

The Impact of Country's Credit Ratings on the Cost of the Capital

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Abstract

The purpose of the paper was to analyse the impact of the country's credit ratings on the cost of the capital. It was made an analysis of existing research on the presented topics. We use static panel data methods for 135 countries between 2002 – 2012 years. As independent variables we take account long and short term country credit ratings granted by Standard and Poor and Moody's Investor Services. Credit ratings are converted linearly into numeric variables. We analyze how credit ratings and the history of defaults influence on interest and maturity on new external debt commitments (official and private), deposit and lending interest rates, interest rate spread, real interest rate and risk premium on lending.

Key Words: Interest Rate, Credit Risk, Cost Of The Capital, External Debt, Risk Premium On Lending.

Introduction

Credit rating agencies play an important role in the financial system of the economy. At the moment there exist three important agencies: S&P, Fitch and Moody's. They specialize in analysing the creditworthiness of corporate and sovereign issuers of debt securities (Elkhoury, 2008). The basic goal of them is to decrease the problem with the information asymmetry between investors and capital borrowers regarding the creditworthiness. Millon and Thakor (1985) propose a model for the existence of "information gathering agencies" such as credit rating agencies based on information asymmetries. They argue that credit rating agencies are formed to act as "screening agencies", certifying the values of firms they analyse. In their opinion credit rating agencies, can reduce a firm's capital costs, by certifying their value in a market. Boot, Milbourne and Schmeits (2003) argue that rating agencies could be seen as information – processing agencies that may speed up the dissemination of information to financial market.

Foreign government officials generally cooperate with credit rating agencies. Credit ratings are used especially during the estimation countries credit rating risk. Countries want to receive high credit ratings to be appreciated in the international debt market. According to the previous researches (Jaramillo, Tejada,

2011; Ferri, Liu, Stiglitz, 1999) the higher risk presented by received credit ratings, the higher interest rates have to pay borrowers for the capital.

Sometimes the credit rating estimation is different than expected. As a result we want to check how country's credit ratings influence on the cost of the capital?

To explore this question we prepared the analysis based on the long and short term country credit ratings granted by Standard and Poor and Moody's Investor Services for 135 countries.

Materials and Methods

Country's credit ratings are important from the investors point of view. The impact of the country's credit rating on the cost of the capital is discussed in a lot of scientific researches. As a result credit ratings are taken into consideration during the investment decisions. Graham and Harvey (2001) found out that credit ratings are the second highest determinant for CFOs decision of the capital structure. Nearly 52% of respondents saying that credit rating were important or very important in how they choose the appropriate amount of debt for their firm.

Changes in the credit rating statements have got the negative effect in the cost of the capital. At first it exist a strong influence on the coupon of bonds. Next it creates problem in the competition between the investments. Firms near a ratings change are issuing less net debt relative to net equity than firms not near a rating change.

Patel, Evans and Burnett (1998) find that liquidity affects whether speculative – grade bonds experience abnormal positive or negative returns. If firms incur higher interest rates in less liquid markets as distinguished by credit rating, there may have incentives to avoid these ratings levels. Also, at certain credit rating levels, during difficult economic times, a firm may not be able to rise debt capital (Stiglitz, Weiss (1981)).

Money market funds, which make up a significant portion of commercial paper investment, invest almost exclusively in A1-rated paper, and A1- rated commercial paper also has more favourable firm liquidity requirements than lower rated paper (Hahn, 1993).

As a measure of the cost of capital the CDS premium was used. As noted by Callen et al (2007), although CDS premium are related to credit ratings issued by rating agencies, there is quite a wide variation in CDS spreads that are observed for firms having a given rating. The relationship can be observed in the market by looking at CDS premium associated with a given rating. Daniels and Jensen (2005) study the relationship between CDS spreads, credit spreads of corporate bonds and credit rating changes using principal component analysis, regression as well event study methodology. Both corporate credit and CDS spreads react to rating changes, CDS spreads exhibit greater sensitivity than corporate bonds.

