
Real Convergence in EU-15: A Comparative Analysis of North versus South Europe

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Xanthippi Chapsa¹, Athanasios L. Athanasenas², Nikolaos Tabakis³

Abstract:

Purpose: The paper looks at the issue of absolute and conditional income convergence in the EU-15 States, focusing upon the growth incidence of certain fundamental economic variables, along with corruption and bureaucracy.

Design/Methodology/Approach: Applying advanced panel data techniques, dating from 1995 up to 2012, we focus on two discrete European State groups. The first group consists of the Southern EU countries (i.e. Greece, Belgium, Italy, France, Spain and Portugal) and, the second group of the Northern EU countries (i.e. Austria, Denmark, Finland, Germany, Ireland, Netherlands, Sweden, UK).

Findings: The results demonstrate that investment share, human capital and country openness appear as robust growth drivers; whereas, inflation and government consumption hamper growth. However, corruption and bureaucracy seem to affect differently growth of the two groups of the European States.

Practical Implications: Certain policy implications and obligations accrue to the Southern European countries vs. the Northern European ones, with respect to the effects and consequences of specific fundamental economic variables, along with corruption and bureaucracy, towards the absolute and conditional income convergence in the EU-15.

Originality/Value: Macroeconomic policies that affect economic growth, directly through their effect on physical and human capital accumulation and macroeconomic stability, reflected in low and stable rates of inflation and government consumption, would indeed increase growth in EU. Taking advantage of the European integration, in terms of real convergence, institutions seem also quite essential ingredients.

Keywords: EU-15, North Europe, South Europe, conditional convergence, growth determinants, panel data analysis

JEL codes: O40, C23, O52.

Paper type : Research article.

¹Corresponding author, International Hellenic University - Serres, Department of Business Administration, xanthi@teicm.gr

²International Hellenic University-Serres, Department of Business Administration, athans@teicm.gr

³International Hellenic University-Thessaloniki, Department of Agriculture, tampac@farm.teithe.gr

1. Introduction

During the past decades, income convergence remains a central macroeconomic issue around which a significant proportion of the recent growth literature has evolved. Ever since 1956, Solow's neoclassical model has produced endless debate on the empirical validity of its predictive power upon income convergence. Baumol (1986) found evidence of convergence, but only within developed countries. Mankiw et al. (1992) argued that poorer countries grow faster than richer ones; whereas, Quah (1993), by augmenting Solow's model with human capital, found no such convergence. Ever since, this debate goes on strong.

In the classic growth literature, two fundamental notions of convergence are the "absolute" and the "conditional" convergence case. Following, thus, Sala-i-Martin (1996a), absolute β -convergence implies that incomes across countries approach the same steady state level; whereas, conditional convergence implies that different economies converge to different steady state levels depending on cross section differences in resources, savings rates, technology, population growth, etc. This fact is due to the endogenous convergence theory according to which, the main factors of convergence are the expenditure for research, technology and human capital. These factors are endogenous and offset the diminishing returns to capital. According to Siriopoulos and Asteriou (1998), poorer countries may converge to the richer ones only if they can assimilate the technological progress that emanates from developed economies, improving under this way the effectiveness of human capital and the ability for innovation.

In this context, it would be interesting to investigate whether or not stronger evidence of convergence exists, among groups of EU countries which are characterized by similar socioeconomic features; that is, whether or not convergence clubs exist, in accordance to Baumol (1986).

In order to study explicitly the determinants of growth in Europe, two distinct groups of countries are considered here: A first group is consisted by the five "Southern" European countries, EU-5 hereafter, (i.e. Greece, Italy, France, Spain and Portugal). These Mediterranean countries share some common characteristics such as the natural conditions and resources. Additionally, in these countries, the agricultural sector is a vital component in terms of share of Gross Domestic Product. Moreover, until the mid-1990s, the EU-5 countries were distinguished from the "Western European" countries, by certain interrelated structural characteristics; such as uneven distribution of human resources, formalism and legalism, and with the exception of Italy and France, by absence of a typical European administrative elite (Ziller, 2001; Bevir *et al.*, 2003; Tsoulakis, 1981; Featherstone and Kazamias, 2001; Goetz, 2001; Giner, 1985; Pagoulatos, 2003). Moreover, Goetz (2001) notes that there is a general understanding that the four bureaucracies share some empirical parallels or similarities while according to Giner (1985) and Pagoulatos (2003) one may speak of the "state in Southern Europe". Finally, Thalassinos and Dafnos

(2015) examine the driving forces that influence the development of the Economic and Monetary Union and more specifically the challenges that the EU's Southern member states face.

A second group of "Western European" countries is formed by the remaining "Northern" European countries (Austria, Belgium, Denmark, Finland, Germany, Ireland, the Netherlands, Sweden and the UK); that is, EU-9 hereafter⁴. The growth experience of these two groups of countries could be much different. Their long-term performance could be associated with macroeconomic stability, financial development, trade regime, or institutional characteristics.

