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BANKS' CREDIT RATINGS INFLATION

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K e y w o r d s: banks' credit ratings, credit rating inflation, financial indicators, probit panel data models.

A b s t r a c t

The aim of the paper is to verify the significance of the credit ratings' inflation phenomenon of banks' notes. First, a literature review was prepared. The following hypotheses were then put: Banks' credit rating inflation has been observed. There are differences between the impact of the financial factors on banks' credit ratings between notes that are given by one or more credit rating agencies to the same entity. The analysis was prepared by using probit panel data models. Data has been collected from the Thomson Reuters database. Long term issuer credit ratings proposed by S&P, Fitch and Moody were used as a dependent variable. As independent factors the financial indicators and macroeconomic variables were measured. The comparison of notes given by credit rating agencies suggests that notes that are given by all CRAs are similar. The same results were received when the notes given by two agencies were compared. Differences are observed only in the case of ratings given by one institution. If a CRA is bigger, notes proposed by them are higher. A list of variables that are taken by a particular credit rating agency can be created regardless of whether the evaluation is one or more CRAs. The strength of impact of the described factors is differentiated.

INFLACJA RATINGÓW KREDYTOWYCH BANKÓW

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S ł o w a k l u c z o w e: rating kredytowy banków, inflacja ratingów kredytowych, wskaźniki finansowe, panelowe modele probitowe.

A b s t r a k t

Celem pracy była weryfikacja występowania zjawiska inflacji ratingów kredytowych. Przygotowano przegląd literatury. Postawiono następujące hipotezy: „istnieje inflacja ratingów kredytowych banków"; „obserwuje się różnice między wpływem poszczególnych wskaźników

finansowych na ratingi kredytowe banków, które są nadawane przez jedną lub więcej agencji ratingowych temu samemu podmiotowi". Do weryfikacji hipotez zastosowano probitowe modele panelowe. Dane zebrano z bazy Thomson Reuters. Zmienną zależną wykorzystaną do badania były długoterminowe ratingi kredytowe emitenta proponowane przez S&P, Fitch i Moody. Jako zmienne niezależne zastosowano wskaźniki finansowe poszczególnych banków i zmienne makroekonomiczne wpływające na sytuację i stabilność finansową banku. Porównanie not ratingowych nadawanych przez agencje sugeruje, że ratingi są podobne. Te same wnioski otrzymano po porównaniu ratingów dwóch agencji. Różnice występują tylko w przypadku not nadawanych przez jedną agencję. Jeżeli agencja jest większa, proponowane noty są wyższe. Lista zmiennych wykorzystywanych przez poszczególne agencje zależy od tego, czy noty są proponowane przez jeden podmiot czy kilka podmiotów. Siła wpływu opisanych czynników jest zróżnicowana.

Introduction

Credit rating agencies (CRAs) are responsible for the reduction of information exchanged between investors and issuers. The measure of the risk assessment relies on credit ratings presented by them. The last financial crisis caused their reputation to decrease because of their too slow reaction to the financial condition of the assessed entity.

The presented literature suggests that two phenomena can be observed here. The first of them is the "credit rating shopping", which relies on the assumption that an issuer is not likely to pick the highest rating if it discloses all the ratings from agencies they have approached (STROBL, XIA 2012). The second phenomenon that has been noticed during the last financial crisis is the "credit rating inflation", which relies on giving higher notes to an issuer to acquire new customers or retain the existing ones. The aim of the paper has been to analyse the second of the mentioned phenomenon. The previous researches that take into consideration the credit rating inflation have been prepared for non-financial entities. There is a lack of analyses that verify the differences between credit ratings given by CRAs to banks.

As a result, the aim of the paper was to verify the significance of the credit ratings' inflation phenomenon of banks' notes. The following hypotheses were put: Banks' credit rating inflation has been observed. There are differences between the impact of the financial factors on banks' credit ratings between notes that are given by one or more credit rating agencies to the same entity. The analysis has been prepared by using probit panel data models for banks' long-term issuer credit ratings.

