ECONOMIC GROWTH AND COHESION IN THE EUROPEAN UNION

HOLOBIUC ANA-MARIA
THE BUCHAREST UNIVERSITY OF ECONOMIC STUDIES, ROMANIA
e-mail: anamaria_holobiuc@yahoo.com

Abstract:

Since the first initiatives of regional integration in the 20th century, the European group has gone through important stages, evolving from customs union to economic and monetary union. During this time, the challenges for the European group have not diminished. By contrary, the internal vulnerabilities were enhanced by the aggressive crises that affected in the last decades the entire World. Despite the transformations of the European Union, cohesion has always remained a main objective of the group, with the purpose to promote the unity between Members. Considering this fundamental principle of the European Union, the aim of this paper was to determine the convergence patterns, together with the main determinants of prosperity in the interval 2000 and 2022. Focusing on absolute β-convergence, we have initially determined the relationship between the initial level of GDP per capita and the average growth rates based on cross-sectional data. We have concluded that the initially less developed countries tend to experience higher growth rates compared to the developed Members. Moreover, the study suggests that the average convergence speed in the European Union was around 2% per year. Complementarily, using panel regressions to estimate conditional β-convergence, we have illustrated that factors such as investment, exports of goods and services and inflation had a positive impact on the dynamics of GDP per capita. Consequently, strengthening the macroeconomic policy framework has generated prosperity gains for the European Union.

Keywords: economic growth, cohesion, European Union, β-convergence, panel data regression

JEL Classification: O40, O52, O57

1. Introduction

Harmonizing the interest of multiple countries has proved to be a difficult to achieve objective even from the initial stages of regional integration on the European continent. Moreover, the subsequent waves of accession and the deepening of the integration process, which quickly evolved from the stage of customs union to that of economic and monetary union, have posed additional challenges for the European Union, which was confronted with the need of finding the optimal balance between cohesion and competitiveness. Although it was not easy from political perspective, the European Union has succeeded to bring together countries with different economic performance and social characteristics, being "united in diversity". In spite of the multiple successes in the recent history of the European group, one of the objectives that has not been accomplished so far is that of economic, social and territorial cohesion. Among this, the topic of economic cohesion remains the most debated one, given the difficulty to manage the interests of the wealthy European countries, focused on increasing the competitiveness, with the needs of the new entrants, which depend on the structural funds in order to promote the economic emancipation. On the background of these challenges, the main objective of the current research is to capture the European Union's economic landscape, considering the objective of convergence. In this respect, the main hypothesis of the current study is that European Union in its expanded composition has shown significant progress towards the aim of economic cohesion in the last two decades. Based on the instrument absolute β-convergence developed by Barro and Sala-i-Martin (1990, 1992), we have shown that the less developed Members at the beginning of the analyzed period experienced higher convergence rates compared to the wealthy countries. Complementarily, our paper brings additional evidence in the favor of the "iron law of convergence" (Barro, 2015), as we identified that the average catching-up speed among the 27 European countries was around 2% per year. In addition, we have studied the impact of several macroeconomic variables on the dynamics of GDP per capita using panel regressions. By estimating conditional β-convergence, we have concluded

that investment, together with exports of goods and services and inflation exerted a positive influence on the prosperity gains between 2000 and 2022.

2. Literature review

The foundation of the current empirical studies in the field of economic convergence is represented by the economic growth theories, developed in the 20th century. In 1928, Ramsey put the foundation of a theory, later expanded by Solow and Swan (1956), known under the name of neoclassical growth model. The exponents of this current of thought considered that the economic growth is the results of labor and capital, as substitutable factors, to which it is added the exogenous technological progress. Another assumption of the Solow's model aims the diminishing returns to capital and labor, which explain the progress of the less developed countries, with scarce resources of physical capital. Similar to Solow, Swan (1956) explained the production growth rate based on savings, capital stock and labor. From Solow's perspective, different growth rates between countries were determined by the amounts of physical capital, the economies being in different growth phases towards the steady state. Consequently, Solow's theory suggests that countries will reach the same level of development in the long run. According to Fagerberg (1995), the neoclassical growth model is based on the following assumptions: perfect competition, lack of externalities and decreasing trend of marginal productivity. In this framework, the share of saving and the growth rate of the labor force were considered given variables, and the productivity increases were determined by the intensification of the role of physical capital. More recently, Mankiw et al. (1992) extended the Solow model by including human capital, population growth and physical capital, concluding that these determinants explain the differences between economies in the Solow model. From the perspective of Mankiw et al. (1992) and Barro and Sala-i-Martin (1992), the model proposed by Solow does not predict absolute convergence, but conditional convergence, so that each economy will reach its own equilibrium state.

