An Econometric Analysis of Determinants of Economic Growth in Crisis Countries of European Union

Olga Betyák

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Approval of the Institute of Graduate Studies and Research

Prof. Dr. Elvan Yılmaz
Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Business Administration.

Assoc. Prof. Dr. Mustafa Tümer
Chair, Department of Business Administration

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Business Administration.

Prof. Dr. Serhan Çiftçioğlu
Supervisor

Examining Committee

1. Prof. Dr. Serhan Çiftçioğlu

2. Assoc. Prof. Dr. Mustafa Tümer

3. Assist. Prof. Dr. İlhan Dalcı

ABSTRACT

This study investigates the impact of several macroeconomic variables on economic growth of five selected European countries which are considered to be 'crisis countries' of the European Union: Portugal, Ireland, Italy, Greece and Spain. The sample period of the analysis is 1986-2010. The econometric and policy related results of the study are presented in three parts: the first part focuses on presentation and discussion of econometric results regarding the relationship between growth rate of GDP and each one of the selected macroeconomic parameters, namely the domestic investment rate, domestic saving rate, inflation rate and trade openness. The estimation results are based on both individual country regressions and pooled regression analysis. In the second part a comparative analysis of the historical averages of the main macroeconomic indicators of each country is carried out for pre and post Euro periods. Specifically the alteration of GDP growth rate, domestic investment and saving rate, inflation rate, trade openness, budget balance of the government, central government debt and unemployment rate is analyzed. Finally in the last part key economic policies implemented in each country over the sample period (1986-2010) are discussed.

Results suggest that domestic investment and saving rates are positively associated with GDP growth rate for each country in the sample. On the other hand estimation results regarding the effects of inflation rate and trade openness are mixed. While in the cases of Portugal, Italy, Ireland and Spain inflation rate has been found to be positively correlated growth rate of GDP, in Greece inflation seems to have had negative effect on economic growth. Trade openness has been found to be positively related to GDP

growth in Portugal, Italy and Spain, in Ireland and Greece its association with economic growth (contrary to theoretical expectation) seems to be negative. Finally, the comparative analysis of data for each country has suggested that there is no marked improvement in the macroeconomic performance in the post-Euro period relative to pre-Euro period.

Keywords: GDP growth rate, Eurozone, savings, investments, inflation, trade openness

ÖZ

Bu çalışmada Avrupa Birliği üyesi ve özellikle 'kriz ekonomileri' olarak biliren beş Avrupa ülkesinde bazı temel makro değişkenlerin ekonomik büyüme üzerindeki etkileri araştırılmıştır. Bu ülkeler sırasıyla Portekiz, İrlanda, İtalya, Yunanistan ve İspanyadır. Çalışmanın veri tabanını öluşturan zaman devresi 1986-2010'dır. Bu çalışmanın gerek ekonometrik, gerekse politika analizlerine ilişkin temel bulguları üç ana kısımda irdelenmiştir. İlk kısımda G.S.Y.İ.H'nin büyüme hızı ile ulusal yatırım ve tasarruf oranları, enflasyon oranı ve dışa açıklık oranı arasındakı ilişkileri analiz eden ekonometrik sonuçlar ifade edilmiş ve irdelenmiştir. Regresyon analizleri hem ülke bazında, hem de 'havuzlanmış veri' tekniği ile elde edilmiş ve irdelenmiştir. Çalışmanın ikinci kısımda ise çalışmaya konu olan ülkelerin Euro kullanımı öncesi ve sonrası dönemlerde temel makroekonomik göstergelerinin tarihsel ortalamaları karşılaştırmalı olarak analiz edilmiştir. Son kısımda ise bu ülkelerde 1980'lerden 2010'a kadar uygulanmış olan temel ekonomik politikalar incelenmiştir.

Ekonometrik sonuçlar, her ülkede ulusal yatırım ve tasarruf oranlarının G.S.Y.İ.H'nin büyüme hızı ile pozitif ilişki içerisinde olduğunu gösterirken, enflasyon ve dışa açıklık oranlarına ilişkin sonuçlar ise bazı ekonomilerde teorik beklentilerin dışında bulgular içermektedir: Portekiz, İtalya, İrlanda ve İspanyada enflasyon oranı ve G.S.Y.İ.H'nin büyüme hızı arasında pozitif korelasyon olduğu gözlemlenirken, Yunanistan'da ise yüksek enflasyonun ekonomik büyüme üzerinde olumsoz etkisi olduğu bulgulanmıştır. Buna paralel olarak dışa açıklık oranı Portekiz, İtalya ve İspanya büyüme hızını olumlu etkilerken, İrlanda ve Yunanistan'da ise bu ilişkinin (teorik beklentilere ters olarak)

negatif olduğunu regresyon sonuçları göstermiştir. Ve son olarak ülkelerin Euro kullanımından önce ve sonrasına ilişkin ekonomik analizleri, çalışmaya konu olan ülkelerde Euro'ya geçisten sonraki dönemde makroekonomik performansta belirgin bir iyileşme olmadığı ortaya konmuştur.

Anahtar Kelimeler: G.S.Y.I.H. büyüme oranı, Euro bölgesi, tasarruflar, yatırımlar, enflasyon, dışa açıklılık

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Chapter 1

INTRODUCTION

There is an active debate about the effects of the European Union on member countries. Supporters claim that the EU has brought nations together, gave economic power to Europe as a united continent, liberalized and opened member countries and provided higher living standards. On the other hand critics doubt the achievements of the EU stating that the organization has been threatening national sovereignty, has taken away national policies from countries, given power to strong states and dragged the whole Europe into the global crisis.

The recent global economic crisis has got great attention worldwide in everyday life. It has started from the US but it has consequences worldwide including Europe. The European Union has members with heterogeneous economic background and performance and the recent crisis has caused a serious upheaval in the integration.

The situation of member countries that already had smaller or bigger difficulties complying with EU rules and regulations in achieving the targeted economic figures have become even more problematic. The economies of Portugal, Italy, Ireland, Greece and Spain have reached their low points. In 2010 the EU voted about a bailout package of 750 billion euros for these countries to help recovering their economies.

The aim of this study is to explore the macroeconomic background of these countries to find out the reasons of their weak economic performance. These countries are all Eurozone members that would suggest a stable and balanced economic performance but the research shows that the single currency has not met the initial expectations to provide a striving economic environment to its members.

The structure of this study is the following: Chapter 2 gives an overview about theoretical background of GDP growth. It includes various theories about what factors influence economic growth so how it can be fostered, specifically neoclassical growth theory with Solow's model and endogenous growth theories are highlighted. There is also a review about some of the most significant new growth theories focusing on how investment and saving rate, inflation, trade openness and economic integration influence growth.

Chapter 3 is dealing with data and methodology of the research. The study is empirical, built on time-series data collected figures from Portugal, Italy, Ireland, Greece and Spain. To analyze macroeconomic performance of these countries several statistical methods are used including individual multiple regression analyses, pooled regression, simple arithmetic averages and political analysis. Also in this chapter the hypotheses are formed.

Chapter 4 presents the results of the research. First the individual regression results are presented for each country followed by the pooled regression. After this there are the implications of the arithmetic averages of the observed figures. To make the analysis

complete there is a brief overview about government policies to back up the economic findings.

Chapter 5 contains conclusions that can be drawn from this research specifically an overview of the economic performance of each selected countries, how different factors influence GDP growth and an overall summary about findings and hypotheses tests.

Chapter 2

LITERATURE REVIEW

There are two main theories about economic growth: endogenous and exogenous growth theories that are based on either the factors responsible for economic growth are coming from inside or outside of the model. Rao (2010) classifies the empirical studies based on these two broad theories using either cross-sectional or time-series data.

One of the most significant models has been created by Robert Solow in 1956, an exogenous growth theory- usually referred as neoclassical growth theory- based on time-series data where growth is determined by technological progress as an exogenous factor (Rao, 2010). In the same study Rao (2010) identifies endogenous growth theories where technology is an endogenous variable caused by human capital or knowledge. Based on this the main difference between the two theories is the following: according to endogenous growth theory economic growth can be influenced by a variety of tools and policies while in exogenous growth model it cannot be done as Solow assumed technological progress evolves at a given rate.

In his book Mankiw (1997) explains the basic Solow model. The model identifies technological progress as the responsible factor for rising living standards. Solow uses the basic production function to construct his model: $Y= f (K, L)$ where Y is the total output of the economy and it is a function of K (capital) and L (labor). He assumes

decreasing returns to capital. The rate of savings, population growth and technological progress are exogenous variables. According to Solow, accumulation of capital by increasing savings rate leads to a larger amount of capital stock and higher output level but this growth is only temporary and lasts until the economy reaches a new and higher level of steady state which is the long run equilibrium of the economy. It shows that investment is a key determinant of growth that can be enforced by higher savings rate but it does not give an explanation for long run growth so the model has been extended by population growth and technological progress. Population growth means the growing labor force. Solow finds that growing labor force cannot explain economic growth either because population growth reduces the accumulation of capital stock, meaning that the larger amount of labor spreads the capital more thinly among people. According to Solow only technological development can explain persistently rising living standards and a stable growth.

To build a more precise model Mankiw and Romer and Weil (1992) include the accumulation of human capital into the Solow growth model in the form of education. They find that accumulation of human capital is correlated with savings and population growth. They also show that the Solow growth model has valid predictions only the magnitude is needed to be adjusted. The authors conclude that if human capital is taken into account convergence of countries is persistent with the Solow model.

Another substantial category contains endogenous growth theories that have different sub-groups depending on how technological change is explained by different researchers. The main point of endogenous theories is that they treat technology as an

endogenous factor and they are trying to answer the question what causes technological development.

Romer (1986) builds his model of long-run growth including knowledge as a factor responsible for technological development. He attributes increasing marginal productivity to it. It is a very important aspect of the theory because in exogenous growth theories economy would reach steady state at some level but with knowledge as a source of growth the author suggests that there is no steady state that would end growth describing an infinite-horizon growth. In the debate of whether countries should converge Romer (1986) states that because of knowledge is an essential factor of long-run growth it can be slower or may not even appear in poor countries. He identifies knowledge as an externality, if a firm invests in knowledge and develops a new technology it will be copied by other firms so knowledge cannot be kept in secret for a long time.

Lucas (1988) argues the validity of the Solow model and adds an extra variable, the human capital. By human capital he means the general level of skill of labor that cannot be generalized for all the countries. Technology is a kind of ’human knowledge’ that is related to particular people. Human capital influences both physical capital and labor and by investing in it both can be improved. Lucas (1988) suggests that differences between countries remain because production of different goods require and develop different skills so human capital is not necessarily will be the same in all countries.

Grossman and Helpman (1991) develop and endogenous growth model based on R&D. They argue that the success of an industry or firm is proportional to its resources in

R&D. Entrepreneurs are competing to produce new products and innovation is a key element in the process. According to the model R&D is a source of infinite expansion. Of course rich countries have more sources to invest in research but poorer countries can copy the original developments.

Barro (1991) shows some regularity in GDP growth based on recent theories and data. He is also using human capital as a positive factor of growth. He presents that countries that are rich in human capital have low fertility rates and high private investment rates. He also investigates the impact of political stability and finds a negative correlation between instability and growth. This issue can be connected to the lack of safe property rights and investment.

Solow (2001) emphasizes the importance of difference between countries and that they cannot be compared by a simple cross-country regression. He also suggests that researchers must pay attention to the non-technological part when analyzing the effects of total factor productivity on growth. The dependent variables that are used affect total factor productivity and through this economic growth.

Neoclassical growth theories do not include education as a factor of growth. Knowledge may appear but its source is not precisely defined. New growth theories build on this deficiency explaining the role of education in economic growth.

Domestic investments, savings and growth have a strong connection according to a vast number of researches. The causality between them is not obvious though. Scmidt-Hebbel and Servén and Solimano (1996) try to explore the relation between these

factors. Savings and investments have different determinants: income and wealth is crucial for savings and profitability and risk are factors of investment. Based on recent studies and their own research the authors conclude that there is a strong link between savings and growth but identifying the causality is still a challenge, these factors reinforce each other. There is a strong correlation between savings and investments and both should be reinforced by government policies. Under the term investments both physical and human capital is understood.

Ahmed and Miller (2002) use data collected through 8 years of 93 countries. The countries are divided into three groups based on their income level. The study shows that investment share affects GDP growth positively while population growth has a negative impact on economic growth in low- and middle-income countries. In high-income countries investment share does not influence GDP growth in a positive way while technology has more important implications than in low- and middle-income economies.

One of the ambiguous factors that influence growth is inflation. Before the 1970's it was a widespread belief that inflation had no significant effect on GDP growth or if it had that was positive. Tobin (1965) uses the Solow model but extends it with adding money as an asset. It is a substitute to capital assets. The author suggests that the opportunity cost of holding money is preferable to accumulate capital so inflation has a positive effect on growth.

During the following decades it was observed that countries with high inflation rates had worse economic performance (Al-Marhubi, 1998). In his study Al-Marhubi (1998) shows negative relation between inflation volatility and economic growth. This relation

is indirect because inflation uncertainty reduces the level of investments thus economic growth.

Alexander and Robert (1997) use a sample of OECD countries to show the relation between inflation and growth in their study. They construct a simple model by using marginal product of labor and capital as factors of growth. As a result of a pooled regression they conclude that even if inflation has any positive effects on growth it is outweighed by its negative effects.

Paul and Kearney and Chowdhury (1997) conduct a research to show if there is causality between the real growth of GDP and inflation in the long run. They use a large sample of 70 countries including industrialized as well as developing countries with both high and low inflation economies during a 30 year period. The main conclusion the researchers make is that we cannot use a single pattern to all of the countries for the relationship between inflation and growth. According to them around one third of the sample countries does not have a relationship between these two factors and in other cases this relationship is ambiguous.

The connection between trade openness and economic growth has been explored for a long time. Dar and Amilkhalkali (2003) explain in their study that if export expansion functions as the engine of growth the more open economies- the more dependent on international trade- should be more advanced. It has to be noted that openness is not only a result of a specific policy but geography and size of the state also determines the trade relations of a country. In their research the authors use data from 19 OECD countries during 1971-1999. The countries are ranked based on their level of openness. The results

show that export is the least significant determinant of growth for those countries that are the least open but the effect of this factor increases as openness increases until a specific level. Besides, labor productivity and total factor productivity are positively related to trade openness.

Zhou and Li (2011) conduct a nonparametric research about openness and trade. They show that openness to make a significant contribution to growth the economy has to perform well and already be open otherwise trade openness does not have a positive impact on economic growth.

There has been an ongoing debate about European Union membership and economic growth, whether it is beneficial for countries to be part of the EU or not. Cuaresma and Ritzberger-Grünwald and Silgoner (2008) have conducted a research to answer the above question. According to neoclassical growth theory the EU should only have temporary effect on growth in its member countries before reaching the steady state level. The theory suggests converging economies. On the other hand endogenous growth theories predict as the integrated economies grow larger there will be more investment in research and development. As a consequence of knowledge spill-over growth rate will increase. Findings of the study show that EU membership has a positive effect on economic growth and it is increasing as the time spent in EU increases. The growth is greater for those countries that have had a lower initial income level indicating that EU membership is more beneficial for the less developed countries. The authors identify the responsible factors as following: technological diffusion, financial support that EU provides for its members, institutional stability and fiscal policy.

There have been other researches about whether European countries behave according to neoclassical or endogenous growth model. Karras (2001) points out that if a permanent change in any of the variables used causes a permanent change in growth the tested countries behave according to endogenous model because neoclassical model suggests achieving a new steady state with a temporary growth. He argues that most of the findings support neoclassical growth theory. One of the most important implications of this result is regional convergence.

Maudos and Pastor and Seranno (1999) observe how economies of European countries change by expansion. They conclude that efficiency and total factor productivity of founder countries have increased by expansion of the EU.

Badinger (2008) points out that economic integration can influence growth in two ways: it can increase the overall efficiency of the economy- this is the technology-led growth and by generating greater investment opportunities- investment-led growth. The study focuses on the period 1960-2000 and finds a significant connection between integration and growth triggered by both investments and technology.

Hishow (2007) is digging into the ambiguity why common currency has not resulted in the expected economic growth in Europe. The main goal of the EU was to achieve higher growth, create more jobs and establish balanced government budget but countries perform very differently in the Eurozone area. Instead of the initial expectation of the Economic and Monetary Union (EMU) of converging per capita income, it is actually diverging. One of the possible explanations is that capital is moving from the richer to the poorer regions because the latter one offers higher returns. The author also points out

that some of the member countries do not use the growing exports as a source of economic growth rather some governments increase budget spending that is not effective in triggering growth. The root of the problem is the heterogeneity of European economies that are forced to act according a common policy frame and also integration is working in theory institutional difficulties make the system function with mistakes.

Chapter 3

DATA, METHODOLOGY AND HYPOTHESES

3.1 Data

I have built my analysis on time-series data from different countries. Most of the data was derived from the electronic Databank of World Bank specifically I used some of the World Development Indicators (databank.worldbank.org). To fill in the missing pieces I gained data from the World Economic Outlook Database of the International Monetary Fund (www.imf.org) and from the electronic statistical database of OECD (stats.oecd.org).

Data have been collected during the period of 1986-2010 for five European countries: Greece, Ireland, Italy, Portugal and Spain- also known as the PIIGS countries (referring to as weaker countries of the EU that received a 750 billion euros stabilization package in 2010 to deal with the economic crisis more effectively[1]). The data is annual, providing a total of 25 observations per country for each variable.

The figures I have used are the following: in the regression analysis the dependent variable is GDP growth in terms of annual percentage change and the right hand-side variables are gross domestic investments and savings in terms of percentage of GDP,

[1]Source: Investopedia http://www.investopedia.com/terms/p/piigs.asp#axzz1ppgF6Uvn (Retrieved: 22.03.2012)

share of export and import of goods and services also in percentage of GDP and inflation that is expressed in annual percentage. For other calculations like comparing averages before and after the introduction of the common currency I have included unemployment rate in percentage of total labor force, budget balance of the central government and the total central government debt both expressed as percentage of GDP.

3.2 Methodology

There are two types of analysis I have used to test the hypotheses. These are regression analysis and comparing simple arithmetic averages.

Regression analysis is a statistical tool that helps exploring the relationship between two or more variables. There are several types of regression models. I used a basic linear model, where GDP growth is expressed as a function of other variables. The general equation is the following:

$$Y= \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_n X_n + \varepsilon$$

where:

Y = dependent variable

α = constant term

β = coefficient

X = dependent or explanatory variable

n = number of variables

ε = error term (it reflects to other factors that influence Y)

Ordinary least squares (OLS) method is a common way to conduct regression analysis. The goal of linear regression is to fit a line through the observed points of variables and the best fit line is the one where the squared deviations from the observed data are the minimum. This is the OLS method[2].

