
The Impact of European Structural Funds on Economic
Growth: The Importance of Institutions

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Biographic Note

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Abstract

In recent years, the European Commission, along with Member States (MS), has established a multiannual framework for the European Union (EU) funds, with the objective of revitalizing the EU economy and fostering greater coordination between the national policies of each MS and EU policies. Currently, the EU cohesion policy which covers the European Social Fund, the European Regional Development Fund and the Cohesion Fund, represents the largest component of the EU budget. However, and notwithstanding the EU's efforts, there are still economic and social disparities across European regions. Bearing in mind these premises, the impact of these funds has been analysed from many different standpoints. Thus, this study contributes to the existing literature by analysing whether the quality of institutions influences the impact of the EU funds on the economic growth of the recipient countries. For pursuing such endeavour, we resort to the Generalized Method of Moments estimation technique, for a sample of 25-EU MS and from 1989-1993 to 2007-2013. Furthermore, random effects panel data models with dummy variables are employed to assess whether the model of capitalism followed by each group of countries is a key factor explaining the differences in promoting economic growth. Our main results suggest that the neoclassical growth model is highly accurate in explaining economic growth within the EU context and there is a positive effect of cohesion policy on economic growth. On the other hand, our findings do not confirm the results presented by Ederveen, Groot and Nahuis (2006) that the effectiveness of structural funds depends on "right" institutions. Last but not least, we have also found that belonging to the "Anglo-Saxon", "Nordic" and "North-Western Continental" groups of countries foster more favourable conditions to economic growth in comparison to the "Mediterranean" and "Central and Eastern European" groups.

JEL-codes: C23, D73, O43, O47

Key-words: Corruption, Economic Growth, European Union Funds, Institutions

Resumo

Nos últimos anos, a Comissão Europeia, em conjunto com os Estados-Membros (EM), tem estabelecido um quadro financeiro plurianual para os fundos da União Europeia (UE), com o objetivo de revitalizar a economia europeia e promover uma maior coordenação das políticas nacionais de cada EM e das políticas da UE. Atualmente, a política de coesão da UE, que abrange o Fundo Social Europeu, o Fundo Europeu de Desenvolvimento Regional e o Fundo de Coesão, representa a maior componente do orçamento da UE. No entanto, e apesar dos esforços da UE, as disparidades económicas e sociais entre as regiões do espaço europeu continuam a subsistir. Tendo em conta esta evidência, o impacto dos fundos da UE no crescimento económico tem vindo a ser analisado de diferentes pontos de vista. Assim, este estudo contribui para a literatura existente, pois analisa se a qualidade das instituições influencia o impacto dos fundos da UE no crescimento económico dos países beneficiários. Para tal, recorreremos a técnicas de estimação pelo Método dos Momentos Generalizado, para uma amostra de 25 EM da UE e para o período de 1989-1993 a 2007-2013. São ainda estimados modelos em painel de efeitos aleatórios com variáveis binárias, com o intuito de avaliar se o modelo de capitalismo seguido por cada grupo de países é um fator determinante na explicação das diferenças no crescimento económico de cada EM. Os nossos resultados sugerem que o modelo de crescimento neoclássico é preciso na explicação do crescimento económico dentro do contexto da UE e que existe um efeito positivo da política de coesão no crescimento económico. Por outro lado, os nossos resultados não confirmam as conclusões apresentadas por Ederveen, Groot e Nahuis (2006), de que a eficácia dos fundos estruturais depende de instituições “certas”. Por último, também constatámos que pertencer aos grupos de países “Anglo-Saxónico”, “Nórdico” e “Norte-Occidental Continental” permite a existência de condições mais favoráveis ao crescimento económico, em comparação com os grupos “Mediterrâneo” e “Europa Central e Oriental”.

Códigos-JEL: C23, D73, O43, O47

Palavras-chave: Corrupção, Crescimento Económico, Fundos da União Europeia, Instituições

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List of Acronyms

CAP	Common Agricultural Policy
CEE	Central and Eastern European
CF	Cohesion Fund
CPI	Corruption Perceptions Index
DOC	Diversity of Capitalism
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EAGGF	European Agricultural Guidance and Guarantee Fund
EC	European Commission
ECU	European Currency Unit
EEC	European Economic Community
EMFF	European Maritime and Fisheries Fund
EMU	Economic and Monetary Union
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
EU	European Union
EUA	European Units of Account
EUR	Euro
FE	Fixed Effects
GDP	Gross Domestic Product
GLS	Generalized Least Squares
GMM	Generalized Method of Moments
GNI	Gross National Income
LSDV	Least Squares with Dummy Variables
MS	Member State(s)
NUTS	Nomenclature of Territorial Units for Statistics
OBB	Operating Budgetary Balance
OLS	Ordinary Least Squares
R&D	Research and Development
SEA	Single European Act
SME	Small and Medium-sized Enterprise
TSLS	Two-Stage Least Squares
WGI	Worldwide Governance Indicators

“Make men work together show them that beyond their differences and geographical boundaries there lies a common interest.”

Jean Monnet

Chapter 1. Introduction

The European Commission (EC), along with Member States (MS), establishes a multi-annual financial framework for the European Union (EU) funds, with the objective of revitalizing the EU economy and fostering greater coordination between the national policies of each MS and EU policies in order to make the market integration of EU more feasible and improve wellbeing of EU citizens (Becker, Egger & von Ehrlich, 2018). According to Melecký (2018), the so-called European Structural and Investment Funds (ESIF) are fundamental instruments of the EU cohesion policy to promote *“a harmonious, balanced and sustainable development of economic activities, a high level of employment and of social protection, (...) a high degree of competitiveness and convergence of economic performance, a high level of protection and improvement of the quality of the environment, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among MS”* (EUR-Lex, 1957) and in many EU countries are considered to be the major source of financing investment (European Commission, 2017).

The establishment of the European Economic Community (EEC) in the late 1950s was the first attempt to promote market integration throughout the elimination of all existing barriers to trade at the time. It was considered that the creation of a common market based on free movement of goods, people, services and capital would lead to convergence at the income level and that only some categories of workers may be left out of the convergence process, which justifies why the European Social Fund (ESF) was the first fund to be introduced, in 1958 (Marzinotto, 2012). However, in the 1970s, the common market remained highly fragmented. Therefore, it has been found that the free-market scenario would not be a perfect representation of the European common market (Marzinotto, 2012). For that reason, the EU regional policy was developed by the creation of the European Regional Development Fund (ERDF) in 1975.

Apart from ESF and ERDF, there are other three ESIF, each one pointing towards a specific area: the European Agricultural Guidance and Guarantee Fund (EAGGF)¹ settled

¹ EAGGF was divided by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD) on 1st January 2007 (in <https://stats.oecd.org/glossary/detail.asp?ID=864>, accessed on 26th June 2019).

up to provide financial support for the Common Agricultural Policy (CAP) in 1962, and the European Maritime and Fisheries Fund (EMFF), which contributed to the fishing industry reform; moreover, there is also the Cohesion Fund (CF), introduced in 1994, that aims to support only the poorest EU regions, which means that only regions with a Gross National Income (GNI) *per* inhabitant below 90% of the EU average are eligible to be supported by the CF (Maynou, Saez, Kyriacou & Bacaria, 2014; Gyórfi, Molnár, Reszkető & Váradi, 2016).

Since the introduction of the ERDF, the scope, as well as the number of eligible funds, have increased. In quantitative terms, it is possible to realise the following: in 1975, the expenditure on structural policies was EUR 375 million – 6,2% of the EU budget – whereas, in 2007, it was EUR 45,5 billion – 34,9% of the EU budget (Bähr, 2008). Currently, the ERDF budget for the period 2014-2020 exceeds EUR 250 billion – more than 40% of the EU budget.² Consequently, the EU cohesion policy (also known as regional policy), which covers the programmes supported by the ESF, ERDF and CF (European Commission, 2017) has become the largest component of EU budget (Caldas, Dollery, & Marques, 2018). As a matter of fact, since the late 1980s, the number of funds supporting the EU cohesion policy has more than doubled (Farole, Rodríguez-Pose & Storper, 2011).

Bearing in mind the impressive ESIF amount, the impact of these funds has been analysed from many different standpoints and it seems impossible to identify a correct theory to evaluate the impact of EU cohesion policy (Melecký, 2018). Besides, the results obtained concerning the EU cohesion policy impact do not seem conclusive (Maynou *et al.*, 2014). Some authors have found a positive impact of the cohesion funds on economic growth (Mohl & Hagen, 2010; Maynou *et al.*, 2014; Gagliardi & Percoco, 2016; Becker *et al.*, 2018), particularly in regions covered by the Convergence Objective. Other authors have not found any significant (or weakly positive) effect of cohesion funds in promoting economic growth (Ederveen, Groot & Nahuis, 2006; Dall’erba & Le Gallo, 2008), or even a positive, but not statistically significant, impact of EU cohesion policy on economic growth (Mohl & Hagen, 2008). From another perspective, some authors have shown that the impact of the EU funds on economic growth depends heavily on conditional factors related to the aid recipient countries (Ederveen *et al.*, 2006; Bähr, 2008). According to Startienė, Dumciuvienė, and Stundziene (2015), the effect of EU aid on economic growth is negative in countries with poor institutional quality. In general, the low quality of the government creates difficulties on

² In <https://cohesiondata.ec.europa.eu/overview>, accessed on 11th March 2018.

promoting economic development and reduces the impact of public investment, including programmes co-financed by EU funds (European Commission, 2017). Bähr (2008) found that there is a significantly positive effect of EU cohesion policy on economic growth when the structural funds are influenced by a decentralized structure of the recipient country. Moreover, and following the institutional factors which enhance the effectiveness of the EU cohesion policy, Ederveen *et al.* (2006) figured out that the quality of institutions in terms of corruption, inflation controlling, openness, central government savings and quality of governance also improve the impact of EU funds on economic growth.

Since there seems to be no consensus within the literature about the impact of EU funds, our major interest herein seeks to contribute to this topic by answering the following questions: Is the quality of institutions influencing the impact of the ESIF on economic growth of the recipient countries? If yes, should the EU re-design its cohesion policy in order to build good institutions? Or, is the convergence between countries just possible when there will only be “right institutions”?³ Therefore, this dissertation aims at investigating these questions through the analysis of the effectiveness of EU cohesion policy when combined with the quality of institutions.

In spite of the existence of different theoretical strands approaching economic growth (classical, Keynesian, neoclassical, endogenous growth, evolutionary and so on) and of several growth models (for example, and just for the neoclassical approach: Solow, 1956; Romer, 1986, 1990; Lucas, 1988), for the purpose of the present dissertation, we have decided to adopt the augmented Solow (1956) model, suggested by Mankiw, Romer and Weil (1992), because it seems the most suitable model describing the European economic growth (Ederveen *et al.*, 2006).

Following Ederveen *et al.* (2006) and Bähr (2008), we will modify the Mankiw *et al.* (1992) model in order to analyse the impact of the institutions of each MS on the effectiveness of the EU cohesion policy. To measure the European aid, we will restrict the analysis to the ESIF related to EU cohesion policy (*i.e.* ERDF, EAFRD/EAGGF and CF, excluding ESF because of the lack of information), using data on the historic EU payments by MS, covering the programmatic periods from 1989-1993 through 2007-2013. The institutional quality of each MS is evaluated by the average of the Corruption Perceptions Index (CPI),

³ The concept of “right institutions” was introduced by Ederveen *et al.* (2006).

per programmatic programme. The remaining variables of the data set are based on the available data at the Penn World Table and the World Development Indicators.

Using the data set aforementioned, we will proceed with estimating three Generalized Method of Moments (GMM) in first differences models. Firstly, we will estimate a Basic model following the Mankiw *et al.* (1992) approach. Secondly, we will include in the model, the variable measuring the European aid as well as a conditioning factor described by the interaction term of CPI with the regional funds' variable (Augmented model). Finally, we will evaluate the coefficient estimates regarding the Restricted model, which does not include in the model the conditioning factor.

Additionally, and following the Diversity of Capitalism (DOC) approach,⁴ we will estimate five random effects panel data models employing dummy variables. According to Farkas (2019), five models of capitalism may be pinpointed in the EU: the “Nordic” (Denmark, Finland and Sweden), the “Anglo-Saxon” (Ireland and the United Kingdom), the “North-Western Continental” (Austria, Belgium, France, Germany, Luxembourg and the Netherlands), the “Mediterranean” (Cyprus, Greece, Italy, Malta, Portugal and Spain) and the “Central and Eastern European” (CEE) (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia). Bearing in mind the Farkas (2019) classification, we will exclude one different dummy variable representing one type of capitalism (“by default”) for each regression and thereafter we will compare the results in order to understand whether the model of capitalism followed by each group is an important factor explaining the differences in promoting economic growth.

The remainder of this dissertation is structured as follows. After the introduction, the next Chapter details the determinants of economic growth with a focus on the relationship between economic growth and EU aid. Chapter 3 introduces the methodology, through the presentation of the different econometric specifications, and describes the data employed. The main results of the empirical results are discussed in Chapter 4. The findings and conclusions, as well as limitations of the research and future work clues, are presented in Chapter 5.

⁴ The DOC approach is a vital modern concept in economics and political science. It refers primarily to comparative studies. Taking this into account, the DOC approach (Amable, 2003) is a concept which defines the differences between the types of capitalism as well as the differences between the institutional arrangements of the countries that belong to a certain type of capitalism. Amable (2003) has distinguished five types of capitalism: Anglo-Saxon (market-based) capitalism, Continental capitalism, Nordic or Scandinavian (social-democratic) capitalism, Mediterranean (South European) capitalism and Asian capitalism.

Chapter 2. The Impact of European Union Funds on Economic Growth: A Literature Review

2.1. Determinants of Economic Growth

The reasons behind the differences in standards of living over time and space have long been of interest to many economists (Snowdon & Vane, 1997). In this light, one of the questions that the theory of economic growth seeks to answer is whether we should expect the convergence *per capita* income levels between different economies or not (Romer, 1994). Looking at the history of the modern economic growth theory, we find that the new theories contain important elements provided by classical economists, such as Smith (1776), Ricardo (1817), Ramsey (1928) and Schumpeter (1934). According to Barro and Sala-i-Martin (2004), these economists provided key elements for the recent theories of economic growth, namely equilibrium dynamics, interaction between diminishing returns to scale and physical and human capital accumulation, as well as between *per capita* income and population growth, incentives for technological progress by the monopoly powers, effects on technological progress caused by the investment in human capital, creation of new goods and new methods of production, among others.

