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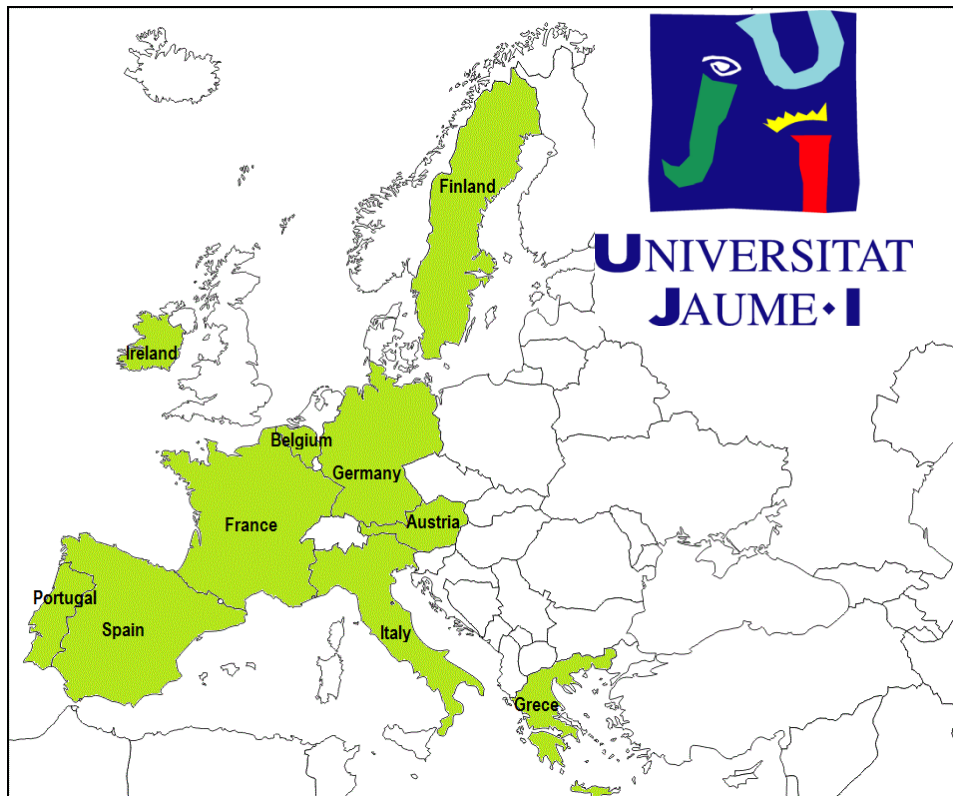
Real divergences and the Eurozone crisis

Degree final Project

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1. ABSTRACT

The first 15 years of European Monetary Union (EMU) have seen growing structural imbalances between member states without offsetting gains in productivity and economic growth.

Economic tensions within the Eurozone have been building since its inception, and have become acute during the current crisis. It has created a dualism in the euro zone, with northern countries recovering, albeit slowly, from the crisis, increasingly diverging from southern countries that are embroiled in sovereign-debt crises and with weak prospects of growth, even in the medium term. Divergence in competitiveness, in current accounts and in private sector debts has led to excessive public sector debt and deficits in peripheral Southern countries.

The Eurozone has imposed an asymmetric policy response to these divergences, with the burden of adjustment falling almost exclusively on the weaker economies of the South. These peripheral economies are required to seek a real depreciation with respect to the North through a combination of wage reductions and fiscal retrenchment.

But, will the internal devaluation contribute to a further increase of real divergences or to restore competitiveness in the peripheral countries? This is the primarily question of this proposal. It is aimed to analyze the euro crisis, focusing on its economic roots and the interactions between the crisis and the observed real divergences.

The results suggest that there are notable differences across countries and the whole nation in terms of capital intensity and total factor productivity. Furthermore, the economic reforms don't have been successful in driving long-run growth. So, countries need further reforms in order to reach convergence.

2. INTRODUCTION

In this paper I present my final degree project. I chose the topic "*Real divergences and the Eurozone crisis*", because I have studied the degree of economics and I would like finishing my studies with a research of the actual economic crisis. Being an specific research work, I will focus only in the related economic aspects.

I study the extent of macroeconomic convergence/divergence among euro area countries. I have to focus on raising the topic on design flaws, which have resulted in imbalances causing the economic current crisis which is affecting a big part of the Eurozone. My hypothesis is that the root of these imbalances is related to the specificities of the growth model in the periphery and core European countries.

The goal of the present paper is to assess whether the data supports the extent of macroeconomic convergence/divergence across 10 European countries over the 1991–2013 period. For this, I used the Net capital stock and in the Total factor productivity of some Eurozone economies. Concretely, I added in this research 10 countries: Belgium, Germany, Ireland, Greece, Spain, France, Italy, Austria, Portugal and Finland.

Accounting for these data features has proved to be very useful in convergence studies since it is crucial to distinguish long-run divergence from transitional dynamics to the steady state. Long-run convergence (or divergence) and catching-up are analyzed in this paper using capital intensity and total factor productivity as convergence indicators.

In this context, the objective of this paper is two-fold. First, we analyze the convergence behavior of capital intensity and total factor productivity (TFP) for 10 countries over the period 1991-2013. And second, we attempt to determine whether differences in competitiveness are accounted for by differences in capital intensity or technological progress. This distinction is important in terms of the sustainability of regional growth. To carry out this research, we focused on the concept of convergence based on unit root tests.

Summarizing, my analysis focuses on the differential performance across countries, and the rest of the paper is structured as follows:

In Section 2 I present the literature review. In Section 3 I have motivated the research. In Section 4, I explain the methodology I use for analysis (I have applied this procedure to a broad selection of Eurozone economies). Section 5 presents my findings with the analysis of results. In Section 6 I add possible further research. Section 7 will present the conclusion. Section 8 contains the Bibliography. And, finally, in Section 9 I attach annexes.

3. LITERATURE REVIEW

In this research, I am going to develop it chronologically. Since its beginning in 1999, the European Union is composed by countries with capitalist economies. It has experienced an expansionary period. So that, exists big growth at European countries.

Nowadays, Europeans are feeling period of crisis. This time is a result of disparities that exist across the countries and how this unbalanced growth path may influence national development and therefore the sustainability of this economic growth. So, it shows two clear differences in the composition of Eurozone countries: the central, whose economy is characterized by surplus, and the periphery with economic deficit.

Serving more details, during the good economic time, there was a capital accumulation, which generated instability. These boom years were characterized by an excessive credit in the peripheral zone. This debt was assumed for some countries, whose are paying little interest rates linked to short-term. This credit was used to benefit the countries to financing them for the construction and consumption, allowed them better rates of GDP and employment.

Nowadays the countries are experiencing difficulties due to the cut of the private capital which they were used to receive until 2009. After that, these countries are not able to pay a sustainable price for the financing.

Now I am going to pose a point of *Gros (2012)*. He did the question why did financial markets, which had provided to the periphery countries with ample financing over years when their current account deficits and the (approximate) size of their public debt were well known, almost out of the blue suddenly review their position. To answer the question, the author considered that, this is merely a change of the risk and growth perception, from before and after 2009.

In this moment, it is worth mentioning certain economic variables that are explained in the paper of *Estrada, Galí and López-Salido (2013)*. These variables are both nominal and real, which have developed in a different form in each country member.

- Unemployment is experiencing a generalized growth in the current period of economic recession, but does not affect equally to all members. For this reason we can say that the existence of the European Union has not been sufficient to prevent the dispersion of unemployment rates. What is more, a common monetary policy would be needed strong stabilization devices to redistribute risk between the Eurozone.
- The implementation of a common monetary policy has simplified the convergence to average inflation rates.
- Despite fluctuations, the evolution of relative prices shows a similar behavior, so we can talk about convergence in the Eurozone.
- Regarding evolution the current account, we know that there were big imbalances between countries in the Eurozone in the pre-crisis period, and which are declining in this period of recession. This is due to a cyclic pattern of medium-term dynamics of the economy (GDP improvement rate in recessions), and different measures imposed in different countries, seeking to improve price competitiveness (internal devaluation output deficit).

At the paper, authors mentioned that there are some concepts that explain imbalances to balance current account:

- | | |
|-----------------------------------|-----------------------------------|
| 1) Institutions | 7) Efficiency in the labor market |
| 2) Infrastructure | 8) Development financial market |
| 3) Macroeconomic Environment | 9) Technology |
| 4) Health and education | 10) Size Marketplace |
| 5) Training by highly educated | 11) Sophistication business |
| 6) Efficiency in the goods market | 12) Innovation |

These are interesting because countries used different policies of investment to different uses. These variances get levels on each country. For instance, invest on health and education at underdeveloped countries means a big positive change on their economic behavior. On the other hand, at developed countries the most important factor to growth is Technology. For this reason, in this project I am going to try to know if actual austerity government's policy is correct, or in the contrary could be better to base it on technological development.

Compiling, there are countries, as we call it peripherals, with deficits, and other we call central countries, with a totally opposite situation (surpluses). This situation occurs at the time when central countries decided stop financing the debt with their national savings. As the author Gros (2000) believes that this situation is because for a long period of prosperity, surplus savings were intermediated by the banking system, creating a strong bias toward movement of capital within the Eurozone. Besides this, the interest rates of the periphery countries felt more when the central countries invested there, because they had no risk. As a result, they achieved large current account deficits, deteriorating their international investment position. This situation explains the international funding. Although the total of the Eurozone has sufficient resources to finance countries needs with deficit.