Micu, Remolona and Wooldridge (2006) suggest that both corporate bond and CDS spreads should change by about the same magnitude, negative rating announcements that result from changes in a company's leverage should lead to a greater CDS price impact and that two credit rating changes should be more informative than one. Negative reviews are found to have the greatest impact on BBB- rated firms, in contrast to the expectation that the trading of "restricted investors" should only have a temporary price impact. Positive rating announcements are found to result in a lesser tightening of CDS spreads, this is most accentuated for BB rated firms just below the investment grade threshold. Larger firms by market capitalization are found to have a smaller rating announcement effect with regard to positive as compared to negative rating announcement, but the impact of positive announcements tends to be stronger for split – rated firms.

Carr and Wu (2006) study the similarities between equity option implied volatility and CDS spreads. Villouta (2006) empirically tests of liquidity in the corporate bonds and CDS markets has an effect on the arbitrage relationship that links these markets, through analysing the effect of liquidity proxies on the CDS basis, as well as, on trading strategies that try to profit from arbitrage due to misalignment between the markets.

Das and Hanouna (2007) identify and extract the implied forward curve of recovery and default rates on an issue using the CDS spread curve. Schneider, Sogner and Veza (2007) examine the relationship between the LGD and PD by looking at the former across ratings as a crude proxy for credit quality. The mostly affects broad ranges in the CDS maturity spectrum, where changes in CDS spreads at the discontinuity is mostly positive, and the one year CDS spread exhibits time – series variation that higher maturity spreads do not share. Ashcraft and Santos (2007) investigate of the CDS market has reduced the cost of debt for corporate borrowers, including both corporate bonds and bank loans.

Previous researches suggest that credit ratings influence a firm's cost of the capital (Kliger and Sarig (2000); Jorion et al. (2005); Kisgen and Strahan (2010)). Restrepo (2013) show that the sovereign ceiling represents a meaningful institutional friction and this channel credit ratings have an important effect on borrowing costs in the private sector.

He estimated the differential effect of contractions and relaxations in the sovereign ceiling on the bond spreads of firms that are exactly at the sovereign bounds, relative to firms that are near but not at the bound. The spreads of bound firms increase significantly more relative to non – bound firms. Firms that are bound tend to be rated more unfavourably and their default rates tend to be lower relative to non – bound firms.

In previous researches is taken into consideration the impact of the credit rating standing on the cost of capital in case of the private sector. We would like to analyse how the country's credit rating influence on the interbank cost of the capital.

In our research we would like to check how the country's credit rating influence on the cost of capital. For estimation process as a independent variables, we have used credit rating data published by S&P and Moody's. We collected Moody's long term Issuer Rating, S&P long term Issuer Rating and S&P short term Issuer Rating from Thomson Reuters database.

We took into consideration credit ratings for particular countries for period of 2002 – 2012. Our decision about the time frame is due to limited availability of macroeconomic determinants for all countries and small changes in the credit rating assessment. As a result we took into consideration credit ratings evaluation for 135 countries¹.

Dependent variables which were used in our research are presented in the table below. Data are taken from the World Bank database.

¹ Albania, Angola, Armenia, Aruba, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belgium, Benin, Bermuda, Burkina Faso, Cambodia, Canada, Cayman Islands, China, Croatia, Curacao, Cyprus, Czech Republic, Denmark, Estonia, Fiji, Finland, France, French Polynesia, Germany, Greece, Hong Kong, Hungary, Iceland, Indonesia, Ireland, Isle of Man, Israel, Italy, Japan, Korea Rep., Lichtenstein, Luxembourg, Malta, Mongolia, Netherlands, New Zealand, Norway, Oman, Papua New Guinea, Philippines, Poland, Portugal, Qatar, Saudi Arabia, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Trinidad and Tobago, United Kingdom, United States, Venezuela, Vietnam, Georgia, Moldova, Ukraine, Belize, Bolivia, El Salvador, Guatemala, Honduras, Nicaragua, Paraguay, Egypt, Morocco, India, Pakistan, Sri Lanka, Cameroon, Congo Rep., Ghana, Nigeria, Senegal, Zambia, Kenya, Male, Mozambique, Rwanda, Uganda, Malaysia, Thailand, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Kazakhstan, Latvia, Lithuania, Macedonia, Montenegro, Romania, Russian Federation, Serbia, Turkey, Turkmenistan, Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Grenada, Jamaica, Mexico, Panama, Peru, St. Vincent and the Grenadines, Uruguay, Jordan, Lebanon, Libya, Tunisia, Angola, Botswana, Gabon, Mauritius, Namibia, Seychelles, South Africa.

