# EURO ZONE DEBT CRISIS: “HOW IT ESCALATED INTO A CRISIS WITH A HUGE IMPACT WITHIN THE WHOLE GROUP”

**By**

**Elda Doda, MSc**

**EPOKA UNIVERSITY**

**January 2014**

**Approval page**

| | |
|---|---|
| **Thesis Title** | **:** Euro zone debt crisis: “How it escalated into a crisis with huge impact within the whole group” |
| **Author** | **:** Elda Doda, MSc |
| **Qualification** | **:** Master of Science |
| **Program** | **:** Banking and Finance |
| **Department** | **:** Banking and Finance |
| **Faculty** | **:** Economics and Administrative Sciences |
| **Thesis Date** | **:** January 2014 |

I certify that this thesis satisfies all legal requirements as a thesis for the degree of Master of Science (MSc).

Prof. Dr. Güngör Turan

**Head of Department**

I certify that I have read this study that is fully adequate, in scope and quality, as a thesis for the degree of Master of Science (MSc).

Assist. Prof. Dr. Urmat Ruskulov

**Supervisor**

## Exam Board of Thesis

**Thesis Title** **:** Euro zone debt crisis: “How it escalated into a crisis with huge impact within the whole group”

**Author** **:** Elda Doda, MSc

**Qualification** **:** Master of Science

**Date** **:** January 2014

**Members**

Prof. Dr. Güngör Turan …….

Assist. Prof. Dr. Urmat Ruskulov …….

Assist. Prof. Dr. Eglantina Hysa …….

## Abstract:

Economic crisis have shown to be periodical. They are encountered during the history in different forms; still it has a common characteristic. In this master thesis, the main focus is the sovereign debt crisis which Euro zone is currently living. The issues discussed are: how it all started and how come no country was able to predict what was soon turning to be one of the harshest crises in the history. It is introduced the case of the most problematic countries also known as PIIGS: Portugal, Italy, Ireland, Greece and Spain. There have been concerns that the PIIGS countries could default on their debts, and as such the crisis turned into a confidence crisis. An important focus is given to the policies undertaken by the European institutions towards responding to the crisis. The model performed, includes the factors that contributed to the crisis and their correlation. The factors are the ratings made by the credit rating agencies, unemployment levels, trade balances as percentage of GDP, Deficit as percentage of GDP and Bond yield as percentage of GDP. The countries included in the study are the PIIGS countries and the developed countries: Germany, France and Belgium. The time interval starts from 2001, when the countries were officially part of the euro zone, since the euro was widely distributed, to 2012. The methodology used is the panel data regression model (Stata). From Hausmann test performed, the fixed effect model was chosen. Credit ratings of Fitch and Standard and Poor's used as dependent variables, have a strong correlation implied from results. The model is explained by the independent variables, but lacks in showing which specific country has the strongest correlation.

**Key words:** euro zone, debt crisis, credit ratings, bond yields, Hausmann test

## Abstrakt:

Krizat ekonomike kanë treguar të jenë periodike. Ato janë shfaqur gjatë historisë në forma të ndryshme. Në këtë tezë, përqëndrimi kryesor është kriza e borxhit sovran që ka përfshirë vendet e Europës. Ceshtjet e trajtuara janë: si filloi dhe si është e mundur që asnjë nga shtetet nuk mundi ta parashikonte një krizë që shumë shpejt do të shndërrohej në një nga krizat më të ashpra të historisë. Gjithashtu, rëndësi i është dhënë shteteve më problematike të njohura si PIIGS: Portugali, Irlandë, Itali, Greqi dhe Spanjë. Shqetësimet kryesore të diskutuara, lidheshin me faktin nëse vendet PIIGS mund të dështonin në pagesat e borxhit, dhe si pasojë kjo krizë u kthye në një krizë besimi. Gjithashtu, në këtë tezë janë trajtuar edhe politikat e ndjekura nga institucionet europiane për t'ju përgjigjur krizës. Në model janë testuar faktorët kontribues në krizë dhe korelacioni ndërmjet tyre. Faktorët janë: vlerësimet nga agjensitë vlerësuese, nivelet e papunësisë, balancat tregtare si % e PBB, deficiti si % e PBB dhe kthimet e obligacioneve si % e PBB. Shtetet e përfshira në studim janë shtetet PIIGS dhe vendet e zhvilluara si Gjermania, Franca dhe Belgjika. Intervali kohor fillon nga 2001, nga krijimi i Euro zones-unifikimit të monedhës, deri në 2012. Metodologjia e zbatuar është regresioni i të dhënave panel tabele (Stata). Nga testi Hausmann, është zgjedhur si më i përshtatshëm modeli i efektit fiks. Sipas rezultateve, agjensitë vlerësuese Fitch dhe Standard & Poor's evidentojnë një korelacion të fortë. Modeli shpjegohet nga variablat e pandryshuara, por dështon që të tregojë se cili nga vendet specifik ka korelacionin më të fortë.

**Fjalë kyçe:** euro zonë, kriza e borxhit sovran, agjensitë vlerësuese, kthime të obligacioneve, testi Hausmann

## Acknowledgements

I gratefully acknowledge all those who have contributed to the preparation of this guide. Special thanks go to my Thesis Supervisor Prof. Urmat Ryskulov.

Also, I am thankful to my precious family who has always been beside me, and has supported me all the time.

## Declaration Statement

1. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

2. The program of advanced study of which this thesis is part has consisted of:

i) Research Methods course during the undergraduate study

ii) Examination of several thesis guides of particular universities both in Albania and abroad as well as a professional book on this subject.

Elda Doda

January 2014

## Table of Contents

**List of Tables**

**List of Figures**

**List of Appendices**

# INTRODUCTION

## Research objective and design

The world is becoming like a village, in the meaning that everything is so easy to access; the distance is shortened between countries. This simplicity has its own positive side, as it has its negative ones. On one hand, everything can be reached at a very short time; people can meet and communicate whenever and wherever. Companies have stretched their activities in different countries, where they seem to have the highest returns. Financial institutions and banking system is becoming one, making possible different investments from different locations. In a first look, globalization is very attractive.

On the other side, there are many negative aspects that make you think whether globalization is good or bad; whether the positive sides outweigh the negative sides. Just thinking of world poverty now days: nearly half the world — over three billion people — live on less than $2.50 a day (World Bank Development Indicator); or noticing the sharp inequalities that do exist. The world is divided into two groups: very rich group that consists in a very small % and the very poor group consists of a very large %: ‘’the poorest 40 percent of the world’s population accounts for 5 percent of global income. The richest 20 percent accounts for three-quarters of world income (World Bank Development Indicator)’’. All those worldwide companies are operating in third world countries for their own personal interests, to produce at low cost, not thinking of the population and environment.

The financial crisis happening periodically, are also a negative aspect. The interconnection of the banking and financial system, acting as one makes the whole system in the world vulnerable to crisis and its spread very quick. The sovereign debt crisis that the Euro Zone is experiencing is a result of the globalization process, of deregulation, lax of regulation and of the integration of the systems, coming together as one. This thesis is an attempt to shed light to the causes of the crisis and events that followed later. It is really interesting how everything emerged and it was not predicted, resulting from the US Financial Crisis of 2008. The European Union currently divided into the prosperous North and the troubled South, implying that the crisis came from the so called PIIGS- Portugal, Ireland, Italy, Greece and Spain. The questions that arise

naturally are: Where were the other countries during this deterioration of the situation, the increase of the debt by these states; how is it possible that no one predicted or took cautions that could refrain it from becoming so problematic. There are many issues that are going to be discussed through this thesis.

In the first chapter, the focus is going to be in the literature review; there is a great literature related to sovereign debt crisis and other economic/financial crisis. The current sovereign debt crisis has aggravated, and it seems like the impacts will stay for some years. It is compared to the Great Depression due to the consequences it has had.

The second chapter is over the crises happened throughout the history and the European Union; including the European central bank. The current European debt crisis is discussed in the third chapter. A special emphasis is given to the most problematic countries: Greece and Ireland; their specific issues and conditions. Within this chapter, it is elaborated the fiscal policies implemented and the regulatory frames. Also, it is included the political and economic aspects of the crisis and whether the Euro Zone will stay united or any country like Greece, could separate.

The forth chapter is for the data and the methodology chosen for the thesis. It is going to be included a model that will analyze the contributing factors of the debt crisis. The factors included are ratings made by the credit rating agencies, unemployment levels, trade balances as percentage of GDP, Deficit as percentage of GDP and Bond yield as percentage of GDP. A panel data model is selected, that comprises the most problematic countries, in order to conclude the correlation and how the investors lost faith and credibility; which led to panic and default of these countries. The countries included in the study are going to be the troubled South countries: Greece, Portugal, Spain, Italy and Ireland; also the other EU countries. In total there would be 25 countries and 300 data. The time interval is from 2001 to 2012, when the countries were officially part of the euro zone, since the euro was widely distributed. The data are yearly for each of the respective countries, and also multiple variables for them. The model comprises pooled OLS, fixed effect model, random effect model, Hausmann test and the dummy variable for the PIIGS countries. In the last chapter, there would be a summary of the findings from the model performed. The objective of this thesis is to identify the correlation between the variables with a panel data model which is very appropriate for such group

of data, and to get a better understanding of the sovereign debt crisis, with the causes and effects.

# CHAPTER 1: LITERATURE REVIEW

The literature related to the sovereign debt crisis is divided into some categories. Each of these categories focuses on the different aspects of the sovereign debt crisis and the macroeconomic and institutional factors. All the previous studies conducted; start with a definition of the sovereign debt crisis. There are many definitions provided, but still it depends to the current situation and the accessibility of the data (Sachs, 1984). It is very hard giving a clear response to the question of what is understood with sovereign debt crisis. The difficulty rises due to the fact that sovereign debt crisis occur in different forms. As a result the response is not clear and easy. According to Fernandez (2012), a specific country is considered to have default problems or being insolvent if it fails to pay a part or all of the stock of the external or public debt. In another definition, sovereign debt crisis is described as the phase/state of restructuring and rescheduling with the private creditors (Detragiache and Spilimbergo, Uruguay 2002).

In order to define a debt crisis, researchers mainly focus on the event of payment of interest and principal. Credit rating agencies have an important role in defining a debt crisis. If a country has a low rating and its rating degrades; than this country is perceived as having difficulties to repay, and as a result it increases the probability of default. According to Standard and Poor's definition related to debt crisis, provided by Fernandez et al (2012); sovereign risk is the risk that a country issuing the loan cannot meet its obligations and it is not able to repay the principal and interest on the maturity. According to S & P's:

i) "For local currency bonds, foreign debt of each issuer is considered in default when payment of debt is not due at maturity or when there is an exchange of the debt under less favorable conditions."

ii) "For bank loans, when the payment of debt service is not made at the due date of payment or when rescheduling of principal and / or interest is accepted by creditors under less favorable conditions than the original issues."

The definitions provided by Standard and Poor's have been adopted by three other authors: Reinhart, Rogoff and Savastano (2003), who have identified like 36 cases out of 53 debt crisis in emerging countries in the interval of 1970-2001. What is noticeable, in

all these definitions it is spoken of credit quality of government. In other words, it is its 'ability' (Detragiache and Spilimbergo, 2001) and its 'willingness' (Eaton and Gersowitz 1981, Bulow and Rogoff, 1989) to meet the obligations in the due date. It is very important to understand the terms: ability and willingness, in order to create an understanding of the sovereign risk itself. Ability is in terms of quantitative parameters, meaning that it can be measured through macroeconomic indicators such as: in terms of GDP, government revenues, exports; which makes the borrower unable to meet its obligations towards lenders. There are possibilities when a country renegotiates or fails to pay its debt, due to rises of interest rates. In this way it is unable to pay the existing debt; or it can borrow more to fulfill the obligations (Menendez, 2012). In such circumstances the debt can be rescheduled or restructured, so that the government can reduce the nominal value of the debt to pay. When speaking of willingness, it is referred in qualitative terms. It refers to the payment habits of a country in the past; the country may have the sources to pay the debt but refuses to do so due to bad faith. Willingness to pay is a choice between loss coming from default and money saved for payment purposes of the debt. The loss refers to sanctions that lenders impose in case of default. Borrowing countries do compare between the costs of repayment of debt or default (higher exposure in international financial markets). The quantitative measures such as GDP etc. affect not only the ability to pay, but at the same time the willingness of paying. Both these measures speak of the credibility of the borrowing countries and on the other side influence investor's country risk. If a country has a low growth, than not being able to get much more debt from international markets is more beneficial. International openness can increase the possibility of nonpayment. Financial markets can be more helpful when the country is unable to pay, instead when the default happens by a willingness to pay.

According to Manasse, Roubini and Shimmelpfenning, (2009) a debt crisis can happen when a country is illiquid rather than insolvent. Illiquidity is when a country has no liquid cash to pay the obligations even if the country can be able to repay in the future; insolvency is unable to repay the debt at maturity given future income. Liquidity measures speak of borrower's creditworthiness, and as such it should be analyzed. From 1800 to 1992, Beim and Calomiris (2001) have compiled a list with the most important periods of debts through adopting different sources. The authors focused on periods of 6

months considered long periods and for cases where part or all of principal and interest have been restructured or reduced. When the debt is paid, then this debt is considered as closed and the default period ends. Episodes of defaults or rescheduling that had a minimum of five years between were grouped, because one crisis formation can be a result of a previous crisis. The inability of non-paying the interest and principal on foreign debt can be very limited or very simplistic, when defining the debt default according to Candelon and Palm (2010). It can be a simple definition, but fails to be an operational tool to predict the debt crisis at a more advanced stage and taking the respective measures to prevent a future default on debt. According to Peter (2002), ratings provided by credit rating agencies are not such good, relying indicators. In a model created by Peter with 78 emerging countries within the interval 1984-1997, using information of World Bank for the increase in arrears of payments. He estimated the probability of sovereign default. The results were compared with the ones of the Standards and Poor's and Moody's, and it was noticed that 79% of the countries rated by both agencies had a default rate lower than the estimated probability of default. The author makes a defining of sovereign default measuring differences in levels of debt arrears and the amount rescheduled. Meaning, it defines the default by defining the increase in the stock of arrears. According to the author: a borrower-an emerging economy is referred to as being in default on its foreign debt in any of the three stated cases below:

1) An increase in the total stock of long term debt arrears (meaning interest and principal) to the official and private creditors is more than 2% of the total external debt.

2) The total amount of long-term debt rescheduled in any given year is higher than 2.5% of the total external debt.

3) If the above mentioned condition is met, but at the same time the total stock of arrears decreases more than the total amount of rescheduled debt, the country is not considered to be in default, i.e. the reduction of arrears payment is less than the amount of debt rescheduled. This last condition avoids classifying as defaulter a country that has paid a significant portion of its debt, but the stock of arrears is still above the threshold fixed in the definition.

The percentage provided are averages of two data sets, which refer to increases in total arrears and amount of rescheduled debt; which is compared to the total external debt that the author has chosen as sample. The drawback of this definition is that a country can be considered as being in crisis even if it has paid the most important part but has not yet paid a small portion of debt. Detragiache and Spilimbergo (2001), sets the limit for the default debt crisis at 5% of the outstanding arrears for the principal and interest payment. Furthermore they define the crisis as a state of restructuring and rescheduling with private commercial creditors. A sovereign debt crisis happens when arrears are higher than 15% of the principal and 5% of the interest (De Paoli and Saporta, 2009). These percentages come from author's sample distribution of arrears for all debtors for the interval 1970-2000 and the thresholds with low probability are identified. One other reason of sovereign debt crisis is the debt restructuring. Due to studies made, 40 debt crises are identified in an interval of 1970-2000, for 41 countries included. A crisis can last 8 to 11 years (De Paoli and Saporta, 2009; Detragiache and Spilimbergo, 2001) and it is accompanied by a deep recession of 5% per year.

Manasse, Roubini and Schimmelpfenning (2003) stated that sovereign debt services have many difficulties to be considered. The crisis escalates from a simple default on debt (Russia in 1998, Argentina in 2001). The crisis than can be turned into a debt restructuring due to risk of default, creating a liquidity crisis (Mexico in 1994-5, Thailand in 1997-8, Turkey 2000-1). Meaning that the country can be illiquid even though it is solvent i.e. the failure of paying the debt as investors being unable to pay short term debts on maturity. These crises can be prevented both from international financial institutions and private sector (Mexico in 1995, Turkey in 2001, Brazil in 2001). Debt servicing difficulties were harsh in 1980s according to Manasse, Roubini and Schimmelpfenning (2003); in 1990s these crisis became common. Many crisis are thought to be prevented from international aids, therefore the studies of Detagriache and Spilimbergo (2001) have not included all the crisis happened. A country is on default not only if it rated by Standard and Poor's, but also due to the fact of having non-concessional loans from IMF and its higher than 100% of its quota. There were spotted 54 debt crises from out of 76 countries in the sample that do have accessibility to international markets in the time interval 1995 to 2002.

The above mentioned definitions are respective to countries that have the possibility of entering the international markets and have the ability to issue international bonds. Low income countries do not have such possibility. The debt crisis gets another definition for these countries. For such countries, according to Kraay and Nehru (2004) there is debt crisis if the three actions occur:

1. The amount of the payment arrears of principal and interest exceeds 5% of the country's debt stock.
2. The debtor is provided debt relief by means of rescheduling or reduction from the Paris Club bilateral creditors.
3. The debtor is provided considerable support (above 50%) from the International Monetary Fund (IMF) to allow adjustment of the balance of payments. These aids are like "Stand by Arrangement" (SBA) or «Extended Fund Facility) (EFF). There have been noted 94 crisis episodes for which the period exceeds three years and 286 quiet period episodes from 1970 to 2001 and for 57 low-income countries.

MacFadden (1985), Hajivassiliou (1989, 1994) define sovereign defaults based on three characteristics. The first element is if the country reschedules its debt. The second element is whether the financial aid provided by IMF is higher than country's quota of 125%. The third element, if arrears on interest and principal are higher than 0.1% and 1% of the total external debt. The model brought by the two authors is based on the correlation of external loan demand with net international reserves, the current account balance and the debt service. According to the model, the rescheduling happens when the demand for the new credit in low income countries is higher than the new credit supply in developed countries. If the supply and demand curves intersect at a point below the interest rate, than the country can borrow to service its debt. According to the authors it is very important the habits of payments of the previously taken debts, to get an understanding of the actual behavior of the borrower.

Ciarlone et Trebeschi (2005) defines the debt crisis according to 5 stages happening:

1. When the borrowing country delays and asks for postponing of the payments of debts
2. When a country fails to pay principal and interest of its external debt to the creditors for more than 5% of the ratio of the total debt service for the entire year

3. When the borrowing country has debt payment arrears in interest and principal more than 5% of total external debt over the year
4. When the country reschedules it debt via an agreement
5. When the borrowing country is provided help by the IMF, if it more than 100% of its quota. In the study, authors could notice 44 episodes of debt crisis for the 28 emerging countries taken in the sample for the time interval 1980-2002.

According to Calvo (1998), countries joining a monetary union, lose their ability to issue debt in currency. They lose this instrument which is very important when implementing economic policy; in this way these countries become vulnerable to solvency crisis due to changes in market conditions. Liquidity crisis are followed by solvency crisis (Eichengreen *et al.* (2005)), because liquidity crisis has a positive impact on the interest rates. When speaking of member states of a union, there are more complex issues which expose these countries towards high risk. Members of a monetary union can be involuntarily directed into a bad equilibrium, which than is characterized by deflation, interest rates increase, high budget deficits and a bank crisis; because in a union is much more difficult to implement counter cyclical budgetary policies (De Grauwe (2011); Wolf (2011)). Danieal et al. (2010) made a study including high income countries in a time interval of 30 years for the fiscal consolidation. The study was to find whether there were any short term growth effects of consolidation and how it is affected by monetary policy, international trade, perceived sovereign risk and form of consolidation. It was found that fiscal consolidation has a shrinking impact on output. Mainly, central banks try to offset these pressures by cutting policy interest rates.

