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Credit Rating Determinants for European Countries

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Credit Rating Determinants for European Countries

Patrycja Chodnicka - Jaworska

Abstract- The purpose of this article is to analyse factors that can affect the European countries' credit ratings. The analysis performed is based on the level of economic development in line with the division proposed by the World Bank. The data used is derived from the World Bank database and the database of Thomson Reuters for the years 2002-2012. The full sample is divided into subsamples due to the level of economic development. Long- and short-term issuer credit ratings given by Standard & Poor's and Moody's Investor Services are used as dependent variables. Ratings are decomposed linearly on numeric variables. As dependent variables I use macroeconomic data such as GDP per capita, real GDP growth, inflation, fiscal deficit, current account balance, external debt to GDP, foreign reserves. I also analyse how the previous credit rating notes and the communication effect between credit rating agencies influence the current country's standing.

Keywords: credit ratings, default risk, credit risk.

I. Introduction

Credit rating agencies play an important role in the financial system of the economy. At the moment there are 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, 2-16). The basic goal of them is to address the problem of the information asymmetry between investors and capital borrowers regarding the creditworthiness. According to the previous researches (Jaramillo, Tejada 2011, 7-18; Ferri, Liu, Stiglitz 1999, 335–355) the higher risk presented by received credit ratings, the higher interest rates paid by borrowers of the capital.

A sovereign credit rating is the ability to repay governments debts and financial system development ratio for the assessed countries. The sovereign rating has an influence on the interest rates at which countries can obtain credit on the international financial markets and on credit rating for national banks and companies. A level of sovereign credit rating has an impact on attractiveness to foreign investors, because they cannot invest in debt rated below an agreed level (Teker, Pala, Kent 2013, 122-132).

This paper aims to analyse the primary determinants driving the short and long term issuer credit ratings and to investigate the strength of the impact of the determinants analysed on the economic development divisions. I also study the influence exerted by the credit rating statement (investment and the speculative grade rating) on the cost of the capital. The paper provides an insight into how historical sovereign credit ratings influence the current rating. I strive to find the effect of communication between changes in level rating across different rating agencies. This study is prepared for a sample of 45 European countries over2002 – 2012. Data includes the sovereign credit rating published by S&P and Moody's from which I chose Moody's long term Issuer Rating, S&P long term Issuer Rating and S&P short term Issuer Rating. The study will be conducted in three subgroups: for the whole population, for political divisions and for economic development divisions. I use dynamic and statistical panel models.

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II. Determinants of Country's Ratings - Literature Review

In the rating criteria, S&P and Moody's present a list of factors to be taken into consideration during the credit rating valuation process. While assessing the sovereign risk, credit rating agencies take into account several risk parameters such as: political, economic and fiscal drivers as well as monetary flexibility and debt burden.

In practice only a small number of indicators play a key role in the assessment process. According to Cantor and Parker (1996) the most important indicators include: income per capita, GDP growth, inflation, fiscal balance, external balance, external debt, indicator for economic development and indicator for default history. Income per capita is measured by them by using GNP per capita. They applied OLS regressions to a linear representation of the ratings. In their opinion the greater is the potential tax base of borrowing country, the greater is the ability of government to repay debt. They suggest that the higher is the rate of economic growth measured by GDP growth, that a country's existing debt burden will become easier to repay. Inflation is measured by using the consumer price inflation rate. When government is not able to pay off its debt, it has to repair their budget by inflationary money finance. As a result, it may in turn lead to political instability. The fiscal balance is measured by an average annual central government budget surplus relative to GDP. In

their opinion a large federal deficit can prompt the implementation of the restrictive fiscal policy: for example levying higher taxes to cover current expenses. Another determinant embraced by Cantor and Parker is an external balance measured by an average annual current account surplus relative to GDP. A large current account deficit indicates that both public and private sectors rely on funds from abroad. As a result, a growth in foreign indebtedness is observed, which may become unsustainable over time. The external debt is measured by the value of the foreign debt to exports. A higher debt should result in higher risk of default. As a consequence, it increases a country's foreign currency debt relative to foreign currency earnings. The level of economic development is measured by a dummy variable according to the classification presented by the International Monetary Fund. While performing analyses, I structured database by the level of countries' development by using the classification presented by the World Bank. I would like to analyse the economic development in the subsamples. The indicator default history is measured by the dummy variable default on foreign currency debt, where variable "1" means default and "0" no default. A country that has defaulted on debt in the recent past is widely perceived as a high credit risk.

According to other researches (Haque et al 1997, 2004; Reisen and von Maltzan 1999; Jutter and McCarthy 2000; Bathia, 2002) presented by Cantor and Parker, credit rating determinants explain 90 percent of the variation in ratings. GDP per capita explains about 80 percent of the mentioned variation (Borenszste in and Panizza, 2006). Haque et al. (1996, 1997) also incorporate other determinants: increases in the international interest rates and the structure of exports and concentration. While analysing the Asian crisis, Juttner and McCarthy (2000) find that the following variables are significant: CPI, the ratio of external debt to exports, a dummy default history, the interest rate differential, the real exchange rate.

Monfort and Mulder (2000) analyse credit ratings for capital requirements for lending in 20 emerging market economies. They examine internal (e.g. inflation history, crisis indicators) and external determinants (e.g.: foreign reserves, current account balance, exports, terms of trade). The level of rating in these countries can explain variables: debt to export ratio, rescheduling history, rate of export, the inflation history, share of investment in GDP, crisis indicators.