Accordingly, then, this paper aims first, at analyzing the growth and convergence issue within the two distinct groups of the EU-5 and the EU-9 countries. Second, to examine whether or not consideration of two discrete state groups, provide evidence of existence of different convergence speeds. Third, we need to test for conditional convergence, where specific drivers of growth are considered to trace out the dominant factors of the convergence process in the examined countries. Finally, we share light on the growth effects of corruption and bureaucracy in these two groups of countries.

The rest of the paper is organized as follows: Section 2 briefly discusses the main growth determinants and reviews the relevant literature, Section 3 presents the dynamics of corruption and bureaucracy in EU-5 and EU-9 countries, Section 4 analyzes our modeling approach, Section 5 describes our research results. Finally, certain concluding remarks and further research suggestions are provided in the last section.

2. Growth Determinants

It is well known that a quite wide range of studies has investigated the factors underlying economic growth and convergence. Thus, using various theoretical and methodological approaches, these studies have focused on a different set of explanatory variables and offered various insights to the sources of economic growth. The importance attached to the above factors has led to an enormous amount of empirical studies, on the relationship between these factors and economic growth per se. Among others, investment in physical and human capital, Foreign Direct Investment (FDI), and trade openness are considered as main drivers of growth and convergence. Although a positive correlation between these variables and GDP growth has been considered, a part of the relevant empirical literature has found a negative association⁵.

⁴*Luxembourg was excluded as it is typically considered an outlier.*

⁵*A number of recent studies have been more skeptical about the robustness of this impact and suggest that the statistical significance of this correlation depends on the specification of the empirical model, the period under consideration and the proxy variables for these factors.*

In this paper, in order to test for conditional convergence, a certain number of growth determinants are being considered. More specifically, in addition to the variables suggested by the augmented neoclassical Solow-Swan model, inflation, government consumption, openness, as well as corruption and bureaucracy are also considered. We mention these variables, in a summarized form.

2.1 Investment and growth

Investment is a fundamental determinant of economic growth and the catching-up process, identified by both neoclassical and endogenous growth models. More specifically, Solow (1956) suggests that the larger the investment and saving rate, the more cumulative capital per worker becomes. Furthermore, in the long-run economic growth, new growth theories stress the importance of investment, especially in human and physical capital⁶.

2.2 Human capital and growth

During the past century, researchers continue focusing upon the impact of human capital on economic growth, by increasing the facilities of education and health. Schultz (1971) and Becker (1962) both developed and analyzed growth models, augmented by human capital and found significant positive association between economic growth and human capital formation. Also, a number of empirical studies documented a strong and positive relationship between human capital and economic growth. However, this relationship between these variables remains so far ambiguous⁷.

2.3 Inflation and growth

Macroeconomic policies can affect economic growth directly through their effect on accumulation of capital, or indirectly through their impact on the efficiency with which the factors of production are used, thus sending important signals to the private sector about the country's authorities, in the form of efficiently managing the economy for profitable investments. Moreover, macroeconomic stability is reflected in low and stable rates of inflation (Mirestean and Tsangarides, 2009). However, considerable ambiguity surrounds the impact of the average rate of inflation on the rate of economic growth, at the theoretical level. The impact of inflation on output growth may also take place indirectly, via the inflation uncertainty channel. Friedman (1977) argues that changes in inflation induce erratic responses by

⁶For the relationship between investment and economic growth see empirical studies by Kormendi and Meguire (1985), De Long and Summers (1992), Levine and Renelt (1992), Mankiw et al. (1992), Auerbach et al. (1994), Barro and Sala-i-Martin (1995), Khan and Kumar (1997), Sala-i-Martin (1997), Bond et al. (2001).

⁷See for example Rosenzweig (1990), Barro (1991), Kyriacou (1991), World Bank (1993), Pritchett (1996), Agiomirgianakis et al. (2002), Bosworth and Collins (2003), Bloom et al. (2004).

monetary authorities, which may lead to more uncertainty about future inflation (Friedman's hypothesis)⁸.

2.4 Government consumption and growth

Government activities may increase economic growth or impede it, depending on net productivity impact of these activities (Karras, 2001). Of particular interest in the literature, is the impact of government size on economic growth (Kwabena, 2002). The main conclusion from the literature here is that there may be both a "size" effect of government intervention, as well as specific effects stemming from the financing and composition of public expenditure. At a low level, the productive effects of public spending are likely to exceed the social costs of raising funds. On the contrary, very large government expenditure to GDP ratios tends to have a negative effect on economic activity of the private sector and reduce economic growth (Yin *et al.*, 2003). Also, government expenditure and the required taxes may reach levels where the negative effects on efficiency, and hence growth, starts dominating. These negative effects may be more evident where the financing relies heavily on more "distortionary" taxes (e.g. direct taxes) and where public expenditure focuses on "unproductive" activities (Bassanini and Scarpetta, 2001)⁹.

