BANKS AND SHAREHOLDERS CREDIT RATINGS – EVIDENCE FROM THE EUROPEAN MARKET

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Abstract

The aim of this paper is to analyse the factors influencing banks' credit ratings, taking into consideration shareholders' credit ratings. A literature review has been prepared, and as a result the following hypotheses have been put: Firstly, banks' credit ratings are determined by the financial factors measured by CAMEL and macroeconomic determinants. Secondly, countries' and shareholders' credit ratings influence banks' notes statistically significantly. Long-term issuer credit ratings proposed by smaller and bigger credit rating agencies have been used for the analysis. To verify the presented hypotheses ordered logit panel data models have been used. The research has been prepared based on quarterly data for the assessed European banks listed on the stock market. The data collected comes from the Thomson Reuters Database for the period between 1998 and 2016.

Contents

1. Introduction

Credit rating agencies play a significant role, especially in assessing default and credit risk. They are useful especially for banks and investors. Banks use them to estimate creditworthiness when exchanging SWIF codes in correspondent banking, or taking investment decisions. The mentioned institutions are the most important users of credit rating agencies. Yet until recently the opinion about credit ratings has been undermined. In the current studies we can find information saying that agencies react too slowly to the situation on the financial market. As a result, the current regulations tend to limit the role of credit rating agencies (CRAs). They assume reduction of the oligopoly of the three biggest CRAs, that is, Standard & Poor's, Moody's, and Fitch. They also relay on moving away from the standardized internal ratings-based approach. Another of these methods rejects using the ratings proposed by CRAs but imposes an obligation on banks to assess their own creditworthiness by themselves. According to the current analyses, the mentioned method is ineffective, because banks give higher notes than credit rating agencies, which suggests that they underestimate the default risk.There are no studies about the impact of the type of investors, their credit ratings on banks' notes. In methodologies we can find information about considering the probability of financial support from the parent company or government for a subsidiary, but the impact of the condition of a country or investors on banks' notes, has not been verified.

Hence, the aim of this paper has been to analyse the factors influencing banks' credit ratings, taking the shareholders' credit ratings into consideration. A literature review has been prepared, and as a result the following hypotheses have been put: Firstly, banks' credit ratings are determined by the financial factors measured by CAMEL and macroeconomic determinants. Secondly, countries' and shareholders' credit ratings statistically significantly influence banks' notes. Long-term issuer credit ratings proposed by smaller and bigger credit rating agencies have been used for the analysis. To verify the presented hypotheses ordered logit panel data models have been used. The research has been prepared based on quarterly data for the assessed European banks listed on the stock market.

The paper has been organized as follows: Section 2 is a description of the previous research about the factors influencing banks' credit ratings, taking the type of investors into consideration. Next data description and methodology has been presented in order to verify the presented hypotheses. Section 4 is a presentation of the received findings with conclusions.

2. Literature review

In most cases the analyses about factors that can influence issuers have been prepared for one, but never more than three credit rating agencies. The mentioned analyses have been made especially for countries and corporate institutions. There are still no studies about the factors determining credit ratings of more significant users of the mentioned notes – banks. The factors that are used by credit rating agencies can be divided into two groups: financial and qualitative indicators. The best effect of the assessment of default risk can be obtained with a combination of both of the

mentioned groups of indicators (Grunert et al., 2005). In this paper an analysis of the financial factors that can impact the analysis of credit ratings changes has been prepared the. The mentioned situation has been strictly connected with the strong differentiation between qualitative indicators and the types of credit rating agencies. In the analysis the first group of factors taken by CRAs are financial indicators. The qualitative measures are treated as complementary factors. According to research prepared by Karminsky and Khromova (2016) only some indicators influence significantly credit ratings. The mentioned factors include risk appetite, economic and operational conditions, and financial ratios, including: profitability, liquidity, efficiency, capital adequacy, asset quality, and quality of management. All of the mentioned factors explain from 62% to 95% of model changes. Cole and White (2012 put attention to equity and CAMEL indicators as those factors that have a significant impact on banks' credit ratings changes. CAMEL factors, including capital adequacy, assets quality, management quality, earnings, liquidity indicators, are taken into consideration in varied options. As a result, the mentioned group of indicators can be classified into the following groups: capital adequacy (Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Chodnicka-Jaworska, 2016), earnings (Pagratis, Stringa, 2007; Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Poon et al., 1999), effectiveness (Pagratis, Stringa, 2007; Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Poon et al., 1999), liquidity (Pagratis, Stringa, 2007; Shen et al.., 2012; Bissoondoyal-Bheenick et al., 2011; Chodnicka-Jaworska, 2016), short-term interest rates (Pagratis, Stringa, 2007; Poon et al., 1999), bank size (Pagratis, Stringa, 2007), assets quality (Poon et al., 1999; Chodnicka-Jaworska, 2016; Estrella et al., 2000), management quality (Chodnicka-Jaworska, 2016). Different opinions have been presented about the impact of countries' default risk. In the research prepared by Belotti et al. (2011) a statistically significant impact of the country's condition on the mentioned ratings has been presented. On the other hand, Poon et al. (1999) did not observe the mentioned relationship. The macroeconomic influence on banks' credit ratings has also been verified by Bissoondoyal-Bheenick and Treepongkaruna (2011). Hassan and Barrell (2013) found that the size, assets liquidity, efficiency and earnings of banks have the strongest influence on their notes. Similar results were obtained by Öğüt et al. (2012).

The analysis of the significance of the mentioned variables has been prepared in subsamples. For example, the size of banks and the banking sector (English, Nelson, 1998; Nakamura, Roszbach, 2016; Traeacy, Carey, 2000; Hau et al., 2012; Jacobson et al., 2006) has been verified. The received results suggest that if a bank is bigger, the received ratings are higher. Kedia et al. (2015) verified the impact of the changes of shareholders on the notes given by Moody's. The notes of the mentioned entities were higher than those given by S&P's. Also the way of financing credit ratings has been taken into consideration in the research. The ratings paid by issuers are higher than those paid by investors (Cornaggia, Cornaggia, 2010; Chodnicka-Jaworska, 2016). The prepared studies give also ambiguous results about the impact of a business cycle on banks' ratings. Bar-Isaac and Shapiro (2011, 2012) found that ratings are anticyclical because more profitable, by taking the reputational risk, is given less precise ratings during a period of prosperity than during a crisis. Karminsky and Khromova (2016) suggested that S&P's and Moody's are more conservative agencies, taking the moment of a business cycle into account. The analysis about the impact of the Brezigar-Masten et al. (2015) found that during an economic downturn precision in predicting credit ratings is lower for smaller banks and those with a

national capital. Hau et al. (202) suggest that during crisis credit ratings are of higher quality. Other criteria taken into consideration were: localization, sector's quality, bureaucracy and corruption (Shen et al., 2012).

As mentioned before, the analysis taking the type and the condition of shareholders into consideration has not been prepared so far. Because of the probability of financial support from the parent company and the government, an analysis has been prepared that takes into consideration the financial situation of banks but also the mentioned factors.

3. Research design

3.1. Hypothesis

The basic goal of the article is to analyse the factors influencing banks' credit ratings, taking into consideration shareholders' credit ratings. The literature review and the practical analysis of the methodologies presented by credit rating agencies suggest that the mentioned institutions use different catalogue of variables to estimate default risk. Previous studies have already drawn attention to financial factors. They can be classified according to the CAMEL structure, that is: capital adequacy, asset quality, management quality, earnings potential, liquidity. The previous analysis relies on an estimation of the factors which can influence credit ratings presented by one of the three biggest agencies, i.e. Fitch, S&P's and Moody's. The differences between macroeconomic determinants have not been analysed or presented. The opinion about the mentioned group of factors is also differentiated, as it has been presented in the literature review. As a result, the hypothesis seems as follows:

Hypothesis 1: Banks' credit ratings are determined by financial factors measured by CAMEL and macroeconomic determinants.