The paper is organized as follows. Section 2 presents the broader literature researches. Section 3 describes the methodology and data. Next, the results of exploring the relation between the differences between notes that are given by CRAs to the same bank are presented. The factors influencing banks' credit ratings were also analysed. Section 4 concludes.

Literature review

Issuers can receive notes from different credit rating agencies. In previous researches a phenomenon has been observed according to which higher notes are given by CRAs to an entity to acquire a new client. As a result, credit ratings can be higher than the financial condition would suggest. The main group of CRAs that try to compete for a customer are the biggest three credit rating agencies, that is, S&P, Fitch and Moody. In the current literature review the credit rating inflation of the non-financial institutions has been taken into consideration.

The differences between credit ratings can be connected with the competition between CRAs (SKRETA, VELDKAMP 2009, BOLTON et al. 2010, MATHIS et al. 2009, CAMANHO et al. 2012, MANSO 2012, GOEL, THAKOR 2015). In the opinion presented by researches such an increased competition can create a credit inflation phenomenon. The mentioned situation is strictly connected with the fight for a market share. Credit rating agencies offer better notes to attract a new customer or keep an existing one. Ratings higher than those received during the estimation process are strictly connected with their quality decrease. On the other hand, DOHERTY et al (2012) find that the new credit rating agencies can compete in credit ratings quality. In their opinion a new credit rating agency entering the market could help to improve the quality and accuracy of notes. Such a situation could be beneficial to issuers with low risk, even though a reduction in broadcasting costs has not been observed.

The inflation of credit ratings can relate to the type of financial instruments that has been emitted by issuers and the goal of using credit ratings. A higher inflation of notes has been observed if credit ratings are used for analysing the risk and hedging against the risk required by the regulations (OPP et al. 2010, SKRETA, VELDKAMP 2009).

The next reason for giving to high notes is connected with the unclear methodology of the risk assessment used by CRAs (SKRETA, VELDKAMP 2009, PAGANO, VOLPIN 2012). Credit rating agencies publish only the basic information about the factors that have been taken into consideration during the estimation of the default risk. They use qualitative variables and non-describe indicators.

The next group of factors influencing the rating inflation are the value of fines and the restrictiveness of the policy about credit ratings and CRAs that has been implemented by governments, and the frequency of control (SANGIORGI et al. 2009, CHODNICKA-JAWORSKA 2016, KARTASHEVA, YILMAZ 2012). If the policy connected with CRAs and notes given by them is more restrictive, credit ratings are lower. On the other hand, the moment of the business cycle (BOLTON et al. 2010, BAR-IZAAK, SHAPIRO 2010, CHEN et al. 2013) can also have

a significant impact on the mentioned phenomenon. During a recession ratings are lower, because CRAs take care of their reputation risk. The risk of a decline of the image of an agency is lower during an economic boom, and as a result they can give higher notes than results of estimation of default risk suggest. The impact of the reputational risk on credit rating inflation has also been described by HARTMAN-GLASER (2013). The reputational risk can be analysed in two ways. On the one hand, CRAs should be treated as those that properly analyse the issuer risk and reduce the asymmetry of information between investors and issuers, and on the other hand they want to acquire customers (BOUVARD, LEVY 2012, FRENKEL 2013).

Credit rating agencies publish also two types of notes. The first one are ratings paid by issuers, the second one are those unpaid. FULGHIERI et al. (2013) and BANNIER et al. (2010) found that the issuance of unfavourable unsolicited credit ratings enables rating agencies to extract higher fees from issuers. The described situation relies on encouraging the issuer to apply for assigning ratings. On the other hand, higher unsolicited ratings increase agencies' reputation. Unsolicited credit ratings are lower than solicited ratings.