Bianca et al. (2006) estimated all the negative aspects of the sovereign debt crisis during the last 30 years, for the low income countries. According to the study, it resulted that sovereign defaults have a huge impact in the economy of a country, especially when it is followed by domestic banking system fiasco/failure and currency crisis. Just for illustration, the Latin American crisis in 1980s, the Russian crisis, these crises have shown the instability that the global financial system experienced as a result. The debt crisis is characterized by a fall in output growth, due to residents who cannot find ways of borrowing because of the crisis and no liquidity (Dooley, 2000). According to Caprio and Klingebiel (2003), sovereign crises have led to recessions, when government and external

debt has been greater than 60% of GDP and the fiscal balance in deficit (of over 2% of GDP). Even though annual inflation was very quick in some situations, taking the case of Indonesia and Ecuador with over 50%, it has been quite low in other countries, like Argentina and Uruguay. The author found that almost all debt crises were combined with a banking and currency crisis.

Literature has shown that a crisis has impacts on an economy through different routes from exports, imports, remittances, aid, foreign direct investment (FDI) flows, employment i.e. labor market, domestic resource mobilization, gross domestic product (GDP) growth and poverty. Still, it is different in each case, depending on the phase of the crisis that a country is experiencing.

Another important issue to be discussed is the credit rating agencies. Not only after the 2008-20009 credit crunch, but also before. After the two crises: the bubble crisis (2008-9) and the euro zone crisis (2010), it was raised a debate in relation to the information that this rating agencies had and the impact that these ratings had on the global markets. The ratings provided by these agencies are indicators of any default risk that a certain country may have, but on the other side the BB- or CC+ can have different interpretations through time and between different rating agencies (Cantor and Packer, 1994). According to the authors there are no explicit areas in the regulations related to rating agencies differences. In the regulations it is stated that the agencies should have equivalent rating scales, on the other side it is noted that some agencies assign higher ratings than other agencies. Partnoy (1999) is also another author who has a critical view on the way how these rating agencies give information and rate certain bonds of countries. These agencies have a high credibility in the world since early 1900s and all this good reputation comes from their ability of rating bonds and giving information to the markets and investors. Partnoy argues that these agencies should not be seen in terms of their reputation, they should be seen in terms of ‘’regulatory license ’’ meaning as generating value by making possible that issuers and investors, both meet certain regulatory requirements.

The turbulences followed by the crisis in the late 2000s provided more information very useful to authors for research. Alsakka and Gwilym (2010) made a research on five agencies and their relationship for the ratings assigned to sovereign countries. These two authors found that there was a correlation between the ratings provided. For a country

who has had recently an upgrade (downgrade) by a certain company, the probability of being upgraded (downgraded) by another company are higher while for being downgraded (upgraded) are much lower. It is noted that Standard and Poor's has the least dependence to other agencies, while Moody's is seen as the first in upgrades. Japanese agencies are in delay when compared to other agencies, still it is found that they can lead Moody's downgrades. In emerging markets, the authors found that if a country is rated by two agencies than this country tends to be upgraded (downgraded) from the agency who got a lower (higher) rating previously. The higher the differences between the rating of agencies, the greater is the impact on future ratings. The study of Ismailescu and Kazemi (2010) was on the impact of these sovereign credit ratings on the CDS spreads and the later impacts on other emerging countries' CDS premiums. It is found that positive ratings have huge impacts on CDS markets and have a higher probability of affecting emerging countries' CDS premiums.

Arghyroua and Kontonikasb (2012) focused on the sovereign debt crisis of 2010-2012. They noted a shift in market pricing behavior; markets changed the pricing method towards macro-fundamentals and international risk during the crisis, when before 2007 the market did not react in such a way. There was evidence on contagion, especially in the European countries. The main country who originated the crisis was Greece, which then due to contagion effect it spreads to other countries in different stages. According to Pan and Singleton (2011) in their studies noted that the sovereign credit risk it is more global-related than specific to a certain country. They found that the CDS spreads have a tighter connection to the US stock and high yield markets, than to local markets. Their results were at the same side with Beirne and Fratzscher (2013). The authors demonstrated that the degraded fundamental indicators of a country and the financial markets increased their sensitivity towards these fundamentals, were the two reasons for the increase in sovereign yield spreads and CDS spreads during the crisis time, globally not only for the euro zone.

Still, the empirical models with these fundamentals explain a very low part the sovereign risk during the period before crisis for EU countries. Meaning that market pricing of sovereign pricing does not fully reflect fundamentals before the crisis period.

# CHAPTER 2: OVERLOOK INTO THE CRISIS AND EUROPEAN UNION

## 2.1 History of the crisis through the years

When looking back in the history, it is obvious that most of the current situations now days are a product of last developments that have happened. The period of financial crisis dates back in 16th century. When speaking of financial crisis, it is normal to distinguish the types of financial crises exist. Under the group of financial crisis there are included the banking crisis. The banking crisis is characterized by a bank run, which happens when the depositors withdraw their money from the bank. In this way a bank panic is generated; two good examples are: the run in the Bank of the United States (1931) and the run in Northern Rock (2007). Another subdivision of the financial crisis is the stock market crash or the bubbles. Bubbles result from over estimating a class of asset, in expectation of buying the asset to sell it later at a higher price. It is hard to detect bubbles, and it exists a risk of a crash in asset price in case of a bubble. Well known examples are the Dutch tulip mania (1873), Wall Street Crash (1929), Japan property bubble of 1980, the dotcom bubble in 2000-1, the housing bubble in USA in 2007-8 and the Ireland bubble in 2010. Economic crisis is also a type of financial crisis which can be in the form of recession: meaning a negative GDP growth for more than 2 quarters, or a long lasting severe recession taking the name of depression. It can be recalled in here the Great Depression, the Subprime Mortgage Crisis (2007-8) and the recession which European Union is suffering currently. The forth form of financial crisis is the international financial crisis. It is shown into two forms: currency crisis and sovereign default. The currency crisis also known as the balance of payments crisis happens when a country having a fixed exchange rate regime is somehow forced to devalue its currency. While when a country cannot repay its sovereign debt, it is called a default. Both pertain to the government decisions. To illustrate better, there is the case of the currency crisis in Asia (1997-8), the 1998 Russian devaluation of the currency and default on government bonds and case of Latin American countries defaulting on their debt in 1980s.

Turning back in time, during 1620-1920 according to the authors: James Narron and David Skeie, the world experienced 300 years of financial crisis. It is quite interesting how these financial crises have happened periodically for centuries. The forgotten

financial crisis over 300 years, have happened before the great depression would occur. In 1620s the crisis took place due to quick deterioration of the coin at the time, represented by the Roman Empire. The crisis was also known as The Kipper und Wipperzeit. The denomination of the coin came as result of financing the thirty years of war (1618-1648). Charles Kindleberger (1991) an author and previous Fed economist, made a good analysis related to the causes and consequences of this crisis. The name of Kippers is related to coin clipping/cutting, while Wipperzeit has to do with a see-saw. The crisis, as mentioned above came as a result of debasement. On one side there was a reduction of the value of the silver coins by cutting shavings from them; and on the other side melting of coins and combining them with inferior metals to re-circulate them.

During the 1600s, it was seen a change of the systems from feudalism towards capitalism, it was being shifted towards a modern economy with markets and money, instead of medieval self-sufficient economy. In these certain conditions, the different states within Roman Empire financed the 30 years war by denominating coins and at the same time leaving large-denomination gold and silver coins unaffected. Due to combinations of the coin, the monetary system was on a copper standard rather than gold or silver one. This change made possible a divergence between the nominal value of the coin and the intrinsic metal value to happen, which then caused the quick debasement of the coin. Problems soon originated, and the states had to implement seigniorage in order to generate more revenues. The quick debasement made Europe experience a boom in 1622, which then was transformed into a mania when citizens returned to coin clipping. Hyperinflation was a result of such situation created in 1622-23. Peasants at the time earned a lot, and as they feared to be paid in debased money did not bring products in the market. Resulting in a breakdown and creating spillover effect to the whole economy and broader. There is a saying that: ‘‘History repeats itself’’, and in the case of the crises it is well demonstrated. In each of the cases there should be learned some lessons, but it is quite obvious that are easily forgotten, since the intensity of the repeating is increased. After this crisis, there were other crises like: Great Re-Coinage of 1696, the Mississippi Bubble of 1720, the Dutch Commodities Crash of 1763, and the Continental Currency Crisis of 1779. Generally, these crises were as result of financing different wars and it is related to the debasement of the coin/currency at the time. In the 18$^{th}$ century the

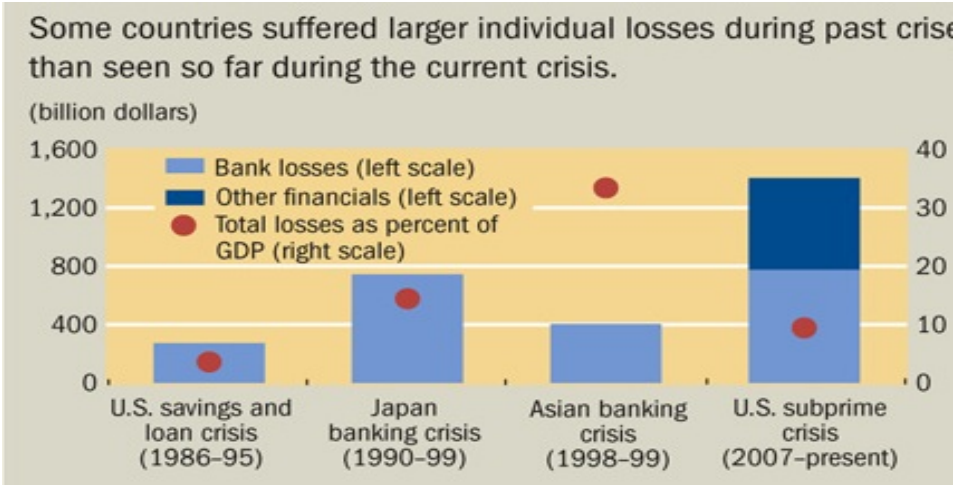
financial markets were more shaped and banking crises are more often. It could be mentioned the crisis of 1825 when the London Stock Market crashed, the panic of 1857 bank runs in New York which affected all other countries in the world, the Baring crisis of 1895 banking crisis etc.

Entering the 20th century, the world would experience one of the harshest crises ever: the Great Depression. The Great Depression of the 1929 which lasted until early of 1940s was also known as the stock market crash. It was a crisis that happened in US including afterwards also other countries in Europe and Asia. It is defined as the worst economic depression that has ever existed and it has shown how far the world economy could fall. One of the possible causes of this depression is thought to be the stock market crash in 1929. Due to the crash many stockholders and investors lost more than 40 billion dollars. Another possible reason is the bank failure. Many banks failed and at the time the deposits were uninsured, which caused depositors lose their money. The banks, who could survive, being uncertain of what was going to happen, were not open to creating new loans. This caused shrinkage of the economy. Individuals on the other side stopped consuming and purchasing goods, which led to a reduction in production. Since everything is tightly connected with one another, the unemployment reached (more than) the 25% level. All these events only made the economic situation worse and worse. The government in order to protect the US businesses imposed a tariff on imports which was really high tax. The trade with other foreign countries lessened and trade started to fall significantly. A last factor contributing to the depression is the drought of 1930 in Mississippi, which forced farmers to sell their farms in loss. In 1980-99 followed the emerging countries debt crisis. Interest rates increased significantly and commodity prices triggered a wide ranging set of sovereign defaults. The defaults were by the Latin American countries and African countries. In 1990 there is the Japanese property bubble crisis and in 1998 there is the currency crisis of the Russian economy, which affected the global financial markets.

In the early 2000s, countries like Turkey and Argentina suffered from the currency crisis, while in 2001 there was the bursting of the dot.com bubble. It was the beginning of another recession which has been compared to the great depression. In 2008, the financial crisis of US crashed. The underlying reason of the crisis is due to the debt, mortgage

backed assets and collaterized debt obligations. The estimated financial losses of the US (provided by IMF, 2008) go up to $1.4 trillion, and they are the highest considered in the history. When considered as percentage of the GDP are not as high as compared to the previous crises (illustrated in the figure 1).

**Figure 1: Historic losses**




Source: World Bank

The crisis was very harsh and it had a wide extent. The reasons for the crisis go back in 1998, when the Glass-Steagall legislation encouraged different businesses to undertake highly risky activities. Later on, in 2000 the Federal Reserve lowered interest rates dropping to 1%, in order for the boom to take place. The low interest rates made managers focus their investments towards high-yield mortgage backed securities rather than treasuries of municipal bond who promised a low return. Credit rating agencies played a positive role in these junk, risky securities by rating them with AAA, where in fact they should have been rated as risky. Fund managers took these ratings for granted, looking at the derivatives as profiting instruments, since they were also deregulated. The policy of 'too big to fail', gave the companies and people a belief that the situation cannot go wrong. The experience showed that the instruments were highly risky, the house bubble bursted and many investments banks and government-sponsored institutions failed. Following this crisis, it is the European debt crisis (2010). The default crisis is going to last for some years; it originated from the default of Greece. The causes of the crisis are: due to globalization making the market system integrated and highly correlated to one another, the lack of requirements for credit providing encouraging risky activities,

the subprime mortgage crisis of 2007, the real estate bubbles, the fiscal policies chosen by governments, international trade imbalances etc. The euro crisis made the Europe divided into two parts: the rich north and the poor south. The countries having a development in these hard times are: Germany, Switzerland etc, while the other group of the countries being the problematic ones are known as PIIGS. Portugal, Ireland, Italy, Greece and Spain are the countries. The crisis came as a result of these countries unable to pay the debts. The levels of debts are more than 60 % as it is the stated limit. The number of years of living the recession depends on the decisions that the most developed countries of Europe with Germany in the lead will take. If the policies would be effective the recovery of the Euro zone will be faster and making possible the regaining of the belief from investors.

### 2.2. A look in the European Union

When speaking of European Union is different when compared to United States of America. They are both unions of countries, but the functionality is different. USA are compact and do not have differences within. In the case of EU the divergences are obvious, because there are many conflicts between them during the history that still are hot debate. There is a 'war' in order to balance nationalism with federalism and unity. Today the EU is a group made of 28 countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Croatia and the United Kingdom. They act as a unique form of cooperation within the sovereign nations. The countries come together to become more strong economically and at the same time politically. The motto is ''United in Diversity'' (Europa 2007), since there are many nations with different languages and culture. Each of the countries has a sovereign power even though being part of a union. Every country within geographical position of Europe is motivated to be part of the union; the characteristics they should have are: the stable democracy, which ensures the power of law, human rights and protection of minorities. The country has to come to the same standards of EU countries (Europa 2007).

The idea of a union in Europe has been for more than 50 years, developed by different citizens or leaders in order to prevent the destruction happened during WW2. The

western countries brought the concept of an alliance to provide peace to Europe and to become stronger economically. Jean Monnet the French politician and Robert Schuman the foreign minister cooperated toward European countries working together, with the belief that it would be in the benefit of all countries. Firstly, there were 6 countries taking the initiative of creating a union. According to Monnet's: ''the means would be economics, the goal always political'' (Burgess, 1996). Schuman (May 9, 1950) expressed his plan for making possible that the Western Europe's industries of coal come together. Step by step the integration and unity would come. As a result the European Coal and Steel Community (ECSC) was created by the treaty of Paris (1951). In 1957 in the Treaty of Rome it was created European Economic Community (EEC) and European Atomic Energy Community; they were successes. The purpose was to encourage trade between the countries, to boost the coal and steel industries and to incentive the development and production of nuclear power. These three creations were a step towards unity. The three communities came to be one: European Community in 1967 and it was governed by three bodies: European Common Assembly (later known as European Parliamentary), Council of Ministers and European Commission. The parliamentary elections control was turned to the citizens of the European Community in 1979. The council is represented by members of each country, with responsibility of certain tasks for the council and not for their pertaining country of origin. Issues to be discussed are in finance, agriculture and security. The European Commission is in charge of updating laws and policies for definition of the EU's budget and creating an environment for cooperation to enforce civil and criminal laws. There is a representative from each country in this body, that has to focus on the interests of the union, rather than individual countries. In 1968, customs duties were removed within countries, in order to liberalize trade and free movement. During the road for the creation of the union there have been many uncertainties and critics. In 1980s, an Italian Commissioner Altiero Spinelli, stated that the Union was too weak to progress ahead. He stated that the union could succeed only if it acted aggressively. There were many steps taken to go towards EU creation during 1980s. It was released a document with 279 steps stated, for countries to fully be integrated with other nations. The steps had to be taken by December, 1992. In 1986, Single European Act SEA was signed, to decide for a common market. In 1992,

European Community was transformed into European Union in Netherlands, in Maastricht Treaty. Another important event occurred in 1995, the Schengen Agreement making possible free movements within nations of Germany, France, Belgium, Luxembourg and Netherlands. England and Ireland have rejected the agreement for security reasons. This agreement is currently signed by 24 countries of EU, and 3 countries which are not EU countries, such as Iceland, Switzerland and Norway.

European Union today is a result of many attempts undertaken years ago, that came up with the concept of unity. As an inevitable step, euro currency was introduced in 1999 and in 2002 was distributed massively to the countries that adopted it. This made the economic integration become stronger. In the Treaty of Nice, which was signed in 2001, it was decided that the composition of the actual Union would change, by imposing rules in case of any further growth on the EU (Europa 2007). In 2004, the union expanded by 10 other countries: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. Currently the union has 28 countries, and other countries will join in the near future. With all these changes happening, it was the need of a European Convention, which was completed and signed in 2004, but not yet ratified. The citizens were against it, so it is being revised. With European Union creation, countries came closer collaborating with each other, contributing in prosperity.

The term of Euro zone sometimes is confused with European Union term. Both terms have different meanings: European Union is related to the group of countries that are together taking decisions, while Euro zone relates to the group of countries who are using the same currency: The Euro. The currencies were with a floating regime, and for the ECC at the time it was dangerous. In the meaning that currencies were floating against one another. The market was increasing its instability, and there was a need to control the European monetary system. So, as stated above the first issuing of euro was made a reality in 1999 and up to 2002 it was distributed to most of countries. Seventeen countries out of 28 member states of European Union have adopted the euro currency, and at the same time belong to Economic and Monetary Union. Euro soon replaced the national currencies up to 2002. The countries started having another common institution: the ECB, European Central Bank, which enables a common monetary policy. The common monetary policy does not imply a common fiscal policy. Member states were totally free

on their fiscal policy implementation related to taxation and spending. So, the seventeen countries refer to the Euro Zone.

**Figure 2: EU euro zone countries**


Source: Lithuania Tribune

EU is currently a superpower, even though it is suffering the default crisis. It has worked a lot in order to make Europe unified and has made possible free trade, free movements of people. European Union is committed to democracy and improvement of Europeans' life in the long term.

### 2.3. European Central Bank

European Central Bank it is located in Frankfurt, Germany. It is owned by other central banks of the European Union countries. It was founded in June 1998 together with European System of Central Banks. It functions as central banks do; in this case it acts as central bank for the euro zone. The responsibilities of central banks are concerning stability of prices, keeping the inflation in control and the stability of the financial system, by ensuring proper supervision of the financial markets and institutions. The role of the central bank does not lie in the euro zone, but also cooperates with other national central banks of the European Union. Together with the other central banks of the 28 countries, it is formed the European System of Central Banks. The structure of the central bank is based on three decision making bodies:

- The Executive Board, it has 6 members chosen by euro zone countries and is responsible for day to day management
- Governing Council is responsible for the monetary policy settlement and interest rate fixing. It is composed of the Executive Board and 17 governors of central banks
- General Council has advisory roles and takes care of new joining countries in the euro zone. ECB president is part of it with vice president and governors of 28 countries.

**Figure 3: EU System**


Source: European Central Bank website

The tasks of the European Central Bank relate to controlling the money supply in circulation and determining the interest rates. The central bank has to manage the foreign currency reserves and to maintain exchange rates in control by trading currencies. The bank is responsible of making possible the supervision of the financial institutions and functionality of payment systems. Also, the bank has to authorize central banks within euro zone to issue euro bank notes and maintaining price stability by monitoring movements of prices. The European Central Bank is totally independent. None of the institutions of the European Union can interfere or give/take instruction from other bodies. All institutions have to respect this principle.