In the previous studies, as it has been mentioned before, no clarified opinion about the impact of the macroeconomic situation on banks' credit ratings has been presented. In methodologies presented by particular agencies a relationship between the mentioned variables can be found. The analysis of the methodologies presented by the Investor Services of Moody's, Fitch and Standard & Poor's suggest that they have taken country risk into consideration. The mentioned agencies put also attention to the type of ownership. The presented methodologies suggest that they put attention to the probability of the financial support from the mother company or the government. As a result, countries' notes and shareholders' credit ratings should have a significant impact on the rated companies. If the condition of the economy is better, the probability of financing should be higher. The same refers to shareholders. If the parent company has got financial problems, it can influence the financial condition of the rated company. As a result, the following hypothesis is to be put:

Hypothesis 2: Countries' and shareholders' credit ratings influence statistically significantly banks' notes.

3.2. Definition of dependent and explanatory variables

In the presented analysis a dependent variable is a long-term issuer credit rating proposed by all credit rating agencies for listed European banks. The mentioned data is downloaded from the Thomson Reuters Database for the period between 1998 and 2016. They are credit ratings taken from the end of a quarter. Moreover, CAMEL factors, including capital adequacy, assets quality, management quality, earrings and liquidity indicators, are used as independent variables. The first of the mentioned groups of indicators taken for the analysis comprises Tier 1 and leverage ratios.

Tier 1 is the ratio of capital to risk-weighted assets. It is strictly connected with Basel II and Basel III regulations. Because it is one of the newest factors, it can be taken into consideration only for a short-term period of time. The mentioned measure represents capital buffers, and thus it should be negatively correlated with credit risk. *The leverage ratio* is the measure of average total assets to average total common equity. The higher value of the mentioned factors would correlate positively with the default risk.

The next group of determinants are asset quality indicators, including loan loss provisions as a percentage of average total loans and non-performing loans to total loans.

Loan loss provisions as a percentage of average total loans measure the bank's credit risk and are strictly connected with the portfolio of the quality of credits. If the mentioned factors are higher, it should positively influence credit risk, and as an effect decrease the bank's credit rating.

Non-performing loans to total loans is calculated as non-performing loans at the end of the year divided by total gross loans for the same period of time. It should be positively correlated with credit risk, and increases default risk.

The management quality groups of determinants contain the following factors: efficiency ratio and securities as a percentage of earning assets,

Efficiency ratio is the ratio of non-interest expense for a fiscal year to the total revenue less interest expense over the same period and is expressed as a percentage. It measures the cost to the bank of each unit of revenue. If the mentioned value is higher, it can increase credit risk.

Securities as a percentage of earning assets is the ratio of average earning assets represented by securities at the end of a fiscal year. This ratio measures the extent to which the bank's income is dependent on investment income rather than interest on loans. If the mentioned value is higher, it can generate an additional default risk.

The next group of banks' risk determinants are profitability factors, including the following determinants: net interest income ratio, return on equity (ROE), return on assets (ROA), operating leverage, loan growth and deposit growth.

Net interest income ratio is calculated as a percentage interest yield of interest bearing assets. It measures the lending margin charged by a particular bank. A higher lending margin may signal

higher risk-taking, and as a result it exerts a negative impact on the mentioned factor of banks' credit rating;

Return on assets and return on capital measures the profit a bank can generate given total assets and shareholders' capital. If the mentioned value is higher, the default risk should be lower. The *operating leverage* is the percent change in net revenue less the percent change in operating expenses for a fiscal year. It should have a positive correlation with the mentioned factors and credit ratings. *Loan growth* is the percent change in annual period net loans as compared to the same period one year previously. It is calculated as net loans for a fiscal year minus net loans for the same period one year previously divided by the annual net loans one year previously, multiplied by 100. A high value of this variable can suggest a possibility of receiving additional earnings by banks, but conversely it can generate credit risk. It should be compared with a *deposit growth*, that is, the percentage change in annual deposits as compared to the same period one year previously. Total deposits represent the sum of non-interest bearing deposits, interest bearing deposits and other deposits at the end of the fiscal year.

The last group of determinants connected with banks' financial statements are liquidity factors including: loan to deposit ratio, short-term borrowing to total liabilities, and liquid assets to total assets.

Loan to deposit ratio analyses the dependence of funding on the non-deposit capital. Because deposits are a more stable, cheaper and safer source of funding, the high value of the mentioned variable can suggest a higher risk for banks.

Short-term borrowing to total liabilities and *liquid assets to total assets* measure the susceptibility of a bank to liquidity risk. If the ratio of the short-term borrowing to total assets is significant, it means that the bank is more vulnerable in the event of a bank run. A bank with a higher share of liquid assets would prove more resilient to liquidity pressures.

Macroeconomic factors include GDP growth and a country's risk.

According to the research proposed by Ötker-Robe and Podpiera (2010), *GDP growth* is negatively correlated with the share of non-performing loans and positively with the recovery rate, and a *volatility of GDP* means uncertainty in earnings. Therefore, a higher GDP growth (volatility) is expected to correlate negatively (positively) with default risk, and as a result it influences banks' credit ratings positively (negatively). The last group of determinants are *country's credit ratings*. The methodologies presented by credit rating agencies suggest that during the estimation process, they are taken into consideration with the same group of factors analysed during a country's risk estimation. On the other hand, we can observe the "sovereign ceiling" effect in practice. As a consequence, a downgrade of a country's credit rating often triggers downgrades of credit ratings of other financial institutions located in its sovereignty.

The last part of factors refers to those connected with the type of ownership. Here three types of investors can be distinguished. The first one is a government, the second – individuals, and the

third – companies. In the presented paper three groups of problems have been taken into consideration. The first group comprises *individuals*, that do not get ratings. As a result, they will be used in this case as dummy variables. The second group comprises *governments*, that do receive credit ratings. In this case the *country's credit rating* and the dummy variable will be taken into consideration. Moreover, the rating of the *stakeholders* already assessed before will also be taken into consideration.

3.3. Data sample and methodology

To analyse the determinants of banks' credit ratings, all long-term issuer credit ratings given to European banks are used. Until the end of December 2016 only 10 different credit ratings were proposed by particular credit rating agencies for banks[2]. The mentioned credit ratings are collected from the Thomson Reuters database. For a better understating of the problem banks' credit ratings from the period between 1998 and 2016 have been taken. A separate analysis for a particular credit rating agency and a type of investor and their credit ratings will be prepared. Credit ratings of 300 banks from selected countries[3] have been analysed. To analyse the impact of particular determinants on banks' credit ratings the linear decomposition proposed by Ferri, Liu, Stiglitz (1999) has been used. The same methodology has been used in other research presented in the literature review. The linear method of decomposition has been presented in the table below.

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[2] AK&M Long-Term Issuer Rating, Dominion Bond Rating Service (DBRS) Long-Term Issuer, ER Long-Term Issuer National Scale Rating, Fitch Long-Term Issuer Rating, R&I Long-Term Issuer Rating, RA Expert Long-Term Issuer Rating, RAM Long-Term Issuer National Scale Credit Rating, RusRating Long-Term Issuer National Scale Rating, S&P Long-Term Issuer Rating, Moody's Long-Term Issuer Rating.

[3] Albania, Armenia, Austria, Belarus, Belgium, Bosna and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russia, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

Table 1. Decomposition of Moody's, S&P's, Dominion Bond Rating Service, ER, Fitch and R&I long-term issuer credit ratings.

