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Determinants Of European Banks' Capital Adequacy

Abstract

This paper examines the factors affecting the Common Equity Tier 1 Ratio (CET1), which is a measure of the relationship between core capital and the risk-weighted assets of banks. The research is based on a randomly selected sample from the group of banks examined by the European Central Bank authorities. The ECB conducted stress tests assessing the CET1 Ratio with respect to the Basel III regulations. The findings confirm the hypothesis about the impact of bank size and the risk indicators (risk-weight assets to total assets ratio and the share of loans in total assets) on banks' capital adequacy. They also confirm strong effect of competitive pressure and the negative correlation between the CET1 Ratio and the share of deposits in non-equity liabilities, which may be explained by the existence of the deposit insurance system. Finally the paper presents the limitations of the study and conclusions regarding possible further research in this subject area.

Keywords: *capital adequacy, Basel III, regulatory capital, leverage ratio, Tier*

1. Introduction

The global financial crisis could stand as empirical evidence of the ineffectiveness of the prudential mechanisms of the global financial system. It turned out that banks' capital equipment was insufficient to absorb losses resulting from shocks which were experienced by the markets after the collapse

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of the US mortgage sector. The necessity for government intervention - i.e. recapitalization or, in some extreme cases, nationalization of bank entities paved the way for resumption of the discussion on the optimal capital structure of banks, and led to the adoption of Basel III package in December 2010 specifying new minimum capital requirements for financial institutions.

In 2014 the European Central Bank conducted comprehensive stress tests of 124 European commercial banks, assessing whether they met the requirements of the Basel III Regime. As a result of this assessment, among others, it turned out that the majority of European banks not only meet the minimum criteria of the solvency ratio,[1] which is currently 8%, but structures their liabilities in such a way that this ratio reaches a value much higher than the required minimum.

It is therefore necessary to assume the existence of additional, non-regulatory determinants of the capital adequacy of banks, measured by the level of the solvency ratio (the Cook's ratio, capital adequacy ratio, CAR). A review of the literature also confirms the assumption that when capital structure decisions are made, banks managers do not rely only on prudential regulations.

The study presented in this article aims to assess the impact of various financial indicators on the level of core capital in banks. This will allow to verify a hypothesis assuming the imperative impact of supervising institutions on the safety of the banking sector, and the marginal role of internal mechanisms aimed at increasing banks' stability and resilience to market shocks.