# CHAPTER 3: EUROPEAN DEBT CRISIS

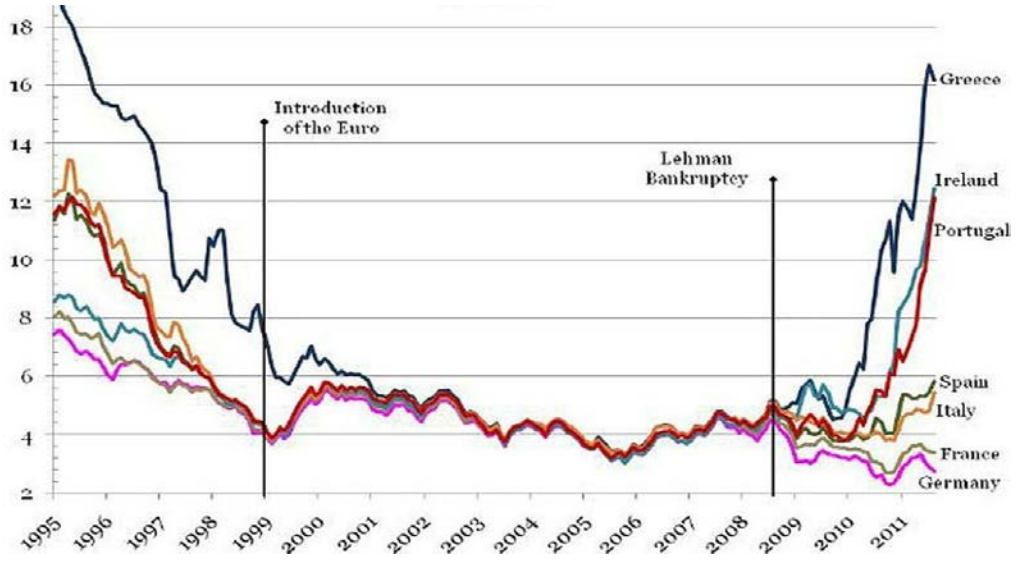
## 3.1. European debt crisis

The European Union was created with the idea of making reality a stronger economic and political Europe and becoming united to face challenges ahead. The sovereign debt crisis doubted this purpose and questioned the whole idea of the European Union and Euro Zone. As previously mentioned, the differences within countries were obvious in terms of economics, politics, social and cultural. In the development of the countries there were noted gaps in GDP growth, inflation rates, unemployment rates, external imbalances and competitiveness. On the other hand, the common currency: euro and the monetary system were implemented to these different countries and societies. The expectations were for the integration of the countries with one another, but as seen, the opposite happened. Sometimes, as in this case, when different countries are treated equally, differences between them start rising.

The Euro Zone crisis is tightly connected to the debt crisis of Greece in 2009-10. Greece defaulted on its sovereign debts. Greece was suffering from budget and trade deficit, and as a result the government seeks ways of financing by borrowing in international capital markets. Investors lost their confidence, due to the global financial crisis and from the fact that the Greek government had misstated the budget deficit. Due to this loss of confidence, investors feared that the Greece's debt was too high. There was an increasing effect on interest rates on Greek bonds that led towards a rise in borrowing costs rising debt levels of Greece. In 2010, Greece had many problems risking default on debt. Since Greece' case, concerns were directed towards other euro zone countries as Ireland, Spain, Italy and Portugal. The banking system was/is jeopardized by the debt problems that these countries have experienced. The unemployment rate has increased in euro zone, by the slow economic growth taking place.

George Soros, is an author that during a speech has made a complete explanation of the euro debt crisis, illustrated with a graph. The euro debt crisis can be described through three stages.

**Figure 4: Interest rates on 10 Year Government bonds: PIIGS vs Germany & France**




Source: Thomson Reuters Data stream

As shown in the graph, before introduction of euro currency the interest rates were different for different countries. Countries like Greece, Spain or Portugal had a higher cost of borrowing than countries like Germany, France or Belgium. After euro introduction, there was such an equalization of borrowing rates called convergence. As Soros explains, after euro all banks were able to buy government bonds without having to set aside equity capital, and government bonds were accepted by the central bank at its discount window on equal terms. On the other side the commercial banks accumulated the bonds of weak countries, in order to a few extra basis points. That is why the interest rates converged, as seen in the graph during 2000 up to 2008 when the financial crisis crashed. In few words, the bonds from all euro zone countries were thought to be the same, no matter which country sold them: Greece or Germany. The second phase in the whole story relates to the false dream. Since the issuing of the euro, for almost ten years, it was generally believed that the unification was becoming a reality. Under the surface, the Europe was not doing well. Germany due to unification process undertook some structural reforms in order to become more competitive. While the weak countries with

cheap credit, increased the consumption that resulted in making them less competitive. It looks like the whole idea of euro was a way for Germany to become the leading country with the exports, and for less developed countries to become consumers and cheap credit takers. After 2008, the crisis exploded. The crisis showed that the euro zone countries were not the same, and differences were much higher than predicted, the government bonds were not identical. The government bonds considered as non risky, could actually go on default. As a result there was a huge increase in risk premiums. The commercial banks that were full of these bonds were becoming insolvent. The European Union was facing two major problems: the sovereign debt crisis and the banking crisis. The current crisis is a mixture of these two: an increase in cost of borrowings for these weak countries and the problems that would follow the banks who had been lending money to these countries. As soon as it was drawn the conclusion that the euro zone countries could go default, there was an uprising pressure on lending interest rates towards weaker countries. The real question lies on the fact that no one was able to predict such a situation, how could Greece borrow so much and then no one could foresee that this country would not be able to repay its debts.

The responsibility for the crisis should fall on those countries that fueled the system in that way, as to create a crisis later on. The response was also too little too late. The responsibility falls on Germany and other creditor countries. The authorities did not know what was going to happen. Greece is the one having the default problem, while the other countries have banking crisis problems and competitiveness that resulted into balance of payments crisis. At this certain stage, a debate is raised: the breakup of euro. Still it is not that easy as said. Assets and liabilities in the balance sheets are denominated in such a currency, and thinking of a breakup would be very uncontrollable. The Bundesbank, central bank of Germany has started thinking the scenario of a possible breakup. It has taken measures towards decreasing of money supply in order to decrease the possible losses. Such actions speak of a self-fulfilling prophecy, meaning that even other countries have to act the same, in case of a breakup. The crisis is definitely getting worse, and it is shown by the low yield of a British 10 year bond, that has never been lower in 300 years, and taking into consideration the fact that UK is not part of the euro zone. On the other hand the risk premium on Spanish bonds has reached peak levels. The economy is having

negative growth, while Germany's economy is increasing. The divergence is getting more emphasized. The Europe is going through the opposite of what was firstly concepted: political and economic disintegration. Germany and the Bundesbank have a really crucial role in this entire situation. Banks need the help of Germany in order to create a European deposit insurance scheme and they need a financing by the European Stability Mechanism that goes parallel to regulation and supervision of the euro zone. The indebted countries need facilities in terms of financing costs. One action undertaken by the European Central Bank was that The Long Term Refinancing Operation had to enable Italian and Spanish banks buy their countries bonds and in this way engaging in a profit-low-risk arbitrage.

Germany in one hand is not interested in a euro breakup. Germany would be left with claims on the weaker countries which would be very hard gaining such claims. Furthermore, a return of deutschmark would result in lowering of exports of Germany, because they would be more expensive in the international trade. So it is in its own interest the preservation of the euro. Germany should do more than just the preservation of euro. The European Union is turned into a two tier Europe (Artus, 2009). Germany is the leading power, while on the other side the euro zone is suffering from deflation debt trap. The Germans are not currently suffering from high unemployment rates, or deflation, so on one side is hard for the government to make Germans accept different measures that in the short term could be not so good, but it would serve for helping the euro zone pass the hard situation created. Germany has to show its leadership and preserve what was firstly thought to be a dream: the unification in diversity. It has to take measures, no matter how drastic they can be, because the future of Europe is on its hands.

### 3.2. Overlook in the Greece and Ireland countries

The European Union is obviously divided in two peripherals. On the weak peripheral there is the group of the countries: Spain, Ireland, Italy, Portugal and Greece. Three of these countries: Greece, Ireland and Portugal, are under full bailout programs, in this third year of the debt crisis. Under this section, there will be analyzed the cases of Greece and Ireland. The reason of taking these two countries are due to the fact that there is an increase in spreads of these two countries sovereign bonds with German bonds on the other side. This spread is more emphasized for these countries and that means that the

investors have lost their confidence that Ireland and Greece could make it, without going on default. As rule of the countries part of euro zone, there should not be an annual deficit of 3% of GDP, but many countries have not respected it, especially in the recent years. Greece has not met this condition since 1999, and in November 2004 admits having given misleading information to European Union. Since 2008 the PIIGS have experienced huge deficits.

Greece has experienced high inflation from 2001 and later on, after joining the European Monetary Union (Arghyrou and Chortareas, 2008). Historically Greece has lived beyond its means[1]. This came as a result of high expenses that Greece was making, the public sector wages increased especially in 1999 up to 2008. The wages increased with a tempo higher than in any other country of the euro zone. They have increased at 50%. Another contributing factor was the debts taken in order to finance the Olympics of 2004, approximately 11 billion $. These were possible, since Greece borrowed continuously in international capital markets to fund deficits and government budget. All these inflows of money coming inside the country were stroke by tax evasion, leaving the budget in deficit and making the difference between expenses-income going out of control. A large part of the financing was kept confidential, and they were going to become public only when the country faced the global financial downward. Greece´s state was much deteriorated, due to high debt levels making the country unable to repay back and default. As a matter of fact, Greece had to ask for help towards the EU countries and IMF, increasing the level of debts. There has been a lot done in terms of helping Greece overcome its bad state.

In 2010, 110 billion Euro were granted to Greece for paying debtors, by the European Union and IMF. Another bailout at the amount of 130 billion Euros was provided at the same year, since the first one was not enough. From private sector creditors' perspective, they wrote off approximately 75% of the bad debts owned by Greece and agreed to replace previous loans to new loans at lower rates. These creditors have removed 40 billion euro of Greece burden. In response to all this help provided, Greece on the other hand has to take drastic measures as conditions: increases of taxes, cutting spending and taking reforms in labor markets and pensions. There were two options in the Greece case in order to help face the crisis: a bailout, which in this case it was followed in order to

pay the Greek maturing debts and restructuring of debt the second scenario. Latin American countries suffered debt crisis of 1980s, and the reaction towards the crisis was restructuring of the debt. IN Greece case it was chosen the bailout for three reasons:

1. Due to contagion risk. If it would be followed the restructuring of the Greek bonds, there would be risen the risk of similar treatment by the bond holders like Spain, Portugal, Italy and Ireland.
2. Another potential reason is the damage that would have been caused to balance sheets of the lenders of Greece. A restructuring of Greek portfolios would result negatively in the balance sheet of the lenders, which were German and French banks mainly. The bailout program was like bailing out these lending banks that were highly exposed financial institutions.
3. The restructuring would jeopardize euro reputation. Greece has been taking loans to handle budget deficits and repay bondholders at par, since 2010.

Besides the bailouts, it is not enough for helping the country. Greece recession has lasted for four years and it is thought that the economy will be shrunk for some years. The economy has had a very weak recovery. Lacking growth, it is hard to have increases in tax revenues and has to depend on the help of other countries for debt repayments. Supposing that Greece won't be able to recover, than its government bonds would not be sold, leading to a default of Greece in loans. All this would have an impact on other European countries, and why not further. A credit crunch would result and there would be space for a leaving from European Union by Greece.

When speaking of Ireland, it is one of the countries experiencing a big deficit amounting 31 % of GDP in 2010, due to bail outing its banks. It is the first country of the eurozone which experenced recession. It is also known as the "Fall of the celtic tiger". It was called the celtic tiger as a parallelism with Asian tiger, during booming in 1990s, by the economists. It all started when in September 2008, Ireland issued the blanket bank guarantee to help banks. This guarantee consisted on 400 billion euro bailout plan for the 6 main banks within the country. Later on in December 2008, the government injects 5.5 billion Euro for 3 largest banks, and nationalizes Anglo Irish bank to avoid its future possible collapse. In february 2009, the government undertakes cuts in public spendings

at the amount 2 billion euro. The government continues helping the banks: the Bank of Ireland and Allied Irish Bank, and at the same time taking stakes within the banks. The Anglo Irish Bank ha shad the largest corporate loss through the history of Ireland, and the bailout by the government was a burden for taxpayers, causing protests. In 2010, the deficit increased to 32% of GDP. The country in October 2010, continues cutting spendings by 15 billion euro to decrease the deficit and at the same time asks for help to IMF and European Union[2]. The irish banking crisis cost was very large and at the amount of 64 billion Euro of public funds. This amount was generated from the National Pension Reserve Fund at the amount of 20.7 billion euro, from the exchequer (11.9 billion euro) and from government issuing promissory notes at the amount of 31.6 billion euro. This huge sovereign debt of Ireland is result of increased borrowings and running deficits, which led to the banking crisis. All the finance taken for the bailout, was a forego for investments in creating new jobs, or infrastructure instead of being used for bailing plans. The country suffered economic growth. Ireland before 2001, attracted many international companies, mainly american ones, taking advantage the low corporate taxes that the country had, and also having the country as a connecting bridge to the european countries.

The country experienced the bubble crisis, due to increased lending by financial institutions by 466%. The two noted banks, undertaking such activities were: Anglo Irish Bank, as stated above having the biggest problems later on, and Irish Nationwide Building Society, acting as speculators. These banks were themselves, asking for borrowings abroad reaching levels of 100 billion euro on 2007, in order to finance the lending activities. Another contributing fact ti the bubble crisis, was lax of regulation by irish authorities, lax of supervision by the financila sector, and tax incentive for the property development. As the crisis became evident, the government guaranted all depositors and the bondholders[3]. The booming came as due to prices of houses quadrapled with the same pace as in the USA. The increasing demand for houses was accompanied by the construction boom: the total stock of dwellings came to be 1.9 million homes in 2008 from 1.4 milions in 2000. All the economy was focused on construction. After the crash of the financial international crisis, the prices began to fall (in 2007), leading towards a collapse of the system. The fall was 40 % and it was

continous. The collapse was followed by unemployment levels, low tax revenues due to severe crisis. The banking system was affected and the government interfered. NAMA (National Asset Management Agency) was formed as an institution for issuing government bonds to banks to buy distressed property assets at discount, and NAMA acquired more and more properties. Recapitalisation was obvious that was going to be very expensive and actually the burden was to the public. As, previously meantioned, Ireland asked for help to European Union, Eurpean Central Bank and IMF. In the programme, besides the bailout amount, are stated the measure the country has to take in order to stabilise the banking sector.

These countries, together with Italy, Portugal and Spain were the most vulnerable countries towards the crisis. Some authors argue about the fact of being part of the European Union has made the lives of these countries much more easier in terms of facing the crisis.

Countries like Ireland, small member states, would have faced the crisis much more worse and with much more difficulties if not being part of the Union (as Tilford states, 2009, pg.3). The arguments go further stating that the crisis result has a more positive effect on European integration (Jones, 2009; Tilford, 2009; Verney, 2009). In these countries, the confidence has evaporated and eventhough the northern countries are better in economic terms, they are included in this crisis by offering bailouts and also affected. The northern countries besides dealing with the current crisis, are also focused on making this crisis prevented and avoided in the future. In October 2010, the EU leaders compromised to stricter and tough new budget rules to prevent a second Greek style crisis. It implies that EU officials will give information regarding speculative bubbles to other countries, and will impose fines on states that are going to spend at high levels and are going to get many ways of financing through debts (BBC News, 2010d, Treaty question).

### 3.3. Fiscal policy and summary of frameworks

This sovereign debt crisis, besides everything has been a real challenge to the northern countries. The PIIGS countries are part of a union, implying that the most developed and stable countries have to help the suffering countries. It is a challenge in terms of policies, deciding the right policy to undertake and whether it will be effective or not. In the debt

crisis there were several policy mechanism undertaken. For Ireland, Greece, Cyprus and Portugal the bailout loans were implemented from EU and IMF. The bailouts have come with conditions, “strings attached”. Other frameworks include: formation of an institution which provides financial help called the European Stability Mechanism EMS in order to be present in times of financial troubles; enacting a decision for creating a bank specialized in supervising Euro zone and used by the ESM for injecting cash for bailing means; and increasing the role of the ECB to stabilize markets by purchasing sovereign debts at large amounts and injecting credit to the banking system. The crisis has had political implications: due to riots and falling of some governments. Policies are difficult to be implemented due to differences in terms of politics within EU countries. The difficult points are in making a balance between implementing austerity measures and stimulation of growth and at what extent there should be the fiscal integration in the Euro zone. A new fiscal impact entered into force in January 2013, a pact with sanctions for the countries breaching any EU fiscal rule.

The options for dealing with PIIGS countries are: Jolly the markets, Massage the yields, Full bailout, Re-profiling and Full restructuring. Jolly the markets is related to debtor countries persuading the markets that they should have faith that the fiscal measures undertaken are irreversible and will lead to sound financial conditions in the future. In this case, the markets should change the expectations related to interest rates. This first option did not work for the countries. Massage the yields is the second option, when the first one does not work. This option has to do with intervention in primary and secondary markets to suppress the yields for the debtors` and making possible for them to take borrowings at achievable coupon rates. The intervention can be from ECB or ESM that can buy bonds in markets, and in this way making yields decrease. On September, 2012 the ECB announced the OMT (outright monetary transactions) purchasing of 1-3 years bonds in secondary market, so to put decreasing pressures n yields. This method was tried and is still used, but not very effective. Full bailouts have been made for the sovereign countries. It consists of a package to cover deficits and repay maturing obligations. The forth option of re-profiling, is a kind of debt restructuring, because as seen from Greek experience it becomes inevitable the restructuring. The fifth option is the full-restructuring. This was used in Greece case in 2012, since the previous options resulted to

be non-effective. An option, restructuring for both the maturity and principal/interest changes. This is an alternative chosen when all the other options fail to give solution and to work. It is a last resort.

### 3.4. Political aspects and economic aspects of the crisis

Crisis was a result of no fiscal discipline in the euro zone countries. These specific countries were engaged in moral hazard, meaning that took excessive borrowings, through not being transparent and using the financing for reasons not explicated. The idea was that, being under the European Union would imply that even though these countries took high risks by borrowing at high rates, the EU would help them.

Furthermore, the euro itself is thought to be politics in essence. The crisis is a result of European monetary system, having euro as the same currency; but not all countries adopting it were ready to do so. Euro was a German-French project (VR, 2000). As per Sorensen, 2011 Germany wanted to dominate the internal markets with a unified currency, while France wanted to diminish D-mark currency from domination. In the current crisis, countries especially the developed ones, have differences in facing the crisis. This comes as a result of following different interests and politics. France with the new measures taken, gives more importance to lender of last resort than fiscal unification, and with the Germany happens the contrary. In decision making process, the country having the highest developing rates, has the advantage of having the highest influence. The PIIGS are countries that created the whole crisis (with the impact of US debt crisis), taking advantage of being part of EU. The crisis showed that it can be very severe and harsh, and it can lead to not only economic and political instability, but also social instability. These countries were given bailout packages to be able to repay their maturing debt. This is with strings attached, it has conditions to be met, and also the countries are dependent from the developed ones. Conditions have to do with austerity measures: cutting of spending drastically, increasing taxes etc. Conditions such that the public will not like, and would result in unrests and protests, reflecting a dissatisfied society. The interdependence of the countries with the developed north, is the worst thing to happen. A country loses the sovereignty and the right to decide for the country`s issues on their own. The developed countries are making them lose this right, because they failed to show the independence at the first place. The European Union was created to bring

countries together and make it easier for the countries to exchange between them. In terms of politics, the EU was created to make countries interrelate and lose this sovereignty.

# CHAPTER 4: DATA AND METHODOLOGY

## 4.1. The database model: Greece and other EU countries

The model includes EU countries, giving special emphasis on PIIGS countries. There are 25 countries of the European Union, for a time interval of 2001 and 2012 and the data taken are 300. The sources of the data are mainly from the Eurostat and European central bank websites. The regression equation is comprised of:

Y, Credit Ratings-Fitch and S & Poor´s ratings

X1, Unemployment level

X2, Trade balance as % of GDP

X3, Deficit as % of GDP

X4, Bond yield %.