Reinsen and Maltzan (1999) also explore sovereign ratings in emerging markets. They attempt to explain the impact of boom-bust cycles on rating notations. One section of the study has examined links between sovereign credit ratings and dollar bond yields spread over the years 1989 to 1997. Second section probes the response of the market within 30 trading days ahead of and following the change in rating announcements. Similar study was accomplished by Brooks, Faff, Hillier, and Hillier (2004) where they sought to verify the market responses to announcements of rating, outlook changes, and the stability of ratings.

In 2005 Bissoondoyal-Bheenick analysed 95 countries (including 25 high rated and 70 low rated countries) for a time period of the four years: from December 1995 to December 1999. The authors argue that the sovereign risk analysis is an interdisciplinary activity in which the quantitative analysis must be combined with sensitivity to historical, political, and cultural factors. The main thesis in the study is that economic variables do not carry the same importance for the high rated countries with a long financial stability history as compared to the low rated countries that are still undergoing structural changes.

Bissoondoyal-Bheenick (2005) conclude that weaker economies are not actually rated by the rating agencies. The study includes more macroeconomic and performance variables like the unemployment rate or the investment to GDP ratio. One year later Bissoondoyal-Bheenick, Brooks, and Yip (2006) deployed methods which determine the size of the differences between each category determinants. There viewed variables include: GDP, inflation, foreign direct investment to GDP, current account to GDP, trade to GDP, real interest rates and mobile phones which show the level of technological advancement of the country.

According to Depken, La Fountain and Butters (2007), there are important variables that assess political risk like: corruption (Corruption Perceptions Index (CPI), published by Transparency International) or social indexes. They also studied indicators: fiscal policy, budget balance, government debt, democracy and oil measures (country that production of oil).

Gaillard analyses and compares the list of determinants proposed in 2005 by Moody's and S&P in their statements. He emphasizes the differences in the assessment methodology provided by credit rating agencies and changes during the time period analysed. Next, he sought the principal economic determinants in his opinion. As a result, he finds that three variables: default history, GDP per capita and net direct debt to operating revenues explain 80% of local and regional ratings.

The previous researchers paid attention not only to the determinants of credit ratings notes but also to effects on the financial markets. As a result, Jaramillo and Tejada (2011) find out that changes from investment grade ratings to speculative grade ratings increase the cost of capital more than decreases within the rating class. The same phenomenon is observed by Ferri, Liu and Stiglitz (1999). They analyse the group of factors which can influence the credit rating statement. In the mentioned group of determinants they classified: GDP per capita, real GDP growth, inflation rate, budget deficit, current account balances, development

indicator, external debt and the sum of current account balances and short term debt divided by the foreign exchange reserves. As a dependent variable they use Moody's credit ratings notes for 17 countries over a time period of the ten years: 1989 – 1998. They divide the time period into "before" and "after" the crisis, thereby adopting linear and nonlinear numerical conversion methods of credit ratings. The results receivedsuggest that credit rating agencies attach higher weights to their qualitative judgment than to the economic fundamentals. They place their emphasison the procyclical nature of the credit rating assignment.

Afonso, Gomes, Rother in 2007 look into short-run (e.g. level of GDP per capita, real GDP growth, the public debt level, government balance) and long-run (e.g. government effectiveness, the level of external debt, external reserves) impact on sovereign ratings over the period of ten year 1995-2005. The study divides the determinants into four groups:

Table 1 : The list of determinants divided into four groups in Afonso, Gomes and Rother study (2007)

Macroeconomic variables	Government variables	External variables	Other variables
• GDP per capita • Real GDP growth • Unemployment • Inflation	• Government debt • Fiscal balance • Government effectiveness	• External debt • Foreign reserves • Current account balance	• Default history • European Union • Regional dummies (uncertain impact: some groups of countries of the same geographical location may have common characteristics that affect their rating)

Source: own calculation based on Afonso, Gomes and Rother (2007).

In 2003 Afonso examines possible determinants of sovereign credit based on Moody's and the S&P data, which includes 81 countries: 29 developed and 52 developing countries using the OLS method. The variables that are statistically significant explanatory to the rating levels are: GDP per capita, external debt as a percentage of exports, the level of economic development, default history, real growth rate and the inflation rate.

According to Afonso, Gomes, Rother (2007), the sovereign ratings are a key determinant of the interest rates that is assumed to be the borrowing cost. Furthermore, they prove that the sovereign rating may have a constraining impact on the ratings assigned to domestic banks or companies and the credit risk perceived by the rating notations (Afonso, Gomes and Rother, 2007).

A study which took into account the recent crisis has been carried out by Teker, Pala and Kent (2013). The period analysed stretched from1998 up to 2010 while the data covered23 countries: 13 developed markets and 10emerging markets with cross sections such as pre crises, post crises, BRIC membership, EU membership, OPEC membership, shipbuilder country and platinum reserved country. On the whole, it was proved that the level of ratings has an impact on the interest rates in the international financial markets whereas sovereign ratings also influence credit ratings of national banks and companies (Teker, Pala and Kent 2013, 122-132). After the crisis faced in 2008, developed and developing countries changed their monetary and fiscal policies. In effect, rating agencies modified criteria and weights used.

III. Methodology

a) Data sources, descriptive analyses and estimation technique

The research involves three steps. The first one strives to distinguish the most important determinants likely to affect the credit rating assessment for European countries. The next step relies on the analysis of the mentioned factors on the economic and political divisions. I also sought to verify how the communication effect influences the credit rating assessment across European countries.