Moody's Long-Term Issuer Rating		S&P's Long-Term Issuer Rating		Dominion Long-Term Issuer		ER Long-Term Issuer National Scale Rating		Fitch Long-Term Issuer Rating		R&I Long-Term Issuer Rating	
Rating	Code	Rating	Code	Rating	Code	Rating	Code	Rating	Code	Rating	Code
Aaa	100	AAA	100	AAA	100	AAA	100	AAA	100	AAA	100
Aa1	95	AA+	95	AA (high)	96	AA+	95,24	AA+	94,74	AA+	95,24
Aa2	90	AA	90	AA	92	AA	90,48	AA	89,47	AA	90,48
Aa3	85	AA-	85	AA (low)	88	AA-	85,71	AA-	84,21	AA-	85,71
A1	80	A+	80	A (high)	84	A+	80,95	A+	78,95	A+	80,95
A2	75	A	75	A	80	A	76,19	A	73,68	A	76,19
A3	70	A-	70	A (low)	76	A-	71,43	A-	68,42	A-	71,43
Baa1	65	BBB+	65	BBB (high)	72	BBB+	66,67	BBB+	63,16	BBB+	66,67
Baa2	60	BBB	60	BBB	68	BBB	61,90	BBB	57,89	BBB	61,90
Baa3	55	BBB-	55	BBB (low)	64	BBB-	57,14	BBB-	52,63	BBB-	57,14
Ba1	50	BB+	50	BB (high)	60	BB+	52,38	BB+	47,37	BB+	52,38
Ba2	45	BB	45	BB	56	BB	47,62	BB	42,11	BB	47,62
Ba3	40	BB-	40	BB (low)	52	BB-	42,86	BB-	36,84	BB-	42,86
B1	35	B+	35	B (high)	48	B+	38,10	B+	31,58	B+	38,10
B2	30	B	30	B	44	B	33,33	B	26,32	B	33,33
B3	25	B-	25	B (low)	40	B-	28,57	B-	21,05	B-	28,57
Caa1	20	CCC+	20	CCC (high)	36	CCC+	23,81	CCC	15,79	CCC+	23,81
Caa2	15	CCC	15	CCC	32	CCC	19,05	CC	10,53	CCC	19,05
Caa3	10	CCC-	10	CCC (low)	28	CCC-	14,29	C	5,26	CCC-	14,29
Caa	5	CC	5	CC (high)	24	CC	9,52	RD	-5	CC	9,52
C	0	NR	0	CC	20	C	4,76	D	-5	C	4,76
WR	-5	SD	-5	CC (low)	16	D	-5	WD	-5	D	-5
NULL	0	NULL	0	C (high)	12	SD	-5			SD	-5
		D	-5	C	8	NR	0			NR	0
				C (low)	4						
				SD/D	-5						

Source: own elaboration.

Table 2. Decomposition of RusRating, RAM, AK&M and RA long-term issuer credit ratings.

RusRating Long-Term Issuer National Scale Rating		RusRating Long-Term Issuer International Scale Rating		RAM Long-Term Issuer National Scale Credit Rating		AK&M Rating Agency		RA Expert Long-Term Issuer Rating	
Rating	Code	Rating	Code	Rating	Code	Rating	Code	Rating	Code
AAA	100	AAA	100	AAA	100	A++	100	A++	100
AA+	94,44	AA+	94,44	AA	85,71	A+	80	A+	83,33
AA	88,89	AA	88,89	A	71,43	A	60	A	66,67
AA-	83,33	AA-	83,33	BBB	57,14	B++	40	B++	50,00
A+	77,78	A+	77,78	BB	42,86	B	20	B+	33,33
A	72,22	A	72,22	B	28,57			B	16,67
A-	66,67	A-	66,67	C	14,29				
BBB+	61,11	BBB+	61,11	D	-5				
BBB	55,56	BBB	55,56						
BBB-	50,00	BBB-	50,00						
BB+	44,44	BB+	44,44						
BB	38,89	BB	38,89						
BB-	33,33	BB-	33,33						
B+	27,78	B+	27,78						
B	22,22	B	22,22						
B-	16,67	B-	16,67						
CCC+	11,11	CCC+	11,11						
CCC	5,56	CCC	5,56						

Source: own elaboration.

Ordered logit panel data models in which European banks' long-term issuer credit ratings are the dependent variable have been used for the analysis. As logit models those models are defined which rely on the verification of the probability unit which is then transformed into its cumulative probability value from a normal distribution. The final version of the ordered logit model is:

$$y_{it}^* = \beta x_{it}' + \gamma Z_{it} + \varepsilon_{it}, (1)$$

where:

Y_{it}^* is an unobservable latent variable that measures the creditworthiness of a bank i in period t;

X'_{it} is a vector of time varying explanatory variables;

β is a vector of unknown parameters;

Z_{it} are time invariant regressors that are generally dummy variables;

ε_{it} is a random disturbance term with a normal distribution .

The y_{it}^* is related to the observed variable y_i, which is a credit rating in this case, in the following way:

$$
\begin{aligned}
y_i &= -5 \; if \; y_i^* < \tau_0 \\
&0 \; if \; \varepsilon_0 < \; y_i^* < \tau_1 \\
&5 \; if \; \varepsilon_1 < \; y_i^* < \tau_2 \\
&10 \; if \; \varepsilon_2 < \; y_i^* < \tau_3 \\
&15 \; if \; \varepsilon_3 < \; y_i^* < \tau_4 \\
&20 \; if \; \varepsilon_4 < \; y_i^* < \tau_5 \\
&\cdots \\
&100 \; if \; \varepsilon_{21} < \; y_i^* < 0
\end{aligned}
$$

where the $\tau_s(\tau_0 < \tau_1 < \tau_2 < \cdots < \tau_{22})$ are the known threshold parameters to be estimated. The following model may be named as a factor ordered probit model:

$$y_{it}^* = \beta F_{it}' + \gamma Z_{it} + \delta(F * Z)_{it} + \varepsilon_{it}$$

where:

$y_{i,t}$ is the AK&M Long-Term Issuer Rating, Dominion Bond Rating Service (DBRS) Long-Term Issuer, ER Long-Term Issuer National Scale Rating, Fitch Long-Term Issuer Rating, R&I Long-Term Issuer Rating, RA Expert Long-Term Issuer Rating, RAM Long-Term Issuer National Scale Credit Rating, RusRating Long-Term Issuer National Scale Rating, S&P Long-Term Issuer Rating, Moody's Long-Term Issuer Rating; for European banks.

F_{it} is a vector of explanatory variables, i.e.:

$$F_{it} = [tier_{it}, lev_{it}, llp_{it}, npl_{it}, ef_{it}, sec_{it}, nii_{it}, roe_{it}, roa_{it}, opl_{it}, lg_{it}, dg_{it}, dep_{it}, sht_{it},$$

$$liq_{it}, dep_{it}, gdp_{it}, cr_{it}, \; ind_{it}, gov_{it}, share_{it}]$$

where:

$tier_{it}$ is the Tier 1 ratio; lev_{it} is the leverage ratio; llp_{it} are loan loss provisions as a percentage of average total loans; npl_{it} are non-performing loans to total loans; ef_{it} is the efficiency ratio; sec_{it} is the value of securities as a percentage of earning assets; nii_{it} is the net interest income ratio; roe_{it} is the return on equity; roa_{it} is the return on assets; opl_{it} is the operating leverage; lg_{it} is the loan growth; dg_{it} is the deposit growth; dep_{it} is the ratio of loans to deposit; sht_{it} is the value of short-term borrowing to total liabilities, liq_{it} is the value of liquid assets to total assets; gdp_{it} is the GDP growth, cr_{it} is the country's credit rating given by a particular credit rating agency (AK&M Long-Term Issuer Rating, Dominion Bond Rating Service (DBRS) Long-Term Issuer, ER Long-Term Issuer National Scale Rating, Fitch Long-Term Issuer Rating, R&I Long-Term Issuer Rating, RA Expert Long-Term Issuer Rating, RAM Long-Term Issuer National Scale Credit Rating, RusRating Long-Term Issuer National Scale Rating, S&P Long-Term Issuer Rating, Moody's Long-Term Issuer Rating); ind_{it} is the dummy variable, where a particular individual with more than 5% of shares is 1, and 0 – where a company does not have significant individual investors; gov_{it} is the dummy variable, where the government with more than 5% of shares is 1, and 0 without it; $share_{it}$ is the stakeholder's credit rating.

