THE CORRELATION OF SOVEREIGN RATING AND BONDS' INTEREST RATE IN EU MEMBER STATES*

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Abstract

The importance of borrowing is fundamental for central public administration and it consists in sources of financing budget deficit and refinancing government debt. In the last years, a lot of countries had difficulties regarding the payment of public loans at their maturity due to the burden of government debt to GDP ratio. In this situation, investors lose their confidence not only in the country that is facing problems, but also in other states that pay their debt at maturity. For this reason, they are careful at any change that affects sovereign rating.

From our investigation we found that sovereign rating has a negative influence on bonds' interest rate. As such, decision makers from central public administration should focus on improving sovereign ratings in order to decrease interest rates.

Keywords: central public administration, sovereign rating, interest rate, financial market.

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1. Introduction

In contemporary days, the need of the governments to borrow money is generated by the increased demands from citizens to cover the collective needs as most countries had to spend more public money than the revenues collected through mandatory taxes, capital income, external grants and other financial resources (Miricescu, 2011). Văcărel *et al.* (2003) highlighted the need for borrowing as many countries around the world are confronted with the problem of public budget deficit. Whole loans borrowed by the government, local public administration authorities and by other public institutions, along with related interest and commissions which were not paid, represent the public debt at a certain time.

In terms of public borrowing importance, Stroe and Armeanu (2004) emphasized that the financing of temporary cash-flow problems and the budget deficit through loans instead of taxes shows some benefits, such as: efficiency, avoidance of social discontent, and relative decrease of fiscal effort over time. If interest rates are too high the government debt will increase rapidly. In this context, Văcărel *et al.* (2003) highlighted that the elevated level of interest rates collected on foreign loans contributed to the external debt crisis of developing countries. But Moşteanu *et al.* (2008) explained that because of the serious problems that faced some debtor countries, the Paris Club was founded within the international financial system that can restructure and even cancel public debt.

For Romania, sovereign rating has a particular significance, as in June 2014 from the total public administration debt 54.14% was borrowed from the external markets. We consider that an opportunity for central public administration to decrease interest rates is sovereign ratings improving with the purpose of reducing the public debt burden.

Figure 1 shows that government debt to GDP ratio in the Euro Area had an increasing trend, starting from 69.2% in 2000 and reaching 93.9% in 2014 Q1. Government debt to GDP ratio in the European Union started from 61.9% in 2000 and reached to 88% in 2014 Q1. Compared with 2000, the Euro Area member states increased with 24.7 percentage points (pp) in their debt to GDP ratio at the end of 2014 Q1. Compared with 2000, the European Union member states increased with 26.1 pp in their debt to GDP ratio at the end of 2014 Q1.

In our opinion, central public authorities should have a suitable management of public debt portfolio in order to better fulfil the citizens needs on long term.

Figure 2 shows that for 16 member states, government debt to GDP ratio exceeds the ceiling specified by Euro convergence Maastricht criteria (maximum 60%), and for 12 member states the index complies with Maastricht criteria. We find in Figure 2 that government debt to GDP ratio in the European Union member states at the end of 2014 Q1 varies from 174.1% in Greece to 10% in Estonia. In our view, large government debts lead to large interest expenses in the public budgets, and we study the influence of sovereign rating on bonds' interest rate.

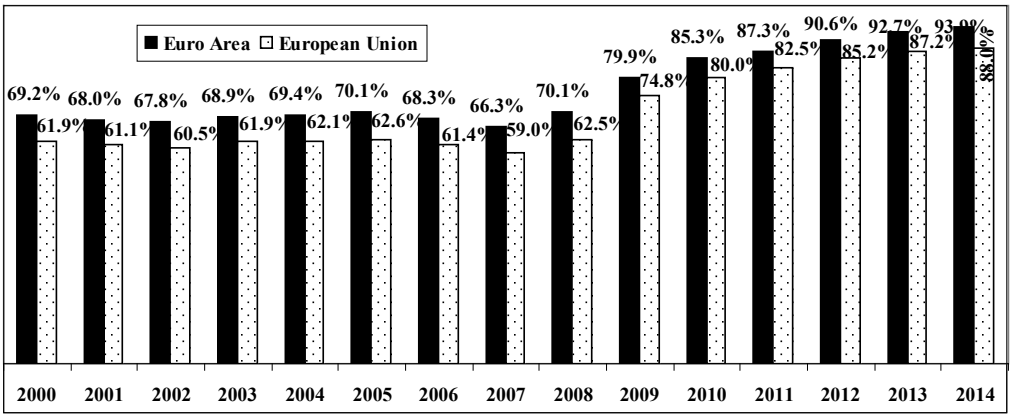

Figure 1: Government debt to GDP ratio in the Euro Area and in the European Union