Pooled regression is a method that builds on time-series cross-sectional data that have been observed during a specific time period for different groups. This method is for those groups that are similar. If the results show large standard error (small t-statistics) it can be a sign of heterogeneous groups and more advanced techniques are suggested[3].

By conducting regression analysis I wanted to test whether the selected macroeconomic variables influence the dependent variable and if they do, is the relation between the dependent and the independent variables positive or negative. For this purpose I conducted multiple regression analyses for the selected countries individually and pooled regression for all the countries. I used the OLS method for time-series data which is the most common and one of the most basic statistical methods. The dependent variable of the model is GDP growth and the independent variables change from the test to test.

The right hand-side variables in regression tests are the following: gross domestic savings and investments, trade openness and inflation. Domestic savings and investments are correlated so to avoid biased results I tested these two variables separately for each country. Trade openness is a figure that shows at what level a

[2] Source: Statsoft http://www.statsoft.com/textbook/multiple-regression/#cleast (Retrieved: 22.03.2012)

[3] Source: Metriscient http://metriscient.com/pooledreg.htm (Retrieved: 22.03.2012)

country participates in international trade by exporting and importing goods and services. One way to express this is to take the share of exports as a percentage of GDP or in the other case add up total exports and imports expressed as a percentage of GDP. I conducted the country specific tests in both ways.

Based on these the following models were tested individually for each country:

GDP growth = f (investment rate, inflation rate, export rate)

GDP growth = f (investment rate, inflation rate, export + import rate)

GDP growth = f (savings rate, inflation rate, export rate)

GDP growth = f (savings rate, inflation, export + import rate)

After running these regressions I also experimented by dropping variables one by one in order to achieve the least biased results I could. In pooled regression the same pattern was used except that the number of observations rose to 125 including all the data from all the countries.

Another key point of my research was to explore how macroeconomic performance of each country has changed by introducing the common currency. To explore the differences I used simple arithmetic averages of macroeconomic indicators for the time period before and after introducing the euro. These macroeconomic figures include GDP growth, gross domestic investments and savings, export and import rates, inflation, unemployment rate, central government budget balance and total government debt.

After analyzing the economic results I wanted to broaden the understanding behind these numbers, to give a possible explanation why and how the economic performance of these countries is the way it is. In order to give a more reasonable explanation to calculated figures I involved some of the government policies that could have influenced the economy.

3.3 Hypotheses

Based on the theoretical background in the topic of economic growth that I summarized in Literature Review in Chapter 2 I formed the following hypotheses:

1) An increase in investment rate has a positive effect on GDP growth

2) An increase in savings rate has a positive effect on GDP growth

3) An increase in inflation has a negative effect on GDP growth

4) An increase in trade openness has a positive effect on GDP growth

Chapter 4

RESULTS

4.1 Regression Results

There are four individual regression cases for each country:

1) GDP growth = f (investment rate, inflation rate, export rate)

2) GDP growth = f (investment rate, inflation rate, export + import rate)

3) GDP growth = f (savings rate, inflation rate, export rate)

4) GDP growth = f (savings rate, inflation, export + import rate)

The goal of individual regression analysis is to make sure that the independent variables have a significant effect on the dependent variable and to check the correlation between them. Individual regression analysis includes these four cases for Portugal, Italy, Ireland, Greece and Spain for the period of 1986-2010 giving 25 observations for each country. If results contradict theory there are extra cases presented by dropping variables to explore if these cases have been biased for some reason.

The abbreviations used in EViews to run the tests are the following:

GDPG = GDP Growth Rate

C = Constant Term

GCF = Gross Capital Formation (Gross Domestic Investment Rate)

GDS = Gross Domestic Saving Rate

I = Inflation Rate

E = Export Share of GDP

EM = Export and Import Share of GDP

In the followings for each case regression equations and below them t-statistics are given. On the right side figures of R-squared are also marked.

To examine whether the chosen variables significantly influence the dependent variable we use t-statistics. For $\alpha = 95\%$ confidence level the tabular value of $t = 2.064$ and for $\alpha = 90\%$ confidence level tabular value of $t = 1.711$. If the observed t-statistics are below -2.064 or above 2.064 at $\alpha = 95\%$ the variables are significant. Also for $\alpha = 90\%$ if the observed t-value is below -1.711 or above 1.711 the variables are significant.

R-squared shows what level of variation in independent variables explain the variation in the dependent variable.

4.1.1 Portugal

4.1.1.1 Case 1: The Effects of Gross Domestic Investment Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Portugal

GDPG = -17.91533 + 0.566526 GCF + 0.168275 I + 0.190240 E

(-3.015172) (4.176497) (1.758035) (1.076192) R-squared = 0.605798

The equation shows that 1% increase in gross capital formation leads to 0.56% increase in GDP growth and 1% increase in exports results 0.19% increase in GDP growth. The signs are positive for these variables as it was expected. The ambiguous figure is the inflation rate, the equation suggests that GDP growth and inflation has a positive relationship. 1% increase in inflation leads to 0.16% increase in GDP growth. At a confidence level of 10% all the variables are significant except for export rate. R-squared shows that variation in independent variables explains 60% variation in the dependent variable.

4.1.1.2 Case 2: The Effects of Gross Domestic Investment Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Portugal

GDPG = -14.34261 + 0.556811 GCF + 0.165620 I + 0.031813 EM

(-2.555187) (3.894177) (1.568260) (0.395075) R-squared = 0.587125

There is a positive relationship between gross capital formation, inflation rate, export and import share of GDP and GDP growth. 1% increase in domestic investments leads to 0.55% increase in GDP growth, 1% increase in inflation rate results in 0.16% increase in GDP growth and 1% increase in trade openness eventuate 0.03% increase in growth rate. Only gross domestic savings is significant at both confidence level of 10% and 5%. The variation in the independent variables explains 58% variation in GDP growth rate.

4.1.1.3 Case 3: The Effects of Gross Domestic Savings Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Portugal

GDPG = -21.22807 + 0.891583 GDS - 0.127288 I + 0.324635 E

(-4.430148) (6.299939) (-1.262675) (2.289164) R-squared = 0.750296

Gross domestic savings and export rate have a positive relationship with GDP growth rate while inflation shows a negative relationship. 1% rise in domestic savings rate increases GDP growth rate by 0.89%, 1% increase in export rate results 0.32% boost in GDP growth and 1% increase in inflation decreases growth rate by 0.12% though inflation is insignificant. The other variables have significant effect on growth rate. Generally variation in independent variables accounts for 75% variation in the dependent variable.

4.1.1.4 Case 4: The Effects of Gross Domestic Savings Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Portugal

GDPG = -21.75130 + 0.887385 GDS - 0.094514 I + 0.149100 EM

(-4.662363) (6.393774) (-0.940450) (2.480869) R-squared = 0.758704

Like in the previous case domestic savings and trade openness have a positive relation to GDP growth while inflation effects growth negatively. 1% rise in savings rate increases GDP growth rate by 0.88% and 1% increase in export and import share boosts the growth rate by 0.14%. On the other hand 1% increase in inflation causes 0.09% decrease in GDP growth. Again inflation is insignificant while the other variables are significant. Variation in independent variables explains 76% variation in the dependent variable.

4.1.1.5 Additional Notes on Regression Analysis for Portugal

As we saw in Case 1 and 2 if we consider gross domestic investment rate, inflation rate and trade openness, the latter variable is insignificant. To check the validity of the test

the following equation shows the regression run by using only trade openness as an independent variable.

GDPG = 0.389262 + 0.074245 E

(0.052433) (0.282293) R-squared = 0.003453

Trade openness still remained insignificant so we can conclude that this variable does not affect GDP growth by itself nor does it with the combination of investment rate. On the other hand combined with savings rate trade openness has a positive effect on growth rate in the case of Portugal.

In case 3 and 4 inflation seems to be insignificant variable. If we run the regression only using inflation we get the following equation:

GDPG = 0.853673 + 0.312755 I

(1.162060) (2.782638) R-squared = 0.251864

Inflation by itself is a significant variable for growth rate that has a positive relation to it. Combining inflation rate with investment or savings rate results in insignificant regression (for t-statistics of inflation in these cases see Appendix A)

4.1.2 Italy

4.1.2.1 Case 1: The Effects of Gross Domestic Investment Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Italy

GDPG = -16.52629 + 0.536872 GCF + 0.735683 I + 0.175641 E

(-2.369136) (1.842421) (2.243589) (1.284329) R-squared = 0.405624

Domestic investment, inflation and export rate have positive relationship with GDP growth, specifically 1% increase in investment rate raises GDP growth with 0.53%, 1% increase in inflation causes 0.73% increase in GDP growth and 1% increase in export rate results 0.17% rise in growth rate. At 5% confidence level only inflation is significant. If we loosen it to 10% level gross domestic investment rate is also significant. Variation in independent variables accounts for 40% variation in GDP growth rate.

4.1.2.2 Case 2: The Effects of Gross Domestic Investment Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Italy

GDPG = -13.22358 + 0.479747 GCF + 0.630825 I + 0.052065 EM

(-2.066679) (1.525238) (1.699309) (0.713376) R-squared = 0.374104

Just like in the previous case all of the right hand side variables have positive relationship with the dependent variable. 1% change in investment rate results in 0.47% increase in growth rate, 1% change in inflation rate increases GDP growth by 0.63% and 1% rise in trade openness increases GDP growth by 0.05%. In this case all of the variables are insignificant and variation in independent variables explains only 37% variation in GDP growth.

4.1.2.3 Case 3: The Effects of Gross Domestic Savings Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Italy

GDPG = -15.13796 + 0.511382 GDS + 0.620308 I + 0.132171 E

(-2.418985) (1.902458) (1.780680) (0.952354) R-squared = 0.411052

Domestic savings, inflation and exports are positively related to GDP growth. 1% increase in savings rate causes the rise of growth rate of GDP by 0.51%. 1% increase in inflation affects GDP growth by 0.62% and 1% rise of export rate increases growth by 0.13%. At 10% confidence level savings and inflation rate are significant, export rate is insignificant. Variation in independent variables accounts for 41% variation in dependent variable.

4.1.2.4 Case 4: The Effects of Gross Domestic Savings Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Italy

GDPG = -18.46130 + 0.587288 GDS + 0.709023 I + 0.096814 EM

(-2.722343) (2.287557) (2.233535) (1.477281) R-squared = 0.443453

All variables are positively related to GDP growth. 1% increase in savings rate causes 0.58% increase in GDP growth rate, 1% increase in inflation accounts for 0.70% rise in growth rate and 1% increase in export and import rate is responsible for 0.09% increase in growth although trade openness is the only insignificant variable. Variation in independent variables explains 44% variation in the dependent variable.

4.1.2.5 Additional Notes on Regression Analysis for Italy

In all four cases trade openness is insignificant for growth rate. If we experiment by dropping variables we reach the same conclusion. The following table shows the results of regressions focusing on trade openness (for the regressions see Appendix A):

Table 1: t-statistics focusing on trade openness for Italy

Variables	t-statistics for Trade Openness	Significance
GCF and E	-0.571692	insignificant
GCF and EM	-1.052281	insignificant
GDS and E	-0.636362	insignificant
GDS and EM	-0.225630	insignificant
I and E	1.280593	insignificant
I and EM	1.215507	insignificant
E	-1.265354	insignificant
EM	-1.320826	insignificant

Trade openness combined with any other variables or by itself is an insignificant variable for Italian growth rate in both cases of export and export plus import rate as a share of GDP (for detailed regression results see Appendix A).

4.1.3 Ireland

4.1.3.1 Case 1: The Effects of Gross Domestic Investment Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Ireland

GDPG = -2.069150 + 0.269716 GCF + 0.653661 I - 0.002548 E

(-0.403728) (1.052148) (1.265268) (-0.040148) R-squared = 0.247624

The interesting figure in this case is the export rate because it shows negative relationship to GDP growth. 1% increase in export rate decreases growth rate by 0.002% although it is insignificant. Gross domestic investments and inflation rate are positively related to GDP growth. It increases by 0.26% and 0.65% if investment rate and inflation

rate rise by 1% respectively. None of the variables are significant and variation in independent variables explains only 24% variation in the dependent variable.

4.1.3.2 Case 2: The Effects of Gross Domestic Investment Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth in Ireland

GDPG = -1.666391 + 0.284296 GCF + 0.634778 I - 0.005907 EM

(-0.315676) (1.102037) (1.239163) (-0.160946) R-squared = 0.248493

Similarly to the previous case trade openness is negatively related to GDP growth while investment rate and inflation rate are positively. 1% increase in investments rate results 0.28% increase in growth rate and 1% rise in inflation causes 0.63% increase in GDP growth. Trade openness has a very negligible effect, 1% increase in trade openness leads to 0.005% decrease in growth rate. On the other hand none of the variables are significant. Variation in right hand side variables accounts only for 24% variation in the dependent variable.

4.1.3.3 Case 3: The Effects of Gross Domestic Savings Rate, Inflation and Export Share of GDP on GDP Growth in Ireland

GDPG = -0.081851 + 0.413725 GDS + 0.687414 I - 0.125565 E

(-0.018458) (1.814448) (1.619376) (-1.253021) R-squared = 0.315304

Gross domestic savings and inflation are positively and export rate is negatively correlated with GDP growth rate. 1% increase in savings rate leads to 0.41% increase in growth rate, 1% rise in inflation causes 0.68% gain and 1% increase in export rate results 0.12% reduction in GDP growth. With 10% confidence level only savings rate is

significant, with 5% level none of the figures are. Variation in dependent variables explains 31% variation in GDP growth rate.

4.1.3.4 Case 4: The Effects of Gross Domestic Savings Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth in Ireland

EViews does not give an equation for this case because the result is close to perfect multicollinearity. It means that there is an almost perfect correlation between the explanatory variables.

4.1.3.5 Additional Notes on Regression Analysis for Ireland

In all cases trade openness is negative and insignificant variable for Ireland. In order to find out if it happens only because variables are correlated the following table shows results for regressions by dropping variables (for detailed regression results see Appendix A).

Table 2: Coefficients and t-statistics focusing on trade openness for Ireland

Variables included	Coefficient for E or EM	t-statistics for E or EM	Significance
GCF and E	-0.029455	-0.486037	insignificant
GCF and EM	-0.004313	-0.021839	insignificant
GDS and E	-0.185069	-1.915688	significant
GDS and EM	Not applicable	Not applicable	Not applicable
I and E	0.027565	0.485499	insignificant
I and EM	0.173105	1.390093	insignificant
E	0.015785	0.254297	insignificant
EM	0.214286	1.610349	insignificant

As the table shows additional regressions have been run by dropping variables. The results show that trade openness is not affecting GDP growth significantly in Ireland except for the case when savings rate and trade openness are used together.

Besides, investment and savings rate are also insignificant variables for growth rate in almost all cases. To examine these figures Table 3 contains different cases.

Table 3: Coefficients and t-statistics focusing on investment and savings rate for Ireland

Variables included	Coefficient for GCF or GDS	t-statistics for GCF or GDS	Significance
GCF and I	0.265074	1.185777	insignificant
GCF and E	0.466346	2.256835	significant
GCF and EM	0.438032	1.468902	insignificant
GCF	0.433125	2.258914	significant
GDS and I	0.173105	1.390093	insignificant
GDS and E	0.555517	2.546374	significant
GDS and EM	not applicable	not applicable	not applicable
GDS	0.214286	1.610349	insignificant

Investment and savings rate positively influence GDP growth but in many cases these figures are insignificant. The variables are only significant when they are combined with export rates or investment share of GDP is significant by itself, too.

4.1.4 Greece

4.1.4.1 Case 1: The Effects of Gross Domestic Investments Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Greece

GDPG = -8.306776 + 0.802805 GCF - 0.221578 I - 0.297326 E

(-1.970633) (4.873237) (-2.846207) (-1.488297) R-squared = 0.567931

Inflation and export rate are negatively correlated to GDP growth rate, while investment spending has a positive relationship with growth. 1% increase in investment rate leads to 0.8% increase in growth rate while 1% rise in inflation and export rate causes 0.22% and 0.29% reduction in GDP growth respectively. Investment rate and inflation rate are significant variables but export rate is insignificant both on 10% and 5% confidence level. The figure of R-squared shows us that variation in explanatory variables accounts for 56% variation in the dependent variable.

4.1.4.2 Case 2: The Effects of Gross Domestic Investment Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Greece

GDPG = -4.897172 + 1.000767 GCF - 0.315083 I - 0.254003 EM

(-1.240222) (5.803969) (-3.905825) (-2.780293) R-squared = 0.650870

Similarly to the previous case inflation and trade openness are negatively correlated with GDP growth rate. 1% increase in inflation rate leads to 0.31% decrease in growth and 1% rise in sum of export and import share of GDP causes 0.25% reduction in growth rate. On the other hand investment rate has a strong positive effect on growth, 1% increase in investment rate boosts growth by 1%. All the variables are significant in this case and variation in independent variables explains 65% variation in GDP growth rate.

4.1.4.3 Case 3: The Effects of Gross Domestic Savings Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Greece

GDPG = -0.672779 + 0.984653 GDS - 0.359930 I - 0.287202 E

(-0.166502) (4.761509) (-3.756190) (-1.423749) R-squared = 0.557281

Rise in savings rate enhances growth, 1% increase in savings causes 0.98% increase in GDP growth. Inflation and export rate are negatively correlated to growth rate. 1% increase in inflation leads to 0.35% decrease and 1% rise in share of exports means 0.28% reduction in GDP growth rate. However export rate is an insignificant variable. Inflation and savings rate are significant. Variation in independent variables explains 55% variation in the dependent variable.

4.1.4.4 Case 4: The Effects of Gross Domestic Savings Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Greece

GDPG = -4.307992 + 0.861356 GDS - 0.286925 I - 0.028994 EM

(-0.928949) (4.306495) (-2.991221) (-0.340134) R-squared = 0.517206

Savings rate and GDP growth rate are positively correlated while inflation and share of export and import of GDP are negatively correlated to GDP growth. 1% increase in savings rate results 0.86% increase in growth rate. On the other hand 1% rise in inflation decreases growth rate by 0.28% and 1% increase in export and import rate causes 0.02% reduction in GDP growth. Trade openness is an insignificant variable in this case. Savings rate and inflation rate are significant. Variation in the right hand side variables accounts for 51% variation in GDP growth.

4.1.4.5 Additional Notes on Regression Analysis for Greece

Trade openness is a negative but insignificant variable for Greece. To check for validity we consider the following regressions presented below (for detailed regression results see Appendix A).