These countries have imbalances in their current account, because they deteriorated their competitiveness on their unemployment labor costs. This statement is relative because it compares deficit countries with other countries more capable. However, we must not forget the housing bubbles which are causing a lot of damage during crisis time. This is due to their acceptance of a common monetary policy, sacrificing their right to devalue national currency.

Summarizing, the problem is that the central countries do not let to spend their savings to finance the debt of peripherals countries. The current account deficit appears for two reasons: lack of funding and low competitiveness.

Clarifying the issue of competitiveness, peripheral countries are relatively worse. Nowadays, divergences in competitiveness are a political debate topic, where the European Commission introduces changes in economic governance, with two indicators:

1. Unit labor costs
2. Relative consumer prices

We must bare in mind that making policies focused on competitiveness may not be the best, because it is difficult to determine the balance level of competitiveness. Furthermore, we cannot affect directly on the determination of labor costs because it is given in the working market. That is why the government has little to do.

Therefore, the imbalances in the current account are not explaining by relative price levels. We know that internal devaluation policies with reduction wage, are limited if they are not accompanied by a structural reforms improvement. At the moment the government seeks the nature and scale of policy responses to reduce imbalances, especially in periphery countries, as they are under pressure from financial markets.

Another point I consider important is the existence of an expansionary monetary policy for a long time, whose transmission mechanisms have different effects on each country. These have worked differently in each country, because each country has particular financial structures.

For this reason, it is possible that a fixed exchange rate cannot be good for different situations. At the center an expansionary policy would be effective with a lowering of the interest rate to increase inflation, while at the peripheral area it would be better a contractionary policy with a rise in the interest rate to decrease inflation.

As we know, corrections have been existed. For example, *Guillemette and Turner (2013)*, mentioned the reduction of the deficit to GDP from 7% to 4%. But society needs further adjustments, because the external debt has continued to rise.

Therefore, we could use the following drivers of the trade balance:

1. Depreciation of the common currency (euro) as a marginal help to countries that are worse off.
2. Structural Reforms to improve competitiveness, making it susceptible to price and wage demand.
3. Boost productivity in peripheral countries affecting taxes that go linked to labor.
4. Apply the adjustment mechanism of falling prices and wages, but without losing sight that this creates a depressed demand, as production falls and unemployment rises.

Now is being carried out an austerity process which is causing internal weakness. So it is generating undesirable consequences due to this, and given our concern for competitiveness, the European Central Bank is a system stabilizer whose main concern is the stability price. It injects liquidity in crash situations, because banks used to borrow at short term and lend at long. Moreover, the Private Sector exists as another stabilizer manager to reduce debt. As it is happening nowadays, the Private Sector can do an austerity fiscal policy in order to reduce spending and increasing taxes. But total production fall yet, as the debt still exists. Another alternative is the active sale, with an internal devaluation that lowers the relative prices. But what may seem like a solution, in turn, can generate future solvency problems.

Nonetheless, it is possible that the relative price adjustments should occur within and between countries in the euro area to support internal and external demands to full employment and low fiscal deficit and current account. That is, we must try to reduce the fiscal austerity of the peripheral countries in order to strengthen domestic demand weakened.

4. **MOTIVATION**

Having clear on what are we working, there is no doubt that countries are different. The question, however, is whether these differences are important enough to represent a stumbling-block for monetary unification.

A common currency has important benefits. For example, I consider important that Common currency decreases transactions costs, since it could stimulate economic integration in Europe. It also will improve the efficiency of the price mechanism, reducing uncertainty and, stress the greater price transparency let countries to increase competition, benefiting consumers. For this reason, the number of countries that benefit from monetary union is large. So it is an attractive position for most European countries.

However, countries differ because they have different preferences and they also differ because they have different fiscal systems. For this reason, countries have to use different combinations of debt and monetary financing of the government budget deficit. When these countries join a monetary union, they will change the way they finance their budget deficits. All this may make the introduction of a common currency costly:

The process is that less developed countries join a monetary union with more developed countries that have a low rate of inflation will also have to lower inflation. This then means that, for a given level spending, they will have to increase taxes. In general, countries with an underdeveloped tax system will find it more advantageous to raise revenue by inflation and the others will be a loss of welfare.

What is more, we know that there are asymmetric shocks, but I want to stress that these can be transmitted in asymmetric way because economies have different structures and institutions in labour, products and financial markets also differ. We conclude that, due to structural differences in the workings of labour markets, the same policy of the ECB has very different effects on outcomes in different countries.

The main problem is that governments can create budget deficits to absorb negative shocks without leading to problems of sustainability of these deficits.

As Peripheral European countries have experienced during the current crisis, however, government budget deficits can lead to problems. If the interest rate on the government debt exceeds the growth rate of the economy, a debt dynamic is set in motion which leads to an ever-increasing government debt relative to GDP. This becomes unsustainable, requiring corrective action. The important message is that, a budget deficit leads to an increase in government debt which will have to be serviced in the future reducing spending and/or increasing taxes.

For this reason, there are instruments that the ECB uses to pilot the economy towards targets, like open market operations, which are the most important instrument of the monetary policy of the ECB. The aim of these is increasing or reducing money market liquidity.

Now, I find interesting to focus my research on the origin of the divergences at the countries of the Eurozone. After that, I pretend to judge if the measures are being carrying out by governments are effective in order to stop divergences, or on the contrary, exist better alternatives to leave of the recession. As we have said, the best measure could not be the internal devaluation. Maybe better options exist to help deficit countries to make productive improvements in their competitiveness.

In order to understand the importance of this research, first of all, I'm going to explain Macroeconomic theory. With this idea I want to solve the next question: "What determines growth?"

Bob Solow and Trevor Swam, published two articles in the year 1956 introducing the Solow model, which I am presenting in this research. Bob Solow later developed many implications and applications of this model and was awarded the Nobel Prize in economics for this contributions. This model has shaped the way we approach not only economic growth but also the entire field of macroeconomics.

Before the advent of the Solow growth model, the most common approach to economic growth was built on the Harrod-Domar model, which emphasized potential aspects of economic growth. So, the Solow model demonstrated why do Harrod-Domar model was not an attractive place to start.

The Solow model is remarkable in its simplicity and for abstract representation of a complex economy. Therefore, the Solow model should be thought of as a starting point and a springboard for richer models.

As I will propose in my study, the role of capital accumulation and the technological progress are the protagonists:

$$Y = F(K, N)$$

Y → Aggregate output

K → Aggregate capital stock

(All the machines, plants and office buildings in the economy)

N → Aggregate employment

(The number of workers in the economy)

As we can see at the formula, capital accumulation does affect the level of output, but it cannot by itself sustain growth. A higher saving rate typically leads to lower consumption initially but to more consumption in the long run. This is because in the long run, the growth rate of an economy is determined by the rate of technological progress.

But, one thing occurs: *Even under constant returns to scale, there are decreasing returns to each factor, keeping the other factor constant:*

- *There are decreasing returns to capital: given labour, increases in capital lead to smaller and smaller increases in output.*
- *There are decreasing returns to labour: given capital, increases in capital lead to smaller and smaller increases in output.*

So, what determines how much output can be produced for given quantities of capital and labour? The state of technology.

Understand the base of this reasoning, the *Solow Model*, transform the first model at the “Output per worker and capital per worker”:

$$\frac{Y}{N} = F\left(\frac{K}{N}, 1\right)$$

With this new formula, if there is an economy with a high growth rate of output per worker over some period of time, it could be for two reasons:

- *It may reflect a high rate of technological progress under balanced growth.*
- *It may reflect instead the adjustment of capital per effective worker, to a higher level. Such adjustment leads to a period of higher growth, even the rate of technological progress has not increased.*

As we know, there are decreasing returns, because increases in capital per worker lead to smaller and smaller increases in output per worker as the level of capital per worker increases. For this reason, capital accumulation by itself cannot sustain growth. The economy will be unwilling or unable to save and invest enough to further increase capital.

At the time, sustained growth requires sustained technological progress.

In order to finally with the economic theory of Blanchard, there are two sources of convergence between countries:

- *Poorer countries are poorer because they have less capital to start with. Over time, they accumulate capital faster than others, generating convergence.*
- *Poorer countries are poorer because they are less technologically advanced than the others. Over the time, they become more sophisticated, either by importing technology from advanced countries or developing their own. As technological levels converge, so does output per worker. This one is the more important source of convergence because development is very important in our society. A country that saves more or spends more on education will achieve a higher level of output per worker in steady state.*

By all this, at the paper I am going to develop a research using real data of Eurozone economies. I am going to use a methodology whose results give me the opportunity to contrast my hypothesis. So that, if I am right on my thoughts, actual policy of depressed countries could not be the better. It is possible that a change in their behavior, doing other government policies based on more investments in the technological process, could be optimal.

5. METHODOLOGY

To get robust conclusions, this type of research of time series analysis has often been conducted by applying unit root tests. In order to explain the quantifiable method, I begin with the normal way of my data and identify the order of integrality to determine the number of times it will be necessary to differentiate the series to make it stationary on average. As I said, the detection method of the number of unit roots that I used, was augmented Dickey Test -Fuller (ADF abbreviated). This test tests the significance of the associated t-1 variable, which in the most general version would take the expression parameter:

$$\Delta y_t = a_0 + \gamma \cdot y_{t-1} + \sum_{i=1}^j \Delta y_{t-i} + a_2 \cdot t + E_t$$

Thus, if the gamma parameter is statistically different from zero, the series will be stationary on average. If we cannot reject the null hypothesis that the parameter equals zero hypotheses, then we can conclude that the series will have at least one unit root.