Source: Our results based on data provided by Eurostat

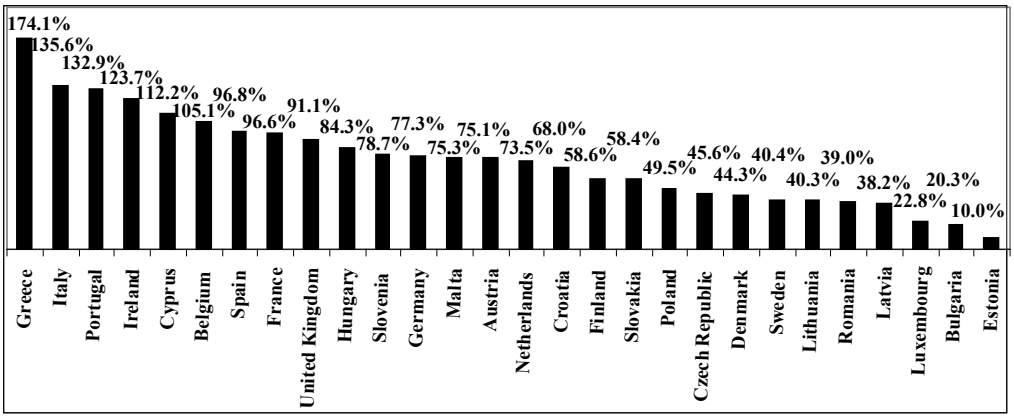

Figure 2: Government debt to GDP ratio in the EU member states at the end of 2014 Q1

Source: Our results based on data provided by Eurostat

Figure 3 shows that government debt to GDP ratio in Romania had an increasing trend, starting from 12.6% in 2007 and reaching to 38.4% in 2013. Debt interest to GDP ratio in Romania also had an increasing trend, starting from 0.7% in 2007 and reaching to 1.7% in 2013. So, government debt to GDP ratio increased faster than debt interest to GDP ratio, as a consequence of sovereign bonds' interest rate diminution.

Specialized global rating agencies are Standard & Poor's, Moody's Investor Services and Fitch Ratings. However, sovereign ratings are also provided by local or regional rating agencies, specialized services from banks, foreign trade agencies and finance journals (Miricescu, 2011).

Sovereign ratings split countries in two clusters: (i) investment grade with ratings equal to or above BBB- (for Standard & Poor's and Fitch Ratings) and Baa3 (for Moody's Investor Services); (ii) speculative grade with ratings equal to or below BB+ (for Standard & Poor's and Fitch Ratings) and Ba1 (for Moody's Investor Services).

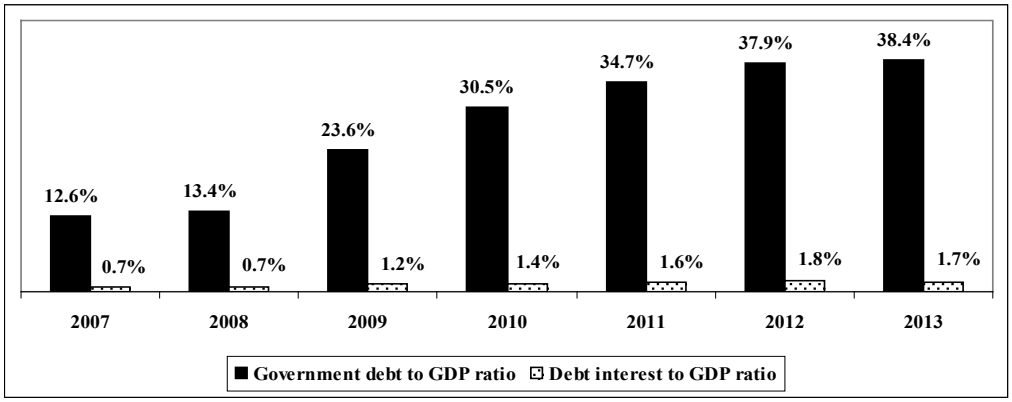

Figure 3: Government debt to GDP ratio and debt interest to GDP ratio in Romania

Source: Our results based on data provided by Eurostat

Table 1: Rating scale

Standard & Poor's	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB
Fitch	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB
Moody's	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2
Standard & Poor's	BB-	B+	B	B-	CCC+	CCC	CCC-	CC	-	SD	D	-
Fitch	BB-	B+	B	B-	CCC+	CCC	CCC-	CC	C	DDD	DD	D
Moody's	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca	-	C	C	C

