

# INVESTIGATING THE DETERMINANTS OF LONG-RUN SOVEREIGN RATING<sup>1</sup>

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## Abstract

The significance of sovereign rating for local and international investors is essential because in recent period many countries had problems concerning the payment of public loans. In most European Union countries government debt to GDP ratio exceeds the Maastricht ceiling and investors may be cautious at sovereign rating modifying. This paper focuses on long-run sovereign rating assigned by Standard & Poor's for European Union countries. We will use the regression analysis in order to investigate quantitative and qualitative determinants of long-run sovereign rating.

**Keywords:** regression analysis, public debt, European Union member states

**JEL classification:** C01, F34

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## 1. Introduction

In recent years many European Union countries faced problems regarding the payment of public loans. Long-run sovereign rating has a strong negative influence on yield spread of government bonds. As a consequence, public decision makers both from central

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and local administration have to concentrate on quantitative and qualitative determinants of long-run sovereign rating.

We consider that (Canuto, Santos and Porto, 2012), stated an appropriate definition for sovereign rating as sovereign risk ratings are qualitative assessments of the probability of default by central governments. (Afonso, Gomes and Rother, 2007) declared that sovereign credit ratings are a condensed assessment of a government's ability and willingness to repay its public debt both in principal and in interests on time.

Miricescu (2011) emphasized that Standard & Poor's has 7 marks for short-run rating scale, less than long-run ratings scale that has 22 marks, consistent with table 1.

**Table 1 - Long-run rating scale of Standard & Poor's**

<b>Investment grade</b>	AAA	AA+	AA	AA-	A+	
<b>Investment grade</b>	A	A-	BBB+	BBB	BBB-	
<b>Speculative grade</b>	BB+	BB	BB-	B+	B	B-
<b>Speculative grade</b>	CCC+	CCC	CCC-	CC	SD	D

*Source: Our results based on information provided by (Bran and Costică, 2003) and Standard & Poor's*

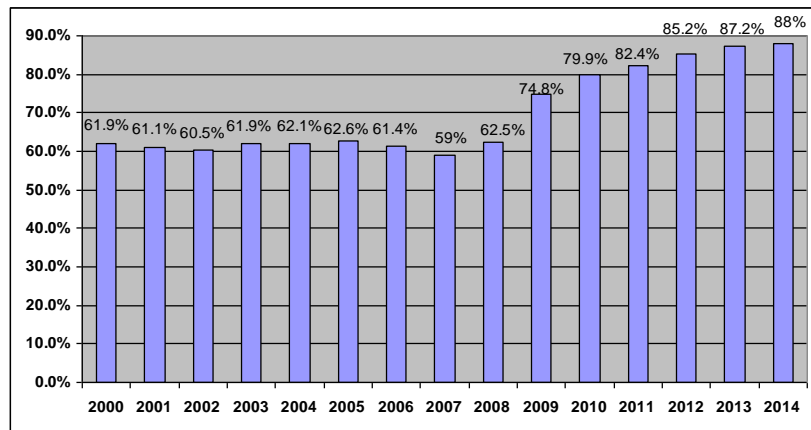
The paper is organised as follows: Section 2 reviews the literature regarding the determinants of long-run sovereign rating and describe the main issue, Section 3 presents research methodology and data sources, Section 4 analyzes the determinants of long-run sovereign rating for 28 EU member states and Section 5 concludes.

## **2. Literature review**

(Cantor and Packer's, 1996); (Monfort and Mulder, 2000); (Eliasson, 2002); (Borio and Packer, 2004); (Bissoondoyal-Bheenick, 2005); (Afonso, Gomes and Rother, 2007); (Afonso, Gomes and Rother, 2011); (Canuto, Santos and Porto, 2012) found determinants of long-run sovereign rating, of which we specify quantitative variables as: (i) GDP per capita, (ii) real GDP growth, (iii) government debt to GDP ratio, (iv) external debt, (v) government deficit/surplus, (vi) inflation, (vii) foreign exchange reserves to imports ratio and so on and qualitative variables as: (i) political stability, (ii) government effectiveness, (iii) control of corruption and the rest.

We will analyse government debt to GDP ratio, as a possible determinant of long-run sovereign rating. Also, interest rates apply to public loans remaining to be paid.