Differences between notes given by particular CRAs have been observed. The credit rating inflation has been observed in the case of notes given by bigger agencies and those notes that are paid by issuers rather than investors (STROBL, XIA 2012, XIA 2012, 2010, HIRTH 2013). The change of the source of financing has also an impact on the quality of credit ratings. JIANG et al. (2012) found that changes from the investor on issuer paid notes cause a credit rating inflation. CRAs that rely on investor paid models react faster to the changes of the financial condition of an issuer (CORNAGGIA, CORNAGGIA 2013). On the other hand, MORGAN (2002) and LIVINGSTON et al. (2010) suggest that Moody's notes are lower than the S&P's, that can be an effect of the share of the market (BECKER, MIBOURN 2011). BENMELECH and DŁUGOSZ (2009) found that notes that are given only by one CRAs are lower.

Also the size of the assessment issuer has got a significant impact on the credit rating inflation phenomenon. If the issuer is bigger, the credit rating is higher than in the case of a smaller entity in a similar financial condition (HE et al. 2011). The same situation has been observed for the size of tranche (JOSEPHSON, SHAPIRO 2015). On the other hand, KIM and PARK (2016) suggest that a credit rating inflation is observed especially in the case of countries' notes.

The next factor that has been analysed is the period of cooperation time between an issuer and a CRA. If the mentioned period is longer, notes are higher and increase the credit ratings inflation (MÄHLMANN 2011). CRAs do not want to lose customers, and as a result propose higher notes.

The way of solving the problem of credit rating inflation is sought in the restrictiveness of law and the way of financing notes. The most popular is the issuer-paid model with a restrictive credit rating and CRAs policy (BONGAERTS 2014, CHODNICKA-JAWORSKA 2016). The next way is to finance ratings by investors with a financial assistance from the government (DEB, MURPHY 2009).

Also issuers can have an impact on the inflation notes. They sometimes try to manipulate financial data to receive higher ratings (COHN et al. 2016). In literature we can also find information about a more conservative credit ratings trend (BAGHAI et al. 2013), but the mentioned situation is not an effect of the quality of the financial statements (GU, ZHAO 2006). BAE et al. (2010) suggest that credit rating agencies do not want to change their notes.

Despite the credit rating inflation, the financial market reacts significantly to credit rating changes (KING et al. 2016). As a result, credit ratings comply with their role.

Differences in the previous researches and a lack of analysis of the banking sector or inflation notes have been observed. As a result, the aim of this paper was to verify the significance of the credit ratings' inflation phenomenon of banks' notes. The following hypotheses have been put: A banks' credit rating inflation has been observed. There are differences between the impact of the financial factors on banks' credit ratings between notes that are given by one or more credit rating agencies to the same entity.

Methodology

Long-term issuer credit ratings proposed by the three largest rating agencies for European banks are used for the analysis. The mentioned data and financial statements are collected from Thomson Reuters database. Credit ratings are taken from the end of the quarter for the period of time between 1998–2015 for 643 banks in 24 countries[1]. Credit ratings have been decomposed linearly (FERRI et al. 1999). Using the linear method of decomposition has been strictly connected with the small number of banks' CDS spreads observations. The mentioned data are used to preparing the code classification. The advantage of using the nonlinear method is taking during the analysis the stage of the business cycle. The linear method can be prepared in two ways.

[1] 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.

The first one relies on starting from the lowest credit rating and putting it the smallest number, and giving one point more for the higher credit ratings. According to the second method, at first, there have been established the smallest and the highest numerical value of credit ratings and then between them putting the linearly intermediate values. In this paper it has been used the second of the described method. The linear method of decomposition has been introduced in the table below.

Table 1

Decomposition of Moody's, S&P's, 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	D	–5
C	0	D	–5	–	
D	–5	–			

Source: own elaboration.

Independent variables include the measure of capital adequacy, quality of assets, management quality, profitability and liquidity factors. To the mentioned factors belong variables described in the table 2. The analysis was prepared for the following subsamples: banks that received notes given by one CRAs, proposed by two agencies and given by Moody, S&P and Fitch.

