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Patrycja Chodnicka-Jaworska[1]

Department of Banking and Money Markets, Faculty of Management, University of Warsaw, Poland

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[1] *Patrycja Chodnicka -Jaworska, University of Warsaw, Faculty of Management, Szturmowa 1/3, 02-691 Warsaw, Poland, phone +48 668 381 224, e-mail: pchodnicka@wz.uw.edu.pl*

Banks' Credit Ratings – the Impact of the Investor Type

Patrycja Chodnicka-Jaworska
Department of Banking and Money Markets, Faculty of Management, University of Warsaw, Poland

Abstract

The aim of the paper is an analysis of the determinants of banks' credit ratings by taking into account the support from the government. A literature review has been prepared and the ensuing hypothesis seems as follows: Banks with the government capital receive higher credit ratings than institutions with private capital if financial factors are taken into account. The mentioned hypothesis has been verified with ordinary logit panel data models. Long-term issuer credit ratings proposed by three biggest credit rating agencies for banks from Europe have been used as dependent variables. The sample has been divided into subsamples according to the investor type, the bank size and the moment of a financial crisis.

Contents

1. Introduction

The aim of credit rating agencies is to reduce the asymmetry of information between investors and issuers. The notes the agencies give are used to analyse the quality of an investment. They are especially taken into consideration in the verification of credit risk in the internal risk-based method. Credit ratings are also important for a SWIFT code exchange in the corresponding banking and cooperation between financial institutions. As a result, banks are the most significant users of credit ratings.

To analyse default risk credit rating agencies use qualitative and quantitative factors. The latter are connected with three groups of determinants: macroeconomic variables, factors connected with the sector, and internal financial determinants. The former are for example connected with the issuer's macro and microeconomic environment, regulatory issues, industry risk, market position, operating and financial position, accounting quality, management and company structure. The methodologies presented by particular credit rating agencies are varied. As a result, the aim of the paper has been to verify which financial factors have got a significant impact on banks' credit ratings. One of the determinants that can be taken into consideration is the possibility of recapitalization from the government for those banks in which the government is one of the investors, especially during a crisis.

The presented considerations were the reasons for putting the aim of the paper, which is an analysis of the determinants of banks' credit ratings by taking into account the type of an investor. The hypothesis put seems as follows: Banks with government capital receive higher credit ratings than institutions with private capital by taking into account financial factors. The mentioned hypothesis has been verified with ordinary logit panel data models. The analysis has been prepared for European banks for the notes given by S&P's, Fitch and Moody's. The sample has been divided into subsamples according to the investor type, the bank size, and the moment of a financial crisis.

The paper has been organized as follows: The second section is a description of the previous literature review. Next the hypothesis with research questions has been presented. The third section is a data and methodology description. The last part of the paper presents the received findings about the factors influencing banks' credit ratings with conclusions.

2. Literature review

The current research describes in most cases the factors influencing corporate credit ratings. Less popular are analyses of the determinants of banks' notes. The aim of the presented research has been to verify the determinants of the credit ratings for public and private banks taking into account the size of a credit rating agency. In the current literature research the previous analyses of the financial factors influencing banks' notes have been described. In their analysis of German banks Grunert et al. (2005) found that a combined use of financial and non-financial factors leads to a more accurate prediction of future default events than a single use of each of these factors. On the other hand, a well-made construction of financial indicators is the basic element of credit ratings assessment.

The financial indicators taken for an analysis have been differentiated. To analyse banks' credit ratings Karminsky and Khromova (2016) take franchise value, risk position, regulatory environment, operational environment and financial factors (profitability, liquidity, efficiency, capital adequacy, assets quality, management quality) into consideration. When predicting rating grades the mentioned factors gave 31% of precise results and up to 70% forecasts with an error within one rating grade, while predicting rating classes resulted in 62% and 95% respectively.

Cole and White (2012) show that bank capital and stronger CAMEL ratings lower the probability of a bank default. Altunbas et al (2011) find that institutions with banks with higher risk were larger and had less capital, a greater reliance on short-term market funding, and aggressive credit growth. The group of factors that have been analysed in banks' credit ratings can be divided into: capital adequacy (Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Chodnicka-Jaworska, 2016), profitability (Pagratis and Stringa, 2007; Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Poon et al, 1999), efficiency (Pagratis and Stringa, 2007; Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Poon et al, 1999), liquidity (Pagratis and Stringa, 2007; Shen et al., 2012; Bissoondoyal-Bheenick et al., 2011; Chodnicka-Jaworska, 2016), provisions (Pagratis and Stringa, 2007), short-term interest rates (Pagratis and Stringa, 2007; Poon et al, 1999), bank size (Pagratis and Stringa, 2007), assets quality (Poon et al, 1999; Chodnicka-Jaworska, 2016; Estrella et al., 2000), risk (Poon et al, 1999), management quality (Chodnicka-Jaworska, 2016). According to the Belotti et al. (2011a), as opposed to the mentioned factors, banks' notes react significantly to countries' risk and the timing of a rating assignment. Countries' credit ratings were unimportant for the estimation process of banks' notes according to the research presented by Poon et al. (1999). Macroeconomic determinants are significant for the analysis of credit ratings (Bissoondoyal-Bheenick et al., 2011). Banks' notes are strictly connected with a bank size, liquidity, profitability, and efficiency (Hassan et al., 2013). The importance of efficiency, profitability and the proportion of loans in assets have been distinguish by Öğüt et al. (2012).

The analysis of banks' credit ratings has been prepared in subsamples. The size of the banking sector has been taken into consideration in the analysis of the method or significance of credit risk management. English and Nelson (1998) found that the use of risk rating systems is quite widespread, but smaller banks have generally less detailed systems than larger institutions. They suggest that a relationship between the reported loan risk and delinquency and charge-off rates has not been observed. The analysis prepared by Nakamura and Roszbach made on Swedish banks credit risk verifies particularly a bank's loan monitoring ability. They suggest that banks' internal credit rating methods indeed include valuable private information, but the mentioned quality is higher in the case of bigger banks. The analysis of internal risk-based approach in US banks has been prepared by Traeacy and Carey (2000). Hau et al. (2012) found that larger and more leveraged banks receive higher ratings, which amounts to an economically significant competitive distortion. Jacobson et al. (2006) found that the design of a rating system itself, but also the grade composition in the portfolio rating, the size of a bank, the preferred level of insolvency risk for a bank, and the forecast horizon influence significantly the probability of default.

The differences between credit rating factors were one of the most popular classification, but some researchers take their ownership into consideration. Kedia et al. (2015) prepared the impact of the changes of stakeholders of Moody's. They found out that Moody's notes of these two stable large shareholders were more favourable relative to S&P's ratings. Notes presented by Moody's were relatively better taking into consideration the size and duration of an investment of the mentioned firms. The results cannot be explained by issuer characteristics or by greater informativeness of Moody's ratings.

The next division that can influence banks' credit ratings can be the one depending on their system of financing. The analysis presented by Cornaggia and Cornaggia (2010) suggests that credit ratings paid by issuers are higher than those paid by investors. The same results were obtained by Chodnicka-Jaworska (2016). In the research differences in the significance and impact of financial factors on banks' credit ratings have been distinguish taking into consideration the source of financing.

Bar-Isaac and Shapiro (2011, 2012) argue that the quality of credit ratings is likely to be counter-cyclical as reputational concerns make it more profitable to issue less accurate ratings in boom times than in crisis periods. The impact of macroeconomic condition on banks' notes has been highlighted by Karminsky and Khromova (2016), and Chodnicka-Jaworska (2017). Opposite the impact of the business cycle on credit ratings S&P and Moody are the most conservative agencies. Beltratti and Stulz (2012) found that banks with higher Tier I capital and loan to total assets ratio performed better in the initial stages of crisis. On the other hand, Berger and Bouwman (2011) suggest that during banking crises higher capital levels improve banks' performance, while a larger deposit base and more liquid assets were associated with higher returns. Brezigar-Masten et al. (2015) suggest that during the financial crisis the predictive accuracy was lowest for domestically owned banks and, within this group, for small banks. Credit ratings play an especially significant role during crisis (Hau et al., 2012). At the mentioned moment of the business cycle credit ratings are more informative. Shen et al. (2012) verified the influence of the country development, geographical location, industrial environment quality, bureaucracy, and corruption level on banks' notes.

The described literature review suggests that in the previous research the impact of financial factors on banks taking into consideration the type of an investor has not been verified . Analyses have been made for the three largest credit rating agencies. There was also a lack of studies for smaller and bigger banks, and the theses that government investors have during a financial crisis. As a result, the aim of this paper has been to verify the analysis of the determinants of banks' credit ratings, taking into account the type of an investor. In the next section the hypothesis, as well as the data and methodology description has been prepared.

3. Research design
3.1. Hypotheses

In their analyses of default risk credit rating agencies take financial and non-financial factors into consideration. The analysis of the practical methodology suggests that credit rating agencies verify macroeconomic conditions, as well as those related to the banking sector and the particular institution. Moody's Investor Service (2016) put attention to the macro profile[2], financial profile[3] and qualitative adjustments[4]. After the analysis of the Baseline Credit Assessment the conditions connected with the support from affiliated entities have been put for the verification. The analysis has been prepared as a support given by affiliates to reduce the probability of default. During the analysis the following was verified:

- The bank's unsupported probability of failure;
- The probability of the affiliate's support;
- The affiliate's capacity to provide support;
- The dependence or correlation between the respective entities.