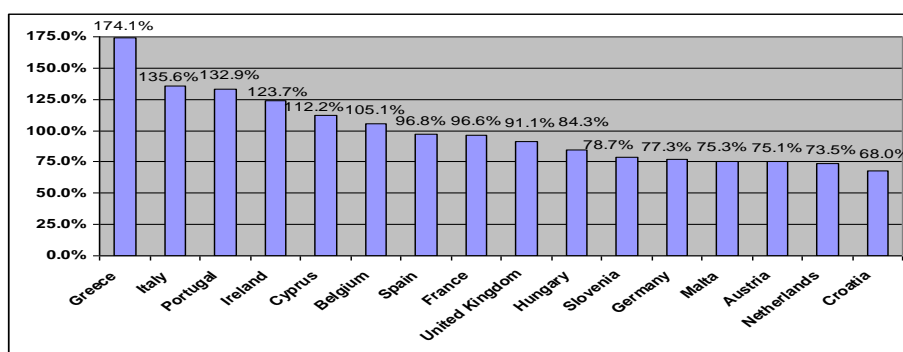
**Figure 1 – Government debt to GDP ratio in the European Union**



*Source: Our results based on data provided by EUROSTAT*

Following a relatively stagnation in the early 2000s, public debt burden increased sharply mainly during the last seven years. According to figure 1, in the European Union government debt to GDP ratio started from 61.9% in 2000 and attained to 88% in 2014. Data from figure 1 are since December of every year, excepting data from the end of the first quarter of 2014. As compared to 2000, the European Union countries registered an increase of 26.1 pp in their debt to GDP ratio at the first quarter of 2014.

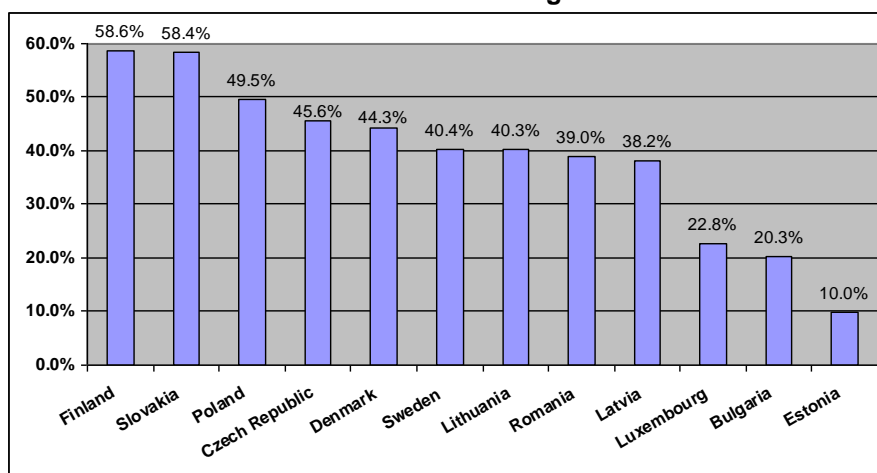
**Figure 2 - Government debt to GDP ratio in the countries beyond the Maastricht ceiling**



Source: Our results based on data provided by EUROSTAT

According to figure 2, in the first quarter of 2014 there are 16 EU member states with government debt to GDP ratio exceeding the Maastricht ceiling of 60%. For six of these countries (Greece, Italy, Portugal, Ireland, Cyprus and Belgium) the indicator is beyond 100%.

**Figure 3 - Government debt to GDP ratio in the countries below the Maastricht ceiling**



Source: Our results based on data provided by EUROSTAT

According to figure 3, in the first quarter of 2014 there are 12 EU member states with government debt to GDP ratio less than the Maastricht ceiling of 60%. For five of these countries (Romania, Bulgaria, Latvia, Lithuania and Sweden) the indicator is between 30% and 45%.

Latvia, Luxembourg, Bulgaria and Estonia) the indicator is beyond 40%.

The main issue of this paper is to find the most important determinants for long-run sovereign rating.

### **3. Methodology and data sources**

The analysis will be performed on annual data over the period 2000-2012 for 28 countries members of European Union by applying a regression analysis.

Long-run sovereign rating (Rating) is the dependent variable in our study and it is assigned by Standard & Poor's. In the mentioned above period, the ratings of European Union member states are from AAA to CC. In order to perform the regression analysis we achieved the linear transformation of long-run ratings, from qualitative variables in quantitative variables (see table 2):

**Table 2 – Linear transformation**

<b>RATING</b>	AAA	AA+	AA	AA-	A+	A	A-
<b>Transformation</b>	20	19	18	17	16	15	14
<b>RATING</b>	BBB+	BBB	BBB-	BB+	BB	BB-	B+
<b>Transformation</b>	13	12	11	10	9	8	7
<b>RATING</b>	B	B-	CCC+	CCC	CCC-	CC	
<b>Transformation</b>	6	5	4	3	2	1	

*Source: Our results based on data provided by Standard & Poor's*

After the linear transformation we applied the logistic transformation, according to (Afonso, Gomes and Rother, 2007).