Table 2

List of the independent variables with description

Name of variable	Description
1	2
Capital adequacy	
Tier 1	This item reflects the ratio of Tier 1 Capital at the end of the fiscal year to total risk-weighted assets for the same period and is expressed as percentage. Tier 1 Capital, also known as core capital, is defined as the sum of common stockholder's equity, certain qualifying issues of preferred stock and minority interest, less goodwill, intangible assets, investments in certain subsidiaries and other adjustments. Regulatory requirements generally mandate this ratio to exceed 4% reported for banks.
Leverage ratio	This is the ratio of total assets for the fiscal year to common shareholders equity for the same period and is expressed as percentage.
Z-score	This is a ratio of return on assets plus capital-asset-ratio to the standard deviation of return on assets.
Assets quality	
Loan loss provisions as a percentage of the average total loans	This is the ratio of provision for loan losses for the fiscal year as a proportion of total loans for the same period and is expressed as percentage.
Non-performing loans to total loans	Nonperforming loans as a percentage of total loans and other real estate owned. It is calculated as non-performing loans at the end of the fiscal year divided by total gross loans for the same period and is expressed as percentage.
Management quality	
Efficiency ratio	This is the ratio of non-interest expense for the fiscal year to total revenue less interest expense for the same period and is expressed as percentage. Measures the cost to the bank of each unit of revenue. Lower values are better.
Securities as a percentage earnings assets	This is the percentage of average earning assets represented by securities at the end of the fiscal year. This ratio measures the extent to which the bank's income is dependent on investment income rather than interest on loans.
Earnings	
Net interest income ratio	It shows the difference between interest income earned and the interest paid on borrowings by the bank, as a percentage of its earning assets.
Return on equity	This value is calculated as the net income before extraordinary Items for the fiscal year divided by the same period average total equity and is expressed as a percentage. Average total equity is the average of total equity at the beginning and the end of the year. Available for industrial and utility companies.
Return on assets	It is calculated as income after tax for the quarter divided by the average total assets for the same period and is expressed as percentage.
Operating leverage	This is percent change in net revenue less the percent change in operating expenses for the fiscal year.

cont. table 2

1	2
Loan growth	This is the change in total loans from the previous period, expressed as a percentage.
Deposit growth	This is the change in total deposits from the previous period, expressed as a percentage.
	Liquidity
Loan to deposit ratio	This is the ratio of end of the fiscal quarters loans to deposits for the same period.
Short-term borrowing to total liabilities	This is the ratio of end of the fiscal quarters short term borrowing to total liabilities for the same period.
Liquid assets to total assets	This is the ratio of end of the fiscal quarters liquid assets to total assets for the same period.

Source: own elaboration.

In this study, I conduct ordered probit panel data models. The presented models are unbalanced. The purpose of the model is to estimate the probability that an observation with particular characteristics will fall into a specific one of the categories. Credit ratings are a qualitative variables that belong to the discontinuous variables. The final version of the model has been presented below:

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

where:

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

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

$$F_{\mathbf{it}} = [\text{tier}_{it},\text{lev}_{it},\text{score}_{it},\text{llp}_{it},\text{npl}_{it},\text{ef}_{it},\text{sec}_{it},\text{nii}_{it},\text{roe}_{it},\text{roa}_{it},\text{opl}_{it},\text{lg}_{it},\text{dg}_{it},\text{liq}_{it},\text{dep}_{it},\text{sht}_{it},\text{liq}_{it}],$$

where:

tier_{it} – the Tier 1 ratio,
lev_{it} – the leverage ratio,
score_{it} – 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} – the efficiency ratio
sec_{it} – the value of securities as a percentage of earnings assets,
nii_{it} – the net interest income ratio,
roe_{it} – the return on equity,

roa_{it} – the return on assets,
opl_{it} – the operating leverage,
lg_{it} – the loan growth,
dg_{it} – the deposit growth,
liq_{it} – the value of liquid assets to total asstes,
dep_{it} – the ratio of loans to deposit,
sht_{it} – the value of short-term borrowing to total liabilities,
Z_{it} – contains time invariant regressors that are generally dummy variables,
ε_{it} – a random disturbance term.