For the variables of the credit ratings agencies, it was needed a conversion into numerical values. The ratings provided by Fitch and Standard and Poor's are in the form of AA+ or BB-. In order to include in the model a conversion was made possible (Please refer to Appendix 1 for the ratings conversions). The analysis is made in order to see the impact that the independent variables have had in the credit ratings agencies. The impact of these agencies giving a certain rating to the countries, is affected by the general economic conditions within countries. Fitch and S & Poor´s, are two well known agencies that have huge impacts on international finance markets, and their ratings can be the same, different or similar to each other, based on different priorities given when making ratings.

## 4.2. Regression model and analysis

The model consists in panel data analysis, since it is more consistent. The panel data are cross-sectional and time –series, meaning that there are multiple countries (25 EU countries), with independent variables changing through time. It is a statistical model with two dimensions. This panel data is realized through Regression Model, Fixed Effect Models, Random Effect Models and Haussman Test. Each test is provided in overall, within and between countries. The fixed effect model is usually used when analyzing variable´s impact that does not change through times. In the model, the fixed effect would mean the impact of budget deficit, trade balance, bond yield and unemployment rate on

the credit rating agencies, not taking other factors into consideration. The general equation of the FE model is:

$$y_{it} = \beta X_{it} + \alpha_i + u_{it} ,$$

where y is the dependent varible, i represent the countries and t, the time intervals for each specific country. The x, is the independent variable that varies over time, there may be more than one independent variable. B is the coefficient with which the independent variable changes through time, and α is the interception for each individual and u is the respective error. The FE model differs from RE model, since the random effect is related countries with differences supposed to be random and not correlated rather than fixed. The equation in this case is as below:

$$yit = \beta Xit + \alpha i + uit + \varepsilon it,$$

ε is the error term related to variables within countries, while the u reflects the errors between countries. This model is a two dimensional cross-section of data, where countries are analyzed thorugh time, and for different variables. The regression models are conducted for the correlations overall, within and between countries. Also, a Haussman Test is performed in order to specify which model is most appropriate for the data. If the p-value is higher than .05 than the most appropriate model to use is the random effect model. In cases where the p-value is lower than .05, than the fixed effect model is used.

Fitch as dependent variable (y):

Table 4. 1 Summary of variables data

| Variable | | Mean | Std Dev | Min | Max | Observation | |
|---|---|---|---|---|---|---|---|
| id | overall | 13 | 7,223151 | 1 | 25 | N | 300 |
| | between | | 7,359801 | 1 | 25 | n | 25 |
| | within | | 0 | 13 | 13 | T | 12 |
| t | overall | 2006,5 | 3,45782 | 2001 | 2012 | N | 300 |
| | between | | 0 | 2006,5 | 2006,5 | n | 25 |
| | within | | 3,45782 | 2001 | 2012 | T | 12 |
| fitch | overall | 3,458 | 0,7144725 | 1 | 4,2 | N | 300 |
| | between | | 0,6433621 | 2,2 | 4,2 | n | 25 |
| | within | | 0,3343407 | 1,708 | 4,108 | T | 12 |
| tb | overall | 0,6383333 | 8,929499 | -21,6 | 32,3 | N | 300 |
| | between | | 8,49136 | -11,025 | 27,475 | n | 25 |
| | within | | 3,207083 | -10,25333 | 11,18833 | T | 12 |
| pd | overall | 54,33433 | 29,37438 | 6,1 | 170,3 | N | 300 |
| | between | | 27,19514 | 11,04167 | 119,6417 | n | 25 |
| | within | | 12,26732 | 26,451 | 119,451 | T | 12 |
| by | overall | 4,963433 | 2,052679 | 1,4 | 22,5 | N | 300 |
| | between | | 1,240694 | 3,553333 | 7,556667 | n | 25 |
| | within | | 1,652514 | 1,1851 | 20,0951 | T | 12 |
| un | overall | 8,549 | 4,092546 | 1,9 | 25 | N | 300 |
| | between | | 3,075187 | 4,1 | 14,95 | n | 25 |
| | within | | 2,764067 | 0,899 | 21,174 | T | 12 |

The picture shows a summary of the variables when taking Fitch as independent variable. The analysis is made for each of the variables in three aspects: overall, between countries and within countries. Id represents the countries, t the time interval from 2001 to 2012. For id and t, there is no need to further develop for mean, standard deviation or min and max; since they are expressed in terms of quantitative. Fitch is the dependent variable, the highest deviation from the mean comes from the overall analysis. This comes as a result of different countries of European Union that have different credit ratings. As mentioned previously in the thesis, there are developed countries like: Germany, Austria etc, and less developed countries that were the influencing factors of the debt crisis, that as a result have low ratings, especially in 2008-2012 years. The same can be stated for the independent variables deviation: trade balance, public debt, bond yield and unemployment level.

**Table 4. 2 Regression of dependent and independent variables**

| Source | SS | df | MS | | No of obs | 300 |
|---|---|---|---|---|---|---|
| Model | 100,1643 | 4 | 25,041076 | | F(4, 295) | 140,8 |
| Residual | 52,4665 | 295 | 0,1778525 | | Prob>F | 0,0000 |
| Total | 152,6308 | 299 | 0,5104709 | | R squared | 0,6563 |
| | | | | | Adj R squared | 0,6516 |
| | | | | | Root MSE | 0,42173 |
| | | | | | | |
| fitch | Coeff | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | 0,02547 | 0,0028765 | 8,85 | 0,0000 | 0,019809 | 0,0311313 |
| pd | 0,003796 | 0,0008495 | 4,47 | 0,0000 | 0,0021238 | 0,0054677 |
| by | -0,19751 | 0,0134862 | -14,65 | 0,0000 | -0,2240504 | -0,1709679 |
| un | -0,03336 | 0,0068473 | -4,87 | 0,0000 | -0,0468343 | -0,0198829 |
| _cons | 4,501008 | 0,0800496 | 56,23 | 0,0000 | 4,343468 | 4,658549 |

From the second figure, there are the coefficients for each of the variables. For the bond yield and unemployment level the coefficients are negative, implying that it does not have a positive impact on the Fitch ratings. It is comprehensive, because when unemployment increases the rating decreases. The same happens when yields increase, ratings decrease due to uncertainty related to repayment of debts. The R2 and Adj-R2 are 65%, it implies for a correlation relatively strong. The model is explained 65% by the independent variables.

**Table 4. 3 Between regression**

| Group variable | | id | | | No of obs | 300 |
|---|---|---|---|---|---|---|
| R square | within | 0,3077 | | | No of groups | 25 |
| | between | 0,8589 | | | Obs per group | 12 |
| | overall | 0,5946 | | | averg | 12 |
| | | | | | max | 12 |
| sd(u_i+avg(e_i.))=0,2647179 | | | | | F(4,20) | 30,44 |
| | | | | | Prob>F | 0,0000 |
| fitch | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | 0,023372 | 0,0091705 | 2,55 | 0,019 | 0,0042426 | 0,042501 |
| pd | 0,006128 | 0,0020366 | 3,01 | 0,007 | 0,00188 | 0,0103767 |
| by | -0,36895 | 0,0554615 | -6,65 | 0,0000 | -0,4846445 | -0,2532631 |
| un | 0,006698 | 0,0217744 | 0,31 | 0,762 | -0,0387229 | 0,0521184 |
| _cons | 4,884122 | 0,3545056 | 13,78 | 0,0000 | 4,144637 | 5,623608 |

In the between regression, the R2 is strong, explaining the model at 86%. The model is significant, except for the bond yield variable that has negative coefficient (yield has impact because when it increases it decreases ratings); the other variables have a positive correlation. For the within and overall R2 is relatively low.

After performing the Hausmann test, in this case the model to be taken into consideration is the fixed effect model. This is due to p which resulted to be lower than .05, as stated below at figure 4.

**Table 4. 4 Hausmann Test**

| Coefficients | | | | | |
|---|---|---|---|---|---|
| | (b) fixed | (B) random | (b-B) Diff | sqrt(diag(V_b-V_B)) S.E. | |
| tb | 0,010256 | 0,0138192 | -0,003563 | 0,0017527 | |
| pd | -0,01058 | -0,006185 | -0,004393 | 0,0004511 | |
| by | -0,07813 | -0,091174 | 0,013042 | . | |
| un | -0,03485 | -0,046198 | 0,0113526 | . | |
| | | | | | |
| b consistent under Ho and Ha; obtained from xtreg | | | | | |
| B=inconsistent under Ha, efficient under Ho; obtained from xtreg | | | | | |
| Test: Ho: diff in coefficients not systematic | | | | | |
| chi2(4)= (b-B)'[(V_b-V_B)^(-1)](b-B) | | | | | |
| | 164,02 | | | | |
| Prob>chi2= 0,0000 | | | | | |
| (V_b-V_B is not positive definite) | | | | | |

As seen from figure, Prob>chi2, so the fixed effect model is more appropriate. Eventhough, in this particular case: the fixed effect model with the random effect do not change considerably.

**Table 4. 5 Fixed effect regression**

| Fixed effects within regression | | | | No of obser | | 300 |
|---|---|---|---|---|---|---|
| | | | | No of groups | | 25 |
| Group variable | | id | | Obs per group | min | 12 |
| R square | within | 0,6833 | | | averg | 12 |
| | between | 0,1346 | | | max | 12 |
| | overall | 0,2392 | | | F(4,271) | 146,18 |
| corr (u_i, xb)= | | -0,2044 | | | Prob>F | 0,0000 |
| | | | | | | |
| fitch | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | 0,010256 | 0,0042155 | 2,43 | 0,016 | 0,0019566 | 0,0185552 |
| pd | -0,01058 | 0,0012864 | -8,22 | 0,000 | -0,0131104 | -0,0080453 |
| by | -0,07813 | 0,0080164 | -9,75 | 0,000 | -0,0939146 | -0,06235 |
| un | -0,03485 | 0,0058151 | -5,99 | 0,000 | -0,0462942 | -0,023397 |
| _cons | 4,711896 | 0,0608707 | 77,41 | 0,000 | 4,592056 | 4,831735 |
| sigma_u | 0,618424 | | | | | |
| sigma_e | 0,197632 | | | | | |
| rho | 0,907336 | (fraction of variance due to u_i | | | | |
| F test that all u_i=0: F(24, 271)=44,68 | | | | Prob>F=0,0000 | | |

In the above figure, it is reflected the fixed effect model. According to this model, as a contributing factor for the ratings provided by Fitch seems to have positive impact the trade balance; while the other variables seem to go on the contrary. The Rsquare is the highest 68%, within the country, ignoring somehow the other countries. Sigma_u and sigma_e are a parameter estimate with a standard error. It provides information relating to the fixed part of the model. The deviation of the overall error of the model is splitted into two parts: into the intercept deviation sigma_u, and the other part the remaining error deviation. Rho coefficient is the proportional total variance contributed by the panel level variance component. Is an estimation of intraclass correlation coefficient ICC. It also can be seen as within country dependency. When it is closed to 0, than the panel level variance component is unimportant.

S&P's as dependent variable (y):

**Table 4. 6 Summary of variables data**

| Variable | | Mean | Std Dev | Min | Max | Observation | |
|---|---|---|---|---|---|---|---|
| id | overall | 13 | 7,223151 | 1 | 25 | N | 300 |
| | between | | 7,359801 | 1 | 25 | n | 25 |
| | within | | 0 | 13 | 13 | T | 12 |
| t | overall | 2006,5 | 3,45782 | 2001 | 2012 | N | 300 |
| | between | | 0 | 2006,5 | 2006,5 | n | 25 |
| | within | | 3,45782 | 2001 | 2012 | T | 12 |
| sp | overall | 3,527333 | 0,6828424 | 1 | 4,2 | N | 300 |
| | between | | 0,6064064 | 2,55 | 4,2 | n | 25 |
| | within | | 0,3347739 | 1,494 | 4,177333 | T | 12 |
| tb | overall | 0,638333 | 8,929499 | -21,6 | 32,3 | N | 300 |
| | between | | 8,49136 | -11,025 | 27,475 | n | 25 |
| | within | | 3,207083 | -10,25333 | 11,18833 | T | 12 |
| pd | overall | 54,33433 | 29,37438 | 6,1 | 170,3 | N | 300 |
| | between | | 27,19514 | 11,04167 | 119,6417 | n | 25 |
| | within | | 12,26732 | 26,451 | 119,451 | T | 12 |
| by | overall | 4,963433 | 2,052679 | 1,4 | 22,5 | N | 300 |
| | between | | 1,240694 | 3,553333 | 7,556667 | n | 25 |
| | within | | 1,652514 | 1,1851 | 20,0951 | T | 12 |
| un | overall | 8,549 | 4,092546 | 1,9 | 25 | N | 300 |
| | between | | 3,075187 | 4,1 | 14,95 | n | 25 |
| | within | | 2,764067 | 0,899 | 21,174 | T | 12 |

The picture shows a summary of the variables when taking Standard and Poor's as independent variable. As in the Fitch case, the analysis is made for each of the variables in three aspects: overall, between countries and within countries. Again, id represents the countries, t the time interval from 2001 to 2012. For id and t, there is no need to further

develop for mean, standard deviation or min and max. Standard and Poor's is the dependent variable, the highest deviation from the mean comes from the overall analysis. This comes due to different countries of European Union that have diverse credit ratings. As mentioned previously in the thesis, there are developed countries like: Germany, Austria etc, and the problematic countries causing the debt crisis and as a result have low ratings, especially in 2008-2012 years. The same can be stated for the independent variables deviation: trade balance, public debt, bond yield and unemployment level.

**Table 4. 7 Regression of dependent and independent variables**

| Source | SS | df | MS | | No of obs | | 300 |
|---|---|---|---|---|---|---|---|
| Model | 85,9742 | 4 | 21,4935505 | | F(4, 295) | | 118,65 |
| Residual | 53,44166 | 295 | 0,181158185 | | Prob>F | | 0,0000 |
| Total | 139,4159 | 299 | 0,466273802 | | R squared | | 0,6167 |
| | | | | | Adj R squared | | 0,6115 |
| | | | | | Root MSE | | 0,42563 |
| | | | | | | | |
| sp | Coeff | Std Err | t | P>(t) | 95% Confidence interval | | |
| tb | 0,024795 | 0,002903 | 8,54 | 0,0000 | 0,019082 | 0,0305088 | |
| pd | 0,001282 | 0,000857 | 1,49 | 0,136 | -0,00041 | 0,002969 | |
| by | -0,17193 | 0,013611 | -12,63 | 0,0000 | -0,19872 | -0,1451449 | |
| un | -0,03427 | 0,006911 | -4,96 | 0,0000 | -0,04787 | -0,0206721 | |
| _cons | 4,588235 | 0,08079 | 56,79 | 0,0000 | 4,429237 | 4,747233 | |

From the second table, there are the coefficients for each of the variables. For the bond yield and unemployment level the coefficients are negative, implying that it does not have a positive impact on the Standard and Poor's ratings. The R2 and Adj-R2 are 62%, it implies for a correlation relatively strong. The model is explained 62% by the independent variables.

**Table 4. 8 Between regression**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | No of obs | | 300 |
| Group variable | | id | | No of groups | | 25 |
| R square | within | 0,2227 | | Obs per group | min | 12 |
| | between | 0,8531 | | | averg | 12 |
| | overall | 0,5488 | | | max | 12 |
| | | | | | F(4,20) | 29,04 |
| sd(u_i+avg(e_i.))=0,2545817 | | | | | Prob>F | 0,0000 |
| | | | | | | |
| sp | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | 0,02334 | 0,008819 | 2,65 | 0,015 | 0,004943 | 0,0417367 |
| pd | 0,003612 | 0,001959 | 1,84 | 0,08 | -0,00047 | 0,0076974 |
| by | -0,34216 | 0,053338 | -6,41 | 0,0000 | -0,45342 | -0,2308943 |
| un | 0,003858 | 0,020941 | 0,18 | 0,856 | -0,03982 | 0,0475394 |
| _cons | 4,98148 | 0,340932 | 14,61 | 0,0000 | 4,270309 | 5,69265 |

In the between regression, the R2 is strong, explaining the model at 85%. The model is significant, except for the bond yield variable that has negative coefficient; the other variables have a positive correlation. For the within and overall R2 is relatively low (table 4.2.8).

After performing the Hausmann test, in this case the model to be taken into consideration is the fixed effect model. This is due to p which resulted to be lower than .05, as stated below at figure 4.2.9.

**Table 4. 9 Hausmann test**

| **Coefficients** | | | | | |
|---|---|---|---|---|---|
| | (b) fixed | (B) randor | (b-B) Diff | iag(V_b-V_B)) | S.E. |
| tb | -0,0006 | 0,008197 | -0,0088007 | 0,0020326 | |
| pd | -0,01279 | -0,00799 | -0,0047935 | 0,000533 | |
| by | -0,05171 | -0,06806 | 0,016357 | . | |
| un | -0,02803 | -0,04351 | 0,0154768 | . | |
| | | | | | |
| b consistent under Ho and Ha; obtained from xtreg | | | | | |
| B=inconsistent under Ha, efficient under Ho; obtained from xtreg | | | | | |
| Test: Ho: diff in coefficients not systematic | | | | | |
| chi2(4)= (b-B)'[(V_b-V_B)^(-1)](b-B) | | | | | |
| | 182,94 | | | | |
| Prob>chi2= 0,0000 | | | | | |
| (V_b-V_B is not positive definite) | | | | | |

**Table 4. 10 Fixed effect regression**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fixed effects within regression | | | No of obser | | 300 | |
| | | | No of groups | | 25 | |
| Group variable | | id | Obs per group | min | 12 | |
| R square | within | 0,6417 | | averg | 12 | |
| | between | 0,0353 | | max | 12 | |
| | overall | 0,1329 | | F(4,271) | 121,34 | |
| corr (u_i, xb)= | | -0,3205 | | Prob>F | 0,0000 | |
| | | | | | | |
| sp | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | -0,0006 | 0,00449 | -0,13 | 0,893 | -0,00944 | 0,0082352 |
| pd | -0,01279 | 0,00137 | -9,33 | 0,000 | -0,01548 | -0,01009 |
| by | -0,05171 | 0,008538 | -6,06 | 0,000 | -0,06852 | -0,0348976 |
| un | -0,02803 | 0,006193 | -4,53 | 0,000 | -0,04022 | -0,0158371 |
| _cons | 4,718781 | 0,06483 | 72,79 | 0,000 | 4,591147 | 4,846415 |
| sigma_u | 0,649122 | | | | | |
| sigma_e | 0,210487 | | | | | |
| rho | 0,904857 | (fraction of variance due to u_i | | | | |
| F test that all u_i=0: F(24, 271)=38,97 | | | | Prob>F=0,0000 | | |

In the above figure, it is reflected the fixed effect model. The fixed effect model implies that the model can be fully explained the independent variables. According to this model, as a contributing factor for the ratings provided by Standard and Poor's, seems to have positive impact the trade balance; while the other variables seem to go on the contrary. The R-square is the highest 65%, within the country, ignoring somehow the other countries. Sigma_u and sigma_e are a parameter estimate with a standard error. It provides information relating to the fixed part of the model. The deviation of the overall error of the model is splitted into two parts: into the intercept deviation sigma_u, and the other part the remaining error deviation. Rho coefficient is the proportional total variance contributed by the panel level variance component. Is an estimation of intraclass correlation coefficient ICC. It also can be seen as within country dependency. When it is closed to 0, than the panel level variance component is unimportant.