Despite the optimistic outlook of neoclassical theory regarding economic growth, which assumed that all economies would experience a positive growth trajectory, concrete evidence on global income distribution have not confirmed some of the hypotheses (De la Fuente, 1997). Starting from the vulnerabilities of the theory developed by Solow (1956) and Swan (1956), researchers such as Romer (1986) and Lucas (1988) put the foundation of a new theory - the endogenous model - trying to explain the causes of the increasing development gaps and polarization, which characterized the second half of the last century. The exponents of the endogenous growth model extended the neoclassical framework, by relaxing the fundamental assumptions, including increasing returns and the technological vector as endogenous factors in the production function. Analysts such as Arrow (1962) were interested in studying the implications of increasing returns and the determinants of technological progress. In addition to physical capital, Romer (1987, 1989) studied the impact on growth of the increase of productivity due to specialization and of the human capital. Complementarily, Romer (1986) illustrated that economies of scale play an important role in sustaining economic growth and implicitly convergence. Moreover, Lucas (1988) and Romer (1990) highlighted the role of technological progress as an endogenous factor in catalyzing economic growth. A defining characteristic of these models derives from the omission of the hypothesis of diminishing returns to capital, as a result of investments in human capital that can propagate in the long term, for example through the transfer of advanced knowledge.

Given the debates between the exponents of these two theories, the sources of economic growth can be explained through a combination of theories and empirical models. For example, in the neoclassical growth model, the main factor contributing to the economic progress is the physical capital. In contrast, the exponents of the neoclassical model of economic growth attributed a primary role to innovations, know-how transfer and investments in human capital. Grela et al.

(2017) noted that the relevant factors in the catching-up process can be extracted from the analysis of some economic and social processes. In this respect, labor supply is a relevant variable in the neoclassical growth model, while human capital formation is representative for the endogenous model. At the same time, investments are considered a representative determinant both for the neoclassical economic growth model and for the endogenous one. From the debates on this topic, a series of dichotomous views on the convergence process resulted (Islam, 2003): a) convergence at the level of an economy versus convergence between economies; b) convergence analyzed from the perspective of growth rates versus as an absolute value of income; c) β- versus σ-convergence; d) absolute versus conditional β- convergence; e) global versus club convergence; f) income convergence versus total factor productivity convergence. Between these dimensions, the present study focuses on absolute and conditional β-convergence.

Regarding the two categories of β-convergence, "absolute" and the "conditional", as described by Barro and Sala-i-Martin (1992), the differences are determined by the premises underlying the catching-up process. While absolute β-convergence implies reaching the same state of equilibrium, the conditional model involves the possibility of reaching different levels of development, determined by the initial conditions and the structural characteristics of the economies. Duro (2012) noted that the exponents of the neoclassical growth model studied absolute β-convergence, assuming that the less developed economies experienced higher growth rates than the advanced ones. In this framework, structurally similar economies will reach a common equilibrium level. In contrast, conditional convergence assumes that the growth rate would depend on the particular conditions of each economy. In this framework, the less developed economies will not necessarily register higher growth rates than the developed ones, and the speed of convergence will depend on the distance of each economy in relation to its own equilibrium state. Considering the model proposed by Solow (1956) based on a Cobb-Douglas function, Islam (2003) highlighted that the absolute model assumes the similarity of the economic variables considered relevant in the process of economic recovery (production, capital, labor and total factor productivity). In the case of the linear regression model used to analyze the absolute convergence, the sign of the coefficient β is negative even if the only independent variable is the initial income. Unlike the absolute approach, conditional β-convergence takes into consideration the possible structural differences between economies and involves the inclusion of independent variables to ensure their control (Islam, 2003).