Findings

The analysis has been prepared separately on credit ratings that are given by particular CRAs, by two agencies and by all of them (S&P, Fitch and Moody). First a descriptive analysis of using data was made. The higher notes are given to banks by Moody and S&P. The average note that has been presented by the mentioned entities is BBB or BAA. Credit ratings proposed by Fitch are lower, because it is meanly BB. The comparison notes between all CRAs suggest that such strong differences have not been observed. The analysis of the mean of notes suggests that the highest credit ratings have been proposed by Moody, but the difference between Fitch and S&P is one degree. Notes presented by Fitch are more differentiated, which suggests a standard deviation. The mentioned situation can be connected with the fear of the loss of reputation, because when we compare notes that have been given by two agencies, the differences are more noticeable. For example, notes presented by Moody are higher than those given by Fitch. The standard deviation in the case of Fitch is higher. The same situation has been observed for S&P and Fitch together. In the case of Moody and S&P the relation is comparable. The mentioned situation suggests that the first hypothesis saying that banks' credit rating inflation has been observed should be rejected. In the case of banks' credit ratings the strong supervisory, reduce the default risk, as a result the credit rating inflation is low or virtually non-exist.

The next part of the analysis relies on defining the more important factors that were taken into consideration by particular credit rating agencies.

Results of estimation of banks' credit ratings determinants have been presented in Table 4. The analysis has been made by using ordinary probit panel data models. The received findings suggest that there are differences between the methodology used by particular credit rating agencies. Differences were also observed between factors influencing notes depending on whether

Table 3

Descriptive statistics

Variable	Separately															S&P, Fitch, Moody				
	S&P					Moody					Fitch					S&P, Fitch, Moody				
	obs.	mean	std	min.	max	obs.	mean	std.	min.	max	obs.	mean	std.	min.	max	obs.	mean	std.	min.	max
ef	93	54.73	87.88	-600.00	267.60	0	–	–	–	–	19	49.26	13.75	22.42	82.69	0				
opl	514	0.49	56.46	-395.28	806.94	23	18.06	205.75	-662.16	514.76	277	-74.8	1,267.23	-21,059.19	582.08	236	2.09	49.33	-218.32	470.63
llp	457	0.33	0.86	-7.67	13.23	22	0.32	0.32	-0.11	1.23	234	0.25	0.55	-1.55	5.36	231	0.10	0.28	-0.08	2.82
npl	61	10.99	13.79	0.14	74.20	0	–	–	–	–	73	10.32	18.72	0.43	100.88	16	0.11	0.05	0.06	0.27
tier	322	10.99	3.79	6.50	52.05	20	9.85	1.78	6.33	13.00	72	9.94	3.14	6.30	17.70	114	7.61	1.62	5.78	12.90
dep	540	1.06	0.41	0.00	2.90	23	0.83	0.21	0.46	1.34	279	11.97	122.47	0.20	1,917.59	237	1.26	0.50	0.40	2.77
sec	584	19.44	24.77	0.08	100.00	23	14.14	11.05	1.55	35.40	274	20.91	17.26	0.00	62.19	195	28.54	14.46	5.23	55.13
roa	598	0.12	1.54	-19.80	7.65	22	0.04	0.80	-1.63	2.38	268	0.52	1.61	-11.95	16.34	231	0.15	0.11	-0.58	0.77
roe	44	-6.02	13.72	-66.94	11.27	0	–	–	–	–	0	–	–	–	–	0	–	–	–	–
dg	531	0.05	0.48	-0.91	10.14	14	-0.13	0.23	-0.83	0.03	218	0.05	0.33	-1.00	3.55	204	0.03	0.10	-0.41	0.91
lg	493	0.06	0.95	-0.95	20.89	14	-0.13	0.19	-0.67	0.01	223	0.06	0.26	-0.81	1.89	204	0.02	0.11	-0.49	0.96
lev	631	13.08	40.30	-920.50	185.99	23	48.90	50.79	6.51	224.91	284	13.26	8.65	1.33	44.78	237	49.92	158.48	11.90	1,892.63
nii	541	0.07	0.06	-0.01	0.44	23	0.03	0.02	0.01	0.11	269	0.09	0.14	0.01	0.95	150	0.03	0.02	0.00	0.11
sht	90	0.12	0.13	0.00	0.48	1	0.46	.	0.46	0.46	111	0.15	0.27	0.00	0.94	64	0.23	0.15	0.05	0.58
liq	584	0.05	0.06	0.00	0.30	23	0.04	0.02	0.01	0.12	279	0.07	0.07	0.00	0.36	151	0.02	0.01	0.00	0.07S
Pf	3,103	61.41	22.95	0.00	100.00	–					–					2,870	73.89	15.55	0.00	95.00
MoodyF	–					254	60.26	16.41	20	85	–					2,580	79.09	13.64	0.00	100.00
Fitchf	–					–					1,329	44.57	27.84	0	100	1,775	73.33	21.24	0.00	100.00