Also the probability of support from the government and the dependence between the support provider and the support recipient were taken for the analysis. The described situation suggests that differences between the notes received by banks with private and those with public investors

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[2] Banking country risk (economic strength, institutional strength, susceptibility to event risk), credit conditions, funding conditions adjustments, industry structure adjustments.

[3] Solvency (assets risk, capital, profitability), liquidity (funding structure, liquid resources).

[4] Business diversification, opacity and complexity, corporate behaviour

can be observed. As a result, a varied significance of financial indicators can be observed. As a consequence, the following hypothesis has been put:

H1. Banks with the government capital receive higher credit ratings than institutions with private capital taking financial factors into account.

It is also significant if an entity belongs to a capital group. It can be connected with the probability of receiving capital from the parent company. Credit rating agencies analyse separately the default risk of the parent company and the subsidiaries. According to the previous research, a different reaction can be noticed during the moment of a financial crisis.

3.2.Data description and methodology

The analysis has been prepared for credit ratings of European banks, proposed by the three largest credit rating agencies. The data have been collected from the Thomson Reuters Database and Bankscope. The analysis has been prepared for 256 banks from 24 countries[5] for the period between 1998 and 2016. Because of the lack of data the analysis has been prepared for Fitch, S&P's and Moody's. The data have been collected quarterly. As banks' notes are expressed in letters, the linear decomposition proposed by Ferri, Liu, Stiglitz (1999) has been used. The effects of the decomposition are presented in Table 1. Long-term issuer credit ratings proposed by S&P's, Fitch and Moody's have been used as a dependent variable. The Big Three has got 90% of the market.

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:

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

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} is time invariant regressors that are generally dummy variables;

ε_{it} is a random disturbance term, that has been 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:

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

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[5] Albania, Armenia, Austria, Belarus, Belgium, Bosna and Herzegovina, Bulgaria, Croatia, Cyrus, 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.

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_{it} is an unobservable latent variable that measures the credit-worthiness of a bank i in period t (Fitch Long-term Issuer Rating, Moody's Long-term Issuer Rating, S&P's Long – Term Issuer Rating) for European banks.

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

$F_{it} = [tier_{it}, lev_{it}, score_{it}, llp_{it}, npl_{it}, ef_{it}, sec_{it}, nii_{it}, roe_{it}, roa_{it}, opl_{it}, lg_{it}, dg_{it}, dep_{it}, sht_{it},$
$liq_{it}, dep_{it}, gdp_{it}, cr_{it}, cgdp_{it}; con_{it}; ondepo_{it}]$

where:

$tier_{it}$ is the Tier 1 ratio; lev_{it} is the leverage ratio; $score_{it}$ is the Z-score 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 earnings 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 (Fitch Long-term Issuer Rating, S&P's Long-Term Issuer Rating, Moody's Long-Term Issuer Rating); $cgdp_{it}$ is the value of private sector credits to GDP; con_{it} is the level of concentration of the banking sector; $ondepo_{it}$ is the measure of the market perception.

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

ε_{it} is a random disturbance term.

4. Findings

The analysis started with a presentation of the data used in the research. As a result, basic summary statistics have been made. The results of the estimation of the mentioned variables have been presented in Table 2. The described database suggests that a lack of data in the case of the following variables is observed: non-performing loans to total loans, the return on equity and the net interest income ratio. The analysis of the data for banks' notes presented by other credit rating agencies suggests that there is a small number of observations of credit rating changes given by the mentioned institutions. As a result, it is impossible to prepare a more developed analysis for the agencies other than S&P's, Fitch and Moody's.

The first agency whose notes and methodology have been verified is Fitch. In Tables 3-5, constituting appendices hereto, the results concerning the estimation and significance of the determinants of banks' credit ratings are presented. The analysis of the impact of the capital adequacy indicators has been made using two of the following factors: Tier 1 and the leverage ratio. Both of the mentioned variables influence statistically significantly Fitch notes. The leverage ratio has been positively correlated with the mentioned dependent variable. In case of small banks with private capital the increase of the mentioned variable by 20 percentage point causes a decrease of the credit rating by one note. In the case of banks where one of the investors is a government, the impact of the mentioned variable is insignificant. A statistically negative influence of the leverage ratio is not observed for bigger banks. The bigger banks are institutions, the assets of which are above the 50th percentile from the analysed institutions. The analysis of Tier 1 confirms the previous opinion. A low value of the mentioned indicator can suggest a

higher risk of default. A lower impact of the mentioned variable has been noticed for bigger banks. Smaller entities have in practice a higher pressure to realize profits, and as a result they usually offer credit with a higher risk of non-payment of loan instalments. The presented situation can create a higher base of the non-performing loans that increase credit risk. Smaller banks do not pass stress tests. The presented indicators have a similar strength of influence for both bigger and smaller banks. Credit ratings of bigger banks react on the mentioned variable later than smaller banks. The mentioned reaction is especially significant in the case of banks with private capital. In the case of S&P's credit ratings (the results presented in Tables 6-8) the statistically significant negative impact of the leverage ratio has been observed, both when taking into consideration the size of a bank and the type of an investor. Just as in the previous case the impact of the Tier 1 ratio influences banks' notes. The presented indicators have a similar strength of influence for smaller banks and those with private capital. Banks with public capital are treated as more stable than those with private investors. The analysis of Moody's notes (Tables 9-11) suggests that the leverage ratio influences significantly banks' notes. The leverage ratio is positively correlated with banks' notes. It can suggest that in the case of smaller banks a higher value of the mentioned variable may create additional profits, especially if they do not have the government as an investor. The analysis of the impact of the presented variables suggests that during the crisis the leverage ratio does not have a significant influence on banks' notes. For all of the mentioned agencies the Tier 1 ratio is one of the most important determinant factors in a crisis period. It is a measure of insolvency risk.

The next group of factors that have been verified were assets quality indicators. One of the measures in the mentioned group of determinants are loan loss provisions as a percentage of average total loans. This indicator should be negatively correlated with credit ratings because it is one of the measures of toxic credits. The received results confirm the previous assumption. In the case of Fitch notes a strong significant impact of the mentioned variable on bigger banks, especially those with private capital, has been noticed. The mentioned relationship confirms the previous opinion that bigger banks with a low quality of assets generate additional systematic risk. As a result, the mentioned variable is one of the most significant determinants that should be taken for analysis for smaller banks with private capital. Smaller institutions have riskier policies. They are also treated as not as significant for the stability of the financial sector. The banks that have got a government as an investor can count on a financial support. The same situation has been noticed by analysing the moment of the financial crisis. In the case of Moody's and S&P's notes a statistically significant positive impact has been observed. It can be connected with the stability of assessed banks. Bigger and more stable banks are verified by these agencies. In the case of Moody's a negative relationship between the mentioned variable and banks' credit ratings has been observed. An analysis taking into consideration the moment of the financial crisis suggests that the mentioned variable is insufficient, the same as in the case of S&P's notes.

The value of securities as a percentage of earnings assets is a measure of the management quality determinant. In the case of Fitch notes both for banks with private and public investors a significant positive influence of this variable has been noticed. The differences have been observed by taking into consideration the size of institutions. For bigger banks, especially those with private investors, a higher value of securities as a percentage of earnings assets causes an increase of banks' notes. It can be an effect of investment in more stable, safer securities, like government bonds. This factor has not been significant for changes of Moody's credit ratings. S&P's notes given both for smaller and bigger banks significantly react to this indicator, without taking into consideration the type of investors. During the crisis the reaction of credit ratings has been differentiated. S&P's put attention to the type of securities in banks' portfolio during a

crisis. Investing in safe government bonds can positively influence banks' credit ratings. For Fitch the significant impact has been noticed during the economic conditions. In the opinion presented by Moody's, banks make risky investments in securities during the moment of stabilization on the financial markets. On the other hand, during a crisis they usually purchase government bonds.

Earnings factors, the impact of which has been verified in this paper include the following determinants: return on assets, operating leverage, loan growth and deposit growth. The first variable that has been analysed is the operating leverage. The mentioned variable influences insignificantly the notes presented by Fitch. For Moody's a significant negative reaction has been observed for banks during a crisis but the coefficient is close to zero. The same situation, but for banks with private capital has been noticed by S&P's. The next and one of the most important measures of banks' earnings is the return on assets. The mentioned variable is insignificant for the changes of ratings given by Fitch. The return on assets is significant for the notes given by S&P's and Moody's. This relationship is stronger for smaller banks and those with private investors. In the case of Fitch notes the differentiation between the moment of the business cycle is insignificant. Moody's notes react more strongly to the mentioned variable during a crisis than to a stable financial market, both in the case of bigger and smaller banks. The mentioned period is also important for the estimation of S&P's notes. During a crisis banks usually see lower profits, and as a result the mentioned relationship is especially important for this period. The last two factors that are connected with banks' earnings is deposit and loan growth. Fitch put attention to the deposit growth in the case of bigger banks and these with private capital. The relationship is positive, which suggests that deposit growth causes an additional financial sources to lend. In the S&P opinion, the increase of the deposit growth creates additional interest costs. Ratings given for banks that have got a private investors as the stakeholders are sensitive to deposit growth. The changes of the smaller banks' credit ratings react on previous changes of the mentioned variable but the bigger banks during the same period of time. In the opinion presented by this agency during a crisis period banks can generate losses by presenting an inflated credit action. The deposit growth is insignificant during an estimation of the default risk, both for crisis and economic condition. Loan and deposit growth are insignificant for S&P's notes taking into consideration the business cycle. Loan growth decreases smaller banks' credit ratings, whereas deposit growth increases them. The mentioned relationship confirms that previous Moody's ratings are insensitive to the mentioned factors, taking into account the size of banks and the type of ownership, but the impact of the mentioned variables is significant during a crisis.