Credit rating data published by S&P and Moody's are leveraged for estimation process. Moody's long term Issuer Rating, S&P long term Issuer Rating and S&P short term Issuer Rating from Thomson Reuters database are collected. Moreover, I take into consideration credit ratings for particular countries over2002 – 2012. My decision is motivated by the limited availability of macroeconomic determinants for all countries and small changes in the credit rating assessment. I also desire to examine whether the principal factors influencing credit rating assessment proposed in previous researches are subject to change. Overall, I incorporate credit ratings evaluation for 45 European countries.

Macroeconomic variables used in research are obtained from the World Bank database.

b) Political and economic development criterion subsamples

At this phase I conduct the analysis in subsamples. The first one encompasses a full sample of European countries. The second group comprises the following: European Union, non-European Union,

Eurozone, non-Eurozone, Central and Eastern Europe. Subsequently, countries divided by their economic development from high – income non OECD members, high – income OECD members, lower - middle income economies, low – income economies and upper – middle income economies are considered. The final version of the division is presented in Tables 2 and 3.

Table 2 : The European political criterion subsamples

Political divisions	*Countries*
European Union	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Spain, Netherland, Ireland, Lithuania, Luxemburg, Latvia, Malta, Germany, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, Hungary, Great Britain, Italy
Non-European Union countries	Albania, Armenia, Belarus. Bosnia and Herzegovina, Montenegro, Georgia, Island, Lichtenstein, Macedonia, Moldavia, Norway, Russia, Serbia, Switzerland, Turkey, Ukraine
Eurozone	Austria, Belgium, Cyprus, Estonia, Finland, France, Spain, Greece, Netherland, Ireland, Luxemburg, Latvia, Malta, Germany, Portugal, Slovakia, Slovenia, Italy
Non – Eurozone Countries	Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Czech Republic, Denmark, Georgia, Island, Lichtenstein, Lithuania, Macedonia, Moldavia, Norway, Poland, Romania, Russia, Serbia, Switzerland, Sweden, Turkey, Ukraine, Hungary, Great Britain.
Central and Eastern Europe	Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Czech Republic, Estonia, Lithuania, Latvia, Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, Ukraine, Hungary.

Source: own calculation.

Table 3 : The European economic development criterion subsamples.

Economic dev. divisions	*Countries*
High – income OECD members	Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Island, Ireland, Italy, Luxemburg, Netherland, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Great Britain.
High – income non OECD members	Croatia, Cyprus, Lichtenstein, Malta.
Lower - middle income economies	Belarus, Bosnia and Herzegovina, Bulgaria, Latvia, Lithuania, Macedonia, Montenegro, Romania, Russia, Serbia, Turkey,
Low – income economies	Albania, Armenia, Georgia, Moldavia, Ukraine,

Source: own calculation

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

$$y_{i,t} = \sum_{k=1}^{n} \alpha_k y_{j,t-k} + \sum_{k=0}^{n} \beta_k x_{j,t-k} + \theta_t T_t + \mu_j + \varepsilon_{j,t}, n = 0,2 \quad (1)$$

where:

$y_{i,t}$ is the credit rating assessment examined (Moody's long term issuer credit rating, S&P long term issuer credit rating, S&P short term issuer credit rating) for: all European countries, EU states, non-EU states, Eurozone states, non-Eurozone states, Central and Eastern Europe states, high – income non OECD members, high – income OECD members, lower - middle income economies, low – income economies and upper – middle income economies;

$x_{j,t}$ is a vector of explanatory variables, i.e.:

$$x_{i,j} = \begin{bmatrix} GDPg_{j,t}, GDPpcc_{j,t}, GDPcur_{i,j}, GDPc_{i,j}, sav_{i,j}, expgdp_{i,j}, \\ expcur_{i,j}, expcon_{i,j}, impgdp_{i,j}, impcon_{j,t}, impcur_{j,t}, \\ cab_{i,j}, cabcur_{i,j}, intpay_{i,j}, extgni_{i,j}, extcur_{i,j}, fdinet_{i,j}, \\ stdebt_{i,j}, tot_{j,t}, res_{j,t}, csdef_{i,j}, unemp_{i,j}, cpi_{i,j}, moncur_{i,j}, \\ montrr_{i,j}, cred_{i,j}, credgdp_{i,j}, fdigdp_{j,t}, oer, reer_{i,j}, \\ claim_{i,j}, debt_{i,j}, longex_{i,j}, pubex_{i,j}, centr_{i,j}, inter_{i,j} \\ rev_{j,t}, expen_{i,j}, bond_{i,j}. \end{bmatrix},$$

where:

$GDPg_{i,j}$ is the GDP growth, $GDPpcc_{i,j}$ isthe GDP per capita in constant prices (2005), $GDPcur_{i,j}$ is the GDP per capita in current prices, $GDPc_{j,t}$is the value of GDP in current prices; $sav_{j,t}$is the value of gross domestic savings as a percentage of GDP, $expgdp_{i,j}$ is the value of export of goods and services divided by the value of GDP, $expcur_{i,j}$ is the value of export of goods and services in current prices, $expcon_{i,j}$ is the export of goods and services in constant prices,$impgdp_{i,j}$ is the total value of import of goods and services divided by the value of GDP, $impcon_{i,j}$ is the imports of goods and services in constant prices, $impcur_{i,j}$ is the value of imports of goods and services in current prices, $cab_{i,j}$ isthe value of current account balance divided by the value of GDP, $cabcur_{i,j}$ is the value of current account balance in current prices, $intpay_{i,j}$ are the interest payments on the external debt, $extgni_{i,j}$ is the present value of external debt divided by GNI, $extcur_{j,t}$is the present value of external debt in current prices, $fdinet_{j,t}$ is the net flows in current prices of the foreign direct investment, $stdebt_{i,j}$ is the short term debt, $tot_{i,j}$ is the terms of trade adjustment in constant prices,$res_{i,j}$ is the total reserves in current prices, $csdef_{i,j}$ is the value of cash surplus divided by the deficit, $unemp_{i,j}$ is the unemployment rate, $cpi_{j,t}$ is the consumer price index, $moncur_{j,t}$ is the money and quasi money in current LCU,$montrr_{i,j}$ is the money and quasi money to total reserves ratio, $cred_{i,j}$ is the value of domestic credit provided by financial sector as a percent of GDP, $credgdp_{i,j}$ is the domestic credit to private sector by banks to GDP, $fdigdp_{i,j}$ are net flows of foreign direct investment as a percentage of GDP,$oer_{i,j}$ is the official exchange rate, $reer_{i,j}$ is the real effective exchange rate index, $claim_{i,j}$ are claims on central government as a percentage of GDP, $debt_{i,j}$ is the value of debt service in external debt in current prices, $longex_{i,j}$ is the long term public external debt stocks, $pubex_{j,t}$ is the public and publicly guaranteed external debt stocks, $centr_{j,t}$ is the central government debt as a percentage of GDP,$inter_{i,j}$ are the interest payments as a percentage of revenues, $rev_{i,j}$ is the value of revenue excluding grants as a percentage of GDP, $expen_{i,j}$ is the value of expenses to GDP, $bond_{i,j}$ is public bond market capitalization to GDP.

To analyse the impact of the previous credit rating on the current country's standing we use the Arellano Bond linear dynamic panel data estimation. The final version of the model is given by equation (2) below:

$$y_{i,t} = \sum_{k=2}^{2} \alpha_k y_{j,t-k} + \sum_{k=0}^{2} \beta_k x_{j,t-k} + \theta_t T_t + \mu_j + \varepsilon_{j,t}, \quad (2)$$

where:

$y_{i,t}$ is the credit rating assessment examined (Moody's long term issuer credit rating, S&P long term issuer credit rating, S&P short term issuer credit rating) for all European countries;
$x_{j,t}$ is a vector of explanatory variables, i.e.:

$$x_{i,j} = \begin{bmatrix} GDPg_{j,t}, GDPpcc_{j,t}, GDPcur_{i,j}, GDPc_{i,j}, sav_{i,j}, expgdp_{i,j}, \\ expcur_{i,j}, expcon_{i,j}, impgdp_{i,j}, impcon_{j,t}, impcur_{j,t}, \\ cab_{i,j}, cabcur_{i,j}, intpay_{i,j}, extgni_{i,j}, extcur_{i,j}, fdinet_{i,j}, \\ stdebt_{i,j}, tot_{j,t}, res_{j,t}, csdef_{i,j}, unemp_{i,j}, cpi_{i,j}, moncur_{i,j}, \\ montrr_{i,j}, cred_{i,j}, credgdp_{i,j}, fdigdp_{j,t}, oer, reer_{i,j}, \\ claim_{i,j}, debt_{i,j}, longex_{i,j}, pubex_{i,j}, centr_{i,j}, inter_{i,j} \\ rev_{j,t}, expen_{i,j}, bond_{i,j}. \end{bmatrix},$$

T_t is a vector of year-dummies;

μ_j is an unobservable time-invariant country effect.

To analyse the communication effect between credit rating agencies and its impact on the current country's standing we use the Arellano Bond linear dynamic panel data estimation. To estimate this phenomenon, monthly data are used. The final version of the model is given by equation (3) below:

$$y_{i,t} = \sum_{k=3}^{2} \alpha_k y_{j,t-k} + \sum_{k=3}^{2} \beta_k x_{j,t-k} + \theta_t T_t + \mu_j + \varepsilon_{j,t}, \quad (3)$$

where:

$y_{i,t}$ is the credit rating assessment examined (Moody's long term issuer credit rating, S&P long term issuer credit rating, S&P short term issuer credit rating) for all European countries;

$x_{j,t}$ is a vector of explanatory variables(the rest of credit rating agencies notes);

T_t is a vector of year-dummies;

μ_j is an unobservable time-invariant country effect.

c) Estimation technique

To examine the link between the credit rating assessment and factors likely to influence the received assessment as well as the direction of the relationship, panel data models are employed. I use static and dynamic panel data models.

Static panel data models, including models with fixed and random effects estimator are harnessed to analyse the influence of the macroeconomic data variables. The Hausman test is used to distinguish between fixed and random effects, where the null hypothesis is that the preferred model is a 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. Also, the Breusch – Pagan Lagrange Multiplier test is exploited 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.

To analyse the impact of the historical credit rating data and the communication effect we use dynamic panel data models, especially one – step Arellano – Bond (1991) GMM difference estimator for panel data with lagged dependent variable. If the specification tests render it necessary, we apply the two-step estimation technique based on the Wind meijer test.

Due to the fact that the consistency of GMM estimator depends on the validity of instruments, we consider two specification tests suggested by Arellano and Bond (1991). Only for homoscedastic error term does the Sargan test have an asymptotic chi-squared distribution. In fact, Arellano and Bond (1991) show that the one – step Sargan test over rejects in the presence of heteroscedasticity. Rejection of the null hypothesis suggests that the over identifying restrictions are valid, and implies the need to reconsider our model or our instruments, unless we attribute the rejection to heteroscedasticicty in the data-generating process. The alternative is the two – step estimator.