2.5 Openness and growth

Although openness as an empirical concept was not formally and econometrically investigated until the World Bank's World Development Report (1991), there are good theoretical reasons for supporting that openness enhances economic growth and convergence through various channels, such as exposure to competition and exploitation of comparative advantage, technology transfer and diffusion of knowledge, etc. More specifically, the neoclassical approach explains the gains from trade liberalization by comparative advantages, in the form of resource endowment, or differences in technology. On the other hand, the endogenous growth literature asserts that trade openness positively affects per capita income and growth through economies of scale and technological diffusion between countries (Mirestean and Tsangarides, 2009)¹⁰. However, though several studies have demonstrated the positive effect of increased trade on convergence, the growth-openness connection remains an open question in the empirical literature¹¹.

⁸Recent empirical studies as in Fountas (2001), Fountas *et al.* (2004), Karanasos *et al.* (2004), Apergis (2004), Conrad and Karanasos (2005) and Thornton (2008) support Friedman's hypothesis.

⁹Empirically a negative effects is found in Barro (1991), Barro and Lee (1994), Sachs and Warner (1995), Bassanini *et al.* (2001), a positive effect in Caselli *et al.* (1996) while in Levine and Renelt (1992), Bassanini *et al.* (2001), empirical evidence is not robust.

¹⁰Rodriguez (2007) discusses recent empirical research regarding the link between openness and growth in cross-section data.

¹¹Several scholars have criticized the robustness of these findings especially on methodological and measurement grounds (see for example, Levine and Renelt, 1992; Rodriguez and Rodrik, 2000; Vamvakidis, 2002; Kaitila, 2004; Rodriguez, 2007).

2.6 Corruption and growth

Corruption and its economic growth implications have received special attention among several economists, during the recent decades¹². In this case, we face two fundamental schools of thought, with respect to the corruption-economic growth nexus. The first school of thought holds that corruption has beneficial effect on economic growth. Its supporters argue that corruption (that is, several types of bribery payment to state bureaucrats) acts like greasing oil that mainly “lubricates” the engine of economic growth, as it helps government officials to make the progress of project approval “more efficient”. Thus, the proponents of this school, including Leff (1964), Huntington (1968), Acemoglou and Verdier (1998), suggest that corruption induces positive efficiency in the overall economy. The second school of thought maintains the view that corruption negates economic growth, by adding to the cost of business functioning and introducing significant uncertainty in the business decision making process. The proponents of this second school of thought, including Murphy *et al.* (1993), Gould and Amero-Reyes (1983), Mauro (1995), Mo (2001), Monte and Papagni (2001), suggest that corruption is indeed disadvantageous to businesses and business people, especially for those that lack the necessary cash flows and the established and necessary lobbying power to either bribe or lobby the bureaucrats¹³.

2.7 Bureaucracy and growth

Similarly to corruption, there is no consensus concerning the effects of bureaucracy on economic growth. During the last years, the negative effect of bureaucracy prevails. Marx’s theory on bureaucracy states that it is a cost to society that can be accepted, insofar as it makes social order plausible and maintains it by enforcing the rule of law. Chowdhury (2006) showed, referring to tax officials, how their rent-seeking behavior causes loss in government revenue and thereby stagnates country’s economic growth. The above inference based also upon the “Smithian” view (Evans and Rauch, 1999) states that government, regardless of its organizational form, is the enemy of growth as soon as it goes beyond protecting property rights¹⁴. Rauch (1995) supports that the “Weberian” bureaucracy has a twofold effect on growth: the negative one emanates from taxation over returns of private investment while the positive comes from the benefits of complementary inputs such as infrastructure development.

3. The Dynamics of Corruption and Bureaucracy in EU-5 and EU-9 Countries

¹²The word *corrupt* when used as an adjective literally means “utterly broken” and was first used by Aristotle.

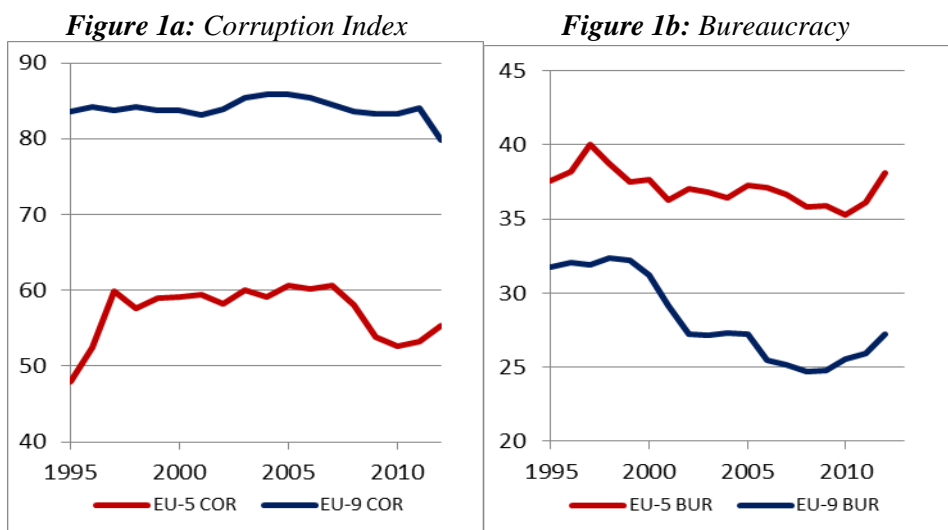
¹³See also, Mauro (1995, 1998), LaPorta *et al.* (1999), Lapsdorff (2003), Papaconstantinou *et al.* (2013), Jalil *et al.* (2016).