The endogenous growth theory also known as the new theory of economic growth has been developing since the mid-1980s (Barro & Sala-i-Martin, 2004). This theory has sought to provide insights regarding the mechanisms that lead to the long-term dynamics of advanced economies in order to help design policies that would make a significant difference on the long-term economic growth (see Crafts, 1996). According to Jones (1995a, 1995b), the endogenous growth literature focus on the prediction that there will be permanent effects on the long-run rate of economic growth if there are permanent changes in variables influenced by government policies [*e.g.* Research and Development (R&D) subsidies].

Prior to the emergence of seminal works related to endogenous growth theory by authors, such as Romer (1986, 1990), Lucas (1988) and Rebelo (1991), the theoretical thought concerning the determinants of economic growth was based on the prediction of the classical growth theory that increasing the factors of production, namely labour and capital, under the condition of no technological change, would increase the output. In his classic paper, Solow (1957) took a step forward in terms of changing the aforementioned paradigm by showing that most of *per capita* output growth in the United States is due to changes in productivity and technology. To reach this outcome, Solow resorted to estimates of United

States technological change using data from 1909 to 1949 and he figured out that around 85% of the real *per capita* growth was a result of technological change or productivity and only 15% was a consequence of increasing capital *per worker* (Snowdon & Vane, 1997). However, with respect to the nature and source of technological change, it was identified that an important part of measuring economic growth was left unexplained by the Solow's model. This so-called "Solow residual" represents the growth of total factor productivity or in a simple way "*a sort of measure of our ignorance about the causes of economic growth*" (Abramovitz, 1956, p. 11).

Unconvinced with the exogenous nature attributed by the neoclassical scholars, pioneers of the new theory of economic growth have reasserted the importance of capital accumulation and proposed different possibilities of endogenizing the technological change, for example by focusing on the role of human capital (Snowdon & Vane, 1997). According to Romer (1994), there are two explanations for the emerging of these new theories. The first explanation is linked to the convergence controversy and the second concerns the scholars' efforts to replace the model of perfect competition at the aggregate-level. In relation to the previous explanation, the author defends that this controversy "*captures only part of what endogenous growth has been all about*" (Romer, 1994, p. 11); it means that economists can be satisfied with neoclassical models if they would consider that market incentives and government policies have no impact on technological change. On the other hand, the second explanation suggests that technological change arises from what people effectively do and many firms have sufficient market power to not operate as price-takers.

For these reasons, within the early models (endogenous), Romer (1986) and Lucas (1988) focused on the accumulation of physical and human capital, respectively, as an important source of economic growth. Romer (1986), using the concept of learning by doing, introduced by Arrow (1962), presented a model which reveals that a larger accumulation of physical capital would experience faster growth. In these models, productivity is influenced by experience and investments in capital and, through a mechanism of knowledge spillovers, the learning by one producer may increase the learning of other producers (Barro & Sala-i-Martin, 2004). From another perspective, Lucas (1988) states that the source of economic growth is the (positive) externality of learning.

Given that the key feature of endogenous-growth models is that there are no diminishing returns to scale, the simplest production function in the literature with these

characteristics is the AK-function (Barro & Sala-i-Martin, 2004).⁵ Mathematically, this function is represented by $Y = AK$, where $A > 0$ and embodies the technology level whereas K reflects the level of capital. Assuming that K is a broad concept, which includes human capital, the idea of diminishing returns to scale seems to be more realistic than considering that K is only the accumulation of physical capital (Barro & Sala-i-Martin, 2004). In this line, Romer (1990) was the first contributing for endogenous growth modelling through a R&D-based model grounded on the neoclassical model with technological change, augmented in order to explain the origin of technological change endogenously. According to Romer (1990), the positive implication of this model is that there is a proportional relationship between a larger stock of human capital and faster economic growth.

Although the considerations of Romer (1990) are theoretically suitable, Jones (1995a) provided evidence against the positive relation amid the technological change rate and the amount of labour engaged within the R&D sector. Following his empirical estimates for United States data, it is possible to point out that the impact of increasing permanently the investment rate on the economic growth rate is at most between eight to ten years, far away of affecting economic growth forever. In fact, increasing the quantity of labour allocated to R&D, through the number of engineers or scientists, is not correlated with a permanent rise in the productivity growth rate (Barro & Sala-i-Martin, 2004). Furthermore, and analysing the 40 years before the publication of the article, the author found that there were no economic growth rates proportional to the level of R&D. According to Dall'Erba and Fang (2015), this is the “empirical paradox” of endogenous growth theory.

Bearing in mind the literature and relating it with the impact of the EU funds on economic growth, it may well be distinguished three theoretical approaches: the traditional approach, the endogenous growth theory and the new economic geography (Dall'Erba & Fang, 2015). The first strand is the neoclassical growth theory (Swan, 1956; Solow, 1956, 1957) and it assumes decreasing returns to capital and exogenous technological change. Within this framework, regions having access to the same technology and with the same characteristics in terms of savings rate, depreciation rate and population growth rate would converge (Swan, 1956; Solow, 1956, 1957). According to Mohl and Hagen (2010), economic integration may lead to equal access to technology, which by itself promotes income convergence. The second strand, *i.e.* the endogenous growth theory (Romer, 1986; Lucas, 1988;

⁵ According to Barro and Sala-i-Martin (2004), the first economist using an AK-type production function was Neumann (1945).

Romer, 1990) has constant or increasing returns to capital (Barro & Sala-i-Martin, 2004) and endogenous technological change. From this perspective, the cohesion policy may have a long-term impact on economic growth whether it promotes R&D and investments in human capital (Mohl & Hagen, 2010). It also assumes that investments in the public sector lead to an increase in the marginal output in the private sector (Dall’Erba & Fang, 2015). The third strand, namely, the new economic geography (Krugman, 1991) stems from the fact that neither the neoclassical nor the endogenous are sufficiently clear as regards the type of capital, which is financed by public aid. Moreover, one-third of EU structural funds finance transport infrastructure and, consequently, it affects economic growth in recipient MS as a result of transport costs reduction (Dall’Erba & Fang, 2015). According to Krugman (1991), a “core-periphery” spatial pattern is the result of a reduction in transport costs, which means that there is a concentration of industry in “core” regions because of higher demand, while the agricultural sector tends to be in the “periphery”.⁶ Therefore, economic integration may lead to economic disparities and regional policy can only lead to economic convergence under certain conditions (Mohl & Hagen, 2010). Moreover, Krugman (1991) sustains the relevance of international trade theory, a specific area of new economic geography, where country governments’ boundaries and actions play a key role in determining the location and spatial distribution of productive activities.

2.2. European Structural and Investment Funds and Economic Growth Policy

Since the creation of the EEC through the Treaty of Rome in 1957,⁷ the EU has several founding principles that were established with the objective of reducing economic and social disparities across EU states and regions (Piattoni & Polverari, 2016; Caldas *et al.*, 2018). Given the regional imbalances that characterized the EU in 1950, the preamble of the Treaty of Rome affirmed the commitment of the signatory states on “*strengthen the unity of their economies and to ensure their harmonious development by reducing the differences existing between the various regions and the backwardness of the less-favoured regions*” (EUR-Lex, 1957). Furthermore, due to neoclassical theory predictions, it was expected that economic integration and the

⁶ In other words, increasing returns to scale industries tend to be located in the “core” areas, whereas constant returns to scale industries are mainly located in the “periphery” areas (Mohl & Hagen, 2010).

⁷ The Treaty on the Functioning of the EU also known as Treaty of Rome was signed by Belgium, France, Italy, Luxembourg, the Netherlands and West Germany on 25th March 1957.

establishment of a common market based on the elimination of all barriers to trade would lead to economic convergence and that only some categories of workers would be excluded from the convergence process, which justifies why the ESF was the first fund to be introduced in 1958 (Marzinotto, 2012).

Despite the founding principles of reducing disparities among EU regions and the early introduction of the ESF, regional funds were not introduced with the Treaty of Rome because the idea of creating a common regional policy was considered politically discordant, unnecessary and ambitious at the time (Piattoni & Polverari, 2016). According to Manzella and Mendez (2009), it is possible to highlight three main reasons for the approach to EU regional policy had remained so vague and unclear when the EEC was founded. The first concerns the fact that it was still largely a nationally emerging area and this policy was politically sensitive since it addressed issues related to the relationship between the public and private sectors as well as to the territorial arrangements of the state.⁸ The second reason was the excessive optimistic feeling of the EEC founder-states that economic integration and the creation of inter-regional trade would lead to reducing disparities across regions. The last reason was the great expectation that the World Bank, founded in 1944, had the capacity of boosting the dynamics of economic growth in the backward-regions.

Even though these impediments have not been modified for about 20 years (Piattoni & Polverari, 2016), the inadequacy of the decisions made within the Treaty of Rome in relation to regional policy soon became evident. As a matter of fact, the organisation of the “Conference on Regional Economics” in 1961 landmarks the first initiative towards the establishment of a common regional policy (Manzella & Mendez, 2009). However, the formation of the Directorate-General for Regional Policy in 1968 was the clear sign of the interest in this issue by the EEC initiatives (Manzella & Mendez, 2009).

According to Marzinotto (2012), in the 1970s, the European common market remained highly fragmented thus, it was concluded that the free market scenario would not be a perfect representation of the European common market. In addition, the 1970s oil crisis persuaded governments at the national level to coordinate their actions in order to deal with the world petroleum shortages. Moreover, the accession of rich countries, such as Denmark, the United Kingdom and Ireland in 1973, accentuated regional disparities between regions

⁸ Since the early 1950s, there were important signs of progress regarding regional policy. Good examples are the established British and American practices as well as the Italian and French policy initiatives (Manzella & Mendez, 2009).

(Piattoni & Polverari, 2016). On those grounds, the EU regional policy was developed by the creation of the ERDF in 1975.⁹ Initially, the ERDF budget was too modest to play a key role, 1,3 billion European Units of Account (EUA) – around 5% of the total EU budget – for the period between 1975 and 1978 (Manzella & Mendez, 2009; Piattoni & Polverari, 2016). Following the words of Manzella and Mendez (2009, p. 10), the “*institutionalisation of a truly European regional policy was, therefore, far from attained*”.

Before the first major revision of the Treaty of Rome through the Single European Act (SEA) of 1987, two minor reforms were carried out. In 1979, the EU members agreed a 50% increase in the ERDF budget in response to the possibility of growing regional disparities due to Greece’s accession (Piattoni & Polverari, 2016).¹⁰ In 1984, financial resources supporting the ERDF budget were progressively increasing and were allocated based on a new system of indicative (minimum and maximum) quotas instead of the old system of fixed quotas (Piattoni & Polverari, 2016). Furthermore, the Community has given greater autonomy to the EC within the project selection process in order to independently decide in which regions should be supported by EU aid (Manzella & Mendez, 2009).

A “new” era for the EU regional policy has begun when the SEA introduced the concept “cohesion” for the first time (Manzella & Mendez, 2009). It was confirmed the policy goal of promoting the “*overall harmonious development*” in order to “*strengthening economic and social cohesion*” by “*reducing disparities between the various regions and the backwardness of the least-favoured regions*” (EUR-Lex, 1987, article 130a). This new approach implemented four basic principles with the purpose of underpinning the policy implementation within the 1989-1993 programmatic period. According to the European Commission (1998), the four principles were: (i) concentration – the EU aid should be focused on a limited number of priority objectives; (ii) partnership – the EC should work with national, regional and local authorities in order to identify fine-tuning approaches and monitor the progress of EU support; (iii) programming – the EU aid should be based on multiannual frameworks; and, additionally, (iv) the ESIF should be a complement of MS’ expenditure (and should not be used to replace national funds). Table 1 presents the five objectives of the EU aid between 1989 and 1993, based on these principles.

⁹ According to Piattoni and Polverari (2016), the main objective of the ERDF was to financially support the development of industry and infrastructure at the time. Moreover, it has also shifted the focus of interest from countries to regions (Marzinotto, 2012).

¹⁰ Greece is EU member since 1st January 1981.

Table 1. Objectives for ESIF and total spending *per fund*, 1989–1993

Objective, 1988-1993		Fund(s) involved			
		ESF	ERDF	EAGGF	
1	Development of the least prosperous regions	64%	✓	✓	✓
2	Regions hit by industrial decline	9%	✓	✓	
3	Combating long-term unemployment		✓		
4	Employment path-ways for young people	10%	✓		
5	(a) Adaptation of agricultural structures				✓
	(b) Development of rural areas	9,2%	✓	✓	✓
#	16 Community initiatives ¹	7,8%	✓	✓	
Total² (ECU billion 1994 prices)			20,00	30,10	11,30

Source: made by authors, based on European Commission (1998), pp. 20, 22 and European Commission (2008), pp. 8–13. *Notes:* ¹ Interreg, Euroform, Now, Horizon, Leader, Resider, Rechar, Retex, Renaval, Konver, Regis, Envireg, Regen, Prisma, Telematique and Stride. ² Plus, other instruments: 1,218 ECU billion (2%). Represents around 25% of the EU budget and 0,3% of the total EU GDP.

The funding provided to Objective 1 during the period 1989-1993 was ECU 43,8 billion – 64% of the total – and the main beneficiaries' countries were Spain, Italy, Portugal, Greece and Ireland (European Commission, 2008).¹¹ Focussing on areas covered by Objective 2, it is possible to realise that ECU 6,1 billion – 9% of the total EU budget – was allocated to the ESF and the ERDF; and, of the total investment amount, 55,1% was spent to support Small and Medium-sized Enterprises (SMEs) on productive processes (European Commission, 2008). According to the European Commission (2008), the 1989-1993 multi-annual programme enabled to narrow the gap by 3 percentage points in Gross Domestic Product (GDP) *per capita* between Objective 1 regions and the EU-12 average, creating 600.000 new jobs in Greece, Ireland, Portugal and Spain, and assisting 470.000 SMEs.

In 1992, the European Council decided to allocate almost ECU 153 billion for the period 1994-1999 – close to the double amount compared with the previous programmatic period (European Commission, 1998, 2008). This decision was a result of the Maastricht Treaty approval in February 1992, which introduced the Economic and Monetary Union (EMU) and reinforced the EU Cohesion policy as the EU's main objective (Manzella & Mendez, 2009; Piattoni & Polverari, 2016). The Maastricht Treaty also extended the role of the EC concerning cohesion policy and created a new instrument (*i.e.* the CF) geared towards co-financing infrastructure projects in countries whose GNI *per* inhabitant was below 90%

¹¹ The main recipient was Spain, which received ECU 10,2 billion with 57,7% of the population living within Objective 1 regions (European Commission, 2008).

of the EU average and helping these countries in fulfilling the convergence criteria of EMU (Manzella & Mendez, 2009; Fiaschi, Lavezzi & Parenti, 2011). According to Marzinotto (2012), nowadays' arrangement of EU cohesion policy is the result of the enlargement of the EU to Greece, Portugal and Spain.