Summarizing,

$H_0 \rightarrow \gamma = 0 \rightarrow$ Accept divergence with Eurozone's average

$H_1 \rightarrow \gamma \neq 0 \rightarrow$ Accept convergence with Eurozone's average

Therefore, if we can reject the null hypothesis, then we consider that the series is stationary and the country converges to the European average. If we cannot reject it then we can think that the country in question has at least one unit root, diverging from the European average, in this case.

6. ANALYSIS OF RESULTS

In this paper we take the real unit labor cost as a relevant indicator of competitiveness and, as such, as a driver of real convergence. We examine our hypothesis of divergence in a selection of 10 Eurozone economies:

- | | |
|------------|-------------|
| 1. Belgium | 6. France |
| 2. Germany | 7. Italy |
| 3. Ireland | 8. Austria |
| 4. Greece | 9. Portugal |
| 5. Spain | 10. Finland |

Through the AMECO database, I have obtained data of the following variables:

- *Gross national income at 2005 market prices, deflator GDP (OVGN)*
- *Net capital stock at 2005 prices per person employed: total economy: Capital intensity (RKNDE)*
- *Total factor productivity: total economy (ZVGDF)*

I have used data series from 1991 to 2013 for each of selected countries. First of all, I need the variable Gross national income to weigh the other two variables concerning the indicator of competitiveness. This is important because I make the average of all the data of the period for each country. With these means, I make a total sum of mean assuming that this is 100%. Now I can ponder each country average:

Belgium	Germany	Ireland	Greece	Spain	France	Italy	Austria	Portugal	Finland	
286,820848	2187,617	111,432222	164,670904	792,618857	1617,56535	1337,79439	227,065009	139,86177	139,469704	7004,92
4,09%	31,23%	1,59%	2,35%	11,32%	23,09%	19,10%	3,24%	2,00%	1,99%	100%

With this, I formed a panel for each variable. I have made some tables and graphs in Excel (see them at annex). This process allows me analyzing behavior of each country during this period time. It is worth to comment the transformation I had to do on the variable of total factor productivity to create a useful table. So I had to make changes in order to prices have first data as the base year. With this change, the results are of more clearly.

Convergence can be defined as the narrowing of international differences in the development of some economic variables. The concept of convergence in time series analysis refers to the notion that the output of a country relative to the European average of the reference is stationary.

This topic of convergence across European countries is receiving a great deal of attention from economists. Since economic convergence within the EMS member states is a precondition to economic and monetary integration.

Distinction must be made between nominal convergence, which is the convergence of the development of costs and prices and their underlying determinants, real convergence of working conditions and living standards and the convergence of economic institutions or structures. The latter is one of the fundamental objectives of a fully integrated Europe, but it is a long-term process.

For all this, I want to extract from the data whether each country converges to the European average sample. To do it, I constructed two tables more with a spread of initial variables and their average (see them at annex). From that differential, I made graphs to see intuitively the behavior of the studied variables: Capital intensity and Total Factor Productivity. In each of the graphs, we can see the evolution of the variable for each of the European countries in the sample over the period. In addition, we calculated the weighted average of the weight that each country in the whole. However, what interests us is whether or not each country converges to the European average. From the graphs, we can get an idea then contrast this with the unit root test to see whether or not convergence.

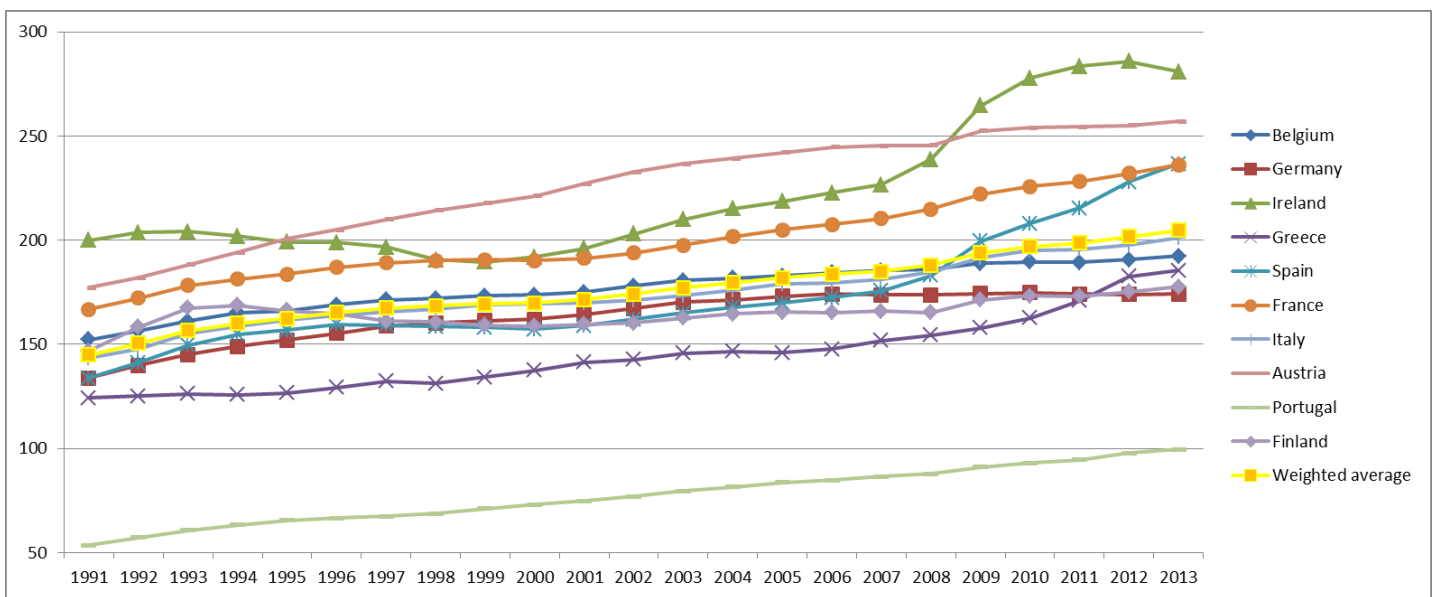
To see it more clearly, I attached two types of graphs for each variable: Net Capital Stock and Total factor productivity. Both show the same but in different ways:

- The first way is the evolution of the real data and the European average. With this, we can see that the country is above the European average in capital accumulation and / or the total factor productivity, which under, and which follows similar trend and evolution.
- The second method shows the differential, calculated with actual data minus the mean. Therefore, when it is close to 0, it has more convergence with the European average of Capital intensity and / or Total factor productivity.

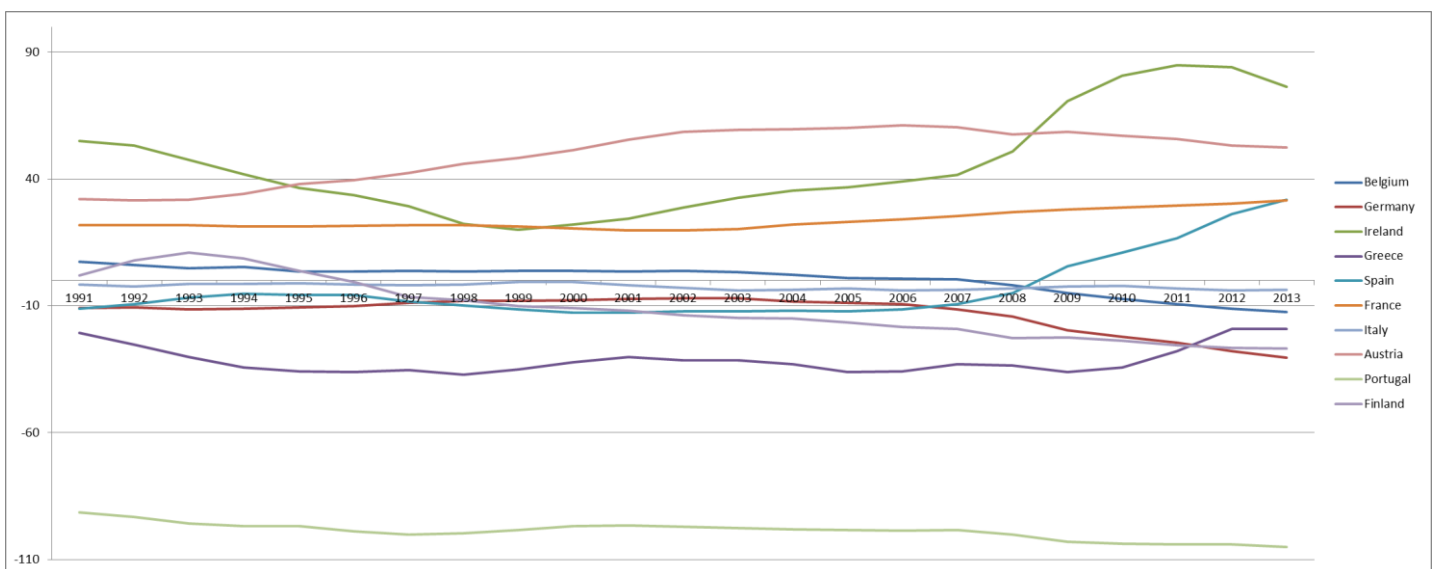
So, here I present graphs which show the evolution of countries respect to the sample mean for the time period studied.

I consider important to distinguish those countries which have big differences from the European average. Besides countries that are closer in terms of capital intensity and Total Factor Productivity. This allows us to see intuitively which countries could converge to the EU average and which others could diverge. This part of my research, only gives us a simple and visual outcome, then I check it with an econometric test of convergence

Net capital stock at prices per person employed: total economy: - Capital intensity



Own elaboration graph with data of database of AMECO.