Source: Our results based on data provided by Bran and Costică (2003) and rating agencies

An earlier version of this paper (Miricescu, 2012) was presented and published in the Proceedings of the 6th International Conference on Globalization and Higher Education in Economics and Business Administration. The paper is organized as follows: Section 2 reviews the existing financial literature regarding the correlation between sovereign ratings and the interest rate on sovereign bonds, Section 3 presents the database and research methodology used in our study, Section 4 analyzes the correlation between sovereign ratings and the interest rate on sovereign bonds for 25 developed and emerging EU member states and Section 5 concludes.

2. Literature review

In recent years, the correlation between sovereign rating and interest rates on bonds was studied in several quantitative papers; almost all the articles emphasize systematic analysis of sovereign ratings (Cantor and Packer, 1996). Sovereign ratings were established by the rating agencies Moody's and Standard & Poor's. Cantor and Packer's (1996) study was carried out on 49 developed and emerging countries by using a regression analysis having data for the 1987-1994 period. The authors stated that investors in sovereign bonds are excessively pessimistic, when countries with low credit ratings intend to issue government bonds on the international financial

market; investors also require high yields on such securities. In order to validate this conclusion, we mention that in July 2014 Romania obtained from Standard & Poor's an investment grade rating (BBB–) and borrowed money at 4,16% interest rate compared with Germany which obtained from Standard & Poor's an investment grade rating (AAA) and borrowed money at 1,11% interest rate.

Min (1998) analyzed determinants of difference between government bond yields in emerging economies and the US government bonds yields. The main factors identified as significant in economic terms were: (i) public debt to GDP ratio – positive influence, (ii) public debt service to exports – positive influence, (iii) net foreign assets to GDP ratio – negative influence, and (iv) international reserves to GDP ratio – negative influence. According to the author, the impact of sovereign ratings on yield spread of government bonds was high.

Reisen and von Maltzan (1999) examined the impact of changes in sovereign ratings on difference between government bond yields having 10 years maturity for 29 emerging economies and the US government bond. The sovereign ratings were established by the rating agencies Moody's, Standard & Poor's and Fitch. The article was carried out by using a sample panel data over the period 1989-1997. The authors concluded that the spreads of government bond yields had already varied before the change of sovereign ratings, namely the financial market anticipated in advance sovereign ratings' changes.

In our opinion, the changes in ratings are performed usually once a year (if it is necessary), but investors generally include gradually positive and negative perceptions on the issuers into bonds' price. There are relatively few examples of more than one rating change during a year.

According to Reisen and von Maltzan (1999), when sovereign rating decreased, the negative influence on bond yield spreads continued for about 20 days after the announcement of change. We believe that investors have confidence in opinions expressed by rating agencies, which are brought into the interest rates of sovereign issuers.

Beck (2001) used a panel data and showed that determinants of government bonds spreads are long-term variables, such as determinants of sovereign ratings and forecasts indicators for economic growth – negative influence, domestic inflation – positive influence and international interest rates – positive influence. The study was performed on nine emerging countries, including data over the period December 1998 – August 2000.

Kaminsky and Schmukler (2002) examined 16 emerging countries by using a panel data analysis with data over the period 1990-2000. Sovereign ratings were established by the rating agency Standard & Poor's. The authors concluded that sovereign ratings and outlooks of emerging countries influence government bond yields and also the bond yields of nearby countries – which are vulnerable on macroeconomic indicators. The influence of sovereign ratings and outlooks on government bond yields are stronger in the period of crisis. The reason for this correspondence is that economic trade increased between nearby countries, and the problems are almost the same.

Gonzalez *et al.* (2004) revealed that sovereign ratings have a moderate correlation with interest rate spreads and this correspondence is more evident for downgrades than for upgrades, and may be more significant for equity prices than for bond prices. Also, liquidity, taxation and historical volatility are determinants for spreads. The authors explain that the basic rationale for using ratings is to achieve information economies of scale and solve principal-agent problems.