Table 2 shows that the Objectives for the period programmatic 1994-1999 were slightly amended. While Objective 1 and 2 remained practically unaltered, the new Objective 3 merged the previous Objectives 3 and 4, incorporating the notion of “integration” of those who were vulnerable in the labour market.

Table 2. Objectives for ESIF and total spending *per fund*, 1994–1999

Objective, 1994-1999		Fund(s) involved					
		ESF	ERDF	EAGGF	FIFG ³	CF	
1	Development of the least prosperous regions	67,5%	✓	✓	✓	✓	✓
2	Adapting regions of industrial decline	5,8%	✓	✓			
3	Combating long-term unemployment and facilitating the integration into working life of young people and of persons exposed to exclusion from the labour market, promotion of equal employment opportunities for men and women	9,5%	✓				
4	Facilitating the adaptation of the workforce to changes in production		✓				
5	(a) Speeding up the restructuring of agriculture and fisheries	8,1%			✓	✓	
	(b) Furthering the development of rural areas		✓	✓	✓		
6	Assisting the development of sparsely populated areas	0,4%	✓	✓	✓	✓	
#	13 Community initiatives ¹	8,7%	✓	✓	✓		
Total² (ECU billion at 1994 prices)			42,00	71,50	22,10	2,70	15,00

Source: made by authors, based on European Commission (1998), pp. 23–25, 40 and European Commission (2008), pp. 14–17. *Notes:* ¹ Adapt, Empleo, Interreg II, Leader, Regis II, Rechar II, Resider II, Retex, Konver, Textil Portugal, Pyme, Urban and Pesca. ² Represents one third of the EU budget and 0,4% of the total EU GDP. ³ FIFG was in force from 1994 to 2006.

The new Objective 4 reflects the new ESF direction with the established Maastricht Treaty that an objective should be related to the adaptation of workers to change in production processes (Piattoni & Polverari, 2016). Objective 5a added to the previous one the importance of modernising the fisheries sector, whereas the Objective 5b remained more or less the same. Following the enlargement of the EU to Sweden and Finland,¹² Objective 6

¹² Sweden and Finland are EU members since 1st January 1995.

was introduced to develop Nordic regions with low population density (Manzella & Mendez, 2009; Fiaschi *et al.*, 2011; Piattoni & Polverari, 2016). Moreover, the Financial Instrument for Fisheries Guidance (FIFG) was set up to support financially the Objective 5a. The funding provided under Objective 1 from 1994 to 1999 covered 24,6% of the EU population – 97,7 million inhabitants – and accounted for 68% of the EU budget (European Commission, 2008).¹³ As reported by the European Commission (2008), the effect of the 1994-1999 multiannual programme on GDP in real terms was an additional impact on GDP growth of 4,7% in Portugal, 3,9% in Germany, 2,8% in Ireland and 2,2% in Greece; and, besides that, 700.000 jobs were created within Objective 1 regions and supported 800.000 SMEs as well as built and modernized 35.948 kilometres of road.

Despite the apparently good results from the previous programmatic period, a new reform was carried out with the goal of supporting the EU's enlargement to CEE countries and their introduction into the EMU. The commitment of the EU regarding the accession of CEE countries was considered a more serious challenge in comparison to the previous enlargements because only one applicant country, namely Slovenia had a GDP *per capita* approximately 70% of the EU average (Piattoni & Polverari, 2016). It means that almost the whole territory of the applicant countries was eligible to be supported by the Objective 1 aid. Furthermore, the economic circumstances at the time were also an important factor that triggered the reform because there was an increase of the concern with unemployment as well as EU's pressures for fiscal consolidation in part related to the introduction of the Euro (Manzella & Mendez, 2009).

In order to address these challenges, the EC has outlined the “Agenda 2000” communication wherein set out four main targets covering the 2000-2006 programmatic period.¹⁴ The first target was to increase the efficiency and concentration of support throughout the reduction in the number of Objectives but also in the number of Community initiatives (see Table 3). The second target was the decentralization of responsibility to national-level in terms of programme management, monitoring and control, while the third target was to simplify and make less detailed the required content for the programmes. The fourth target was to strengthen the control and effectiveness of expenditure. Thus, a detailed and

¹³ According to the European Commission (2008), 41% of the investment allocated to Objective 1 was used to support businesses and 29,8% on building infrastructure.

¹⁴ According to Manzella and Mendez (2009). For more detailed information about the “Agenda 2000” communication, see <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:51997DC2000>, accessed on 19th March 2019.

comprehensive *ex-ante*, mid-term, and *ex-post* evaluations were introduced as well as the so-called n+2 rule – requiring the commitment of fund spending within two years. A “performance reserve” was also created, in which 4% of the allocation to each MS should be retained and awarded to those whose performance was considered successful (Manzella & Mendez, 2009; Piattoni & Polverari, 2016).

Table 3. Objectives for ESIF and total spending *per fund*, 2000–2006

	Objective, 2000-2006		Fund(s) involved				
			ESF	ERDF	EAGGF	FIFG ³	CF
1	Promoting the development and structural adjustment of regions whose development is lagging behind	71,6%	✓	✓	✓	✓	✓
2	Supporting the economic and social conversion of areas facing structural difficulties	9,6%	✓	✓			
3	Supporting the adaptation and modernisation of policies and systems of education, training and employment	10,3%	✓				
#	4 Community initiatives ¹	8,5%	✓	✓	✓		
Total² (EUR billion) at current prices			45,63	97,60	19,83	2,95	20,18

Source: made by authors, based on European Commission (2008), pp. 18–21 and Varga and in 't Veld (2011), p. 648. *Notes:* ¹ Interreg III, Urban II, Equal and Leader+. ² Represents one third of the EU budget and 0,4% of the total EU GDP. ³ FIFG was in force from 1994 to 2006.

During the 2000-2006 period programmatic, about EUR 149,2 billion was provided by ESF, ERDF, EAGGF and FIFG, while about EUR 25,4 billion was financed by CF under Objective 1 (European Commission, 2008). Regarding Objective 2, 15,2% of the EU population has benefited from EUR 22,5 billion of funding – 9,6% of the total EU budget (European Commission, 2008). As stated by the European Commission (2008), Objective 1 funding created around 570.000 jobs – about 160.000 in the new MS – whereas Objective 2 funding created 730.000.

The most challenging enlargement of the EU since its establishment was when 10 countries with relatively low-income levels joined the EU, in 2004.¹⁵ Moreover, years later, the accession of low-income countries such as Bulgaria and Romania further amplified the concern among the old MS that the budgetary resources would be transferred from the richest MS to the new MS (Manzella & Mendez, 2009).¹⁶ As a matter of fact, the *per capita* income

¹⁵ Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia are EU members since 1st May 2004.

¹⁶ Bulgaria and Romania are EU member since 1st January 2007.

in Luxembourg was seven times higher than in Romania at the time whereas, at the regional level, the gap was even bigger: Inner London was considered the richest region with 290% of EU-27 average in terms of GDP *per capita* while the poorest regions was Nord-Est, located in Romania, with only 23% (European Commission, 2008). This scenario politically divided the EU debate into two blocks: on the one hand, MS that argued for a spending increase on cohesion policy; on the other side, those MS which were not in accord with increases in their contribution to the EU budget (Piattoni & Polverari, 2016).

Inevitably, a new reform was needed to absorb these latest challenges. In early 2004, and after a long dialogue, the EC presented its reform proposals to implement during the 2007-2013 programmatic period. Nonetheless, only two years later, within an interinstitutional agreement, the EU decided the allocation of budgetary resources made available for supporting EU cohesion policy.¹⁷ At 2004 prices, the EU has established that, from the community budget, EUR 308 billion would be allocated to cohesion policy – 35,7% of the EU budget. According to Piattoni and Polverari (2016), it represented the highest amount employed within cohesion policy expenditure since its creation, but as a percentage of total EU-27 GDP embodied a decrease in comparison to the previous programmatic period. Indeed, the funds made available within the 2000-2006 programmatic period were 0,4% of the total EU-26 GDP while for 2007-2013 represented 0,38% of the total EU-27 GDP (European Commission, 2008).

As we can see in Table 4, the Objectives were revised and simplified. In this sense, the three new Objectives were Convergence, Regional Competitiveness and Employment, and European Territorial Cooperation. The Convergence Objective foresaw the reduction of disparities between regions as well as the incentive to economic growth and employment within the most backward EU regions. Regions whose GDP *per capita* was less than 75% of the EU-27 average were eligible to be aided under Objective 1 and MS with a GNI less than 90% of EU-27 average were eligible to be supported by CF, under Objective 1 (European Commission, 2010). The Regional Competitiveness and Employment Objective had as priority the promotion of competitiveness through job creation in order to make the recipient regions more attractive for the investment while the European Territorial Cooperation Objective covered the whole territory of EU and aimed to stimulate the cross-border and regional level cooperation. Moreover, and notwithstanding that Interreg has been included in

¹⁷ See Annex I: Financial Framework 2007-2013 (in [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006Q0614\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006Q0614(01)), accessed on 20th March 2019)

part in the new Objective for European Territorial Cooperation, Community initiatives were abandoned (Manzella & Mendez, 2009).

Table 4. Objectives for ESIF and total spending *per fund*, 2007–2013

Objective, 2007-2013		Fund(s) involved			
		ESF	ERDF	CF	
1	Convergence	81,5%	✓	✓	✓
2	Regional competitiveness and employment	16%	✓	✓	
3	European territorial cooperation	2,5%		✓	
Total¹ (EUR billion at current prices)		76,00	198,80	69,60	

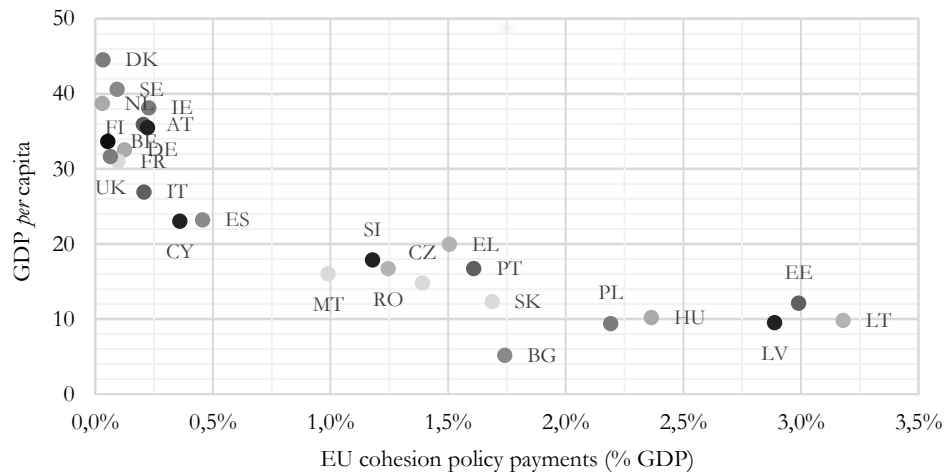
Source: made by authors, based on Piattoni and Polverari (2016), pp. 28–29 and European Commission (2010), p. 202. *Notes:* ¹ represents 35,7% of EU budget and 0,38% of the total EU GDP.

In the course of 2007-2013 programmatic period, it was allocated around EUR 282 billion to the Convergence Objective while EUR 55 billion and EUR 7,8 billion was aimed at financing Objective 2 and Objective 3, respectively (European Commission, 2010). An independent *ex-post* evaluation published by the European Commission indicates that 2007-2013 EU cohesion policy created one million new jobs (equivalent to one-third of the overall EU net job creation) and for each euro spent on cohesion policy is estimated a return of EUR 2,74 on GDP, which means EUR 1 trillion of additional GDP by 2023. Moreover, and according to the same *ex-post* evaluation, 121.400 start-ups and 400.000 SMEs were financially supported by EU funding and it was built 4.900 kilometres of road.¹⁸ Although the results are not so enthusiastic than the previous programmes, it is important to highlight that the effects of EU cohesion policy were weaker during the financial and economic crisis (Becker *et al.*, 2018).

Looking at the main beneficiaries of EU cohesion policy for the 2007-2013 period (see Figure 1) and considering that the EU founding members display the highest GDP *per capita*, we realise that the new MS, which joined the EU during this period, have received much more (as a percentage of GDP) in comparison to the older MS. Only Portugal and Greece are part of this group of countries, which have most benefited with the EU regional policy. On the other hand, the net contributors for the EU budget, as a whole, during the programmatic period 2007-2013 were Belgium, Denmark, Germany, France, Italy, Luxembourg, the Netherlands, Austria, Finland, Sweden and the United Kingdom (see Figure 2).

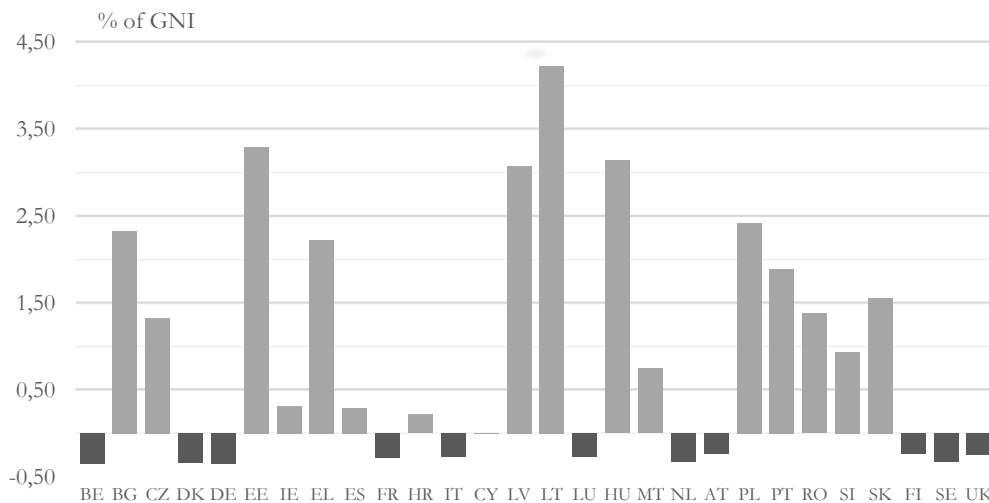
¹⁸ In https://ec.europa.eu/regional_policy/en/newsroom/news/2016/10/10-07-2016-cohesion-policy-at-work-key-outcomes-of-eu-investments-in-2007-2013, accessed on 25th April 2019.

Figure 1. Relation between EU payments and GDP per capita, 2007–2013



Source: authors' calculations, based on data provided by the European Commission and AMECO Database. Notes: values for the variables in the scatter plot correspond to the average for the time spanning 2007-2013. GDP per capita is expressed in thousand euros. Croatia is excluded from the analysis.