Table. 2. The list of the cost of capital dependent variables.

Dependent variables	Abbreviations
Interest on new external debt commitments (%)	Com
Interest on new external debt commitments, official (%)	Comoff
Interest on new external debt commitments, private (%)	compriv
Maturity on new external debt commitments (years)	Mat
Maturity on new external debt commitments, official (years)	Offmat
Maturity on new external debt commitments, private (years)	privmat
Deposit interest rate (%)	Dep
Interest rate spread (lending rate minus deposit rate, %)	Intr
Lending interest rate (%)	Lend
Real interest rate (%)	Real
Risk premium on lending (lending rate minus treasury bill rate, %)	Risk

Source: own elaboration.

The final version of the model is given by equation (1) below:

$$y_{i,t} = \sum_{k=0}^n \beta_k x_{j,t-k} + \theta_t T_t + \mu_j + \varepsilon_{j,t}, \quad n = 0 \text{ Eq. (1)}$$

where:

$y_{i,t}$ is the dependent variable of the cost of the capital ($com_{i,j}$ is the interest on new external debt commitments, $comoff_{i,j}$ is the interest on new external official debt commitments, $compriv_{i,j}$ is the interest on new private external debt commitments, $mat_{i,t}$ is the maturity on new external debt commitments; $offmat_{i,t}$ is the maturity on new official external debt commitments, $privmat_{i,j}$ is the maturity on new private external debt commitments, $dep_{i,j}$ is the deposit interest rate, $intr_{i,j}$ is the interest rate spread; $lend_{i,j}$ is the lending interest rate; $real_{i,j}$ is the real interest rate, $risk_{i,j}$ is the risk premium on lending); $x_{j,t}$ is a vector of explanatory variables, i.e. :

$$x_{i,j} = [moodylong_{i,j}, spslongterm_{i,j}, defaultsl_{i,j}, spshortterm_{i,j}, defaultss_{i,j}]$$

where:

$moodylong_{i,j}$ is the Moody's long term issuer credit rating for countries, $spslongterm_{i,j}$ is the S&P's long term issuer credit rating for countries, $defaultsl_{i,j}$ is the variable of the long term history of country's default for S&P's long term issuer credit rating, where "1" means default, $spshortterm_{i,j}$ is the S&P's short term issuer credit rating for countries, $defaultss_{i,j}$ is the variable of the short term history of country's default for S&P's short term issuer credit rating, where "1" means default.

To examine the link between the influence of the country's credit standing on the cost of the capital, we employ static panel data models.

To static models those with fixed and random effects estimator were included. To decide between fixed and random effects it was used the Hausman test, where the null hypothesis is that the preferred model is random effect model (Greene, 2008). It basically tests whether the unique errors are correlated with the regressors and the null hypothesis is that they are not. We have also used Breusch – Pagan Lagrange

Multiplier test, which helps to decide between the random effects regression and a simple OLS regression. The null hypothesis is that variances across entities is zero. It is no significant difference across the units. We used in our model the linear method of decomposition of the credit rating assessment, which is presented in the table number 3.

Table 3. The codification system of the credit rating assessment.