Table 4: Coefficients and t-statistics focusing on trade openness for Greece

Variables included	Coefficient for E or EM	t-statistics for E or EM	Significance
GCF and E	0.075414	0.434633	insignificant
GCF and EM	0.015598	0.203019	insignificant
GDS and E	0.237610	1.292707	insignificant
GDS and EM	0.138950	1.856726	significant
I and E	0.194136	0.789331	insignificant
I and EM	0.101847	0.953774	insignificant
E	0.262451	1.303713	insignificant
EM	0.123676	1.470814	insignificant

Table 4 shows coefficients and t-statistics for trade openness in different regression equations. Generally trade openness is an insignificant variable to measure GDP growth in Greece. It is only significant at 10% level when it is combined with savings rate. In this case 1% growth in export and import rate leads to 0.13% growth in GDP.

4.1.5 Spain

4.1.5.1 Case 1: The Effects of Gross Domestic Investment Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Spain

GDPG = -9.399980 + 0.163402 GCF + 0.720107 I + 0.229219 E

(-1.953768) (1.077565) (2.315212) (1.533097) R-squared = 0.263560

Investment rate, inflation rate and export rate are all positively correlated to GDP growth rate. 1% increase in investment rate, inflation and export rate increases GDP growth by 0.16%, 0.72% and 0.22% consecutively. However investment rate and export rate are

insignificant, only inflation is a significant variable. Variation in independent variables explains only 26% variation in the dependent variable.

4.1.5.2 Case 2: The Effects of Gross Domestic Investment Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Spain

GDPG = -6.864670 + 0.127665 GCF + 0.628491 I + 0.083203 EM

(-1.566707) (0.672844) (1.875723) (1.009770) R-squared = 0.219054

All the variables are positively correlated to GDP growth rate. 1% increase in investment rate causes 0.12% gain, 1% rise in inflation rate leads to 0.62% increase and 1% rise in trade openness results 0.08% increase in GDP growth rate. At 5% confidence level all variables are insignificant and if we loosen it to 10% level still only inflation rate is significant. Also variation in independent variables explains only 22% variation in GDP growth rate.

4.1.5.3 Case 3: The Effects of Gross Domestic Savings Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Spain

GDPG = -21.87337 + 0.919670 GDS + 0.512933 I + 0.071861 E

(-3.270101) (2.696780) (1.778065) (0.489429) R-squared = 0.422751

All the observed variables have a positive relationship with GDP growth rate. 1% increase in savings rate boosts the economy by 0.91%, 1% rise in inflation causes 0.51% increase in growth rate and 1% gain in exports rate leads to 0.07% increase in GDP growth. Export rate is insignificant. At 5% confidence level only savings rate is

significant and at 10% level inflation rate can be read as significant. Variation in independent variables explains 42% variation in the dependent variable.

4.1.5.4 Case 4: The Effects of Gross Domestic Savings Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Spain

GDPG = -21.92229 + 1.020163 GDS + 0.397493 I - 0.002498 EM

(-3.222679) (2.774399) (1.365292) (-0.035827) R-squared = 0.416202

Savings rate and inflation rate are positively correlated with GDP growth. 1% increase in savings causes 1.02% gain in growth and 1% rise in inflation leads to 0.39% increase in GDP growth. Trade openness however is negatively correlated to growth: 1% increase in openness decreases growth by 0.002%. Only savings rate is a significant variable in this case. R-squared shows that variation in independent variables accounts for 41% variation in the dependent variable.

4.1.5.5 Additional Notes on Regression Analysis for Spain

There are two trends that contradict theoretical background. Investment rate seems to be insignificant in case of Spain and also trade openness is insignificant in all four cases.

To filter biased results the following tables focus on significance of investment rate and trade openness (for detailed results see Appendix A).

Table 5: T-statistics focusing on investment rate for Spain

Variables included	t-statistics for investment rate	Significance
GCF and I	1.744514	significant
GCF and E	1.291894	insignificant

GCF and EM	1.423042	insignificant
GCF	1.354186	insignificant

As Table 5 shows investment rate has positive relation to GDP growth but in almost all cases the variable is insignificant. Only combined with inflation rate gives the regression significant result for investment rate.

Table 6: Coefficients and t-statistics focusing on trade openness for Spain

Variables included	Coefficient for E or EM	t-statistics for E or EM	Significance
GCF and E	-0.022841	-0.203623	insignificant
GCF and EM	-0.033560	-0.588851	insignificant
GDS and E	-0.126873	-1.271539	insignificant
GDS and EM	-0.075154	-1.636175	insignificant
I and E	0.290603	2.094573	significant
I and EM	0.119176	1.924872	significant
E	0.036837	0.355240	insignificant
EM	0.014726	0.314673	insignificant

There is only one case when trade openness is a significant variable for GDP growth in Spain specifically combined only with inflation rate. In this case trade openness is positively correlated to growth rate.

4.1.6 Panel Regression

Panel regression is a technique to combine time-series and cross-sectional data for homogenous groups. Just like at individual country regressions at panel regression there are four cases, too. The only difference between panel and individual regression is that

in panel all the data for the five countries are added together. Specifically it means there are 25 periods and 5 cross-sections giving a total of 125 numbers of observations. Panel regressions are constructed by using heteroscedasticity correlation in order to achieve more reliable results.

4.1.6.1 Case 1: The Effects of Gross Domestic Investment Rate, Inflation rate and Export Share on GDP Growth Rate in Portugal, Italy, Ireland, Greece and Spain

GDPG = -7.876812 + 0.356390 GCF + 0.047510 I + 0.065360 E

(-3.097391) (4.051047) (0.555728) (6.005206) R-squared = 0.298178

All the independent variables are positively correlated to GDP growth rate. 1% increase in investment rate causes 0.35% growth, 1% rise in inflation rate leads to 0.04% increase in growth rate and 1% increase in export rate results 0.06% gain in GDP growth. However inflation is insignificant in this case, investment rate and export rate significantly affect growth rate. Variation in independent variables explains 0.29% variation in the dependent variable.

4.1.6.2 Case 2: The Effects of Gross Domestic Investment Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Portugal, Italy, Ireland, Greece and Spain

GDPG = -7.547180 + 0.333063 GCF + 0.037644 I + 0.035371 EM

(-2.943934) (3.758706) (0.435479) (5.582485) R-squared = 0.279153

All the right hand side variables are positively correlated to GDP growth. 1% increase in investment rate results in 0.33%, 1% rise in inflation leads to 0.03% and 1% increase in

export and import share of GDP also causes 0.03% increase in GDP growth rate. Similarly to the previous case inflation is insignificant while investment rate and export and import share are significant variables. Variation in independent variables accounts for 27% variation in the dependent variable.

4.1.6.3 Case 3: The Effects of Gross Domestic Savings Rate, Inflation Rate and Export Share of GDP on GDP Growth Rate in Portugal, Italy, Ireland, Greece and Spain

GDPG = -2.017509 + 0.181047 GDS + 0.121506 I + 0.010837 E

(-1.677241) (3.415715) (1.207449) (0.550511) R-squared = 0.221026

All independent variables have a positive relationship with GDP growth rate. 1% increase in savings rate raises growth rate by 0.18%, 1% increase in inflation shows 0.12% rise in growth and 1% gain in export rate leads to 0.01% increase in GDP growth. In this case export rate and inflation rate are insignificant. Savings rate is significant at both 10% and 5% confidence level. Variation in independent variables accounts for 22% variation in the independent variable.

4.1.6.4 Case 4: The Effects of Gross Domestic Savings Rate, Inflation Rate and Sum of Export and Import Share of GDP on GDP Growth Rate in Portugal, Italy, Ireland, Greece and Spain

GDPG = -2.129772 + 0.171381 GDS + 0.124246 I + 0.009540 EM

(-1.951920) (3.748375) (1.208628) (0.945192) R-squared = 0.225781

Again all the variables are positively correlated to GDP growth rate. 1% increase in savings rate causes 0.17%, 1% rise in inflation leads to 0.12% and 1% gain in sum of export and import share of GDP results 0.009% increase in GDP growth rate. Export and import share of GDP and inflation rate are insignificant while savings rate is a significant variable. Variation in independent variables explains 22% variation in GDP growth rate.

4.1.6.5 Additional Notes on Panel Regression Analysis

There are three points I would like to highlight in this section. Firstly, the insignificance of inflation rate in all cases; secondly, the insignificance of trade openness in Case 3 and 4 and finally the low values of R-squared.

From the panel regression it seems like inflation is insignificant when it is combined with investment rate or savings rate and trade openness at the same time. To check for the validity of the test the following additional regression equations are given:

GDPG = -3.442856 + 0.280205 GCF - 0.044181 I

(-1.448873) (3.483752) (-0.494637) R-squared = 0.099021

In this test export rate is dropped and it causes the sign of inflation to change to negative. In this case 1% rise in inflation rate decreases GDP growth rate by 0.04%. However variation in right hand side variables accounts for only 9% variation in the dependent variable and inflation rate remains insignificant.

In the following test savings rate and inflation rate are put together by dropping trade openness:

GDPG = - 2.126772 + 0.205619 GDS + 0.114867 I

(-2.006844) (7.198195) (1.094483) R-squared = 0.218461

Combining with only savings rate, inflation remains positive and insignificant. The equation shows that 1% rise in inflation rate increases GDP growth rate by 0.11%. Also the variation in savings rate and inflation rate accounts only for 21% variation in GDP growth rate.

If we only consider inflation as the variable influencing GDP growth we get the following equation:

GDPG = 2.643491 + 0.019273 I

(3.015730) (0.172760) R-squared = 0.000696

Inflation is positively correlated to GDP growth. 1% increase in inflation rate raises GDP growth by 0.01%. The variable is insignificant and variation in inflation rate explains only 0.06% variation in GDP growth rate.

Another interesting feature in panel regression is that trade openness is insignificant when it is combined with savings rate and inflation rate. The following table shows the results when trade openness is only combined with savings rate or it stands by itself.

Table 7: Coefficients and t-statistics focusing on trade openness for panel regression

Variables	Coefficients for E or EM	t-statistics for E or EM	Significance
E and GDS	0.005088	0.210745	insignificant
EM and GDS	0.006956	0.571218	insignificant
E	0.048161	3.353852	significant
EM	0.027963	3.302647	significant

Trade openness is insignificant combined with savings rate, it only influences GDP growth rate significantly when it is the only variable or combined with investment rate as it was shown in Case 1 and 2.

For each case in panel regression very low values of R-squared could be obtained. It means that the independent variables I used such as investment rate, savings rate, inflation and trade openness are not very good predictors of GDP growth in the five selected countries generally. For example most of the cases R-squared are around 20% which means that these variables are only responsible for one fifth changes in GDP growth rate (for detailed panel regression results see Appendix B).

4.2 Arithmetic Averages

By checking the average annual figures before and after the introduction of the euro I was trying to analyze how macroeconomic performance of the selected countries has changed by entering the Eurozone.

The construction of the tables is the following: averages of different figures are calculated for the periods of before and after the introduction of the euro. The starting date of the research is from the year 1986- the ratification of the Single European Act

(SEA). By the mid 1980's the European Community had twelve members including Portugal, Italy, Ireland, Greece and Spain. Many guidelines and laws had been created but there was no mechanism to make countries implement them. The main purpose of the SEA was to deeper the integration and set a target date of 1992 for establishing a single market[4].

In 1999 the EU enacted the introduction of a single currency. The process goes back to 1988 when the Delors Committee had been established to plan the implementation of the Economic and Monetary Union (EMU). It had three stages and the final one in 1999 drew the finishing brushes on the EMU. The final stages included irrevocable fixing of exchange rates, introduction of the euro and establishment of a single monetary policy by the European System of Central Banks.[5]

The distribution of calculations is between 1986-1999 and 1999-2010. A line labeled 2000-2008 exists in order to avoid biased results because of the global economic crisis that has the estimated starting date in 2008. The aim is to examine whether the introduction of a common currency has improved the economic performance of the member countries but in times of disturbance such as the recent economic crisis may give a wrong impression of the performance of economies.

4.2.1 GDP Growth of Selected Countries

Table 8 presents the average GDP growth for the five selected countries:

[4] Source: Civitas http://www.civitas.org.uk/eufacts/FSTREAT/TR2.htm (Retrieved: 27.03.2012)

[5] Source: The European Central Bank http://www.ecb.int/ecb/history/emu/html/index.en.html (Retrieved: 27.03.2012)

Table 8: Average GDP growth (annual %)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	2.48	1.36	4.75	2.00	2.92
1986-1999	3.71	1.93	6.14	1.79	3.29
2000-2010	0.91	0.64	3.36	2.27	2.45
2000-2008	1.33	1.22	5.00	3.55	3.44

In theory we would expect the annual average GDP growth to be higher after 1999 than before. If we look at the period 2000-2010 only Greece has higher GDP growth than before introducing the Euro. If we distract the last two years to adjust for the recent crisis Spain is also performing better in the last decade than before. On the other hand Portugal, Italy and Ireland have lower growth rates since they have been using a common currency.

To see how GDP growth has been changing in time the data have been plotted in a graph. Figure 1 shows the fluctuations between 1986 and 2010.

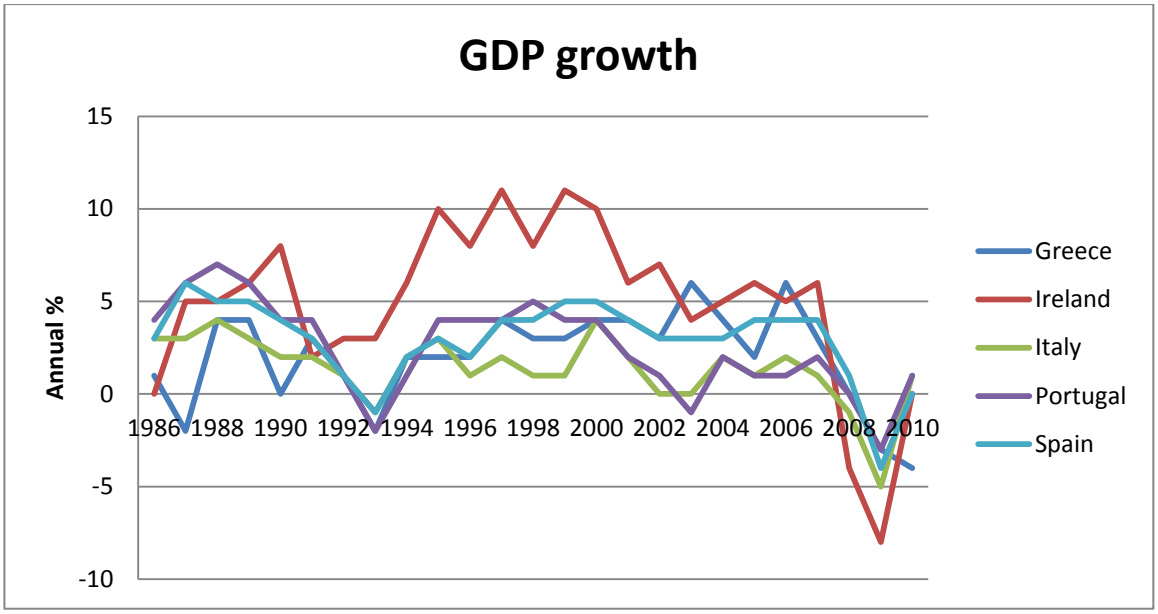

Figure 1: Annual GDP growth for 1986-2010

There are some significant events that can be interpreted from the graph. Until the early 2000's Ireland had far higher growth rates than the rest of the observed countries. Since the beginning of the last decade growth rates have been decreasing. There have been two sharp declines in the last 25 years, one is in 1992-1993 and the other has started in 2008.

The currency crisis in 1992-1993 was mainly due to the reunification of Germany and the collapse of the Exchange Rate Mechanism. Germany was a major factor in planning and participating in the monetary union. This is the reason why it had such a deep effect on the whole organization when the country was reunited and West-Germany spent great amount of money to help the convergence of its eastern regions.[6]

[6] Source: Wellesley College http://www.wellesley.edu/Economics/weerapana/econ213/econ213pdf/lect213-15.pdf (Retrieved: 18.04.2012)

The crisis in 2008 is consequence of the US subprime mortgage crisis that spread to Europe causing serious distress in weaker economies. The reason it has global effects is the interdependence of economies all around the world and the dominance of financial unsecure capital.

The main question to answer is why only Greece and Spain have been performing better after the introduction of the Euro or to put it other way why have growth rates been decreasing since the early 2000's?

To answer this question there are some other macroeconomic figures to look at. The following tables present the main macroeconomic variables for the selected countries.