Figure 2. Operating Budgetary Balance (OBB), 2007–2013



Source: made by the authors, based on data available at http://ec.europa.eu/budget/graphs/revenue_expenditure.html (accessed on 18th June 2019). Notes: operating budgetary balance is used to calculate the difference between the total allocated expenditure and the total national contribution of a MS (excluding administrative expenditure).

In 2014, the last reform of EU regional policy took place once again during a period of changes. On the one hand, the approval of the Treaty of Lisbon changed the legal framework of the EU's functioning.¹⁹ On the other hand, the economic crisis that began in the United States had an enormous impact on the EU's economy, especially in the eurozone.²⁰

¹⁹ Signed on 13th December 2007, the Treaty of Lisbon amends both Treaty of Rome (1957) and the Maastricht Treaty (1993).

²⁰ MS such as Greece, Ireland, Portugal and Spain suffered severely because of the economic crisis. The unemployment rate within these countries has risen to an unprecedented level after the economic recession.

This scenario has divided, one more time, the debate on possible solutions to face the crisis into two blocks: those MS in favour of austerity policies and those MS favouring the existence of solidarity among the EU members (Piattoni & Polverari, 2016). Hence, and still during the 2007-2013 programmatic period, the European Council approved a document named “Europe 2020”, outlining the EU strategy to enhance economic growth and create more jobs for the next 10 years. In this context, five main targets were defined for the EU: employment; economic growth through the R&D investment; combat climate changes and increase the percentage of renewable energy; education; reduce poverty and promote social inclusion.

In 2011, the negotiations on new regulations to delineate the multiannual financial framework for the 2014-2020 period programmatic started and, since the beginning, it seemed difficult to reach an agreement among the parties because of the successive tensions (Piattoni & Polverari, 2016). Despite the pressures and disagreements between the parties, the new framework for EU cohesion policy was finally approved at the end of 2013. The premises created by this new framework introduced the concept of ESIF and defined 11 thematic objectives for the 2014-2020 EU cohesion policy (see Table 5).

Table 5. Objectives for ESIF, 2014–2020

	Objective, 2014-2020	Fund(s) involved		
		ESF	ERDF	CF
1	Strengthening research, technological development and innovation	✓	✓	
2	Enhancing access to, and use and quality of, information and communication technologies	✓	✓	
3	Enhancing the competitiveness of SMEs	✓	✓	
4	Supporting the shift towards a low-carbon economy	✓	✓	✓
5	Promoting climate change adaptation, risk prevention and management		✓	✓
6	Preserving and protecting the environment and promoting resource efficiency		✓	✓
7	Promoting sustainable transport and improving network infrastructures		✓	✓
8	Promoting sustainable and quality employment and supporting labour mobility	✓	✓	
9	Promoting social inclusion, combating poverty and any discrimination	✓	✓	
10	Investing in education, training and lifelong learning	✓	✓	
11	Improving the efficiency of public administration	✓	✓	✓

Source: made by authors, based on the website https://ec.europa.eu/regional_policy/en/policy/how/priorities (accessed on 21st March 2019). *Notes:* the available budget for EU cohesion policy is EUR 351,8 billion.

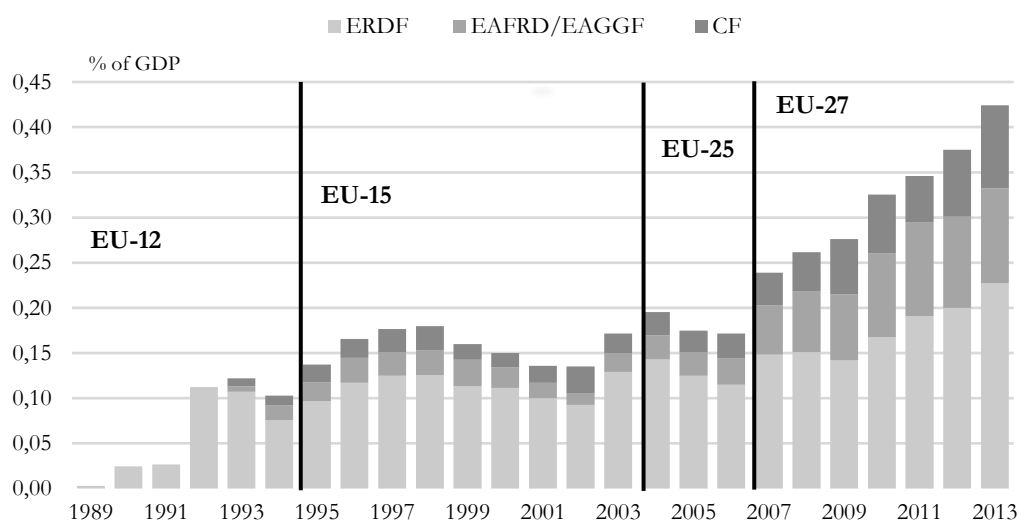
According to Piattoni and Polverari (2016), the concentration principle, which guided the policy implementation of the 1989-1993 programmatic period is touching now on three axes: (i) resources concentration – 70% of EU cohesion funding is focused on the most backward regions; (ii) effort concentration – the highest amount of financial support is granted to the first four principles; and (iii) spending concentration – funding is allocated to each programme and should be spent within three years (in compliance to N+3 rule).

On the other hand, and as a matter of fact, it is expected that each euro of 2014-2020 EU cohesion policy investment will raise EUR 2,37 of Baltic countries GDP between 2014 and 2030, on average (European Commission, 2016).²¹

In order to summarise the evolution of EU cohesion policy expenditure, Figure 3 displays the EU payments under the EU cohesion policy, as a percentage of EU GDP.

As shown in Figure 3, below, the EU expenditure on cohesion policy has been increasing over the years. Indeed, this growth pattern is even more visible in the 2007-2013 programmatic period, which marked the period after the EU enlargement to 10 new countries with relatively low-income levels.

Figure 3. Total EU cohesion policy payments (% of GDP), 1989–2013



Source: authors' calculations, based on data provided by the European Commission and AMECO Database. *Notes:* ESF is excluded from the analysis due to lack of information for the period 1989-2000.

²¹ EUR 2,51 of GDP in Estonia, EUR 2,33 in Lithuania and EUR 2,27 in Latvia.

2.2.1. The Impact of European Union's Structural and Cohesion Funds on Economic Growth

Studying the impact of the cohesion funds on economic growth is particularly important since the main goal of these funds is to enhance the economic growth of the recipient countries and promote the convergence among MS through the allocation of budgetary resources to the least developed EU regions. Therefore, the impact of EU funds on economic growth has been analysed from different standpoints, and it seems impossible to identify the best theory to evaluate the effect of this kind of policy on economic growth (Melecký, 2018). Besides, the results obtained regarding the impact of EU cohesion policy do not seem to be conclusive (Maynou *et al.*, 2014).

Many scholars, within the current literature on economic growth, have been focused on the issue of convergence process among regions or countries (Mohl & Hagen, 2010). According to Barro and Sala-i-Martin (2004), there are two concepts of convergence in the literature: on the one side, there is a β -convergence process if a low-income economy tends to grow faster than a higher-income economy since this implies that the previous economy will catch-up the latter in terms of *per capita* income or output; on the other side, there is a σ -convergence process if the dispersion in levels of *per capita* income or output tends to decrease over a group of countries or regions. In other words, the β -convergence process concerns the negative relation among GDP *per capita* growth rate and the initial GDP *per capita* while the σ -convergence process considers the reduction of the standard deviation of the logarithm of GDP *per capita* or, alternatively, the reduction of the coefficient of variation of GDP *per capita* (Barro & Sala-i-Martin, 2004).

Ederveen, Gorter, de Mooij and Nahuis (2003) were pioneers in analysing the impact of structural funds on β - and σ -convergence processes. The authors, evaluating the β -convergence through the relation between the logarithm of GDP *per capita* in 1977 and the GDP *per capita* growth rate between 1977 and 1996 for 12 MS, concluded that there was a “*clear pattern of catching-up*” (p. 15) – convergence rate around 2,1% *per year*. Regarding σ -convergence, the authors found that there was a decrease in the standard deviation of the logarithm of GDP *per capita* from 0,282 in 1977 to 0,246 in 1996.

Even though Cappelen, Castellacci, Fagerberg and Verspagen (2003) studied the effect of EU aid on the convergence process almost for the same period that Ederveen *et al.*

(2003) analysed,²² their findings were different. According to Cappelen *et al.* (2003), there was no convergence between 1980 and 1990. But, after 1990, it seems that the regional dispersion decreased. Nevertheless, and excluding Greece, Portugal and Spain from the sample, the results changed, and it appears to exist a trend for divergence instead of convergence. In this regard, the authors concluded that the β -convergence process was a result of the enlargement to the three new MS and that, on average, there was no convergence within countries – α -convergence. Bearing in mind the results of Cappelen *et al.* (2003), it is important to point out the significance of the time period concerned. Puigcerver-Peñalver (2007) also had differences in the estimated values of β -convergence between two different periods. The author results suggest that there was a more significant impact on the convergence of Objective 1 regions for the 1989-1993 programmatic period than for 1994-1999.

Dall’erba and Le Gallo (2008) also investigated the influence of structural funds on the convergence process among 145 EU regions, over the period 1989-1999. The authors found a significant convergence across the EU regions. However, the results indicate that there was no influence of the funds on the convergence process. Moreover, the authors concluded that it is necessary to evaluate the impact of structural funds on economic growth looking at spatial spillover effects in order to obtain reliable results. Boldrin and Canova (2001) are also sceptical concerning the effectiveness of the EU aid. The authors inclusively stated that EU policies are “*not justifiable in the light of current economic knowledge*” (Boldrin & Canova, 2001, p. 242). Maynou *et al.* (2014), studying the economic convergence only within the eurozone from 1990 to 2010,²³ reached conclusions akin to Ederveen *et al.* (2003). The authors found a statistically significant convergence process among the eurozone MS – convergence rate around -1,6% *per year*. Moreover, they pointed out that whether the EU regional aid increases by 1%, the GDP *per* inhabitant raises by 0,9% within the MS of the eurozone.

From a country-level perspective, Antunes and Soukiazis (2006) examined the convergence process in Portugal through a panel data approach for 30 NUTS-III Portuguese regions, covering the period 1991-2000. The authors compared if the convergence process between the “littoral” and “interior” areas of Portugal was influenced by structural funds, namely the ERDF. The conclusions drawn were that, although the “littoral” areas received a larger amount of EU aid, the “interior” areas denoted a slightly faster convergence process

²² Between 1980 and 1997.

²³ The data set employed corresponds to 174 NUTS-II regions for 17 EU countries.

than the “littoral” areas. Bondonio and Greenbaum (2006), resorting a unique firm-specific data set regarding the northern and central Italy across the period 1995-1998, calculated the effect of the incentives to Objective 2 areas on employment. The authors’ outcomes indicate that the most successful aid programs were those that rewarded businesses that had shown the most promising economic results in the years before the incentive.

Albeit there is a vast literature in the convergence process field, there are also a group of scholars focused on analysing the effects of EU incentives on regional economic growth. Fratesi and Rodríguez-Pose (2004), concentrating on the EU funds allocations to Objective 1 regions of 10 MS for the period 1989-1999, concluded that, although the attention of EU aid is to develop infrastructure and investment on business processes, the impact of these policies is not significant. Esposti and Bussoletti (2008) achieved the same results and stated that there is a quite limited impact on the economic growth of Objective 1 funding. From another point of view, Fratesi and Rodríguez-Pose (2004) also referred that agricultural support from the EU budget has only temporary effects on growth whereas the investment in human capital has medium-run positive returns. Still analysing the impact of Objective 1 funds, Fiaschi *et al.* (2011), through the analysis of three programmatic periods (*i.e.* 1975-1988, 1989-1993 and 1994-1999), found that there was a positive effect of EU aid on productivity growth, but the effect was mainly driven by the funds targeted to Objective 1 regions. Another outcome of the authors was that funds devoted to Objective 2 had a negative influence on the growth rate of productivity while the effect of the remaining Objectives was not significant.

According to Mohl and Hagen (2008), their results showed that structural funds had a positive, but not statistically significant, influence on the three-year average of the GDP growth rate for a data set of 122 NUTS-I and NUTS-II EU regions between 1995-2005. In another study, Mohl and Hagen (2010) presented evidence for the period 2000-2006 confirming that there is a strong dependency between the effectiveness of the EU aid and the Objective analysed. The authors identified that, despite funds allocated to Objective 1, 2 and 3 together did not have a positive and significant effect on the regional growth rates, funds devoted only to Objective 1 promoted economic growth within the EU regions. Studying the same period as Mohl and Hagen (2010), Gagliardi and Percoco (2016) pointed out that the EU cohesion policy contributed to economic growth in backward regions. Nonetheless, the authors showed that the positive influence of EU aid on regional growth is mainly a consequence of the good performance of rural areas close to urban conglomerates.

More recently, Becker *et al.* (2018) studied the impact of EU cohesion policy during four programmatic periods (*i.e.* 1989-1993, 1994-1999, 2000-2006, 2007-2013) focusing on the EU funds allocations to Objective 1 regions. The evidence gathered confirmed the results of Mohl and Hagen (2008) in which the effects of EU aid on economic growth are positive but not long-lived. Furthermore, the authors also highlighted that MS severely influenced by the economic crisis denoted a weaker effect of EU aid on growth (Becker *et al.*, 2018). Likewise, Crescenzi and Guida (2014), evaluating the period 1995-2013, also concluded that EU cohesion policy has a positive influence on economic growth. The authors found that the positive impact of EU funding is more pronounced in the most socio-economically advanced areas. The next table systematizes the empirical studies focused on assessing the impact of ESIF on economic growth and convergence in EU regions.