Z_{it} contains time invariant regressors that are generally dummy variables;

ε_{it} is a random disturbance term.

4. Results

The analysis of the factors that can influence banks' credit ratings was started with preparation of descriptive statistics of the factors used for the research. The results of the estimation have been presented in Table 3. In the analysed sample the number of observations connected with some factors like non-performing loans to total loans ratio, the efficiency ratio, the net interest income ratio, the return on equity is too small. The received findings also suggest that in Europe the three most popular credit rating agencies are Fitch, Moody's and S&P's. This may stem from the recognisability of the mentioned institutions on the financial market and the quality of ratings proposed by them. The AK&M, RusRating, RA Expert and R&I practically do not publish information about the default risk of banks. Some notes have been prepared by the Dominion Bond Rating Service, but the number of observations has been too small to prepare an analysis. The notes given to countries by the biggest three credit rating agencies have been used for the research. In the analysis the individual investors dummy variable has also been used, where 1 means that a company has got individual investors with 5% of shares, and 0 – where it doesn't. In the same way the government has been marked. The banks taken for the analysis also have main corporate investors or parent companies, whose credit ratings have been prepared by Dominion Bond Rating Service, Fitch, Moody's, S&P's, Japan Credit Rating Agency, and R&I.

The next step of the analysis was to verify the impact of financial indicators on banks' credit ratings. The results of the estimation have been presented in tables 4, 5 and 6. Also the type of ownership and investors' credit ratings have been considered. The first group of determinants

taken for the analysis were capital adequacy ratios, including Tier 1 and the leverage ratio. The Tier 1 ratio is negatively correlated with the credit ratings presented by Fitch. The mentioned relationship is the strongest in the case of the companies with the government as one of the investors. The same situation has been noticed in the case when a credit rating given for the parent company (not countries' notes) has been included in the analysis. The presented situation can be connected with the quality of the loans in their credit portfolio. The high value of non-performing loans can generate a duty to set up reserves. The weakest reaction has been observed in the case of the notes proposed by S&P's, the strongest for Moody's. For all of the mentioned agencies the impact of Tier 1 ratio is statically significant. If credit rating agencies analyse the mentioned factor, they also put attention to individual investors. In their opinion, the mentioned group of stakeholders can generate additional default risk. The leverage ratio correlates positively with default risk. The impact of the mentioned variable is weak and insignificant in the subsamples referring to the type of investors for the estimation prepared by Fitch. Moody's takes into consideration the leverage ratio when verifying of the impact of individuals and the government as an investor, but if we take private shareholders' credit ratings for the analysis, the mentioned relationship has not been noticed. The weakest reaction has been observed for S&P's notes, the significance of these factors is a little stronger for the analysis taking shareholders' credit ratings into consideration.

The described analysis suggests that banks' credit ratings are sensitive to capital adequacy ratios. In the case of Tier 1, especially when one of the main investors is the government, parent companies and individuals, but the reasons for such situations have been differentiated. In the case of the government and parent companies the probability of the recapitalization in case of solvency problems can be underlined. The mentioned reaction cannot be observed in the case where one of the main investors are individuals. As a result, the direction of the influence has been varied.

The next group of factors the impact of which has been verified were the assets quality indicators. Because of the lack of data, only loan loss provisions as a percentage of the average total loans ratio have been taken for the analysis. The mentioned indicator is strictly connected with the portfolio of the quality of credits. It should positively influence credit risk, and as an effect it decreases the bank's credit rating. The strongest reaction of credit ratings to the mentioned indicator has been noticed for the ratings proposed by Fitch. The analysed ratio is especially important if we take into consideration the type of stakeholders. Its significance increases for the banks where the government is not one of the main investors, and where the impact of the shareholders' notes are verified. The described situation suggests that the presented institutions can have a higher risk connected with toxic assets. On the other hand, they can have problems with the pressure from investors to generate higher profits; hence they can provide loans to borrowers that have low creditworthiness. The mentioned situation increases the value of loan loss provisions and as a result – the default risk. The same results have been noticed in the case of Moody's credit ratings. The weakest reaction is observed for S&P's. It can be an effect of the type of issuers, the default risk of which has been verified.

The prepared analysis suggests that assets quality indicators play a significant role in the estimation of credit ratings. They are especially important for the notes of those banks that are

subsidiaries. Their notes are more sensitive than others, especially in the case of Moody's and Fitch. It is strictly connected with the quality of credit portfolio and pressure from the mother company to generate profits.

The management quality determinant taken for the analysis are securities as a percentage of earnings assets. The efficiency ratio has not been verified because of the lack of data. The securities as a percentage of earnings assets ratio should be negatively correlated with credit ratings. The mentioned factor has got a weak impact on banks' credit ratings. It is especially significant for classification for banks, that do not have individuals or the government as investors. The results are similar for all credit rating agencies. For S&P's the significance is also noticed when shareholders' notes are taken into consideration. The received findings suggest that management quality indicators are not as popular during the analysis of banks' default risk.

The next part of factors that have been taken into consideration during the analysis are profitability factors, including the following determinants: return on assets, operating leverage, loan growth and deposit growth. The prepared analysis suggests that for Fitch ratings estimation from the mentioned variables, only loan growth has a significant impact. The strongest reaction to this factor has been noticed for the banks with the government as an investor. According to other classification the mentioned impact is weaker. The model where the rating of the stakeholders has been taken into consideration suggests that the mentioned ratio is insignificant. According to Fitch, if loan growth is higher, notes should be better, because it can create additional profits for investors and increase the company. On the other hand, the strong emphasis is on the quality of credit portfolio. In the case of Moody's notes a strong significant impact of the return on assets has been noticed on banks' ratings. The mentioned variable is especially important during the analysis of shareholders' notes. It can suggest that the parent company puts emphasis on the profitability of the subsidiaries. The same model has been taken by agencies for risk analysis. The coefficient near the operating leverage is near zero, both taking into consideration the government and individuals as investors, like the stakeholders credit ratings. In the estimation of credit ratings Moody's does not put attention to loan growth. An increase of deposit growth causes higher credit ratings, and as a result – reduces the probability of insolvency, especially if we take shareholders' notes into consideration. The analysis prepared for S&P's banks' credit ratings suggests that the mentioned institution did not take the operating leverage into analysis as previous agencies did. The return on assets has got a statistically significant impact on the ratings given for banks without the capital of individuals or the government. Deposit growth is practically insignificant but loan growth has a negative influence on banks' credit ratings, even if we divide the sample into government and private investors. The same situation has been noticed for credit ratings of parent companies taken for an analysis. The stronger reaction has been observed for the banks with individuals as one of the main investors. The mentioned relationship can suggest that credit ratings are afraid of a pressure of private stakeholders to generate additional, higher profits.