Own elaboration graph with data of database of AMECO.

I am going to begin the comment with countries which their data is very different from the mean. With these countries, I can form two groups of four countries each.

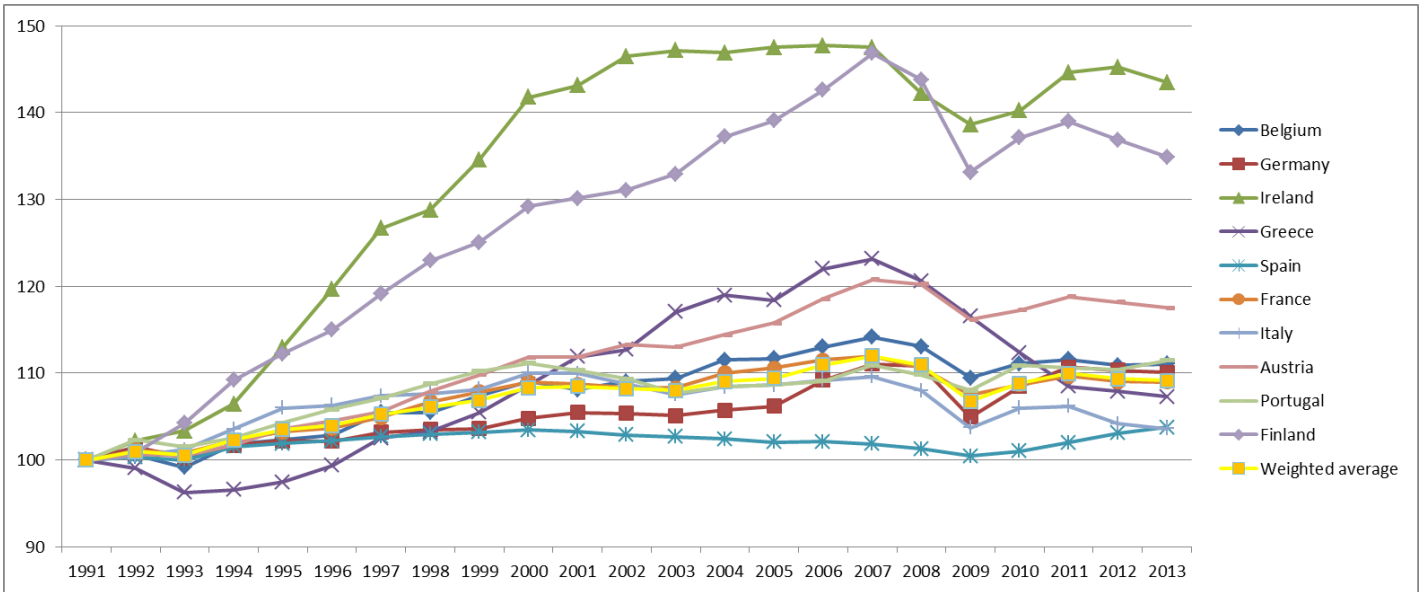
- Countries far above the average
 - With mixed developments:
 - Ireland: shows a very different evolution, not constant, always staying above the European sample mean.
 - Austria: country with constantly evolving, always with higher intensity than the European average capital.
 - With possible future convergence between both:
 - France: country with constantly evolving, always with higher intensity than the European average capital.
 - Spain: country whose capital intensity, despite close to, has generally been lower than average until 2008, then it changes its trend positively, placing it in a more favorable area, above the average.
- Countries far below the average
 - With possible future convergence between them:
 - Greece: presents some fluctuations and a growing trend in recent years.
 - Finland: country with evolving with fluctuations, generally with lower intensity than the European average capital. It also has a decreasing trend.
 - Germany: country with evolving fluctuations, generally with lower intensity than the European average capital. It also has an increasing tendency.
 - With mixed developments:
 - Portugal: stands out as the country that is far from the European average. Presents a consistent trend, without many fluctuations.

Meanwhile, two countries whose capital intensity is closer to the average observed:

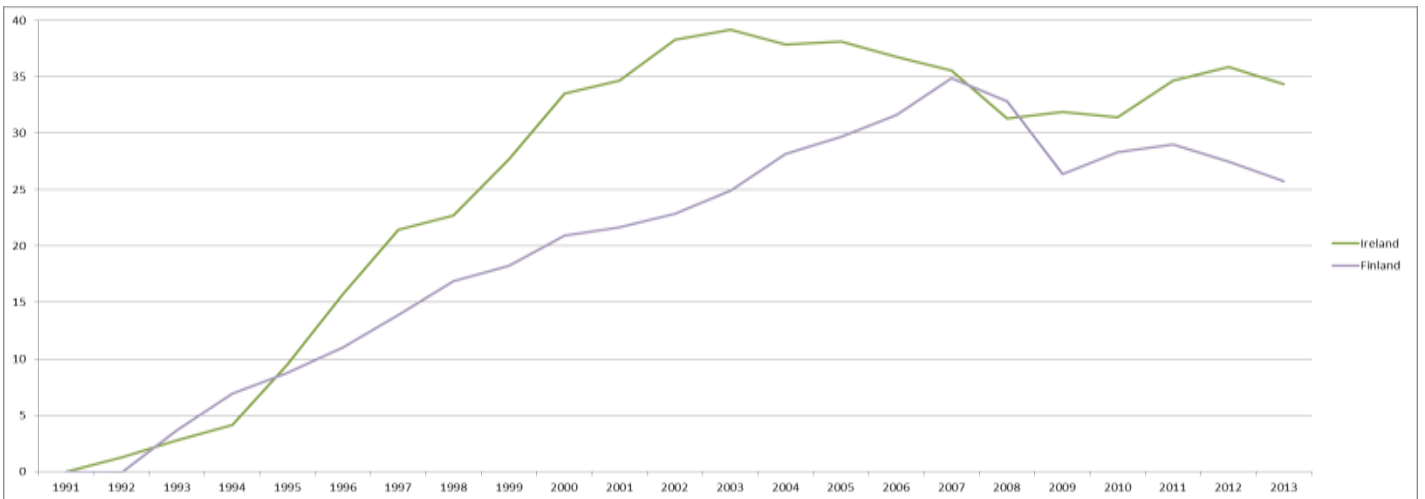
- Italy: the country that is closest to the European average. Presents a consistent trend, near the average for the entire period.
- Belgium: has similar capital intensity to the European average over time, one time above, one time below, but without much fluctuation.

So, I remark Italy as the country most likely to indicate that the econometric test convergence with the European average. Also, stressing Portugal, because it has very different capital intensity than the mean. This is negative, since it has very small capital intensity relative to other European members.

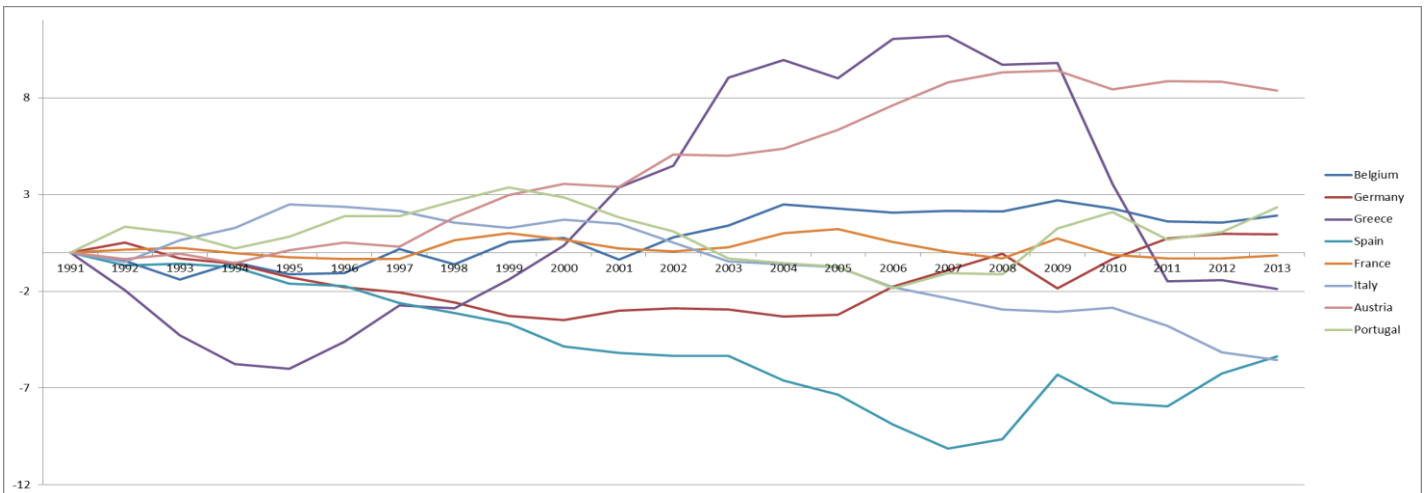
Total factor productivity: total economy



Own elaboration graph with data of database of AMECO.



Own elaboration graph with data of database of AMECO.



Own elaboration graph with data of database of AMECO.