The last part of the financial indicators are liquidity variables. In the paper the impact of the loan to deposit ratio, short-term borrowing to total liabilities, and liquid assets to total assets indicators has been analysed. In the case of Fitch rating all of the mentioned variables influence statistically significantly the notes received by bigger banks. In the case of the loan to deposit ratio, a negative relationship between this variable and credit ratings has been noticed. The notes of banks with private stakeholders react more strongly to the mentioned indicator. The value of the liquid assets to total assets is especially important for banks where one of the investors is the government. The impact of the value of short-term assets depends on the type of them. Banks that have got a high proportion of cash can have problems with overliquidity. This situation can generate interest losses. The mentioned problem has been noticed for bigger banks. The bigger banks finance themselves by using short-term capital. As a result, the higher value of this indicator increases their notes. It is one of the methods to acquire a cheap source of financing. In the case of the smaller entities, that do not have overliquidity, it can create problems with insolvency. In the case of S&P's only the impact of the liquid assets to total assets ratio has been

noticed for smaller banks during a crisis. The loans to deposit ratio influences statistically significantly bigger entities and those with private investors. The relationship between short-term borrowing to total loans is especially important for estimation ratings of smaller banks. The changes of Moody's rating react on the loan to deposit ratio given for smaller banks with private stakeholders. The analysis of Moody's notes by taking into account the moment of the business cycle suggests that the strongest impact of the mentioned liquidity variables has been noticed during the moment of market stability.

The next group of determinants that are taken for the analysis were market factors. The first factor the impact of which has been verified was the gross domestic product. In the case of Fitch the mentioned variable influences statistically insignificantly banks' notes. In the case of S&P's the stronger reaction of banks' notes has been noticed in the case of bigger banks, and those that have got a government as an investor. Bigger banks are more sensitive to changes of the economic situation. The mentioned variable is also less significant during a stability period of the financial market than in a crisis period. In the case of S&P's the GDP growth is insignificant taking into account the moment of the business cycle. The analysis of the impact of the size of a bank and a type of a stakeholder gives similar results as in the case of Fitch notes, but the strength of impact is smaller. Moody's notes are positively correlated with a GDP growth during a stability period on the financial market, and negatively during a crisis. The mentioned relation can be connected with the condition of the economy. Because a GDP growth is one of the measures of the country's credit ratings, a decrease of them has an impact on banks' notes. The mentioned relation has been confirmed by a stronger positive influence of countries' notes on banks' ratings. A stronger impact of countries' credit ratings on the mentioned variable has been observed especially during a crisis than in the face of a stable financial market. In the case of Fitch notes the significance is significant for smaller banks and these with private investors. Moody's and S&P's ratings are more sensitive to countries' notes for smaller banks than the bigger ones. The next variable that has been taken for the analysis of banks' notes is the market perception that measure the credit and liquidity risk in the interbank market. The high value of the mentioned variable should negatively influence banks' credit ratings. The prepared analysis for Fitch confirms the presented opinion, in the case of S&P and Moody the reaction is opposite and significant for the group of smaller banks. Fitch notes given to bigger banks by credit ratings agencies are more sensitive to the mentioned variable than those for smaller institutions. A stronger reaction has also been noticed during a crisis, except for Moody's ratings. The banks' capitalization on the financial market influences insignificantly banks' notes. The market capitalisation to GDP ratio has a statistically significant negative influence on S&P's notes changes for bigger banks with private capital. The same situation has been noticed in the case of Moody's ratings, but for smaller institutions. Moody's ratings react positively to an increase of the mentioned notes. The presented situation can be connected with the opinion of credit rating agencies on the mentioned variable. On the one hand a more developed capital market can influence the condition of the economy and help to find investors; on the other it can create a risk connected with price changes. A stronger reaction has been noticed during a crisis. The next variable that has been taken for the analysis was the value of private sector credits to GDP. In the case of Fitch notes the mentioned variable has got a positive impact on smaller banks' notes and those institutions with a government as one of the investors, without taking the business cycle into consideration. The mentioned variable increases S&P's notes for bigger banks, especially those with private capital. In the case of Moody's the described situation has been noticed for all types of banks in a stability period on the financial market. A concentration of the banking sector is treated by Fitch, S&P's and Moody's as an insignificant measure that has not influence on

changes of banks' notes. The mentioned relationship has been observed especially in the case of bigger institutions, and those with the government capital. The concentration of the banking sector reduces Moody's notes given for bigger entities because it can generate an additional systemic risk. The impact of the concentration ratio has been noticed during a stability period on the financial market.

The value of assets that is one of the measure of the size of banks is significant for the changes of Fitch and Moody's credit ratings of smaller banks with private capital. The mentioned relationship is especially significant in the case of changes of S&P's credit ratings of bigger banks.

Fitch ratings are lower for the banks with a government as one of the investors. It can be connected with bad quality of assets and a need for recapitalization of these banks during a crisis. In the case of Moody's and S&P's the mentioned relationship in the whole sample has not been observed but a significant negative impact has been noticed for bigger banks. The size of banks plays a significant role in the estimation of banks notes. During a crisis banks' notes are decreased. The changes of banks' credit ratings are insufficient on the mentioned variable.

In the case of Fitch, the changes of credit ratings has not been created by previous changes. The significant negative relationship has been noticed for smaller banks assessed by S&P and Moody.

5. Conclusions

The aim of the presented paper has been to analyse determinants of banks' credit ratings by taking into account the type of investors. The research has been prepared by using logit panel data models. The size of banks and the moment of crisis have also been taken into consideration in the analysis. The following hypothesis has been put: Banks with the government capital receive higher credit ratings than institutions with private capital by taking financial factors into account; that has been verified positively. The results of the study have been presented according to the CAMEL indicators. The analysis of the impact of the capital adequacy indicators suggests that the mentioned determinants have got a significant impact on banks' ratings, especially during a crisis. Fitch takes the leverage ratio into consideration for banks that have private investors, especially the bigger institutions. Tier 1 has got a more important impact on smaller banks with private capital. The same situation has been observed for Moody's. In the case of S&P's the strength of influence on banks' notes is similar for each of the analysed groups. As a result, the capital adequacy indicators are treated as a good measure of default risk. The high value of loan loss provisions as a percentage of the total loans decreases especially the notes of bigger banks with private capital, also during a financial crisis. Moody's notes are more sensitive to the mentioned factor in the case of smaller entities. The management quality indicators are significant for bigger banks' ratings given by Fitch and Moody's. Smaller entities' credit ratings are sensitive to these factors if they are presented by S&P's. The earnings factors are especially significant for Fitch and Moody's credit ratings given for bigger banks and those with a government as one of investors. S&P's puts attention to smaller banks and those with private capital during the analysis of the mentioned group of variables. The liquidity indicators and their impact is differentiated taking into consideration the type of a credit rating agency, but in each case a stronger reaction of credit ratings has been noticed for bigger banks, especially those with private capital.

As far as financial market indicators are concerned, an especially significant impact during a crisis and for bigger banks has been noticed for GDP growth and countries' credit ratings. The high value of the market perception influences negatively banks' credit ratings. The notes given to bigger banks by all credit ratings agencies are more sensitive to the mentioned variable than

those for smaller institutions. The size of the capitalization plays an insignificant role during the estimation of default risk. Fitch ratings are lower for banks where one of the investors is a government. The size of banks plays significant role for an estimation of banks' notes. During a crisis banks' notes are decreased.

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Table 1. Decomposition of Moody's, S&P's and Fitch long-term issuer credit ratings.

Moody's Long-term Issuer Rating		S&P's Long-term Issuer Rating		Fitch Long-term Issuer Rating	
Rating	Code	Rating	Code	Rating	Code
Aaa	100	AAA	100	AAA	100
Aa1	95	AA+	95	AA+	94,74
Aa2	90	AA	90	AA	89,47
Aa3	85	AA-	85	AA-	84,21
A1	80	A+	80	A+	78,95
A2	75	A	75	A	73,68
A3	70	A-	70	A-	68,42
Baa1	65	BBB+	65	BBB+	63,16
Baa2	60	BBB	60	BBB	57,89
Baa3	55	BBB-	55	BBB-	52,63
Ba1	50	BB+	50	BB+	47,37
Ba2	45	BB	45	BB	42,11
Ba3	40	BB-	40	BB-	36,84
B1	35	B+	35	B+	31,58
B2	30	B	30	B	26,32
B3	25	B-	25	B-	21,05
Caa1	20	CCC+	20	CCC	15,79
Caa2	15	CCC	15	CC	10,53
Caa3	10	CCC-	10	C	5,26
Caa	5	CC	5	RD	-5
C	0	NR	0	D	-5
WR	-5	SD	-5	WD	-5
NULL	0	NULL	0		
		D	-5		

Source: own elaboration.