¹⁴Rauch (1995) and Evans and Rauch (1999) found a positive effect of bureaucracy on growth. Ayal and Karras (1996) detected a negative effect of bureaucracy (See also Papaconstantinou *et al.*, 2013).

This particular section focuses on answering the following question: “do the two groups of the EU member states (the EU-9 and the EU-5) present through time two distinct patterns of behavior, with respect to corruption and bureaucracy?” Since the question is posed at a group level, it can be answered by comparing two variables – the mean Corruption Perception Index for the EU-9 countries, and the mean value for the EU-5 countries (Figure 1a). The answer, next, is based on comparing the trends in both values, over time. Respectively, in Figure 1b the mean value of Bureaucracy measure is presented, for the two groups of countries.

The picture we get from Figure 1a is quite convincing: “the average corruption index for the EU-9 European countries is placed above the EU-5 average and remains unchanged through the time¹⁵”. The Southern European countries which are characterized by high corruption present, in average, a considerable improvement at the beginning of the period, but after a long period of stability, the average position of the group has been deteriorated, especially in the crisis years. It is clear that the “clean” North rests “clean”, but the corrupted South becomes even more corrupted in these crisis years.

Figure 1b next, shows bureaucracy dynamics as they are measured by the average value, both in the EU-9 and EU-5 countries. The EU-5 average is being positioned above EU-9 average, thus revealing that the EU-9 countries are less bureaucratic. Although the two groups display similar behavior, one can observe a significant reduction in bureaucracy in the EU-9 country group, while the “bureaucratic” South makes only a little such progress and remains “bureaucratic”.



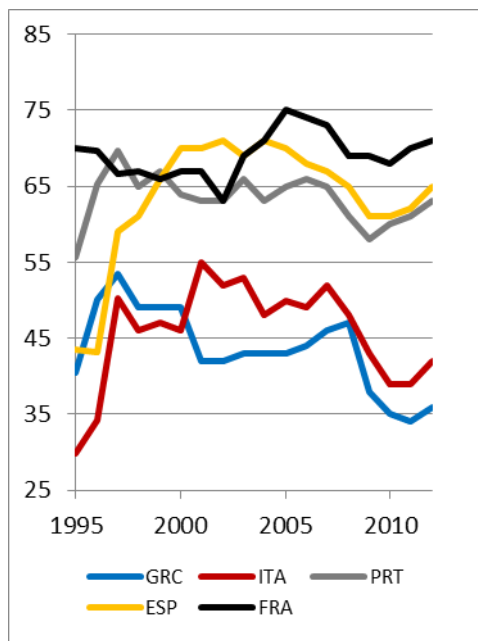
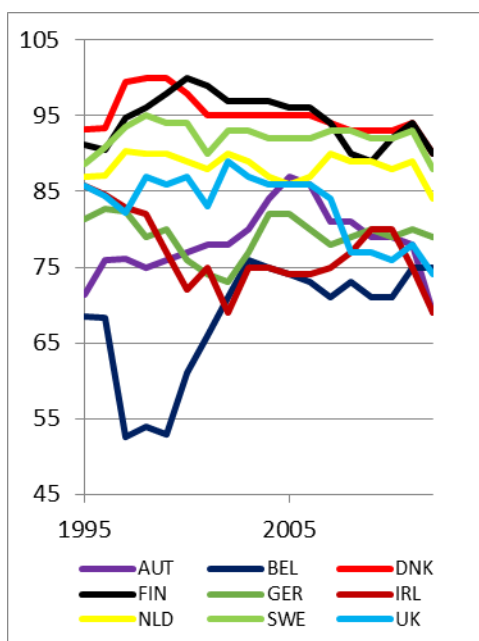
Source: Own elaboration using data from Transparency International and The Heritage Foundation.

¹⁵ We note that the higher the Corruption Index is, the cleaner the country.

In Figures 2a and 2b, the Corruption Index evolution is presented. On the left we can see “The clean North” and on the right the “corrupted South”. Furthermore, a comparative look at these two figures reveals two distinct patterns of corruption. Specifically, the Nordic countries seem to follow parallel paths through the time. In this group, Finland, Denmark and Sweden, used to be and remain the cleanest countries. Of a great interest is the performance of Belgium, which being the most corrupted state in 1995 and especially in the late 1990, improved its position in the years after 2000, but still remains the most corrupted in 2010.