Looking at the European Union's ecosystem and the progress in the field of convergence, researchers tend to find evidence in favor of the "iron law of convergence" (Barro, 2015), economies reducing the developments gaps with an average growth rate of 2% per year. For example, Dobrinsky and Havlik (2014) found evidence in favor of absolute β-convergence, identifying an average speed of convergence around 2% considering the interval 1995 and 2011. Similarly, Rapacki and Próchniak (2019) found evidence to support the hypothesis of absolute convergence, identifying a convergence speed of 2.2% between 1995 and 2015, the leaders of the process of convergence being the Baltic countries, which experienced annual growth rates of 4.5-5%. Focusing on subgroups, Matkowski et al. (2016) identified a convergence speed of 1.5% for EU (15) and an average of 3.2% for the Central and Eastern European countries between 1993 and 2015. Comparative analyses were also carried out by Stanišić (2012) who identified an average growth rate of 1.7% between 1993 and 2010, also illustrating that the new member states recorded higher growth rates compared to old members. According to Stanišić (2012), the convergence process was positively influenced by the level of education, life expectancy at birth, investments, exports and a positive current account balance. Also considering the influence of some variables, Forgó and Jevčák (2015) showed that the increase of exports and gross fixed capital formation accelerated the convergence process before the financial crisis.

In conclusion, the literature focused on the topic of convergence is vast, the process being studied from multiple perspectives. On the one hand, the empirical studies have as staring point the

economic growth theories established in the 20th century, particularly, the neoclassical growth model and the endogenous theory. On the other hand, the methodology for studying the progress towards economic cohesion is based on the instrument of β-convergence, with its two facets: absolute and conditional. Considering the studies in the field, we try to capture recent trends and to determine if the European Union has come closer to the objective of economic cohesion. In addition, we have studied the influence of several macroeconomic variables under the framework of conditional β-convergence.

3. Data and methodology

The main purpose of the current empirical study is to determine the convergence patterns in the European Union, trying to identify if the regional group has come closer to the desiderate of economic cohesion. Looking at the timespan 2000-2022, which comprises two major crises (financial and sanitary), we have estimated absolute and conditional β-conditional convergence using cross sectional and panel data. In this respect, absolute β-convergence was determined on cross-sectional data, comprising the values of GDP per capita for all the Member States, as obtained from Eurostat Database. The equation was estimated using ordinarily least squares method. Complementarily, we have estimated conditional β-convergence on panel data, including in the equation as dependent variable the annual GDP per capita growth rate for 27 Member States. The explanatory variables were the lagged value of GDP per capita (obtained from Eurostat), the gross fixed capital formation (% of GDP) (World Bank), the volume of exports of goods and services (% of GDP) (World Bank) and the inflation rate (% annual) (Eurostat). The equations were estimated using the generalized least squares (GLS) method, with the aim of managing the correlation between residuals, heteroscedasticity and serial correlation, which are frequent vulnerabilities in the study of economic growth based on panel data[1].

The empirical study is based on the following assumptions:

Hypothesis 1: The EU (27) recorded a positive economic growth trajectory at the beginning of the 21st century.

Hypothesis 2: The average growth rate of GDP/capita in EU (27) was around 2% between 2000 and 2022.

Hypothesis 3: Investment had a positive influence on the annual growth rates of GDP/capita.

Hypothesis 4: The intensification of exports of goods and services contributes to the increase of prosperity at the Community level.

Hypothesis 5: The increase in prices, reflected by the inflation rate, positively influences the dynamics of GDP.

Initially, we have estimated absolute β-convergence, under the form proposed by Barro and Sala-i-Martin (1992), using the formula below:

$$\frac{1}{T}ln[\frac{y_{i,T}}{y_{i,0}}] = a + a_1 ln(y_{i,0}) + u_i \tag{1}$$

y_i = GDP per capita of country i
T = period of time
α = constant
u_i = error term

The convergence rate was estimated based on the results obtained in equation 1, as follows:

$$\beta = -\frac{1}{T}ln(1 + \alpha_1 T) \tag{2}$$

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[1] The empirical study is part of the postdoctoral research of the author entitled "*Challenges to economic and social cohesion, in the context of the European Union's expansion towards the center and east of the continent*"

Complementary, we have estimated conditional β-convergence using the generalized least squares method, considering the equation below:

$$\ln(\Delta GDP/capita_{i,t})$$
$$= a + a_1 \ln(GDP/capita_{i,t-1}) + a_2 \ln(GFCF) + a_3 \ln(Exports) + a_4(Inflation)$$
$$+ u_{i,t}$$

4. Results

The results of absolute β-convergence are presented in Table 1. The negative relationship between variables confirm the first hypothesis of the study, the European Union experiencing a catching-up process between 2000 and 2022. In this respect, the negative sign of the coefficient suggests that the initially less developed Members, with low GDP per capita, recorded higher growth rates compared to the developed Members. The coefficients are statistically significant (Prob. < 1%). Moreover, the initial level of GDP per capita explains in large proportion of 66% the variation of the dependent variable. The convergence speed estimated on the coefficient α_1 is 2.4%. Moreover, we confirm the second hypothesis, identifying evidence in favor of the universal convergence rate of 2%, also identified by Barro and Sala-Martin (1992) and Barro (2015).