Table 2. Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
nii	288	3.342993	2.062914	.496	14.697
ef	528	49.07732	80.3074	-1358.44	327.994
Total assets	7,067	1.22e+11	2.97e+11	1465207	2.51e+12
Total liabilities	7,011	1.17e+11	2.86e+11	121690.9	2.45e+12
opl	6,125	2.065091	375.8041	-21059.2	10346.1
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
tier1	3,125	11.85822	4.407446	1	52.3202
dep	6,044	34.2422	950.0079	-.037852	59681.4
sec	6,008	20.38771	16.94233	0	129.026
roa	6,442	.1944293	3.080577	-94.7601	49.4816
roe	443	-.1723354	25.86521	-436.544	57.7226
liq	6,703	.2647782	.1628054	0	1.329167
lg	5,657	.0156321	.2433758	-6.955236	3.999034
dg	5,601	.0213583	.3295184	-8.351819	8.321701
sht	6,152	1.211432	15.1379	-3.307692	382.3529
fitch	4,516	22.36469	37.68147	-5	94.7368
sp	5,123	67.36775	24.02625	-5	100
moody	1,404	78.57906	19.50182	-5	100
cr_sp	17,238	74.83786	26.43105	-5	100
cr_fitch	16,081	25.25069	42.54353	-5	100
cr_moody	13,821	67.01415	28.37377	0	100
gdpg	18,355	2.282583	3.53236	-16.43029	13.8265
cpi	18,222	205.4448	631.5867	36.8	6739.645
public	20,519	.83391	.3721704	0	1
capit	13,301	6.17e+09	1.54e+10	40032.35	1.66e+11
ondepo	16,196	4.303322	7.948153	-1	85
con	19,020	8.15062	3.506112	2.7	24
cgdp	19,368	87.08083	55.9036	1.12552	312.154
capgdp	18,808	70.09433	59.13708	.7307906	265.1282
gover	20,519	.0899654	.2861392	0	1
osfiz	20,519	.1141869	.3180458	0	1
capbig	10,537	1	0	1	1
capsmall	9,982	1	0	1	1
bigg	5,530	1	0	1	1
cap	13,301	20.26821	2.385335	10.59744	25.83484
small	14,989	1	0	1	1
big	17,800	1	0	1	1
ass	7,067	23.17477	2.511739	14.19751	28.5525

Source: own calculation.

Table 3. Estimation of Fitch banks' credit ratings by taking into account the size of banks and the type of ownership.

fitch	big Coef.	big P>z	big Coef.	big P>z	big nogov Coef.	big nogov P>z	small Coef.	small P>z	small Coef.	small P>z	small nogov Coef.	small nogov P>z	no gover Coef.	no gover P>z	gover Coef.	gover P>z
opl	.0079291	0.418	.0084063	0.395	-.002006	0.869	-.0012799	0.126	-.0012862	0.124	-.0011942	0.163	.0039925	0.437	-.0103958	0.354
lev	-.066316	0.079	-.0701735	0.059	-.1492719	0.000	.085078	0.000	.0853087	0.000	.0883098	0.000	-.0493379	0.022	.1697326	0.259
llp	-32.03139	0.000	-31.53374	0.000	-53.70643	0.000	.1132337	0.524	.1150246	0.517	.1106664	0.544	-2.602991	0.000	-5.05183	0.518
tier1	-.4992437	0.005	-.5251759	0.003	-.1816577	0.327							-.6446343	0.000		
dep	-3.152344	0.000	-3.249092	0.000	-5.220479	0.000	-.0001748	0.862	-.0002492	0.809	-.0180883	0.751	-1.84245	0.076	-.0198684	0.020
sec	.0893989	0.000	.0801073	0.000	.1395828	0.000	-.0556161	0.023	-.0556525	0.023	-.0552559	0.027	.0420396	0.102	.046016	0.707
roa	5.186077	0.050	5.165907	0.052	.7856727	0.822	.2957764	0.154	.2961535	0.152	.2257195	0.297	-.5982836	0.730	6.15697	0.007
liq	-8.668317	0.001	-8.97549	0.001	-10.26854	0.001	6.459203	0.003	6.501015	0.003	5.964759	0.007	-3.127554	0.424	-47.27705	0.090
lg	.0291715	0.991	-.0155285	0.995	.0416749	0.988	.9903695	0.010	.9939494	0.010	.9531051	0.014	.4939878	0.261	17.78765	0.040
dg	-1.84033	0.459	-1.710074	0.493	-2.878433	0.285	-.1908097	0.674	-.1924698	0.672	-.1562658	0.741	-1.166952	0.304	-39.89329	0.007
sht	2.857766	0.010	3.295131	0.001	1.316826	0.269	-.6705114	0.090	-.6777022	0.086	-.6408693	0.114	4.466878	0.002	3.295506	0.894
gdpg	.3923421	0.003	.4185794	0.001	.202769	0.195	.1758739	0.000	.1766103	0.000	.1612607	0.001	.5096758	0.000	1.005032	0.013
cr_fitch	.051212	0.000	.0509359	0.000	.0701858	0.000	.0541586	0.000	.0542722	0.000	.0523232	0.000	.0507736	0.000	.0574347	0.013
ondepo	-.2200509	0.442	-.2401347	0.407	-.5803998	0.115	-.0125256	0.750	-.0118014	0.764	-.0182134	0.656	-.3781055	0.033	.6622937	0.443
capit	1.35e-11	0.444	1.79e-11	0.293	-5.15e-13	0.977	-2.22e-10	0.000			-2.11e-10	0.001	-2.76e-11	0.233	3.65e-10	0.038
gover	-.7071778	0.393					-5.186845	0.134	-2.22e-10	0.000						
con	.0518486	0.099	.0590697	0.056	-.0215228	0.581	-.0213653	0.041	-.0213819	0.041	-.0258632	0.014	.0383384	0.192	.2966824	0.060
cgdp	.0022931	0.718	.0034051	0.588	.0145291	0.087	.095733	0.000	.0951565	0.000	.1097631	0.000	.0513263	0.006	.2764357	0.020
capgdp	-.0283649	0.022	-.0295383	0.020	-.0150464	0.283	.0271411	0.128	.0272259	0.128	.0219561	0.240	-.0195595	0.159	-.1886374	0.161
/cut1	-6.643393	0.075	-6.467479	0.089	-15.95178	0.000	-2.983265	0.116	-2.456519	0.180	-4.305575	0.042	-9.334405	0.038	39.24481	0.010
/cut2	-6.297077	0.091	-6.122045	0.107	-14.99999	0.001	-2.891457	0.128	-2.364752	0.197	-4.20848	0.047	-9.012691	0.045	40.36755	0.009
/cut3	-5.356323	0.150	-5.196322	0.171	-13.01093	0.003	-2.836099	0.135	-2.309415	0.208	-4.149787	0.050	-8.555221	0.056	41.05761	0.008
/cut4	-3.877324	0.295	-3.737617	0.323	-6.490956	0.133	-2.501177	0.188	-1.974601	0.281	-3.878084	0.067	-8.098711	0.069	44.94957	0.005
/cut5	1.259948	0.735	1.353239	0.722	-5.795573	0.183	-1.894661	0.317	-1.368582	0.454	-3.296607	0.119	-6.093804	0.166		
/cut6	1.953837	0.603	2.046924	0.593			-1.670853	0.377	-1.145097	0.531	-3.066734	0.146	-2.257253	0.605		
/cut7							-1.602199	0.397	-1.076528	0.556	-2.996251	0.156	-.7378037	0.867		
/cut8							-1.578677	0.404	-1.053035	0.564	-2.9721	0.159				
/cut9							.1321636	0.944	.6561529	0.718	-1.213782	0.563				
/cut10							.9940895	0.596	1.517584	0.402	-.3282233	0.875				
/cut11							1.809844	0.332	2.332778	0.196	.5215728	0.803				
/cut12							4.434915	0.018	4.958025	0.006	3.2388	0.121				
/cut13							6.462367	0.001	6.986787	0.000	5.299059	0.014				
no obs	611		611		539		1018		1018		979		925		119	
no group	23		23		20		37		37		34		34		5	
Wald	0.0000		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		0.0000	

Notes: *Fitch* - Fitch Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_fitch* - country's Fitch Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cgdp* - is the value of private sector credits to GDP; *capgdp*- is the value of the capitalization to GDP; no *obs* – number of observations; *no gr* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 4. Determinants of changes of Fitch long-term issuer credit ratings for European banks.