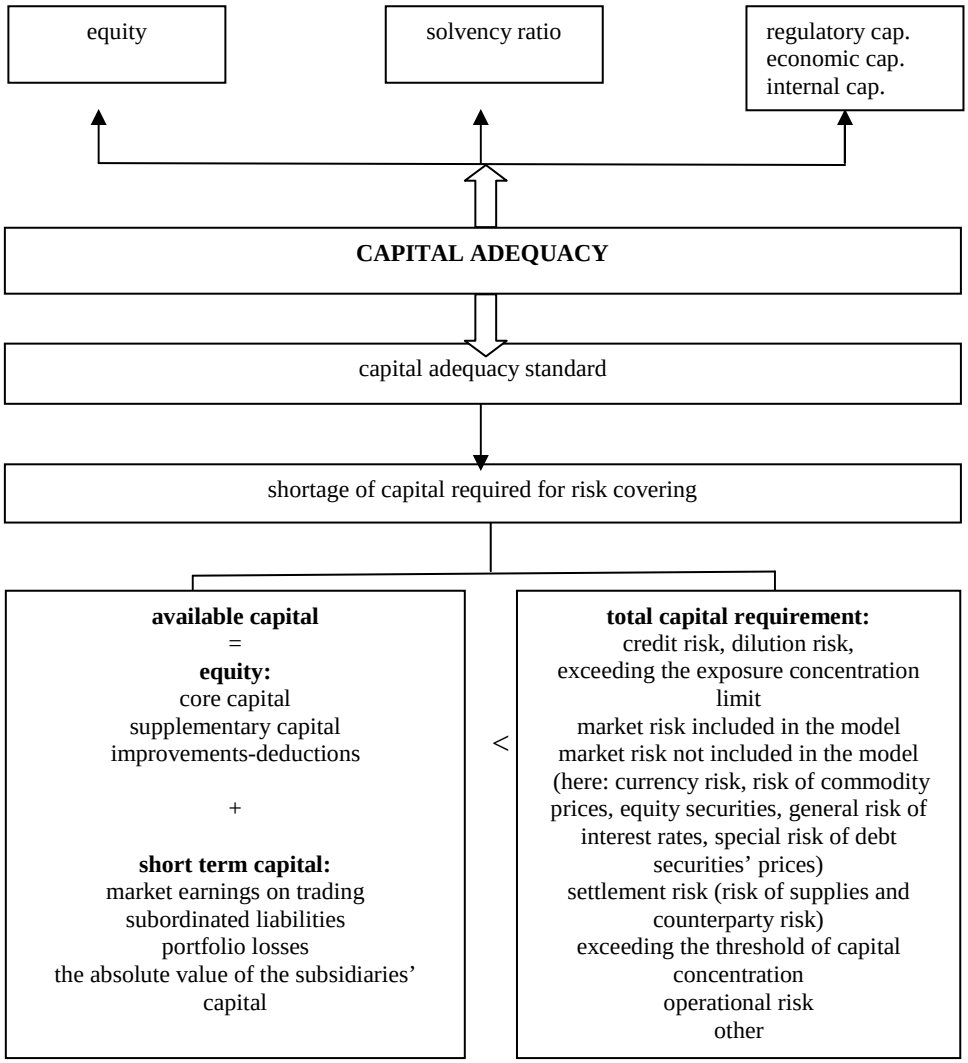
The first part of the article presents the specific nature of the activities of financial institutions in the context of their capital adequacy assessment. Next the concept of capital adequacy and the importance of different categories of capital in minimizing the risk of bank collapse is described and examined. The following part presents a review of the literature related to the determinants of capital structure in financial institutions. Finally, the article describes the assumptions, methodology and results of the author's research. which could be important in the discussion on ways of improving the safety of financial markets.

2. Capital adequacy - definition and evaluation methods

The assessment of bank's capital adequacy is based on an analysis of the level of equity, which consists of regulatory, economic and internal capital, as well as on information about the solvency ratio. This value is then compared with the capital adequacy standard and the possible shortage of capital required for risk covering is estimated (see Figure 1).

[1] The ratio of core capital to risk-weighted assets.

Figure 1. Elements of a bank's capital adequacy assessment



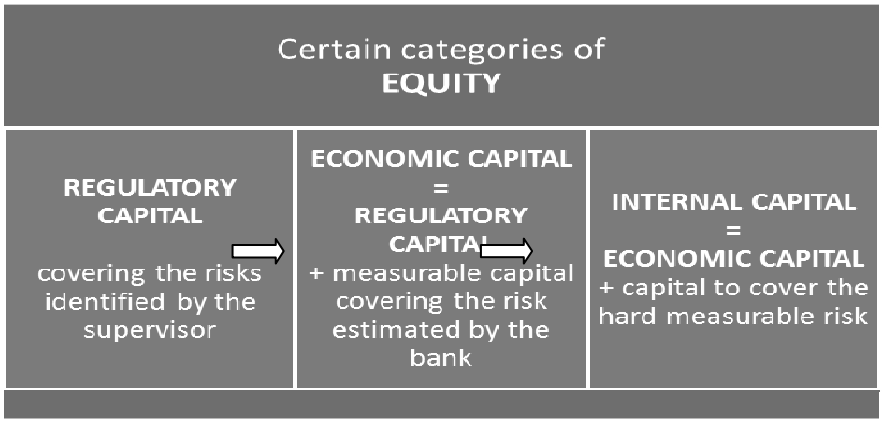
Source: Own study based on: (Capiga, 2010, p.97; KNF, 2010).

The term 'capital adequacy standard' is not defined explicitly by the KNF[2]. However, Annex 20 to Resolution 76/2010 obliges banks to immediately notify the KNF about exceeding the norm of capital adequacy, which means that the supervised bank experiences a shortage of capital to cover potential losses arising from the different types of risk (KNF 2010).

[2] Polish Financial Supervision Authority (pol. Komisja Nadzoru Finansowego).