4.2.2 Domestic Investment and Savings Rate for Selected Countries

Table 9: Domestic Investments Rate (% of GDP)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	25.00	20.80	20.46	22.96	25.04
1986-1999	25.93	20.71	18.64	22.86	23.21
2000-2010	23.82	20.91	22.27	23.09	27.36
2000-2008	24.77	21.22	24.44	24.44	28.22

Table 10: Domestic Savings Rate (% of GDP)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	17.08	21.92	31.53	11.96	22.88
1986-1999	18.71	22.64	27.14	12.71	22.29
2000-2010	15.00	21.00	35.91	11.00	23.64
2000-2008	15.66	21.55	37.33	11.88	24.11

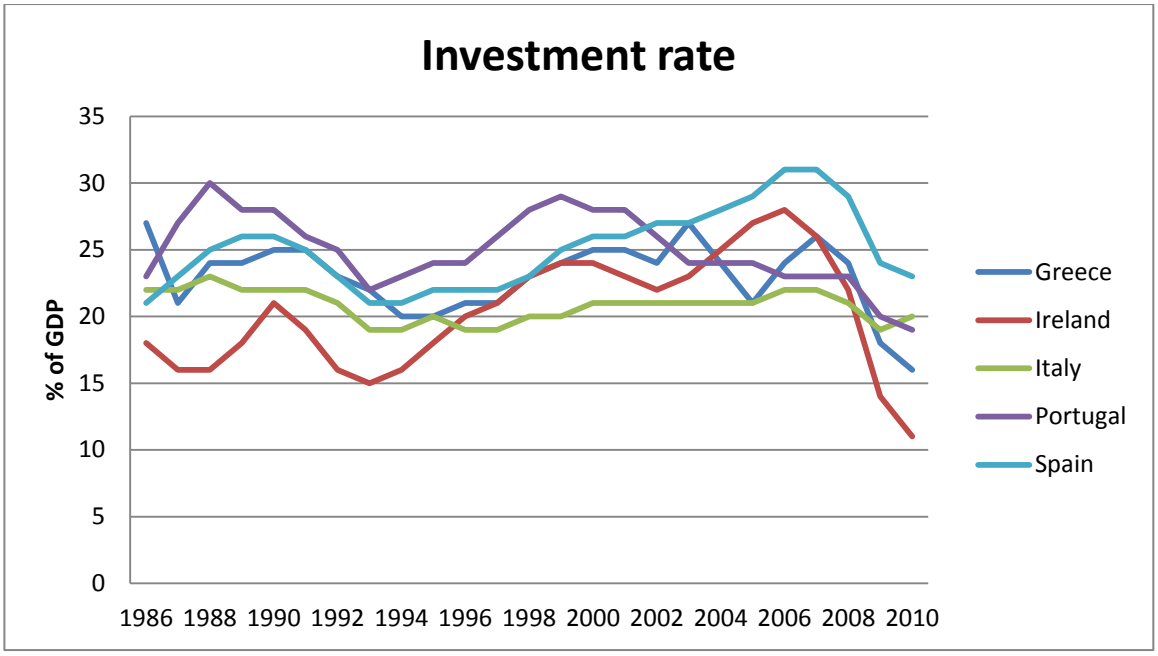

Figure 2: Annual Domestic Investment Rate (% of GDP)

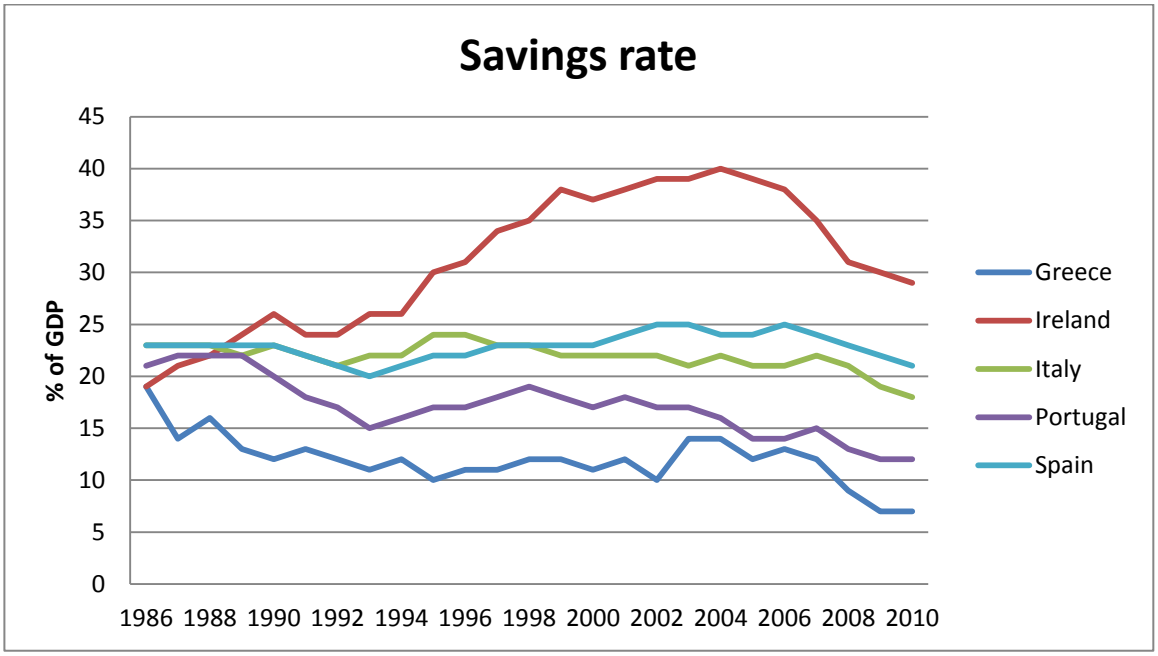

Figure 3: Annual Domestic Savings Rate (% of GDP)

Theory would suggest that domestic investments and savings increase or at least stay stable in a prosperous economic integration. Mainly in all of the countries these figures remained almost the same in the last decade as they were before. Only Ireland improved its savings and investment rate by 8% and 6%. The change in other countries is only around 1-2% in both investments and savings rate. From Figure 2 it can be concluded that investment rates has been moving similarly in all countries so a common trend has been formed. On the other hand Figure 3 shows how Ireland has had higher savings rate than any other country in this group. A common characteristic of investment and savings rates that after 2008 both figures have been decreasing in all the observed countries.

4.2.3 Trade Openness for Selected Countries

Table 11: Average Export Rates of Goods and Services (% of GDP)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	28.16	23.68	78.02	20.92	23.08
1986-1999	27.21	21.36	67.50	19.36	20.43
2000-2010	29.36	26.64	88.54	22.91	26.45
2000-2008	29.33	26.88	87.11	23.44	26.88

Table 12: Average Import Rates of Goods and Services (% of GDP)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	32.00	22.60	66.99	31.72	25.28
1986-1999	34.43	19.50	59.07	29.29	21.21
2000-2010	38.00	26.54	74.91	34.82	30.45
2000-2008	38.33	26.55	74.22	35.77	31.22

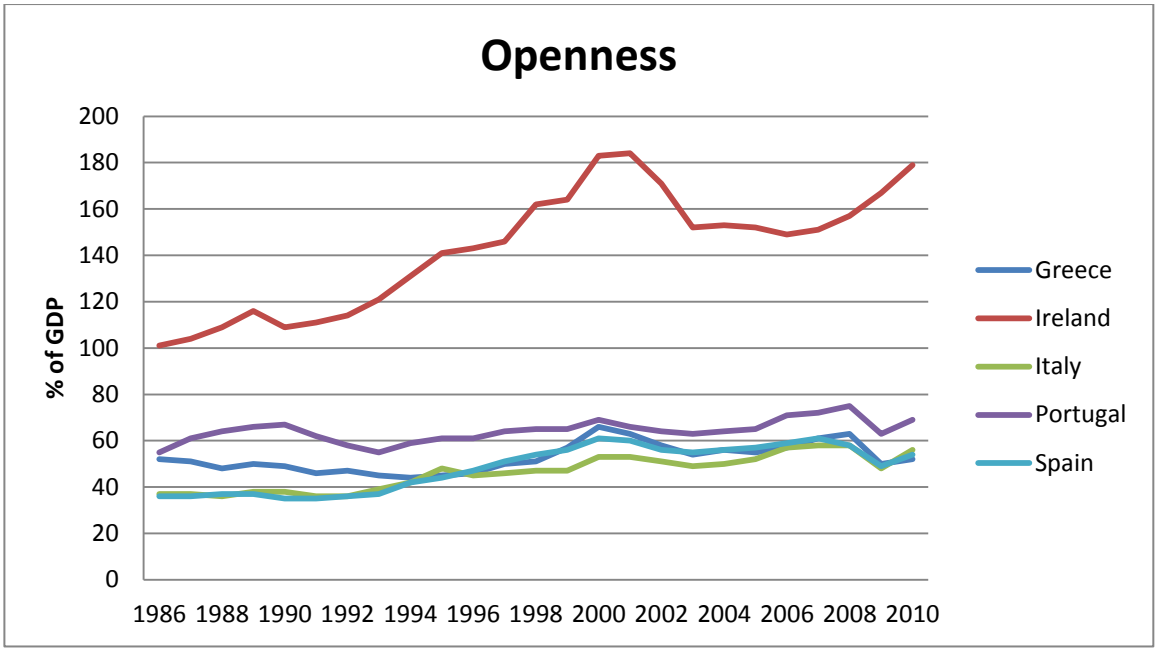

Figure 4: Annual Sum of Export and Import Share of GDP (% of GDP)

One of the most important goals of a single market and thus the Economic and Monetary Union is to enhance economic relations and to ease trade of goods and services among member countries. In all cases the share of exports and imports of GDP in the observed countries have increased after the introduction of euro. It means the trade openness of these countries has improved. Ireland is an interesting case by having the far most open economy among these five states. If we add up exports and imports share of GDP the figure exceeds 100 meaning that Ireland has an export and import share more than 100% of its GDP value. As Figure 4 shows after a sharp decline in 2008 and 2009 trade openness of selected countries have started to increase. Ireland is a different case, after the decrease of exports and imports during the last decade in 2007 this rate has started growing.

4.2.4 Inflation Rate for Selected Countries

Table 13: Average Inflation Rates (Annual %)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	5.20	3.48	2.66	8.60	4.08
1986-1999	7.36	4.43	2.50	12.71	5.00
2000-2010	2.45	2.27	2.82	3.36	2.91
2000-2008	3.00	2.44	4.00	3.44	3.33

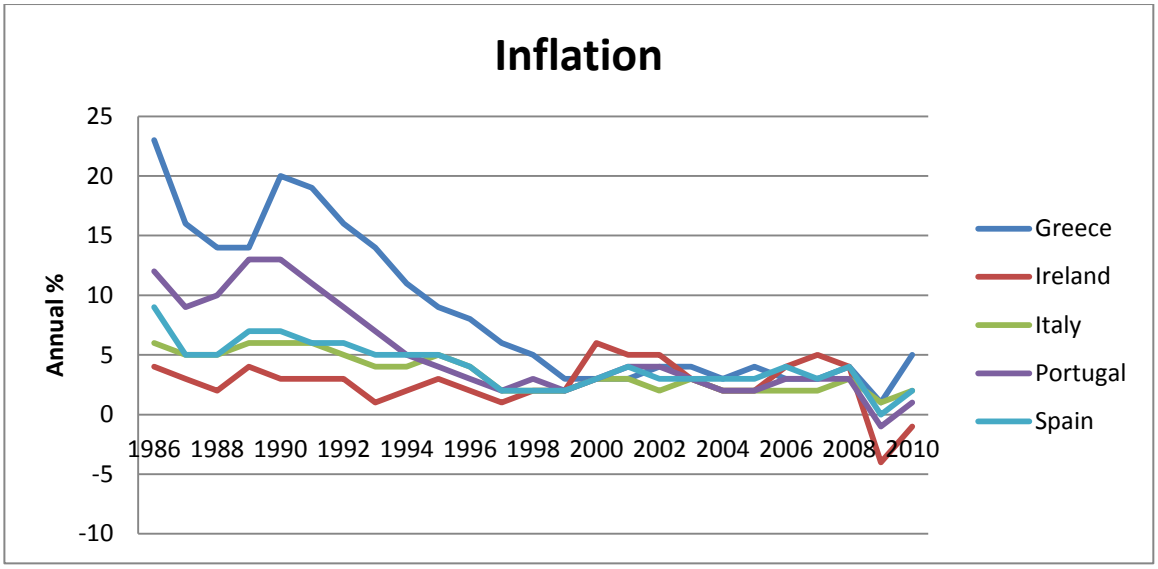

Figure 5: Annual Inflation Rate (Annual %)

Introducing a common currency suggests inflation rates to decrease in those countries that had high inflation rates in the old system and remaining stable low rates for those who had lower inflation before. Results prove the theory right. Higher inflation rates in the period of 1986-1999 in Portugal, Italy, Greece and Spain have reduced to around 2-3% average. Ireland had initial low inflation rates that has slightly increased but still remained under 3%.

4.2.5 Budget Balance for Selected Countries

Table 14: Budget Balance of the Government (% of GDP)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	-5.20	-5.83	-2.60	-8.54	-3.20
1986-1999	-5.80	-8.33	-3.50	-9.37	-4.80
2000-2010	-4.49	-2.64	-1.72	-7.49	-1.11
2000-2008	-3.44	-2.33	0.44	-6.11	0.44

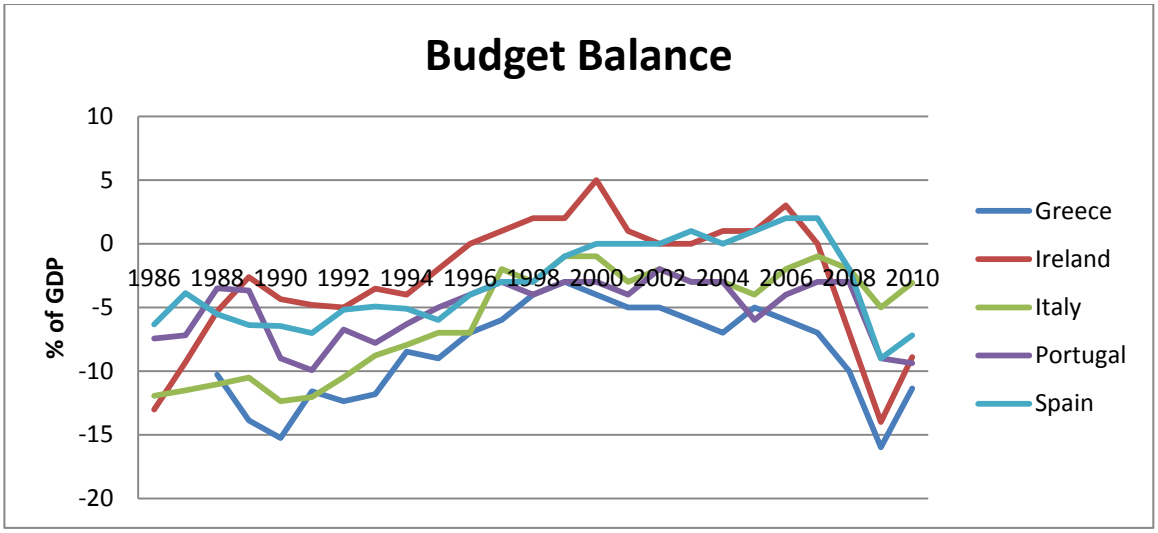

Figure 6: Annual Budget Balance (% of GDP)

The Maastricht criteria (or convergence criteria) prescribes that a country's annual government budget deficit cannot exceed 3% of the GDP[7]. It binds countries that are already members of the Eurozone and candidates, too. Only Italy, Ireland and Spain could meet the criteria among the observed countries. Portugal and Greece has had excess deficit but since the EU does not have a powerful sanctioning system there is no

[7] Europa

effective punishment for not meeting the criteria. On the other hand before entering the Eurozone if we only look at the figures of the previous year, 1998 (see Appendix C) all the countries were eligible to become a member of the Eurozone. In general the average figures have improved in all the observed countries after joining the EMU. Figure 6 shows that after the rising trend towards budget surplus in the 1990's, the new millennium has brought a different movement. Governments have been running deficits especially since the sharp decline of budget balance in 2007.

4.2.6 Central Government Debt for Selected Countries

Table 15: Total Central Government Debt (% of GDP)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	63	110	65	105	49
1986-1999	57	108	87	85	52
2000-2010	70	113	44	130	46
2000-2008	66	112	35	127	44

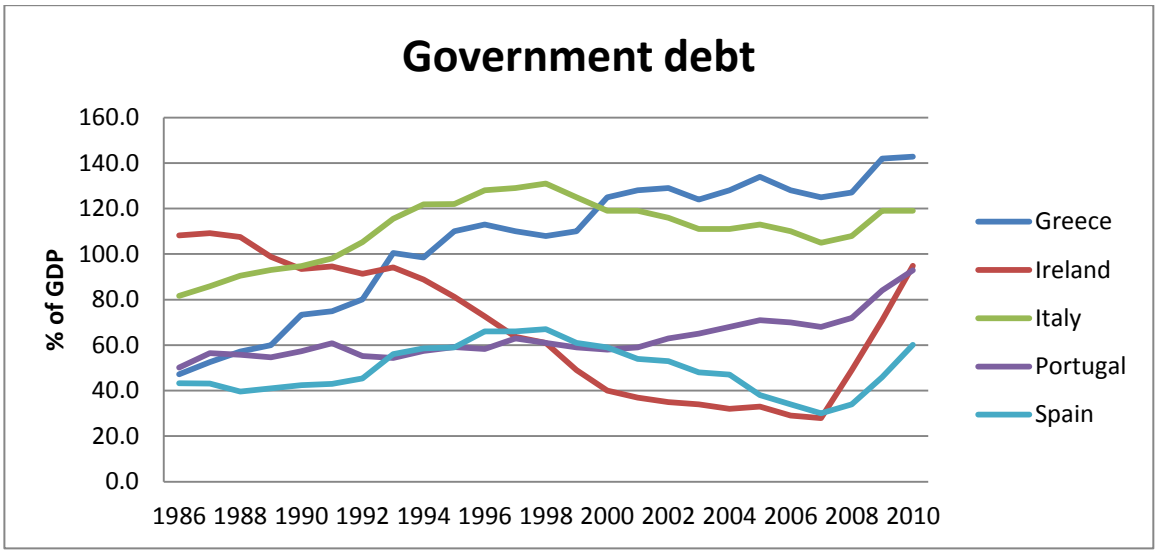

Figure 7: Annual Government Debt (% of GDP)

The Maastricht criteria also suggests that member countries have to keep their government debt rate under 60% of the GDP which as we see has not been accomplished by many countries, even one of the founders, Italy could not keep this figure as it has been prescribed.

Entering the Economic and Monetary Union has worsened the situation of total outstanding debt of several countries. Total government debt has increased in Portugal, Italy and Greece even if we only look at the adjusted period of 2000-2008 to avoid the negative effects of the recent crisis. On the other hand Ireland has reduced its debts to half and Spain has also performed better in terms of total debts after 1999 (Table 15 and Figure 7).

4.2.7 Unemployment Rate for Selected Countries

Table 16: Average Unemployment Rates (% of Total Labor Force)

Period/Countries	Portugal	Italy	Ireland	Greece	Spain
1986-2010	6.60	9.65	9.92	9.37	15.83
1986-1999	5.93	11.00	13.79	8.79	19.57
2000-2010	7.28	8.31	6.06	9.95	12.09
2000-2008	6.44	8.33	4.55	9.66	10.55

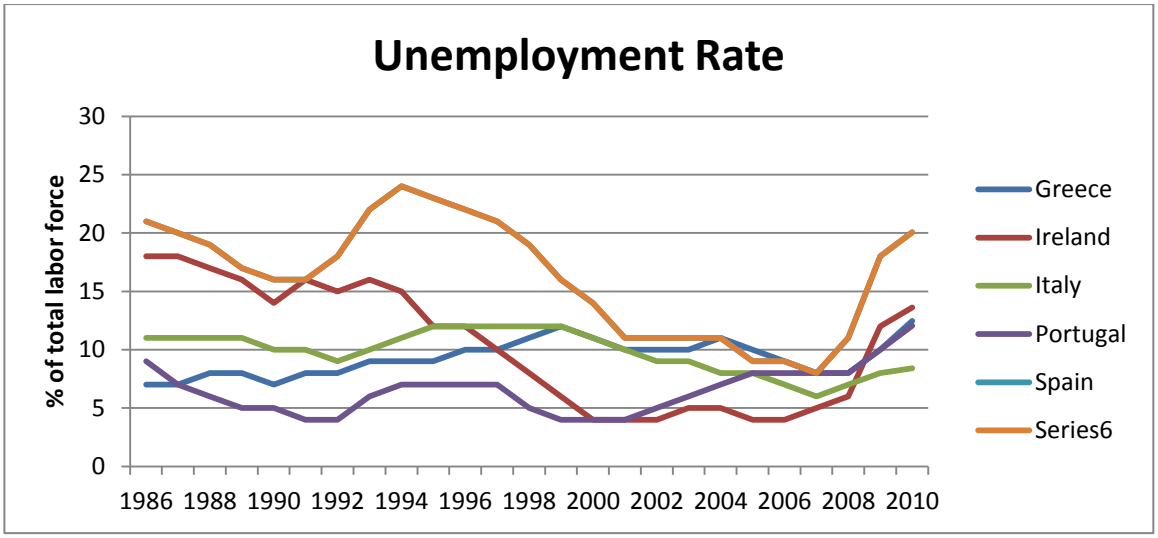

Figure 8: Annual Unemployment Rate (% of Total Labor Force)

Unemployment rate has slightly increased in Portugal and Spain after becoming a member of the Eurozone. In other countries it has decreased complying with the theory of the single market that provides macroeconomic stability.