The Arellano – Bond test measures first and second –order autocorrelation in the first – differenced errors. When the idiosyncratic errors are independently and identically distributed, the first – differenced errors are first – order serially correlated.

Arellano and Bond recommend against using the two – step non-robust results for inference on the coefficients, because the standard errors tend to be biased downward. To overcome this problem we also apply the Windmeijer test.

d) Estimation results

Credit rating determinants have changed over recent years. Numerous researches placed their focus on the same determinants while analysing different credit rating assessment. As a result, the observation of the methodology deployed by particular credit rating agencies provide completely different variables.

One of the most important factor, presented in the over-mentioned statements, is the stage of the economic development. The previous studies analysed the influence of the gross domestic product or the gross national product per capita. The analysis carried out in compliance with the information presented in credit rating agencies methodology, the GDP growth is taken into consideration. In the case of the Moody's assessment process it is an important determinant for European countries, but the strength of its impact is different for particular subsamples. It is observed the higher influence for EU states, especially the Eurozone. The same conclusion is formed for the developed economies according for the World Bank classification. The strength of this factor is weaker for the developing economies. The same conclusion is observed for the S&P's long term issuer ratings, but the differences are not as strong as in the case of Moody's assessment. The most sensitive rating on the over – mentioned factor is the S&P's short – term rating.

The next distinguishing factor is the track record of country's default. In previous researches it is one of the most important determinants. In the case of the Moody's credit rating assessment, countries with solvency problems received notes lower by 6 degrees. In practice, countries that belong to the European Union do not have the high credit risk, and thus the mentioned factor has not been taken into consideration. The analysed phenomenon is characteristic for the less developed economies. It is not an important determinant for the process of the both S&P's long and short term issuer rating.

The uneconomical factors are more important for the European Union countries, especially for Eurozone states. It is the characteristic phenomenon for

the developed economies, especially for the Moody's assessment process.

Moreover, the value of the gross domestic savings as a percent of GDP is also taken into account. We assumed that with the higher value of savings, the countries default risk should decrease. The mentioned correlation is especially high for the Eurozone. In the short-term the high propensity to save has a negative influence on the received credit rating. Meanwhile, it is believed that savings contribute to higher stability in terms of credit risk, and trigger diminished economic growth by reducing the bank credit activity, and hence lower inflation, which confirms the analysis carried out for the European countries according to the level of economic development.

Further determinants considered are indices of exports and imports. It turns out that there is a significant statistical relationship between these indicators and the credit rating of the broadcast by Moody's. The situation proves to be different in subsamples. The higher the value of exports in relation to GDP, the higher the credit rating is assigned to a country. Exports fuel the economic growth, and tend to be particularly important for developing countries, and thus a stronger positive relationship across these groups is noted. The high level of import is observed for developed countries. In this case, it positively affects the credit rating, but it is not the outcome of favorable trade and the same characteristics of the economies. The value in terms of trade is statistically significant, but analysed relationship is very weak. The influence of the factors examined is stronger for the short time period. It can be an effect of the conviction that the situation should be stabilized in long term.

The level of foreign exchange reserves should be revealed as the next indicator of the economic stability in terms of solvency risk. It turns out that this variable significantly affects the credit rating statement, while the strength of its impact is weak. It should be explained by the low value of foreign exchange reserves relative to GDP held by countries, particularly developed ones.

Another variable is the level of the budget deficit. It is statistically insignificant for the entire study sample. Interesting results are provided by the observation of particular subgroups. The value of the budget deficit for the European Union is irrelevant. While for the Eurozone a positive correlation is observed. During the credit rating estimation process, countries that are outside of the Eurozone receive lower credit ratings if they noticed the high value of the analyzed factor. The same situation is observed for countries that do not belong to the European Union and the Central - Eastern European economies. The information about the value of the budget deficit is more important for the developed countries. This is due to the fact that the Eurozone countries maintain the high value of the budget deficit. The accession of these countries to a group of highly developed economies does not affect the analysed relationship, because this phenomenon is not observed in the group of OECD countries. However, the negative correlation between high budget deficit and credit standing is observed, as in the case of highly developed non-OECD countries. This relationship is stronger for the developing economies.

The next two factors that are referred to in the credit rating statements reports are the unemployment rate and the inflation rate measured by the consumer price index. The analysis of all European countries found that only the consumer price index has a positive effect on the Moody's long term issuer rating. For countries of the European Union, an increase in the unemployment rate causes a strong growth in the default risk, while the small (lower than for all European countries) inflation rate affects incentives for the researched group. For countries outside the European Union the influence exerted by the rate of unemployment is much weaker. The credit standing of the Eurozone countries is not significantly dependent on the level of inflation or unemployment. For countries not belonging to European Union or Eurozone the situation resembles that prevailing in the EU states. It is only the result of the political division and non-compliance with the Maastricht Treaty by Eurozone countries. Such a relationship is not observed for the division in terms of the level of economic development. For the countries belonging to the OCED, credit standing is negatively correlated with the value of the unemployment rate and inflation. For less developed countries economically the CPI is a more important indicator. Its strength decreases with the level of the country's wealth. The unemployment rate is not contained in the S&P's methodology. The most important factor is the inflation rate. While performing research, I found out that this indicator is also important for this credit rating agency. It can be a result of the communication effect or the connection with the inflation rate according to the Philips curve.

The level of money supply measured by M2 to the total value of foreign exchange reserves is statistically significant only for the developing economies. The analysed relationship is negative. That is the result of fear of having an overly excessive surplus of money over the reserves in order to reduce the debt by its recollection group of countries.