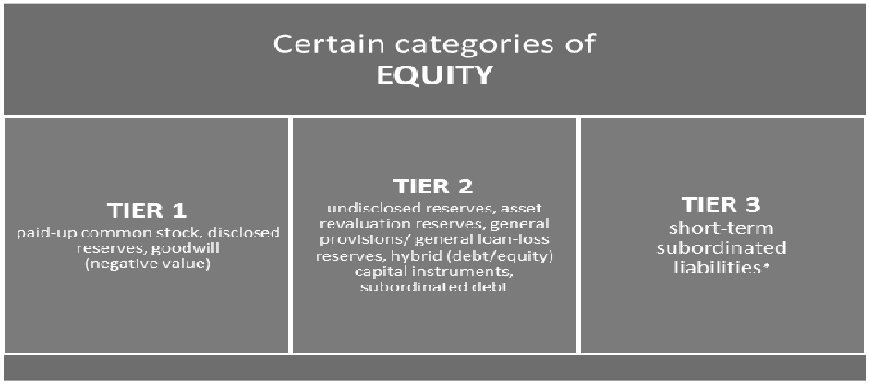
For a full understanding of the capital adequacy issue it is necessary to characterize the various categories of evaluated capital. The criterion of the degree of coverage of each risk occurring in a bank allows it to divide its equity into regulatory, economic and internal capital (Figure 2). It should be assumed that it is the level of equity that sufficiently absorbs any losses resulting (respectively) from the risks identified by the supervisor, the calculated risks measurable by the bank, and the immeasurable risks associated with the occurrence of unexpected losses in a given time horizon (GINB 2005, p.4).

Figure 2. Types of bank capital - classification according to the degree of risk absorption



Source: Own compilation.

Figure 3. Types of bank capital - classification according to the source of origin



*meeting certain conditions (see, for example: (Iwanicz-Drozdowska, 2004, p. 90)

Source: Own study based on: (BCBS 1988, pp. 15-16).

The Basel Committee on Banking Supervision characterizes specific groups of capital according to the source of origin, dividing them into core capital (Tier 1), supplementary capital (Tier 2) and short term capital (Tier 3).

The construction of the capital adequacy ratio (CAR) is based on the above described division and is represented with the following formula:

$$CAR = \frac{Tier1 + Tier2}{r_{cred} + 12{,}5 \times (r_{oper} + r_{mrk})}$$

where:

Tier1 / Tier2 – core / supplementary capital
r_{cred}– exposure to credit risk
r_{oper}- exposure to operational risk
r_{mrk} - exposure to the market risk

As part of Tier 1 capital the Basel Committee additionally distinguishes the Common Equity Tier1 (CET1) and defines the CET1 Ratio, the minimal standard (the minimum ratio of CET1 to risk-weighted assets) of which was established in 2013 at the level of 3.5-4.5%.

According to the Basel III definitions, Common Equity Tier 1 consists of the following:

- common shares issued by the bank that meet the criteria for classification as common shares for regulatory purposes (or equivalent for non-joint stock companies),
- stock surplus (share premium) resulting from the issue of instruments including CET1,
- retained earnings,
- accumulated other comprehensive income and other disclosed reserves,
- common shares issued by consolidated subsidiaries of the bank and held by third parties (i.e. minority interest) that meet the criteria for inclusion in CET1,
- regulatory adjustments applied in the calculation of CET1 (BCBS, 2010, p.13).

For a full explanation of the formula of the CET1 Ratio it is necessary to describe the concept of risk-weighted assets. The value of risk-weighted assets (the denominator in capital ratio formulas) may be calculated using the standard or Internal Rating Based (IRB) approach. In the standard method banks use the regulatory risk weight coefficient, which is based on the quality of the loan quantified by external ratings. However for some institutions (like the BIS, IMF, ECB, EC) the risk weight is always 0%, which means that they are considered solvent at all times by the BCBS (Genest and Brie 2013, p. 5). For different kinds of contracting parties the risk weights are as follows:

Table 1. Risk weights in the standard approach

Rating	Sovereigns	Banks	Corporations
AAA : AA-	0%	20%	20%
A+ : A-	20%	50%	50%
BBB+ : BB-	50%	100%	100%
BB+ : BB-	100%	100%	100%
B+ : B-	100%	100%	150%
Below B-	150%	150%	150%
Unrated	100%	100%	100%

Source: (Genest and Brie, 2013, p. 6).