4.3. Policy Background

4.3.1 Portugal

Pereira and Lains (2010) try to give an overview about Portuguese economy in the last 50 years. After the revolutionary period of 1974-1975 Portuguese economy started growing significantly in the mid 1980's. The country joined the European Communities in 1986 and it also helped boosting its economy. By entering the Communities widespread institutional reforms, privatization and economic liberalization programs took place in Portugal that made the country more open to the rest of Europe. In the last century Portugal managed to become an industrialized country.

The 1990's were not that successful for the country. An increase in unemployment and low accumulation of human capital led to lower productivity growth that decreased general economic growth during the decade. An explanation for this trend is the deficiencies of structural changes and inefficiency of labor. The strict measurements that needed for the introduction of euro also made growth rate to slow down and caused disadvantage in export competitiveness. The adjustment to Eurozone was a difficult process for Portugal. Because of the rapid economic growth in the previous decades fueled by investments, further investments started to show diminishing returns. Besides, Portugal still had structural imbalances and public finance was still a weak point of the economy.

The WTO Uruguay Round accepted lower tariffs on exports that affected Portugal negatively. Being a traditional textile exporter made it difficult for Portugal to compete with cheap Asian exports[8].

The 21st century has brought economic recession and fiscal crisis to the country. By joining the monetary union Portugal could not control some of its policies that were national authority before so some of the traditional industries could not get enough governmental support to be competitive. Adjustment to the euro also proved to be very challenging for the Portuguese economy (Soares, 2007).

Labor and capital have been invested in those branches that were protected by the government such as law, construction, healthcare and government activities. To keep up

[8] Source: The Economist http://www.economist.com/node/17902815 (Retrieved: 16.04.2012)

the living standards Portugal has accumulated its borrowings mainly from Europe because of the low interest rates and cheap credit that Eurozone has provided during the last decade[9]. The recent crisis has also worsened the situation in Portugal. To stabilize the economy and reduce the unemployment Portugal has to complete strict austerity measures that are also the condition of the bailout package the country received in 2011.

4.3.2 Italy

The 1970's oil shock and world crisis meant a great challenge for Italy. The inflation rose from around 5% to 21% by 1980. The country had to make some structural changes, small and medium enterprises became widespread and successful. In the 1980's the popularity of government bonds increased, this was a major source of financing the welfare state even if it was not possible to keep up at long term (Németh, 2006).

The political scandals in the beginning of 1990's undermined the economy, too. The Italian lira was suspended from participation in European Monetary System in 1992, budget deficit and public debt were constantly rising and productivity was decreasing. In the last decade Italian economy has continued to be sluggish, investments have slowed down so has consumption. Because of the fall in public investments there are problems with the infrastructure and education system. Another major source of anomalies is that government used to devaluate currency to keep up Italian competitiveness but since the introduction of euro it is not possible any more (De Cecco, 2007).

The impact of the single currency on Italian economy has been more negative than positive so far. One of the reasons that the country is in a troublesome situation is the

[9] Source: The Economist http://www.economist.com/node/21548977 (Retrieved: 16.04.2012)

huge public debt. It had been similar for a long time, the only thing has changed that even though public debt was huge in the previous decades growth rate was stable. After 2000 the growth rate has declined but huge public debt has remained. Besides, the country's productivity is not competitive with emerging Asian markets. Small and medium sized enterprises are dominant in Italian economy but their productivity is lower than huge multinationals. Significant activities of shadow economy, mafia and political scandals have also been worsening the economic performance. Finally the lack of convergence between the richer industrialized northern parts and poorer agricultural southern territories further deepen the economic problems of Italy[10].

4.3.3 Ireland

In the 1970's Ireland was still an agricultural country but a growing destination for foreign direct investment. In order to achieve economic growth the country had to raise the numbers in employment, open the economy by raising export share and productivity. The government strategy was built on company development and innovation to achieve higher growth rates. In the late 1980's the economy started growing significantly. Major industries were knowledge-based sectors like pharmaceuticals and biotechnology. Ireland began to be a popular host country for FDI. The country was aiming to become a knowledge-based economy by investing in human capital and research and development. To strengthen its exports the government used tax incentives to support a positive trade balance (Swift, 2003).

[10] Source: The Atlantic http://www.theatlantic.com/business/archive/2011/11/4-reasons-why-italys-economy-is-such-a-disaster/248238/# (Retrieved: 17.04.2012)

1990's was a success story for Irish economic growth. The country maintained long term price stability, growth in employment, reduced its government deficit and external debt. Trade openness level (sum of exports and imports share) exceeded 100% of GDP.[11] There are several factors that boosted the economy including the expanding labor supply, attracting investments from abroad, technological development, anticipating in innovation, putting emphasis on education, using EU funds and applying innovative and progressive government policies in order to increase economic performance.[12]

The upward trend was broken by the financial crisis in 2008. Because of the cheap credit available the Irish economy got involved in speculative investments in real estate. Since interest rates fell due to participation in Economic and Monetary Union Ireland financed the increasing demands in housing from international borrowings. Another main cause of Ireland's vulnerability of global events is its extreme openness. Besides, wage competitiveness has decreased. [13]

4.3.4 Greece

Bryant and Garganas and Tavlas (2001) give an overview of the macroeconomic policies and economic performance of Greece for the last thirty years. In the beginning of 1980's Greece got into a stagnation after the 1979 oil crisis. There were some attempts for stabilization but macroeconomic policy of the country was adjusted to

[11] Source: FX Centre http://www.fxcentre.com/jb/pdfs/quarterly/q3-2000-15.pdf (Retrieved: 18.04.2012)

[12] Source: eMarket Services http://www.emarketservices.com/clubs/ems/prod/E-business%20in%20Ireland.pdf (Retrieved: 18.04.2012)

[13] Source: Trinity College Dublin http://www.tcd.ie/Economics/staff/phonohan/What%20went%20wrong.pdf (Retrieved: 18.04.2012)

political cycles. Government expenditure and pension deficits were rising significantly in the following couple of years. The central bank was trying to finance growing public expenditure with expanding money supply. The competitiveness of the country was also declining because the government focused on traditional industries that did not make profit. Another major problem was the small amount of FDI invested in Greece because of the bureaucracy and lack of institutional transparency. Besides, the poor infrastructure and the heavily subsidized public sector deepened the problems. Joining to the European Communities in 1981 meant competing with more efficient and developed European countries for Greece. The slow growth rate was accompanied by high inflation rates during this period.

To stabilize the economy, improve balance of payments and reduce inflation the government introduced a stabilization package in 1985. After a two year adjustment macroeconomic policies were relaxed again but output was still growing, inflation was declining. It was a short term blooming weakened by the following political uncertainty and weak coalition governments.

In the beginning of 1990's the government introduced another stabilization package with structural reforms to achieve a more market-oriented economy with the assistance of the Communities. Improvements were modest and after government change the stabilization was neglected. Also the macro environment was discouraging because of the European recession in early 1990's.

In 1993 Maastricht Treaty came into force that contained the convergence criteria for participating in the euro area. Greece had major problems fulfilling the criteria without a

strict macroeconomic stabilization. As a result a new convergence program was accepted for the period of 1994-1999 that was aiming the reduction of government deficit, decreasing inflation and keeping monetary policy tight. In 1998 the drachma entered the Exchange Rate Mechanism (ERM) that was the transitory body towards Eurozone.

By participating in the Eurozone Greece could borrow at much lower interest rates than before. This led to huge amount of spending that focused on increasing public spending, generous pension system and wealth of the country rather than paying off its debts[14].

The outburst and spread of the US subprime mortgage crisis has worsened the situation in Greece, too. The crisis reached the country in a vulnerable position by having large amount of current account deficit and huge government debts.

Greece has been downgraded by the biggest credit rating agencies, lack of trust in Greek banks internationally has caused credit to be scarce and the European Union has also been expecting strict austerity measures to stabilize the Greek economy.

4.3.5 Spain

The 1970's oil price boom put an end to a flourishing period. The drastic rise in oil prices made the heavy industry expensive and less competitive. The gap between rural and industrialized areas grew larger. Also unemployment, inflation and budget deficit rose due to the structural changes in global economy. Joining the European Communities in 1986 had some positive effects on economy, investment share and

[14] Source: The Telegraph http://www.telegraph.co.uk/news/worldnews/europe/greece/7646320/Greece-why-did-its-economy-fall-so-hard.html (Retrieved: 16.04.2012)

growth rate started increasing and the country became more open (Németh, 2006). The Spanish economy stepped on an expansion path in the upcoming years but it could have only achieved by rising inflation rates and deficit in trade balance (Somers, 1991).

In late 1992 recession reached Spain just as other European countries. The economy entered a contraction period, domestic and foreign demand decreased, unemployment rose. Spanish peseta was devalued to increase the country's international competitiveness and Spain also joined the Exchange Rate Mechanism that aimed the introduction of a common currency of member states. The major goal of the economy was to liberalize and meet the convergence criteria to become a member of Eurozone. By the middle of the decade the economy recovered due to increasing export and domestic consumption. Labor market became more flexible, infrastructure and technology were developed. The whole economy became more integrated into Europe (Salmon, 2000).

After the millennium Spain has become a successful member of the EU. Public debt has been reduced, construction industry enjoyed a boom, job creation has been going on a fast pace and the country has become the biggest recipient of immigrants who contributed to GDP growth. Being a member of European Monetary Union decreased the cost of capital in a significantly lower level and provided macroeconomic stability and Spain has also been a major recipient of Structural Funds. The 2007-2008 global crisis has damaged the economy of Spain deeply. The real estate sector collapsed accompanied by rising unemployment rates and a remarkable decrease in consumer

confidence. The government was unable to react in the beginning of the crisis so the figures continued to worsen (Royo, 2009).

Chapter 5

CONCLUSIONS

5.1 Portugal

GDP growth after 2000 has been lower in Portugal than the decade before. The main reason for this trend is that it has been challenging for Portuguese economy to adjust to the requirements of Eurozone as a peripheral country and even though membership in European Union has opened up its economy, Portugal is loosing competitiveness against cheap producers in the world. In exports Portugal has increased its share of GDP by only 2% in the last decade. Investment and savings rate have not been changing in a large volume in the last two decades pointing out that there has not been a big boost in the economy because regression results showed that both of the variables have positive impact on growth and they are also significant for economic growth. Trade openness by itself or combined with investment rate seems to be insignificant in regard of economic growth. It shows significant effect on growth only combined with savings rate. Budget balance and inflation rate show the upside of participating in the single currency, inflation has decreased by 5% since the 1990's and budget balance has been showing improvements except for the last two years. Budget deficit has increased from 3% to 9% in 2009 and 2010 exceeding the Maastricht criteria. However, as regression results show inflation has a positive and significant relationship with GDP growth so a decrease in inflation rate does not necessarily means increase in growth rather it is the opposite.

Unemployment and government debt has increased in the last decade. Government debt has worsened significantly after 2007 due to borrowing cheap credit from the EU to keep up the living standards this way. In 2010 this figure was 93% of GDP. As a general overview Portugal is in a worse situation after the millennium than before but it is not only the negative effect of participating in Eurozone but the effects of the recent economic crisis.

5.2 Italy

Italy's growth rate has decreased from an average of 1.93% to 0.64% between the period 1986-1999 and 2000-2010. Investment and savings rate have been stable in the last two decades, there has only been approximately 1% change in these figures. It is important because both investment and savings rate influence GDP growth positively and in most cases these figures are significant according to the regression results. If there is no increase in these rates it has a lower chance to be an increase in GDP growth rate, too. Trade openness of the country has increased since the 1990's but even though Italy is more integrated to Europe and world market, trade openness is not significant in influencing GDP growth. Italy meets the Maastricht criteria in accordance with inflation rate (average inflation rate in the last decade has been 2.27%) and budget balance (on average it has been under 3%, but it has slightly increased in 2009 and 2010). Regression results show that inflation positively influences GDP growth rate and it has a significant effect on it. Unemployment has also decreased by around 3% since 2000. Historically Italy has had high government debt rates. It was above 100% of GDP even before entering the Eurozone and it has not changed essentially. On average Italy has had 113% government debt of GDP after the millennium. The factor that has changed in

the last decade is productivity. Even if the country had huge debts in the previous periods its economy was productive and could offset the high volume of borrowings. But small and medium sized enterprises could not stay competitive against multinational companies in the long term. Besides, the government could not devaluate the currency anymore to keep up competitiveness. There are several other reasons why the economy has been in a trouble in the last decades such as the negative effect of political scandals, great influence of the shadow economy and the lack of convergence between rural and industrial regions.

5.3 Ireland

Average growth rate of the country has been reduced to almost half in 2000-2010 from the high growing rate of 1986-1999. If we take the last two years of recession out of calculation there has been only a slight decline. Investment and savings rate show an upward trend that we can consider a continuity of the high rates of 1990's especially extensive investments into knowledge based sectors, research and development and human capital. Investment rate is significant for economic growth by itself or combined with export rate; savings rate also significantly influence growth combined with export rate. In this case surprisingly export rate has a negative effect on GDP growth. Trade openness is an insignificant variable according to regression results. On the other hand figures show that Ireland has increased its export share of GDP by 21% and import share by 16% in the last decade. The country has opened its economy to more than 100% of GDP. This extreme openness is one of the reasons why recession has hit the Irish economy so hard. Another major reason is the availability of cheap credit that Ireland has been borrowing in a high volume to use it as speculative investment in real estate

market. Average inflation and budget balance has stayed stable during the last 25 years. Unemployment has decreased. It has been decreasing since the beginning of 1990's due to innovative government policies to enhance economic growth. From the period 1986-1999 Ireland has reduced its government debt to half from 87% to 44% of GDP after 2000, being one of the few countries in the EU that meet the Maastricht criteria.

5.4 Greece

Greece is the only one from the observed countries that have a higher growth rates on average after 2000 than before. The average growth rate of 1.79% has grown to 2.27% (it would be 3.55% if we do not involve the recession years of 2008-2010 into calculations). Investment and savings rate have basically not changed much during the last 25 years. Both figures are positively correlated with GDP growth rate and strongly significant variables. Trade openness has improved. Export share of GDP has risen by 4% and import share by 5% on average after 2000. However trade openness is an insignificant variable regarding growth rate except when domestic savings rate and export and import share of GDP are combined. Greece has had a high inflation rate for a long time and entering the Eurozone helped it decreasing from 12.71% to 3.36% on average. Since the 1980' Greece applied high government expenditure policy to boost the economy after the stagflation of the oil crisis but using expansionist monetary policy led to high inflation rates that was accompanied by slow growth. Entering the common currency area required the country to complete strict adjustments in economy including lowering inflation rates. In all observed cases inflation has a negative impact on economic growth and it is a significant variable. Regarding budget balance Greece has been sustaining deficit for a long time and EU memberships has not changed it. After

2007 the country has had budget deficit more than 10% of GDP whereas Maastricht criteria requires 3% maximum. Also Greece has been accumulating high government debts that grew from an initial of 85% to 130% of GDP on average. In 2010 the figure was 140% of GDP. The reason is similar to the problems other countries encounter, participating in the Eurozone has given available cheap euro-based credit that Greece has been borrowing at a large scale and instead of radical structural changes in the economy the country has spent these loans on public sector, high pensions and wealth to keep up the living standards. Since the crowded public sector has been a priority there have not been huge layoffs and unemployment remained stable.

5.5 Spain

GDP growth for Spain has been higher on average in the last decade than in the previous period if the last two years of global crisis is excluded from calculation. On average Spanish economy has grown at a 3.44% average between 2000 and 2008. There has been an increase in investment rate after the millennium. Savings rate has remained stable. Both investments and savings influence GDP growth positively but only savings rate has significant effect on growth according to regression results. Investment rate is only significant when it is combined with inflation rate. Joining the European Communities has increased trade openness of the country. This rate has been even higher after 2000. Export share has grown by 6% and import share by 9% of GDP in the period of 2000-2010. However trade openness is insignificant in most of the cases, it has only significant positive effect when it is combined with inflation rate. Inflation has decreased due to austerity measures to enter Eurozone and it has remained under 3% on an average for the period of 2000-2010. Inflation positively affects GDP growth rate in

Spain and as regression results show it is a significant variable for growth rate. Budget deficit and government debt have been reduced on an average during the last decade meeting the Maastricht criteria. Unemployment has also declined by 7% on average after 2000 due to the great effort in job creation. Spain is the biggest recipient of immigrants among EU members and they have essentially contributed to GDP growth in the last decade. The crisis has not avoided Spain either, after 2008 unemployment has increased when real estate sector collapsed due to speculative investments and also consumer confidence has declined.

5.6 Conclusions Based on Panel Regression and General Trends in the Macro Economy of Selected Countries

After the ERM crisis in 1992-1993 there was a boom in the European economies until the end of the decade. After 2000 the rate of growth has slowed down and in 2007 there was a sharp decline in GDP growth rate that indicates the recent global economic crisis (Figure 1). In the beginning of 1990 the share of investments and savings in GDP declined but after the recovery in the upcoming years it remained on a stable moderate growth until 2008. Investment and savings rate have positive effect on GDP growth of selected countries and these variables are also significant. Trade openness was growing slowly in the 1990's and continued this pace until 2008. The global crisis has decreased export and import rates of selected countries. Trade openness also positively influences GDP growth rate in these countries but it is only significant when it is combined with investment rate or considered only by itself. Regarding the role of inflation there have been different views how inflation rate influences the economic performance of a country. In this case inflation has a positive relation to GDP growth rate and

significantly influences it when it is combined with savings rate and/or trade openness. Inflation rate was high in many countries before the millennium but establishment of a common currency has changed this trend. In most of the time budget balance means budget deficit for most of the countries. In this case only Spain and Ireland have kept budget surplus for a while but in the last couple of years all countries have been running deficits. In the 1990's values of budget balance were converging but it has loosened after 2007. Countries have been running higher deficits due to economic crisis. Regarding government debt it shows a very different pattern for the selected countries but generally it has been growing sharply since 2007 because countries have been trying to boost their economies out of the recession by borrowing cheap credit from abroad.