Table 1. Results of absolute β-convergence

Dependent variable: average GDP per capita growth rate (2000-2022)	
OLS Method	
No. of obs.	27
a	0.2704*
	(0.0388)
	(6.9645)
GDP per capita in 2000 (α_1)	-0.0241*
	(0.0041)
	(-5,8593)
R^2	0.6604
Adjusted R^2	0.6468
β (convergence speed)	2.4%

Source: Author's computation
*Note: standard errors and t-statistics in parentheses. * - p-value < 1%*

The results of conditional β-convergence are presented in Table 2. Also in case of panel regressions, we identify a negative relationship between the annual growth rates and the lagged value of GDP per capita. Furthermore, the convergence speed, which was estimated on coefficient α_1 is 2.4%. Consequently, we re-confirm the first two hypotheses of the research. Analysing the influence of the selected macroeconomic variables, we have illustrated that investments, as reflected by the level of gross fixed capital formation (GFCF), was the main determinant of prosperity in the European Union between 2000 and 2022. In addition, the paper emphasizes the positive impact of exports of goods and services (% GDP), as well as of the inflation rate. The coefficient of determination has large value (87%), suggesting that the selected variables explain in a large proportion the variation of the dependent variable. In order to determine the robustness of the model, we have also looked at the result of the Durbin-Watson test. Being close to the value of 2, it indicates the absence of serial correlation of order 1.

Table 2. Results of conditional β-convergence

Dependent variable: annual growth rate of GDP per capita	
GLS Method	
No. of obs.	572
a	0.091*

	(0.0171)
	(5.3684)
GDP per capita (-1)	-0.0241*
	(0.0014)
	(-16.3389)
GFCF (% of GDP)	0.0288*
	(0.0211)
	(9.4687)
Exports of goods and services (% of GDP)	0.0211*
	(0.0014)
	(14.3251)
Inflation rate (annual, %)	0.0054
	(0.001)
	(48.7284)
R^2	0.8734
Adjusted R^2	0.8725
Durbin-Watson	1.9981
β (convergence speed)	2.4%

Source: Author's computation
*Note: standard errors and t-statistics in parentheses. * - p-value < 1%*

5. Conclusion

Since the establishment of the European Economic Community in the second half of the last century, cohesion has remained one of the fundamental pillar, supporting the stability and the credibility of the regional group. However, despite the ambitious steps that European decision makers have made with the aim of promoting the convergence between countries and regions, this objective has proved to be difficult to achieve. Moreover, the crises that affected the European continent in the 20th and especially in the recent years, have posed into question the capacity of the European Union to accomplish the objective of economic cohesion. The aim of this paper was to study the representative trends for the European Union between 2000 and 2022, taking into consideration the methodology of absolute and conditional β-convergence. Estimating absolute β-convergence based on cross-sectional regressions, we have identified a negative relationship between the average growth rate of GDP per capita and the initial level of income. Consequently, the study brings additional evidence in favour of the neoclassical growth model (Solow, 1956; Swan, 1956), as the initially poorer Members experienced higher growth rates compared with the developed ones. Complementarily, we have focused on conditional β-convergence, with the purpose the control the structural differences between economies. In this respect, we have included several variables aiming the macroeconomic environment and conducted the estimations based on panel data. Out study has some policy implications. First of all, we have identified that investments have played a major role in enhancing the growth rates between 2000 and 2022. Moreover, the increase of exports of goods and services enhanced the prosperity in the Member States. The increase of prices, as reflected by the inflation rate, had also a positive influence on the dependent variable. However, the study does not document the level to which inflation exerts a positive influence. Moreover, in spite of the positive influence of exports, the European Union, in its capacity of global actor, has to be involved in the international trade system also as importer. Another vulnerability of the study is determined by the limited perspective on the convergence process. Consequently, the empirical study can be further expanded considering the influence of other economic, social and institutional variables.

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