The previous researches mentioned the positive impact of the credit lending activity on the financial condition of the economy. The value of domestic credit granted to private sector by banks as a percent of GDP and the value of domestic credit provided by financial institutions as a percent of GDP are taken into account. The second factor mentioned is a negative correlated with the credit rating assessment. It can be an effect of the opinion that shadow banking institutions are characterized by higher credit risk. This phenomenon is

observed for all types of credit rating received by countries. Its strength is higher in the short – term. The value of domestic credit granted to private sector by banks has a positive impact on the country's standing. The analysed relationship is stronger for the developed countries. The lax regulated supervision of the financial sector and more advanced activities of shadow banking reduce the positive influence on the banking credit activity. The researched phenomenon has the weaker impact in short – term period.

The depreciation of the exchange rate contributes to the deterioration of the credit standing of both the countries belonging to the European Union, as well as the Eurozone subsample. This relationship is very weak for the level of economic development.

The analysis embraces the impact of the historical credit ratings on the European country's standing. The positive influence of the previous credit ratings noted by particular agencies is observed. A stronger relationship is presented on the first lags. The analysis of the credit rating determinants by Arellano – Bond method confirms the received results. The strong relationship is apparent between the value of exported goods and services and the received credit ratings. This impact is higher for the short term period of the analysis. The value of imports is important only for the short term. If the variable mentioned is higher, the credit rating received is lower. The next significant variable is the budget deficit. But this factor is also relevant only for the short term credit rating. In statements presented by particular agencies it can be found the information about the significant influence of the inflation ratio measured by CPI and the unemployment ratio. The last factor is negatively correlated with all credit ratings, but especially with S&P's short term issuer rating. The consumer price index is taken into consideration, especially by the S&P's, and thus the stronger ratio for the short term is observed. The deprecation of the currency is the significant determinant for the long term prediction. As in previous researches, the important determinants are those connected with the non-economic factors, especially for the short term analysis. The received results corroborate the previous analysis and place an emphasison the influence of the historical notes on the received credit rating.

Credit rating agencies are not willing to make changes in the country's notes. At the same time a strong correlation between changes made by particular institutions should be noted, thereby giving rise to the communication effects. This phenomenon can be observed on yearly database.

IV. Conclusions

The country's credit rating plays an important role in taking investment decisions. The observation of certain factors can predict changes to the country's credit standing. When analysing the level of economic development or political subdivision, varying strength and direction of change, or even non-reaction from the credit rating agency may be reported. It turns out that the countries that previously had solvency problems, receive a definitely lower rating. The countries not belonging to the Eurozone or the European Union should enjoy GDP growth, because its changes are key for the credit rating assessment. The standing of the Eurozone countries is insensitive to information on the GDP growth. The high level of savings guarantee the greater credit risk stability. On the other hand, it can reduce the economic growth by limiting the bank credit activity. That opinion confirms the analysis carried out for the European countries according to the level of economic development. The level of exports is especially important in the case of developing countries, hence a stronger positive relationship in these groups. The high level of imports observed for economically developed countries has a positive effect on the credit rating, but it is not the outcome of a favorable trade and the same characteristics of the economies. The level of foreign exchange reserves practically does not influence the country's credit standing. It can be explained by the low value of the foreign exchange reserves held by countries, particularly those developed ones. In countries that belong to the Eurozone, budget deficits are not key factors in taking decisions by credit rating agencies. The tested negative correlation is stronger for the developing countries. An increase in the unemployment rate causes a strong insolvency risk for the European Union countries. The lower (less than for the total researched European countries) inflation rate affects incentives for the tested dependent variable. The influence of the unemployment rate is weaker for countries that not belong to the European Union. The credit standing of the Eurozone countries is not significantly dependent on the level of inflation or unemployment. The negative correlation between the unemployment rate and the inflation rate is observed for the subsample of countries belonging to the OCED with their credit rating. For less economically developed countries the CPI is a more important indicator, but its strength falls with the country's wealth. The high level of money supply measured by M2 to the total value of foreign exchange reserves has a negative effect on the credit rating of the developing countries as a result of fears of debasement. The lax shadow banking lending activity contributes the default risk. A large share of domestic credit provided by banking as a percent of GDP has a positive effect on the country's standing. The depreciation of the exchange rate contributes to the deterioration of the credit standing of both the countries belonging to the European Union, as well as the Eurozone subsample.

The study displayed indicates the wide use of non-economic factors, especially in the case of the

Eurozone. Moreover, it reveals the low sensitivity to changes in credit ratings of some determinants given for the research group, which may indicate a relctance in correcting credit standing of these countries.

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Table 4 : The determinants of Moody's long term issuer credit rating according to political and economic development divisions