Δfitch	big		small		nogover		big & nogover		small & nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Δopl	-.0005022	0.829	.0005339	0.947	-.0005833	0.840	-.0005309	0.816	-.0009636	0.915
Δlev	-.041882	0.762	.0346396	0.506	.014055	0.810	-.037462	0.785	.2867445	0.062
Δllp	-.6015786	0.599	.0091669	0.983	-.0230706	0.902	-.7139322	0.537	.0613062	0.918
Δtier1	.423178	0.047	.0679279	0.761	.2044795	0.169	.4228672	0.046	.0340419	0.915
Δdep	.0036725	0.991	1.639594	0.571	.076527	0.800	.004647	0.989	-.9259281	0.851
Δsec	.3262745	0.019	-.0075994	0.775	.0044019	0.865	.3322011	0.017	-.0087142	0.855
Δroa	.9266229	0.438	-.382655	0.885	.3496754	0.647	.8425781	0.538	.7075796	0.801
Δliq	-24.12811	0.136	-4.308089	0.578	2.21006	0.711	-24.92213	0.126	-3.763243	0.694
Δlg	-7.493316	0.155	-.9307357	0.251	-.0975715	0.881	-7.540147	0.152	-.2687688	0.845
Δdg	-1.613763	0.670	3.909315	0.072	.9908296	0.593	-1.595543	0.674	3.935983	0.107
Δsht	4.119529	0.822	4.782056	0.542	-.4979166	0.641	3.905184	0.832	4.450558	0.590
Δass	3.636279	0.608	5.777162	0.386	-4.221615	0.184	3.677906	0.603	-15.70162	0.089
Δcaptb	-.6141983	0.672	.0894699	0.921	.0097835	0.989	-.5780436	0.693	-.1421289	0.892
Δcon	-.0876857	0.401	.0095758	0.959	-.011414	0.899	-.0864252	0.408	.1362634	0.567
Δcr_fitch	-.6336127	0.986	.0512462	0.000	.0411066	0.000	-.6202951	0.997	.0546063	0.000
Δgdpg	-.0150599	0.959	.1675219	0.450	.1349281	0.444	-.0065211	0.982	.083693	0.730
Δcpi	1.590805	0.003	.0130936	0.952	.4402482	0.060	1.59733	0.003	-.2133307	0.508
Δondepo	-3.154174	0.019	.0425312	0.932	-.7272831	0.146	-3.134979	0.020	.4583815	0.479
/cut1	-6.379319	0.000	-5.426552	0.000	-7.595082	0.000	-6.35548	0.000	-6.101116	0.000
/cut2	-5.271963	0.000	-4.815044	0.000	-5.137815	0.000	-5.247966	0.000	-5.434242	0.000
/cut3	-4.729443	0.000	-4.491199	0.000	-4.449041	0.000	-4.704487	0.000	-5.188942	0.000
/cut4	-4.330911	0.000	6.849317	0.000	-4.280244	0.000	-4.304473	0.000		
/cut5	-4.16473	0.000			-4.135057	0.000	-4.137639	0.000		
/cut6	-4.020024	0.000			-4.007281	0.000	-3.992306	0.000		
/cut7					-3.948717	0.000				
/cut8					-3.893275	0.000				
no obs	346		613		898		344		554	
no grup	29		24		46		28		21	
Wald	0.6451		0.0000		0.0000		0.6266		0.0002	
LM	0.0000		0.0000		0.0000		0.0000		0.0000	

Notes: *Fitch* - Fitch Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_fitch* - country's Fitch Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cpi* - is the CPI index; *no obs* – number of observations; *no grup* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 5. Determinants of changes of Fitch long-term issuer credit ratings for European banks.

Δfitch	big		small		nogover		big & nogover		small & nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Δfitch										
L.	-2.823529	0.998	.012206	0.637	-2.306691	0.995	-2.802883	0.998	-.2104272	0.998
Δopl										
L.	.0000743	0.987	.0072387	0.165	.0021879	0.388	.0000752	0.987	.009723	0.129
Δlev										
L.	.0061652	0.948	-.0219391	0.585	-.0090715	0.841	.0063715	0.946	-.0199643	0.667
Δllp										
L.	.8110527	0.379	-.3002519	0.189	-.080025	0.549	.8072226	0.382	-.4290335	0.107
Δtier1										
L.	-.0652222	0.791	.3835483	0.028	.2279845	0.180	-.0643999	0.793	.5122468	0.022
Δdep										
L.	-.3531645	0.088	.4063419	0.920	-.255697	0.184	-.3535561	0.087	-1.278146	0.829
Δsec										
L.	-.1122237	0.598	-.016662	0.647	-.0070009	0.855	-.1096902	0.607	-.0101138	0.881
Δroa										
L.	.569221	0.532	-2.324052	0.375	-.2457322	0.797	.5658379	0.534	-3.899347	0.261
Δliq										
L.	5.916459	0.774	3.196828	0.767	1.367181	0.827	5.742027	0.780	10.79737	0.318
Δlg										
L.	.8465574	0.359	.2358217	0.838	.378682	0.562	.8431974	0.361	.6644906	0.541
Δdg										
L.	-5.890883	0.082	-3.666338	0.236	-4.219878	0.027	-5.901119	0.081	-6.233777	0.147
Δsht										
L.	-13.71622	0.111	-9.34943	0.180	-11.64008	0.043	-13.72572	0.111	-13.33446	0.102
Δass										
L.	-4.233518	0.426	-8.443255	0.137	-5.761621	0.080	-4.211321	0.429	-19.10573	0.026
Δcaptb										
L.	.1614315	0.902	.2365154	0.857	.3782513	0.679	.168205	0.898	.2726544	0.895
Δcon										
L.	-.0230854	0.889	.0483337	0.764	.0347113	0.751	-.0225258	0.891	.1239918	0.491
Δcr_fitch	-.2644056	1.000	.0506282	0.000	.0468286	0.000	-.262823	1.000	.0587451	0.000
L.	-.2460797	1.000	-.0439793	0.049	.0220354	0.108	-.2444007	1.000	.0347884	0.036
Δgdpg										
L.	.1829397	0.521	-.0925468	0.676	-.0580191	0.734	.1846252	0.516	-.2783536	0.270
Δcpi										
L.	.3325677	0.273	-.0133355	0.946	.0263706	0.867	.3367907	0.269	-.408578	0.226
Δondepo	-.633981	0.333	.3206061	0.536	-.054357	0.901	-.6360332	0.332	.600721	0.349
/cut1	-6.028638	0.000	-5.863639	0.000	-8.166851	0.000	-6.018892	0.000	-7.173148	0.000
/cut2	-5.312796	0.000	-5.256191	0.000	-5.665628	0.000	-5.302743	0.000	-6.483361	0.000
/cut3	-4.566875	0.000	-4.924291	0.000	-5.054573	0.000	-4.556194	0.000	-6.217137	0.000
/cut4	-4.323758	0.000	7.653523	0.000	-4.869742	0.000	-4.312906	0.000		
/cut5	-4.126244	0.000			-4.711806	0.000	-4.115288	0.000		
/cut6	-3.960958	0.000			-4.640934	0.000	-3.949927	0.000		
/cut7					-4.574632	0.000				
/cut8					-4.512435	0.000				
no obs	343		617		899		341		558	
no grup	29		26		46		28		23	
Wald	0.9967		0.0000		0.0000		0.9967		0.0026	
LM	0.0000		0.0000		0.0000		0.0000		0.0000	

Notes: *Fitch* - Fitch Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_fitch* - country's Fitch Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cpi* - is the CPI index; *no obs* – number of observations; *no grup* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 6. Estimation of S&P's credit ratings for banks by taking into account the size of banks and the type of ownership.