<i>Moody's Long-term Issuer Rating (Foreign)</i>		<i>S&P's Long-term Issuer Rating (Foreign)</i>		<i>S&P's Short-term Issuer Credit Rating (Foreign)</i>	
<i>Rating</i>	<i>Code</i>	<i>Rating</i>	<i>Code</i>	<i>Rating</i>	<i>Code</i>
Aaa	100	AAA	100	A-1+	100
Aa1	95	AA+	95	A-1	83,33333
Aa2	90	AA	90	A-2	66,66667
Aa3	85	AA-	85	A-3	50
A1	80	A+	80	B	33,33333
A2	75	A	75	C	16,66667
A3	70	A-	70	NR	0
Baa1	65	BBB+	65	SD	-5
Baa2	60	BBB	60		
Baa3	55	BBB-	55		
Ba1	50	BB+	50		
Ba2	45	BB	45		
Ba3	40	BB-	40		
B1	35	B+	35		
B2	30	B	30		
B3	25	B-	25		
Caa1	20	CCC+	20		
Caa2	15	CCC	15		
Caa3	10	CCC-	10		
Caa	5	CC	5		
C	0	NR	0		
WR	-5	SD	-5		

Source: own elaboration.

Results

The previous researches suggest that credit rating has got the influence on the cost of capital. But in our opinion it strictly depends on the definition of the cost of the capital. As a result we took into consideration some different definitions. The received results of the estimation we present in the table number 4. The first indicator taken into consideration is the interest on new external debt commitments. For the estimation we have used the panel data models with the random effects. The received results suggest that generally there does not exist a strong, important relation between the credit rating and history of defaults and the analysed variable. It exists the influence of the S&P's credit rating assessment on the value of the interest on the official debt. The important and economically justified impact has got the short term issuer credit rating proposed by S&P's. If the analysed assessment grow up on one point, interests fall on 0,2 percent.

The maturity on new external debt commitments depends on the country's credit rating. If the country's credit standing is better, the analysed variable is higher. As a result it is observed the positive relationship between these variables. It is an effect of the cost of the capital. If the credit risk is lower, the lower cost of capital which should be paid. But this relation is observed only for the S&P's estimation. If the credit rating increases by one note, the maturity is extended by a year. For the maturity on new private external debt

commitments, more important are credit ratings for short term period of time. It is an effect of the specifics of the source of debt.

Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing. The terms and conditions attached to these rates differ by country, however, limiting their comparability. If the long term issuer rating is higher on one note, the lending interest rate is lower on one percent. The relationship between the short term credit rating and the analysed interest rate is reverse. It is an effect of the reluctance of banks to changes in lending interest rates. As a result interest rates are more sensitive on the long term issuer credit ratings.

The next variable, that is taken into consideration is the deposit interest rate. In our research the deposit interest rate is defined as the rate paid by commercial or similar banks for demand, time, or savings deposits. The same like in case of the lending rate, the deposit rate responds slowly on the changes in credit rating. The strength of decline is similar. We would like to check also, how is the reaction of the interest rate spread on the country's credit standing. Interest rate spread is the interest rate charged by banks on loans to private sector customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits. We observed the significant influence of the credit rating and history of default, but only for the long-time period. If the Moody's long term issuer rating rises on one note, the interest rate spread is decreased on nearly 0,4 percent. Whereas when the S&P's long term issuer rating is lifted on one note, the observed variable is increased on nearly 0,6 percent.

The two last dependent variable, that are taken to the estimation process, are the risk premium on lending and the real interest rate. The first one is defined by the World Bank as the interest rate charged by banks on loans to private sector customers minus the "risk free" treasury bill interest rate at which short-term government securities are issued or traded in the market. In some countries this spread may be negative, indicating that the market considers its best corporate clients to be lower risk than the government. The important determinant is only the Moody's long – term issuer credit rating. If the analyzed determinant is raised on one note, the risk premium on lending is decreased on 0,15 percent.