The IRB method assumes that the bank is able to calculate the risk using internal models, instead of relying on an outside rating agency. This would seem to be more accurate in terms of precisely aligning the capital requirements with credit risk.

3. Literature review

If a bank finds all its instruments with a 0% coefficient, the CET1 Ratio takes the form of a classic indicator of capital structure (Equity-to-asset ratio). The following research can thus be treated as an attempt to evaluate capital structure determinants, which has been one of the most important topics in corporate finance area since Modigiliani and Miller's theorem (M&M) was formulated in 1958. It seems, however, that the decisions on capital in financial institutions should be considered separately because of the unique kind of activities they deal with. The specificity of the activities of the banking sector entities is associated with the characteristic structure of liabilities, dominated by outside funding. The primary sources of funding are liabilities to depositors, which, in Poland represent more than75% of total liabilities (NBP).

Although there are a great number of studies relating to capital decisions in production, service and trading entities, the literature on capital structure in financial companies is limited. Miller (1995) states that there are some fundamental differences in bank financing, but they may not be important enough to overturn M&M Propositions. Berger and Herring (1995) argue that there are two contrary forces that determine a bank’s capital structure. The first - the bank's market capital requirement - causes bank to hold additional capital as a financial slack to take advantage of profitable opportunities or to guard against unexpected losses. This causes a bank to increase its capital buffers. The second force is the

regulatory safety net (deposit insurance, access to the discount window, etc.), which is likely to lower bank capital. Berger and Herring also emphasize the importance of legal capital requirements, as do Osterberg and Thompson (1990) in analyzing the optimal leverage ratio taking into account the balance between the tax advantage of the debt and the costs of bankruptcy.

If one assumes that the legal capital requirements are a key determinant of the capital structure in banks, then the capital equity tier ratios should be constant and equal to the minimum required levels. This statement is in line with Mishkin (2000), who argues that "Banks also hold capital because they are required to do so by regulatory authorities. Because of the high costs of holding capital [...], bank managers often want to hold less bank capital than is required by the regulatory authorities. In this case, the amount of bank capital is determined by the bank capital requirements" (Mishkin 2000, p.227).

There are many studies which call into question the above-mentioned opinion. Barth et al. (2005) assesses the strength of influence of the Basel Committee's regulations on banks' capital level and empirically proves that it is much higher than formally required. Similar conclusions are drawn from the research of Flannery and Rangan (2008). They argue that bank counterparties have strong incentives to monitor and price default risk and that there is a strong cross-sectional relation between capitalization and asset risk. That validates the claim put forward by Berger et al. (2007), according to which financial institutions manage their capital ratios actively and adjust the level of capital to their own targets, set quite above the regulatory minimum.

The legal regulations thus seem not to be important when establishing the capital level determinants. Flannery (1994) maintains that the liabilities structure reflects liquidity risk in the asset portfolio. Myers and Rajan (1998) explain 'the paradox of liquidity' phenomenon, stating that in some circumstances the greater the asset liquidity, the lesser a company's capacity to raise external finance. Diamond and Rajan's (2000) studies show that, apart from liquidity creation, the optimal bank capital structure results from trading off the effects of equity capital on the expected costs of bank distress and the ease of forcing borrower repayment.

Considering the determinants of capital ratios, which reflect a bank's stability and security better than the traditional capital structure indicators, one can find very few studies that relate to specific markets. Ahmad et al. (2009) examines capital ratios in Malaysian banking firms. He finds that risk variables (non-performing loans and the risk index) have a positive correlation with bank capital, while there is no significant association between the bank managers' capital decisions and profitability. This last statement however is not consistent with the prior studies carried out by Berger and Herring (1995) or Saunders and Wilson (2001).