We will use six quantitative and qualitative independent variables that are potential determinants of long-run sovereign rating:

- (i) GDP growth (%) – quantitative variable;
- (ii) GDP per capita (US\$) – quantitative variable;
- (iii) Inflation measured by the consumer price index (%) – quantitative variable;
- (iv) Unemployment (%) – quantitative variable;
- (v) Cash surplus/deficit (% of GDP) – quantitative variable;
- (vi) Internet users (per 100 people) – qualitative variable.

Our analysis used data published by official sources as it follows:

- i) GDP growth is from World Bank and OECD;
- (ii) GDP per capita is from World Bank and OECD;

- (iii) Inflation is from International Monetary Fund;
- (iv) Unemployment is from International Labour Organization;
- (v) Cash surplus/deficit is from International Monetary Fund, World Bank and OECD;
- (vi) Internet users' index is from International Telecommunication Union.

#### **4. Results obtained**

We expect that independent variables have the next influence on dependent variable:

- i) GDP growth – positive influence, as countries having economic growth have the chance to improve budgetary revenues;
- (ii) GDP per capita – positive influence, as in such countries both population and legal entities may sustain better public debt service. We used the logarithmic function in order to compare this index for all 28 EU member states.
- (iii) Inflation – negative influence, as the inflation decrease the purchasing power both of population and legal entities;
- (iv) Unemployment – negative influence, as the unemployment is the population without work but available for employment;
- (v) Cash surplus/deficit – positive influence, as such countries may sustain better public debt service;
- (vi) Internet users – positive influence, as usually population that use internet is better educated.

We analyzed for the entire period 2000-2012, if six qualitative and quantitative variables influences transformed long-run sovereign rating, by using data panel regression.

First, we performed the stationary analysis, and we used the test Im, Pesaran, Shin (see table 3) both for dependent variable and also for independent variable. The unemployment variable is not stationary because the significance level is higher than the threshold of 0.05. We will stationary the unemployment series by using the difference operator. The 1<sup>st</sup> difference of unemployment series provides a significance level lower than the threshold of 0.01 that indicates stationary series. The other variables are stationary because the significance level is lower than the threshold of 0.01.

**Table 3 – Im, Pesaran, Shin panel unit root test**

Variable	IPS statistic	Significance level
Rating - level	-2.6	0.00
GDP growth - level	-2.5	0.00
LN(GDP per capita) - level	-4.4	0.00
Inflation - level	-8.5	0.00
Unemployment - level	-0.7	0.23
Unemployment – 1 <sup>st</sup> difference	-2.5	0.00
Cash surplus/deficit - level	-3.1	0.00
Internet users - level	-8.9	0.00

Source: Our results

Second, we performed multiple iterations with the purpose to find the main determinants for long-run sovereign rating. The six independent variables have an explanatory power of 62.7%, but the public decision makers should focus only on a few variables in order to improve sovereign rating. Step by step, we eliminated from the regression model the following independent variables: GDP growth, Inflation, Cash surplus/deficit, Internet users.

**Table 4 – Data panel regression results**

Regression equation	
$\text{Rating}_t = -11.71 + 1.37 \ln(\text{GDP}/\text{capita}_t) - 0.17 \Delta \text{Unemployment}_t$	
(0.65)*	(0.07)* (0.03)*
Adjusted R Square	Significance level
57.26%	0.00

Source: Our results

\*Standard Error of OLS estimators, all estimators show significance at 1% level.  
For the entire period 2000-2012, F-values show significance at 1% level.

From the regression equation for the entire period 2000-2012 (see table 4), we found that logarithmic GDP per capita have a positive influence on transformed sovereign rating, and unemployment have a negative influence on transformed sovereign rating. The intensity relation between variables considered as panel data is strong as the model adjusted explanatory power is 57.26%.

## 5. Conclusions

Public decision makers should focus on improving both GDP per capita and employment rate in order to increase long-run sovereign rating. On the other side, long-run sovereign rating influence public debt interests and also public debt burden.

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