Budget Deficit as dependent variable (y):

**Table 4. 11 Summary of variables data**

| Variable | | Mean | st dev | Min | Max | Observations | |
|---|---|---|---|---|---|---|---|
| id | overall | 13 | 7,223151 | 1 | 25 | N | 300 |
| | between | | 7,359801 | 1 | 25 | n | 25 |
| | within | | 0 | 13 | 13 | T | 12 |
| t | overall | 2006,5 | 3,45782 | 2001 | 2012 | N | 300 |
| | between | | 0 | 2006,5 | 2006,5 | n | 25 |
| | within | | 3,45782 | 2001 | 2012 | T | 12 |
| bd | overall | -2,907 | 3,874061 | -30,6 | 6,1 | N | 300 |
| | between | | 2,378264 | -8,05 | 1,975 | n | 25 |
| | within | | 3,091972 | -28,02367 | 6,359667 | T | 12 |
| tb | overall | 0,6383333 | 8,929499 | -21,6 | 32,3 | N | 300 |
| | between | | 8,49136 | -11,025 | 27,475 | n | 25 |
| | within | | 3,207083 | -10,25333 | 11,18833 | T | 12 |
| pd | overall | 54,33433 | 29,37438 | 6,1 | 170,3 | N | 300 |
| | between | | 27,19514 | 11,04167 | 119,6417 | n | 25 |
| | within | | 12,26732 | 26,451 | 119,451 | T | 12 |
| by | overall | 4,963433 | 2,052679 | 1,4 | 22,5 | N | 300 |
| | between | | 1,240694 | 3,553333 | 7,556667 | n | 25 |
| | within | | 1,652514 | 1,1851 | 20,0951 | T | 12 |
| un | overall | 8,549 | 4,092546 | 1,9 | 25 | N | 300 |
| | between | | 3,075187 | 4,1 | 14,95 | n | 25 |
| | within | | 2,764067 | 0,899 | 21,174 | T | 12 |
| fitch | overall | 3,458 | 0,7144725 | 1 | 4,2 | N | 300 |
| | between | | 0,6433621 | 2,2 | 4,2 | n | 25 |
| | within | | 0,3343407 | 1,708 | 4,108 | T | 12 |
| sp | overall | 3,527333 | 0,6828424 | 1 | 4,2 | N | 300 |
| | between | | 0,6064064 | 2,55 | 4,2 | n | 25 |
| | within | | 0,3347739 | 1,494 | 4,177333 | T | 12 |
| crisis | overall | 0,16 | 0,3672186 | 0 | 1 | N | 300 |
| | between | | 0,0333333 | 0 | 0,1666667 | n | 25 |
| | within | | 0,3657585 | -0,0066667 | 0,9933333 | T | 12 |

The picture shows a summary of the variables when taking Budget Deficit as independent variable. There can be a correlation of the independent variables adding also the credit ratings within the model. As in the previous cases, the analysis is made for each of the variables in three aspects: overall, between countries and within countries. Again, id represents the countries, t the time interval from 2001 to 2012. For id and t, there is no need to further develop for mean, standard deviation or min and max. Even in this model the highest deviation from the mean comes from the overall analysis. This comes due to different European Union countries, which have changing levels of budget deficits. As mentioned previously in the thesis, there are developed countries like: Germany, Austria etc, where they have low levels of budget deficit and the problematic countries causing the debt crisis and as a result having extremely high levels of budget deficits, especially in 2008-2012 years. The same can be stated for the independent

variables deviation: trade balance, standard and poor's ratings, fitch ratings, bond yield and unemployment level.

**Table 4. 12 Regression of dependent and independent variables**

| Source | SS | df | MS | | Number of obs | | 300 |
|---|---|---|---|---|---|---|---|
| Model | 1655,21 | 7 | 236,458637 | | F(7, 292) | | 24,38 |
| Residual | 2832,285 | 292 | 9,69960562 | | Prob>F | | 0,0000 |
| Total | 4487,495 | 299 | 15,0083455 | | Rsquared | | 0,3688 |
| | | | | | Adj R square | | 0,3537 |
| | | | | | Root MSE | | 3,1144 |
| | | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | | |
| tb | -0,01268 | 0,0246672 | -0,51 | 0,608 | -0,061225 | 0,035871 | |
| pd | -0,05424 | 0,0067452 | -8,04 | 0 | -0,0675107 | -0,04096 | |
| by | 0,060334 | 0,1316252 | 0,46 | 0,647 | -0,1987203 | 0,319389 | |
| un | -0,19435 | 0,0540542 | -3,6 | 0 | -0,300731 | -0,08796 | |
| fitch | 3,819137 | 0,8720758 | 4,38 | 0 | 2,102785 | 5,535488 | |
| sp | -2,29457 | 0,861132 | -2,66 | 0,008 | -3,989377 | -0,59975 | |
| crisis | 0,539596 | 0,5187829 | 1,04 | 0,299 | -0,4814315 | 1,560624 | |
| _cons | -3,78928 | 2,097773 | -1,81 | 0,072 | -7,917952 | 0,33939 | |

From the second table, there are the coefficients for each of the variables and the standard errors. The trade balance is negatively correlated with budget deficit. This is understandable, because the increase in trade balances decreases the deficit. Public debt and unemployment have negative correlations, while bond yield have positive coefficients. The crisis variable has a positive correlation with the budget deficit. It is interesting that Fitch and Standard and Poor's have different implications in budget deficit. When the ratings made from Standard and Poor's increase showing increase credibility towards a country, the budget deficit is decreased. The budget a priori should be increased since it gets more financing from other countries. As for Fitch, if the rating is increasing than also the budget deficit increases, this correlation can be accepted. The R2 is 37% and Adj-R2 is 35%, it implies for a correlation which is very weak. The model is explained 37% by the independent variables. It is implied also that the ratings are explained by budget deficit and other variables, instead of budget deficit being explained by the ratings and the other variables.

**Table 4. 13 Between regression**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | No of obs | | 300 |
| Group variable | | id | | | No of groups | | 25 |
| R square | within | 0,0001 | | | Obs per group | min | 12 |
| | between | 0,6199 | | | | averg | 12 |
| | overall | 0,0355 | | | | max | 12 |
| | | | | | F(7,17) | | 3,96 |
| sd(u_i+avg(e_i.))=1,742101 | | | | | Prob>F | | 0,0096 |
| | | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | | |
| tb | -0,07981 | 0,0963874 | -0,83 | 0,419 | -0,2831699 | 0,12355 | |
| pd | -0,04119 | 0,0170576 | -2,41 | 0,027 | -0,0771817 | -0,00521 | |
| by | -0,93272 | 0,6686553 | -1,39 | 0,181 | -2,343463 | 0,478016 | |
| un | -0,17709 | 0,1444116 | -1,23 | 0,237 | -0,4817688 | 0,127595 | |
| fitch | 1,652872 | 2,70135 | 0,61 | 0,549 | -4,04648 | 7,352223 | |
| sp | -1,03022 | 2,959787 | -0,35 | 0,732 | -7,27482 | 5,214389 | |
| crisis | -11,3549 | 17,06355 | -0,67 | 0,515 | -47,35582 | 24,64607 | |
| _cons | 5,260654 | 8,165271 | 0,64 | 0,528 | -11,96656 | 22,48787 | |

In the between regression, the R2 is the highest in the between model, explaining the model at 62%. The model is significant. The accepted correlations are the trade balance and the Standard and Poor's rating. In the case of bond yield, resulting to have negative impact on budget deficit; if the yields increase it means that the interest rates for borrowing increase and as a matter of fact the deficit to increase. The cost of borrowings increases. The unemployment has resulted to have negative impact, too. It should be the contrary, since in order to decrease unemployment level more financing needs to be provided. Fitch ratings have positive impact on deficit. If the rating is increased, reflecting an increase in a countries feasibility and credibility; than budget deficit increases. The country has a decrease in deficit, since it shows the ability of repaying the debts. The crisis variable has also a negative impact, when the impact could be positive. More countries being affected by the crisis, the chances for the budget deficit to increase should be higher. The results are also deriving from an analysis where the budget deficit is explained by these variables only 37%, that is why we do not get the expected results. For the within and overall R2 is really low (table 4.2.13).

After performing the Hausmann test, in this case the model to be taken into consideration is the fixed effect model. This is due to p=0,0317, is lower than .05, as stated below at figure 4.2.14.

**Table 4. 14 Hausmann test**

| Coefficients | | | | | |
|---|---|---|---|---|---|
| | (b) fixed | (B) random | (b-B) Diff | sqrt(diag(V_b-V_B)) S.E. | |
| tb | 0,060115 | 0,0133808 | 0,046734 | 0,04716 | |
| pd | -0,12976 | -0,0666071 | -0,0631563 | 0,0172605 | |
| by | 0,122688 | 0,1757796 | -0,053092 | 0,0201859 | |
| un | -0,32922 | -0,2648225 | -0,0643975 | 0,0490329 | |
| fitch | 2,593164 | 3,943153 | -1,349989 | 0,4761728 | |
| sp | -4,4348 | -3,130803 | -1,303999 | 0,4322752 | |
| crisis | 0,123552 | 0,4243365 | -0,3007845 | . | |
| | | | | | |
| b consistent under Ho and Ha; obtained from xtreg | | | | | |
| B=inconsistent under Ha, efficient under Ho; obtained from xtreg | | | | | |
| Test: Ho: diff in coefficients not systematic | | | | | |
| chi2(7)= (b-B)'[(V_b-V_B)^(-1)](b-B) | | | | | |
| | 15,35 | | | | |
| Prob>chi2= 0,0317 | | | | | |
| (V_b-V_B is not positive definite) | | | | | |

Even in this model, the fixed effect model is requested to be performed.

**Table 4. 15 Fixed effect regression**

| Fixed effects within regression | | | | No of obser | | 300 |
|---|---|---|---|---|---|---|
| | | | | No of groups | | 25 |
| Group variable | | id | | Obs per group | min | 12 |
| R square | within | 0,3325 | | | averg | 12 |
| | between | 0,1726 | | | max | 12 |
| | overall | 0,1823 | | F(7,268) | | 19,07 |
| corr (u_i, xb)= | | -0,7041 | | Prob>F | | 0,0000 |
| | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence | interval |
| tb | 0,060115 | 0,0587277 | 1,02 | 0,307 | -0,0555115 | 0,175741 |
| pd | -0,12976 | 0,0203334 | -6,38 | 0,000 | -0,169797 | -0,08973 |
| by | 0,122688 | 0,1264675 | 0,97 | 0,333 | -0,1263086 | 0,371684 |
| un | -0,32922 | 0,086425 | -3,81 | 0,000 | -0,4993784 | -0,15906 |
| fitch | 2,593164 | 1,080179 | 2,4 | 0,017 | 0,4664489 | 4,719879 |
| sp | -4,44348 | 1,027983 | -4,31 | 0,000 | -6,458751 | -2,41085 |
| crisis | 0,123552 | 0,4656036 | 0,27 | 0,791 | -0,7931541 | 1,040258 |
| _cons | 12,96688 | 4,285856 | 3,03 | 0,003 | 4,528648 | 21,40511 |
| sigma_u | 3,482463 | | | | | |
| sigma_e | 2,668215 | | | | | |
| rho | 0,630103 | (fraction of variance due to u_i | | | | |
| F test that all u_i=0: F(24, 268)=5,41 | | | | Prob>F=0,0000 | | |

In the above table, it is reflected the fixed effect model. The fixed effect model implies that the model can be fully explained the independent variables. According to this model, as a contributing factor for the budget deficit, seems to have positive impact the trade balance, bond yield and Fitch rating; while the other variables seem to go on the contrary. The R-square is the highest 33%, within the country, ignoring somehow the other countries. It is a low model explanation. Sigma_u and sigma_e are a parameter estimate with a standard error. It provides information relating to the fixed part of the model. The deviation of the overall error of the model is splitted into two parts: into the intercept deviation sigma_u, and the other part the remaining error deviation. Rho coefficient is the proportional total variance contributed by the panel level variance component. Is an estimation of intraclass correlation coefficient ICC. It also can be seen as within country dependency. When it is closed to 0, than the panel level variance component is unimportant.

The dummy variable is done for the case where the budget deficit is the dependent variable. The reference country is taken Greece and the other countries to be analyzed are: Ireland (country 2), Italy (country 3), Portugal (country 4) and Spain (country 5). The first thing to be done is looking at the the pooled OLS regression for the dependent and independent variable. Again, the budget deficit is the dependent one, and trade balance, public debt, bond yields, unemployment, Fitch and Standard&Poor's are the independent variables.

It is assumed that the cross section and time series for the given data is neglected and as a result it is tried to construct the OLS model. At the same time, there is another assumption meaning that the combination of these five countries in the model, denies the heterogeneity or individuality that may exist among these countries.

According to the OLS regression where R2=0,58, meaning that the model can explain 58% the budget deficit (please refer to table below).

**Table 4. 16 Summary of variables data**

| Source | SS | df | MS | | No of obser | 72 |
|---|---|---|---|---|---|---|
| Model | 1245,216 | 6 | 207,536019 | | F(6, 65) | 15,48 |
| Residual | 871,6566 | 65 | 13,4101025 | | Prob>F | 0,0000 |
| Total | 2116,873 | 71 | 29,8151095 | | R squared | 0,5882 |
| | | | | | Adj R squared | 0,5502 |
| | | | | | Root MSE | 3,662 |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | -0,06051 | 0,0529144 | -1,14 | 0,257 | -0,1661878 | 0,045167 |
| pd | -0,04513 | 0,0280965 | -1,61 | 0,113 | -0,101241 | 0,010984 |
| by | 1,147536 | 0,2956261 | 3,88 | 0 | 0,5571303 | 1,737943 |
| un | -0,5637 | 0,1308786 | -4,31 | 0 | -0,8250829 | -0,30232 |
| fitch | 9,952193 | 2,5644 | 3,88 | 0 | 4,830733 | 15,07365 |
| sp | -5,3432 | 2,888132 | -1,85 | 0,069 | -11,1112 | 0,424796 |
| _cons | -17,9745 | 10,61271 | -1,69 | 0,095 | -39,1695 | 3,220584 |

However, it is important to choose which model needs to be applied in this case, with this sample data. Namely, fixed effect or random effect model. This implies that the fixed effect model allows heterogeneity or individuality among countries, allowing to have its own intercept value. Even if the intercept may differ among countries, the intercept is invariant over time. Whereas, the random effect model implies that the mean value for the intercept for the countries is common. To choose the appropriate model for the sample cases in the model, the Hausmann test is performed.

**Table 4. 17: Hausmann test**

| **Coefficients** | | | | | |
|---|---|---|---|---|---|
| | (b) fixed | (B) random | (b-B) Diff | sqrt(diag(V_b-V_B)) S.E. | |
| tb | 0,356396 | -0,0605105 | 0,4169063 | 0,2149958 | |
| pd | -0,2237 | -0,0451285 | -0,1785713 | 0,0392616 | |
| by | 0,728479 | 1,147536 | -0,4190574 | . | |
| un | -0,88871 | -0,5637002 | -0,325011 | 0,1260546 | |
| fitch | 5,106963 | 9,952193 | -4,84523 | . | |
| sp | -9,79508 | -5,343202 | -4,451877 | . | |
| | | | | | |
| b consistent under Ho and Ha; obtained from xtreg | | | | | |
| B=inconsistent under Ha, efficient under Ho; obtained from xtreg | | | | | |
| Test: Ho: diff in coefficients not systematic | | | | | |
| chi2(6)= (b-B)'[(V_b-V_B)^(-1)](b-B) | | | | | |
| | 52,19 | | | | |
| Prob>chi2= 0,0000 | | | | | |
| (V_b-V_B is not positive definite) | | | | | |

Hausmann test with a H0: “The random effect model is appropriate” and Ha: “The fixed effect model is appropriate”. In this case, the Hausmann test is significant and below the p-value as in the table shown above, it is implied that the fixed effect model is the appropriate model and if not the vice versa is possible. The fixed effect model is chosen and performed for the model. Below it is the fixed effect model shown in the table:

**Table 4. 18 Fixed effect regression**

| | | | | | | |
|---|---|---|---|---|---|---|
| Fixed effects within regression | | | | No of obser | | 72 |
| Group variable | | id | | No of groups | | 6 |
| R square | within | 0,683 | | Obs per grou | min | 12 |
| | between | 0,2555 | | | averg | 12 |
| | overall | 0,3226 | | | max | 12 |
| | | | | F(6,60) | | 21,55 |
| corr (u_i, xb)= | | -0,8078 | | Prob>F | | 0,0000 |
| | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | 0,356396 | 0,2214117 | 1,61 | 0,113 | -0,0864935 | 0,799285 |
| pd | -0,2237 | 0,0482792 | -4,63 | 0,000 | -0,3202726 | -0,12713 |
| by | 0,728479 | 0,2462163 | 2,96 | 0,004 | 0,2359731 | 1,220985 |
| un | -0,88871 | 0,1817112 | -4,89 | 0,000 | -1,252188 | -0,52523 |
| fitch | 5,106963 | 2,486255 | 2,05 | 0,044 | 0,1337128 | 10,08021 |
| sp | -9,79508 | 2,531135 | -3,87 | 0,000 | -14,8581 | -4,73206 |
| _cons | 34,3805 | 12,41295 | 2,77 | 0,007 | 9,550902 | 59,21009 |
| sigma_u | 6,67955 | | | | | |
| sigma_e | 2,897212 | | | | | |
| rho | 0,841656 | (fraction of variance due to u_i | | | | |
| F test that all u_i=0: F(5, 60)=8,77 | | | | Prob>F=0,0000 | | |

According to the fixed effect model regression, the within R2=,68, between ,26 and overall ,32, where all the independent variables have t-statistics of greater than t-critical value, except the trade balance.

The dummy variable model comprised of the countries: Greece (reference country), Ireland, Italy, Portugal and Spain, has some many interesting findings. The budget deficit is the dependent variable. The budget deficit is seen to be affected mostly by the credit ratings agencies: Fitch and Standard and Poor’s. The effect is seen to be different, whereas a priori is thought to be the same. From the coefficients shown in the below table, Fitch has a positive effect on the budget deficit. It means that the deficit will decrease. While the Standard and Poor’s from the coefficient resulted, the effect is negative on the budget deficit, increasing it.

| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
|---|---|---|---|---|---|---|
| tb | 0,353541 | 0,242343 | 1,46 | 0,151 | -0,1334661 | 0,840548 |
| pd | -0,23382 | 0,055579 | -4,21 | 0 | -0,3455099 | -0,12213 |
| by | 0,726468 | 0,276433 | 2,63 | 0,011 | 0,1709543 | 1,281981 |
| un | -0,88146 | 0,203972 | -4,32 | 0 | -1,29136 | -0,47156 |
| fitch | 5,327825 | 2,775572 | 1,92 | 0,061 | -0,2498968 | 10,90555 |
| sp | -10,3415 | 2,922486 | -3,54 | 0,001 | -16,21442 | -4,46851 |
| _Icountry_Ireland | -18,0387 | 8,121177 | -2,22 | 0,031 | -34,35876 | -1,71853 |
| _Icountry_Italy | 0,169011 | 3,229297 | 0,05 | 0,958 | -6,320504 | 6,658525 |
| _Icountry_Portugal | -6,99778 | 2,444003 | -2,86 | 0,006 | -11,90919 | -2,08637 |
| _Icountry_Spain | -4,25033 | 3,991781 | -1,06 | 0,292 | -12,27211 | 3,771455 |
| _cons | 42,5481 | 15,6105 | 2,73 | 0,009 | 11,17762 | 73,91858 |

The model is significant due to the R-squared being 72.33%. Ireland, Portugal and Spain in respective to Greece, have the significant impacts on the budget deficits within their economies.

From the Hausmann test performed, the fixed effect model is the most appropriate method to use. From the fixed effect model it can be easily seen that the

**Table 4. 19 Regression of dependent and independent variables**

| Group variable | | id | | No of obser | | 60 |
|---|---|---|---|---|---|---|
| R square | within | 0,693 | | No of groups | | 5 |
| | between | 0,0604 | | Obs per group | min | 12 |
| | overall | 0,231 | | | averg | 12 |
| | | | | | max | 12 |
| corr (u_i, xb)= | | -0,8251 | | F(6,49) | | 18,44 |
| | | | | Prob>F | | 0,0000 |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| tb | 0,353541 | 0,242343 | 1,46 | 0,151 | -0,1334661 | 0,840548 |
| pd | -0,23382 | 0,055579 | -4,21 | 0 | -0,3455099 | -0,12213 |
| by | 0,726468 | 0,276433 | 2,63 | 0,011 | 0,1709543 | 1,281981 |
| un | -0,88146 | 0,203972 | -4,32 | 0 | -1,29136 | -0,47156 |
| fitch | 5,327825 | 2,775572 | 1,92 | 0,061 | -0,2498968 | 10,90555 |
| sp | -10,3415 | 2,922486 | -3,54 | 0,001 | -16,21442 | -4,46851 |
| _Icountry_Ireland | 0 | omitted | | | | |
| _Icountry_Italy | 0 | omitted | | | | |
| _Icountry_Portugal | 0 | omitted | | | | |
| _Icountry_Spain | 0 | omitted | | | | |
| _cons | 36,72455 | 14,2142 | 2,58 | 0,013 | 8,160045 | 65,28905 |
| sigma_u | 7,4647 | | | | | |
| sigma_e | 3,12908 | | | | | |
| rho | 0,850546 | (fraction of variance due to u_i | | | | |
| F test that all u_i=0: F(4, 49)=6,99 | | | | Prob>F=0,0002 | | |

values for the countries are omitted due to col-linearities. In the within model, it is the highest significance. The table reflects the same data as the summary of dependent and independent variables in the previous table.