Powell and Martinez (2008) revealed, by taking into consideration sovereign ratings which were established by rating agencies Moody's and Standard & Poor's, that a rating model should include: (i) variables of the real sector (economic growth level, GDP per capita, inflation and unemployment rate); (ii) external sector indicators (external debt, real exchange rate volatility and international reserves), (iii) variables that highlight the political and institutional environment (especially the effectiveness of government), and (iv) indicators of public debt and consolidated budget deficit. The scholars used a regression based on a structured data panel, which showed that sovereign ratings of emerging economies such as Brazil, Argentina, Mexico and Chile have a greater impact on the spread of Credit Default Swap than other financial factors such as: the yield of US T-bills and the yield index of US corporate bonds.

Hartelius, Kashiwase and Kodres (2008) carried out a study on 33 emerging economies and the US economy with data collected over the period January 1991 – February 2007. The authors used sovereign ratings established by the rating agency Standard & Poor's. The scholars found that the main determinants for emerging market spreads are both sovereign rating and the US interest rates.

Greenidge, Drakes and Craigwell (2010) explored empirically the causality direction between external debt and sovereign rating by using panel causality tests for 32 developed and emerging countries having data over the period 1998-2008. The authors used sovereign ratings established by the rating agency Standard & Poor's, and they concluded that there is a bidirectional causality relationship between external public debt and sovereign rating. The scholars highlighted that sovereign rating is one key element that determine if the lender provides the credit and the interest rate.

Jaramillo and Tejada (2011) emphasized that an investment grade sovereign rating is related to low interest rate spreads on financial markets. Based on a panel data analysis over the period 1997-2010 for 35 emerging economies, the researchers showed that sovereign investment grade rating reduces the interest rate spreads against a benchmark with almost 36% from the interest rate spreads involved by the macroeconomic fundamentals of these countries. Sahinoz and Gonenc (2011) examined for the period 1998-2008 18 emerging market economies in a panel data. The authors concluded that these countries should enhance the economic growth, reduce the public debt to GDP ratio and sustain the institutions' strength to facilitate recovering the sovereign ratings and to have lower interest rates.

Canuto, Santos and Porto (2012) analyzed for the period 1998-2002, 66 countries by using a panel data analysis. The authors used sovereign ratings established by Moody's, Standard & Poor's and Fitch. The authors emphasized that a high sovereign

rating (which involves a low sovereign risk) is the result of high per capita income, high economic growth and a low government debt. Thus, a low sovereign risk determines a low interest rate on government bonds.

Afonso, Gomes and Taamouti (2014) examined 21 EU countries from January 1995 until October 2011 in a panel data. The authors used sovereign ratings established by the rating agencies Standard & Poor's and Moody's and Fitch. The authors concluded that rating upgrades do not have any significant effect on volatility, but sovereign downgrades increase bonds volatility after two lags.

From the financial literature we conclude that sovereign rating has a major impact on interest rates of government bonds, especially in emerging countries which have frequently speculative ratings. In many cases, rating changes performed by rating agencies are already contained in sovereign interest rates. In this case, the interest rate change is small after the press announcement.

3. Database and methodology

Our investigation will be conducted on annual data (end of December of each year), over the period 2001-2013 for 25 countries members of European Union by applying a regression analysis. Of the 28 European Union member states we removed Germany, Estonia and Croatia. We excluded Germany because for this country the dependent variable is zero in all cases. According to European Central Bank, there are no Estonian sovereign debt securities that comply with the definition of long-term interest rates for convergence purposes, and no suitable proxy indicator has been identified; so we decided to eliminate Estonia from our analysis. We excluded Croatia from our analysis because for this country there are less data for long-term interest rates.

Independent variable is sovereign rating (RATING) established by the rating agency Standard & Poor's as a measure of risks associated to the borrower countries. Dependent variable (SP) is the spread between each member state long-term interest rate and Germany's long-term interest rate. Long-term interest rate represents a convergence criteria corresponding to sovereign bonds close to 10 years maturity. Afonso, Gomes and Taamouti (2014) used 10-year government bonds taken from Reuters for interest rate. We consider Germany's long-term interest rate to be a proxy for risk-free interest rate, as Germany has the highest GDP from the EU member states and Germany had in many investigated periods the lowest interest rates for sovereign bonds. Pungulescu (2013) also used German government bonds as benchmark rate, and she omitted Germany from the regressions.