Hypotheses about macroeconomic factors have been formed in Chapter 3 and they are the following:

1) An increase in investment rate has a positive effect on GDP growth

2) An increase in savings rate has a positive effect on GDP growth

3) An increase in inflation has a negative effect on GDP growth

4) An increase in trade openness has a positive effect on GDP growth

Based on the results of regressions and arithmetic averages we can conclude the following facts:

1) Investment rate does have a positive effect on GDP growth rate. However this effect is insignificant in some countries such as Ireland and Spain. Panel regression shows that this figure is significant. Hypotheses 1 is accepted.
2) Savings rate does have a positive effect on GDP growth and in all cases savings rate is a significant variable for GDP growth rate. Hypotheses 2 is accepted.
3) Regarding the effects of inflation there is controversy. In some countries inflation has a positive effect on GDP growth specifically Portugal, Italy, Ireland and Spain. On the other hand in Greece inflation is negatively related to GDP growth rate. Panel regression shows a positive relationship between inflation and GDP growth so Hypotheses 3 is rejected: inflation rate does not necessarily have a negative effect on GDP growth rate.
4) The effect of trade openness also differs from country to country. In Portugal, Italy and Spain trade openness and economic growth are positively related. However it is not in all cases a significant factor. In Portugal it is only significant when it is combined with savings rate and in Italy trade openness is an insignificant factor. In Ireland and Greece trade openness and GDP growth rate are negatively correlated and only significant by being combined with savings rate. Panel regression shows positive and significant relation between trade openness and GDP growth rate. Based on these observations Hypotheses 4 is accepted.

There are many other factors to be considered in a research about macroeconomic performance of selected countries. The aim of this study is to show general trends in economies of Portugal, Italy, Ireland, Greece and Spain before and after introducing the

Euro and to gain an overview about these economies and effects of a single currency on their performance. There are many supporters as well as critics of the European Union and the Eurozone. Until now the results of establishment of this supranational organization have been mixed and probably a couple of more years will pass to get an absolutely clear view about the success or failure of the EU.

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APPENDICES

Appendix A: Individual Regression Results

Regressions for Portugal

GDPG = f (GCF, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:42
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.91533	5.941728	-3.015172	0.0066
GCF	0.566526	0.135646	4.176497	0.0004
I	0.168275	0.095718	1.758035	0.0933
E	0.190240	0.176771	1.076192	0.2941

R-squared	0.605798	Mean dependent var	2.480000
Adjusted R-squared	0.549483	S.D. dependent var	2.518597
S.E. of regression	1.690497	Akaike info criterion	4.033569
Sum squared resid	60.01338	Schwarz criterion	4.228589
Log likelihood	-46.41961	Hannan-Quinn criter.	4.087659
F-statistic	10.75737	Durbin-Watson stat	1.017019
Prob(F-statistic)	0.000172		

GDPG = f (GCF, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:43
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-14.34261	5.613135	-2.555187	0.0184
GCF	0.556811	0.142986	3.894177	0.0008
I	0.165620	0.105608	1.568260	0.1318
EM	0.031813	0.080523	0.395075	0.6968

R-squared	0.587125	Mean dependent var	2.480000
Adjusted R-squared	0.528143	S.D. dependent var	2.518597
S.E. of regression	1.730071	Akaike info criterion	4.079848
Sum squared resid	62.85604	Schwarz criterion	4.274868

Log likelihood	-46.99810	Hannan-Quinn criter.	4.133939
F-statistic	9.954297	Durbin-Watson stat	1.060166
Prob(F-statistic)	0.000276		

GDPG = f (GDS, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:45
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.22807	4.791729	-4.430148	0.0002
GDS	0.891583	0.141523	6.299939	0.0000
I	-0.127288	0.100808	-1.262675	0.2205
E	0.324635	0.141814	2.289164	0.0325

R-squared	0.750296	Mean dependent var	2.480000
Adjusted R-squared	0.714623	S.D. dependent var	2.518597
S.E. of regression	1.345451	Akaike info criterion	3.576982
Sum squared resid	38.01500	Schwarz criterion	3.772002
Log likelihood	-40.71228	Hannan-Quinn criter.	3.631072
F-statistic	21.03314	Durbin-Watson stat	1.532191
Prob(F-statistic)	0.000002		

GDPG = f (GDS, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:46
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.75130	4.665295	-4.662363	0.0001
GDS	0.887385	0.138789	6.393774	0.0000
I	-0.094514	0.100499	-0.940450	0.3577
EM	0.149100	0.060100	2.480869	0.0217

R-squared	0.758704	Mean dependent var	2.480000
Adjusted R-squared	0.724234	S.D. dependent var	2.518597
S.E. of regression	1.322603	Akaike info criterion	3.542727
Sum squared resid	36.73484	Schwarz criterion	3.737747
Log likelihood	-40.28409	Hannan-Quinn criter.	3.596817
F-statistic	22.01006	Durbin-Watson stat	1.449978
Prob(F-statistic)	0.000001		

GDPG = f (E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 13:27
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.389262	7.424051	0.052433	0.9586
E	0.074245	0.263006	0.282293	0.7802

R-squared	0.003453	Mean dependent var	2.480000
Adjusted R-squared	-0.039875	S.D. dependent var	2.518597
S.E. of regression	2.568322	Akaike info criterion	4.801001
Sum squared resid	151.7143	Schwarz criterion	4.898511
Log likelihood	-58.01251	Hannan-Quinn criter.	4.828046
F-statistic	0.079690	Durbin-Watson stat	0.594887
Prob(F-statistic)	0.780243		

GDPG = f (I)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 13:28
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.853673	0.734621	1.162060	0.2571
I	0.312755	0.112395	2.782638	0.0106

R-squared	0.251864	Mean dependent var	2.480000
Adjusted R-squared	0.219336	S.D. dependent var	2.518597
S.E. of regression	2.225311	Akaike info criterion	4.514289
Sum squared resid	113.8962	Schwarz criterion	4.611799
Log likelihood	-54.42861	Hannan-Quinn criter.	4.541334
F-statistic	7.743073	Durbin-Watson stat	0.830588
Prob(F-statistic)	0.010583		

Regressions for Italy

GDPG = f (GCF, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:08
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-16.52629	6.975660	-2.369136	0.0275
GCF	0.536872	0.291395	1.842421	0.0796
I	0.735683	0.327905	2.243589	0.0358
E	0.175641	0.136757	1.284329	0.2130

R-squared	0.405624	Mean dependent var	1.360000
Adjusted R-squared	0.320713	S.D. dependent var	1.868154
S.E. of regression	1.539712	Akaike info criterion	3.846714
Sum squared resid	49.78497	Schwarz criterion	4.041734
Log likelihood	-44.08393	Hannan-Quinn criter.	3.900805
F-statistic	4.777049	Durbin-Watson stat	1.223878
Prob(F-statistic)	0.010847		

GDPG = f (GCF, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:09
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.22358	6.398469	-2.066679	0.0513
GCF	0.479747	0.314539	1.525238	0.1421
I	0.630825	0.371224	1.699309	0.1040
EM	0.052065	0.072984	0.713376	0.4835

R-squared	0.374104	Mean dependent var	1.360000
Adjusted R-squared	0.284691	S.D. dependent var	1.868154
S.E. of regression	1.580009	Akaike info criterion	3.898385
Sum squared resid	52.42501	Schwarz criterion	4.093405
Log likelihood	-44.72981	Hannan-Quinn criter.	3.952475
F-statistic	4.183974	Durbin-Watson stat	1.207481
Prob(F-statistic)	0.018058		

GDPG = f (GDS, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:11
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.13796	6.257981	-2.418985	0.0247
GDS	0.511382	0.268801	1.902458	0.0709
I	0.620308	0.348355	1.780680	0.0894
E	0.132171	0.138783	0.952354	0.3518

R-squared	0.411052	Mean dependent var	1.360000
Adjusted R-squared	0.326916	S.D. dependent var	1.868154
S.E. of regression	1.532665	Akaike info criterion	3.837540
Sum squared resid	49.33032	Schwarz criterion	4.032560
Log likelihood	-43.96925	Hannan-Quinn criter.	3.891630
F-statistic	4.885591	Durbin-Watson stat	1.695196
Prob(F-statistic)	0.009904		

GDPG = f (GDS, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:12
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-18.46130	6.781399	-2.722343	0.0128
GDS	0.587288	0.256732	2.287557	0.0326
I	0.709023	0.317445	2.233535	0.0365
EM	0.096814	0.065535	1.477281	0.1544

R-squared	0.443453	Mean dependent var	1.360000
Adjusted R-squared	0.363946	S.D. dependent var	1.868154
S.E. of regression	1.489909	Akaike info criterion	3.780954
Sum squared resid	46.61640	Schwarz criterion	3.975974
Log likelihood	-43.26192	Hannan-Quinn criter.	3.835044
F-statistic	5.577548	Durbin-Watson stat	1.679630
Prob(F-statistic)	0.005641		

GDPG = f (GCF, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:28

Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-12.59989	7.345569	-1.715305	0.1003
GCF	0.734706	0.302123	2.431813	0.0236
E	-0.055828	0.097653	-0.571692	0.5733

R-squared	0.263152	Mean dependent var	1.360000
Adjusted R-squared	0.196166	S.D. dependent var	1.868154
S.E. of regression	1.674927	Akaike info criterion	3.981583
Sum squared resid	61.71841	Schwarz criterion	4.127849
Log likelihood	-46.76979	Hannan-Quinn criter.	4.022151
F-statistic	3.928448	Durbin-Watson stat	1.231464
Prob(F-statistic)	0.034766		

GDPG = f (GCF, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:29
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.85289	6.614131	-1.792055	0.0869
GCF	0.741180	0.285874	2.592679	0.0166
EM	-0.047616	0.045250	-1.052281	0.3041

R-squared	0.288039	Mean dependent var	1.360000
Adjusted R-squared	0.223316	S.D. dependent var	1.868154
S.E. of regression	1.646399	Akaike info criterion	3.947224
Sum squared resid	59.63383	Schwarz criterion	4.093489
Log likelihood	-46.34030	Hannan-Quinn criter.	3.987792
F-statistic	4.450291	Durbin-Watson stat	1.354689
Prob(F-statistic)	0.023824		

GDPG = f (GDS, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:30
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-13.17863	6.457277	-2.040896	0.0534
GDS	0.726746	0.251619	2.888277	0.0085
E	-0.058769	0.092351	-0.636362	0.5311

R-squared	0.322125	Mean dependent var	1.360000
Adjusted R-squared	0.260500	S.D. dependent var	1.868154
S.E. of regression	1.606503	Akaike info criterion	3.898164
Sum squared resid	56.77877	Schwarz criterion	4.044429
Log likelihood	-45.72705	Hannan-Quinn criter.	3.938732
F-statistic	5.227191	Durbin-Watson stat	1.958729
Prob(F-statistic)	0.013888		

GDPG = f (GDS, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:31
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-14.44969	7.107339	-2.033066	0.0543
GDS	0.744225	0.268382	2.773002	0.0111
EM	-0.010884	0.048238	-0.225630	0.8236

R-squared	0.311242	Mean dependent var	1.360000
Adjusted R-squared	0.248627	S.D. dependent var	1.868154
S.E. of regression	1.619349	Akaike info criterion	3.914092
Sum squared resid	57.69041	Schwarz criterion	4.060357
Log likelihood	-45.92615	Hannan-Quinn criter.	3.954660
F-statistic	4.970766	Durbin-Watson stat	1.889861
Prob(F-statistic)	0.016548		

GDPG = f (I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 14:28
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.200733	4.373657	-1.417746	0.1703
I	0.918499	0.329100	2.790942	0.0107
E	0.184306	0.143922	1.280593	0.2137

R-squared	0.309546	Mean dependent var	1.360000

Adjusted R-squared	0.246778	S.D. dependent var	1.868154
S.E. of regression	1.621341	Akaike info criterion	3.916550
Sum squared resid	57.83239	Schwarz criterion	4.062815
Log likelihood	-45.95688	Hannan-Quinn criter.	3.957118
F-statistic	4.931557	Durbin-Watson stat	1.338054
Prob(F-statistic)	0.017001		

GDPG = f (I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 14:32
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.815664	4.289177	-1.355893	0.1889
I	0.907766	0.333406	2.722704	0.0124
EM	0.086790	0.071402	1.215507	0.2371

R-squared	0.304769	Mean dependent var	1.360000
Adjusted R-squared	0.241566	S.D. dependent var	1.868154
S.E. of regression	1.626941	Akaike info criterion	3.923446
Sum squared resid	58.23258	Schwarz criterion	4.069711
Log likelihood	-46.04308	Hannan-Quinn criter.	3.964014
F-statistic	4.822070	Durbin-Watson stat	1.278203
Prob(F-statistic)	0.018341		

GDPG = f (E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 14:29
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.424779	2.450025	1.806014	0.0840
E	-0.129425	0.102283	-1.265354	0.2184

R-squared	0.065083	Mean dependent var	1.360000
Adjusted R-squared	0.024435	S.D. dependent var	1.868154
S.E. of regression	1.845189	Akaike info criterion	4.139659
Sum squared resid	78.30863	Schwarz criterion	4.237169
Log likelihood	-49.74574	Hannan-Quinn criter.	4.166704
F-statistic	1.601120	Durbin-Watson stat	1.516649
Prob(F-statistic)	0.218414		

GDPG = f (EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 14:33
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.412958	2.340507	1.885471	0.0721
EM	-0.065967	0.049944	-1.320826	0.1996

R-squared	0.070504	Mean dependent var	1.360000
Adjusted R-squared	0.030091	S.D. dependent var	1.868154
S.E. of regression	1.839833	Akaike info criterion	4.133845
Sum squared resid	77.85462	Schwarz criterion	4.231355
Log likelihood	-49.67306	Hannan-Quinn criter.	4.160890
F-statistic	1.744580	Durbin-Watson stat	1.566841
Prob(F-statistic)	0.199551		

Regressions for Ireland

GDPG = f (GCF, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 12:55
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.069150	5.125104	-0.403728	0.6905
GCF	0.269716	0.256348	1.052148	0.3047
I	0.653661	0.516619	1.265268	0.2196
E	-0.002548	0.063461	-0.040148	0.9684

R-squared	0.247624	Mean dependent var	4.920000
Adjusted R-squared	0.140142	S.D. dependent var	4.452715
S.E. of regression	4.128937	Akaike info criterion	5.819564
Sum squared resid	358.0105	Schwarz criterion	6.014584
Log likelihood	-68.74455	Hannan-Quinn criter.	5.873654
F-statistic	2.303861	Durbin-Watson stat	0.822907
Prob(F-statistic)	0.106331		

GDPG = f (GCF, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 12:56
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.666391	5.278797	-0.315676	0.7554
GCF	0.284296	0.257973	1.102037	0.2829
I	0.634778	0.512264	1.239163	0.2290
EM	-0.005907	0.036704	-0.160946	0.8737

R-squared	0.248493	Mean dependent var	4.920000
Adjusted R-squared	0.141135	S.D. dependent var	4.452715
S.E. of regression	4.126551	Akaike info criterion	5.818408
Sum squared resid	357.5969	Schwarz criterion	6.013428
Log likelihood	-68.73010	Hannan-Quinn criter.	5.872498
F-statistic	2.314622	Durbin-Watson stat	0.823186
Prob(F-statistic)	0.105184		

GDPG = f (GDS, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:00
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.081851	4.434515	-0.018458	0.9854
GDS	0.413725	0.228017	1.814448	0.0839
I	0.687414	0.424493	1.619376	0.1203
E	-0.125565	0.100210	-1.253021	0.2240

R-squared	0.315304	Mean dependent var	4.920000
Adjusted R-squared	0.217490	S.D. dependent var	4.452715
S.E. of regression	3.938852	Akaike info criterion	5.725302
Sum squared resid	325.8057	Schwarz criterion	5.920322
Log likelihood	-67.56628	Hannan-Quinn criter.	5.779393
F-statistic	3.223518	Durbin-Watson stat	0.763644
Prob(F-statistic)	0.043319		

GDPG = f (GCF, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:18
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.257868	5.192426	-0.434839	0.6679
GCF	0.466346	0.206637	2.256835	0.0343
E	-0.029455	0.060602	-0.486037	0.6317

R-squared	0.190268	Mean dependent var	4.920000
Adjusted R-squared	0.116656	S.D. dependent var	4.452715
S.E. of regression	4.184946	Akaike info criterion	5.813031
Sum squared resid	385.3029	Schwarz criterion	5.959296
Log likelihood	-69.66289	Hannan-Quinn criter.	5.853599
F-statistic	2.584740	Durbin-Watson stat	0.814404
Prob(F-statistic)	0.098119		

GDPG = f (GCF, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:18
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.812062	4.351093	-0.876116	0.3904
GCF	0.438032	0.298204	1.468902	0.1560
EM	-0.004313	0.197498	-0.021839	0.9828

R-squared	0.181591	Mean dependent var	4.920000
Adjusted R-squared	0.107190	S.D. dependent var	4.452715
S.E. of regression	4.207309	Akaike info criterion	5.823690
Sum squared resid	389.4318	Schwarz criterion	5.969955
Log likelihood	-69.79613	Hannan-Quinn criter.	5.864258
F-statistic	2.440710	Durbin-Watson stat	0.791765
Prob(F-statistic)	0.110325		

GDPG = f (GDS, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:20
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.904839	4.415768	0.431372	0.6704
GDS	0.555517	0.218160	2.546374	0.0184
E	-0.185069	0.096607	-1.915688	0.0685

R-squared	0.229803	Mean dependent var	4.920000
Adjusted R-squared	0.159785	S.D. dependent var	4.452715
S.E. of regression	4.081503	Akaike info criterion	5.762974
Sum squared resid	366.4907	Schwarz criterion	5.909239
Log likelihood	-69.03718	Hannan-Quinn criter.	5.803542
F-statistic	3.282054	Durbin-Watson stat	0.800815
Prob(F-statistic)	0.056575		

GDPG = f (I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 16:42
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.208474	4.656778	0.044768	0.9647
I	0.983182	0.411861	2.387172	0.0260
E	0.027565	0.056778	0.485499	0.6321

R-squared	0.207963	Mean dependent var	4.920000
Adjusted R-squared	0.135959	S.D. dependent var	4.452715
S.E. of regression	4.138967	Akaike info criterion	5.790936
Sum squared resid	376.8830	Schwarz criterion	5.937201
Log likelihood	-69.38670	Hannan-Quinn criter.	5.831504
F-statistic	2.888234	Durbin-Watson stat	0.828996
Prob(F-statistic)	0.076949		