sp	big				big nogover		small				small nogover		nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	-.0076942	0.018	-.0077477	0.016	-.0077552	0.020	-.0008684	0.198	-.0008625	0.201	-.0007914	0.232	-.0052331	0.002
lev	.043949	0.177	.0422722	0.182	.0367226	0.250	.0015918	0.858	.0015672	0.860	.002901	0.743	-.009687	0.523
llp	-1.149634	0.274	-1.072964	0.306	-.4572914	0.655	-.2941167	0.029	-.2956571	0.028	-.2782732	0.034	-.7177713	0.021
tier1	-.1883721	0.017	-.182068	0.020	-.1949786	0.014							-.1711682	0.000
dep	1.001385	0.341	1.126783	0.283	.8836317	0.407	6.119907	0.000	6.149816	0.000	6.489703	0.000	.1656097	0.803
sec	.003709	0.755	.0036319	0.760	-.0005661	0.964	.0799701	0.002	.0797875	0.002	.0783987	0.003	.0052755	0.633
roa	1.805953	0.096	1.871739	0.084	2.185568	0.049	.3029057	0.077	.3001137	0.080	.2654601	0.122	1.241911	0.002
liq	2.521869	0.363	2.65718	0.337	4.444573	0.120	-2.300074	0.458	-2.303336	0.457	-1.554424	0.624	-1.647892	0.455
lg	-1.189534	0.167	-1.242338	0.149	-.8799682	0.314	-.815731	0.047	-.8176318	0.046	-.8012861	0.049	-.7339104	0.054
dg	1.063394	0.358	1.152719	0.319	.6762629	0.565	2.797808	0.008	2.814307	0.008	2.531648	0.019	-.1898442	0.810
sht	-18.69131	0.028	-17.78056	0.037	-44.56213	0.000	.0214999	0.953	.0221148	0.952	.0490437	0.892	-1.321861	0.023
gdpg	.1088936	0.033	.1089634	0.033	.1069722	0.038	.0594305	0.031	.0593684	0.031	.0602323	0.029	.0013279	0.968
cr_sp	.3807715	0.000	.3781091	0.000	.3782518	0.000	.4971965	0.000	.4964093	0.000	.4904458	0.000	.4812842	0.000
ondepo	-.5604796	0.000	-.5818471	0.000	-.6519386	0.000	-.1105286	0.000	-.1105417	0.000	-.1095732	0.000	-.3674827	0.000
capit	9.03e-11	0.000	9.09e-11	0.000	8.75e-11	0.000	1.06e-10	0.017	1.08e-10	0.015	8.44e-11	0.072	9.54e-11	0.000
gover	5.730836	0.253					3.840385	0.511						
con	-.0008141	0.970	-.0057048	0.792	.0027281	0.902	-.0176961	0.121	-.0182171	0.110	-.0190244	0.101	.0253105	0.111
cgdp	.0666295	0.000	.0642414	0.000	.0718816	0.000	.0506539	0.000	.0502	0.000	.051043	0.000	.0487774	0.000
capgdp	-.0026442	0.806	-.0034809	0.747	-.0025973	0.811	-.0435382	0.000	-.0438154	0.000	-.0441579	0.000	-.015064	0.065
/cut1	21.10712	0.000	20.18396	0.000	22.31273	0.000	16.3191	0.000	15.95939	0.000	16.60145	0.000	20.4053	0.000
/cut2	24.12452	0.000	23.25778	0.000	25.13219	0.000	22.61128	0.000	22.24282	0.000	22.77208	0.000	23.45689	0.000
/cut3	25.96002	0.000	25.15858	0.000	26.94887	0.000	24.25569	0.000	23.88473	0.000	24.3986	0.000	24.44897	0.000
/cut4	27.60935	0.000	26.79559	0.000	28.49074	0.000	25.67189	0.000	25.30072	0.000	25.7774	0.000	26.61179	0.000
/cut5	31.51951	0.000	30.64265	0.000	32.28687	0.000	25.99281	0.000	25.62168	0.000	26.08906	0.000	28.59698	0.000
/cut6	34.25635	0.000	33.33935	0.000	35.26668	0.000	27.76719	0.000	27.39759	0.000	27.8529	0.000	32.14314	0.000
/cut7	36.60217	0.000	35.70814	0.000	36.7403	0.000	31.70963	0.000	31.34284	0.000	31.77454	0.000	35.53064	0.000
/cut8	40.44858	0.000	39.57425	0.000	40.91449	0.000	36.38185	0.000	36.01057	0.000	36.47028	0.000	37.48685	0.000
/cut9	42.45907	0.000	41.57249	0.000	43.00501	0.000	39.09523	0.000	38.72089	0.000	39.1865	0.000	39.53609	0.000
/cut10	46.86373	0.000	45.97111	0.000	47.50502	0.000	40.62474	0.000	40.24657	0.000	40.73281	0.000	44.18511	0.000
/cut11	49.47024	0.000	48.57668	0.000	50.16159	0.000	43.78946	0.000	43.40708	0.000	43.67875	0.000	46.46291	0.000
/cut12	55.36054	0.000	54.45985	0.000	56.15259	0.000	47.25386	0.000	46.87257	0.000	47.14934	0.000	51.88077	0.000
/cut13							50.68462	0.000	50.30521	0.000	50.26363	0.000	54.24103	0.000
/cut14							60.73035	0.000	60.35553	0.000	60.41144	0.000	58.89601	0.000
/cut15							65.14086	0.000	64.79357	0.000	64.90909	0.000	68.53675	0.000
/cut16							80.27245	0.000	80.00651	0.000	80.26971	0.000		
no obs	503		503		497		692		692		677		815	
no group	23		23		22		29		29		27		43	
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	

Notes: *Fitch* - Fitch Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_fitch* - country's Fitch Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cgdp* - is the value of private sector credits to GDP; *capgdp*- is the value of the capitalization to GDP; no *obs* – number of observations; *no gr* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 7. Determinants of changes of S&P long-term issuer credit ratings for European banks.

Δsp	big		small		nogover		big & nogover		small & nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Δopl	-.0021494	0.357	-.0046055	0.200	-.0029761	0.071	-.0021772	0.348	-.0045697	0.203
Δlev	.0125114	0.765	.0584638	0.088	.0198126	0.474	.0126259	0.762	.0589759	0.086
Δllp	.146201	0.783	-.2530888	0.842	.1568806	0.667	.1568526	0.768	-.2474315	0.846
Δtier1	.0951394	0.592	-.0644667	0.644	.014845	0.889	.0954187	0.590	-.067049	0.631
Δdep	-5.120864	0.189	1.643004	0.410	.7208255	0.635	-5.069064	0.189	1.578055	0.434
Δsec	-.0079741	0.952	.0220594	0.086	.0173595	0.140	-.0038856	0.977	.0221291	0.085
Δroa	.7424675	0.169	.5216527	0.747	.8360724	0.039	.741832	0.167	.5223984	0.747
Δliq	-8.607835	0.521	-.2493219	0.966	-.0399884	0.993	-8.731272	0.520	-.4032	0.946
Δlg	-.3403338	0.603	-.510873	0.356	-.3037398	0.465	-.3516978	0.592	-.5055722	0.363
Δdg	-6.118374	0.009	.9252639	0.515	-.8043238	0.361	-6.065775	0.010	.9389974	0.511
Δsht	-.2568256	0.854	14.09275	0.189	-.2807343	0.734	-.265335	0.849	15.18792	0.185
Δass	6.897197	0.215	5.222852	0.265	2.983643	0.266	6.680885	0.230	5.167445	0.270
Δcaptb	.1601613	0.773	.2508111	0.747	.2192183	0.573	.1667434	0.763	.2457944	0.752
Δcon	.0439985	0.583	.016739	0.851	.0293263	0.608	.0500055	0.561	.0165151	0.853
Δcr_sp	.5325797	0.000	.6038868	0.000	.5108578	0.000	.5295558	0.000	.603744	0.000
Δgdpg	.3699527	0.002	-.2482779	0.045	.1099416	0.175	.3642067	0.002	-.2478743	0.045
Δcpi	-.0572915	0.564	.2369521	0.098	.0201015	0.811	-.0564467	0.574	.2323856	0.108
Δondepo	.2875078	0.284	1.098466	0.001	.3982904	0.036	.2845941	0.286	1.102185	0.001
/cut1	-12.10639	0.000	-10.79265	0.000	-10.85422	0.000	-12.0303	0.000	-10.79747	0.000
/cut2	-8.94675	0.000	-7.131412	0.000	-7.417298	0.000	-8.887535	0.000	-7.133438	0.000
/cut3	-5.71828	0.000	-6.204748	0.000	-5.596072	0.000	-5.681449	0.000	-6.206731	0.000
/cut4	-3.498643	0.000	-3.873209	0.000	-3.414771	0.000	-3.467565	0.000	-3.874222	0.000
/cut5	4.289386	0.000	4.321478	0.000	3.917328	0.000	4.236259	0.000	4.316477	0.000
no obs	297		515		801		287		514	
no grup	24		23		41		22		22	
Wald	0.0000		0.0000		0.0000		0.0000		0.0000	
LM	0.0000		0.2473		0.4560		0.0000		0.2452	

Notes: *sp* – S&P Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_sp* - country's S&P Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cpi* - is the CPI index; *no obs* – number of observations; *no grup* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors

Source: own elaboration.

Table 8. Determinants of changes of S&P long-term issuer credit ratings for European banks.

Δsp	big		small		nogover		big & nogover		small & nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Δsp										
L.	-.1324748	0.273	-.1753093	0.111	-.1355318	0.068	-.1283146	0.285	-.1732923	0.113
Δopl										
L.	.0006849	0.796	-.0014534	0.714	-.0008104	0.699	.0006793	0.794	-.0015704	0.692
Δlev										
L.	-.0694807	0.111	-.075073	0.046	-.0517268	0.039	-.0687955	0.113	-.0770131	0.041
Δllp										
L.	.5751228	0.253	1.376359	0.295	.5608284	0.151	.56731	0.260	1.374795	0.295
Δtier1										
L.	-.2687517	0.153	-.2063753	0.090	-.1703205	0.071	-.2652301	0.156	-.197163	0.112
Δdep										
L.	-8.61963	0.029	-.8377229	0.677	-3.018958	0.052	-8.415528	0.032	-.5684369	0.781
Δsec										
L.	-.1802732	0.097	.0218291	0.076	.0207459	0.072	-.1842199	0.091	.0215269	0.079
Δroa										
L.	.0042715	0.994	.6606419	0.680	.2643439	0.580	.0203579	0.972	.6994281	0.662
Δliq										
L.	-7.618118	0.549	2.89563	0.619	-4.347105	0.363	-7.084541	0.579	3.49924	0.546
Δlg										
L.	1.006022	0.278	.5413952	0.323	.4884764	0.246	1.040873	0.261	.5203722	0.346
Δdg										
L.	-3.506007	0.242	-4.486681	0.001	-3.261492	0.001	-3.393016	0.255	-4.485391	0.002
Δsht										
L.	-.8337695	0.545	-15.13315	0.108	-.6867848	0.435	-.8304991	0.544	-18.57737	0.084
Δass										
L.	16.7411	0.005	9.73255	0.042	10.08722	0.000	16.39335	0.006	9.774483	0.041
Δcaptb										
L.	-1.223164	0.059	.0236007	0.976	-.7220782	0.098	-1.203361	0.062	.0349906	0.965
Δcon										
L.	-.0794821	0.335	.0065732	0.934	-.0377541	0.492	-.1027009	0.247	.007023	0.929
Δcr_sp	.6382813	0.000	.6709518	0.000	.5988824	0.000	.6317703	0.000	.6702375	0.000
L.	.0118887	0.910	.0141097	0.901	.0321035	0.640	.0077212	0.941	.0124228	0.913
Δgdpg										
L.	.3055295	0.021	.188524	0.120	.2326761	0.003	.2974826	0.024	.1867555	0.123
Δcpi										
L.	.2128564	0.083	-.1594264	0.290	.0345626	0.685	.2171446	0.079	-.1438873	0.347
Δondepo	.0208474	0.949	1.0536	0.000	.4592962	0.028	.0205191	0.950	1.049644	0.000
/cut1	-13.49387	0.000	-11.81889	0.000	-11.62022	0.000	-13.48578	0.000	-11.83039	0.000
/cut2	-9.400674	0.000	-7.964344	0.000	-7.825192	0.000	-9.324756	0.000	-7.950448	0.000
/cut3	-5.876758	0.000	-6.799236	0.000	-5.856855	0.000	-5.82745	0.000	-6.787128	0.000
/cut4	-3.546999	0.000	-4.06021	0.000	-3.530121	0.000	-3.492951	0.000	-4.055119	0.000
/cut5	5.297291	0.000	4.254742	0.000	4.218407	0.000	5.272778	0.000	4.244043	0.000
no obs	293		519		801		283		518	
no grup	24		25		41		22		24	
Wald	0.0000		0.0000		0.0000		0.0000		0.0000	
LM	0.0000		0.1054		0.4675		0.0000		0.1159	