Table 6. Empirical studies assessing the impact of ESIF in promoting economic growth and convergence among European regions

Author(s)	Main goal(s)	Sample / Time period	Methodology	Dependent variable	Explanatory variables	Main conclusion(s)
Antunes and Soukiazis (2006)	Twofold purpose: assess whether there is any difference in the convergence process between “littoral” and “interior” regions in Portugal and analyse the relevance of ERDF as conditioning factor influencing the convergence process in Portugal	30 NUTS-III regions in Portugal 1991–2000	Panel: Pooled Ordinary Least Squares (OLS), FE, random effects	GDP <i>per capita</i>	Lagged GDP <i>per capita</i> and ERDF <i>per capita</i>	Conclusions reveal that the distinction between the “littoral” and “interior” regions is important to evaluate the convergence process in Portugal. Besides, structural funds have a positive (significant) impact only in the “littoral” Portuguese areas
Becker <i>et al.</i> (2018)	The paper addresses the regional effect of EU cohesion policy across four programmatic periods, with a focus on the evaluation of the impact of EU transfers during the financial and economic crisis	187 NUTS-II regions in 1989–1993 (EU-12), 209 NUTS-II regions in 1994–1999, 253 NUTS-II regions in 2000–2006 and 2007–2013 (EU-25) 1989–2013	Regression discontinuity design [Two-Stage Least Squares (TSLS) approach]	GDP <i>per capita</i> growth, employment growth, investment <i>per</i> GDP, public investment <i>per</i> GDP	Treatment variable: the binary Objective 1 treatment indicator variable Control variables: government-bond-yield spreads	The main results reveal that: i) effects of Objective 1 on economic growth are positive but, not long-lasting; ii) losing Objective 1 status has a negative impact on growth; iii) effects are weaker during the financial and economic crisis when compared with the years before
Boldrin and Canova (2001)	Analyse whether there is either divergence or convergence among EU regions	185 NUTS-II regions (EU-15) 1980–1996	Not specified	GDP <i>per capita</i> or labour productivity	Initial GDP <i>per capita</i>	Results show that, although some exceptions, there is neither convergence nor divergence among EU regions

Bondonio and Greenbaum (2006)	Address, through evidence from EU Objective 2 areas and a unique firm-specific data, the question: Do business investment incentives promote employment in declining Italian areas?	All the provinces in each Italian region comprising at least one Objective 2 areas 1995–1998, includes a pre-treatment period (1986–1991)	Panel: FE	Aggregated employment level and province-sector 1995–1998 employment growth	Treatment assignment, industrial sector, region, set of pre-intervention province-specific observed characteristics, specific pre-intervention (1986–91) employment growth, linear treatment variable expressing the incentives paid	Results indicate that business investment incentives allocated in Italy between 1995 and 1998 did not generate more jobs. On the other hand, incentives, which were allocated to the most promising economic performance production activities before the programme intervention, were more successful
Cappelen <i>et al.</i> (2003)	Twofold purpose: analyse the dispersion of regional GDP <i>per capita</i> and examine the influence of EU regional support (objective 1, 2 and 5b) in growth performance	105 EU regions 1980–1997	Panel: Pooled OLS, FE	GDP <i>per capita</i>	Initial level of GDP <i>per capita</i> , complementary variables (physical infrastructure, population density, industrial structure, long-term unemployment, R&D intensity) and EU regional support	Conclusions drawn show that structural funds allotment had a positive impact on the growth performance of EU regions and that regional dispersion decreased after 1990. However, it tends to slightly increase if Portugal, Spain and Greece are excluded from the sample

Crescenzi and Guia (2014)	The paper examines how growth is affected by EU cohesion policy and its relationship with EU agricultural and rural policies	139 NUTS-I/II regions (EU-12) 1995–2013	Panel: FE	GDP <i>per capita</i> growth	Initial GDP <i>per capita</i> , EU policy (regional policy, rural development policy and CAP), territorial conditioning factors (<i>e.g.</i> Social Filter Index), policy interactions, spatially lagged variables, control variables	The main results are: (i) EU regional policy payments are strongly linked to regional growth rates; (ii) rural development expenditure is not explicitly associated with regional growth; (iii) the impact of EU cohesion policy is stronger in the most endowed regions and when is accompanied by CAP funds
Dall'erba and Le Gallo (2008)	Evaluate the impact of structural funds on the convergence process of EU regions	206 NUTS-II regions (EU-15) 1989–1999	Cross-section: Spatial lag model with IV	GDP <i>per capita</i> growth	Initial GDP, share of industry and agriculture, unemployment, infrastructure, structural funds transfers, dummy for core and peripheral EU regions	Findings suggest that significant convergence took place among EU regions. Nonetheless, there was no evidence that structural fund had an impact on it
Ederveen <i>et al.</i> (2003)	Twofold purpose: assess the impact of ERDF on economic growth and evaluate α - and β -convergence process within MS. There are also other types of analysis	EU-12 1960–1995	Panel: Pooled OLS	GDP <i>per capita</i> growth	Investment in physical capital, investment in human capital, population growth, ERDF support (% of GDP), openness of the economy	Results indicate that EU cohesion support has not increased economic growth performance. Moreover, there is evidence of convergence process among EU countries – a rate of convergence at 2,1%/year (β -convergence) as well as among EU regions (α -convergence)

Esposti and Bussoletti (2008)	Evaluate the impact of Objective 1 funds on regional growth convergence within EU through the estimation of an augmented conditional convergence econometric model	206 NUTS-II regions (EU-15) 1989–2000	Panel: first-differences GMM and system-GMM	GDP growth <i>per</i> labour unit	Initial GDP, all structural funds payments (under Objective 1), human capital, R&D, infrastructure endowment	Conclusions bear that there is a quite limited impact on the economic growth of structural funds (under Objective 1 policy). Moreover, this impact might become even negative (for example, whether it is clustered regions by country)
Fiaschi <i>et al.</i> (2011)	Analyse the impact of EU regional policy on the productivity growth of European regions	173 NUTS-II regions (EU-12) 1980–2002	Cross-section and pooled regression with dummies: Spatial-Durbin model and OLS	Growth rate of <i>per</i> worker gross value added of a region	Ratio of funds on regional gross value added with a three-year lag, initial productivity level, investment rate, employment growth rate, other control variables	The main conclusions are: (i) although structural and cohesion funds have an overall positive effect on productivity growth, Objective 1 funds are the main force of this outcome; (ii) the positive effects are more pronounced for 1989–1993 and 1994–1999 programmatic periods; and (iii) there is the robustness of these results in the presence of potential endogeneity of funds and also of spatial effects
Gagliardi and Percoco (2016)	Evaluation of the impact of EU cohesion policy on the economic performance of the most backwardness regions (under Objective 1)	1233 NUTS-III regions (EU-25) 1999–2008, focusing on the 2000–2006 programmatic period	Regression discontinuity design (IV estimation)	GDP growth	Population density, employment rate, secondary education, tertiary education, treatment variable	Findings indicate that EU cohesion funds promoted economic growth. Nonetheless, this effect is a result of the successful performance of rural areas, near to urban conglomerates. Thus, favourable geography and suburbanisation of the countryside are creating new opportunities

Maynou <i>et al.</i> (2014)	Ascertain the impact of structural and cohesion funds on eurozone economic convergence through a spatiotemporal econometric model	174 NUTS-II regions (EU-17) 1990–2010	Panel: FE	GDP <i>per capita</i> growth	Lagged GDP <i>per capita</i> Regional level: gross fixed capital formation, several unemployment and employment rate variables, percentage of secondary and university students Country level: external balance, public expenditure rate, structural and cohesion funds (ERDF, EAGGF, FIFG and CF), exports and imports rate	The evidence indicates that funds positively contributed to the economic growth of the beneficiary EU regions as well as to the economic convergence among eurozone countries. In fact, if regional funds raise 1%, the growth rate of the eurozone countries increases by 0,9%
Mohl and Hagen (2008)	Investigation of the impact of EU cohesion policy on economic growth through the application of a relatively recent econometric approach	122 NUTS-I/II regions (EU-15) 1995–2005	Panel: generalised propensity score approach (OLS and logit model)	GDP <i>per capita</i> growth	Ratio of structural funds to nominal GDP, lagged GDP <i>per capita</i> , several employment and unemployment variables, population density	Conclusions drawn reveal that structural funds had a positive, however, not significantly, influence on EU regions growth rates. Therefore, it is not crucial the “dose” of structural funds payments that a region benefits

Mohl and Hagen (2010)	The paper presents an evaluation exercise of the impact on economic growth of EU structural funds, controlling the problem of endogeneity and the spatial spillovers effects	126 NUTS-I/II regions (EU-15) 1995–2006	Panel: two-step system GMM and spatial lag model	GDP <i>per capita</i> growth	Initial GDP <i>per capita</i> , investment, population growth, technical progress, Objective 1 payments <i>per capita</i> and Objective 1+2+3 payments <i>per capita</i>	Notwithstanding results show that the total amount of payments under Objectives 1, 2 and 3 did not exhibit a positive and significant effect on the economic growth of EU regions, funds allocated to only Objective 1 areas promoted regional economic growth
Puigcerver-Peñalver (2007)	Estimate the impact of EU cohesion policy on the growth rate of eligible regions under Objective 1	41 NUTS-II regions (EU-10) 1989–1999	Panel: Pooled OLS, Fixed Effects (FE)	GDP <i>per capita</i> growth	Initial GDP <i>per capita</i> , public and private national expenditure and several structural funds variables	Overall, there is evidence that structural funds had a significant impact on economic growth. However, the effect was more explicit in 1989–1999 than 1994–1999
Rodríguez-Pose and Fratesi (2004)	The paper ascertains, using cross-sectional and panel data analyses, the fulfilling of the greater economic and social cohesion EU objective through the examination of the EU support allotment to different development axes within Objective 1	152 NUTS-II regions (EU-8) 1989–1999	Cross-section and panel: OLS, pooled Generalized Least Squares (GLS), FE	GDP <i>per capita</i> growth	Initial GDP, structural funds transfers (broken down by 4 main axes of ERDF), several employment rates	Findings show the failure of European policies in delivering greater economic and social cohesion. Both development funds on infrastructure (higher concentration) and on business support (lesser extent) had no significant returns to commitments. Nevertheless, and despite agriculture support had a short-term positive impact on growth rates, only investments in education and human capital sustained a medium-term positive (significant) effects on growth

2.2.2. Factors Influencing the Effectiveness of European Union Funds

Bearing in mind the heterogeneity of EU regions concerning their characteristics, there is an emerging stream within the literature that explores the impact of EU aid on economic growth, considering other factors which might influence the effectiveness of the EU policy. In this light, Crescenzi and Giua (2016) identified three main factors, which have been driving recent studies in this area: (i) institutional and structural factors; (ii) the interplay between EU regional policy and other policies (at EU level or national level); and (iii) political circumstances.

As regards to the first factor mentioned, Bähr (2008) stressed the importance of the degree of decentralization in MS in order to enhance the effectiveness of EU cohesion policy. Moreover, Ederveen *et al.* (2006) found that the quality of institutions in terms of corrupt practices, inflation controlling, openness, governance quality improves the impact of EU funds on economic growth. According to Freitas, Pereira and Torres (2003), the rule of law, bureaucracy and risk of expropriation by the government are also important factors affecting the impact of EU aid. The geographical position of the recipient MS is as well crucial (Antunes & Soukiazis, 2006; Gagliardi & Percoco, 2016).

As regards to the second factor, Crescenzi and Giua (2016) highlighted that the cohesion policy should be related to other EU policies. The authors gave the example of CAP and its spatial implications in favouring some regions with agricultural characteristics, excluding the less-developed areas. In another study, apart from Crescenzi and Giua (2014) achieved results which pointed to the positive effect of EU cohesion policy on growth, the authors also found that this impact is magnified when there is a complement between cohesion policy and funding from other policies.

As regards to the latter factor, there is no doubt that the political situation is a determinant that seriously influences the allocation of the funds and in turn the effectiveness of EU aid (Crescenzi & Giua, 2016). For instance, the Spanish government has allocated funding to support infrastructure towards core regions rather than favouring the most backward areas (Crescenzi & Giua, 2016). Moreover, Mohl and Hagen (2010) declared that there is a propensity for the policy-makers to finance projects with EU funds because of political motives instead of financing those that are economically efficient. According to the authors, funds allocated to Objective 2 and 3 are the most prone to these political actions since there

is more room for arbitrary evaluations. Zubek and Henning (2016) also underlined the importance of political knowledge for the effective implementation of EU cohesion policy.

From another point of view, Ederveen *et al.* (2003) proposed three reasons that may be undermining the effectiveness of EU cohesion policy. First, it could exist the tendency for local governments to approve projects not necessarily effective in stimulating economic convergence with the purpose of meeting the EU criteria for the funding allocation (“rent-seeking”). Second, local governments may be distributing funds to low-productivity projects in order to maintain the eligibility of being supported by the EU cohesion policy (“moral hazard”).²⁴ Finally, the authors’ findings suggested that for each euro of EU cohesion aid the national governments spend less 17 cents of their budget to support regional economic convergence (“crowding out”).

Although it is important to understand the factors which influence the effectiveness of EU aid in boosting economic growth and convergence among European regions, it is also important to realise to what extent these funds have been absorbed by the recipient countries. Melecký (2018) stressed the existence of a dependency amongst the overall impact of EU funds and the absorption capacity of MS. On the other hand, Kersan-Škabić and Tijanić (2017) highlighted that the capacity to absorb funds is very important to achieve the European integration process. However, and given the importance of high absorption capacities to the EU equilibrium, there is a paucity of literature related to the absorption capacity evaluation of EU funds as well as the adequate conceptual framework to address this topic (Horvat, 2005; Zubek & Henning, 2016; Kersan-Škabić & Tijanić, 2017).

But what does it mean absorption capacity of a country? For Haider (2018, p. 3), a definition can be the “*ability to use additional aid without pronounced inefficiency of public spending and without induced adverse effects*”. In other words, it means in which way a country is competent to spend, efficiently, the financial assistance received. Furthermore, and having in mind the previous definition, identify the maximum absorption capacity of a country is also important to mitigate the risk of diminishing returns to aid and thus reduce the risk of corruption and misgovernment (Haider, 2018). For example, Tosun (2013), analysing the ERDF absorption performance of 25 MS for the 2000-2006 programmatic period, concluded that the absorption rates of EU funds are higher for new MS than for older MS. In contrast, Melecký (2018), focusing the analysis in the transport sector for the 2007-2013 programmatic period, noticed

²⁴ Beugelsdijk and Eijffinger (2005) also studied the problem of moral hazard of EU funds, and they noticed that there are countries not eligible receiving EU funds, which means these funds are thus inefficiently used.

that there is a positive relationship between higher efficiency and lower level of funding, particularly in the group of old MS. In other study, Surubaru (2016), comparing the management of structural funds in Romania and Bulgaria, realised that the variation of absorption capacity is related to political factors such as the administrative capacity and the processes needed to absorb EU funds as well as the existence of little experience in controlling complex and sophisticated funding instruments.

Regarding the determinants affecting the absorption capacity, Haider (2018) identified six constraints that might limit the capacity of beneficiary countries to absorb aid:

- (i) Macroeconomic constraints: scholars have been discussing that large amounts of aid can raise the inflation rate as well as appreciate the real exchange rate and, therefore, lead to the “Dutch disease effect”.²⁵
- (ii) Institutions constraints: according to Horvat (2005), absorption problems arise mostly from institutional factors respecting both EU administration and national administrations. These factors comprise the shortages of administrative capacity to handle high levels of aid and to transform these incentives into credible and reliable policies which seek economic development (Haider, 2018). Besides, transparency and coherence by EC during the allocation process are crucial to overcoming the consequences of the arbitrary funds’ allotment (Horvat, 2005).
- (iii) Human capital constraints: linked to the lack of skilled labour force to manage the aid inflows.
- (iv) Aid delivery constraints: coordination problems between the aid source and the recipient countries as well as the excessive and ambitious objectives imposed by the aid source that undermines the capacity of the recipient country to absorb aid inflows.
- (v) Social and cultural constraints: related to the lack of demand from companies to be supported by government-funded programmes.
- (vi) Sector constraints: problems associated with the own characteristics of the sectors in the economy.