Van den Brink and Arping (2009), who analyze data from 11 countries (the G-10 and Switzerland), prove a negative correlation between size, asset structure (risk weighted assets to total assets) and capital structure (total liabilities to total assets) of a bank. Gropp and Heider (2008) confirm the negative correlation between size and Tier 1 capital, and a positive one between collateral and risk (measured by the asset volatility) and the capital level. They focused their research on 200 largest banks from the US and Europe, also finding that more profitable banks have better capital equipment – which contradicts the conclusions by Ahmad et al.(2009).

Considering the fact that financial markets around the world have become more tightly integrated, an important research was carried out by Mili et al. (2014). It concentrates on 340 subsidiaries of 123 multinational banks and tests whether the subsidiaries' capital ratio depends on the parent banks' fundamentals. The investigation leads to the conclusion that the CAR of the foreign subsidiaries depends on the fragility of the parent bank, the regulatory framework of a parent bank's home country, and the role of the interbank market.

4. Data source and the description of variables

The data came from the SNL Financial database.[3] CET1 Ratios have been taken from the 2014 EU-wide stress test carried out by the European Banking Authority. The test includes 123 banking groups across the EU and Norway, with total assets of EUR 28000 Bln, comprising more than 70% of total EU banking assets (EBA, 2014, p.7). The rest of the financial data was generated with the SNL tools and is based on the banks' financial reports.

The dependent variable, the CET1 Ratio, shows the relation of core equity capital to total risk-weighted assets and is a measure of a bank's financial strength. The fundamental assumption relating to this indicator is that it should be at the level minimizing the cost of debt and maximizing the bank's stability and security.

Taking the above into account it seems very important to define the set of determinants that affect the CET1 Ratio. Hence I examine the strength of influence of the following: bank's size (ln assets), profitability (ROA), alternative cost of the capital (ROE), competitive pressure (average country CAR1 ratio), share of deposits in non-equity liabilities, asset risk (risk-weighted assets/total assets), asset structure (loans/total assets) and macroeconomic uncertainty

[3] http://www.snl.com/

(average country inflation rate). The last three measures may be treated as a set of risk indicators as they show the level of risk connected with bank instruments, structure of assets. and the external market conditions.

Asset size however is also strongly risk-related. Wong et al. (2005) prove that larger banks have better risk management techniques than smaller ones. This is why they need less capital to maintain the same level of uncertainty. Besides, they can relatively easily cover their capital requirements from external sources due to their stronger market position. Thus it is usually argued that asset size is negatively correlated with capital adequacy.

Profitability, normally measured through return on total assets of the bank, tends to be positively correlated with the capital level. This is consistent with the pecking-order theory suggesting that retained earnings are a better source of funding than debt, and debt is better than equity (Myers 1984). It implies that, for a pre-set level of investments, capital adequacy (which includes retained earnings) is higher for more profitable companies. This is also in the line with the dynamic trade-off theory (Hennesy and Whited, 2005), according to which every entity establishes its capital structure taking into consideration the benefit (tax deduction) and cost (bankruptcy), and finally it can be proved that profitable firms tend to be less highly leveraged (Murray and Goyal, 2005).

An increase of the alternative cost of the capital, the most suitable measure for banks of which is the return on equity (ROE), causes a decrease of the willingness of banks to hold more capital (Asarkaya and Ozcan 2007). This will probably result in a lower level of the capital adequacy ratio.

The cost of the capital varies depending on the instruments of non-equity liabilities. Deposits are usually thought to be a cheaper source of funding than borrowing. Therefore if there is a decreasing in the share of deposits in total liabilities, there is a higher cost effect related to other borrowing using financing sources. That cost decreases the bank's profitability, which leads to a lower capital level, as was explained above with the pecking-order and dynamic trade-off theories. Nevertheless it should be mentioned that according to the static trade-off theory more profitable firms retain less capital to shield their profits from corporate income tax (Bradley et al. 1984).

Competitive pressure should affect the CAR 1 ratio as a kind of benchmark. The higher the indicator maintained by other market players, the higher is the motivation to get the same level of trust, as the amount of core capital can be perceived by clients as a guarantee of security. Another reason for adjusting the level of capital adequacy to the business environment is to attempt to get at least the same ratings as the competitors.