Figure 2a: Corruption Index in EU-9

Figure 2b: Corruption Index in EU-5



Source: Own elaboration using data from Transparency International.

In contrast, the five Mediterranean countries, after improving their relative position in the corruption ranking, were characterized by stable corruption levels up to 2007; but in the recent years, they have followed different corruption evolution paths. France, Spain and Portugal reported a progress, whereas Greece with Italy fell behind.

Finally, looking at the dynamics of Bureaucracy within the two groups of countries reveals two obviously different patterns of bureaucracy (Figures 3a and 3b). The bureaucratic structures in the Nordic countries, which in 1995 were characterized by significant differences, share some empirical parallels or similarities in the early 2000. After a period of dramatic drop of bureaucracy, these countries seem to become more bureaucratic, converging to a higher level in the years after the global

crisis. Contrary to the North, the Mediterranean countries, with the exception of Spain, fail to improve their position and seem to diverge.

Figure 3a: Bureaucracy in EU-9

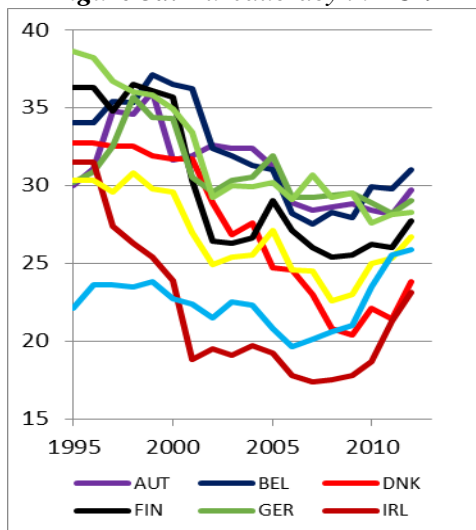
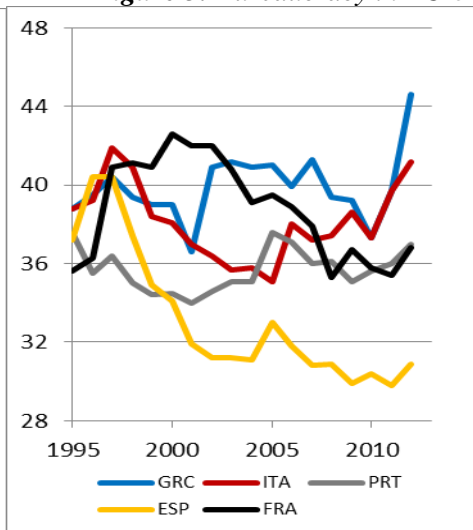


Figure 3: Bureaucracy in EU-5



Source: Own elaboration using data from The Heritage Foundation

4. Theoretical Foundation and Research Focus

4.1 Methodological Issues

The first research efforts on convergence were cross-sectional studies, with β -convergence holding when the coefficient of a regression of GDP per capita growth rates on its initial level is negative¹⁶. More recent approaches make use of time series techniques and examine their integration properties. More formally, time series tests of convergence focus on the notion of “stochastic” convergence; that is, the per capita income disparities between economies should follow a stationary process (Bernard and Durlauf, 1995, 1996)¹⁷. Time-series unit root testing has been often criticized for its limited power and poor size properties (Haldrup and Jansson, 2006); whereas, convergence in the strict sense of Bernard and Durlauf appears to be a difficult hypothesis to confirm (Greasley and Oxley, 1997). Furthermore, Strazicich *et al.* (2004) note that in contrast to the cross-sectional studies, the time series results are less clear¹⁸.

¹⁶Cross sectional studies generally support the convergence hypothesis (Baumol, 1986; De Long, 1988; Grier and Tullock, 1989; Barro, 1991; Barro and Sala-i-Martin, 1992; Sala-i-Martin, 1996b).

¹⁷See Durlauf and Quah (1999) for a survey of the convergence testing literature based on both cross-section and time-series data.

¹⁸Campbell and Mankiw (1989) do fail to find convergence among OECD countries which display similar economic characteristics; Quah (1990), Ben-David (1994), and Bernard and Durlauf (1991, 1995, 1996) find little evidence among a large number of countries, and

New testing procedures for the convergence hypothesis using panel data have been developed, quite recently though. Panel data analysis endows regression analysis, with both a spatial and temporal dimension. The superiority of panel data methods over cross-country growth regressions has been highlighted often in the empirical literature (Islam, 1995). The panel data analysis takes into account (a) the heterogeneity into the units of analysis, by allowing individual-specific variables, (b) gives more variability and less collinearity among variables and, (c) it is also suited for studying the dynamics of change (Baltagi, 1995). The panel approach can additionally capture the influence of certain periods of time on the economic growth, e.g. economic recessions and financial crises, by including dummy variables in the panel regression¹⁹. More evidently, panel data studies generally support the convergence hypothesis (Islam, 1995; Caseli, 1996; Bassanini and Scarpetta, 2001; Bassanini *et al.*, 2001; Sarajevs, 2001; Borys *et al.*, 2008; Cuaresma *et al.*, 2008; Szeles and Marinescu, 2010).