Continuing with the same criteria of comment now I will differentiate countries according to their levels of total factor productivity. Regarding countries most differenced from the mean, I can form two groups:

- Countries far above the average
 - Remarkably far (I present it in a separate graph because they show very different to other European countries evolution. Their total factor productivity is much higher, which means better use of their resources)
 - Finland: presents growing trend of total factor productivity until 2007, then it changes its trend as negative. However, it remains well above the European average.
 - Ireland: country with evolving fluctuations, generally with an overall increased productivity and well above the European average factors.
 - Moderately above average
 - Austria: presents growing trend of total factor productivity, which lets itself walk away positively of the European average.
- Countries far below the average
 - Moderately below average showing some convergence between them.
 - Italy: evolves with fluctuations, generally close to the average until 2005, when total factor productivity changes its trend negatively.
 - Spain: country always with total productivity lowers than the European average. Besides decreasing trend until recent years. This is the worst country of the European members.
 - France: noted for its constant proximity to the European average.
- Country with mixed developments:
 - Greece: classified it regardless because it has introduced large variations in total factor productivity over the period. It started by below average, followed by a strong improvement until 2009, when it again changed its trend, plummeting. However, in recent years it is close to the average, what is more, it is being more or less stable.

Meanwhile, two countries whose capital intensity is closer to the average observed:

- With possible future convergence between them:
 - Belgium: country which evolves with small fluctuations, it usually has constant total productivity and it is close to the European average.
 - Portugal: its total factor productivity fluctuates above and below the average, and recently is placed above.
 - Germany: mainly their total factor productivity has been below average, until it changed its trend positively.

So, I remark France as the country most likely to indicate that the econometric test convergence with the European average. I also stress Greece to present large fluctuations relative to the average during all the period.

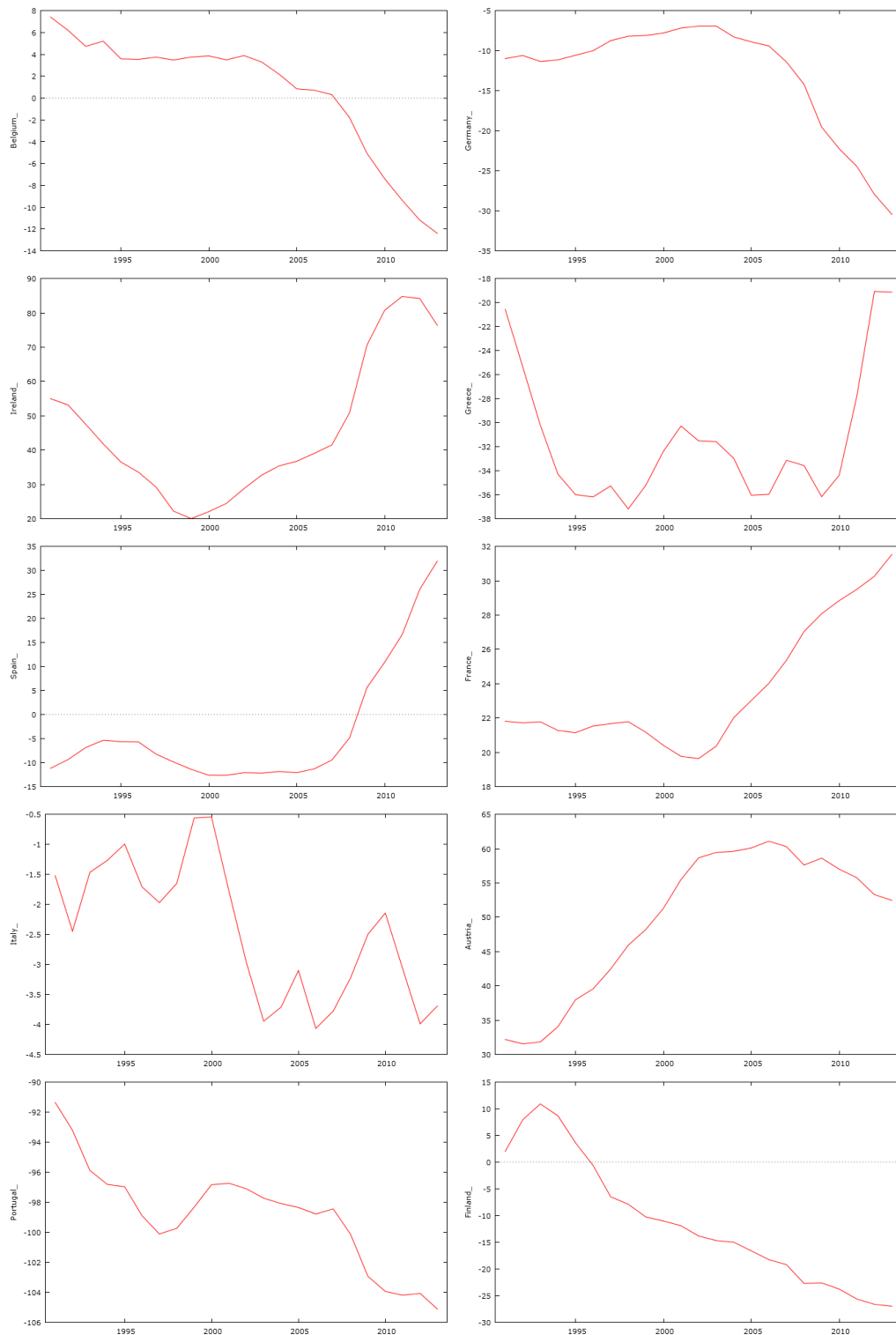
But a graphical analysis is not enough to get consistent conclusions. For this reason I used RATS, to support the convergence hypothesis across countries with unit root tests, as the augmented Dickey-Fuller.

To begin, I passed data from Excel to my sample. I can start using the data at the moment as I characterize these data as a time series that got its start in 1991.

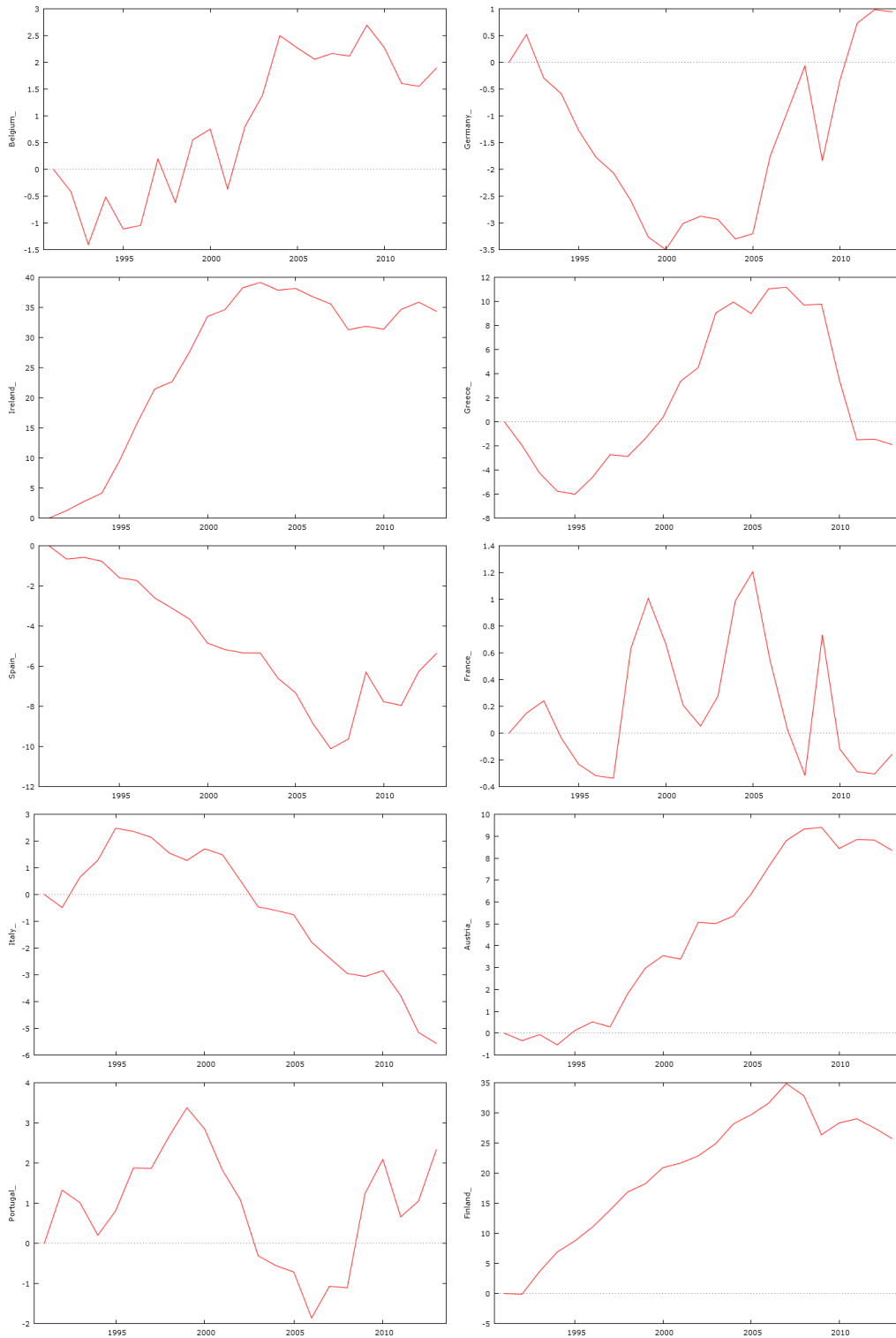
In order to do a do a good research, I need to know if data have trend. This is important because, empirically speaking, if the process is stationary, it will be without trend. Conversely, a non-stationary process it will be with a trend which implies divergence with European average sample. So I made graphs of development of each country during the period. I used Gretl to make graphs.

As we can see then, not all countries have a clear tendency during the studied period. So it is worth to do a complete test of unit roots in order to get robust results.