The real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. The significant variable for the estimation process is the S&P's long – term issuer credit rating. It is observed the negative relationship between the analyzed variables. The one note long term credit rating increase, results the 0,6 percent change in the real interest rate.

Table 4. The estimation of the influence of the credit ratings and history of defaults on the interest on new external debt commitments.

independent variable	Dependent Variable																	
	Com						comoff						compriv					
	Fixed effects		Random effects				Fixed effects		Random effects				Fixed effects		Random effects			
	Coef.	T	Coef.	T	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
moodyslong	0,0137	0,5430	0,0131	0,5250			0,0294	0,1010	0,0166	0,2910			0,0616	0,1060	0,0513	0,1470		
spslongterm	0,0041	0,8920	0,0070	0,7980			0,0367	0,1280	0,0479	0,0230	0,0514	0,0000	0,0541	0,2930	0,0472	0,3220		
defaultsl	1,1571	0,6220	0,7620	0,7400			0,1157	0,9500	0,5249	0,7700			0,6476	0,8620	0,7270	0,8420		
spsshortterm	0,0144	0,4240	0,0243	0,1330			0,0452	0,0020	0,0478	0,0000	0,0490	0,0000	0,0127	0,6820	0,0009	0,9740		
defaultss	0,8622	0,5470	1,1113	0,4240	1,2071	0,0080	0,9216	0,4150	0,8005	0,4600			3,9967	0,0810	4,3265	0,0520		
_cons	4,1519	0,0000	3,9343	0,0000	3,1973	0,0000	4,2397	0,0000	3,2199	0,0000	2,1621	0,0000	3,8226	0,0040	4,5839	0,0000		
Hausman	0,8668						0,4845						0,8686					
Chi	0,0000						0,0000						0,0000					
xttest	0,0000						0,0000						0,0000					

Source: own calculations.

Table 5. The estimation of the influence of the credit ratings and history of defaults on the maturity on new external debt commitments.

independent variable	Dependent Variable																			
	Mat						offmat						privmat							
	Fixed effects		Random effects				Fixed effects		Random effects				Fixed effects				Random effects			
	Coef.	t	Coef.	T	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t		
moodyslong	-0,1463	0,1090	-0,1766	0,0330	-0,1850	0,0230	-0,1308	0,2630	-0,1575	0,1200	-0,1744	0,0790	0,1578	0,1070			0,0513	0,5570		
spslongterm	0,1761	0,1490	0,1355	0,2190	0,2003	0,0190	0,2179	0,1670	0,1230	0,3610	0,1870	0,0750	-0,1152	0,3790			-0,0312	0,7910		
defaultsl	-0,6698	0,9430	-2,3184	0,7990			1,2923	0,9140	-1,4565	0,9000			11,4584	0,2170			11,8002	0,2000		
spssshortterm	0,0494	0,4980	0,0507	0,4370			0,0161	0,8640	0,0349	0,6580			0,2707	0,0010	0,1683	0,0000	0,1239	0,0740		
defaultss	-0,7175	0,9000	-1,1288	0,8380			-5,9286	0,4200	-6,2224	0,3720			10,7055	0,0620			7,2084	0,1970		
_cons	14,9276	0,0000	18,3980	0,0000	17,8988	0,0000	16,0461	0,0000	20,8569	0,0000	20,1124	0,0000	-1,8345	0,5950	3,7132	0,0180	4,8806	0,0250		
Hausman							0,8518						0,8074						0,0000	
Chi							0,0000						0,0000						0,0000	
Xttest							0,0000						0,0000						0,0000	

Source: own calculations.