Part of the thesis, are also the dummy variables for each of the independent variables in relation to the independent one, for the fixed effect. The trade balance as seen in the fixed effect model dummy variable, the R-square is the highest for the between countries. From the coefficients and the p-values it is noted that the trade balance has a negative impact on the budget deficit. Ireland and Spain are the countries with significant values, having negative coefficient values (Please refer to the table below):

**Table 4. 20 Trade balance variable in respective to budget deficit**

| R square | within | 0,2637 | | | | |
|---|---|---|---|---|---|---|
| | between | 1 | | | | |
| | overall | 0,3364 | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| _Icountry_Ireland | 0 | Omitted | | | | |
| _Icountry_Italy | 0 | Omitted | | | | |
| _Icountry_Portugal | 0 | Omitted | | | | |
| _Icountry_Spain | 0 | Omitted | | | | |
| **tb** | -0,1809 | 0,517189 | -0,35 | 0,727 | -1,19457 | 0,832772 |
| _Icountry_Ireland | -0,78501 | 0,595789 | -1,32 | 0,188 | -1,952731 | 0,38272 |
| _Icountry_Italy | 0,473107 | 1,461364 | 0,32 | 0,746 | -2,391114 | 3,337328 |
| _Icountry_Portugal | 0,042429 | 0,745639 | 0,06 | 0,955 | -1,418996 | 1,503854 |
| _Icountry_Spain | -1,42266 | 0,796626 | -1,79 | 0,074 | -2,984019 | 0,138697 |
| _cons | -3,84816 | 1,819255 | -2,12 | 0,039 | -7,502241 | -0,19408 |
| sigma_u | 7,770743 | | | | | |
| sigma_e | 4,797396 | | | | | |
| rho | 0,724039 | (fraction of variance due to u_i | | | | |

The model performed for the public debt variable, and analysed in relation to the budget deficit, has the highest R-square in the within model at a figure of 52%. Not very significant. The table provides information for the analysis (please refer to table 4.21). Even in this analysis, Spain and Ireland are the two countries having the significant figures, when taking Greece as reference country. The coefficients are negative, implying that it decreases the budget deficit.

**Table 4. 21 Public debt variable in respective to budget deficit**

| R square | within | 0,5213 | | | | |
|---|---|---|---|---|---|---|
| | between | 0,0284 | | | | |
| | overall | 0,1647 | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| _Icountry_Ireland | 0 | Omitted | | | | |
| _Icountry_Italy | 0 | Omitted | | | | |
| _Icountry_Portugal | 0 | Omitted | | | | |
| _Icountry_Spain | 0 | Omitted | | | | |
| **pd** | -0,07091 | 0,04602 | -1,54 | 0,13 | -0,1633421 | 0,021525 |
| _Icountry_Ireland | -0,14298 | 0,057319 | -2,49 | 0,016 | -0,2581052 | -0,02785 |
| _Icountry_Italy | 0,027865 | 0,151282 | 0,18 | 0,855 | -0,275993 | 0,331723 |
| _Icountry_Portugal | 0,023115 | 0,070591 | 0,33 | 0,745 | -0,1186702 | 0,1649 |
| _Icountry_Spain | -0,22183 | 0,096219 | -2,31 | 0,025 | -0,4150949 | -0,02857 |
| _cons | 3,541844 | 3,633635 | 0,97 | 0,334 | -3,756526 | 10,84021 |
| sigma_u | 5,451679 | | | | | |
| sigma_e | 3,868294 | | | | | |
| rho | 0,665126 | (fraction of variance due to u_i | | | | |

The bond yield is also another independent variable taken as a means of analysis with the budget deficit and PIIGS countries. Ireland seems to have the biggest impact as per model on the budget deficit. The model has an R-square for the within (being the highest result reflected) with a value of 24.36 %. Follow the below table:

**Table 4. 22 Bond yield variable in respective to budget deficit**

| R square | within | 0,2436 | | | | |
|---|---|---|---|---|---|---|
| | between | 0,0413 | | | | |
| | overall | 0,0061 | | | | |
| | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| _Icountry_Ireland | 0 | Omitted | | | | |
| _Icountry_Italy | 0 | Omitted | | | | |
| _Icountry_Portugal | 0 | Omitted | | | | |
| _Icountry_Spain | 0 | Omitted | | | | |
| **by** | -0,13891 | 0,250889 | -0,55 | 0,582 | -0,6428351 | 0,365016 |
| _Icountry_Ireland | -3,07008 | 0,92734 | -3,31 | 0,002 | -4,932694 | -1,20746 |
| _Icountry_Italy | 0,762995 | 2,435054 | 0,31 | 0,755 | -4,127956 | 5,653945 |
| _Icountry_Portugal | 0,110787 | 0,664675 | 0,17 | 0,868 | -1,224252 | 1,445825 |
| _Icountry_Spain | -3,26816 | 2,048424 | -1,6 | 0,117 | -7,382541 | 0,846221 |
| _cons | 0,80632 | 3,16192 | 0,26 | 0,8 | -5,544583 | 7,157224 |
| sigma_u | 9,62528 | | | | | |
| sigma_e | 4,862262 | | | | | |
| rho | 0,796697 | (fraction of variance due to u_i | | | | |

In case of the unemployment, the same analysis is performed and somehow the results are the same. For the within model, the R-square is 65%. Ireland and Spain have the biggest value amounts. Refer to the below table:

**Table 4. 23 Unemployment variable in respective to budget deficit**

| R square | within | 0,6499 | | | | |
|---|---|---|---|---|---|---|
| | between | 0,1065 | | | | |
| | overall | 0,1449 | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| _Icountry_Ireland | 0 | Omitted | | | | |
| _Icountry_Italy | 0 | Omitted | | | | |
| _Icountry_Portugal | 0 | Omitted | | | | |
| _Icountry_Spain | 0 | Omitted | | | | |
| **un** | -0,10194 | 0,210288 | -0,48 | 0,63 | -0,5243188 | 0,320433 |
| _Icountry_Ireland | -1,66933 | 0,302548 | -5,52 | 0 | -2,277016 | -1,06165 |
| _Icountry_Italy | -0,0683 | 0,856589 | -0,08 | 0,937 | -1,788813 | 1,652206 |
| _Icountry_Portugal | -0,25293 | 0,378633 | -0,67 | 0,507 | -1,013432 | 0,507579 |
| _Icountry_Spain | -0,76711 | 0,272896 | -2,81 | 0,007 | -1,315237 | -0,21898 |
| _cons | 1,151061 | 1,700402 | 0,68 | 0,502 | -2,264297 | 4,566419 |
| sigma_u | 6,918217 | | | | | |
| sigma_e | 3,307895 | | | | | |
| rho | 0,813921 | (fraction of variance due to u_i | | | | |

Fitch and Standard and Poor's have similarities for the analysis performed. Ireland and Spain are the two countries having significant values. The within model was 55%, implying for a model not very significant. The coefficients of Ireland and Spain are

positive, meaning that the effect in the budget deficit is positive. (Please refer to the appendices for the whole table).

## CONCLUSION

In this thesis, the model followed to be analyzed was the panel data model: Stata. The number of observations taken for the study was 300, taking 25 countries of the European Union for the respective years from 2001 up to 2012. The variables used were: trade balance (x1), public debt (x2), bond yield (x3), budget deficit (x4 but also used as y3), unemployment level (x5), Fitch ratings (y1) and Standard & Poor's ratings (y2).

From the test performed were: the between regression, fixed effect model and random effect model. The Hausman test was provided in order to decide which model was the most appropriate to explain the model in general. From the Hausmann tests made for all three cases when the dependent variables were: the ratings and budget deficit, the fixed model was chosen as the most appropriate to explain the model. This due to the fact that there were no variables left outside the model that could have a great impact on the independent variables. That is why the p value was less than 0.05. When the dependent variable is Fitch and Standard and Poor's, the results are quite similar. In the summary regressions of the data, it is easily seen the similarity. The highest deviation for both the credit ratings, come due to the overall analysis. There are differences between countries, since in the model are included the developed ones, and the less developed. The coefficients signs are the same for the both models; the bond yield and unemployment have a negative coefficient because they have to have such correlation with the dependent variable. The R-squared and the Adjusted R are quite high, respectively 65% and 62%, implying for a strong correlation. The model is explained at 65% and 62% degree. For the between regressions, the R-squared is 86% and 85%, while for the within and overall effect the R-squared are relatively low. Performing the Hausmann test, derived a decision of choosing the fixed effect model instead of a random effect model. The fixed effect, in both cases had the highest value of R-squared for within country: 68% and 64%. The fixed effect is more appropriate since the model is mostly explained by the independent variables chosen in the model. The errors are quite high, especially the individual error, meaning for each country. The models are significant, but they lack in providing which of the specific countries does have the highest correlation or the highest impact, in contributing for the high individual errors, or deviations from the sample mean. The

model taking budget deficit as the independent variable resulted to be very weak. The assumption that the ratings made by the two agencies could have a large impact on the budget deficit of a country, resulted to be non realistic. The analysis is explained just 37% from the independent variables, and that is the reason why the expectations do not fall within the expected levels, but go beyond boundaries. The p value from Hausmann test, with a value less than 0.05 makes it obligatory to perform the fixed effect model. The R-squared from within countries is 33%, and for the within and overall is very low. The model can be seen as non significant; not being fully able to be explained by the independent variables.

The dummy variable is constructed with the PIIGS countries, taking budget deficit as the dependent variable. Also, for each of the independent variables is made an analysis relevant to the dependent variable and to the respective countries. In the dummy variable for the PIIGS countries: Greece (taken as the reference country), Ireland, Italy, Portugal and Spain, the test resulted to be significant. For the dummy variable the fixed effect model is the appropriate. Ireland, Portugal and Spain are the countries having the most influential impacts within the model. What is interesting is that the Fitch and Standard and Poor's variables result to have different impacts on the budget deficit. Fitch has a positive impact, while the Standard and Poor's having a negative impact. Trade balance is analyzed in terms of budget deficit as a fixed effect model. The R square for the between countries is the highest, being 100%. Spain and Ireland have negative coefficients when taken as referring to Greece. The public debt variable analysis shows a 52% R square. Again Ireland and Spain have the negative coefficients, implying a negative impact on the budget deficit. The same thing can be concluded for the other variables: bond yield, unemployment. For the Fitch and Standard and Poor's variables the coefficients turn to be positive and having similarities. The impact is positive in the budget deficit, meaning decreasing the deficit.

## References


Adams, P (1991), ‘‘Odious Debt: Loose Lending, Corruption, and the Third World’s Environmental Legacy’’. London: Earthsacn.

Ahearne, A. (2006), ‘‘The Euro: Only for the Agile”, Bruegelpolicybrief, No.1.

Arestis, P. and Sawyer, M. (2002). “European Integration and the ‘Euro Project’ Policy Note’’. No.3, the Levy Institute of Economics of Bard College.

Artus, P. (2011), ‘‘A two tier Europe: How can this be overcome?’’ Flash Economics, Economic Research.

Bernanke, B. (1983), “Non-Monetary Effects of the Financial Crisis in the Propagation of the Great Depression,”. American Economic Review, Vol. 73 (June), pp. 257–76.

Bustillo, I. and Velloso, H. (2000), “Bond market for Latin America debt in the 1990s” Cepal Eclac, Temas de Coyuntura, Santiago.

Burgess, M. (1996), ‘‘Introduction: Federalism and Building the European Union’’. Publius: The Journal of Federalism 26:1-15.

Guttmann, R. et Plihon, D. ‘‘Whiter the Euro? History and Crisis of Europe’s Single-Currency Project’’.

Gros, D. (2011), ‘‘External versus Domestic Debt in the Euro Crisis’’. Ceps Policy Brief, Thinking Ahead for Europe, No. 243, website http://www.ceps.eu.

King, J. (2003), ‘‘The Doctrine of Odious Debt under International Law: Definition, Evidence and Issues concerning Application, in Advancing the Odious Debt Doctrine”. Cisdl Working Paper.

Fitoussi, J. and Saraceno, F. (2010) “Europe: How Deep Is a Crisis?, Policy Responses and Structural Factors behind Diverging Performances”. Journal of Globalization and Development: Vol. 1: Iss. 1, Article 17. http://www.bepress.com/jgd/vol1/iss1/art1722

IMF, (2008), ‘‘Global Financial Stability Report (Washington), October’’.

Cardarelli, R. L. S., and Elekdag, S., (2008), “Financial Stress and Economic Downturns, in World Economic Outlook” (Washington: IMF).

Mathieu, C. and Sterdyniak, H., (2003), “Reforming the Stability and Growth Pact”.

Mathieu, C. and Sterdyniak, H., (2006), “A European Fiscal Framework designed for stability or growth, in European Economic Policies -Alternatives to Orthodox Analysis and Policy Concepts”.

Mathieu, C. and Sterdyniak, H., (2007), ‘‘How to deal with economic divergences in EMU? ”. Intervention Journal of Economics, Volume 4, n° 2.

Palley, T. (2007), ‘‘Financialization: What it is and Why it Matters’’. Working Papers n. 525, The Levy Economics Institut of Bard College.

Palley, T., (2011), ‘’Monetary Union Stability: The Need for a Government Banker and the Case for a European Public Finance Authority.’’ Working Paper. Macroeconomic Policy Institute.

Wade, R., (2004), “Is Globalization Reducing Poverty and Inequality?”. World Development 32(4): 567-589.

**Articles cited:**

Banking Inquiry Commission Report (2011), ‘‘Misjudging risk: Causes of the systemic Banking Crisis in Ireland’’.

Killian, S et al. (2011), ‘‘An Audit of Irish Debt. University of Limerick’’

Kitchin, R et al. (2011), ‘‘A Haunted Landscape: Housing and Ghost Estates in Post-Celtic Tiger Ireland’’. NIRSA Working Paper.

Ó Riain, S., (2009), ‘‘Banks, the State and Finance 1998-2007’’. NUI Maynooth.

Whelan, K., (2011), ‘‘Ireland’s Sovereign Debt Crisis’’.

**Websites:**

http://www.forbes.com/fdc/welcome_mjx.shtml

http://www.ecb.europa.eu/home/html/index.en.html

http://www.npr.org/blogs/money/2012/06/04/154282337/the-crisis-in-europe-explained

http://books.google.al/books?id=TCg02e-tI_cC&pg=PA82&lpg=PA82&dq=interpreting+sigma_u+sigma_e+stata&source=bl&ots=2GhqhNHiqb&sig=qMgdi-O7JOlhEvUZsmPZsMAx3kE&hl=en&sa=X&ei=VguaUoW1GIK44ASU7oGYBw&ved=0CDEQ6AEwAjgK#v=onepage&q=interpreting%20sigma_u%20sigma_e%20stata&f=false).

https://www.khanacademy.org/economics-finance-domain/core-finance/money-and-banking/greek-debt-crisis/v/why-europe-is-worried-about-greece

http://www.stata.com/support/faqs/statistics/between-estimator/

http://dss.princeton.edu/online_help/stats_packages/stata/panel.htm

http://www.agecon.ksu.edu/support/Stata11Manual/xt.pdf

https://sites.google.com/site/econometricsacademy/econometrics-models/panel-data-models

# Appendices:

**Appendix 1 Ratings converted to numerical values**

| S&P | | Fitch | Conversion |
|---|---|---|---|
| AAA | 4.2 | AAA | High grade |
| AA+ | 4 | AA+ | High grade |
| AA | 3.8 | AA | Upper Medium grades |
| AA- | 3.6 | AA- | Upper Medium grades |
| A+ | 3.4 | A+ | Upper Medium grades |
| A | 3.2 | A | Upper Medium grades |
| A- | 3 | A- | Upper Medium grades |
| BBB+ | 2.8 | BBB+ | Lower Medium grades |
| BBB | 2.6 | BBB | Lower Medium grades |
| BBB- | 2.4 | BBB- | Lower Medium grades |
| BB+ | 2.2 | BB+ | Speculative |
| BB | 2 | BB | Speculative |
| BB- | 1.8 | BB- | Speculative |
| B+ | 1.6 | B+ | Speculative |
| B | 1.4 | B | Speculative |
| B- | 1.2 | B- | Speculative |
| CCC+ | 1 | CCC | Extremely Speculative |
| CCC | | | Extremely Speculative |
| CCC- | | | Extremely Speculative |
| CC | | | Extremely Speculative |