Notes: *sp* – S&P Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_sp* - country's S&P Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cpi* - is the CPI index; *no obs* – number of observations; *no grup* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 9. Estimation of Moody's credit ratings for banks by taking into account the size of banks and the type of ownership.

moody	big				big & nogover		nogover	
	Coef.	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**
opl	-.0106545	0.016	-.0107054	0.014	-.0071474	0.082	-.0075059	0.089
lev	.0918406	0.002	.0832746	0.007	.2694931	0.000	.1497221	0.000
llp	-.6103798	0.006	-.6116173	0.006	-.4280108	0.037	-.4543971	0.045
tier1	-.3397722	0.000	-.3250955	0.000			-.591418	0.000
dep	.0794069	0.931	.3633896	0.721	-2.548478	0.000	-.0743535	0.227
sec	.0408165	0.002	.0361489	0.008	.0511691	0.001	.019861	0.206
roa	5.906347	0.003	5.787523	0.004	2.787545	0.086	7.782261	0.000
liq	-4.349349	0.118	-2.860937	0.290	-11.85435	0.000	-3.745543	0.164
lg	-.805556	0.747	-.6681957	0.789	1.517652	0.303	1.802636	0.501
dg	-.3934968	0.854	-.354193	0.870	-.7906663	0.564	-.8025157	0.592
sht	-.3652653	0.745	-.030209	0.980	-.2529387	0.782	-2.543192	0.021
gdpg	.2253143	0.000	.2400965	0.000	.1781663	0.000	.2950924	0.000
cr_moody	.2729114	0.000	.2665827	0.000	.2478776	0.000	.2829225	0.000
ondepo	-.8729723	0.000	-.9178124	0.000	-1.098375	0.000	-.8138155	0.000
capit	-3.88e-11	0.076	-5.62e-11	0.010	8.95e-12	0.376	-1.84e-11	0.355
gover	-6.883115	0.001					-.1043983	0.001
con	-.0732008	0.025	-.0556743	0.082	-.0361405	0.143	.0054137	0.626
cgdp	-.0100011	0.460	-.0164475	0.293	.0321896	0.000	.0358818	0.010
capgdp	.0282039	0.037	.03493	0.013	.0219542	0.044		
							4.336374	0.270
/cut1	8.820497	0.027	10.6961	0.011	19.74105	0.000	5.225459	0.176
/cut2	13.26602	0.002	14.91106	0.001	22.97672	0.000	8.672573	0.021
/cut3	13.94027	0.001	15.55701	0.000	23.26122	0.000	9.83133	0.009
/cut4	17.21806	0.000	18.72035	0.000	25.32676	0.000	12.67413	0.001
/cut5	18.68943	0.000	20.20842	0.000	26.85217	0.000	12.97385	0.001
/cut6	21.66062	0.000	23.25254	0.000	30.46812	0.000	15.94275	0.000
/cut7	23.79369	0.000	25.43014	0.000	32.94373	0.000	18.93684	0.000
/cut8	30.81351	0.000	32.66095	0.000	40.25988	0.000	22.14555	0.000
/cut9							24.5582	0.000
/cut10							31.77459	0.000
no obs	337		337		331		331	
no group	11		11		12		12	
Wald	0.0000		0.0000		0.0000		0.0000	
LR	0.0000		0.0000		0.0000		0.0000	

Notes: *moody* – Moody's Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_moody* - country's Moody's Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cgdp* - is the value of private sector credits to GDP; *capgdp-* is the value of the capitalization to GDP; no *obs* – number of observations; *no gr* – number of groups; *Wald* – Wald test; *LM* – Breusch - Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 10. Determinants of changes of Moody's long-term issuer credit ratings for European banks.

Δmoody	small		nogover		small & nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z
Δopl	-.0048667	0.174	-.0052671	0.135	-.003995	0.289
Δlev	.0419644	0.599	.0495479	0.378	.1922433	0.094
Δllp	.2206623	0.192	.2327334	0.160	.2276518	0.180
Δtier1	-.1308185	0.219	-.0788772	0.461	-.1140696	0.290
Δdep	5.114911	0.050	-.0541046	0.606	5.076903	0.066
Δsec	.0117806	0.669	.0089333	0.762	.012039	0.711
Δroa	5.222875	0.017	4.962546	0.016	6.4547	0.005
Δliq	-1.025343	0.844	-4.07496	0.430	-2.219931	0.713
Δlg	-2.038372	0.457	-.4676972	0.865	-.1746529	0.956
Δdg	.6069673	0.807	-.9322971	0.627	.1837548	0.944
Δsht	-.0729231	0.985	-1.206095	0.744	-.9065229	0.820
Δass	4.57295	0.340	3.202597	0.471	-.4094623	0.946
Δcaptb	.5796051	0.522	-.3861338	0.580	.7594122	0.393
Δcon	-.0328648	0.828	-.0337483	0.813	-.0858629	0.539
Δcr_moody	.4120494	0.001	.2906692	0.000	.4646503	0.000
Δgdpg	-.2884923	0.027	-.1480331	0.251	-.2617768	0.056
Δcpi	-.2394154	0.090	-.1694194	0.164	-.2700877	0.072
Δondepo	1.106834	0.002	.7305585	0.021	1.196888	0.002
/cut1	-6.928958	0.000	-6.547886	0.000	-7.276745	0.000
/cut2	-4.232627	0.000	-5.784894	0.000	-4.490265	0.000
/cut3	-2.962874	0.000	-4.096146	0.000	-3.184958	0.000
/cut4	3.722125	0.000	-2.823874	0.000	3.66182	0.000
/cut5	4.333573	0.000	3.69814	0.000	4.384367	0.000
/cut6			4.408951	0.000		
no obs	346		349		314	
no grup	11		13		10	
Wald	0.0450		0.1958		0.0352	
LM	0.0000		0.0000		0.0000	

Notes: *moody* – Moody's Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_moody* - country's Moody's Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cpi* - is the CPI index; *no obs* – number of observations; *no grup* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 11. Determinants of changes of Moody's long-term issuer credit ratings for European banks.

Δmoody	small		nogover		small & nogover	
	Coef.	P>z	Coef.	P>z	Coef.	P>z
Δmoody						
L.	-.1393399	0.056	-.1991244	0.003	-.1991244	0.003
Δopl						
L.	-.0048624	0.249	-.0057069	0.129	-.0057069	0.129
Δlev						
L.	-.0808215	0.421	-.0489697	0.333	-.0489697	0.333
Δllp						
L.	.1920281	0.324	.234944	0.201	.234944	0.201
Δtier1						
L.	-.0626602	0.562	-.0475767	0.676	-.0475767	0.676
Δdep						
L.	-2.371866	0.364	.0131174	0.911	.0131174	0.911
Δsec						
L.	.022027	0.449	.0201364	0.532	.0201364	0.532
Δroa						
L.	2.946691	0.262	3.87336	0.086	3.87336	0.086
Δliq						
L.	.0971885	0.983	-.3714921	0.941	-.3714921	0.941
Δlg						
L.	-.3788797	0.898	-1.754926	0.552	-1.754926	0.552
Δdg						
L.	-1.376172	0.621	.2349652	0.913	.2349652	0.913
Δsht						
L.	-.6646535	0.860	-.7505261	0.843	-.7505261	0.843
Δass						
L.	11.83078	0.039	10.22796	0.030	10.22796	0.030
Δcaptb						
L.	-1.344804	0.092	-.3797504	0.626	-.3797504	0.626
Δcon						
L.	.0626109	0.685	-.0397624	0.807	-.0397624	0.807
Δcr_moody	.2039194	0.048	.2255878	0.000	.2255878	0.000
L.	.0681821	0.678	.2589716	0.002	.2589716	0.002
Δgdpg						
L.	.1327764	0.325	.1915273	0.147	.1915273	0.147
Δcpi						
L.	.1419683	0.333	.0953015	0.509	.0953015	0.509
Δondepo	.5693123	0.067	.4377891	0.139	.4377891	0.139
/cut1	-3.984013	0.000	-6.679272	0.000	-6.679272	0.000
/cut2	-2.718889	0.000	-4.200918	0.000	-4.200918	0.000
/cut3	4.372597	0.000	-2.739898	0.000	-2.739898	0.000
/cut4	4.852789	0.000	4.521905	0.000	4.521905	0.000
/cut5			5.089543	0.000	5.089543	0.000
no obs	346		350		350	
no grup	11		13		13	
Wald	0.1340		0.0019		0.0019	
LM	0.0000		0.0000		0.0000	

Notes: *moody* – Moody's Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_moody* - country's Moody's Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*, dummy variable, where "1" means the company that one of the stakeholders is government; *cpi* - is the CPI index; *no obs* – number of observations; *no grup* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.