Afonso, Gomes and Rother (2007) used a linear scale and they grouped the ratings in 17 categories, by putting together in the same bucket the few observations below B- (as presented in Table 2).

We analyzed 25 countries that had ratings ranging from AAA to CC, which leads to the following linear transformation, from qualitative variables in quantitative variables (Table 3).

Table 2: Linear transformation of ratings

RATING	AAA	AA+	AA	AA-	A+	A
Transformation (i)	17	16	15	14	13	12
RATING	A-	BBB+	BBB	BBB-	BB+	BB
Transformation (i)	11	10	9	8	7	6
RATING	BB-	B+	B	B-	below B-	
Transformation (i)	5	4	3	2	1	

Source: Afonso, Gomes and Rother (2007)

Table 3: Linear transformation of ratings

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

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

Figure 4 shows that sovereign rating correlates with interest rate spread in 2012.

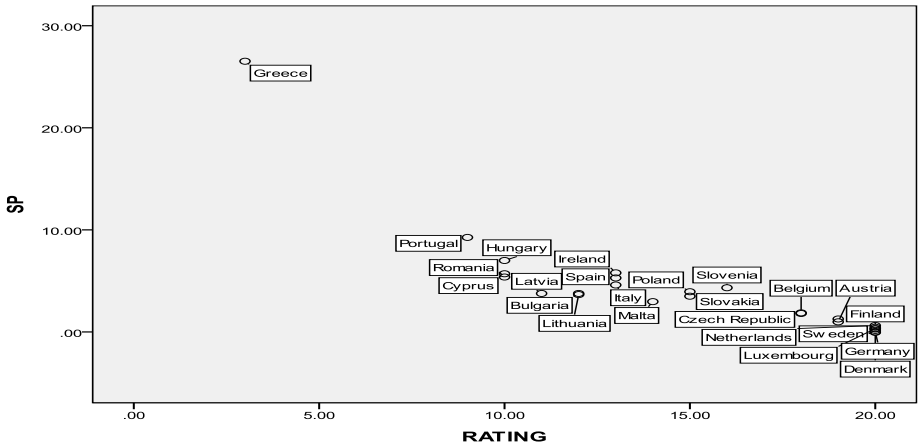

Figure 4: Analysis along with sovereign rating and interest rate spread in 2012

Source: Our results based on data provided by European Central Bank and Standard & Poor's

Afonso, Gomes and Rother (2007) emphasized that one alternative way to overcome the criticism of assuming that the distance between two notches is equal for every combination of sequential notches is to apply alternative transformations besides the usual linear one. The reason why they applied the logistic transformation is that at the middle of the scale, ratings can rise rather quickly, as the sovereigns deliver some improvements. Both at the bottom and the top end of the rating scale, the increase of an additional notch is slower, since the improvements are more demanding.

We adjusted and applied the logistic transformation described previously, as follows:

$SR=\ln[Rating_i/(1- Rating_i)]$, where, $Rating_i = (2 * i – 1)/(2 * n)$; in our study n = 20

Table 4: Logistic transformation of ratings

RATING	AAA	AA+	AA	AA-	A+	A	A-
Transformation (i)	20	19	18	17	16	15	14
SR	3.66	2.51	1.95	1.55	1.24	0.97	0.73
RATING	BBB+	BBB	BBB-	BB+	BB	BB-	B+
Transformation (i)	13	12	11	10	9	8	7
SR	0.51	0.30	0.10	-0.10	-0.30	-0.51	-0.73
RATING	B	B-	CCC+	CCC	CCC-	CC	
Transformation (i)	6	5	4	3	2	1	
SR	-0.97	-1.24	-1.55	-1.95	-2.51	-3.66	

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

Over the period 2001-2013, as a result of ratings logistic transformation, the rating ranges between -3.66 and 3.66. The independent variable (SR) in our model is related in 2012 to the following countries: (i) 3.66 to Germany, Luxembourg, Netherlands, Finland, Denmark, Sweden and the United Kingdom; (ii) 2.51 to France and Austria; (iii) 1.95 to Belgium and Czech Republic; (iv) 1.24 to Slovenia; (v) 0.97 to Slovakia and Poland; (vi) 0.73 to Malta; (vii) 0.51 to Ireland, Spain and Italy; (viii) 0.30 to Bulgaria and Lithuania; (ix) 0.10 to Latvia; (x) -0.10 to Cyprus, Hungary and Romania; (xi) -0.30 to Portugal, and (xii) -1.95 to Greece.