| | | | |
|---|---|---|---|
| D | 0 | DDD | Default |

## Appendix 2 The data base for the model

| Country | id | t | tb | pd | by | un | fitch | sp | crisis |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 1,00 | 2001,00 | 2,20 | 66,80 | 5,08 | 3,60 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2002,00 | 4,80 | 66,20 | 4,96 | 4,20 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2003,00 | 3,50 | 65,30 | 4,14 | 4,30 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2004,00 | 3,80 | 64,70 | 4,13 | 4,90 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2005,00 | 4,00 | 64,20 | 3,39 | 5,20 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2006,00 | 5,10 | 62,30 | 3,80 | 4,80 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2007,00 | 5,70 | 60,20 | 4,30 | 4,40 | 3,80 | 4,20 | 1,00 |
| Austria | 1,00 | 2008,00 | 5,80 | 63,80 | 4,36 | 3,80 | 3,80 | 4,20 | 1,00 |
| Austria | 1,00 | 2009,00 | 4,50 | 69,20 | 3,94 | 4,80 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2010,00 | 4,20 | 72,00 | 3,23 | 4,40 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2011,00 | 3,30 | 72,50 | 3,32 | 4,20 | 3,80 | 4,20 | 0,00 |
| Austria | 1,00 | 2012,00 | 3,80 | 73,20 | 2,37 | 4,30 | 3,80 | 4,00 | 0,00 |
| Belgium | 2,00 | 2001,00 | 3,60 | 106,50 | 5,13 | 6,60 | 3,80 | 4,00 | 0,00 |
| Belgium | 2,00 | 2002,00 | 5,70 | 103,40 | 4,99 | 7,50 | 3,80 | 4,00 | 0,00 |
| Belgium | 2,00 | 2003,00 | 5,40 | 98,40 | 4,18 | 8,20 | 3,80 | 4,00 | 0,00 |
| Belgium | 2,00 | 2004,00 | 4,90 | 94,00 | 4,15 | 8,40 | 3,80 | 4,00 | 0,00 |
| Belgium | 2,00 | 2005,00 | 3,90 | 92,00 | 3,43 | 8,50 | 3,80 | 4,00 | 0,00 |
| Belgium | 2,00 | 2006,00 | 3,80 | 88,00 | 3,82 | 8,30 | 4,00 | 4,00 | 0,00 |
| Belgium | 2,00 | 2007,00 | 3,80 | 84,00 | 4,33 | 7,50 | 4,00 | 4,00 | 1,00 |
| Belgium | 2,00 | 2008,00 | 0,90 | 89,20 | 4,42 | 7,00 | 4,00 | 4,00 | 1,00 |
| Belgium | 2,00 | 2009,00 | 2,70 | 95,70 | 3,90 | 7,90 | 4,00 | 4,00 | 0,00 |
| Belgium | 2,00 | 2010,00 | 2,30 | 95,60 | 3,46 | 8,30 | 4,00 | 4,00 | 0,00 |
| Belgium | 2,00 | 2011,00 | 1,20 | 97,80 | 4,23 | 7,20 | 4,00 | 3,80 | 0,00 |
| Belgium | 2,00 | 2012,00 | 1,30 | 99,80 | 3,00 | 7,60 | 3,80 | 3,80 | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Bulgaria** | 3,00 | 2001,00 | -9,40 | 66,00 | 6,18 | 19,50 | **2,00** | **2,00** | 0,00 |
| **Bulgaria** | 3,00 | 2002,00 | -8,10 | 52,20 | 5,90 | 18,20 | **2,00** | **2,20** | 0,00 |
| **Bulgaria** | 3,00 | 2003,00 | -10,30 | 44,20 | 6,45 | 13,70 | **2,20** | **2,40** | 0,00 |
| **Bulgaria** | 3,00 | 2004,00 | -11,50 | 36,90 | 5,36 | 12,10 | **2,40** | **2,60** | 0,00 |
| **Bulgaria** | 3,00 | 2005,00 | -15,10 | 27,50 | 3,87 | 10,10 | **2,60** | **2,80** | 0,00 |
| **Bulgaria** | 3,00 | 2006,00 | -17,60 | 21,60 | 4,18 | 9,00 | **2,60** | **2,80** | 0,00 |
| **Bulgaria** | 3,00 | 2007,00 | -19,70 | 17,20 | 4,54 | 6,90 | **2,60** | **2,80** | 1,00 |
| **Bulgaria** | 3,00 | 2008,00 | -20,50 | 13,70 | 5,38 | 5,60 | **2,60** | **2,60** | 1,00 |
| **Bulgaria** | 3,00 | 2009,00 | -8,80 | 14,60 | 7,22 | 6,80 | **2,40** | **2,60** | 0,00 |
| **Bulgaria** | 3,00 | 2010,00 | -1,90 | 16,20 | 6,01 | 10,30 | **2,40** | **2,60** | 0,00 |
| **Bulgaria** | 3,00 | 2011,00 | 0,00 | 16,30 | 5,36 | 11,30 | **2,40** | **2,60** | 0,00 |
| **Bulgaria** | 3,00 | 2012,00 | -3,70 | 18,50 | 4,50 | 12,30 | **2,40** | **2,60** | 0,00 |
| **Cyprus** | 4,00 | 2001,00 | 2,10 | 61,30 | 7,63 | 3,90 | **3,40** | **3,20** | 0,00 |
| **Cyprus** | 4,00 | 2002,00 | -1,50 | 65,40 | 5,70 | 3,50 | **3,40** | **3,20** | 0,00 |
| **Cyprus** | 4,00 | 2003,00 | -1,20 | 69,40 | 4,74 | 4,10 | **3,40** | **3,40** | 0,00 |
| **Cyprus** | 4,00 | 2004,00 | -2,40 | 71,20 | 5,80 | 4,60 | **3,40** | **3,40** | 0,00 |
| **Cyprus** | 4,00 | 2005,00 | -2,50 | 69,80 | 5,16 | 5,30 | **3,40** | **3,20** | 0,00 |
| **Cyprus** | 4,00 | 2006,00 | -3,70 | 64,40 | 4,13 | 4,60 | **3,80** | **3,20** | 0,00 |
| **Cyprus** | 4,00 | 2007,00 | -6,20 | 58,50 | 4,48 | 3,90 | **3,60** | **3,20** | 1,00 |
| **Cyprus** | 4,00 | 2008,00 | -11,10 | 48,90 | 4,60 | 3,70 | **3,60** | **3,40** | 1,00 |
| **Cyprus** | 4,00 | 2009,00 | -5,70 | 58,50 | 4,60 | 5,40 | **3,60** | **3,40** | 0,00 |
| **Cyprus** | 4,00 | 2010,00 | -6,20 | 61,30 | 4,60 | 6,30 | **3,60** | **3,20** | 0,00 |
| **Cyprus** | 4,00 | 2011,00 | -4,30 | 71,10 | 5,79 | 7,90 | **2,60** | **2,60** | 0,00 |
| **Cyprus** | 4,00 | 2012,00 | 0,10 | 85,80 | 7,00 | 11,90 | **1,80** | **1,00** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Czech Rep** | 5,00 | 2001,00 | -1,50 | 25,50 | 6,31 | 8,10 | **2,80** | **3,40** | 0,00 |
| **Czech Rep** | 5,00 | 2002,00 | -1,20 | 26,40 | 4,88 | 7,30 | **2,00** | **3,40** | 0,00 |
| **Czech Rep** | 5,00 | 2003,00 | -1,20 | 28,10 | 4,12 | 7,80 | **3,00** | **3,40** | 0,00 |
| **Czech Rep** | 5,00 | 2004,00 | 0,90 | 30,30 | 4,82 | 8,30 | **3,00** | **3,20** | 0,00 |
| **Czech Rep** | 5,00 | 2005,00 | 2,70 | 29,20 | 3,54 | 7,90 | **3,20** | **3,20** | 0,00 |
| **Czech Rep** | 5,00 | 2006,00 | 3,00 | 29,20 | 3,80 | 7,10 | **3,20** | **3,20** | 0,00 |
| **Czech Rep** | 5,00 | 2007,00 | 2,70 | 29,10 | 4,30 | 5,30 | **3,20** | **3,40** | 1,00 |
| **Czech Rep** | 5,00 | 2008,00 | 2,40 | 26,60 | 4,63 | 4,40 | **3,40** | **3,40** | 1,00 |
| **Czech Rep** | 5,00 | 2009,00 | 4,00 | 34,20 | 4,84 | 6,70 | **3,40** | **3,40** | 0,00 |
| **Czech Rep** | 5,00 | 2010,00 | 3,20 | 38,20 | 3,88 | 7,30 | **3,40** | **3,40** | 0,00 |
| **Czech Rep** | 5,00 | 2011,00 | 4,00 | 39,10 | 3,71 | 6,70 | **3,40** | **3,80** | 0,00 |
| **Czech Rep** | 5,00 | 2012,00 | 5,30 | 45,90 | 2,78 | 7,00 | **3,40** | **3,80** | 0,00 |
| **Denmark** | 6,00 | 2001,00 | 6,60 | 49,70 | 5,08 | 4,50 | **4,00** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2002,00 | 5,80 | 49,50 | 5,06 | 4,60 | **4,00** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2003,00 | 6,30 | 47,10 | 4,31 | 5,40 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2004,00 | 4,90 | 45,10 | 4,31 | 5,50 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2005,00 | 4,90 | 37,70 | 3,40 | 4,80 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2006,00 | 3,20 | 32,10 | 3,81 | 3,90 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2007,00 | 2,30 | 27,10 | 4,29 | 3,80 | **4,20** | **4,20** | 1,00 |
| **Denmark** | 6,00 | 2008,00 | 3,20 | 33,40 | 4,29 | 3,40 | **4,20** | **4,20** | 1,00 |
| **Denmark** | 6,00 | 2009,00 | 3,90 | 40,70 | 3,59 | 6,00 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2010,00 | 5,60 | 42,70 | 2,93 | 7,50 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2011,00 | 5,20 | 46,50 | 2,73 | 7,60 | **4,20** | **4,20** | 0,00 |
| **Denmark** | 6,00 | 2012,00 | 4,40 | 45,60 | 1,40 | 7,50 | **4,20** | **4,20** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Finland** | 7,00 | 2001,00 | 9,40 | 42,50 | 5,04 | 9,10 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2002,00 | 9,20 | 41,50 | 4,98 | 9,10 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2003,00 | 6,80 | 44,50 | 4,13 | 9,00 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2004,00 | 6,50 | 44,40 | 4,11 | 8,80 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2005,00 | 4,10 | 41,70 | 3,35 | 8,40 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2006,00 | 4,70 | 39,60 | 3,78 | 7,70 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2007,00 | 5,10 | 35,20 | 4,29 | 6,90 | **4,20** | **4,20** | 1,00 |
| **Finland** | 7,00 | 2008,00 | 3,80 | 33,90 | 4,29 | 6,40 | **4,20** | **4,20** | 1,00 |
| **Finland** | 7,00 | 2009,00 | 1,60 | 43,50 | 3,74 | 8,20 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2010,00 | 1,30 | 48,60 | 3,01 | 8,40 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2011,00 | -0,70 | 49,00 | 3,01 | 7,80 | **4,20** | **4,20** | 0,00 |
| **Finland** | 7,00 | 2012,00 | -0,60 | 53,00 | 1,89 | 7,70 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2001,00 | 1,10 | 56,90 | 4,94 | 8,20 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2002,00 | 1,50 | 59,00 | 4,86 | 8,30 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2003,00 | 0,90 | 63,20 | 4,13 | 8,90 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2004,00 | 0,40 | 65,00 | 4,10 | 9,30 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2005,00 | -0,60 | 66,70 | 3,41 | 9,30 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2006,00 | -1,00 | 64,00 | 3,80 | 9,20 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2007,00 | -1,50 | 64,20 | 4,30 | 8,40 | **4,20** | **4,20** | 1,00 |
| **France** | 8,00 | 2008,00 | -2,10 | 68,20 | 4,23 | 7,80 | **4,20** | **4,20** | 1,00 |
| **France** | 8,00 | 2009,00 | -1,80 | 79,20 | 3,65 | 9,50 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2010,00 | -2,20 | 82,40 | 3,12 | 9,70 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2011,00 | -2,80 | 85,80 | 3,32 | 9,60 | **4,20** | **4,20** | 0,00 |
| **France** | 8,00 | 2012,00 | -2,10 | 90,20 | 2,54 | 10,30 | **4,00** | **4,00** | 0,00 |
| **Germany** | 9,00 | 2001,00 | 2,00 | 59,10 | 4,80 | 7,90 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2002,00 | 4,50 | 60,70 | 4,78 | 8,70 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2003,00 | 3,90 | 64,40 | 4,07 | 9,80 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2004,00 | 5,00 | 66,20 | 4,04 | 10,50 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2005,00 | 5,20 | 68,50 | 3,35 | 11,30 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2006,00 | 5,60 | 68,00 | 3,76 | 10,30 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2007,00 | 7,00 | 65,20 | 4,22 | 8,70 | **4,20** | **4,20** | 1,00 |
| **Germany** | 9,00 | 2008,00 | 6,30 | 66,80 | 3,98 | 7,50 | **4,20** | **4,20** | 1,00 |
| **Germany** | 9,00 | 2009,00 | 4,90 | 74,50 | 3,22 | 7,80 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2010,00 | 5,60 | 82,40 | 2,74 | 7,10 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2011,00 | 5,10 | 80,40 | 2,61 | 5,90 | **4,20** | **4,20** | 0,00 |
| **Germany** | 9,00 | 2012,00 | 5,70 | 81,90 | 1,50 | 5,50 | **4,20** | **4,20** | 0,00 |
| **Greece** | 10,00 | 2001,00 | -13,20 | 103,70 | 5,30 | 10,70 | **3,20** | **3,20** | 0,00 |
| **Greece** | 10,00 | 2002,00 | -13,50 | 101,70 | 5,12 | 10,30 | **3,20** | **3,20** | 0,00 |
| **Greece** | 10,00 | 2003,00 | -12,30 | 97,40 | 4,27 | 9,70 | **3,40** | **3,40** | 0,00 |
| **Greece** | 10,00 | 2004,00 | -10,10 | 98,90 | 4,26 | 10,50 | **3,20** | **3,20** | 0,00 |
| **Greece** | 10,00 | 2005,00 | -9,30 | 101,20 | 3,59 | 9,90 | **3,20** | **3,20** | 0,00 |
| **Greece** | 10,00 | 2006,00 | -11,40 | 107,50 | 4,07 | 8,90 | **3,20** | **3,20** | 0,00 |
| **Greece** | 10,00 | 2007,00 | -14,10 | 107,20 | 4,50 | 8,30 | **3,20** | **3,20** | 1,00 |
| **Greece** | 10,00 | 2008,00 | -14,50 | 112,90 | 4,80 | 7,70 | **3,20** | **3,20** | 1,00 |
| **Greece** | 10,00 | 2009,00 | -11,50 | 129,70 | 5,17 | 9,50 | **2,80** | **2,80** | 0,00 |
| **Greece** | 10,00 | 2010,00 | -9,30 | 148,30 | 9,09 | 12,60 | **2,40** | **2,20** | 0,00 |
| **Greece** | 10,00 | 2011,00 | -8,10 | 170,30 | 15,75 | 17,70 | **1,00** | **1,00** | 0,00 |
| **Greece** | 10,00 | 2012,00 | -5,00 | 156,90 | 22,50 | 24,30 | **1,00** | **1,20** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Hungary** | 11,00 | 2001,00 | -1,00 | 55,10 | 7,95 | 5,60 | **3,00** | **3,40** | 0,00 |
| **Hungary** | 11,00 | 2002,00 | -1,90 | 57,50 | 7,09 | 5,60 | **3,00** | **3,20** | 0,00 |
| **Hungary** | 11,00 | 2003,00 | -3,80 | 56,60 | 6,82 | 5,80 | **3,00** | **3,20** | 0,00 |
| **Hungary** | 11,00 | 2004,00 | -3,60 | 60,90 | 8,19 | 6,10 | **3,00** | **3,20** | 0,00 |
| **Hungary** | 11,00 | 2005,00 | -2,10 | 60,50 | 6,60 | 7,20 | **3,00** | **3,00** | 0,00 |
| **Hungary** | 11,00 | 2006,00 | -0,90 | 69,20 | 7,12 | 7,50 | **2,80** | **2,80** | 0,00 |
| **Hungary** | 11,00 | 2007,00 | 0,90 | 66,40 | 6,74 | 7,40 | **2,80** | **2,80** | 1,00 |
| **Hungary** | 11,00 | 2008,00 | 0,50 | 68,80 | 8,24 | 7,80 | **2,60** | **2,60** | 1,00 |
| **Hungary** | 11,00 | 2009,00 | 4,90 | 82,70 | 9,12 | 10,00 | **2,60** | **2,40** | 0,00 |
| **Hungary** | 11,00 | 2010,00 | 6,50 | 81,10 | 7,28 | 11,20 | **2,40** | **2,40** | 0,00 |
| **Hungary** | 11,00 | 2011,00 | 6,70 | 72,30 | 7,64 | 10,90 | **2,40** | **2,20** | 0,00 |
| **Hungary** | 11,00 | 2012,00 | 7,80 | 78,40 | 7,89 | 10,90 | **2,20** | **2,00** | 0,00 |
| **Ireland** | 12,00 | 2001,00 | 15,50 | 35,20 | 5,01 | 3,90 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2002,00 | 17,20 | 32,00 | 5,01 | 4,50 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2003,00 | 16,00 | 30,70 | 4,13 | 4,60 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2004,00 | 14,90 | 29,50 | 4,08 | 4,50 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2005,00 | 11,70 | 27,30 | 3,33 | 4,40 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2006,00 | 9,60 | 24,60 | 3,77 | 4,50 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2007,00 | 9,00 | 25,10 | 4,31 | 4,70 | **4,20** | **4,20** | 0,00 |
| **Ireland** | 12,00 | 2008,00 | 9,10 | 44,50 | 4,53 | 6,40 | **3,20** | **4,20** | 1,00 |
| **Ireland** | 12,00 | 2009,00 | 16,10 | 64,80 | 5,23 | 12,00 | **3,60** | **3,80** | 1,00 |
| **Ireland** | 12,00 | 2010,00 | 18,80 | 92,10 | 5,74 | 13,90 | **2,80** | **3,20** | 0,00 |
| **Ireland** | 12,00 | 2011,00 | 22,00 | 106,40 | 9,60 | 14,70 | **2,80** | **2,80** | 0,00 |
| **Ireland** | 12,00 | 2012,00 | 24,10 | 117,60 | 6,17 | 14,70 | **2,80** | **2,80** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Italy** | 13,00 | 2001,00 | 1,40 | 108,30 | 5,19 | 9,00 | **3,80** | **3,80** | 0,00 |
| **Italy** | 13,00 | 2002,00 | 0,90 | 105,40 | 5,04 | 8,50 | **3,80** | **3,80** | 0,00 |
| **Italy** | 13,00 | 2003,00 | 0,50 | 104,10 | 4,25 | 8,40 | **3,80** | **3,80** | 0,00 |
| **Italy** | 13,00 | 2004,00 | 0,70 | 103,70 | 4,26 | 8,00 | **3,80** | **3,60** | 0,00 |
| **Italy** | 13,00 | 2005,00 | -0,10 | 105,70 | 3,56 | 7,70 | **3,80** | **3,60** | 0,00 |
| **Italy** | 13,00 | 2006,00 | -0,80 | 106,30 | 4,05 | 6,80 | **3,60** | **3,40** | 0,00 |
| **Italy** | 13,00 | 2007,00 | -0,30 | 103,30 | 4,49 | 6,10 | **3,60** | **3,40** | 1,00 |
| **Italy** | 13,00 | 2008,00 | -0,80 | 106,10 | 4,68 | 6,70 | **3,60** | **3,40** | 1,00 |
| **Italy** | 13,00 | 2009,00 | -0,50 | 116,40 | 4,31 | 7,80 | **3,60** | **3,40** | 0,00 |
| **Italy** | 13,00 | 2010,00 | -1,90 | 119,30 | 4,04 | 8,40 | **3,60** | **3,40** | 0,00 |
| **Italy** | 13,00 | 2011,00 | -1,50 | 120,80 | 5,42 | 8,40 | **3,40** | **3,20** | 0,00 |
| **Italy** | 13,00 | 2012,00 | 1,20 | 127,00 | 5,49 | 10,70 | **3,00** | **2,80** | 0,00 |
| **Latvia** | 14,00 | 2001,00 | -9,60 | 14,20 | 7,57 | 12,90 | **2,60** | **3,00** | 0,00 |
| **Latvia** | 14,00 | 2002,00 | -9,80 | 12,90 | 5,41 | 12,80 | **2,60** | **3,00** | 0,00 |
| **Latvia** | 14,00 | 2003,00 | -12,60 | 14,00 | 4,90 | 11,30 | **2,80** | **3,00** | 0,00 |
| **Latvia** | 14,00 | 2004,00 | -15,60 | 14,30 | 4,86 | 11,20 | **3,00** | **3,00** | 0,00 |
| **Latvia** | 14,00 | 2005,00 | -14,50 | 12,50 | 3,88 | 9,60 | **3,00** | **3,00** | 0,00 |
| **Latvia** | 14,00 | 2006,00 | -21,60 | 10,70 | 4,13 | 7,30 | **3,00** | **3,00** | 0,00 |
| **Latvia** | 14,00 | 2007,00 | -20,10 | 9,10 | 5,28 | 6,50 | **2,80** | **2,80** | 1,00 |
| **Latvia** | 14,00 | 2008,00 | -13,70 | 19,60 | 6,43 | 8,00 | **2,40** | **2,40** | 1,00 |
| **Latvia** | 14,00 | 2009,00 | -1,50 | 36,70 | 12,36 | 18,20 | **2,20** | **2,00** | 0,00 |
| **Latvia** | 14,00 | 2010,00 | -1,40 | 44,40 | 10,34 | 19,80 | **2,20** | **2,20** | 0,00 |
| **Latvia** | 14,00 | 2011,00 | -4,80 | 42,30 | 5,91 | 16,20 | **2,40** | **2,20** | 0,00 |
| **Latvia** | 14,00 | 2012,00 | -3,30 | 40,60 | 4,57 | 14,90 | **2,60** | **2,60** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lithuania** | 15,00 | 2001,00 | -5,50 | 23,30 | 8,15 | 17,40 | **2,40** | **2,80** | 0,00 |
| **Lithuania** | 15,00 | 2002,00 | -5,70 | 22,20 | 6,06 | 13,80 | **2,60** | **2,80** | 0,00 |
| **Lithuania** | 15,00 | 2003,00 | -5,90 | 21,00 | 5,32 | 12,40 | **2,60** | **3,00** | 0,00 |
| **Lithuania** | 15,00 | 2004,00 | -7,10 | 19,30 | 4,50 | 11,30 | **3,00** | **3,00** | 0,00 |
| **Lithuania** | 15,00 | 2005,00 | -7,10 | 18,30 | 3,70 | 8,00 | **3,00** | **3,00** | 0,00 |
| **Lithuania** | 15,00 | 2006,00 | -10,10 | 17,90 | 4,08 | 5,20 | **3,20** | **3,20** | 0,00 |
| **Lithuania** | 15,00 | 2007,00 | -13,30 | 16,80 | 4,55 | 3,80 | **3,20** | **3,20** | 1,00 |
| **Lithuania** | 15,00 | 2008,00 | -11,80 | 15,50 | 5,61 | 5,30 | **2,80** | **2,80** | 1,00 |
| **Lithuania** | 15,00 | 2009,00 | -1,80 | 29,30 | 14,00 | 13,60 | **2,60** | **2,60** | 0,00 |
| **Lithuania** | 15,00 | 2010,00 | -2,00 | 37,90 | 5,57 | 18,00 | **2,60** | **2,60** | 0,00 |
| **Lithuania** | 15,00 | 2011,00 | -2,80 | 38,50 | 5,16 | 15,30 | **2,60** | **2,60** | 0,00 |
| **Lithuania** | 15,00 | 2012,00 | 0,70 | 40,60 | 4,83 | 13,30 | **2,60** | **2,60** | 0,00 |
| **Luxembou** | 16,00 | 2001,00 | 17,60 | 6,30 | 4,86 | 1,90 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2002,00 | 19,60 | 6,30 | 4,70 | 2,60 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2003,00 | 23,80 | 6,10 | 3,32 | 3,80 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2004,00 | 24,20 | 6,30 | 2,84 | 5,00 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2005,00 | 25,50 | 6,10 | 2,41 | 4,60 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2006,00 | 30,80 | 6,70 | 3,30 | 4,60 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2007,00 | 32,30 | 6,70 | 4,46 | 4,20 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2008,00 | 30,00 | 14,40 | 4,61 | 4,90 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2009,00 | 32,20 | 15,30 | 4,23 | 5,10 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2010,00 | 32,10 | 19,20 | 3,17 | 4,60 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2011,00 | 31,20 | 18,30 | 2,92 | 4,80 | **4,20** | **4,20** | 0,00 |
| **Luxembou** | 16,00 | 2012,00 | 30,40 | 20,80 | 1,82 | 5,10 | **4,20** | **4,20** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Malta** | 17,00 | 2001,00 | -2,20 | 59,40 | 6,19 | 7,60 | **3,20** | **3,60** | 0,00 |
| **Malta** | 17,00 | 2002,00 | 3,70 | 56,60 | 5,82 | 7,40 | **3,20** | **3,60** | 0,00 |
| **Malta** | 17,00 | 2003,00 | 0,20 | 65,10 | 5,04 | 7,70 | **3,20** | **3,40** | 0,00 |
| **Malta** | 17,00 | 2004,00 | -2,30 | 68,80 | 4,69 | 7,20 | **3,20** | **3,20** | 0,00 |
| **Malta** | 17,00 | 2005,00 | -3,10 | 68,00 | 4,56 | 7,30 | **3,20** | **3,20** | 0,00 |
| **Malta** | 17,00 | 2006,00 | -4,70 | 62,50 | 4,32 | 6,90 | **3,20** | **3,20** | 0,00 |
| **Malta** | 17,00 | 2007,00 | -1,20 | 60,70 | 4,72 | 6,50 | **3,40** | **3,20** | 1,00 |
| **Malta** | 17,00 | 2008,00 | -1,80 | 60,90 | 4,81 | 6,00 | **3,40** | **3,20** | 1,00 |
| **Malta** | 17,00 | 2009,00 | -2,20 | 66,50 | 4,54 | 6,90 | **3,40** | **3,20** | 0,00 |
| **Malta** | 17,00 | 2010,00 | 1,40 | 67,30 | 4,19 | 6,90 | **3,40** | **3,20** | 0,00 |
| **Malta** | 17,00 | 2011,00 | 5,00 | 70,00 | 4,49 | 6,50 | **3,20** | **3,20** | 0,00 |
| **Malta** | 17,00 | 2012,00 | 5,70 | 71,60 | 4,13 | 6,40 | **3,20** | **3,00** | 0,00 |
| **Netherlan** | 18,00 | 2001,00 | 5,80 | 50,70 | 4,96 | 2,50 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2002,00 | 6,50 | 50,50 | 4,89 | 3,10 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2003,00 | 6,30 | 52,00 | 4,12 | 4,20 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2004,00 | 7,40 | 52,40 | 4,09 | 5,10 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2005,00 | 8,50 | 51,80 | 3,37 | 5,30 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2006,00 | 7,70 | 47,40 | 3,78 | 4,40 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2007,00 | 8,20 | 45,30 | 4,29 | 3,60 | **4,20** | **4,20** | 1,00 |
| **Netherlan** | 18,00 | 2008,00 | 8,30 | 58,50 | 4,23 | 3,10 | **4,20** | **4,20** | 1,00 |
| **Netherlan** | 18,00 | 2009,00 | 7,00 | 60,80 | 3,69 | 3,70 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2010,00 | 8,20 | 63,10 | 2,99 | 4,50 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2011,00 | 8,90 | 65,50 | 2,99 | 4,40 | **4,20** | **4,20** | 0,00 |
| **Netherlan** | 18,00 | 2012,00 | 8,80 | 71,20 | 1,93 | 5,30 | **4,20** | **4,20** | 0,00 |
| **Poland** | 19,00 | 2001,00 | -3,70 | 39,50 | 10,68 | 18,30 | **2,80** | **3,40** | 0,00 |
| **Poland** | 19,00 | 2002,00 | -3,50 | 40,40 | 7,36 | 20,00 | **2,80** | **3,20** | 0,00 |
| **Poland** | 19,00 | 2003,00 | -2,70 | 44,00 | 5,78 | 19,80 | **2,80** | **3,00** | 0,00 |
| **Poland** | 19,00 | 2004,00 | -2,40 | 50,60 | 6,90 | 19,10 | **2,80** | **3,00** | 0,00 |
| **Poland** | 19,00 | 2005,00 | -0,70 | 49,10 | 5,22 | 17,90 | **2,80** | **3,00** | 0,00 |
| **Poland** | 19,00 | 2006,00 | -1,80 | 48,50 | 5,23 | 13,90 | **2,60** | **3,00** | 0,00 |
| **Poland** | 19,00 | 2007,00 | -2,90 | 47,40 | 5,48 | 9,60 | **3,00** | **3,40** | 1,00 |
| **Poland** | 19,00 | 2008,00 | -4,00 | 39,80 | 6,07 | 7,10 | **3,00** | **3,40** | 1,00 |
| **Poland** | 19,00 | 2009,00 | 0,10 | 53,60 | 6,12 | 8,10 | **3,00** | **3,40** | 0,00 |
| **Poland** | 19,00 | 2010,00 | -1,20 | 55,10 | 5,78 | 9,70 | **3,00** | **3,40** | 0,00 |
| **Poland** | 19,00 | 2011,00 | -1,10 | 52,00 | 5,96 | 9,70 | **3,20** | **3,40** | 0,00 |
| **Poland** | 19,00 | 2012,00 | 0,30 | 57,10 | 5,00 | 10,10 | **3,20** | **3,20** | 0,00 |
| **Portugal** | 20,00 | 2001,00 | -10,20 | 53,80 | 5,16 | 4,60 | **3,80** | **3,80** | 0,00 |
| **Portugal** | 20,00 | 2002,00 | -8,30 | 56,80 | 5,01 | 5,70 | **3,80** | **3,80** | 0,00 |
| **Portugal** | 20,00 | 2003,00 | -6,80 | 59,40 | 4,18 | 7,10 | **3,80** | **3,80** | 0,00 |
| **Portugal** | 20,00 | 2004,00 | -8,30 | 61,90 | 4,14 | 7,50 | **3,80** | **3,80** | 0,00 |
| **Portugal** | 20,00 | 2005,00 | -9,40 | 67,70 | 3,44 | 8,60 | **3,80** | **3,60** | 0,00 |
| **Portugal** | 20,00 | 2006,00 | -8,70 | 69,40 | 3,92 | 8,60 | **3,80** | **3,60** | 0,00 |
| **Portugal** | 20,00 | 2007,00 | -8,00 | 68,40 | 4,42 | 8,90 | **3,80** | **3,60** | 1,00 |
| **Portugal** | 20,00 | 2008,00 | -10,10 | 71,70 | 4,52 | 8,50 | **3,80** | **3,60** | 1,00 |
| **Portugal** | 20,00 | 2009,00 | -7,40 | 83,70 | 4,21 | 10,60 | **3,80** | **3,40** | 0,00 |
| **Portugal** | 20,00 | 2010,00 | -7,70 | 94,00 | 5,40 | 12,00 | **3,40** | **3,00** | 0,00 |
| **Portugal** | 20,00 | 2011,00 | -4,40 | 108,30 | 10,24 | 12,90 | **2,20** | **2,40** | 0,00 |
| **Portugal** | 20,00 | 2012,00 | -0,50 | 123,70 | 10,55 | 15,90 | **2,20** | **2,00** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Romania** | 21,00 | 2001,00 | -7,60 | 24,10 | 7,06 | 6,60 | **1,40** | **1,60** | 0,00 |
| **Romania** | 21,00 | 2002,00 | -5,60 | 22,10 | 7,08 | 7,50 | **1,60** | **1,80** | 0,00 |
| **Romania** | 21,00 | 2003,00 | -7,50 | 19,60 | 7,05 | 6,80 | **2,00** | **2,20** | 0,00 |
| **Romania** | 21,00 | 2004,00 | -9,00 | 19,30 | 7,11 | 8,00 | **2,40** | **2,40** | 0,00 |
| **Romania** | 21,00 | 2005,00 | -10,20 | 15,50 | 6,99 | 7,20 | **2,40** | **3,00** | 0,00 |
| **Romania** | 21,00 | 2006,00 | -12,00 | 12,90 | 7,23 | 7,30 | **2,60** | **3,00** | 0,00 |
| **Romania** | 21,00 | 2007,00 | -13,90 | 11,80 | 7,13 | 6,40 | **2,60** | **3,00** | 1,00 |
| **Romania** | 21,00 | 2008,00 | -13,00 | 12,30 | 7,70 | 5,80 | **2,20** | **2,80** | 1,00 |
| **Romania** | 21,00 | 2009,00 | -6,00 | 23,70 | 9,69 | 6,90 | **2,20** | **2,80** | 0,00 |
| **Romania** | 21,00 | 2010,00 | -5,70 | 30,10 | 7,34 | 7,30 | **2,20** | **2,80** | 0,00 |
| **Romania** | 21,00 | 2011,00 | -5,30 | 34,00 | 7,29 | 7,40 | **2,40** | **2,80** | 0,00 |
| **Romania** | 21,00 | 2012,00 | -5,20 | 37,90 | 6,68 | 7,00 | **2,40** | **2,80** | 0,00 |
| **Slovakia** | 22,00 | 2001,00 | -8,10 | 49,50 | 8,04 | 19,50 | **2,20** | **3,00** | 0,00 |
| **Slovakia** | 22,00 | 2002,00 | -7,30 | 44,70 | 6,94 | 18,80 | **2,40** | **3,00** | 0,00 |
| **Slovakia** | 22,00 | 2003,00 | -1,90 | 42,70 | 4,99 | 17,70 | **2,60** | **3,00** | 0,00 |
| **Slovakia** | 22,00 | 2004,00 | -2,80 | 42,80 | 5,03 | 18,40 | **3,00** | **3,00** | 0,00 |
| **Slovakia** | 22,00 | 2005,00 | -4,70 | 34,80 | 3,52 | 16,40 | **3,20** | **3,20** | 0,00 |
| **Slovakia** | 22,00 | 2006,00 | -4,00 | 33,00 | 4,41 | 13,50 | **3,20** | **3,20** | 0,00 |
| **Slovakia** | 22,00 | 2007,00 | -1,10 | 29,80 | 4,49 | 11,20 | **3,20** | **3,20** | 1,00 |
| **Slovakia** | 22,00 | 2008,00 | -2,40 | 28,90 | 4,72 | 9,60 | **3,40** | **3,20** | 1,00 |
| **Slovakia** | 22,00 | 2009,00 | -0,50 | 35,60 | 4,71 | 12,10 | **3,40** | **3,40** | 0,00 |
| **Slovakia** | 22,00 | 2010,00 | -0,20 | 41,00 | 3,87 | 14,50 | **3,40** | **3,40** | 0,00 |
| **Slovakia** | 22,00 | 2011,00 | 0,60 | 43,30 | 4,45 | 13,70 | **3,40** | **3,40** | 0,00 |
| **Slovakia** | 22,00 | 2012,00 | 5,00 | 52,10 | 4,55 | 14,00 | **3,20** | **3,20** | 0,00 |
| **Slovenia** | 23,00 | 2001,00 | -0,80 | 26,40 | 5,97 | 6,20 | **3,20** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2002,00 | 1,20 | 27,30 | 5,54 | 6,30 | **3,20** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2003,00 | -0,20 | 26,90 | 6,40 | 6,70 | **3,20** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2004,00 | -1,30 | 27,30 | 4,68 | 6,30 | **3,60** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2005,00 | -0,40 | 26,80 | 3,81 | 6,50 | **3,60** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2006,00 | -0,50 | 26,40 | 3,85 | 6,00 | **3,80** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2007,00 | -1,70 | 23,10 | 4,53 | 4,90 | **3,80** | **3,80** | 1,00 |
| **Slovenia** | 23,00 | 2008,00 | -2,50 | 22,00 | 4,61 | 4,40 | **3,80** | **3,80** | 1,00 |
| **Slovenia** | 23,00 | 2009,00 | 2,00 | 35,00 | 4,38 | 5,90 | **3,80** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2010,00 | 1,00 | 38,60 | 3,83 | 7,30 | **3,80** | **3,80** | 0,00 |
| **Slovenia** | 23,00 | 2011,00 | 1,20 | 46,90 | 4,97 | 8,20 | **3,60** | **3,60** | 0,00 |
| **Slovenia** | 23,00 | 2012,00 | 4,00 | 54,10 | 4,40 | 8,90 | **3,00** | **3,20** | 0,00 |
| **Spain** | 24,00 | 2001,00 | -2,50 | 55,60 | 5,12 | 10,50 | **4,20** | **4,00** | 0,00 |
| **Spain** | 24,00 | 2002,00 | -2,10 | 52,60 | 4,96 | 11,40 | **4,20** | **4,00** | 0,00 |
| **Spain** | 24,00 | 2003,00 | -2,40 | 48,80 | 4,12 | 11,40 | **4,20** | **4,00** | 0,00 |
| **Spain** | 24,00 | 2004,00 | -4,00 | 46,30 | 4,10 | 10,90 | **4,20** | **4,20** | 0,00 |
| **Spain** | 24,00 | 2005,00 | -5,30 | 43,20 | 3,39 | 9,20 | **4,20** | **4,20** | 0,00 |
| **Spain** | 24,00 | 2006,00 | -6,40 | 39,70 | 3,79 | 8,50 | **4,20** | **4,20** | 0,00 |
| **Spain** | 24,00 | 2007,00 | -6,70 | 36,30 | 4,31 | 8,30 | **4,20** | **4,20** | 1,00 |
| **Spain** | 24,00 | 2008,00 | -5,80 | 40,20 | 4,37 | 11,30 | **4,20** | **4,20** | 1,00 |
| **Spain** | 24,00 | 2009,00 | -1,90 | 53,90 | 3,98 | 18,00 | **4,00** | **4,20** | 0,00 |
| **Spain** | 24,00 | 2010,00 | -2,20 | 61,50 | 4,25 | 20,10 | **4,00** | **3,80** | 0,00 |
| **Spain** | 24,00 | 2011,00 | -0,80 | 69,30 | 5,44 | 21,70 | **3,60** | **3,60** | 0,00 |
| **Spain** | 24,00 | 2012,00 | 1,00 | 84,20 | 5,85 | 25,00 | **2,60** | **2,40** | 0,00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sweden** | 25,00 | 2001,00 | 6,70 | 54,50 | 5,11 | 5,80 | **3,80** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2002,00 | 6,70 | 52,60 | 5,30 | 6,00 | **4,00** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2003,00 | 6,80 | 52,00 | 4,64 | 6,60 | **4,00** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2004,00 | 8,20 | 50,90 | 4,43 | 7,40 | **4,20** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2005,00 | 7,80 | 49,80 | 3,38 | 7,70 | **4,20** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2006,00 | 8,10 | 46,30 | 3,71 | 7,10 | **4,20** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2007,00 | 7,50 | 39,40 | 4,17 | 6,10 | **4,20** | **4,20** | 1,00 |
| **Sweden** | 25,00 | 2008,00 | 6,80 | 34,30 | 3,89 | 6,20 | **4,20** | **4,20** | 1,00 |
| **Sweden** | 25,00 | 2009,00 | 6,50 | 44,10 | 3,25 | 8,30 | **4,20** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2010,00 | 6,20 | 42,00 | 2,89 | 8,60 | **4,20** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2011,00 | 6,20 | 38,90 | 2,61 | 7,80 | **4,20** | **4,20** | 0,00 |
| **Sweden** | 25,00 | 2012,00 | 6,10 | 38,70 | 1,59 | 8,00 | **4,20** | **4,20** | 0,00 |