cont. table 3

Variable	Fitch, Moody					Fitch, S&P					Moody, S&P				
	obs.	mean	std.	min.	max	obs.	mean	std.	min.	max	obs.	mean	std.	min.	max
ef	0					9	46.97	71.11	-140.67	92.21	6	46.32	12.53	28.64	65.44
opl	16	0.66	21.69	-41.69	58.94	328	-0.03	54.34	-278.90	457.72	39	-30.78	165.14	-701.32	454.51
llp	14	0.10	0.12	-0.06	0.45	270	0.27	0.72	-1.30	8.49	35	0.18	0.14	0.01	0.71
npl	3	0.19	0.02	0.16	0.21	25	47.30	127.90	0.77	432.69	9	4.30	1.93	1.36	6.24
tier	4	9.99	1.71	8.40	11.84	150	9.37	3.21	3.39	16.50	36	12.10	2.65	7.10	16.79
dep	17	4.23	6.88	1.38	27.09	325	1.50	5.44	0.00	75.60	24	0.83	0.05	0.71	0.93
sec	17	5.93	5.68	0.50	17.42	333	22.70	15.71	0.79	81.15	36	34.23	6.53	1.28	42.29
roa	16	0.37	0.58	-0.18	1.99	323	0.24	0.94	-9.02	8.66	35	0.11	0.65	-2.71	1.32
roe	0	–	–	–	–	0	–	–	–	–	0	–	–	–	–
dg	13	0.09	0.33	-0.12	1.16	247	0.03	0.09	-0.22	0.98	22	-0.01	0.04	-0.09	0.05
lg	13	0.01	0.03	-0.06	0.07	243	0.03	0.13	-1.00	1.62	35	-0.01	0.06	-0.27	0.18
lev	17	16.56	4.25	7.57	20.18	340	19.09	9.72	4.25	50.79	36	18.93	3.99	14.79	34.27
nii	17	0.20	0.05	0.10	0.27	299	0.08	0.10	0.01	0.81	36	0.03	0.04	0.00	0.26
sht	3	0.93	0.01	0.92	0.95	110	0.10	0.09	0.00	0.30	23	0.00	0.00	0.00	0.00
liq	17	0.01	0.01	0.00	0.02	311	0.04	0.05	0.00	0.20	36	0.02	0.01	0.01	0.05
Fitchf	178	50.09	40.25	0.00	100.00	2,991	58.03	25.27	0.00	94.74	–	–	–	–	–
MoodyF	118	72.67	27.58	20.00	100.00	–	–	–	–	–	475	62.66	14.31	25.00	85.00
SPf	–	–	–	–	–	3,750	62.05	17.15	0	90	558	59.68	15.88	0.00	80.00

Source: own calculations.