Apart from the aid absorption capacity of EU countries, Acemoglu, Johnson and Robinson (2005) stressed that there are fundamental causes that explain the existence of different levels in economic performance between countries over the world. In this regard,

²⁵ “Dutch disease effect” refers to the negative repercussions that may emerge from peaks in the national currency value.

the authors state that these differences are explained over: (i) economic institutions – how the society is organised, through its institutional arrangements, influences if the economy will prosper or not; (ii) geography – climate may be a conditioning factor of work effort, technology endowment is influenced by geography, and the spatial “disease burden”; and (iii) culture – might be seen as a determinant factor in shaping how the society is organised (Acemoglu *et al.*, 2015).

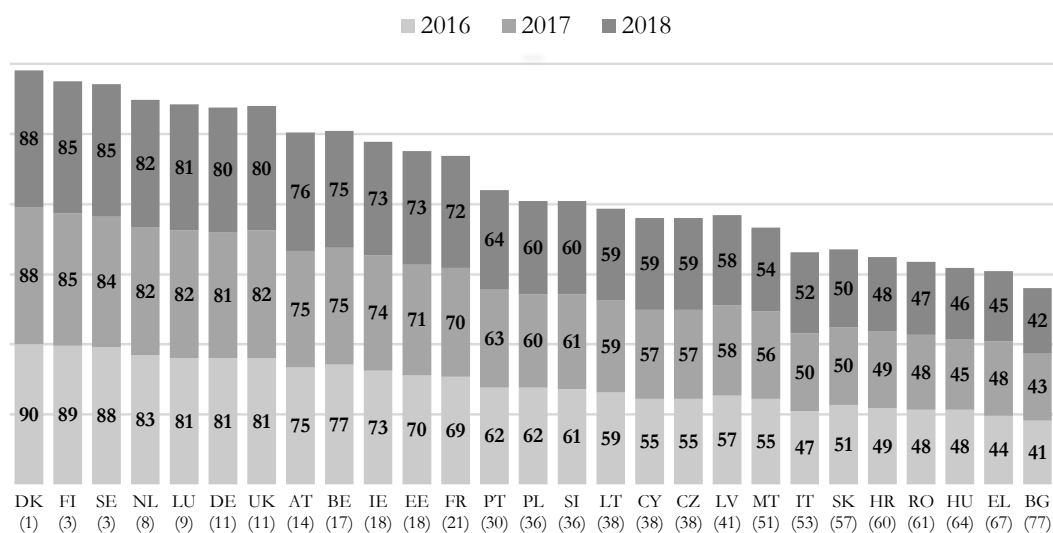
The conclusion that institutions matter for the effectiveness of EU policies is evident from what has already been discussed within previous sections. Moreover, the European Commission (2017) devoted a full chapter in the “Seventh Report on Economic, Social and Territorial Cohesion” for the importance of improving the institutions of EU. Bearing in mind that the quality of governance and institutions vary across the EU (European Commission, 2017), it is necessary to compare these differences regarding the quality of European institutions. The Worldwide Governance Indicators (WGI),²⁶ provided every year by the World Bank, makes this comparison possible. Analysing only the Government Effectiveness Indicator for the EU countries, it is possible to realise that Finland, the Netherlands, Sweden, Denmark and Germany denoted the most effective governance in 2017, while the least effective were Romania, Bulgaria, Greece, Italy and Hungary. However, effective governance does not necessarily mean higher rates of economic growth because in the last years the fastest growing economies in the EU tend to be the less governance effective (European Commission, 2017). β -convergence process in which, *a priori*, a low-income economy tends to grow faster than a higher-income economy, may be an explanation for this contradictory evidence.

The existence of EU common policies stresses also the importance of understanding institutional differences among the MS. From this point of view, the current literature tends to analyse the effectiveness of EU cohesion policy considering the institutional arrangements as a conditional factor. Ederveen *et al.* (2006), exploring this conditional factor through the CPI, reached results suggesting that funds allocated to “good” institutions are more effective than funds devoted to “bad” institutions. The authors also highlighted the obligation of the EU to redesign its regional policy because, in their opinion, funds should be allocated primarily to the creation of “sufficient” quality institutions, and only with these institutions, the funds may be effective for achieving the regional convergence.

²⁶ Available at <https://info.worldbank.org/governance/wgi/>, accessed on 14th June 2019.

Assessing the institutional quality of EU countries through the CPI, it is noticed that there are considerable differences in terms of corruption across Europe, as can be seen in Figure 4. However, the EU is still considered one of the least corrupt regions in the world with eleven MS in the top-20 best performers and three MS in the top-3. Concerning the most corrupt countries in the EU are Bulgaria, Greece and Hungary.

Figure 4. Corruption Perceptions Index (CPI), 2016–2018



Source: Transparency International. Notes: numbers in brackets indicate the country world ranking in 2018.

Chapter 3. Methodology

3.1. Main Estimation Methods and Choice of the Methodology

The recent literature concerning the effectiveness of EU cohesion policy relies on three types of methodological approaches: quantitative, qualitative and mixed. With respect to the latter, Surubaru (2016) compared the implementation performance of EU cohesion policy as well as the absorption capacity of Romania and Bulgaria, combining qualitative interviews and data from a questionnaire filled by selected interviewees. As regards to qualitative approaches, Giordano (2016), employing only semi-structured interviews, examined the regional features of two sparsely populated Spanish and Swedish regions, and a small island in Denmark in order to identify the role of ERDF in contributing to economic development in regions with specific characteristics. However, the extant literature in this field of research usually resorts quantitative methods, although the results reached by these means do not seem conclusive (Maynou *et al.*, 2014), as already discussed in Chapter 2. Indeed, some authors have employed a simple pooled OLS to estimate a panel data model (Ederveen *et al.*, 2003; Antunes & Soukiazis, 2006; Ederveen *et al.*, 2006; Bähr, 2008). Other authors have estimated a panel data with FE models – Least Squares with Dummy Variables (LSDV) estimator (Antunes & Soukiazis, 2006; Puigcerver-Peñalver, 2007) – or with random effects models – GLS estimator (Rodríguez-Pose & Fratesi, 2004; Antunes & Soukiazis, 2006). There are also some authors who have resorted a GMM estimation (Beugelsdijk & Eijffinger, 2005; Esposti & Bussoletti, 2008; Mohl & Hagen, 2010) or a TSLS approach (Dall’erba & Le Gallo, 2008; Becker *et al.*, 2018).

Bearing in mind the purpose of the present study, *i.e.* to assess whether the quality of institutions influences the impact of the EU cohesion policy on economic growth of the recipient countries, we resort a quantitative approach, specifically a panel data estimation using GMM. The panel data option lays on the fact that, unlike cross-sectional and time-series regressions, panel data models give to the researcher, the advantage of analysing a wide array of datapoints, which enables to increase the degrees of freedom and reduce the collinearity among regressors (Hsiao, 2003). Besides, and regarding cross-country growth studies, panel data approaches lead to more successful results than cross-sectional regressions (Islam, 1995) and may bring considerable gains in robustness whenever there is an unobserved heterogeneity (Durlauf, Johnson & Temple, 2005). On the other hand, the GMM-based technique choice is the result of other methods not being able to deal with endogeneity problems

directly (Katsaitis & Doulos, 2009) and to mitigate biases linked with measurement errors (Durlauf *et al.*, 2005). According to Beugelsdijk and Eijffinger (2005), GMM models are more efficient because other models (*e.g.* “FE subperiod”) tend to have a considerable correlation among error terms and explanatory variables.

Arellano and Bond (1991) were the pioneers introducing a GMM estimator in first-differences. In this context, the authors proposed that, after rewriting the first-difference of the dependent variable in order to remove FE, it is possible to generate an error term not correlated with any lagged variable and to employ as valid instruments, the dependent variable and lagged explanatory variables at least two periods. It means that moment restrictions $E[Y_{i,t-s}\Delta v_{i,t}] = 0$ and $E[X_{i,t-s}\Delta v_{i,t}] = 0$ for $t = 3, \dots, T$ and $s \geq 2$ allow to carry out the estimation of GMM in first-differences. In other words, a GMM estimator combines more orthogonality conditions and explores the covariance structure of the perturbations (Beugelsdijk & Eijffinger, 2005).

Nevertheless, Blundell and Bond (1998) showed that GMM estimator in first-differences has weak properties in terms of centricity and efficiency for small samples due to weak correlation among instruments and explanatory variables. In fact, there is a tendency to decrease the accuracy of estimates in first-order autoregressive – AR(1) – models whenever the autocorrelation measure is close to the unit (Esposti & Bussoletti, 2008). Another possible bias is the explanatory variables be highly persistent over time (*e.g.* educational level may affect output with a significant delay) and, hence, lagged levels in first-differences may be weak instruments (Durlauf *et al.*, 2005). Thus, Blundell and Bond (1998) suggested an additional moment restriction wherein first-differences lagged variables can also be used as instruments in level equations: $E[Y_{i,t-1}\Delta v_{i,t}] = 0$ and $E[X_{i,t-1}\Delta v_{i,t}] = 0$ for $t = 3, \dots, T$. This alternative GMM approach which includes the additional moment restriction is the so-called system GMM estimator that is considered more efficient for empirical economic growth models than the GMM estimator in the first-differences (Bond, Hoeffler & Temple, 2001; Esposti & Bussoletti, 2008).

The system GMM estimation can be divided into one- and two-step procedures (Bond *et al.*, 2001; Hwang & Sun, 2018). The difference between the one- and two-step lies in the fact that the latter requires the additional estimation of a weighting matrix while the one-step procedure only needs a robust covariance-variance matrix of the standard errors (Hwang & Sun, 2018). In this view, the two-step procedure has more efficient GMM estimators and improves the related statistical tests (Hwang & Sun, 2018). However, and although

the two-step approach seems to have the most efficient estimator, Bond *et al.* (2001) pointed out that the convergence of the two-step estimator to its asymptotic distribution tends to be relatively slower and in finite samples, it may arise underestimated standard errors. Therefore, the use of a two-step procedure entails a prior cost-benefit comparison (Hwang & Sun, 2018).

3.2. The Augmented Neoclassical Approach and Model Specification

In order to evaluate if the quality of institutions influences the impact of the EU funds on economic growth of the recipient countries, it is followed the growth model proposed by Mankiw *et al.* (1992). In this light, the model of Solow (1956) is augmented by including the accumulation of human capital. According to Mankiw *et al.* (1992) and Islam (1995), extend the Solow model to human capital provides a better performance and fit of the model when confronted with data because it eliminates the high coefficients on other components of the model even whether it is utilized an inaccurate proxy for human capital.

The augmented neoclassical model adopts as production function:²⁷

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta} \quad (3.1)$$

where Y is output; and K , H , A and L are physical capital, human capital, level of technology and labour, respectively. Assuming that s_k is the portion of output invested in physical capital and s_h the portion invested in human capital, the evolution of an economy might be defined by:

$$\begin{aligned} \dot{k}(t) &= s_k y(t) - (n + g + \delta)k(t) \\ \dot{h}(t) &= s_h y(t) - (n + g + \delta)h(t) \end{aligned} \quad (3.2)$$

where y , k and h defines output, physical capital and human capital “*per effective unit of labour*”, respectively (Mankiw *et al.*, 1992, p. 416).²⁸ It is also assumed that a unit of consumption may be transformed without cost into either an additional unit of physical capital or an additional unit of human capital and that $\alpha + \beta < 1$, *i.e.* diminishing returns to both physical and human capital (Mankiw *et al.*, 1992). Considering the previous assumptions and more

²⁷ Whilst, a Cobb-Douglas production function given by $Y(t) = K(t)^\alpha (A(t)L(t))^{1-\alpha}$, $0 < \alpha < 1$ might be representative of Solow’s model.

²⁸ Mathematically, $y = \frac{Y}{AL}$, $k = \frac{K}{AL}$ and $h = \frac{H}{AL}$.

importantly equations in (3.2), an economy converges to the following steady-state level given by:

$$k^* = \left(\frac{s_k^{1-\beta} s_h^\beta}{n + g + \delta} \right)^{\frac{1}{1-\alpha-\beta}} \quad (3.3)$$

$$h^* = \left(\frac{s_k^\alpha s_h^{1-\alpha}}{n + g + \delta} \right)^{\frac{1}{1-\alpha-\beta}}$$

Substituting (3.3) into the production function and taking logarithms, it is obtained:

$$\ln \left[\frac{Y(t)}{L(t)} \right] = \ln A(0) + gt + \frac{\alpha}{1-\alpha-\beta} \ln(s_k) + \frac{\beta}{1-\alpha-\beta} \ln(s_h) - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n + g + \delta) \quad (3.4)$$

In order to estimate the expression (3.4), it is theoretically assumed that gt is a fixed constant since the exogenous rate of technological progress (g) is the same for all countries and t is a fixed number (Islam, 1995). However, this assumption is not possible to be made for $A(0)$ because it “reflects not just technology but resource endowments, climate, institutions, and so on” (Mankiw *et al.*, 1992, pp. 410-411) that hence, it is not uniform across countries. For this reason, it is imposed that $\ln A(0) = \alpha + \varepsilon$ where α is a constant and ε is a random term, represented by the country-specific change. Reformulating the above expression:

$$\ln \left[\frac{Y(t)}{L(t)} \right] = \alpha + \frac{\alpha}{1-\alpha-\beta} \ln(s_k) + \frac{\beta}{1-\alpha-\beta} \ln(s_h) - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n + g + \delta) + \varepsilon \quad (3.5)$$

Taking this into account and rethinking the equation (3.5), a possible panel data econometric specification away from the steady-state behaviour presented above can be:

$$y_{it} = \beta_0 + \beta_1 \ln(y_{0,it}) + \beta_2 \ln(s_{it}) + \beta_3 \ln(hc_{it}) + \beta_3 \ln(n_{it} + g_A + \delta) + \varepsilon_{it} \quad (3.6)$$

where the dependent variable is the annual GDP *per* person employed growth rate (y_{it}); the independent variables are: the initial GDP *per* person employed ($y_{0,it}$), the annual gross domestic savings rate (s_{it}), the annual human capital index (hc_{it}), the annual growth of population rate (n_{it}), the exogenous rate of technological progress (g_A) and the rate of depreciation (δ); the unknown coefficients are $\beta_k, k = 0, \dots, 3$; and the error term is ε_{it} .