Table 6. The estimation of the influence of the credit ratings and history of defaults on the deposit, lending interest rate and interest rate spread.

independent variable	Dependent Variable																			
	Dep						intr						lend							
	Fixed effects				Random effects		Fixed effects				Random effects		Fixed effects		Random effects					
	Coef.	T	Coef.	T	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t		
moodyslong	-0.0082	0.7790			0.0216	0.4260	-0.0697	0.0020	-0.0671	0.0010	-0.0535	0.0150	-0.0132	0.7480	-0.0043	0.9150				
spslongterm	-0.2440	0.0000	-0.2387	0.0000	-0.1755	0.0000	-0.1243	0.0000	-0.1157	0.0000	-0.0833	0.0110	-0.3620	0.0000	-0.2437	0.0000	-0.2554	0.0000		
defaultsl	-2.5875	0.5370			-0.8168	0.8450	-7.5113	0.0200	5.4321	0.0350	-6.2198	0.0550	-9.2278	0.1470	-6.1294	0.3330				
spssshortterm	0.0436	0.0900	0.0488	0.0360	0.0328	0.1670	0.0100	0.6160			0.0056	0.7760	0.0625	0.0980	0.0336	0.3470	0.0509	0.1170		
defaultss	3.4802	0.1690	3.0442	0.0100	3.0454	0.2250	2.0853	0.2850			2.1337	0.2760	-0.7274	0.8490	-1.0960	0.7740				
_cons	17.7254	0.0000	15.9529	0.0000	12.4593	0.0000	17.2357	0.0000	17.1701	0.0000	14.0471	0.0000	30.1881	0.0000	24.0985	0.0000	23.3312	0.0000		
Hausman							0.0000						0.0049						0.1349	
Chi							0.0000						0.0000						0.0000	
Xttest							0.0000						0.0000						0.0000	

Source: own calculations.

Table 7. The estimation of the influence of the credit ratings and history of defaults on the real interest rate and the risk premium on lending.

independent variable	Dependent variable											
	real						risk					
	Fixed effects			Random effects			Fixed effects			Random effects		
	Coef.	T	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
moodyslong	-0,0376	0,4900			-0,0195	0,7040	-0,0269	0,2250	-0,0321	0,1380	-0,0381	0,0000
spslongterm	-0,1172	0,1730	-0,1260	0,0010	-0,0282	0,6990	-0,0158	0,6870	-0,0175	0,6060		
defaultsl	-10,7267	0,2030			-6,0134	0,4690	dropped					
spssshortterm	0,0090	0,8570			-0,0198	0,6610	0,0105	0,6540	0,0089	0,6900		
defaultss	3,3664	0,5070			1,7919	0,7190	dropped					
_cons	13,9366	0,0000	12,6884	0,0000	9,0131	0,0000	5,9255	0,0000	6,8983	0,0000	6,7729	0,0000
Hausman							0,0011					
Chi							0,0000					
xttest							0,0000					

Source: own calculations.

Discussion and Conclusions

Credit rating agencies play an important role on the financial market. According to previous researches we wanted to check how the country's credit rating influence on the cost of the capital. At first we take into consideration the new external debt commitments and the maturity of this variable. We have not observed the important relationship between the history of default and this variable. The important and economically justified impact have got the short term issuer credit rating proposed by S&P's. The maturity on new external debt commitments depends on the country's credit rating. If the country's credit standing is better, the analysed variable is higher. If the credit risk is lower, the lower cost of the capital should be paid.

Next we analysed the influence of the credit ratings on the lending interest rate, deposit interest rate, interest rate spread, real interest rate and the premium risk. We observed the different results of estimation for particular variables of capital costs. If the long term issuer rating is higher on one note, the lending interest rate is lower on one percent. The relationship between the short term credit rating and the analysed interest rate is reverse. It is an effect of the reluctance of banks to changes in lending interest rates. As a result interest rates are more sensitive on the long term issuer credit ratings. The deposit rate also responds slowly on the changes in credit rating. We observed the significant influence of the credit rating and history of default on the interest rate spread, but only for the long-time of period. The risk premium on lending is the important determinant only for the Moody's long – term issuer credit rating. The real interest rate is the significant variable for the estimation process is the S&P's long – term issuer credit rating. It is observed the negative relationship between the analyzed variables.

The received results are important form the investors point of view. Changes in the long and short term country's credit ratings causes the different results.

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