Findings of estimation of determinants of banks' credit ratings

Table 4

Variable	Separately						ALL						Moody, S&P				Fitch, S&P			
	S&P		Moody		Fitch		Fitch		Moody		S&P		Moody		S&P		Fitch		S&P	
	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*
sec	0.00	0.63	-0.73	0.00	0.01	0.20	0.00	0.98	-0.02	0.71	0.38	0.00	1.78	0.00	1.69	0.05	-0.06	0.08	-0.26	0.00
roa	1.91	0.00	-2.11	0.03	2.81	0.00	1.36	0.77	16.90	0.00	26.72	0.01	-2.32	0.12	-4.34	0.07	0.07	0.84	1.13	0.77
lev	0.14	0.00	–	–	0.12	0.00	-0.11	0.00	-0.03	0.00	-0.15	0.00	–	–	–	–	–	–	–	-
liq	-12.36	0.01	-51.68	0.06	6.31	0.00	-14.78	0.47	69.08	0.11	-34.06	0.73	188.58	0.01	7.48	0.15	45.68	0.01	-18.91	0.21
nii	9.33	0.00	–	–	-0.78	0.56	–	–	–	–	–	–	–	–	–	–	–	–	–	-
opl	0.00	0.07	0.01	0.03	0.00	0.97	0.00	0.83	-0.04	0.03	-0.11	0.01	0.01	0.08	0.02	0.07	0.00	0.54	0.01	0.69
tier	-0.02	0.67	–	–	–	–	–	–	–	–	–	–	-0.34	0.25	-0.50	0.32	–	–	-1.22	0.00
dg	–	–	–	–	0.20	0.67	1.46	0.29	1.35	0.71	2.52	0.77	–	–	–	–	–	–	–	-
lg	–	–	–	–	0.29	0.60	-1.71	0.23	-0.13	0.97	0.27	0.97	8.77	0.43	27.24	0.13	–	–	-0.87	0.48
llp	–	–	–	–	0.73	0.04	-0.69	0.77	-14.17	0.00	-35.38	0.00	-4.00	0.18	-29.31	0.05	–	–	0.03	0.99
dep	–	–	–	–	0.01	0.70	3.05	0.17	-2.55	0.08	-1.82	0.59	–	–	–	–	–	–	–	-
_cons	–	–	–	–	-3.89	0.00	–	–	–	–	–	–	–	–	–	–	–	–	–	-
/cut1	-8.91	0.00	-28.05	0.00	–	–	-7.40	.	-17.01	0.00	-6.43	0.00	53.68	0.00	43.97	0.13	-3.18	0.00	-3.97	0.00
/cut2	-5.00	0.03	-26.05	0.00	–	–	-6.68	0.00	-16.54	0.00	-6.33	0.00	56.45	0.00	53.73	0.09	-3.00	0.00	-3.70	0.00
/cut3	-0.39	0.85	-22.73	0.00	–	–	0.84	0.79	-16.22	0.00	-6.32	0.00	57.69	0.00	55.27	0.09	-1.54	0.00	-3.38	0.00
/cut4	1.22	0.54	-20.14	0.00	–	–	4.22	0.18	-15.67	0.00	-6.31	0.00	60.04	0.00	–	–	-1.28	0.00	-2.73	0.00
/cut5	2.63	0.18	-11.38	0.00	–	–	11.25	0.08	-15.53	0.00	-6.21	0.00	67.12	0.00	–	–	-1.15	0.00	-2.16	0.00
/cut6	4.18	0.03	-7.73	0.00	–	–	14.88	0.02	-14.94	0.00	-5.87	0.00	–	–	–	–	-0.74	0.04	-1.59	0.00
/cut7	4.44	0.02	-4.82	0.02	–	–	–	–	-12.92	0.00	-5.50	0.00	–	–	–	–	-0.53	0.13	-1.19	0.00
/cut8	6.27	0.00	–	–	–	–	–	–	-10.52	0.00	-4.31	0.00	–	–	–	–	0.02	0.94	–	-
/cut9	8.27	0.00	–	–	–	–	–	–	-7.03	0.00	-3.46	0.00	–	–	–	–	0.24	0.49	–	-
/cut10	8.67	0.00	–	–	–	–	–	–	-6.55	0.00	–	–	–	–	–	–	1.07	0.00	–	-
/cut11	12.82	0.00	–	–	–	–	–	–	-4.79	0.00	–	–	–	–	–	–	1.90	0.00	–	-
no obs	194		22		181		131		131		131		33		34		216		89	
no group	15		1		–		9		9		9		1		1		25		14	
Wald	0.0000		0.0184				0.0019		0.0000		0.0001		0.0332		0.0438		0.0115		0.0000	
Chi	–				0.0000		–													
R^2					0.3370															