Having the equation (3.5) as a benchmark and following the specification suggested by Ederveen *et al.* (2006) to assess if the quality of institutions influences the impact of EU

funds in promoting economic growth, two more explanatory variables are included in the model:

$$y_{it} = \beta_0 + \beta_1 \ln(y_{0,it}) + \beta_2 \ln(s_{it}) + \beta_3 \ln(hc_{it}) + \beta_3 \ln(n_{it} + g_A + \delta) + \beta_4 regf_{it} + \beta_5 cpi_{it} regf_{it} + \varepsilon_{it} \quad (3.7)$$

where $regf_{it}$ represents the annual funds allocated to the regional policy (as a percentage of GDP) and $cpi_{it} regf_{it}$ denotes an interaction term of CPI with the regional funds' expenditure (as employed by, for example, Beugelsdijk & Eijffinger, 2005; Ederveen *et al.*, 2006; Bähr, 2008).

3.3. Description of the Data Set

The empirical approach of the present study relies on a data set taken from several sources. For the purpose of being entirely consistent with the neoclassical growth theory, it is employed the GDP *per* person employed as the dependent variable, although GDP *per capita* growth is more often used within empirical growth work (Esposti & Bussoletti, 2008).

Regarding independent variables, the initial GDP *per* person employed is also introduced in order to assess the growth convergence (Barro & Sala-i-Martin, 2004). A negative coefficient implies that poor economies tend to grow faster than rich economies, which means that there is absolute convergence (Barro & Sala-i-Martin, 2004). Available World Bank data provides the gross domestic savings calculated as GDP less total consumption as well as the annual population growth rate. Despite measures of human capital are considered a discussion topic in growth empirics (Islam, 1995), Penn World Table covers this issue through a human capital index premised on the average of schooling years (see Barro & Lee, 2013) and a rate of returns to education associated with Mincer equation estimates (see Psacharopoulos, 1994).²⁹ On the other hand, many empirical works tend to assume a constant value for $(g_A + \delta)$ (Esposti & Bussoletti, 2008). In the present work, it is taken the assumption originally made by Mankiw *et al.* (1992) and followed by other authors (such as Islam, 1995; Ederveen *et al.*, 2006; Bähr, 2008; Esposti & Bussoletti, 2008) that $(g_A + \delta)$ is the same for all countries and all years and is equal to 0,05.

Data about the historic EU payments is provided by European Commission and refer to four programmatic periods (*i.e.* 1989-1993, 1994-1999, 2000-2006 and 2007-2013)

²⁹ See https://www.rug.nl/ggdc/docs/human_capital_in_pwt_90.pdf, accessed on 18th April 2019.

covering the annual payments under the ERDF, EAFRD/EAGGF and CF.³⁰ Financial data from ESF is excluded from the data set since it is only covered by the last two programmatic periods. The previously mentioned EU payments are later expressed as a fraction of GDP with the aim of weighing the economic capacity of each MS and making evaluations possible.

The variable assessing the quality of EU institutions is based on the CPI, which is an index that scores countries according to the perceived corruption levels among experts, politicians, employers and employees. The CPI ranking exploits a scale from 0 to 100 in which a lower value is related to more corruption and a higher value to corruption lack.

Table 7 gives a detailed description of the data as well as its data source.

Table 7. Summary of variables description and its data source

Variable	Description	Data source
y	The annual GDP <i>per</i> person employed growth rate (expressed as a percentage) ¹	AMECO Database
y_0	Initial GDP <i>per</i> person employed at 2010 constant prices	AMECO Database
s	The annual gross domestic savings (expressed as a percentage of GDP)	World Bank Open Data
hc	The annual human capital index, based on schooling years and returns to education	Penn World Table 9.0
n	The annual population growth rate (expressed as a percentage)	World Bank Open Data
$regf$	The annual EU aid payments at current prices, covering the historic EU payments for ERDF, EAFRD/EAGGF and CF (expressed as a percentage of GDP) ²	European Commission - Directorate-General for Regional and Urban Policy & AMECO Database
cpi	The annual CPI (expressed between 0 and 100) ³	Transparency International
$(g_A + \delta)$	Assumed to be 0,05 for all countries and all years	-

Notes: ¹ an exchange rate is applied to values for non-eurozone members (EUR/national currency unit) and for years before the introduction of the euro (EUR/ECU or national currency unit). ² Financial data, covering the ESF and Interreg programmes (ERDF), is not included. ³ Available data for 1995-2013. It is considered for the missing data (*i.e.* 1989-1994), the value of CPI in 1995.

As regards to the sample of the present study (see Table 8), the database includes all NUTS-II regions of 25 MS, excluding Bulgaria, Croatia and Romania.³¹ Of these, 12 MS (EU-12), which comprise the EEC founding members plus the United Kingdom, Greece, Spain and Portugal, are over the whole period. The EU enlargement to Austria, Finland and Sweden has increased the group of countries (EU-15) receiving financial support from the EU cohesion policy between 1994-1999 and therefore, also the sample in the analysis. For the 2000-2006 programmatic period is already considered into the sample the 10 MS that joined the EU after the so-called Eastern and Western Balkans enlargement (EU-25). Lastly, the analysis for the 2007-2013 programmatic period is limited to 25 MS (EU-25).

³⁰ Available at <https://cohesiondata.ec.europa.eu/>, accessed on 18th April 2019.

³¹ A total of 255 NUTS-II regions.

Table 8. Description of the sample

Programmatic period / <i>t</i>	Countries / <i>i</i>
1989–1993	EU-12 = Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom
1994–1999	EU-15 = EU-12 + Austria, Finland, Sweden
2000–2006	EU-25 = EU-15 + Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia
2007–2013	EU-25

Notes: Bulgaria, Croatia and Romania are not included in the sample.

Following the DOC approach introduced by Amable (2003), and according to Farkas (2019), the sample, described in Table 8, is clustered by type of capitalism (see Table 9). The DOC concept defines differences and similarities in institutional arrangements between countries with the goal of grouping countries into different types of capitalism. Among these differences/similarities are institutional characteristics regarding the level of product market regulation, wage-labour relationship, labour market institutions, financial intermediation, corporate governance, social protection sector, education and knowledge sector (Amable, 2003).

Table 9. Sample clustered by type of capitalism

Type of capitalism	Countries / <i>i</i>
Nordic	Denmark, Finland and Sweden
Anglo-Saxon	Ireland and the United Kingdom
North-Western Continental	Austria, Belgium, France, Germany, Luxembourg and the Netherlands
Mediterranean	Cyprus, Greece, Italy, Malta, Portugal and Spain
CEE	Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia

Source: Farkas (2019), p. 5. *Notes:* Bulgaria, Croatia and Romania are not included.

To ascertain whether the type of capitalism matters, different models are estimated, and results are compared. In the next Chapter, the results of the estimation analysis will be presented.

Chapter 4. Empirical Results

4.1. Evaluating the Impact of European Structural Funds on Economic Growth

Focusing on the economic growth spanning from 1989 to 2013 of EU countries, the estimations for the impact of European Structural Funds in promoting economic growth are presented in Table 11. As discussed previously, a GMM in first differences estimation technique is employed. In order to do so, we firstly estimated a Basic model, which relies on the neoclassical working assumptions of Mankiw *et al.* (1992) (see the first column of Table 11). Then, we estimated the Augmented model introduced by Ederveen *et al.* (2006) as well as the Restricted model that does not consider the interaction term of CPI. Results are presented in the second and third column of Table 11, respectively. The reason why we examine the Restricted model is due to the possible presence of a moderately negative correlation and statistically significant between variables CPI and initial GDP *per person* employed (y_0) as shown in Table 10.

Table 10. Correlation matrix of the model's variables

	<i>y</i>	<i>y</i> ₀	<i>s</i>	<i>hc</i>	<i>n</i>	<i>regf</i>	<i>cpi</i>
<i>y</i>	1						
<i>y</i> ₀	-0,176 (0,000)	1					
<i>s</i>	0,064 (0,151)	0,558 (0,000)	1				
<i>hc</i>	0,085 (0,059)	0,052 (0,245)	0,202 (0,000)	1			
<i>n</i>	0,013 (0,769)	0,044 (0,324)	0,332 (0,000)	-0,108 (0,016)	1		
<i>regf</i>	-0,069 (0,769)	-0,516 (0,000)	-0,218 (0,000)	-0,028 (0,534)	0,074 (0,096)	1	
<i>cpi</i>	-0,042 (0,352)	-0,663 (0,000)	0,419 (0,000)	0,287 (0,000)	-0,045 (0,312)	-0,360 (0,000)	1

Notes: the statistical significance (p-value) is indicated in parentheses. The method resorted for estimating correlations among variables was a Pearson product moment.

Diagnosis tests, provided by Arellano-Bond serial correlation test, indicate that first- and second-order statistic are not statistically significant in Augmented and Restricted models. Hence, in these cases and unlike the Basic model, it is predictable that error terms are serial uncorrelated in levels.

On the other hand, the Sargan test shows that the statistic does not reject its null hypothesis and, therefore, instruments are valid and appropriate (see Table 11).

4.1.1. Estimation Results for All Countries Sample

Estimates obtained regarding the variables of the neoclassical growth model are quite reliable and statistically significant. Thus, the empirical evidence gathered points to the accuracy in explaining economic growth within the EU, through the augmented neoclassical growth predictions proposed by Mankin *et al.* (1992).

Table 11. The impact of EU cohesion policy on economic growth – main empirical results (dependent variable: GDP growth *per* person employed)

	Basic	Augmented	Restricted
Log of initial GDP <i>per</i> person employed	-0,114*** (0,004)	-0,123*** (0,006)	-0,144*** (0,006)
Log of savings rate	0,019*** (0,003)	0,021* (0,012)	0,023** (0,010)
Log of human capital	0,178*** (0,022)	0,174** (0,090)	0,202*** (0,068)
Log of (population growth + 0,05)	-0,003*** (0,0007)	-0,002* (0,001)	-0,002*** (0,0009)
Log of regional funds	–	1,017* (0,634)	0,281 (0,615)
Log of regional funds * CPI	–	-0,013 (0,011)	–
No. countries	25	25	25
No. periods	23	23	23
No. observations	450	450	450
Sargan test	21,458	21,451	21,493
[p-value]	[0,371]	[0,257]	[0,310]
<u>Arellano-Bond serial correlation test</u>			
AR(1)	-2,906	-0,673	-0,280
[p-value]	[0,003]	[0,500]	[0,780]
AR(2)	-2,115	N/A	-0,107
[p-value]	[0,034]	[–]	[0,915]
Robust errors (White period)	Yes	Yes	Yes

Notes: dynamic panel data model estimated by GMM in first-differences under an Arellano-Bond two-step estimation. Instruments specification: dependent variable lagged up to three periods [$@dyn(y,-3)$]. ***, (**) and [*] statistically significant at 1%, (5%) and [10%], respectively. The standard errors of the coefficient estimates are indicated in parentheses.

Nonetheless, the inclusion of the regional funds variable into the model has a positive and slightly statistical relevance impact on economic growth in the Augmented model and a less positive, but no statistically significant in the Restricted model. It means that, although the low statistical significance, the analysis reveals that cohesion policy has contributed to the

economic growth of EU countries. These conclusions are in line with results obtained by several authors, namely Puigcerver-Peñalver (2007), Mohl and Hagen (2008) and Maynou *et al.* (2014), among others.

Considering the conditioning factor described by the interaction term of CPI, there is no statistical evidence that this element is influencing the model. It may be therefore concluded that our findings do not confirm the positive relationship between “right” institutions and the effectiveness of structural funds in promoting economic growth revealed by Ederveen *et al.* (2006).

Recalling the variables related to the neoclassical growth model and bearing in mind that all the coefficients estimates have the predicted signals, the evidence shows a greater capacity of human capital investment in promoting economic growth. There is also a relatively high annual convergence rate of 0,50% amongst EU countries in the Augmented model, assuming that the convergence rate is given by the relation $\beta_1 = -(1 - e^{-\lambda t})$ in accordance with Mankiw *et al.* (1992). In contrast, the coefficient on population growth has a low negative impact on economic growth, which may reveal the stagnation of population growth and the increase of life expectancy in Europe when compared with the rest of the world.³² Moreover, and albeit the possible problem respecting the correlation between the error terms of the Basic model, coefficient estimates obtained for this model are consistent with the results of the Augmented and Restricted models.

4.1.2. Appraising the Impact of European Structural Funds on Economic Growth with Cluster Samples by Type of Capitalism

In order to ascertain the effectiveness of EU structural funds and its relationship with the type of capitalism representative of a specific group of EU countries, we opted to include dummy variables into the Augmented model (see Table 12). From our point of view, this choice is the best option among many others since it ensures a consistent comparative analysis *vis-à-vis* heterogeneous groups of countries.

To appraise this analysis with dummies, we estimated random effects panel data models, after computing the Hausman test. Furthermore, diagnosis tests, based on the Breusch-

³² In <https://www.telegraph.co.uk/news/worldnews/11414064/How-Europe-is-slowly-dying-despite-an-increasing-world-population.html>, accessed on 4th June 2019.

Pagan test, suggest that heteroscedasticity problems did not influence the inferences obtained.