Figure 5 shows that in 2012 the transformed sovereign rating (SR) correlates with interest rate spread (SP), which validated the transformation and the use of SR as independent variable.

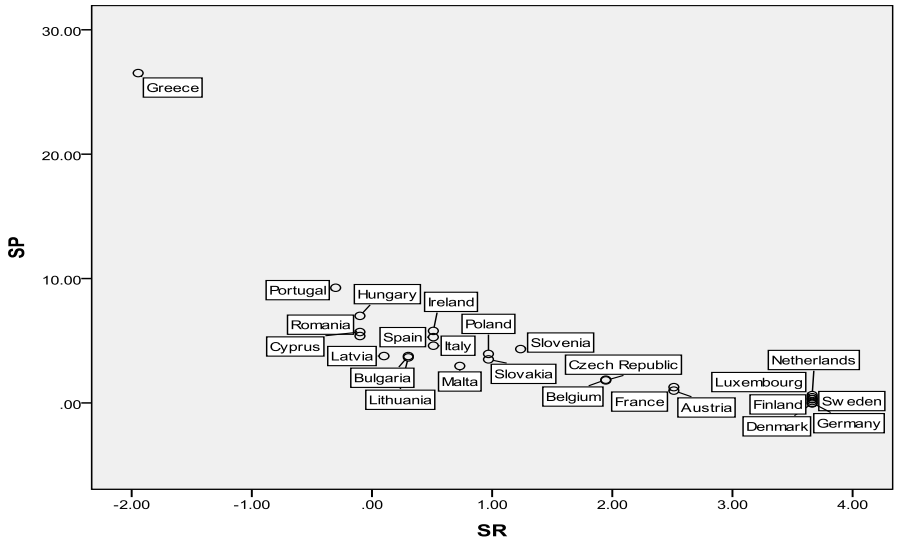

Figure 5: Analysis along with transformed sovereign rating and interest rate spread in 2012

Source: Our results based on data provided by European Central Bank and Standard & Poor's

4. Empirical results

On short run we studied for each year the intensity by which the transformed sovereign rating influences the interest rate spread, by using cross-section regression at the same moment in time. Cross-section regression is used to highlight the static relation between variables for each year studied separately. From the regression equations for each year, we found that as the transformed sovereign rating (SR) increases, the interest rate spread (SP) decreases and vice versa. However the intensity relation between two variables is different from year to year depending on investors' risk perception: (i) in 2003, 2004, 2005, 2006 and 2007, sovereign rating had a small impact on interest rate, estimated coefficients ranging from –0.32 to –0.54, and the models explanatory power ranging from 24.93% to 40.09%; and (ii) in 2001, 2002, 2008, 2009, 2010, 2011, 2012 and 2013, sovereign rating had a huge impact on interest rate, estimated coefficients ranging from –0.43 to –1.95, and the models explanatory power ranging from 50.34% to 73.77%.

Table 5: Cross-section regression results

Year	Regression equation	Adjusted R Square	Significance F
2001	SP = 2.63 – 0.77 * SR (0.25)§ (0.11)§	66.25%	0.00
2002	SP = 1.48 – 0.43 * SR (0.20)§ (0.08)§	50.34%	0.00
2003	SP = 1.76 – 0.53 * SR (0.31)§ (0.13)§	39.09%	0.00
2004	SP = 1.92 – 0.54 * SR (0.33)§ (0.13)§	40.09%	0.00
2005	SP = 1.37 – 0.40 * SR (0.33)§ (0.13)§	24.93%	0.00
2006	SP = 1.30 – 0.37 * SR (0.28)§ (0.11)§	28.90%	0.00
2007	SP = 1.28 – 0.32 * SR (0.22)§ (0.09)§	34.96%	0.00
2008	SP = 4.02 – 1.01 * SR (0.43)§ (0.17)§	58.56%	0.00
2009	SP = 4.25 – 1.24 * SR (0.57)§ (0.25)§	50.36%	0.00
2010	SP = 4.15 – 1.12 * SR (0.46)§ (0.20)§	55.57%	0.00
2011	SP = 6.85 – 1.95 * SR (0.55)§ (0.24)§	73.77%	0.00
2012	SP = 4.51 – 1.38 * SR (0.40)§ (0.19)§	67.82%	0.00
2013	SP = 2.98 – 0.89 * SR (0.25)§ (0.13)§	66.23%	0.00

§Standard Error of OLS estimators, all estimators show significance at 1% level.
Over the period 2001-2013, F-values show significance at 1% level.