Independent variables	Political divisions												Economic development divisions/							
	Europe		UE		non UE		EURO		non EURO		CEE		high OECD		high non		middle		low	
	OLS		FE		OLS		OLS		FE		RE		RE		OLS		OLS		OLS	
	Coef.	t	Coef	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
defaultm	-31,1281	*			-30,1653	*			-28,2693	*									-26,2	*
gdpg					0,4478	*	-0,3851	*	0,2343	*					0	***				
gdppcc	0,0028	*			0,0012	*	-0,0034	*	0,0007	***	0,0023	*	0	*			0,01	*	0,02	*
gdpcur					-0,0003	*	0,0015	*			0	***			0	*	0	*		
sav	0,8636	*					1,7516	*	0,3788	*	0,7612	*					1,39	*	-0,29	*
expgdp			-0,385	*	-0,191	*			-0,1167	***	-0,6324	*	-0,14	*	-0,09	***	-1,01	*	0,24	*
impgdp			0,3701	*	-0,3243	*	-0,5486	*			0,6542	*					1,13	*		
csdef					-0,6456	*	1,1469	*	-0,5378	*	-0,7618	*			-0,16	***	-0,77	*	-0,52	**
unemp			-0,504	*	-0,1571	***			-0,3732	*			-1,9	*						
cpi	0,1244	*	0,093	**					0,0405	**			-0,25	*			0,24	*	-0,07	*
montrr									-0,1858	**									-3,83	*
cred	-0,1574	*	0,1944	*	-0,2756	*	1,25	*			-0,0676	**	-0,15	***			-0,61	*		
credgdp			-0,1825	*	0,4014	*	-1,1818	*	0,0599	**			0,18	**			0,49	*		
fdigdp					0,5915	*	0,4865	**	0,1343	*										
oer	-0,011	*	-0,1356	*	0,007	*	0,1615	*	0,0051	***							-0,01	*	0,04	*
claim											0,2678	*					0,48	**		
cons	24,6104	*	75,374	*	50,8696	*	90,7763	*	47,7188	*	24,7006	*	128,4	*	67,51	*	-25,9	*		
Hausmann			0						0		0,1032		0,33							
Chi			0						0		0		0							
xttest			0						0		0		0							
Rsq	0,8568				0,9867		0,9157								0,98		0,88		1	
F	0				0		0								0		0		0	

Source: own calculations.

Table 5 : The determinants of S&P's long term issuer credit rating according to political and economic development divisions

Independent variables	Political divisions												Economic development divisions					
	Europe		UE		non UE		EURO		non EURO		CEE		high OECD		high non		middle	
	FE		FE		OLS		OLS		RE		FE		OLS		OLS		OLS	
	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	T	Coef,	t	Coef,	t	Coef,	t	Coef,	t
Defaultm																		
Gdpg	0,3396	*	0,2619	*	0,4309	*	-0,4068	***			0,3277	*	0,351	***	-0,6134	*		
Gdppcc					0,0015	*			0,0012	*			0,0004	*			0,0065	*
Gdpcur					-0,0006	*			-0,0002	*							-0,0031	*
Sav							1,5102	*	0,3401	**			0,5595	*	0,5479	**	0,5671	*
Expgdp							-1,4256	*	-0,2721	**			-0,1688	*	0,2141	*	-0,2505	**
Impgdp							1,3845	*	0,2497	**							0,5773	*
Csdef									-0,3632	*					0,3491	*		
Unemp	-0,7852	*	-0,7774	*	0,3678	*	0,799	*	-0,4887	*	-0,7292	*	-1,3023	*			-0,2506	*
Cpi					0,0412	**									-0,7503	*	0,1617	*
Montrr			0,2357	***	0,7964	***	4,3099	*			1,6783	*	-0,0113	*				
Cred					-0,7748	*	1,046	*	-0,2259	*							-0,5088	*
Credgdp					0,8598	*	-0,8898	*	0,2089	*					0,1039	*	0,425	*
Fdigdp					0,2227	*												
Oer	0,0099	*	-0,2255	*	0,0102	*	0,1691	*			0,0109	*					-0,0113	*
Claim					0,4871	*					-0,1938	***						
_cons	69,9123	*	85,2832	*	20,0665	*			45,6285	*	61,5858	*	78,239	*	119,5326	*		
Hausmann	0,0005		0						0,247		0							
Chi	0		0						0		0							
Xttest	0,00056		0						0		0							
Rsq					0,9816		0,9965						0,6955		0,9854		0,9912	
F					0		0						0		0		0	

Source: own calculations.

Table 6 : The determinants of S&P's short term issuer credit rating according to political and economic development divisions

Independent variables	Political divisions												Economic development divisons					
	Europe		UE		non UE		EURO		non EURO		CEE		High OECD		high non		middle	
	FE		FE		RE		OLS		FE		OLS		OLS		OLS		OLS	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Gdpg	0,6403	*	0,4495	*	0,4256	*	-0,9811	*	0,3025	**			0,5316	**	0,2753	***		
Gdppcc					0,0014	*	-0,0053	*			0,0049	*					0,0076	*
Gdpcur					-0,0005	*	0,0029	*	-0,0002	***	-0,0012	*	0,0004	*			-0,0031	*
Sav					-0,2196	*	2,2223	*					-1,6703	*				
Expgdp	0,7266	*					-1,9132	*					1,087	*	0,1123	**		
Impgdp	-0,6446	*					0,7616	*			0,5064	*	-0,8736	*			0,5158	*
Csdef					0,4975	***	1,3749	*							-0,2063	***	1,1712	*
Unemp	-2,3927	*	-1,4304	*					-0,9361	*	-0,7032	*	-1,8296	*	-2,3445	*	-0,805	*
Cpi							1,1932	*	0,0667	**	0,1511	*	0,1818	***			0,1273	*
Montrr					1,4091	**	9,1622	*					0,4557	*				
Cred							3,6964	*	-0,3386	*	-0,4433	*						
Credgdp					0,1347	*	-4,0464	*	0,3193	*	0,3156	*			0,0433	*		
Fdigdp							0,8086	*										
Oer			-0,2842	**	0,0084	*	0,4701	*	0,0144	*			0,0759	*				
Claim					0,2402	**	-0,8274	*										
_cons	89,6656	*	93,5796	*	24,5141	*			65,6098	*			99,4274	*	87,5809	*		
Hausmann	0		0		0,1093				0									
Chi	0		0		0				0									
Xttest	0		0		0,0476				0									
Rsq							0,998				0,9759		0,8394		0,9838		0,9746	
F							0				0		0		0		0	

Source: own calculations.