Table 12. The impact of EU cohesion policy on economic growth – empirical results with dummies (dependent variable: GDP growth *per* person employed)

Default (dummy excluded)	Nordic	Anglo-Saxon	North-Western Continental	Mediterranean	CEE
Constant	0,090*** (0,017)	0,093*** (0,017)	0,089*** (0,017)	0,077*** (0,015)	0,064*** (0,016)
Log of initial GDP <i>per</i> person employed	-0,034*** (0,004)	-0,034*** (0,004)	-0,034*** (0,004)	-0,034*** (0,004)	-0,034*** (0,004)
Log of savings rate	0,019*** (0,004)	0,019*** (0,004)	0,019*** (0,004)	0,019*** (0,004)	0,019*** (0,004)
Log of human capital	0,001 (0,010)	0,001 (0,010)	0,001 (0,010)	0,001 (0,010)	0,001 (0,010)
Log of (population growth + 0,05)	-0,002 (0,001)	-0,002 (0,001)	-0,002 (0,001)	-0,002 (0,001)	-0,002 (0,001)
Log of regional funds	0,127 (0,535)	0,127 (0,535)	0,127 (0,535)	0,127 (0,535)	0,127 (0,535)
Log of regional funds * CPI	-0,008 (0,010)	-0,008 (0,010)	-0,008 (0,010)	-0,008 (0,010)	-0,008 (0,010)
<u>Dummy</u>					
• Nordic	–	-0,002 (0,003)	0,001 (0,002)	0,013*** (0,003)	0,026*** (0,005)
• Anglo-Saxon	0,002 (0,003)	–	0,004 (0,003)	0,016*** (0,003)	0,028*** (0,006)
• North-Western Continental	-0,001 (0,002)	-0,004 (0,003)	–	0,012*** (0,003)	0,025*** (0,005)
• Mediterranean	-0,013*** (0,003)	-0,016*** (0,003)	-0,012*** (0,003)	–	0,013** (0,005)
• CEE	-0,026*** (0,005)	-0,028*** (0,006)	-0,025*** (0,005)	-0,013** (0,005)	–
No. countries	25	25	25	25	25
No. periods	24	24	24	24	24
No. observations	475	475	475	475	475
Breusch-Pagan test	0,003 [0,960]	0,003 [0,960]	0,003 [0,960]	0,003 [0,960]	0,003 [0,960]
Mean VIF	8,951	9,303	8,672	8,826	10,755
[Max VIF]	[28,522]	[28,552]	[28,552]	[28,552]	[28,552]
Hausman test	Chi2<0	Chi2<0	9,663	8,497	8,444
[p-value]			[0,209]	[0,291]	[0,295]
RE versus FE	RE	RE	RE	RE	RE

Notes: ***, (**) and [*] statistically significant at 1%, (5%) and [10%], respectively. The standard errors of the coefficient estimates are indicated in parentheses.

Regarding the Variance Impact Factors (VIF) estimates that evaluate in which way the presence of multicollinearity issues in the model are inflating the variance of regression coefficients, the gathered evidence seems to be acceptable as long as it is considered the

assumption that VIF should be less than 10 (Babin, Hair, Anderson & Black, 2014). Despite that the estimated VIF tends to increase with the inclusion of regional funds and interaction term variables, we resorted the Augmented model as our initial framework instead of the Basic model because there are no substantial differences on the coefficient estimates.

As shown in Table 12, five models were estimated. For each one, we excluded one different dummy variable representing one type of capitalism (“by default”) to be possible a comparative analysis among groups.

Analysing the results and although the estimated coefficients regarding the variables of neoclassical growth model indicate the expected signal, there are low levels of statistical significance and the obtained results seem to be underestimated when compared with the estimated coefficients described in Table 11. It seems that employing a random effects panel data technique has this impact on the coefficients obtained. Regardless of the beforementioned facts and given the main goal of this research approach to evaluate in which context belonging to a particular type of capitalism is relatively negative or positive in promoting economic growth, our results point to clear differences within different groups of countries in the EU.

Taking as reference the first column of Table 12, which “by default” excludes the dummy concerning the “Nordic” group of countries, the empirical evidence indicates that, in comparison to this group, belonging to “Mediterranean” or “CEE” groups of countries has a negative and statistically significant impact on economic growth. Based on the same procedure, the results also show that be classified as either “Mediterranean” or “CEE” groups holds a negative effect on economic growth compared to be part of the “Anglo-Saxon” and “North-Western Continental” group (see the second and third column of Table 12, respectively). These relationships are confirmed when dummies concerning “Mediterranean” group, on the one hand, and the “CEE” group, on the other hand, are excluded. In addition, the evidence presented reveals that belonging to the “Anglo-Saxon” group has the greatest positive and statistically significant impact on economic growth in comparison to the “Mediterranean” as well as to the “CEE” group. Regarding the differences among the “Mediterranean” and “CEE” group, it may be concluded that pertaining to the group of countries respecting the type of capitalism “Mediterranean” has a positive effect on economic growth compared to belong the group of “CEE” countries. Thus, the empirical evidence suggests that be part of the “Anglo-Saxon”, “Nordic” and “North-Western

Continental” groups promote more favourable conditions to do exist economic growth in contrast to the “Mediterranean” and “CEE” groups.

In a nutshell, the results obtained confirm the existing heterogeneity across the EU territory and the possibility of clustering different groups of countries in order to assess which group is the most effective in promoting economic growth and which one is the least prone to that. There is, therefore, evidence showing that institutional arrangements matter and EU authorities, being aware of this, should promote policies (or even re-design them) with the aim of building “right” institutions and, consequently, achieve the EU’s main goal of convergence at the income levels.

4.2. Robustness Checks

Aiming to deal with possible issues concerning the variables or the sample employed, several different analyses are carried out in order to validate the statistical inferences previously made as well as to ascertain whether our conclusions are robust when these changes are applied. In other words, we consider different variations of the Augmented model in relation to the time span examined or the variables used with a focus on testing the robustness of our results. The estimations for these different model specifications are presented in Table 13.

The first variation of the model was to investigate how the time period under analysis influences the effect of structural funds on economic growth. For this purpose, we estimated four models representing, each one, a different time interval (*viz.* 1989-1999, 1995-2006, 2000-2006 and 2007-2013).³³ Analysing the results, it has become clear that most of the coefficient estimates that typically explain economic growth hold the expected signals. Furthermore, and although results regarding the impact of regional funds on economic growth are ambiguous, the evidence, for the periods 1995-2006 and 2000-2006, seems to highly confirm the positive effect of EU cohesion policy on growth, especially the analysis for the third programmatic period that also revealed the most consistent results in terms of statistical significance. Nevertheless, results gathered, regarding the periods 1989-1999 and 2007-2013, suggest that there is a negative but non-statistically significant effect of structural funds on economic growth. Focusing the analysis on the interaction term for the last programmatic

³³ There was an effort to divide the analysis by programmatic period. However, only the estimates for the last two programs are consistent. Therefore, we evaluated the results for the first and second programmatic period together with the second period and third programmatic period, respectively.

period, it must be pointed out that, albeit it is not statistically significant, our outcomes show that institutional quality matters for the effectiveness of regional funds in promoting economic growth (see the fifth column of Table 13). However, this result may have been influenced by the economic and financial crisis, which had a tremendous negative impact on the EU economy in general.

Secondly, it is limited the analysis only to ERDF (as performed by several authors) in order to assess whether the results are being biased due to consider several funds together rather than just the ERDF. Examining the empirical evidence described in the sixth column of Table 13, we realise that there are no significant differences in the coefficient estimates compared with the Augmented model results, which include into the analysis in addition to the ERDF, the EAFRD/EAGGF as well as the CF. Thus, our findings suggest that the impact of ERDF on economic growth is positive, but no statistically significant.

Lastly but not least and considering that our results strongly indicate that the inclusion of the interaction term into the model has no statistically impact on the dependent variable, we estimated the Augmented model for the whole period, employing other variables instead of CPI, namely the government effectiveness, the regulatory quality, the rule of law and the control of corruption. These variables, which provide different proxies of institutional quality based on the perceptions of several agents in the economy, are taken from the WGI and compiled by the World Bank.³⁴ Regarding the results, the estimated coefficients for the conditioning factor present once again a non-statistically significant negative sign for all the variables (see the seventh through the tenth column of Table 13). Therefore, this robustness test confirms that there is no evidence indicating that does exist a statistically significant impact of the interaction term on the dependent variable and that substituting the conditioning factor did not change the results.

³⁴ Available at <https://info.worldbank.org/governance/wgi/>, accessed on 14th June 2019.

Table 13. Robustness of results in evaluating the impact of structural funds on economic growth

	Augmented	Different time spans				ERDF only	Different measures of institutional quality			
		1989-1999	1995-2006	2000-2006	2007-2013		Government effectiveness	Regulatory quality	Rule of law	Control of corruption
Log of initial GDP <i>per</i> person employed	-0,123*** (0,006)	-0,200*** (0,033)	-0,217*** (0,039)	-0,198*** (0,011)	-0,186*** (0,037)	-0,120*** (0,005)	-0,125*** (0,008)	-0,122*** (0,006)	-0,127*** (0,010)	-0,124*** (0,007)
Log of savings rate	0,021* (0,012)	0,114* (0,064)	0,008 (0,012)	0,020** (0,011)	-0,017 (0,025)	0,016 (0,023)	0,017* (0,013)	0,019 (0,012)	0,020 (0,018)	0,019 (0,012)
Log of human capital	0,174** (0,090)	0,387 (0,320)	0,518*** (0,145)	0,592*** (0,053)	0,002 (0,103)	0,189*** (0,070)	0,242** (0,113)	0,175* (0,102)	0,267** (0,113)	0,206** (0,103)
Log of (population growth + 0,05)	-0,002* (0,001)	0,007 (0,009)	-0,005 (0,005)	-0,007*** (0,001)	-0,008** (0,003)	-0,003* (0,002)	-0,003 (0,002)	-0,002** (0,001)	-0,003* (0,004)	-0,002* (0,001)
Log of regional funds	1,017* (0,634)	-0,317 (3,480)	11,821*** (4,515)	9,171*** (0,546)	-1,024 (3,563)	0,577 (0,903)	1,823 (3,077)	0,945 (1,275)	4,856 (0,634)	1,084 (1,119)
Log of regional funds * CPI / other measures	-0,013 (0,011)	-0,041 (0,056)	-0,130** (0,006)	-0,122*** (0,006)	0,024 (0,062)	-0,006 (0,016)	-0,027 (0,044)	-0,008 (0,021)	-0,070 (0,052)	-0,015 (0,018)
No. countries	25	9	25	25	25	25	25	25	25	25
No. periods	23	15	12	7	7	23	23	23	23	23
No. observations	450	120	227	155	175	475	450	450	450	450
Sargan test	21,458	8,381	13,799	20,107	17,416	21,314	20,933	21,337	19,905	21,348
[p-value]	[0,371]	[0,397]	[0,740]	[0,327]	[0,495]	[0,264]	[0,283]	[0,263]	[0,338]	[0,262]
Arellano-Bond serial correlation test										
AR(1)	-2,906	-0,613	-0,418	-0,010	-0,328	-1,678	-0,007	-0,023	-0,185	-0,329
[p-value]	[0,003]	[0,540]	[0,540]	[0,121]	[0,743]	[0,093]	[0,995]	[0,982]	[0,853]	[0,742]
AR(2)	-2,115	N/A	-0,129	0,181	-0,275	-0,995	N/A	N/A	N/A	-0,579
[p-value]	[0,034]	[-]	[0,540]	[0,856]	[0,783]	[0,320]	[-]	[-]	[-]	[0,563]
Robust errors (White period)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: dynamic panel data model estimated by GMM in first-differences under an Arellano-Bond two-step estimation. Instruments specification: dependent variable lagged up to three periods [$@dyn(y,-3)$]. ***, ** and [*] statistically significant at 1%, (5%) and [10%], respectively. The standard errors of the coefficient estimates are indicated in parentheses.

Chapter 5. Conclusion

5.1. Main Contributions

Over recent years, the EU budget allocated to cohesion policy has been increasing and, therefore, it has become the largest component of the EU budget (Caldas *et al.*, 2018). Considering this, the impact of EU cohesion policy has been assessed from many different standpoints, and it seems that there is no consensus either in identifying the correct theory to evaluate the impact of EU cohesion policy (Melecký, 2018) or in the results obtained (Maynou *et al.*, 2014). In addition to the extant literature, which has identified conditional factors related to the aid recipient countries (*e.g.* the quality of institutions or the level of corruption) that affect the impact of EU cohesion funds in promoting economic growth, the European Commission (2017) has also stressed the importance of improving institutions along with the quality of governance in order to narrow differences across the EU.

Bearing in mind that the present study delved the evaluation of whether the quality of institutions influences the effectiveness of the EU cohesion policy as well as ascertain in which context belonging to a particular type of capitalism is relatively negative or positive in promoting economic growth, the contributions of this work to the scientific literature are threefold. Firstly, and with a focus on the theoretical level, this study provides a detailed literature review regarding the current theories of economic growth, which attempts to clear up the key elements that lead to long-term economic growth. Secondly, and with a focus on the empirical level, we estimated unbalanced panel data models, covering a total sample of 255 NUTS-II regions of 25 MS over the period 1989-2013 (*i.e.* four programmatic periods: 1989-1993, 1994-1999, 2000-2006 and 2007-2013), which represents the most extended time spanning in comparison to the majority of the previous empirical studies (Dall’erba & Le Gallo, 2008; Esposti & Bussolletti, 2008; Mohl & Hagen, 2008, 2010; Fiaschi *et al.*, 2011; Crescenzi & Guia, 2014; Maynou *et al.*, 2014; Gagliardi & Percoco, 2016). Only Becker *et al.* (2018) addressed the effect of Objective 1 on economic growth for a similar time period. Thirdly, this study goes beyond the principal goal of evaluating the effectiveness of the EU cohesion policy, by presenting into the discussion the DOC approach introduced by Amable (2003) and transposed to the EU reality by Farkas (2019). This introduction allows us to appraise a comparative relationship amongst the type of capitalism and the capability in promoting economic growth.

Regarding the main findings reported through the present work, it is possible to underline the following: (i) at the econometric level, the empirical evidence gathered suggests that the neoclassical growth model is highly accurate in explaining economic growth within the EU context; (ii) although there is a slightly statistical significance, the results obtained point to a positive effect of cohesion policy on economic growth, which is more evident during the 2000-2006 programmatic period when 10 relatively low-income countries joined the EU; (iii) considering the conditioning factor described by the interaction term of CPI introduced in the analysis for the purpose of assessing whether the effectiveness of structural funds depends on “right” institutions, our findings do not confirm the results exposed by Ederveen *et al.* (2006); (iv) our outcomes also indicate that belonging to the “Anglo-Saxon”, “Nordic” and “North-Western Continental” groups of countries foster more favourable conditions to economic growth in comparison to the “Mediterranean” and “CEE” groups.

5.2. Limitations and Paths for Further Research

The present analysis, by appraising the impact of the EU cohesion policy on economic growth as well as its relationship with institutions raises several limitations that might open paths for future research. First, this investigation did not encompass the specific institutional arrangements at the national-level thus, and notwithstanding that those individual country evaluations are a complex procedure, further studies must explore the different contexts of each MS in order to clarify by what means structural funds are contributing to growth. Second, and given the fact that structural funds are financial tools, which co-finance national policies, the effectiveness of these instruments depends heavily on the national policymakers. Hence, future research could also focus the attention on the domestic policies financed by structural funds and assess the relationship between these policies and the institutions in terms of either the quality of governance or corruption.

It is also worth noting that the EU is facing new challenges. For instance, the possible withdrawal of the United Kingdom from the EU (the so-called Brexit), a net contributor to the community budget. Considering that such an event has never happened, it is crucial that the European authorities, along with the MS, take the necessary measures to smooth this out of Britain. Additionally, the rise of nationalism across the EU and the problem of refugees might be a threat to the European project and its main goal of convergence at the income level across the EU.

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