The last group of financial indicators taken for the analysis are liquidity factors, including: loan to deposit ratio, short-term borrowing to total liabilities, and liquid assets to total assets. The first determinant that has been taken into analysis is the loan to deposit ratio. The mentioned variable has got a significant negative impact on banks' credit ratings in the case of Fitch and S&P's

ratings. The strongest reaction has been noticed for banks with private capital. In a model where notes given for banks' shareholders have been included, the mentioned reaction is important. The described situation suggests that a higher value of this factor can generate problems with liquidity in short term and insolvency in a long term. Banks have to give back the borrowed capital from depositaries. The same situation has been observed for the notes given by Moody's, but the reaction is weaker than the ratings proposed by Fitch and S&P's. The next variable that has been taken into consideration is the value of liquid assets to total assets. This ratio is insignificant for the notes proposed by Moody's. In the case of the S&P's and Fitch ratings the mentioned variable has a statistically significant impact on banks' notes. The described relationship is important for the notes proposed by Fitch for the companies that do not have individuals or the government capital. In the case of S&P's notes a stronger reaction has been noticed for the banks with individual investors than those without them. It can be connected with the risk generated by them. The mentioned ratings are also sensitive to the ratio of liquid assets to total assets if we take shareholders' credit ratings into analysis. On one hand, the presented relationship can create additional profits, and on the other – it can be connected with liquidity risk. The short-term borrowing to total liabilities has got a similar impact on S&P's and Fitch notes as the liquid assets to total assets ratio. The reason for this reaction is the same as in the previous case. Moody's notes react positively to the changes of the mentioned factor. If this variable increases by one percentage point, these ratings rise by 3 degrees. The short-term borrowing cost on the interbank market is quite high, it is one of the last ways to raise capital from the market in a short time. On the other hand, if banks have financing from low-interest capital (usually nearly 0%) from depositors and lend it through loans with higher interest, it can generate an additional source of income for them. It can be burdened with high liquidity risk, if the term of lending is mismatched with the term of funding.

The received results suggest that banks' credit ratings are sensitive to liquidity determinants. Moody's notes react especially to the loan to deposit ratio and the short-term borrowing to total liabilities index, taking the type of investors and shareholders' credit ratings into consideration. Fitch takes into analysis all of the mentioned liquidity variables in the sample of the government and individual investors, but only the loan to deposit ratio has been important if we include shareholders' notes in the analysis. For S&P's all liquidity indicators have been significant for all classifications.

The last part of the financial indicators included in the analysis were macroeconomic variables GDP growth and countries' credit ratings have been used in the research. The mentioned variable has got a significant impact on Fitch banks' notes, especially if the shareholder's credit rating has been taken into consideration. In the case of Moody's the mentioned relationship has been nearly zero. S&P's ratings are insensitive to GDP growth by taking the type of investors and shareholders' credit ratings into consideration. The mentioned situation can be connected with the type of entities rated. Banks that have credit ratings are in most cases international companies that are insensitive to the condition of the local economy. If a credit rating agency is bigger, it usually also rates bigger issuers, which is connected with the value of fees for ratings and the prestige of the agency.

The last part of the analysis relies on the verification of countries' credit ratings' impact on banks' notes. The prepared analysis for Fitch suggests that the mentioned reaction has been noticed but it is weak. No strong diversification according to the type of invertors has been observed either. The strongest reaction has been observed for S&P's, especially for a group of individual stakeholders. The described situation suggests that if a credit rating agency is bigger, the impact of their credit ratings is more significant. The prepared analysis can help to verify the first part of the second hypothesis, which seems as follows: Countries' and shareholders' credit ratings influence statistically significantly banks' notes.

Shareholders' credit ratings and the type of investors are insignificant for Fitch notes. The dummy variable that represents individual investors is also unimportant for banks' credit ratings proposed by Moody's and S&P's. It can suggest that generally credit rating agencies do not take into consideration the risk connected with main individual investors. In most cases the presented people do not have more than 20% of shares. On the other hand, the mentioned banks in most cases will not be able to receive a financial support from them in the case of financial problems. The other situation has been noticed for the government as an investor. For Moody's ratings the presence of the government as an investor of banks decreases their credit ratings. It can be connected with the economic situation in the mentioned countries. The opposite reaction has been notice in the case of S&P's ratings. The presence of the government as a one of the investors causes an increase of notes. It can be strictly connected with the probability of financial support. The last part of the analysis relies on the verification of the impact of shareholders' credit ratings on banks' notes. The significance of the mentioned variable has been observed only for the notes proposed by Moody's. The received results are surprising, because credit rating agencies in their methodologies publish information about taking the probability of financing from the parent company. The described findings can stem from two things. The first one is the type of sample. It is a small number of observations about the credit ratings of shareholders. Most of them are investment funds which do not have credit ratings. It can also suggest that subsidiaries rely on the parent company's credit ratings and usually do not have their own notes.

The received findings help to test both hypotheses, saying: Banks' credit ratings are determined by the financial factors measured by CAMEL and macroeconomic determinants; and – countries' and shareholders' credit ratings influence statistically significantly banks' notes. Both of them have been positively verified.

5. Conclusions

The aim of the paper has been to analyse the factors influencing banks' credit ratings, taking shareholders' credit ratings into consideration. Two hypotheses have been put: Banks' credit ratings are determined by financial factors measured by CAMEL and macroeconomic determinants; and – countries' and shareholders' credit ratings influence statistically significantly banks notes. They have been verified by using the ordered panel data models for long-term issuer credit ratings. The presented analysis helps to realize the above-mentioned goal and test hypotheses. Both of them have been positively verified. Banks' credit ratings are sensitive to capital adequacy ratios, especially when one of the main investors are the government, parent

companies and individuals, but the reasons of this situation have been differentiated. In the case of the government and parent companies the probability of the recapitalization in the case of the solvency problems should be underlined. The mentioned reaction cannot be observed in the case where one of the main investor type are individuals. As a result, the direction of the influence has been varied. The mentioned result confirms the opinion about the significance of the probability of the recapitalization and financial support in the case of default problems of the rated companies. The assets quality indicators also play a significant role during the estimation of credit ratings, especially for banks that are subsidiaries during the estimation made by Moody's and Fitch. It is strictly connected with the quality of credit portfolio and a pressure from the mother company to generate profits. The management quality indicators are not as popular during the analysis of banks' default risk. The earnings factors have got a statistically significant impact on banks' notes, but taking stakeholders' credit ratings have no significant impact on the mentioned analysis. More important is a classification into private and public investors. Ratings of banks that have got government stakeholders positively react to an increase of profitability. On the other hand, notes of banks' where one of the investors is private react variously. Agencies are afraid of the pressure to generate additional, risky profits from stakeholders. The significance of the type of investors and shareholders' credit ratings has been underlined especially for liquidity factors. The companies where one of the main investors are individuals are more sensitive to the mentioned changes. A weaker reaction has been noticed in the case of parent companies. The described situation suggests that credit rating agencies put attention to the type of investors and the mentioned probability of financial support. The prepared research suggests, that only Fitch put attention to GDP growth, which can be connected with the type and size of the banks rated. Banks' credit ratings are determined by countries' notes. The mentioned relationship increases according to the size of the agency. It also confirms the opinion that there is a contagion effect between credit ratings. The mentioned relationship between the degree of credit ratings has also been noticed for banks' and their stakeholders, which can create systemic risk. Generally, credit rating agencies do not take into consideration individual investors as a part of default risk. It can be connected with a low probability of receiving the financial support from the mentioned group of people. They usually have got less than 20% of shares.