Table 12. Estimation of the banks' credit ratings by taking into account the size of banks and the moment of financial crisis.

Variable	S&P						Fitch						Moody							
	big & crisis		small & crisis		crisis		big & nocrisis		small & nocrisis		nocrisis		big & crisis		big & nocrisis		crisis		nocrisis	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
opl	-.017965	0.818	-.0056352	0.083	-.0024183	0.314	.0025435	0.731	-.0012058	0.154	-.0007189	0.391	-.0197106	0.042	.0069773	0.714	-.011683	0.154	.0121358	0.453
lev	.4428935	0.506	-.0914786	0.257	.038059	0.385	-.1248107	0.000	.1576024	0.000	.0006981	0.975	-.0326514	0.763	-.0049813	0.968	-.0215184	0.789	-.0309286	0.797
llp	-1.720657	0.788	1.412102	0.223	-.5934045	0.084	-22.35434	0.000	.0134674	0.953	-.0130822	0.886	.2964639	0.936	-.098557	0.896	-1.243641	0.717	-.2866991	0.664
tier1													-1.043796	0.002	-.0166942	0.983	-.9273531	0.001	-.1618292	0.834
dep	4.142161	.	-5.258784	0.259	-.0405774	0.982	4.066995	0.044	-.0001038	0.921	-.0006003	0.563	-6.984661	0.013	-10.14106	0.000	-5.577235	0.041	-10.33434	0.000
sec	.1122073	0.674	.1227866	0.722	.0786618	0.015	.085055	0.010	-.030401	0.259	.0528845	0.001	.0769857	0.007	-.1728542	0.001	.0623773	0.018	-.179035	0.000
roa	7.605386	0.767	3.527168	0.220	2.725901	0.011	.7376307	0.773	.2735253	0.244	.1895386	0.317	15.92509	0.006	8.692445	0.078	11.99974	0.007	8.49999	0.075
liq	-14.98298	.	-52.88737	0.033	-13.64155	0.028	6.942298	0.029	4.386359	0.081	.4091777	0.787	-28.31597	0.002	-49.09145	0.000	-15.93789	0.042	-48.33331	0.000
lg	-6.690368	0.425	-4.542274	0.618	-1.743651	0.480	-.6258357	0.809	.6809105	0.071	.8892382	0.015	11.16774	0.011	-3.805414	0.494	8.215477	0.045	-4.884228	-0.383
dg	3.402691	.	-1.833109	0.786	1.917411	0.518	-.6893997	0.750	-.2375883	0.577	-.1930074	0.653	-12.21497	0.001	6.38138	0.260	-11.38426	0.002	5.855208	0.282
sht	-74.92367	.	1.151214	0.934	-4.254295	0.611	3.764683	0.216	-.3615227	0.441	.0762873	0.759	30.8911	0.018	16.4199	0.000	17.27831	0.115	16.83301	0.000
gdpg	-1.293085	0.306	.0755711	0.717	.0399502	0.539	.1040783	0.460	.1223214	0.012	.1829984	0.000	-.2667157	0.013	.261342	0.450	-.2716443	0.009	.2575842	0.450
cr	2.849948	0.184	1.507537	0.061	.9479577	0.000	.0615393	0.000	.0368967	0.000	.048216	0.000	.1525447	0.392			.3843588	0.001	2.170243	0.000
ondepo	-2.340054	0.187	-.2077515	0.832	-.3880679	0.000	-.02595	0.901	-.0631074	0.099	-.0444276	0.226	-1.193989	0.000	-2.040859	0.003	-.8477169	0.000	-2.066153	0.003
capit	6.33e-10	0.773	-1.51e-10	0.482	4.19e-11	0.474	1.43e-11	0.450	-2.68e-10	0.000	-2.39e-11	0.067	-9.26e-11	0.076	-1.86e-11	0.607	-8.95e-11	0.080	-1.89e-11	0.600
con	.0014619	0.997	.0566704	0.571	.0937107	0.062	.0600571	0.055	.0101437	0.415	-.0073774	0.482	.049108	0.659	.2938571	0.001	-.0444478	0.603	.2995042	0.001
cgdp	.0405637	.	.042646	0.679	.0501148	0.074	.118381	0.000	.0487215	0.002	.0720279	0.000	.0442546	0.222	.2098154	0.000	.0199938	0.571	.2099507	0.000
capgdp	.3444254	0.000	-.1083922	0.027	-.0354054	0.161	-.0208009	0.061	-.010143	0.610	-.0081575	0.282	.0127797	0.713	-.0545938	0.160	.0150891	0.671	-.0532052	0.155
/cut1	140.5534	1.000	22.11013	0.155	34.38673	0.000	-1.665889	0.706	-.1831954	0.927	-3.449248	0.045	-8.217975	0.525	8.322464	0.590	-10.78581	0.405	223.4467	0.000
/cut2	191.9276	0.082	46.79552	0.527	48.81806	0.000	-1.623715	0.713	-.084786	0.966	-3.384849	0.049	-4.902665	0.705	15.91775	0.310	-1.829024	0.879	224.2643	0.000
/cut3	213.9954	0.000	58.40066	0.177	55.97858	0.000	-1.198844	0.786	-.0257879	0.990	-3.332781	0.052	-.2580102	0.984	18.15894	0.249	2.980139	0.780	231.7775	0.000
/cut4	238.9798	.	62.06325	0.163	58.5645	0.000	.0742509	0.987	.3302802	0.869	-3.096044	0.071	4.617611	0.719	31.44049	0.046	10.7471	0.338	233.9798	0.000
/cut5	299.1294	0.000	74.03672	0.131	63.8418	0.000	2.961848	0.499	.9840857	0.622	-2.682839	0.117					14.64635	0.191	247.2702	0.000
/cut6	313.2461	0.000	79.34526	0.115	68.92818	0.000	9.168843	0.036	1.227902	0.538	-2.538039	0.138					18.01543	0.107		
/cut7	332.5758	.	84.45251	0.109	72.10613	0.000	10.09934	0.022	1.302586	0.513	-2.494196	0.145					22.60721	0.046		
/cut8	338.8461	0.000	95.57548	0.108	78.5923	0.000			1.328224	0.505	-2.479368	0.147								
/cut9	354.6329	0.000	103.0621	0.098	85.80813	0.000			2.882363	0.142	-1.589288	0.349								
/cut10			117.7148	0.106	92.17762	0.000			3.819718	0.050	-.9542576	0.573								
/cut11			132.2635	0.089	101.0964	0.000			4.751484	0.014	-.0742645	0.965								
/cut12			139.3389	0.080	103.4864	0.000			6.641422	0.001	1.761461	0.285								
/cut13			142.357	0.077	109.8452	0.000			8.310889	0.000	5.64774	0.001								
/cut14					128.667	0.000					7.975107	0.000								
no obs	368		159		368		365		614		614		160		160		176		123	
no group	29		16		29		21		34		34		11		10		12		11	
Wald	0.0000		0.0000		0.0000		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		0.0000		0.0000		0.0000	

Notes: *moody* – Moody's Long-Term Issuer Rating given for European banks; *tier1* - the Tier 1 ratio; *lev* – the leverage ratio; *llp* – the loan loss provisions as a percentage of average total loans; *sec* - the value of securities as a percentage of earnings assets; *roa* - the return on assets; *opl* - is the operating leverage; *lg* - the loan growth; *dg* - deposit growth; *dep* - the ratio of loans to deposit; *sht* - value of short-term borrowing to total liabilities, *liq* - the value of liquid assets to total assets; *ass* - the logarithm of the total assets; *gdp* - the GDP growth; *cr_moody* - country's Moody's Long-Term Issuer Rating; *con* - the 5-bank assets concentration; *ondepo* - the market perception; *capit* – the capitalization; *gover*; dummy variable, where "1" means the company that one of the stakeholders is government; *cgdp* - is the value of private sector credits to GDP; *capgdp*- is the value of the capitalization to GDP; *no obs* – number of observations; *no gr* – number of groups; *Wald* – Wald test; *LM* – Breusch -Pagan test; *big* – the group of banks that assets are between 50 to 100 percentile; *small* – the group of banks that assets are between 0 to 50 percentile; *gover* - the group of banks where one of the investors is government; *nogover* - the group of banks that have got only private investors.

Source: own elaboration.