GDPG = f (I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 16:43
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.775911	3.928355	-0.706635	0.4872
I	0.882448	0.400010	2.206061	0.0381

EM	0.173105	0.124527	1.390093	0.1784

R-squared	0.264113	Mean dependent var	4.920000
Adjusted R-squared	0.197214	S.D. dependent var	4.452715
S.E. of regression	3.989557	Akaike info criterion	5.717404
Sum squared resid	350.1645	Schwarz criterion	5.863669
Log likelihood	-68.46755	Hannan-Quinn criter.	5.757972
F-statistic	3.947947	Durbin-Watson stat	0.785767
Prob(F-statistic)	0.034271		

GDPG = f (E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 16:44
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.708368	4.850465	0.764539	0.4523
E	0.015785	0.062072	0.254297	0.8015

R-squared	0.002804	Mean dependent var	4.920000
Adjusted R-squared	-0.040553	S.D. dependent var	4.452715
S.E. of regression	4.542102	Akaike info criterion	5.941275
Sum squared resid	474.5059	Schwarz criterion	6.038785
Log likelihood	-72.26594	Hannan-Quinn criter.	5.968320
F-statistic	0.064667	Durbin-Watson stat	0.701600
Prob(F-statistic)	0.801526		

GDPG = f (EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/02/12 Time: 21:52
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.722857	4.214284	-0.408814	0.6865
EM	0.214286	0.133068	1.610349	0.1210

R-squared	0.101325	Mean dependent var	4.920000
Adjusted R-squared	0.062252	S.D. dependent var	4.452715
S.E. of regression	4.311893	Akaike info criterion	5.837250
Sum squared resid	427.6257	Schwarz criterion	5.934760
Log likelihood	-70.96562	Hannan-Quinn criter.	5.864295

F-statistic	2.593222	Durbin-Watson stat	0.701524
Prob(F-statistic)	0.120962		

GDPG = f (GCF, I)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:17
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.189123	4.068199	-0.538106	0.5959
GCF	0.265074	0.223545	1.185777	0.2484
I	0.660612	0.475575	1.389080	0.1787

R-squared	0.247566	Mean dependent var	4.920000
Adjusted R-squared	0.179163	S.D. dependent var	4.452715
S.E. of regression	4.034161	Akaike info criterion	5.739640
Sum squared resid	358.0380	Schwarz criterion	5.885905
Log likelihood	-68.74550	Hannan-Quinn criter.	5.780208
F-statistic	3.619230	Durbin-Watson stat	0.822514
Prob(F-statistic)	0.043767		

GDPG = f (GCF)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/24/12 Time: 18:01
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.846448	3.967125	-0.969581	0.3423
GCF	0.433125	0.191740	2.258914	0.0337

R-squared	0.181573	Mean dependent var	4.920000
Adjusted R-squared	0.145989	S.D. dependent var	4.452715
S.E. of regression	4.114874	Akaike info criterion	5.743712
Sum squared resid	389.4402	Schwarz criterion	5.841222
Log likelihood	-69.79640	Hannan-Quinn criter.	5.770757
F-statistic	5.102694	Durbin-Watson stat	0.790246
Prob(F-statistic)	0.033675		

GDPG = f (GDS, I)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:19
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.775911	3.928355	-0.706635	0.4872
GDS	0.173105	0.124527	1.390093	0.1784
I	0.882448	0.400010	2.206061	0.0381

R-squared	0.264113	Mean dependent var	4.920000
Adjusted R-squared	0.197214	S.D. dependent var	4.452715
S.E. of regression	3.989557	Akaike info criterion	5.717404
Sum squared resid	350.1645	Schwarz criterion	5.863669
Log likelihood	-68.46755	Hannan-Quinn criter.	5.757972
F-statistic	3.947947	Durbin-Watson stat	0.785767
Prob(F-statistic)	0.034271		

GDPG = f (GDS)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/24/12 Time: 18:02
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.722857	4.214284	-0.408814	0.6865
GDS	0.214286	0.133068	1.610349	0.1210

R-squared	0.101325	Mean dependent var	4.920000
Adjusted R-squared	0.062252	S.D. dependent var	4.452715
S.E. of regression	4.311893	Akaike info criterion	5.837250
Sum squared resid	427.6257	Schwarz criterion	5.934760
Log likelihood	-70.96562	Hannan-Quinn criter.	5.864295
F-statistic	2.593222	Durbin-Watson stat	0.701524
Prob(F-statistic)	0.120962		

Regressions for Greece

GDPG = f (GCF, I, E)

Dependent Variable: GDPG

Method: Least Squares
Date: 02/23/12 Time: 12:20
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.306776	4.215282	-1.970633	0.0621
GCF	0.802805	0.164738	4.873237	0.0001
I	-0.221578	0.077850	-2.846207	0.0097
E	-0.297326	0.199776	-1.488297	0.1515

R-squared	0.567931	Mean dependent var	2.000000
Adjusted R-squared	0.506207	S.D. dependent var	2.614065
S.E. of regression	1.836915	Akaike info criterion	4.199698
Sum squared resid	70.85936	Schwarz criterion	4.394718
Log likelihood	-48.49623	Hannan-Quinn criter.	4.253789
F-statistic	9.201106	Durbin-Watson stat	1.561813
Prob(F-statistic)	0.000439		

GDPG = f (GCF, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 12:27
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.897172	3.948624	-1.240222	0.2286
GCF	1.000767	0.172428	5.803969	0.0000
I	-0.315083	0.080670	-3.905825	0.0008
EM	-0.254003	0.091358	-2.780293	0.0112

R-squared	0.650870	Mean dependent var	2.000000
Adjusted R-squared	0.600995	S.D. dependent var	2.614065
S.E. of regression	1.651222	Akaike info criterion	3.986555
Sum squared resid	57.25724	Schwarz criterion	4.181575
Log likelihood	-45.83194	Hannan-Quinn criter.	4.040646
F-statistic	13.04987	Durbin-Watson stat	1.829304
Prob(F-statistic)	0.000050		

GDPG = f (GDS, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 12:39
Sample: 1986 2010

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.672779	4.040656	-0.166502	0.8694
GDS	0.984653	0.206794	4.761509	0.0001
I	-0.359930	0.095823	-3.756190	0.0012
E	-0.287202	0.201723	-1.423749	0.1692

R-squared	0.557281	Mean dependent var	2.000000
Adjusted R-squared	0.494035	S.D. dependent var	2.614065
S.E. of regression	1.859416	Akaike info criterion	4.224048
Sum squared resid	72.60596	Schwarz criterion	4.419068
Log likelihood	-48.80060	Hannan-Quinn criter.	4.278139
F-statistic	8.811373	Durbin-Watson stat	1.229934
Prob(F-statistic)	0.000562		

GDPG = f (GDS, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 12:41
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.307992	4.637491	-0.928949	0.3635
GDS	0.861356	0.200013	4.306495	0.0003
I	-0.286925	0.095922	-2.991221	0.0070
EM	-0.028994	0.085244	-0.340134	0.7371

R-squared	0.517206	Mean dependent var	2.000000
Adjusted R-squared	0.448236	S.D. dependent var	2.614065
S.E. of regression	1.941749	Akaike info criterion	4.310702
Sum squared resid	79.17817	Schwarz criterion	4.505722
Log likelihood	-49.88377	Hannan-Quinn criter.	4.364792
F-statistic	7.498945	Durbin-Watson stat	1.041307
Prob(F-statistic)	0.001352		

GDPG = f (GCF, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:08
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-13.12911	4.439203	-2.957538	0.0073
GCF	0.590220	0.168875	3.495024	0.0020
E	0.075414	0.173511	0.434633	0.6681

R-squared	0.401257	Mean dependent var	2.000000
Adjusted R-squared	0.346826	S.D. dependent var	2.614065
S.E. of regression	2.112666	Akaike info criterion	4.445945
Sum squared resid	98.19385	Schwarz criterion	4.592210
Log likelihood	-52.57431	Hannan-Quinn criter.	4.486513
F-statistic	7.371823	Durbin-Watson stat	1.215521
Prob(F-statistic)	0.003545		

GDPG = f (GCF, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:12
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-12.54726	4.401429	-2.850725	0.0093
GCF	0.597831	0.177364	3.370645	0.0028
EM	0.015598	0.076830	0.203019	0.8410

R-squared	0.397245	Mean dependent var	2.000000
Adjusted R-squared	0.342449	S.D. dependent var	2.614065
S.E. of regression	2.119732	Akaike info criterion	4.452623
Sum squared resid	98.85180	Schwarz criterion	4.598888
Log likelihood	-52.65779	Hannan-Quinn criter.	4.493191
F-statistic	7.249540	Durbin-Watson stat	1.218449
Prob(F-statistic)	0.003815		

GDPG = f (GDS, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:14
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.427940	4.387799	-1.920767	0.0678
GDS	0.456283	0.191489	2.382822	0.0262
E	0.237610	0.183808	1.292707	0.2095

R-squared	0.259837	Mean dependent var	2.000000
Adjusted R-squared	0.192550	S.D. dependent var	2.614065
S.E. of regression	2.348952	Akaike info criterion	4.657982
Sum squared resid	121.3867	Schwarz criterion	4.804247
Log likelihood	-55.22478	Hannan-Quinn criter.	4.698550
F-statistic	3.861598	Durbin-Watson stat	0.930037
Prob(F-statistic)	0.036526		

GDPG = f (GDS, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:14
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.25160	4.684039	-2.402116	0.0252
GDS	0.496427	0.184922	2.684518	0.0135
EM	0.138950	0.074836	1.856726	0.0768

R-squared	0.311504	Mean dependent var	2.000000
Adjusted R-squared	0.248913	S.D. dependent var	2.614065
S.E. of regression	2.265486	Akaike info criterion	4.585622
Sum squared resid	112.9134	Schwarz criterion	4.731887
Log likelihood	-54.32028	Hannan-Quinn criter.	4.626190
F-statistic	4.976851	Durbin-Watson stat	0.991667
Prob(F-statistic)	0.016478		

GDPG = f (I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 15:40
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.635033	5.685885	-0.287560	0.7764
I	-0.049569	0.098962	-0.500893	0.6214
E	0.194136	0.245950	0.789331	0.4383

R-squared	0.079313	Mean dependent var	2.000000
Adjusted R-squared	-0.004386	S.D. dependent var	2.614065
S.E. of regression	2.619790	Akaike info criterion	4.876232
Sum squared resid	150.9926	Schwarz criterion	5.022497
Log likelihood	-57.95290	Hannan-Quinn criter.	4.916800

F-statistic	0.947602	Durbin-Watson stat	1.087920
Prob(F-statistic)	0.402931		

GDPG = f (I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 15:41
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.060597	6.205456	-0.493211	0.6268
I	-0.034957	0.101911	-0.343018	0.7348
EM	0.101847	0.106783	0.953774	0.3506

R-squared	0.090833	Mean dependent var	2.000000
Adjusted R-squared	0.008181	S.D. dependent var	2.614065
S.E. of regression	2.603350	Akaike info criterion	4.863642
Sum squared resid	149.1034	Schwarz criterion	5.009907
Log likelihood	-57.79552	Hannan-Quinn criter.	4.904209
F-statistic	1.098983	Durbin-Watson stat	1.118621
Prob(F-statistic)	0.350818		

GDPG = f (E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 15:43
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.490479	4.242830	-0.822677	0.4191
E	0.262451	0.201310	1.303713	0.2052

R-squared	0.068813	Mean dependent var	2.000000
Adjusted R-squared	0.028327	S.D. dependent var	2.614065
S.E. of regression	2.576774	Akaike info criterion	4.807572
Sum squared resid	152.7146	Schwarz criterion	4.905082
Log likelihood	-58.09465	Hannan-Quinn criter.	4.834617
F-statistic	1.699669	Durbin-Watson stat	1.097059
Prob(F-statistic)	0.205230		

GDPG = f (EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 15:44
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.510328	4.455695	-1.012261	0.3219
EM	0.123676	0.084087	1.470814	0.1549

R-squared	0.085970	Mean dependent var	2.000000
Adjusted R-squared	0.046230	S.D. dependent var	2.614065
S.E. of regression	2.552926	Akaike info criterion	4.788976
Sum squared resid	149.9009	Schwarz criterion	4.886486
Log likelihood	-57.86219	Hannan-Quinn criter.	4.816021
F-statistic	2.163294	Durbin-Watson stat	1.133621
Prob(F-statistic)	0.154891		

Regressions for Spain

GDPG = f (GCF, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:51
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.399980	4.811207	-1.953768	0.0642
GCF	0.163402	0.151640	1.077565	0.2935
I	0.720107	0.311033	2.315212	0.0308
E	0.229219	0.149513	1.533097	0.1402

R-squared	0.263560	Mean dependent var	2.920000
Adjusted R-squared	0.158355	S.D. dependent var	2.196968
S.E. of regression	2.015525	Akaike info criterion	4.385283
Sum squared resid	85.30915	Schwarz criterion	4.580303
Log likelihood	-50.81604	Hannan-Quinn criter.	4.439373
F-statistic	2.505193	Durbin-Watson stat	0.936401
Prob(F-statistic)	0.086919		

GDPG = f (GCF, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:52
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.864670	4.381591	-1.566707	0.1321
GCF	0.127665	0.189739	0.672844	0.5084
I	0.628491	0.335066	1.875723	0.0747
EM	0.083203	0.082398	1.009770	0.3241

R-squared	0.219054	Mean dependent var	2.920000
Adjusted R-squared	0.107490	S.D. dependent var	2.196968
S.E. of regression	2.075535	Akaike info criterion	4.443962
Sum squared resid	90.46479	Schwarz criterion	4.638982
Log likelihood	-51.54952	Hannan-Quinn criter.	4.498052
F-statistic	1.963488	Durbin-Watson stat	0.842918
Prob(F-statistic)	0.150395		

GDPG = f (GDS, I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:53
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.87337	6.688896	-3.270101	0.0037
GDS	0.919670	0.341025	2.696780	0.0135
I	0.512933	0.288478	1.778065	0.0899
E	0.071861	0.146825	0.489429	0.6296

R-squared	0.422751	Mean dependent var	2.920000
Adjusted R-squared	0.340287	S.D. dependent var	2.196968
S.E. of regression	1.784437	Akaike info criterion	4.141730
Sum squared resid	66.86852	Schwarz criterion	4.336750
Log likelihood	-47.77162	Hannan-Quinn criter.	4.195820
F-statistic	5.126483	Durbin-Watson stat	1.144792
Prob(F-statistic)	0.008116		

GDPG = f (GDS, I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/23/12 Time: 13:54

Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.92229	6.802505	-3.222679	0.0041
GDS	1.020163	0.367706	2.774399	0.0114
I	0.397493	0.291142	1.365292	0.1866
EM	-0.002498	0.069728	-0.035827	0.9718

R-squared	0.416202	Mean dependent var	2.920000
Adjusted R-squared	0.332803	S.D. dependent var	2.196968
S.E. of regression	1.794531	Akaike info criterion	4.153011
Sum squared resid	67.62714	Schwarz criterion	4.348031
Log likelihood	-47.91263	Hannan-Quinn criter.	4.207101
F-statistic	4.990453	Durbin-Watson stat	1.151845
Prob(F-statistic)	0.009078		

GDPG = f (GCF, I)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:40
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.910911	3.932998	-1.248643	0.2249
GCF	0.251978	0.144441	1.744514	0.0950
I	0.372885	0.219627	1.697812	0.1036

R-squared	0.181136	Mean dependent var	2.920000
Adjusted R-squared	0.106694	S.D. dependent var	2.196968
S.E. of regression	2.076461	Akaike info criterion	4.411374
Sum squared resid	94.85722	Schwarz criterion	4.557639
Log likelihood	-52.14218	Hannan-Quinn criter.	4.451942
F-statistic	2.433242	Durbin-Watson stat	0.756500
Prob(F-statistic)	0.111002		

GDPG = f (GCF, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:40
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-1.869947	3.880807	-0.481845	0.6347
GCF	0.212345	0.164367	1.291894	0.2098
E	-0.022841	0.112172	-0.203623	0.8405

R-squared	0.075586	Mean dependent var	2.920000
Adjusted R-squared	-0.008452	S.D. dependent var	2.196968
S.E. of regression	2.206232	Akaike info criterion	4.532616
Sum squared resid	107.0841	Schwarz criterion	4.678881
Log likelihood	-53.65770	Hannan-Quinn criter.	4.573184
F-statistic	0.899428	Durbin-Watson stat	0.702347
Prob(F-statistic)	0.421243		

GDPG = f (GCF, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:41
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.054404	3.750542	-0.547762	0.5894
GCF	0.263472	0.185147	1.423042	0.1688
EM	-0.033560	0.056992	-0.588851	0.5620

R-squared	0.088214	Mean dependent var	2.920000
Adjusted R-squared	0.005325	S.D. dependent var	2.196968
S.E. of regression	2.191111	Akaike info criterion	4.518861
Sum squared resid	105.6212	Schwarz criterion	4.665126
Log likelihood	-53.48576	Hannan-Quinn criter.	4.559428
F-statistic	1.064240	Durbin-Watson stat	0.725572
Prob(F-statistic)	0.362093		

GDPG = f (GCF)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 15:57
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.051991	3.696894	-0.555058	0.5842
GCF	0.198562	0.146628	1.354186	0.1888

R-squared	0.073844	Mean dependent var	2.920000

Adjusted R-squared	0.033576	S.D. dependent var	2.196968
S.E. of regression	2.159770	Akaike info criterion	4.454499
Sum squared resid	107.2860	Schwarz criterion	4.552009
Log likelihood	-53.68124	Hannan-Quinn criter.	4.481544
F-statistic	1.833820	Durbin-Watson stat	0.693177
Prob(F-statistic)	0.188833		

GDPG = f (GDS, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:42
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-19.72165	6.894117	-2.860648	0.0091
GDS	1.117565	0.337817	3.308194	0.0032
E	-0.126873	0.099779	-1.271539	0.2168

R-squared	0.335847	Mean dependent var	2.920000
Adjusted R-squared	0.275470	S.D. dependent var	2.196968
S.E. of regression	1.870045	Akaike info criterion	4.201968
Sum squared resid	76.93547	Schwarz criterion	4.348233
Log likelihood	-49.52460	Hannan-Quinn criter.	4.242536
F-statistic	5.562452	Durbin-Watson stat	1.135458
Prob(F-statistic)	0.011090		

GDPG = f (GDS, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 02/29/12 Time: 10:43
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-21.29510	6.918967	-3.077785	0.0055
GDS	1.217200	0.344778	3.530389	0.0019
EM	-0.075154	0.045933	-1.636175	0.1160