Net capital stock



Total factor productivity



Once the test has been understood, I proceed to present the results that I extracted from the data analyzed:

Net capital stock

	Belgium				Germany				Ireland			
	BIC		LM		BIC		LM		BIC		LM	
	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static
t	1	-0,7369	0	0,0299	0	0,9270	0	0,927	4	2,1376	0	-2,139
Z	1	-2,501	0	0,0639	0	0,9302	0	0,9302	4	-2,4592	0	-2,856

	Greece				Spain				France			
	BIC		LM		BIC		LM		BIC		LM	
	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static
t	1	-2,5861	0	-1,9833	0	1,2333	0	1,2333	1	-1,6865	0	-1,6964
Z	1	-14,3205	0	-4,8388	0	1,9717	0	2,9717	1	-4,236	0	-2,0873

	Italy				Austria				Portugal				Finland			
	BIC		LM		BIC		LM		BIC		LM		BIC		LM	
	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static
t	1	-3,4514	0	-2,1525	1	0,7813	0	0,7813	1	-1,4722	0	-1,6248	0	-1,7482	0	-1,7482
Z	1	-22,3844	0	-8,5378	1	1,2393	0	1,2393	1	-5,8878	0	-4,1662	0	-5,9975	0	-5,9975

**Rejection if the null hypothesis at 5% significance level*

Note: * Choosing the optimal lag length for the ADF regression between 0 and 5 lags by adding lags until a Lagrange Multiplier test fails to reject no residual serial correlation at level 0.050

	1%	5%	10%
t	-4,38	-3,6	-3,24
Z	-22,5	-17,9	-15,6

Total factor productivity

	Belgium				Germany				Ireland			
	BIC		LM		BIC		LM		BIC		LM	
	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static
t	0	-2,9265	0	-2,9265	0	-1,1392	0	-1,1392	0	-0,6456	0	-0,6456
Z	0	-13,0877	0	-13,0977	0	-2,7877	0	-2,7877	0	-0,969	0	-0,969

	Greece				Spain				France			
	BIC		LM		BIC		LM		BIC		LM	
	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static
t	0	-0,3718	0	-0,3718	0	-0,3928	0	-0,3928	0	-2,4844	0	-2,4844
Z	0	-0,9505	0	-0,9505	0	-1,5719	0	-1,5719	0	-10,9495	0	-10,9495

	Italy				Austria				Portugal				Finland			
	BIC		LM		BIC		LM		BIC		LM		BIC		LM	
	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static	lag	static
t	4	-3,3165	0	-1,7907	0	-1,511	0	-1,511	0	-1,5942	0	-1,5942	0	0,1987	0	0,1987
Z	4	-8,07	0	-3,6771	0	-6,1189	0	-6,1189	0	-5,6652	0	-5,6652	0	0,4003	0	0,4003

*Rejection if the null hypothesis at 5% significance level

Note: * Choosing the optimal lag length for the ADF regression between 0 and 5 lags by adding lags until a Lagrange Multiplier test fails to reject no residual serial correlation at level 0.050

	1%	5%	10%
t	-4,38	-3,6	-3,24
Z	-22,5	-17,9	-15,6

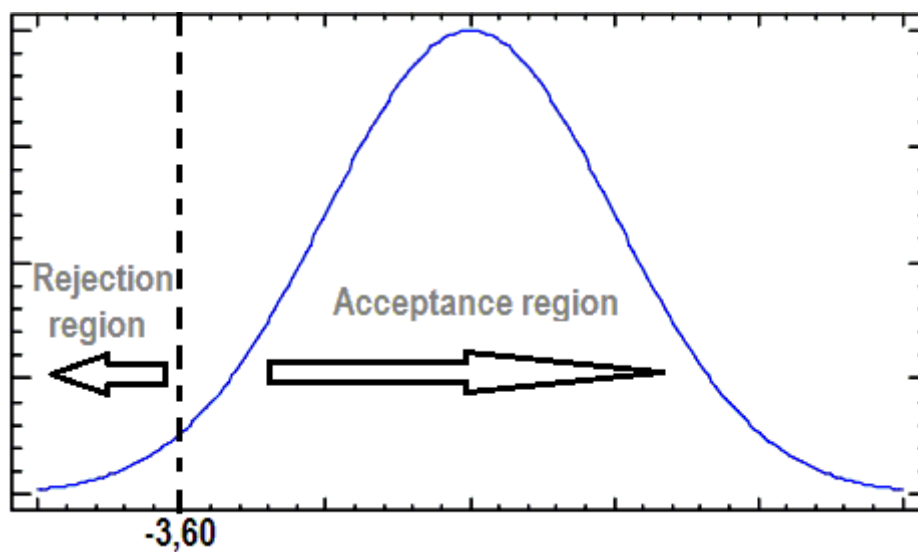
As I said, I used augmented Dickey Test-Fuller as a method of unit root test. There, I had to choose delays. So I did it with AIC/BIC and LM, two forms to establish delays. With this I am seeking more robust conclusions.

- First method, AIC / BIC, use t-static to make a basic unit root test. But as we saw with the graphs of each country before, some countries may have a tendency. For this reason, it is interesting to calculate Z-static to include tendency at the study.
- Second method, LM, calculates same statistics, but it has different way to choose delays.

Therefore, in order obtain robustly results, it is worth to both methods give us the same outputs. As we clearly could see on results' tables, generally, all of them are situated in the region of non-rejection of the null hypothesis of convergence. So countries do not converge with the European average, this is, they are diverging.

In reaching this conclusion, we interpret econometrics:

If the statistical value of t is greater than -3.60 , which is showing in above table significance, it would be in the rejection region. Therefore, when there are more small statics of countries, we could reject the null hypothesis of no convergence with different maximum error: 10%, 5% and 1% significance.



Therefore, with the variable Net Capital stock, we accept the null hypothesis of divergence in all countries, except on Italy. The results of the AIC / BIC method are the same: t -statistic = -3.4514 and $Z = -22.3844$. Although with LM method, which includes influence of tendency, gives inconsistent results, $t = -2.1525$ as $Z = -8.5378$. So, we can say that the result of convergence to the European average is not robust at both methods.

As can be seen from the analysis, most of the results are greater than the statistic associated with 0.05 significance level, so we cannot reject the null hypothesis and the series has at least a unit root. In case of Italy, the statistic t is less than 0.05 of significance and it is stationary. So we can conclude that Italy converges to the European average. However, we can see at the rest of countries, unit root tests might fail to reject the null hypothesis of the unit root, thereby wrongly implying absence of convergence.

Now it is important to note that studies with the unit root test refer to absolute convergence of the countries with the average. With that I have just obtained one converging country (Italy). This little evidence of convergence at European countries could be because I used a simple method of root test. This method has low power as unit root test, as it leaves out the possible structural changes. So, it is logical that there is not convergence between them. To sum up, there may be nominal convergence, but I could not affirm that there is real convergence. For this reason, the traditional neoclassical model of Solow fails.

7. FURTHER RESEARCH

I have obtained a basic result of convergence between countries. It would be appropriate to continue the study in order to obtain greater convergence. It would be possible relaxing some rigidities of the basic model of absolute convergence.

Therefore, given the existence of structural changes, it might be better not to stop the analysis here. The next thing that I would have to do to continue the research is to make conditional convergence econometric test. In this test I can limit the study, for example, doing groups of countries with similar economies.

8. CONCLUSION

As we know, in modern growth theory, when a country joins a monetary union, foregoing the use of monetary and Exchange rate policies to stabilize its national economy, the independent use of fiscal policy becomes more attractive, despite the political obstacles to fiscal flexibility.

In order to do a government's fiscal policy suitable, the growth rate of a government's debt, which is defined as the ratio of the budget deficit to the stock of debt outstanding, must not exceed the interest rate on that debt.

It is true that the existence of a current account deficit only becomes a problem when other countries are no longer willing to finance it. Without adjustments, debt accumulation will lead to destabilizing monetary tensions or a continuous impoverishment of the debtor country. This situation is exactly happening in Europe now, so it is necessary a reduction in current account imbalances with improvements in economics growth.

Capital accumulation plays a greater role in the growth process due to the embodied technological progress. Under this framework, capital accumulation and technical change can influence long-run growth. Bearing this in mind, we decided to turn our attention to the extent to which European countries are converging in terms of capital intensity and total factor productivity.

This paper contributes to the empirical literature significantly. The most innovative feature of our analysis is to contribute to looking for the cause of the deficit in the periphery countries. It is common to think that this cause of deficit is linked to excess debt, but is truer if we link this excess like a consequence. So, the policies that governments have to carry out by have to go by the supply side (innovation, development, productivity...). Therefore, what is wrong is the growth model, so we have to correct it.

To conclude this research, I am going to do a little summary:

First, I examined capital intensity and total factor productivity. This is interesting because the analysis of these two variables may provide richer information on convergence behavior and may help clarify the mechanisms that operate in European national growth dynamics. As stated before, I used the ADF unit root test to examine convergence behavior in Europe.

Although capital intensity and productivity have played an important role for countries, our results suggesting that the economic reforms don't have been successful in driving long-run growth. So, countries need further reforms in order to reach convergence. Specific economic policies aimed at enhancing a balanced national development are still needed.

I found that only one country has converged in terms of labor productivity and total factor productivity. The results suggest that there are notable differences across countries and the whole nation in terms of capital intensity and total factor productivity.

Clarifying, it seems that according to our results not all the countries have benefited from the economic reforms to the same degree. The results were generally to be expected, as countries have experienced rapid and continuous development throughout the period under consideration. It means, the results show notable improvements in total factor productivity across countries and relative to the European average, although there are still differences in some countries. So, further economic policies are needed to achieve convergence in capital intensity and narrow the gap that exists across countries.