Source: Our results based on data provided by European Central Bank and Standard & Poor's

On the long run, for the entire period 2001-2013 we studied the intensity by which the transformed sovereign rating influences the interest rate spread, by using data

panel regression (data panel regression is used to highlight the dynamic relation between variables for the entire period of time). According to the data panel regression methodology, the first stage is represented by the stationary analysis, and we chose to use the test Im, Pesaran, Shin both for dependent variable and also for independent variable. Im, Pesaran and Shin (2003) argued that they have developed a simple computational procedure for testing the unit root hypothesis in heterogeneous panels.

Table 6: Im, Pesaran, Shin panel unit root test

Variable	IPS statistic	Significance level
SP - level	-5.01	0.00
SR - level	-6.24	0.00

Source: Our results based on data provided by European Central Bank and Standard & Poor's

The SP variable is stationary because the significance level is lower than the threshold of 0.01. The SR variable is stationary because the significance level is lower than the threshold of 0.01. One possible explanation for this situation is the fact that in order to define the quantitative variable SR we carried out the logistic transformation of qualitative variable sovereign rating, after we performed the linear transformation. In our opinion, another possible explanation resides in minor fluctuations of sovereign ratings for each country, excepting the last periods, when sovereign ratings had rapid changes.

Table 7: Data panel regression results

Regression equation	Adjusted R Square	Significance level
$SP_t = 3.26 - 0.96 * SR_t$ $(0.14)^{\S}$ $(0.06)^{\S}$	44.41%	0.00

§Standard Error of OLS estimators, all estimators show significance at 1% level.
For the entire period 2001-2013, F-values show significance at 1% level.

Source: Our results based on data provided by European Central Bank and Standard & Poor's

From the regression equation for the entire period 2001-2013, we found that as the transformed sovereign rating (SR) increases by 1% it determines the interest rate spread (SP) to decrease by 0.96%. The intensity relation between the variables considered as panel data is moderate as the model explanatory power is 44.41%.

For the entire period 2001-2013 we analyzed the direction of presumed causality from transformed sovereign rating (SR) and interest rate spread (SP), on the Granger causality test. We found a bi-directional causality among transformed sovereign rating (SR) and interest rate spread (SP), as the significance level is lower than the threshold of 0.05.

Table 8: Granger causality test

Null Hypothesis:	F-Statistic	Significance level
SP does not Granger Cause SR	5.86	0.02
SR does not Granger Cause SP	11.16	0.00

Source: Our results based on data provided by European Central Bank and Standard & Poor's

5. Conclusions and recommendations

Comparing the results of the cross-section regression with the results of the panel data regression we found that, in both analyses, the sovereign rating has a strong negative influence on bonds' interest rate, as previous studies found.

In our opinion, public decision makers from EU member states must improve sovereign ratings in order to decrease interest rates. Thus, central public administration will have money to satisfy better the collective needs of the citizens living in their territory. From the regression analysis we found that the correlation between the two indexes is stronger during financial or economic crises, and it is weaker during the periods of economic growth. However an important element of the interest rate is the risk-free interest rate, which increases or decreases independently of sovereign rating.

In order to improve sovereign ratings and decrease interest rates, we recommend that public decision makers from the EU member states to increase, for example: (i) GDP per capita, (ii) real GDP growth, (iii) foreign exchange reserves, (iv) political stability, (v) government effectiveness, and so on, and to decrease, for example: (i) government debt to GDP ratio, (ii) public budget deficit, (iii) inflation, (iv) unemployment, and so on.

In the last three decades, the importance of sovereign rating for international investors became fundamental as there are states having problems with the payment of principal loans and interests.