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Table 3. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
tier1	3,125	11.85822	4.407446	1	52.3202
lev	6,702	15.86557	41.21953	-916.6667	1944.444
llp	5,379	.9817801	38.02288	-939.181	2524.49
npl	1,323	16.67219	62.07641	.000012	1431.78
ef	528	49.07732	80.3074	-1358.44	327.994
sec	6,008	20.38771	16.94233	0	129.026
nii	288	3.342993	2.062914	.496	14.697
roa	6,442	.1944293	3.080577	-94.7601	49.4816
roe	443	-.1723354	25.86521	-436.544	57.7226
opl	6,125	2.065091	375.8041	-21059.2	10346.1

lg	5,657	.0156321	.2433758	-6.955236	3.999034
dg	5,601	.0213583	.3295184	-8.351819	8.321701
dep	6,044	34.2422	950.0079	-.037852	59681.4
sht	6,152	1.211432	15.1379	-3.307692	382.3529
fitch_bank	4,516	22.36469	37.68147	-5	94.7368
sp_bank	5,123	67.36775	24.02625	-5	100
amk_bank	0				
rus_bank	0				
dom_bank	255	83.34118	8.669186	64	96
moody_bank	1,404	78.57906	19.50182	-5	100
rl_bank	3	74.6032	2.749285	71.4286	76.1905
ra_bank	0				
er_bank	0				
ram_bank	0				
cr_sp	17,238	74.83786	26.43105	-5	100
cr_fitch	16,081	25.25069	42.54353	-5	100
cr_dom	2,872	92.32312	16.58244	20	100
cr_moody	13,821	67.01415	28.37377	0	100
cr_ri	12,035	81.33579	25.64559	9.52381	100
gdpg	18,355	2.282583	3.53236	-16.43029	13.8265
gover	20,519	.0899654	.2861392	0	1
osfiz	20,519	.1141869	.3180458	0	1
dom_share	213	86.70423	8.819566	68	100
fitch_share	1,681	23.61627	39.66115	-5	94.73684
jcr_share	44	25.89713	45.77629	-5	94.73684
moody_share	709	79.39351	12.20639	55	100
ri_share	76	11.40351	32.05866	-5	85.71429
sp_share	2,115	70.93144	18.28588	-5	95

Source: own calculations.

Table 3. Determinants of Fitch long term issuers credit ratings by taking into consideration type of investors.

fitch	individual								gover		nogover		nofiz	
	Coef.	*P>z*	*Coef.*	*P>z*	*Coef.*	*P>z*	*Coef.*	*P>z*	*Coef.*	*P>z*	*Coef.*	*P>z*	*Coef.*	*P>z*
opl	.0032541	0.338	.0065848	0.068	.0063336	0.128	.0025538	0.510	-.0040533	0.921	.0060704	0.171	.0068756	0.090
lev	.0321576	0.010	.0353711	0.011	-.0150337	0.528	-.0039373	0.823	.3305365	0.268	-.0319993	0.195	-.0105683	0.654
llp	-3.952206	0.000	-2.954586	0.000	-2.567377	0.000	-3.370727	0.000	-1.273901	0.879	-2.477919	0.000	-2.399086	0.000
tier1	-.495722	0.000	-.5116785	0.000	-.3185304	0.000	-.2938684	0.000	-2.490407	0.071	-.2831613	0.000	-.3184847	0.000
dep	-2.442764	0.000	-3.044061	0.000	-1.592987	0.002	-1.206828	0.005	-21.58369	0.205	-1.787265	0.001	-1.583125	0.002
sec	.0520476	0.000	.0686762	0.000	.0474901	0.005	.0300963	0.042	.0865671	0.652	.054195	0.014	.044046	0.007
roa	.4481521	0.505	-1.380269	0.213	-1.483663	0.226	.5436996	0.503	10.02816	0.401	-1.193016	0.356	-1.918295	0.103
liq	-11.75114	0.000	-13.13546	0.000	-6.204313	0.030	-4.338279	0.084	22.19249	0.546	-5.461289	0.084	-4.876808	0.093
lg	-.0117995	0.975	.1734552	0.647	.678948	0.067	.3824503	0.283	25.96851	0.083	.7261477	0.050	.7503971	0.054
dg	.3628749	0.714	.1491146	0.885	-.3917476	0.702	-.2020945	0.833	-41.91563	0.110	-.6880417	0.516	-.515956	0.621
sht	7.413793	0.000	5.85535	0.000	4.699768	0.000	5.827311	0.000	-10154.05	1.000	-4.461918	0.000	-4.331364	0.000
gdpg			.3791035	0.000	.4321572	0.000			3.121036	0.034	.4060049	0.000	.446874	0.000
cr_fitch					.0497312	0.000	.0489327	0.000	.0036679	0.910	.055544	0.000	.0451901	0.000
/cut1	-6.733007	0.000	-6.779747	0.000	-1.382375	0.330	-1.171569	0.329	-9.397169	0.677	-1.100591	0.454	-1.164955	0.416
/cut2	-6.613587	0.000	-6.649624	0.000	-1.14435	0.420	-.9465271	0.431	-5.577044	0.805	-.8323422	0.572	-.9118248	0.525
/cut3	-6.290478	0.000	-6.295433	0.000	-.5388911	0.704	-.3753274	0.755			-.3022271	0.837	-.4520833	0.753
/cut4	-6.0476	0.000	-6.030323	0.000	-.105431	0.941	.0337434	0.978			.0537282	0.971	.0053983	0.997
/cut5	-5.040564	0.000	-4.944994	0.000	1.659133	0.241	1.692249	0.160			1.961771	0.182	1.905315	0.183
/cut6	-2.387976	0.041	-2.223679	0.080	5.046175	0.000	5.003688	0.000			5.516537	0.000	4.602533	0.002
/cut7	-.8787987	0.507	-.7114322	0.615	6.555638	0.000	6.517818	0.000			7.027662	0.000	6.1136	0.000
no obs	1286		1276		1276		1286		86		1190		1101	
no group	55		55		55		55		5		50		49	
Wald	0.0000		0.0000		0.0000		0.0000		0.7006		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000		1.0000		0.0000		0.0000	

Source: own calculations.

Table 4. Determinants of Moody long term issuers credit ratings by taking into consideration type of investors.

moody	individuals								nogover		noosfiz	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	-.0096655	0.003	-.0106074	0.002	-.0077067	0.027	-.0068668	0.046	-.0079986	0.026	-.0070531	0.068
lev	.1063049	0.000	.1041271	0.000	.1551795	0.000	.1570316	0.000	.1795806	0.000	.2039278	0.000
llp	-.4904181	0.003	-.5157726	0.002	-.4246272	0.014	-.4005613	0.019	-.4033973	0.024	-.3841837	0.038
tier1	-.2507513	0.000	-.2563256	0.000	-.2072157	0.000	-.2041249	0.000	-.2236357	0.000	-.1783761	0.000
dep	.0100906	0.802	.0085523	0.831	-.0215325	0.597	-.020143	0.619	-.0286079	0.490	-1.077617	0.014
sec	.0084963	0.415	.0062341	0.550	.0183172	0.083	.0201265	0.057	.0012348	0.921	.0204751	0.062
roa	6.310356	0.000	7.083163	0.000	5.834503	0.000	5.195796	0.000	6.526508	0.000	5.05942	0.000
liq	1.929751	0.250	2.094314	0.214	-.4685224	0.789	-.5236756	0.764	-.1252549	0.947	-2.203528	0.243
lg	-1.734084	0.292	-1.359403	0.412	-1.352625	0.430	-1.695525	0.315	.6011723	0.765	-.7422106	0.701
dg	.673536	0.443	.5833728	0.499	-.8482894	0.330	-.7636623	0.377	-1.021218	0.251	-2.820981	0.037
sht	-.9102477	0.255	-1.019967	0.203	1.420138	0.065	1.474129	0.056	1.171407	0.132	1.74395	0.052
gdpg			-.0604021	0.070	-.049354	0.150			-.0601798	0.093	-.0440422	0.209
cr_moody					.2565738	0.000	.25795	0.000	.2528308	0.000	.2300811	0.000
/cut1	-4.188892	0.000	-4.262641	0.000	15.55954	0.000	15.6826	0.000	15.18944	0.000	10.9402	0.004
/cut2	-4.078638	0.000	-4.152348	0.000	16.02252	0.000	16.15091	0.000	15.66104	0.000	16.4676	0.000
/cut3	-3.410589	0.000	-3.484374	0.000	18.40292	0.000	18.55187	0.000	18.06775	0.000	19.55074	0.000
/cut4	-2.975518	0.002	-3.050119	0.001	19.82273	0.000	20.00131	0.000	19.52068	0.000	20.43825	0.000
/cut5	-1.700227	0.069	-1.77723	0.059	22.41406	0.000	22.60471	0.000	21.81662	0.000	22.62121	0.000
/cut6	-1.246703	0.182	-1.324523	0.160	23.23908	0.000	23.43414	0.000	22.6273	0.000	24.2143	0.000
/cut7	.1321162	0.889	.0570907	0.952	25.37717	0.000	25.57092	0.000	24.57962	0.000	26.56633	0.000
/cut8	1.634161	0.086	1.561405	0.103	27.1265	0.000	27.32013	0.000	26.69867	0.000	28.26683	0.000
/cut9	3.574092	0.000	3.511228	0.000	29.39054	0.000	29.579	0.000	28.95066	0.000	34.20072	0.000
/cut10	5.06343	0.000	5.017035	0.000	31.10178	0.000	31.27618	0.000	30.75045	0.000		
/cut11	10.57155	0.000	10.57574	0.000	36.90434	0.000	37.03077	0.000	36.69061	0.000		
no obs	493		493		493		493		452		462	
no group	14		14		14		14		13		13	
Wald	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Source: own calculations.