Table 7 : The determinants of Moody's long term issuer credit rating

Independent variables	Political divisions												Economic development divisions							
	Europe		UE		non UE		EURO		non EURO		CEE		high OECD		high non		middle		low	
	FE		FE		FE		FE		FE		RE		FE		RE		RE		FE	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
defaultm	-21,83	**			-26,46	*			-26,09	*									-25,84	*
gdpg	0,41	*	0,59	*	0,01		0,87	*	0,04		0,30	*	0,77	*	0,90		0,16		0,07	
_cons	73,76	*	133,59	*	51,03	*	85,25	*	63,42	*	57,72	*	88,84	*	65,11	*	48,28	*	32,27	*
Hausmann	0		0		0		0		0		0,7318		0		0,9647		0,9448		0	
Chi	0		0		0		0		0		0		0		0		0		0	
xttest	0		0		0		0		0		0		0		0		0		0	

Source: own calculations.

Table 8 : The determinants of S&P's long term issuer credit rating

Independent variables	Political division												Economic development divisionS					
	Europe		UE		non UE		EURO		non EURO		CEE		high OECD		high non		middle	
	FE		FE		FE		FE		FE		RE		FE		FE		RE	
	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t
Defaultm																		
Gdpg	0,59	*	0,71	*	0,28	*	0,97	*	0,26	*	0,45	*	0,76	*	0,82	*	0,40	*
_cons	73,23	*	79,52	*	56,13	*	83,52	*	64,40	*	54,71	*	87,04	*	71,93	*	46,73	*
Hausmann	0		0		0		0		0		0,9734		0		0		0,7848	
Chi	0		0		0		0		0		0		0		0		0	
Xttest	0		0		0		0		0		0		0		0		0	

Source: own calculations.

Table 9 : The determinants of S&P's short term issuer credit rating

Independent variables	Political divisions												Economic development divisions					
	Europe		UE		non UE		EURO		non EURO		CEE		HighOECD		high non		middle	
	FE		FE		FE		FE		FE		RE		FE		FE		RE	
	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t	Coef,	t
Defaultm																		
Gdpg	0,75	*	0,98	*	0,20	***	1,24	*	0,34	*	0,68	*	0,86	*	1,19	**	0,67	*
_cons	72,58	*	80,42	*	51,83	*	86,77	*	60,43	*	51,65	*	89,41	*	72,08	*	39,28	*
Hausmann	0		0		0		0		0		0,8323		0		0		0,9023	
Chi	0		0		0		0		0		0		0		0		0	
Xttest	0		0		0		0		0		0		0		0		0	

Source: own calculations.

Table 10 : The determinants of the issuer credit rating for European countries by using the Arellano Bond linear dynamic panel data estimation

Dependent variable	Moody's		S&P's long		S&P's short	
	Coef	t	Coef	t	Coef	t
L1.	0,40962	*	032968	*	0,22500	**
L2.	0,13488		0,20970	***	0,07909	
Gdpg	0,15099		0,09995		0,30463	
Gdppcc	-0,00052		-0,00057		-0,00159	
Sav	-0,12303		0,01143		-0,54401	
Expgdp	0,28300	***	0,26041	***	1,20377	*
Impgdp	-0,11533		-0,03838		-0,64927	**
Csdef	0,11141		0,24176		1,05978	**
Unemp	-0,50381	*	-0,41273	**	-1,37844	*
Cpi	-0,06836		-0,23705	*	-0,33679	*
Montrr	-0,04434		0,17503		0,04935	
Cred	0,10996		0,12555		0,44515	
Credgdp	-0,05506		-0,10053		-0,30877	
Fdigdp	-0,03828		-0,07465		-0,06932	
Oer	-0,16427	***	-0,19564	**	0,10974	
Claim	-0,04954		-0,11171		-0,37609	***
_cons	50,58799	*	78,01331	*	99,63164	*
Sargan	0,07420		0,19170		vce(robust)	
abond (1)					0,01310	
abond (2)					0,36190	

Source: own calculations.

Table 11 : The communication effect between credit rating agencies for European countries notes by using the Arellano Bond linear dynamic panel data estimation

Dependent variable	Moody's		Dependent variable	S&P's long		Dependent variable	S&P's short	
	Coef	t		Coef	t		Coef	t
Moodys			spslong			spsshort		
L1.	0,2299		L1.	-0,0400		L1.	0,0045	
L2.	-0,0729		L2.	-0,1403		L2.	-0,2148	*
Spslong			moodys			moodys		
--.	0,9526	*	--.	0,3794	*	--.	-0,0442	
L1.	0,3181	**	L1.	0,1209		L1.	-0,0646	
L2.	-0,0576		L2.	-0,0284		L2.	-0,1412	
Spsshort			spsshort			spslong		
--.	-0,0290		--.	0,2907	*	--.	1,3400	*
L1.	-0,1743	***	L1.	0,0632		L1.	0,2573	
L2.	0,1516		L2.	-0,0349		L2.	0,2816	
_cons	-25,2914	*	_cons	30,8487	*	_cons	-32,1433	*
abond(1)	0.0000		abond(1)	0.0238		abond(1)	0.0035	
abond(2)	0.8948		abond(2)	0.6233		abond(2)	0.4251	

Source: own calculations.