References:

1. Afonso, A., Gomes, P. and Rother, P., 'What "Hides" Behind Sovereign Debt Ratings?', 2007, *European Central Bank Working Paper Series*, no. 711, pp. 1-65.
2. Afonso, A., Gomes, P. and Taamouti, A., 'Sovereign Credit Ratings, Market Volatility, and Financial Gains', 2014, *European Central Bank Working Paper Series*, no. 1654, pp. 1-52.
3. Beck, R., 'Do Country Fundamentals Explain Emerging Market Bond Spreads?', 2001, *Center for Financial Studies Working Paper*, no. 2001/02, pp. 1-32.
4. Bran, P. and Costică, I., *Economica activităţii financiare şi monetare internaţionale (The Economics of International Financial and Monetary Activity)*, Bucharest: Economica Publishing House, 2003.
5. Cantor, R. and Packer, F., 'Determinants and Impact of Sovereign Credit Ratings', 1996, *FRBNY Economic Policy Review*, no. 2, pp. 37-53.
6. Canuto, O., Santos, P.F.P. and Porto, P.C.S., 'Macroeconomics and Sovereign Risk Ratings', 2012, *Journal of International Commerce, Economics and Policy*, vol. 3, no. 2, pp. 1-36.
7. Gonzalez, F., Haas, F., Johannes, R., Persson, M., Toledo, L., Violi, R., Wieland, M. and Zins, C., 'Market Dynamics Associated with Credit Ratings – A Literature Review', 2004, *European Central Bank Occasional Paper Series*, no. 16, pp. 1-36.
8. Greenidge, K., Drakes, L. and Craigwell, R., 'Debt and Sovereign Credit Ratings: Evidence from Panel Causality Tests', 2010, [Online] available at http://www.ccmfuwi.

org/files/publications/conference/2010/9_4-Craigwell_Drakes_Greenidge-p.pdf, accessed on September 24, 2014.
9. Hartelius, K., Kashiwase, K. and Kodres, L.E., 'Emerging Market Spread Compression: Is it Real or Is it Liquidity?', 2008, *IMF Working Paper*, no. WP/08/10, pp. 1-36.
10. Im, K.S., Pesaran, M.H. and Shin, Y., 'Testing For Unit Roots in Heterogeneous Panels', 2003, *Journal of Econometrics*, vol. 115, no. 1, pp. 53-74.
11. Jaramillo, L. and Tejada, C.M., 'Sovereign Credit Ratings and Spreads in Emerging Markets: Does Investment Grade Matter?', 2011, *IMF Working Paper*, no. WP/11/44, pp. 1-17.
12. Kaminsky, G. and Schmukler, S.L., 'Emerging Markets Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns?', 2002, *World Bank Economic Review*, vol. 16, no. 2, pp. 171-195.
13. Min, H.G., 'Determinants of Emerging Market Bond Spread: Do Economic Fundamentals Matter?', 1998, *The World Bank Policy Research Working Paper*, no. 1899, pp. 1-33.
14. Miricescu, E.C., *The Sovereign Rating*, Bucharest: ASE Publishing House, 2011.
15. Miricescu, E.C., 'The Correlation of Sovereign Rating and Bonds' Interest Rate in the EU Member States', in *The Proceedings of the 6th International Conference on Globalization and Higher Education in Economics and Business Administration*, 2012, pp. 798-803.
16. Moşteanu, T., Câmpeanu, E., Cataramă, D. and Miricescu, E.C., *Gestiunea datoriei publice (Public Debt Management)*, Bucharest: Universitară Publishing House, 2008.
17. Powell, A. and Martínez, S.J.F., 'On Emerging Economy Sovereign Spreads and Ratings', 2008, *Inter-American Development Bank Working Paper Series*, no. 629, pp. 1-42.
18. Pungulescu, C., 'Measuring Financial Market Integration in the European Union: EU15 vs. New Member States', 2013, *Emerging Markets Review*, vol. 17, pp. 106-124.
19. Reinsen, H. and von Maltzan, J., 'Boom and Bust and Sovereign Ratings', 1999, *International Finance*, vol. 2, no. 2, pp. 273-293.
20. Sahinoz, S. and Gonenc, R., 'Determinants of Credit Ratings, Sovereign Bond Spreads and Real Interest Rates in Emerging Markets', 2011, *Iktisat Isletme Ve Finans*, vol. 26, no. 305, pp. 9-35.
21. Stroe, R. and Armeanu, D., *Finanţe (Finances)*, Bucharest: ASE Publishing House, 2004.
22. Văcărel, I., Bistriceanu, G., Bercea, F., Anghelache, G., Moşteanu, T., Bodnar, M. and Georgescu, F., *Finanţe publice (Public finances)*, Bucharest: Didactică şi Pedagogică Publishing House, 2003.