The main risk indicator - the relation between the risk-weighted assets and the total assets, would be expected to be positive as more risky assets require a higher capital buffer. However the correlation is often negative because of the difference in the risk perception - the assets that a regulator rates as a high level of risk are not found to be so risky by the managers (Wong et al. 2005). Another reason could be the deposit insurance system, increasing risk appetite, which results in a higher risk and higher balance sheet total financed mainly by deposits, with a relatively lower level of equity capital.

The share of loans in total assets generally indicates the level of assets' risk, since the lending of funds is always connected with some level of uncertainty related to the borrower. Therefore a bank with more risky assets should balance out the higher risk with the better capital coverage. Besides, the larger the share of loans, the lesser the share of tangible assets which provide the creditors with a guarantee that the money they lend will be repaid (Kamran et al., 2014). This causes more difficulties in financing with debt and affects the capital proportion by increasing the share of equity in total liabilities.

The last dependent variable put into the model - average country inflation rate - could be a measure of market uncertainty, as inflation uncertainty is a key and distinct element of a general uncertainty about the future (Clements and Galvao 2014). The higher the average inflation rate the higher the uncertainty, which should result in an increase in the CET1 Ratio.

5. Data and preliminary statistics

The presented random sample covers 22 European countries, includes 49 banks and consists of 441 observations of 2013 financial and macroeconomic data. The given sample allows for the estimation with a 95% confidence level and +/- 0.11 confidence interval (measurement uncertainty).

As shown in Table 2, the surveyed banks are large - with an average asset value at the level of 292 billion Euro, and median 73 billion Euro. This observation could also have arisen from the EBA's stress-test assumptions, which examined the largest bank groups in Europe and Norway. But although all entities are considered to be large, there is nevertheless a great heterogeneity among the sample - the biggest had an asset value at the level about 1,810 billion Euro (PNB Paribas), and the smallest at about 3 billion Euro (ABLV Bank).

One can observe a similar situation with respect to the other variables. The RWA/TA ratio varies from 1.71 (which means that the risk weights of

assets is almost negligible[4]) to 78.75. There is also a great spread in the structure ratios – from 0.23 to 0.85 considering the share of loans in assets, and from 0.05 to 0.93 when deposits in non-equity liabilities are considered.[5] Profitability indicators are even more diversified – with negative means between the level -0.39% and -7.02%, but positive medians at the level 0.22% and 5.03% for ROA and ROE respectively. The lowest profitability ratios apply to two Slovenian banks - Nova Kreditna Banka Maribor d.d. (ROA – 13.25% and ROE – 227.19%) and Nova Ljubljanska banka d.d. (ROA – 10.45% and ROE – 136.38%). It should be noted that they are essentially higher (in absolute value) than the rest of the sample and the Slovenian banking sector was the only one in East-Central Europe that reported a loss in 2013. Moreover, Nova Kreditna Banka Maribor d.d. was put up for sale and its securities were invalidated.

As far as the dependent variable is concerned, the case of Nederlandse Waterschapsbank N.V. seems to stand out once again. If it is deleted then the mean is lower than the median and stands at 12.44%, which is still much higher than the required 4.5%. The lowest CET1 Ratios are reported for banks in Cyprus and the United Kingdom.

Table 2. Descriptive statistics

	mean	median	st. dev.	Max	min
CET1 Ratio (%)	13.66%	12.99%	9.06%	72.51%	5.22%
RWA/TA	44.12	43.90	19.00	78.75	1.71
loans/TA	0.57	0.60	0.16	0.85	0.23
Inflation rate (%)	1.08	1.22	0.95	2.56	-0.92
ROA (%)	-0.39	0.22	2.80	4.08	-13.25
av. CET1 Ratio	13.76%	12.29%	5.51%	32.51%	6.25%
ROE (%)	-7.02	5.03	43.22	46.65	-227.19
TA (000)	291 837 159	73 006 000	471 944 418	1 810 522 000	3 316 077
dep/ n-eq. liab	0.55	0.55	0.22	0.93	0.05

Source: Own study.

[4] The case of Nederlandse Waterschapsbank N.V. (NWB Bank) which provides services for the public sector.

[5] The 0.05 ratio concerns the Nederlandse Waterschapsbank N.V. again.