Table 5. Determinants of S&P long term issuers credit ratings by taking into consideration type of investors.

sp	individuals								nogover		osfiz		nofiz	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	-.0011474	0.293	-.001088	0.314	-.0011843	0.341	-.0010538	0.407	-.0027186	0.059	-.0000883	0.975	-.0008617	0.600
lev	.0213497	0.080	.0217983	0.066	.0109995	0.394	.0113342	0.383	.0137653	0.292	.0153246	0.577	.0311621	0.123
llp	.0436978	0.706	.0667465	0.500	.2891687	0.262	.3738143	0.140	.3638973	0.163	.7615527	0.253	1.187074	0.003
tier1	-.0922103	0.000	-.0902123	0.000	-.0029316	0.895	-.0051028	0.819	-.0016675	0.941	.4644405	0.002	-.0034578	0.889
dep	1.331508	0.000	1.292174	0.001	-.2114135	0.332	-.1869637	0.390	-.165313	0.442	-11.28359	0.000	-.0141415	0.952
sec	-.0161465	0.018	-.0140256	0.038	.0033827	0.684	.0033181	0.689	.0043437	0.596	-.0903338	0.277	.0001064	0.990
roa	1.755025	0.000	1.579851	0.000	.416873	0.196	.4500446	0.169	.5828995	0.078	-.4188323	0.586	1.953836	0.000
liq	3.22355	0.005	2.919668	0.011	-4.018956	0.004	-4.045225	0.003	-3.869125	0.005	-20.7863	0.018	-4.313959	0.009
lg	-.0854011	0.692	-.1188689	0.584	-.4161072	0.070	-.4315198	0.059	-.4178053	0.067	-1.628878	0.004	-.4584346	0.123
dg	1.758032	0.001	1.796342	0.001	.148258	0.797	.071694	0.899	.1365548	0.813	1.251149	0.779	.1425108	0.811
sht	.1274538	0.700	.1045493	0.737	-.4325437	0.370	-.5739035	0.227	-.5475102	0.258	-29.55748	0.000	-1.899603	0.008
gdpg			.0608504	0.001	-.0227414	0.310			-.0253956	0.261	-.0753249	0.327	-.0068576	0.780
cr_sp					.4117922	0.000	.4132062	0.000	.4042823	0.000	.921436	0.000	.3818934	0.000
/cut1	-8.636996	0.000	-8.691341	0.000	.0276772	0.986	-.0213531	0.989	.1893699	0.907	26.70551	0.000	-2.058808	0.389
/cut2	-8.034225	0.000	-8.084	0.000	.7651262	0.600	.7150117	0.623	.9378011	0.528	44.625	0.000	-.0977509	0.959
/cut3	-5.280376	0.000	-5.276053	0.000	10.13713	0.000	10.25176	0.000	10.26936	0.000	51.94099	0.000	9.482424	0.000
/cut4	-4.79744	0.000	-4.781689	0.000	13.75834	0.000	13.83048	0.000	13.83336	0.000	56.89448	0.000	13.33339	0.000
/cut5	-4.651838	0.000	-4.634394	0.000	15.47566	0.000	15.47898	0.000	15.51859	0.000	62.96274	0.000	15.29728	0.000
/cut6	-4.174313	0.000	-4.14922	0.000	17.68731	0.000	17.66396	0.000	17.67868	0.000	67.17928	0.000	17.41912	0.000
/cut7	-3.695423	0.000	-3.678767	0.000	19.3059	0.000	19.3333	0.000	19.39966	0.000	72.43652	0.000	18.33009	0.000
/cut8	-2.872768	0.002	-2.835053	0.002	21.87788	0.000	21.84205	0.000	22.04254	0.000	75.04122	0.000	20.72541	0.000
/cut9	-2.047943	0.029	-2.065509	0.027	24.33047	0.000	24.45293	0.000	24.61413	0.000	77.44645	0.000	23.09404	0.000
/cut10	-1.611648	0.085	-1.659154	0.076	26.02469	0.000	26.27931	0.000	26.09153	0.000	83.75783	0.000	24.88351	0.000
/cut11	-1.095717	0.242	-1.126269	0.229	28.20046	0.000	28.39193	0.000	27.95511	0.000	89.43475	0.000	27.2496	0.000
/cut12	.2153777	0.818	.1992087	0.832	31.21823	0.000	31.40005	0.000	31.01555	0.000	105.909	0.000	30.05675	0.000
/cut13	1.683538	0.072	1.668309	0.075	33.65862	0.000	33.83083	0.000	33.31815	0.000	115.032	0.000	32.48494	0.000
/cut14	4.727643	0.000	4.726662	0.000	37.71185	0.000	37.88997	0.000	37.36004	0.000			36.31113	0.000
/cut15	6.681373	0.000	6.681117	0.000	39.83684	0.000	40.01667	0.000	39.48172	0.000			38.39274	0.000
/cut16	10.25203	0.000	10.25874	0.000	44.21035	0.000	44.39907	0.000	43.84008	0.000			42.23841	0.000
/cut17	15.03959	0.000	15.02494	0.000	50.24876	0.000	50.47341	0.000	49.83861	0.000			48.20994	0.000
no obs	1197		1188		1072		1081		1043		191		881	
no group	52		52		49		49		46		5		44	
Wald	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Source: own calculations.