My findings provide new insights into Europa's national growth and convergence behavior. So, this analysis may be useful for policymakers seeking to address national imbalances. For example, stepped-up integration of financial markets may improve capital allocation efficiency and it also can broaden risk-sharing among euro area countries, thus mitigating the negative impact of heterogeneity in the euro area. However, in the light of the most recent crisis, the effects of capital market integration, like the convergence of interest rates and lower financing costs, have not to be seen as absolutely positive.

Therefore, the main idea is that the policies that governments have to carry out by have to go by the supply side, in order to correct the growth model.

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10. ANNEXES

ANNEX 1

Gross national income at 2005 market prices, deflator GDP

(OVGN)

	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Austria	Portugal	Finland	
1991	229,3834	1881,76	58,8558	130,4567	598,2625	1315,427	1162,525	176,8336	112,8072	102,0514	
1992	232,8372	1914,909	60,0511	131,5405	602,7192	1338,132	1169,935	181,1181	116,9113	97,3494	
1993	232,8667	1891,989	61,9406	128,6172	598,4654	1331,54	1162,379	182,1263	116,0822	95,9121	
1994	242,2426	1925,077	65,8069	131,5631	607,0361	1358,462	1185,709	186,2736	117,382	100,6624	
1995	247,4052	1952,081	71,0482	134,3399	629,5929	1385,66	1224,135	190,2135	120,505	105,7179	
1996	251,5739	1971,887	78,3346	137,0609	642,5056	1408,381	1241,091	196,7204	124,6953	110,2762	
1997	261,2486	2002,556	85,7413	142,09	667,6354	1444,055	1271,905	200,217	129,3931	118,1209	
1998	265,764	2033,613	92,7227	146,7989	696,9055	1494,425	1288,883	207,3999	135,8459	123,4215	
1999	275,6675	2069,981	99,9219	149,7578	730,3036	1555,027	1313,097	213,8149	141,0537	129,5665	
2000	286,7444	2136,415	110,7683	159,003	767,9489	1609,103	1357,437	221,8456	144,9748	137,2029	
2001	287,1329	2167,146	114,03	166,2764	789,9348	1637,611	1383,881	222,7586	147,1066	141,2207	
2002	290,3253	2162,67	117,9716	171,3644	812,1945	1641,646	1390,073	228,5791	149,6855	144,2501	
2003	293,1519	2165,458	126,1067	180,0011	840,2714	1661,726	1389,18	231,1964	149,2775	145,7951	
2004	301,5075	2228,2	131,6403	187,6395	866,1559	1709,32	1418,163	237,7092	151,4529	154,1237	
2005	305,423	2249,59	140,4425	190,2405	896,385	1744,922	1436,795	242,8631	151,9806	158,154	
2006	314,1888	2353,686	150,6145	199,0153	930,4989	1791,902	1472,396	251,5091	151,7784	165,9313	
2007	323,7208	2423,141	156,3293	204,8566	956,4263	1832,069	1491,839	260,4874	155,1204	173,2163	
2008	328,3071	2435,975	153,0032	203,5597	961,5881	1830,899	1459,316	266,8301	154,4653	174,394	
2009	312,6333	2341,023	137,7435	198,8752	932,3267	1774,754	1387,914	254,7553	149,1971	161,3569	
2010	327,5321	2427,457	137,4336	188,327	936,1056	1808,664	1411,685	261,972	153,1097	166,6077	
2011	330,6559	2510,362	135,5406	174,7766	929,5849	1847,061	1416,665	267,3744	150,8614	169,2409	
2012	328,0481	2530,775	136,6019	169,3463	922,2843	1839,862	1379,976	269,8692	147,3334	167,8855	
2013	328,5193	2539,44	140,292	161,9242	915,1022	1843,355	1354,292	270,0284	145,8014	165,3458	
	286,820848	2187,617	111,432222	164,670904	792,618857	1617,56535	1337,79439	227,065009	139,86177	139,469704	7004,92
	4,09%	31,23%	1,59%	2,35%	11,32%	23,09%	19,10%	3,24%	2,00%	1,99%	100%

Own elaboration table with data of database of AMECO.

ANNEX 2

Net capital stock at 2005 prices per person employed: total economy: Capital intensity (RKNDE)

	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Austria	Portugal	Finland	Weighted average
1991	152,2749	133,8699	199,8612	124,304	133,678	166,6812	143,346	177,0626	53,51859	146,8637	144,8676588
1992	156,5937	139,8091	203,5407	125,0534	141,0564	172,1278	147,9635	181,9701	57,19758	158,3577	150,4112696
1993	161,19	145,1062	203,9949	126,2505	149,6122	178,2426	154,9981	188,3035	60,57779	167,3769	156,4650562
1994	165,2784	148,9365	201,8776	125,798	154,74	181,3585	158,8143	194,1379	63,27321	168,7798	160,0837589
1995	166,094	151,9298	199,0401	126,5239	156,878	183,6599	161,5145	200,4901	65,5413	166,1588	162,5119249
1996	168,8658	155,3246	198,8965	129,1522	159,6335	186,8618	163,6203	204,8868	66,43455	164,7275	165,3302958
1997	171,2358	158,7382	196,7333	132,2274	159,2646	189,164	165,5216	209,9437	67,38126	161,0239	167,4933459
1998	171,9291	160,2553	190,6722	131,2726	158,5827	190,2403	166,8026	214,3702	68,71556	160,587	168,4541079
1999	173,2007	161,3484	189,5055	134,2438	158,0624	190,6251	168,8939	217,6726	71,13138	159,1989	169,4558585
2000	173,7041	162,0441	191,9296	137,4678	157,2311	190,2562	169,303	221,1375	73,01826	158,8394	169,8497991
2001	175,0467	164,3713	196,0302	141,2762	158,9184	191,3225	169,7796	227,0405	74,82678	159,6543	171,5581607
2002	178,0433	167,2303	202,9316	142,64	162,0764	193,7934	171,1952	232,8046	77,05658	160,3376	174,158792
2003	180,5645	170,3358	209,9638	145,6871	165,0919	197,6252	173,3246	236,6982	79,53966	162,6069	177,269047
2004	181,799	171,3363	215,029	146,657	167,7845	201,6439	175,9141	239,2199	81,53711	164,6491	179,6249136
2005	182,784	173,0406	218,6991	145,9043	169,8612	204,9678	178,8471	242,0364	83,59962	165,348	181,9472501
2006	184,2955	174,1702	222,6481	147,6272	172,2959	207,6061	179,5219	244,6516	84,80504	165,3406	183,5875203
2007	185,3126	173,5969	226,5246	151,8802	175,5485	210,373	181,2349	245,2873	86,56827	165,8213	185,0112674
2008	186,1251	173,6993	238,7397	154,3378	183,0326	214,9471	184,6841	245,5088	87,77365	165,2008	187,909305
2009	188,8716	174,3954	264,5742	157,7842	199,5827	222,018	191,4455	252,547	91,00942	171,3495	193,943074
2010	189,6199	174,7525	277,73	162,6343	207,8755	225,8473	194,8653	254,0028	93,07502	173,2484	197,0104822
2011	189,2935	174,2105	283,4291	170,8537	215,3169	228,1522	195,5874	254,4079	94,4683	173,0432	198,6607555
2012	190,5654	173,8089	285,8821	182,6716	227,8242	232,0117	197,7637	255,039	97,68773	175,1419	201,7528563
2013	192,2581	174,1995	280,9658	185,5155	236,5859	236,1857	200,9635	257,1031	99,53692	177,6818	204,6535469

176,1743498

Own elaboration table with data of database of AMECO.

ANNEX 3

Total factor productivity: Total economy (ZVGDF)

	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Austria	Portugal	Finland	Weighted average
1991	100	100	100	100	100	100	100	100	100	100	100
1992	100,571085	101,503788	102,232157	99,0330415	100,323646	101,13357	100,499515	100,645479	102,308498	100,889825	100,9843024
1993	99,1411871	100,249567	103,33518	96,2856293	99,9647025	100,786672	101,195122	100,483506	101,557024	104,204032	100,5448834
1994	101,781369	101,713147	106,443091	96,5444566	101,52724	102,260686	103,575687	101,766685	102,498324	109,1889	102,2970425
1995	102,372662	102,213471	112,959438	97,4718435	101,893014	103,252792	105,962323	103,613106	104,293568	112,220868	103,4853099
1996	102,904125	102,175008	119,669665	99,3458576	102,219497	103,631981	106,311718	104,471133	105,829568	114,981051	103,9505259
1997	105,441958	103,181999	126,671744	102,520403	102,651388	104,910281	107,385574	105,535648	107,11218	119,113283	105,2464597
1998	105,474108	103,509004	128,782318	103,226809	102,971176	106,722823	107,647862	107,898684	108,754893	122,962587	106,0909427
1999	107,412667	103,59664	134,556502	105,4668	103,199379	107,867536	108,135933	109,832556	110,239274	125,083627	106,8601212
2000	109,03967	104,787553	141,771666	108,649269	103,440153	108,956018	109,995259	111,831789	111,132761	129,200312	108,286546
2001	108,122426	105,479379	143,12586	111,85534	103,315417	108,696957	109,976077	111,870546	110,307645	130,145168	108,4879489
2002	109,033851	105,356344	146,492771	112,727455	102,899481	108,282878	108,756534	113,293985	109,31733	131,075559	108,2302082
2003	109,39757	105,080513	147,159563	117,053133	102,672806	108,29053	107,555825	113,024751	107,702861	132,918477	108,0137931
2004	111,530341	105,730945	146,894609	118,974401	102,433493	110,019458	108,436968	114,386098	108,47453	137,199758	109,0304191
2005	111,65343	106,182106	147,524797	118,378868	102,063402	110,589686	108,63035	115,734279	108,670103	139,066584	109,3838878
2006	113,021218	109,212663	147,704367	122,002154	102,089492	111,503045	109,183223	118,568731	109,105234	142,576984	110,9642709
2007	114,12707	111,050947	147,525652	123,143106	101,849026	111,985761	109,594051	120,755823	110,89193	146,825296	111,9614926
2008	113,045218	110,861039	142,220696	120,622929	101,300181	110,61164	107,979248	120,247885	109,819	143,760628	110,9275411
2009	109,456205	104,922248	138,62687	116,53803	100,458418	107,496371	103,70138	116,166697	108,001869	133,124663	106,7607779
2010	111,079937	108,463237	140,190008	112,358471	101,03887	108,684408	105,962898	117,241841	110,895829	137,128779	108,8039951
2011	111,552575	110,680555	144,62435	108,468791	101,996783	109,660456	106,170161	118,793422	110,609273	138,961136	109,9493282
2012	110,893554	110,325607	145,209099	107,903234	103,084705	109,036025	104,186541	118,163482	110,394195	136,830896	109,3404515
2013	111,033428	110,083941	143,491775	107,250367	103,769871	108,97987	103,582037	117,493262	111,471572	134,879406	109,1380848