## Appendix 3 Fitch variable respective to budget deficit

| **fitch** | | | | | | |
|---|---|---|---|---|---|---|
| R square | within | 0,5549 | | | | |
| | between | 0,0201 | | | | |
| | overall | 0,0329 | | | | |
| | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| _Icountry_Ireland | 0 | Omitted | | | | |
| _Icountry_Italy | 0 | Omitted | | | | |
| _Icountry_Portugal | 0 | Omitted | | | | |
| _Icountry_Spain | 0 | Omitted | | | | |
| **fitch** | 1,336218 | 1,311409 | 1,02 | 0,313 | -1,297826 | 3,970261 |
| _Icountry_Ireland | 11,39331 | 2,203574 | 5,17 | 0 | 6,967301 | 15,81932 |
| _Icountry_Italy | -1,79991 | 5,003789 | -0,36 | 0,721 | -11,85031 | 8,250501 |
| _Icountry_Portugal | -0,92669 | 2,243311 | -0,41 | 0,681 | -5,432517 | 3,57913 |
| _Icountry_Spain | 6,050239 | 2,725748 | 2,22 | 0,031 | 0,5754141 | 11,52506 |
| _cons | -21,198 | 4,464562 | -4,75 | 0 | -30,16535 | -12,2307 |
| sigma_u | 21,24544 | | | | | |
| sigma_e | 3,730032 | | | | | |
| rho | 0,970097 | (fraction of variance due to u_i | | | | |

## Appendix 4 Standard and Poor's variable in respective to budget deficit

| **standard and poor's** | | | | | | |
|---|---|---|---|---|---|---|
| R square | within | 0,4063 | | | | |
| | between | 0,008 | | | | |
| | overall | 0,0196 | | | | |
| | | | | | | |
| bd | Coef. | Std Err | t | P>(t) | 95% Confidence interval | |
| _Icountry_Ireland | 0 | Omitted | | | | |
| _Icountry_Italy | 0 | Omitted | | | | |
| _Icountry_Portugal | 0 | Omitted | | | | |
| _Icountry_Spain | 0 | Omitted | | | | |
| **standard and poor's** | 1,465177 | 1,561616 | 0,94 | 0,353 | -1,67142 | 4,601775 |
| _Icountry_Ireland | 10,41017 | 2,753068 | 3,78 | 0 | 4,880469 | 15,93987 |
| _Icountry_Italy | -1,60488 | 4,786137 | -0,34 | 0,739 | -11,21812 | 8,008356 |
| _Icountry_Portugal | -0,1563 | 2,681232 | -0,06 | 0,954 | -5,541716 | 5,229109 |
| _Icountry_Spain | 4,470251 | 2,966717 | 1,51 | 0,138 | -1,488576 | 10,42908 |
| _cons | -20,5487 | 4,471278 | -4,6 | 0 | -29,52956 | -11,5679 |
| sigma_u | 19,18117 | | | | | |
| sigma_e | 4,307909 | | | | | |
| rho | 0,951981 | (fraction of variance due to u_i | | | | |