R-squared	0.364383	Mean dependent var	2.920000
Adjusted R-squared	0.306599	S.D. dependent var	2.196968
S.E. of regression	1.829430	Akaike info criterion	4.158053
Sum squared resid	73.62992	Schwarz criterion	4.304318
Log likelihood	-48.97566	Hannan-Quinn criter.	4.198620
F-statistic	6.306009	Durbin-Watson stat	1.260537

Prob(F-statistic)	0.006842

GDPG = f (I, E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 16:03
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.915794	4.238349	-1.631719	0.1170
I	0.766831	0.309122	2.480676	0.0212
E	0.290603	0.138741	2.094573	0.0479

R-squared	0.222841	Mean dependent var	2.920000
Adjusted R-squared	0.152190	S.D. dependent var	2.196968
S.E. of regression	2.022893	Akaike info criterion	4.359101
Sum squared resid	90.02612	Schwarz criterion	4.505366
Log likelihood	-51.48876	Hannan-Quinn criter.	4.399669
F-statistic	3.154114	Durbin-Watson stat	0.991971
Prob(F-statistic)	0.062461		

GDPG = f (I, EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 16:04
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.758584	4.010685	-1.435811	0.1651
I	0.714520	0.305835	2.336290	0.0290
EM	0.119176	0.061914	1.924872	0.0673

R-squared	0.202218	Mean dependent var	2.920000
Adjusted R-squared	0.129693	S.D. dependent var	2.196968
S.E. of regression	2.049557	Akaike info criterion	4.385291
Sum squared resid	92.41503	Schwarz criterion	4.531556
Log likelihood	-51.81614	Hannan-Quinn criter.	4.425859
F-statistic	2.788233	Durbin-Watson stat	0.903387
Prob(F-statistic)	0.083315		

GDPG = f (E)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 16:05
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.069809	2.434785	0.850099	0.4040
E	0.036837	0.103695	0.355240	0.7256

R-squared	0.005457	Mean dependent var	2.920000
Adjusted R-squared	-0.037784	S.D. dependent var	2.196968
S.E. of regression	2.238088	Akaike info criterion	4.525739
Sum squared resid	115.2079	Schwarz criterion	4.623249
Log likelihood	-54.57174	Hannan-Quinn criter.	4.552785
F-statistic	0.126195	Durbin-Watson stat	0.748841
Prob(F-statistic)	0.725647		

GDPG = f (EM)

Dependent Variable: GDPG
Method: Least Squares
Date: 04/03/12 Time: 16:06
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.207830	2.307096	0.956973	0.3485
EM	0.014726	0.046799	0.314673	0.7558

R-squared	0.004287	Mean dependent var	2.920000
Adjusted R-squared	-0.039005	S.D. dependent var	2.196968
S.E. of regression	2.239404	Akaike info criterion	4.526915
Sum squared resid	115.3434	Schwarz criterion	4.624425
Log likelihood	-54.58644	Hannan-Quinn criter.	4.553960
F-statistic	0.099019	Durbin-Watson stat	0.746274
Prob(F-statistic)	0.755847		

Appendix B: Panel Regression Results

GDPG = f (GCF, I, E)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/24/12 Time: 14:18
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.876812	2.543047	-3.097391	0.0024
GCF	0.356390	0.087975	4.051047	0.0001
I	0.047510	0.085491	0.555728	0.5794
E	0.065360	0.010884	6.005206	0.0000

R-squared	0.298178	Mean dependent var	2.736000
Adjusted R-squared	0.280777	S.D. dependent var	3.077347
S.E. of regression	2.609806	Akaike info criterion	4.787906
Sum squared resid	824.1415	Schwarz criterion	4.878412
Log likelihood	-295.2441	Hannan-Quinn criter.	4.824673
F-statistic	17.13610	Durbin-Watson stat	0.798096
Prob(F-statistic)	0.000000		

GDPG = f (GCF, I, EM)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/24/12 Time: 14:19
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.547180	2.563637	-2.943934	0.0039
GCF	0.333063	0.088611	3.758706	0.0003
I	0.037644	0.086444	0.435479	0.6640
EM	0.035371	0.006336	5.582485	0.0000

R-squared	0.279153	Mean dependent var	2.736000
Adjusted R-squared	0.261281	S.D. dependent var	3.077347
S.E. of regression	2.644941	Akaike info criterion	4.814652

Sum squared resid	846.4814	Schwarz criterion	4.905158
Log likelihood	-296.9157	Hannan-Quinn criter.	4.851419
F-statistic	15.61940	Durbin-Watson stat	0.785405
Prob(F-statistic)	0.000000		

GDPG = f (GDS, I, E)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/24/12 Time: 14:19
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.017509	1.202873	-1.677241	0.0961
GDS	0.181047	0.053004	3.415715	0.0009
I	0.121506	0.100630	1.207449	0.2296
E	0.010837	0.019685	0.550511	0.5830

R-squared	0.221026	Mean dependent var	2.736000
Adjusted R-squared	0.201712	S.D. dependent var	3.077347
S.E. of regression	2.749516	Akaike info criterion	4.892203
Sum squared resid	914.7402	Schwarz criterion	4.982709
Log likelihood	-301.7627	Hannan-Quinn criter.	4.928971
F-statistic	11.44416	Durbin-Watson stat	0.793615
Prob(F-statistic)	0.000001		

GDPG = f (GDS, I, EM)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/24/12 Time: 14:20
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.129772	1.091116	-1.951920	0.0533
GDS	0.171381	0.045721	3.748375	0.0003
I	0.124246	0.102799	1.208628	0.2292
EM	0.009540	0.010093	0.945192	0.3464

R-squared	0.225781	Mean dependent var	2.736000
Adjusted R-squared	0.206585	S.D. dependent var	3.077347

S.E. of regression	2.741111	Akaike info criterion	4.886080
Sum squared resid	909.1564	Schwarz criterion	4.976587
Log likelihood	-301.3800	Hannan-Quinn criter.	4.922848
F-statistic	11.76216	Durbin-Watson stat	0.798382

GDPG = f (GCF, I)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:25
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.442856	2.376230	-1.448873	0.1499
GCF	0.280205	0.080432	3.483752	0.0007
I	-0.044181	0.089320	-0.494637	0.6217

R-squared	0.099021	Mean dependent var	2.736000
Adjusted R-squared	0.084251	S.D. dependent var	3.077347
S.E. of regression	2.944860	Akaike info criterion	5.021707
Sum squared resid	1058.009	Schwarz criterion	5.089587
Log likelihood	-310.8567	Hannan-Quinn criter.	5.049283
F-statistic	6.704136	Durbin-Watson stat	0.668589
Prob(F-statistic)	0.001728		

GDPG = f (GDS, I)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:30
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.126772	1.059760	-2.006844	0.0470
GDS	0.205619	0.028565	7.198195	0.0000
I	0.114867	0.104951	1.094483	0.2759

R-squared	0.218461	Mean dependent var	2.736000
Adjusted R-squared	0.205649	S.D. dependent var	3.077347
S.E. of regression	2.742728	Akaike info criterion	4.879490
Sum squared resid	917.7520	Schwarz criterion	4.947370
Log likelihood	-301.9682	Hannan-Quinn criter.	4.907066

F-statistic	17.05112	Durbin-Watson stat	0.786273
Prob(F-statistic)	0.000000		

GDPG = f (I)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:36
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.643491	0.876568	3.015730	0.0031
I	0.019273	0.111558	0.172760	0.8631

R-squared	0.000696	Mean dependent var	2.736000
Adjusted R-squared	-0.007429	S.D. dependent var	3.077347
S.E. of regression	3.088756	Akaike info criterion	5.109284
Sum squared resid	1173.471	Schwarz criterion	5.154538
Log likelihood	-317.3303	Hannan-Quinn criter.	5.127668
F-statistic	0.085653	Durbin-Watson stat	0.693466
Prob(F-statistic)	0.770271		

GDPG = f (GDS, E)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:39
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.121297	0.742542	-1.510079	0.1336
GDS	0.175585	0.054571	3.217555	0.0017
E	0.005088	0.024143	0.210745	0.8334

R-squared	0.196126	Mean dependent var	2.736000
Adjusted R-squared	0.182947	S.D. dependent var	3.077347
S.E. of regression	2.781644	Akaike info criterion	4.907668
Sum squared resid	943.9800	Schwarz criterion	4.975548
Log likelihood	-303.7293	Hannan-Quinn criter.	4.935244
F-statistic	14.88250	Durbin-Watson stat	0.788294
Prob(F-statistic)	0.000002		

GDPG = f (GDS, EM)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:40
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.144687	0.593601	-1.928379	0.0561
GDS	0.161574	0.044194	3.656041	0.0004
EM	0.006956	0.012177	0.571218	0.5689

R-squared	0.199516	Mean dependent var	2.736000
Adjusted R-squared	0.186393	S.D. dependent var	3.077347
S.E. of regression	2.775772	Akaike info criterion	4.903442
Sum squared resid	939.9989	Schwarz criterion	4.971322
Log likelihood	-303.4651	Hannan-Quinn criter.	4.931018
F-statistic	15.20389	Durbin-Watson stat	0.793057
Prob(F-statistic)	0.000001		

GDPG = f (E)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:40
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.073487	0.362797	2.958918	0.0037
E	0.048161	0.014360	3.353852	0.0011

R-squared	0.124152	Mean dependent var	2.736000
Adjusted R-squared	0.117032	S.D. dependent var	3.077347
S.E. of regression	2.891672	Akaike info criterion	4.977418
Sum squared resid	1028.497	Schwarz criterion	5.022671
Log likelihood	-309.0886	Hannan-Quinn criter.	4.995801
F-statistic	17.43538	Durbin-Watson stat	0.778428
Prob(F-statistic)	0.000056		

GDPG = f (EM)

Dependent Variable: GDPG
Method: Panel Least Squares
Date: 05/30/12 Time: 10:41
Sample: 1986 2010
Periods included: 25
Cross-sections included: 5
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.754910	0.431536	1.749357	0.0827
EM	0.027963	0.008467	3.302647	0.0013

R-squared	0.125062	Mean dependent var	2.736000
Adjusted R-squared	0.117949	S.D. dependent var	3.077347
S.E. of regression	2.890170	Akaike info criterion	4.976378
Sum squared resid	1027.429	Schwarz criterion	5.021631
Log likelihood	-309.0236	Hannan-Quinn criter.	4.994762
F-statistic	17.58139	Durbin-Watson stat	0.774637
Prob(F-statistic)	0.000052		

Appendix C: Data

Portugal

Time	GDP growth (annual %)	Gross capital formation (% of GDP)	Gross domestic savings (% of GDP)	Exports of goods and services (% of GDP)	Imports of goods and services (% of GDP)	Inflation, consumer prices (annual %)	Cash surplus/ deficit (% of GDP)	Central government debt, total (% of GDP)	Unemployment (% of total labor force)
1986	4	23	21	26	29	12	-7	50	9
1987	6	27	22	28	33	9	-7	57	7
1988	7	30	22	28	36	10	-4	56	6
1989	6	28	22	30	36	13	-4	55	5
1990	4	28	20	30	37	13	-9	57	5
1991	4	26	18	27	35	11	-10	61	4
1992	1	25	17	25	33	9	-7	55	4
1993	-2	22	15	24	31	7	-8	54	6
1994	1	23	16	26	33	5	-6	57	7
1995	4	24	17	27	34	4	-5	59	7
1996	4	24	17	27	34	3	-4	58	7
1997	4	26	18	28	36	2	-3	63	7
1998	5	28	19	28	37	3	-4	61	5
1999	4	29	18	27	38	2	-3	59	4
2000	4	28	17	29	40	3	-3	58	4
2001	2	28	18	28	38	4	-4	59	4
2002	1	26	17	28	36	4	-2	63	5
2003	-1	24	17	28	35	3	-3	65	6
2004	2	24	16	28	36	2	-3	68	7
2005	1	24	14	28	37	2	-6	71	8
2006	1	23	14	31	40	3	-4	70	8
2007	2	23	15	32	40	3	-3	68	8
2008	0	23	13	32	43	3	-3	72	8
2009	-3	20	12	28	35	-1	-9	84	10
2010	1	19	12	31	38	1	-9	93	12

Italy

Time	GDP growth (annual %)	Gross capital formation (% of GDP)	Gross domestic savings (% of GDP)	Exports of goods and services (% of GDP)	Imports of goods and services (% of GDP)	Inflation, consumer prices (annual %)	Cash surplus/ deficit (% of GDP)	Central government debt, total (% of GDP)	Unemployment rate (% of total labor force)
1986	3	22	23	19	18	6	-12	82	11
1987	3	22	23	19	18	5	-12	86	11
1988	4	23	23	18	18	5	-11	91	11
1989	3	22	22	19	19	6	-11	93	11
1990	2	22	23	19	19	6	-12	95	10
1991	2	22	22	18	18	6	-12	98	10
1992	1	21	21	18	18	5	-10	105	9
1993	-1	19	22	21	18	4	-9	116	10
1994	2	19	22	23	19	4	-8	122	11
1995	3	20	24	26	22	5	-7	122	12
1996	1	19	24	25	20	4	-7	128	12
1997	2	19	23	25	21	2	-2	129	12
1998	1	20	23	25	22	2	-3	131	12
1999	1	20	22	24	23	2	-1	125	12
2000	4	21	22	27	26	3	-1	119	11
2001	2	21	22	27	26	3	-3	119	10
2002	0	21	22	26	25	2	-2	116	9
2003	0	21	21	25	24	3	-3	111	9
2004	2	21	22	25	25	2	-3	111	8
2005	1	21	21	26	26	2	-4	113	8
2006	2	22	21	28	29	2	-2	110	7
2007	1	22	22	29	29	2	-1	105	6
2008	-1	21	21	29	29	3	-2	108	7
2009	-5	19	19	24	24	1	-5	119	8
2010	1	20	18	27	29	2	-3	119	8

Ireland

Time	GDP growth (annual %)	Gross capital formation (% of GDP)	Gross domestic savings (% of GDP)	Exports of goods and services (% of GDP)	Imports of goods and services (% of GDP)	Inflation, consumer prices (annual %)	Cash surplus/deficit (% of GDP)	Central government debt, total (% of GDP)	Unemployment (% of total labor force)
1986	0	18	19	51	50	4	-13	108	18
1987	5	16	21	54	50	3	-9	109	18
1988	5	16	22	58	51	2	-5	107	17
1989	6	18	24	61	55	4	-3	99	16
1990	8	21	26	57	52	3	-4	93	14
1991	2	19	24	58	53	3	-5	95	16
1992	3	16	24	61	53	3	-5	91	15
1993	3	15	26	66	55	1	-4	94	16
1994	6	16	26	71	60	2	-4	89	15
1995	10	18	30	76	65	3	-2	81	12
1996	8	20	31	77	66	2	0	73	12
1997	11	21	34	79	67	1	1	64	10
1998	8	23	35	87	75	2	2	61	8
1999	11	24	38	89	75	2	2	49	6
2000	10	24	37	98	85	6	5	40	4
2001	6	23	38	100	84	5	1	37	4
2002	7	22	39	94	77	5	0	35	4
2003	4	23	39	84	68	3	0	34	5
2004	5	25	40	84	69	2	1	32	5
2005	6	27	39	82	70	2	1	33	4
2006	5	28	38	79	70	4	3	29	4
2007	6	26	35	80	71	5	0	28	5
2008	-4	22	31	83	74	4	-7	49	6
2009	-8	14	30	91	76	-4	-14	71	12
2010	0	11	29	99	80	-1	-9	95	14

Greece

Time	GDP growth (annual %)	Gross capital formation (% of GDP)	Gross domestic savings (% of GDP)	Exports of goods and services (% of GDP)	Imports of goods and services (% of GDP)	Inflation, consumer prices (annual %)	Cash surplus/ deficit (% of GDP)	Central government debt, total (% of GDP)	Unemployment (% of total labor force)
1986	1	27	19	22	30	23	-9	47	7
1987	-2	21	14	22	29	16	-9	53	7
1988	4	24	16	20	28	14	-10	57	8
1989	4	24	13	20	30	14	-14	60	8
1990	0	25	12	18	31	20	-15	73	7
1991	3	25	13	17	29	19	-12	75	8
1992	1	23	12	18	29	16	-12	80	8
1993	-2	22	11	17	28	14	-12	101	9
1994	2	20	12	18	26	11	-8	99	9
1995	2	20	10	18	27	9	-9	110	9
1996	2	21	11	18	28	8	-7	113	10
1997	4	21	11	20	30	6	-6	110	10
1998	3	23	12	20	31	5	-4	108	11
1999	3	24	12	23	34	3	-3	110	12
2000	4	25	11	26	40	3	-4	125	11
2001	4	25	12	25	38	3	-5	128	10
2002	3	24	10	22	36	4	-5	129	10
2003	6	27	14	21	33	4	-6	124	10
2004	4	24	14	23	33	3	-7	128	11
2005	2	21	12	23	32	4	-5	134	10
2006	6	24	13	23	34	3	-6	128	9
2007	3	26	12	24	37	3	-7	125	8
2008	0	24	9	24	39	4	-10	127	8
2009	-3	18	7	19	31	1	-16	142	10
2010	-4	16	7	22	30	5	-11	143	12

Spain

Time	GDP growth (annual %)	Gross capital formation (% of GDP)	Gross domestic savings (% of GDP)	Exports of goods and services (% of GDP)	Imports of goods and services (% of GDP)	Inflation, consumer prices (annual %)	Cash surplus/ deficit (% of GDP)	Central government debt, total (% of GDP)	Unemployment rate (% of total labor force)
1986	3	21	23	19	17	9	-6	43	21
1987	6	23	23	18	18	5	-4	43	20
1988	5	25	23	18	19	5	-6	40	19
1989	5	26	23	17	20	7	-6	41	17
1990	4	26	23	16	19	7	-6	42	16
1991	3	25	22	16	19	6	-7	43	16
1992	1	23	21	17	19	6	-5	45	18
1993	-1	21	20	18	19	5	-5	56	22
1994	2	21	21	21	21	5	-5	59	24
1995	3	22	22	22	22	5	-6	59	23
1996	2	22	22	24	23	4	-4	66	22
1997	4	22	23	26	25	2	-3	66	21
1998	4	23	23	27	27	2	-3	67	19
1999	5	25	23	27	29	2	-1	61	16
2000	5	26	23	29	32	3	0	59	14
2001	4	26	24	29	31	4	0	54	11
2002	3	27	25	27	29	3	0	53	11
2003	3	27	25	26	29	3	1	48	11
2004	3	28	24	26	30	3	0	47	11
2005	4	29	24	26	31	3	1	38	9
2006	4	31	25	26	33	4	2	34	9
2007	4	31	24	27	34	3	2	30	8
2008	1	29	23	26	32	4	-2	34	11
2009	-4	24	22	23	26	0	-9	46	18
2010	0	23	21	26	28	2	-7	60	20