With respect to specification choice, we emphasize Islam's observation that country-specific effects are correlated with the explanatory variables, and hence, random effects specification is accepted as unsuitable. Moreover, following Hsiao (1981) and Baltagi (1995), the choice of fixed effects option is more appropriate when the research focuses on a specific set of N countries, which are not drawn randomly from a large population, and outcomes of the study are viewed as conditional on this set of countries²⁰. This is our particular research direction here, as the EU-9 and the EU-5 countries share a few common characteristics discussed earlier.

4.2 Model specification and variables description

According to the convergence theory, the main factor explaining the GDP growth is the initial level of per capita GDP. Thus, apart from the lagged (log) level of per capita GDP (which is considered as the convergence variable) our model will be extended by including an augmented set of explanatory variables. The obvious candidates to form part of the group are those variables which are explicitly implied by economic theory: the investment share and some proxy for human capital. Together with these basic variables, other which are considered to be relevant to economic growth have been included in the econometric specification. The specification is given by eq. 1 below:

$$growth_{it} = \alpha_0 + \beta \ln y_{it-1} + \alpha_1 INV_t + \alpha_2 EDU_t + \alpha_3 INFL_{t-1} + \alpha_4 GOV_t + \alpha_5 OPEN_t + \alpha_6 COR_t + \alpha_7 BUR_t + \alpha_8 DUM \quad (1)$$

Carlino and Mills (1993), Cunado et al. (2003), Beliu et al. (2004) do not find general evidence of convergence.

¹⁹*The panel approach finds faster rates of conditional convergence compared with the single cross-section approach. See also Sarajevs (2001) for relative issues.*

²⁰*See also Sarajevs (2001), Greene (2000).*

where $growth_{it} = lny_{it} - lny_{it-1}$ is the annual growth rate of real per capita GDP in country i , lny_{it-1} is the (log) lagged per capita GDP of country i , INV share investment, EDU the average years of schooling over 15 years, $INFL$ inflation rate, GOV government consumption as percentage of GDP, $OPEN$ the openness of the economy as trade in percentage of GDP, COR and BUR are the corruption and bureaucracy indices.

We expect to find positive relationships between the economic growth on a side and the investment share on physical and human capital as well as the openness on the other side. Also, a negative relationship between growth with the level of inflation and government consumption is expected. The impact of corruption and bureaucracy might differ in the two subgroups of countries due to the specific characteristics of the countries in the group.

The variables used are described in Table 1. The sample consists of two sub-groups of the EU-14, i.e. the EU-5 and the EU-9 countries. Moreover, for the sake of robustness we drop Luxembourg which is considered an outlier. We also construct a dummy variable to account for the financial crisis²¹, which is assumed to be exogenous as described in Table 1.

We test the convergence hypothesis using the growth rate of GDP per capita (the variable $growth_{it}$) as the dependent variable and the lagged by one year values of per capita GDP in natural logarithms (lny_{it-1}), as the core explanatory variable across all specifications. For the convergence hypothesis to hold the coefficient on lny_{it-1} is expected to be negative.

We control for the impact of investment in physical as well as in human capital on economic growth, using two variables: investment share as percentage of GDP (INV) measuring the overall level of investment in the country, and human capital (EDU). We expect higher investment in physical capital and human capital to have a positive impact on economic growth (positive coefficient).

The impact of macroeconomic stabilization policies are captured by inflation rate ($INFL$) and government expenditure (GOV). We expect higher levels of inflation and government expenditure to have a negative impact on GDP growth.

The relative importance of trade for conditional convergence is measured by trade openness ($OPEN$). Trade openness is measured as the ratio of exports plus imports to GDP. A positive coefficient on openness would indicate a positive impact of trade on growth.

²¹The financial crisis of 2007 touched all the EU countries but in the Mediterranean economies the depth of the resulting recession was the largest (see also, Alexe, 2012; Stanišić, 2012).

To control for the impact of institutions on growth two variables are considered: corruption and bureaucracy. In our specification we use the Corruption Perception Index (CPI) from International Transparency data base as a measure of corruption (*COR*). The CPI is measured on a scale of 0-100, where 0 means that a country is perceived as highly corrupt and 100 means it is perceived as very clean. As regards the data of bureaucracy, and given that the quality of government expressed through bureaucratic structure is reflected at the level of economic freedom of every country, we use the variable $BUR=1-\text{economic freedom}$. The index of economic freedom is published annually by the Heritage Foundation. The higher the value of this index (economic freedom) the lower the level of government interference.