Source: own calculations.

they were given by one, two or all CRAs for the same bank. Because of the lack of data it was not be possible to prepare an analysis for banks that received notes from both Fitch and Moody. Among the estimation notes taken as the most significant by S&P are: return on assets, loan loss provisions as a percentage of average total loans, net interest income ratio, loan growth, the value of liquid assets to total assets. Moody during the estimation process takes the value of liquid assets to total assets, the rates of return and the loan loss provisions as a percentage of average total loans into consideration. For Fitch the ratio of loans to deposit and the value of liquid assets to total assets have the most significant impact during the estimation process . The presented results suggest that the mentioned variables are the most significant factors, regardless of whether the evaluation is one or more agencies. The mentioned situation can help create a list of variables that should be taken into consideration during the estimation process. The described factors have got a different impact strength depending on the number of assessment entities.

Credit rating inflation has not been observed for the banking sector. The mentioned situation can be an effect of the restrictiveness of supervisors and law connected with the mentioned institutions. This opinion also confirms the prepared analysis of factors that are taken into consideration by a particular credit rating agency. There are differences between the impact strength of particular determinants on the banks' notes proposed by a particular credit rating agency, when notes are given by one, two or all of the Big Three, but the list of the significant factors is stable. As a result, credit rating agencies are afraid of losing the reputation in the case of banks' credit ratings, because the mentioned institution is one of the most important customers. Credit ratings are used by banks to estimate the default risk according to the internal based approach. They are also need to corresponding banking. The described analysis also suggests that larger banks use notes that are given by the S&P. This relates to the market share. As a result, a credit rating inflation in the banking sector notes has not been observed.

Conclusions

The aim of the paper has been to verify the significance of the credit ratings' inflation phenomenon for banks' notes. The first hypothesis seems as follows: Banks' credit rating inflation has been observed. The prepared analysis suggests that the mentioned phenomenon has not been observed for the banking sector. The comparison of notes given by credit rating agencies suggests that notes that are given by all CRAs are similar. The same results were received when the notes given by two agencies were compared. Differences are observed only

in the case of ratings given by one institution. If a CRA is bigger, notes proposed by them are higher. It can be connected with the level of risk of the assessed institution.

The second part of the analysis is aimed at verifying differences between the impact of the financial factors on banks' credit ratings between notes that are given by one or more credit rating agencies to the same entity. A list of variables that are taken by a particular credit rating agency can be created regardless of whether the evaluation is one or more CRAs. The strength of impact of the described factors is differentiated and there are differences in the significance of variables.

In future researches will be also take into account the impact of the business cycle on the differences between the credit ratings changes. The analysis will be also expanded by the size of the issuers. The bigger banks can receive higher notes that the smaller financial institutions. It can be connected with two things. The first of it is the lower probability of default. The second one can be connected with the higher fees that pay bigger issuers.

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