106,9016667

Own elaboration table with data of database of AMECO.

ANNEX 4

Differential of initial variables and their average:

Capital intensity

Net capital stock at 2005 prices per person employed: total economy :- Capital intensity (RKNDE)

	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Austria	Portugal	Finland
1991	7,40724121	-10,9977588	54,9935412	-20,5636588	-11,1896588	21,8135412	-1,52165879	32,1949412	-91,3490688	1,99604121
1992	6,1824304	-10,6021696	53,1294304	-25,3578696	-9,3548696	21,7165304	-2,4477696	31,5588304	-93,2136896	7,9464304
1993	4,72494379	-11,3588562	47,5298438	-30,2145562	-6,85285621	21,7775438	-1,46695621	31,8384438	-95,8872662	10,9118438
1994	5,19464106	-11,1472589	41,7938411	-34,2857589	-5,34375894	21,2747411	-1,26945894	34,0541411	-96,8105489	8,69604106
1995	3,58207513	-10,5821249	36,5281751	-35,9880249	-5,63392487	21,1479751	-0,99742487	37,9781751	-96,9706249	3,64687513
1996	3,53550423	-10,0056958	33,5662042	-36,1780958	-5,69679577	21,5315042	-1,70999577	39,5565042	-98,8957458	-0,60279577
1997	3,74245412	-8,75514588	29,2399541	-35,2659459	-8,22874588	21,6706541	-1,97174588	42,4503541	-100,112086	-6,46944588
1998	3,47499215	-8,19880785	22,2180921	-37,1815079	-9,87140785	21,7861921	-1,65150785	45,9160921	-99,7385479	-7,86710785
1999	3,7448415	-8,1074585	20,0496415	-35,2120585	-11,3934585	21,1692415	-0,5619585	48,2167415	-98,3244785	-10,2569585
2000	3,85430089	-7,80569911	22,0798009	-32,3819991	-12,6186991	20,4064009	-0,54679911	51,2877009	-96,8315391	-11,0103991
2001	3,4885393	-7,1868607	24,4720393	-30,2819607	-12,6397607	19,7643393	-1,7785607	55,4823393	-96,7313807	-11,9038607
2002	3,88450798	-6,92849202	28,772808	-31,518792	-12,082392	19,634608	-2,96359202	58,645808	-97,102212	-13,821192
2003	3,29545301	-6,93324699	32,694753	-31,581947	-12,177147	20,356153	-3,94444699	59,429153	-97,729387	-14,662147
2004	2,17408642	-8,28861358	35,4040864	-32,9679136	-11,8404136	22,0189864	-3,71081358	59,5949864	-98,0878036	-14,9758136
2005	0,83674994	-8,90665006	36,7518499	-36,0429501	-12,0860501	23,0205499	-3,10015006	60,0891499	-98,3476301	-16,5992501
2006	0,70797973	-9,41732027	39,0605797	-35,9603203	-11,2916203	24,0185797	-4,06562027	61,0640797	-98,7824803	-18,2469203
2007	0,30133258	-11,4143674	41,5133326	-33,1310674	-9,46276742	25,3617326	-3,77636742	60,2760326	-98,4429974	-19,1899674
2008	-1,78420504	-14,210005	50,830395	-33,571505	-4,87670504	27,037795	-3,22520504	57,599495	-100,135655	-22,708505
2009	-5,07147402	-19,547674	70,631126	-36,158874	5,63962598	28,074926	-2,49757402	58,603926	-102,933654	-22,593574
2010	-7,39058224	-22,2579822	80,7195178	-34,3761822	10,8650178	28,8368178	-2,14518224	56,9923178	-103,935462	-23,7620822
2011	-9,36725552	-24,4502555	84,7683445	-27,8070555	16,6561445	29,4914445	-3,07335552	55,7471445	-104,192456	-25,6175555
2012	-11,1874563	-27,9439563	84,1292437	-19,0812563	26,0713437	30,2588437	-3,98915627	53,2861437	-104,065126	-26,6109563
2013	-12,3954469	-30,4540469	76,3122531	-19,1380469	31,9323531	31,5321531	-3,69004685	52,4495531	-105,116627	-26,9717469

Own elaboration table with data of database of AMECO.

ANNEX 5

Differential of initial variables and their average:

Total factor productivity

Total factor productivity: total economy (ZVGDF)

	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Austria	Portugal	Finland
1991	0	0	0	0	0	0	0	0	0	0
1992	-0,41321768	0,51948573	1,24785486	-1,95126091	-0,66065652	0,14926774	-0,48478738	-0,33882376	1,32419537	-0,09447696
1993	-1,40369638	-0,29531683	2,7902967	-4,2592541	-0,58018094	0,24178878	0,65023857	-0,06137744	1,0121405	3,65914849
1994	-0,51567318	-0,58389548	4,14604831	-5,75258591	-0,76980226	-0,03635682	1,27864468	-0,53035743	0,20128178	6,89185715
1995	-1,11264752	-1,27183848	9,47412802	-6,01346645	-1,59229582	-0,23251801	2,47701328	0,12779598	0,80825833	8,735558
1996	-1,04640063	-1,77551763	15,7191396	-4,60466833	-1,73102912	-0,31854483	2,36119239	0,520607	1,87904179	11,0305249
1997	0,1954983	-2,06446041	21,4252846	-2,7260569	-2,59507126	-0,33617879	2,13911443	0,28918849	1,86571988	13,8668229
1998	-0,616835	-2,58193842	22,6913756	-2,86413391	-3,11976698	0,63188059	1,55691918	1,80774171	2,66395032	16,871644
1999	0,5525454	-3,26348143	27,6963812	-1,39332119	-3,66074253	1,00741439	1,27581185	2,97243475	3,3791524	18,2235057
2000	0,75312388	-3,49899279	33,4851197	0,36272273	-4,84639313	0,669472	1,70871335	3,54524323	2,84621492	20,9137656
2001	-0,3655232	-3,00857008	34,637911	3,36739132	-5,17253228	0,20900826	1,48812777	3,38259676	1,8196956	21,6572186
2002	0,80364298	-2,87386463	38,2625629	4,4972464	-5,33072773	0,05267007	0,52632602	5,06377671	1,08712183	22,8453505
2003	1,3837766	-2,93327985	39,1457703	9,0393398	-5,34098708	0,27673687	-0,45796807	5,01095834	-0,31093231	24,9046842
2004	2,49992224	-3,2994741	37,8641903	9,94398245	-6,59692636	0,98903893	-0,59345095	5,35567853	-0,5558891	28,1693385
2005	2,26954214	-3,20178144	38,1409093	8,99498028	-7,32048567	1,20579847	-0,75353758	6,35039111	-0,71378491	29,6826959
2006	2,056947	-1,75160804	36,7400964	11,0378831	-8,87477917	0,53877444	-1,7810483	7,60446012	-1,85903688	31,6127131
2007	2,1655771	-0,91054528	35,564159	11,1816133	-10,1124664	0,02426803	-2,36744126	8,79433002	-1,0695624	34,8638036
2008	2,11767639	-0,06650252	31,2931552	9,69538827	-9,62735983	-0,31590147	-2,9482932	9,32034423	-1,10854085	32,8330869
2009	2,69542758	-1,83852995	31,8660921	9,77725182	-6,30235937	0,73559346	-3,05939769	9,40591927	1,24109127	26,3638854
2010	2,27594216	-0,34075787	31,3860133	3,55447591	-7,76512532	-0,119587	-2,84109704	8,43784569	2,09183351	28,3247841
2011	1,60324634	0,73122698	34,675022	-1,48053732	-7,95254496	-0,28887217	-3,77916751	8,84409337	0,65994446	29,0118082
2012	1,55310208	0,98515538	35,8686471	-1,43721779	-6,25574598	-0,30442619	-5,15391043	8,82303037	1,0537438	27,4904448
2013	1,89534366	0,9458561	34,3536906	-1,88771831	-5,36821344	-0,15821491	-5,55604737	8,35517701	2,33348746	25,7413207

Own elaboration table with data of database of AMECO.