Table 1: Variables description and data sources

<i>lny_{it-1}</i>	Natural logarithm of the real per capita GDP constant (2005) lagged by one year	UNCTAD
<i>INV</i>	Investment share as percentage of GDP	PWT 7.1
<i>EDU</i>	Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994)	PWT 8.0
<i>INFL</i>	Inflation, consumer prices (annual %)	World Development Indicators-WDI
<i>GOV</i>	General government final consumption expenditure (% of GDP)	WDI
<i>OPEN</i>	Sum of imports and exports as % of GDP	World Bank-WB
<i>COR</i>	Corruption Perceptions Index (CPI). Level of public sector corruption on a scale of 0–100, where 0 means that a country is perceived as highly corrupt and 100 means it is perceived as very clean.	(Transparency International-IT)
<i>BUR</i>	1-Economic freedom based on 10 quantitative and qualitative factors. Each of the ten economic freedoms is graded on a scale of 0 to 100.	The Heritage Foundation
<i>DUM</i>	Crisis Dummy variable that takes the value 1 for 2008	

5. Results

Table 2 summarizes the results obtained from the estimation of the fixed effects regressions using annual panel data for the EU-9 and EU-5 for the period 1995-2012. The estimated results are rather satisfactory and give some interesting insides for the convergence process of these two distinct groups. Furthermore, the F-statistic strongly rejects the null hypothesis that intercepts are the same for all countries supporting appropriateness of the Fixed Effects model.

Results concerning the unconditional convergence are presented in columns 1 and 2. The negative and significant coefficient of the lagged per capita GDP provides evidence of absolute convergence in EU-9 as well as in EU-5. The explanatory power of the model is relatively low ($R^2=0,345$ and $0,233$ for the EU-9 and EU-5

respectively) highlighting the need for the inclusion of additional explanatory variables.

Thus, in a second step investment share and the years of education as a measure of physical and human capital, are added, while the inflation rate, and government consumption enter in the model to measure macroeconomic stability. Finally, the effect of trade openness is examined (columns 3 and 4). Again, growth depends negatively on initial GDP, indicating conditional β -convergence. The investment share enters positively²², (see e.g. Barro, 1991; Levine and Renelt, 1992) as it was expected and is significant at the 1% significance level. Turning to the average years of schooling, the positive and significant coefficient for the EU-9 indicates that education is growth enhancing in this group of countries. Contrary, in specification 4 for the EU-5, the human capital enters with a non significant coefficient. The minus sign of the coefficient for the inflation indicates a growth hampering effect²³. Inflation has a significant negative impact on growth, reflecting a reduction in purchasing power and a lower income performance. Also, government consumption enters the equation with a negative sign implying a negative relationship between government expenditures and growth in the EU-9 countries as well as in EU-5 (columns 3 and 4). Finally, Inclusion of trade openness in the equation reveals a positive but non-significant coefficient for both groups and the variable is excluded from the next models, since it is never significant. These results are in line with many others researchers.

In the next step, the model is modified by considering two institutional variables: corruption and bureaucracy (columns 5 and 6). The results provide mixed evidence for the EU-9 and EU-5 with coefficients appearing with the expected sign for the EU-9 and with opposite signs in the EU-5 countries. More specifically, for the northern group of countries coefficient of corruption is significant with positive value and comes in accordance to the theory, considering that an increase of CPI provides evidence of low corruption implying high level of functionality without wasting public money, correct distribution and confidence for the investments from the abroad. On the contrary, bureaucracy although appearing with the expected sign, is not significant, implying that it does not affect growth when CPI and the other control variables are included in the model. Of great interest are the results for the group of EU-5 countries, in which coefficients of both the corruption and the bureaucracy enters with opposite sign than expected. More precisely, the coefficient of corruption is negative but not significant. As it concerns to bureaucracy, its coefficient enters the equation with a positive and statistically significant coefficient, giving support to the “Weberian” bureaucracy, the positive effect is due to the benefits of complementary inputs like the development of infrastructures, which

²²Czasonis and Quinn (2012) found that capital formation was one of the root causes of convergence of the Eastern European countries to German.

²³For a detailed study of this relationship, see Barro (1995).

took place particularly in Greece Spain and Portugal through the European Structural Funds.

Table 2: Conditional β -convergence in the EU-9 and EU-5 countries, (1995-2012). Panel Fixed Effects Models