Table 6. Determinants of Fitch long term issuers credit ratings by taking into consideration shareholders' credit ratings.

fitch	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	.0063428	0.128	.0062872	0.134	-.0281209	0.242	-.0069818	0.749
lev	-.0146594	0.539	-.0143126	0.550	-.0451049	0.708	-.0580277	0.502
llp	-2.562084	0.000	-2.545583	0.000	-7.413588	0.010	-9.250556	0.000
tier1	-.3170786	0.000	-.3190103	0.000	-2.952518	0.000	-2.550598	0.000
dep	-1.599249	0.002	-1.600158	0.002	-4.988497	0.076	-4.979177	0.055
sec	.04718	0.006	.048196	0.005	-.0025057	0.970	.012783	0.828
roa	-1.480627	0.227	-1.449282	0.241	9.480335	0.233	-8.997187	0.220
liq	-6.194407	0.030	-6.136343	0.033	13.64883	0.203	-5.316102	0.607
lg	.6797321	0.066	.67846	0.067	3.419588	0.542	-.7430086	0.804
dg	-.3902681	0.704	-.4020559	0.695	-2.982108	0.668	-1.801081	0.803
sht	4.689387	0.000	4.655996	0.000	-10930.62	0.999	-7350.461	0.999
share					-.0306735	0.314	-.0419545	0.149
gdpg	.4319705	0.000	.4322108	0.000			.8870476	0.000
cr_fitch	.0497359	0.000	.0496608	0.000				
osfiz	.4577534	0.707						
gover			-1.099091	0.550				
/cut1	-1.320452	0.355	-1.403902	0.324	-26.68379	0.034	-31.4087	0.004
/cut2	-1.082424	0.448	-1.165937	0.413	-26.61057	0.035	-31.319	0.004
/cut3	-.4771652	0.738	-.560475	0.694	-25.39077	0.043	-29.83444	0.006
/cut4	-.0440048	0.975	-.1265389	0.929				
/cut5	1.720858	0.227	1.639306	0.248				
/cut6	5.10953	0.000	5.026147	0.001				
/cut7	6.618927	0.000	6.535594	0.000				
no obs	1276		1276		349		349	
no group	55		55		18		18	
Wald	0.0000		0.0000		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000	

Source: own calculations.

Table 7. Determinants of Moody's long term issuers credit ratings by taking into consideration shareholders' credit ratings.

Moody	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	-.0077435	0.026	-.0076204	0.027	-.0299471	0.059	-.0325183	0.044
lev	.1553821	0.000	.1560625	0.000	-.0325015	0.556	-.0200944	0.732
llp	.4261651	0.014	.424331	0.013	11.31659	0.051	8.277411	0.256
tier1	-.2075	0.000	-.2066856	0.000	-.4365135	0.000	-.4288893	0.000
dep	-.0217826	0.592	-.0224535	0.576	-.3057518	0.007	-.3091754	0.007
sec	.0183045	0.084	.0198947	0.058	.0623484	0.147	.0588703	0.173
roa	5.85555	0.000	5.801772	0.000	17.75249	0.012	19.00289	0.010
liq	-.4982539	0.776	-.6112822	0.724	6.638501	0.409	5.710698	0.494
lg	-1.358598	0.428	-1.344274	0.430	1.011543	0.826	1.459664	0.750
dg	-.8491566	0.330	-.8584096	0.323	4.45519	0.058	4.43191	0.061
sht	1.40899	0.067	1.36945	0.071	14.81316	0.002	14.63915	0.003
share					.9159427	0.000	.9157818	0.000
gdpg	-.0497676	0.146	-.0478029	0.161			-.087198	0.495
cr_moody	.2558245	0.000	.2571496	0.000				
osfiz	-1.135445	0.651						
gover			-5.520092	0.008				
/cut1	15.41075	0.000	15.22061	0.000	61.95835	0.000	61.84343	0.000
/cut2	15.87519	0.000	15.68158	0.000	63.0201	0.000	62.90525	0.000
/cut3	18.25606	0.000	18.04253	0.000	69.56568	0.000	69.49074	0.000
/cut4	19.6731	0.000	19.45548	0.000	70.07286	0.000	69.99202	0.000
/cut5	22.25899	0.000	22.06326	0.000	71.42477	0.000	71.31673	0.000
/cut6	23.08244	0.000	22.89662	0.000	78.28307	0.000	78.18506	0.000
/cut7	25.21695	0.000	25.04694	0.000	79.8802	0.000	79.8004	0.000
/cut8	26.96642	0.000	26.79704	0.000	82.49294	0.000	82.4381	0.000
/cut9	29.2323	0.000	29.05527	0.000				
/cut10	30.94424	0.000	30.75989	0.000				
/cut11	36.74771	0.000	36.54985	0.000				
no obs	493		493		112		112	
no group	14		14		4		4	
Wald	0.0000		0.0000		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000	

Table 8. Determinants of S&P's long term issuers credit ratings by taking into consideration shareholders' credit ratings.

sp	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	-.0011847	0.340	-.0011602	0.352	-.0009347	0.625	-.0011148	0.566	-.0012935	0.548
lev	.0107054	0.407	.0116216	0.369	.0722159	0.010	.0712295	0.011	.0458265	0.080
llp	.2877934	0.264	.285776	0.268	.0871375	0.888	.0543576	0.930	1.344567	0.052
tier1	-.0028796	0.897	-.0025517	0.909	.0736408	0.126	.0727269	0.130	.131454	0.011
dep	-.2129922	0.328	-.2061872	0.344	-5.675179	0.000	-5.658144	0.000	-1.81721	0.184
sec	.0033019	0.691	.0036273	0.662	-.0764293	0.012	-.0770854	0.012	-.0415005	0.138
roa	.4155275	0.197	.4110838	0.202	.7746823	0.218	.7618915	0.227	.7268693	0.266
liq	-4.020431	0.004	-4.014288	0.004	-8.820219	0.002	-9.011188	0.002	2.8483	0.371
lg	-.4152408	0.071	-.4173458	0.069	-.801884	0.075	-.7720786	0.086	-.3001639	0.557
dg	.147735	0.797	.1405008	0.807	.0600938	0.977	-.0131795	0.995	.7326124	0.735
sht	-.4296557	0.373	-.4269538	0.376	-8.374272	0.081	-8.476773	0.078	-6.017868	0.252
share					-.0000725	0.988	.0005693	0.908	.0046263	0.389
gdpg	-.0225801	0.313	-.0228845	0.307			-.0228103	0.585	-.0223248	0.603
cr_sp	.4117099	0.000	.4126322	0.000					.421077	0.000
osfiz	1.507726	0.446								
gover			3.030084	0.027						
/cut1	.1566535	0.922	.2378022	0.882	-4.496772	0.148	-4.489931	0.149	18.2061	0.000
/cut2	.8973374	0.542	.9781417	0.506	-.1145266	0.966	-.1104041	0.967	24.61607	0.000
/cut3	10.28592	0.000	10.37814	0.000	2.261834	0.399	2.26225	0.399	28.09025	0.000
/cut4	13.90512	0.000	14.01121	0.000	3.827051	0.154	3.832297	0.154	30.71313	0.000
/cut5	15.62124	0.000	15.73458	0.000	4.420156	0.099	4.424492	0.099	31.92005	0.000
/cut6	17.83386	0.000	17.94847	0.000	5.041323	0.059	5.045394	0.059	33.17555	0.000
/cut7	19.4532	0.000	19.56949	0.000	6.680565	0.012	6.684783	0.012	35.55817	0.000
/cut8	22.0233	0.000	22.14768	0.000	8.743878	0.001	8.749802	0.001	38.12001	0.000
/cut9	24.47505	0.000	24.61331	0.000	14.29269	0.000	14.31133	0.000	46.06005	0.000
/cut10	26.16796	0.000	26.31462	0.000	21.24944	0.000	21.27346	0.000	51.65027	0.000
/cut11	28.34268	0.000	28.48749	0.000						
/cut12	31.35987	0.000	31.50362	0.000						
/cut13	33.79957	0.000	33.94133	0.000						
/cut14	37.85359	0.000	37.98963	0.000						
/cut15	39.98073	0.000	40.11329	0.000						
/cut16	44.3527	0.000	44.4865	0.000						
/cut17	50.36133	0.000	50.49623	0.000						
no obs	1072		1072		410		410		393	
no group	49		49		19		19		18	
Wald	0.0000		0.0000		0.0000		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000		0.0000	

Source: own calculations.