Dependent variable: $growth_{it} = \ln y_{it} - \ln y_{it-1}$								
	EU-9	EU-5	EU-9	EU-5	EU-9	EU-5	EU-9	EU-5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	1,532 ^a	1,574 ^a	1,296 ^a	1,130 ^a	1,129 ^a	0,779 ^a	0,723 ^a	0,792 ^a
<i>lny_{t-1}</i>	-0,144 ^a	-0,155 ^a	-0,136 ^a	-0,119 ^a	-0,124 ^a	-0,098 ^a	-0,1 ^a	-0,086 ^a
<i>INV</i>			0,004 ^a	0,003 ^a	0,004 ^a	0,004 ^a	0,004 ^a	0,004 ^a
<i>EDU</i>			0,044 ^c	0,012	0,055 ^a	-	0,072 ^a	-
<i>INFL</i>			-0,011 ^a	-0,007 ^a	-0,012 ^a	-0,003 ^a	-0,007 ^a	-0,006 ^a
<i>GOV</i>			-0,004 ^b	-0,004 ^a	-0,004 ^b	-0,003 ^b	-0,006	-0,003 ^a
<i>OPEN</i>			0,0003	0,0002	-	-	-	-
<i>COR</i>					0,0007 ^a	-9e ⁻⁰⁵	0,0007 ^a	-
<i>BUR</i>					-0,0002	0,002 ^a	-	0,002 ^b
<i>DUM (2008)</i>							-0,021 ^a	-0,014 ^a
Observations	153	85	135	75	135	75	135	75
Adj. R²	0,3448	0,2327	0,7062	0,8329	0,7086	0,8565	0,8583	0,8516
F-Statistic	6,07 ^a	6,28 ^a	16,77 ^a	17,64 ^a	12,42 ^a	14,07 ^a	14,69 ^a	19,057 ^a

Note: EU-9: Austria, Belgium, Denmark, Finland, Germany, Ireland, the Netherlands, Sweden and the UK, (Luxembourg is excluded). EU-5: Greece, Italy, France, Spain and Portugal.

a, b, c denote significance at the 1%, 5% and 10% levels respectively.

F-Statistic is used to test the null hypothesis: The groups have a common intercept.

Source: Own Elaboration.

Finally, the negative and significant coefficients of the dummy variable DUM (2008), shows that the economic crisis affected negatively the growth performance of the EU-5²⁴ as well as EU-9 countries (columns 7, 8).

6. Conclusions and Some Policy Implications

In this paper, using panel data techniques, we investigate the existence of real convergence in two distinct groups of European States; that is, the South consisting of the states of Greece, Italy, France Spain and Portugal (EU-5), and the North consisting of the states of the remaining nine members (EU-9) of the EU. More specifically, we examined whether or not consideration of these two discrete state groups, provides evidence of existence of different convergence speeds.

²⁴See also, Fernandes and Mota (2011) for the PIGS and non-PIGS Eurozone countries, Kouretas and Vlamis (2010) for the Greek crisis, and Andrade and Duarte (2011) for the Portuguese crisis.

Employing a first step analysis on the growth effects of corruption and bureaucracy, in these two groups of European States, the dynamics of two institutional variables is presented. The picture is convincing in that the North and the South European countries indeed present through time, two distinct patterns of behavior. The “clean” North rests “clean”, but the corrupted South becomes even more corrupted in these certain crisis years. With respect to bureaucracy, once again, the EU-9 country group presents a significant improvement, while the “bureaucratic” South made only a little such progress and remained “bureaucratic” per se.

With respect to the specification choice, we chose the panel fixed effect model in order to account for the heterogeneity into the units of analysis, by allowing individual-specific variables. The panel data approach can additionally capture the influence of certain periods of time on the economic growth, such as economic recessions and financial crises, by including a certain dummy variable. Now, in order to test for the conditional convergence, a certain number of growth determinants are being considered. More specifically, in addition to the variables suggested by the augmented neoclassical Solow-Swan model (inflation, government consumption, and country openness), corruption as well as bureaucracy are also taken into account.

Our results, then, reveal that in both countries’ groups, both absolute as well as conditional convergence indeed occurred over the certain period of 1995-2012. Investment in physical capital is a robust growth driver, while human capital seems to impact growth only in the case of the Northern European countries. To the contrary, inflation and government consumption, as it was expected, both have a strong negative effect thus hampering economic growth. With respect to the country openness, in line with other studies, the variable enters with a positive but non-significant coefficient thus leaving the openness–growth connection as a still open scientific question. Also, a special issue of economic interest is our finding that the growth effects of corruption and bureaucracy seem to differ across the two groups of countries. More specifically, in North Europe, low corruption is related to the per capita GDP growth rates, while bureaucracy seems to have only insignificant effects. In the South, on the contrary, corruption does not seem to influence economic performance, while bureaucracy is also positively related to economic growth.

Overall then, our results suggest that macroeconomic policies that affect economic growth, directly through their effect on physical and human capital accumulation and macroeconomic stability, reflected in low and stable rates of inflation and government consumption, would indeed increase growth in EU. Finally, taking advantage of the European integration, in terms of real convergence, institutions seem also quite essential ingredients.

We are aware of the fact that the empirical evidence reported in this study is not definitely conclusive, since the issue of convergence remains quite complex and ambiguous. In particular, we do emphasize that the results are subject to the overall

economic evolution, necessarily depending upon the evolving dynamics of the economy and the continuous impact of various macroeconomic developments, as the current crisis expands. To that end, the continuous use of alternative scientific specifications and methods of analysis would also help to deepen our economic understanding of the economic convergence issues, both in Europe and elsewhere. It is certain that such additional research directions are left for the future scientific needs that we are facing.

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