Table 3. Correlation matrix

	CET1 Ratio	*RWA /TA*	*Loans /TA*	*infl.*	*ROA (%)*	*av. CET1 Rat.*	*ROE (%)*	*lnA*	*dep/ n-e liab*
CET1 Ratio	1.00								
RWA/TA	-0.39	1.00							
loans/TA	0.21	0.32	1.00						
Infl.rate (%)	0.24	-0.36	-0.19	1.00					
ROA (%)	0.03	-0.17	0.06	-0.13	1.00				
av. CET1 R.	0.60	-0.47	0.24	0.37	-0.01	1.00			
ROE (%)	0.03	-0.16	0.04	-0.15	0.97	-0.07	1.00		
lnA	-0.04	-0.50	-0.11	0.22	0.25	0.11	0.27	1.00	
dep/ n-e liab	-0.37	0.52	0.17	-0.18	-0.12	-0.21	-0.15	-0.46	1.00

Source: Self study.

Table 3 displays the correlation matrix of the variables used in the regression analysis. The risk-weight assets/total assets ratio, deposits/non-equity liabilities ratio, and asset size are negatively correlated with the dependent variable, whereas the loans/total assets ratio, profitability indicators, average CET1 Ratio, and average country inflation rate are positively correlated. These results are consistent with the preliminary assumptions, with two exceptions. The return of equity and deposits/non-equity liabilities have the opposite signs than expected. However, if the Nederlandse Waterschapsbank N.V. is deleted as the extreme case, the correlation for ROE is negative and for deposits/non-equity liabilities is much weaker (-0.18).

The highlighted values are these with strong correlation. The CET1 Ratio is strongly correlated with country average CET1 Ratio, which would seem to be obvious taking into account that the country average was estimated on the basis of the banks included in the sample. There is also near 100% association between the ROE and ROA indicators, as they have the same numerator (net income). The RWA/TA ratio correlates positively with deposits/non-equity liabilities and negatively with average CET1 and assets size. There is also negative relationship between the asset size and the deposits to non-equity liabilities, which can be explained by the fact that the largest banks look for other, more sophisticated sources of funding than deposits.

6. Econometric analysis

The baseline specification of the regression model is premised on finding the level of CET1 Ratio as a function of the above-mentioned variables, and can be formulated as follows:

$$\text{CAR1 Ratio} = \alpha_1+\alpha_2\text{RWA/TA}+\alpha_3\text{loans/TA}+\alpha_4\text{av.CET1 Ratio}+\alpha_5\text{lnA}+\alpha_6\text{dep/n-e liab}$$

The author used the OLS regression model, assuming that this is the normal, independent distribution and constant variance of errors. Table 4 shows the regression results for the determinants of the core capital adequacy ratio.

Table 4. Regression results for all explanatory variables - dependent variable: CET1Ratio

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	0.481878	0.162819	2.9596	0.00516	***
RWATA	−0.00130862	0.00082835	-1.5798	0.12203	
loansTA	0.144916	0.0772822	1.8751	0.06809	*
Infl	0.00940736	0.0118075	0.7967	0.43031	
ROA	−0.0193789	0.0163494	-1.1853	0.24289	
avCET1	0.6373	0.256732	2.4824	0.01735	**
ROE	0.00138569	0.00107791	1.2855	0.20600	
lnA	−0.0214507	0.00736717	-2.9117	0.00585	***
depneliab	−0.136857	0.0548051	-2.4972	0.01674	**

Mean dependent var	0.136626	S.D. dependent var	0.090646
Sum squared resid	0.176780	S.E. of regression	0.066479
R-squared	0.551776	Adjusted R-squared	0.462131
F(8, 40)	6.155138	P-value(F)	0.000036
Log-likelihood	68.27637	Akaike criterion	−118.5527
Schwarz criterion	−101.5264	Hannan-Quinn	−112.0930

Source: Own study.

On the basis of the above-presented estimation it can be seen that some preliminary predictions are not confirmed. ROA and ROE coefficients are not consistent with the sign predicted, nor is the ratio of deposits to non-equity liabilities. The negative sign of the ROA coefficient may be an argument for the accuracy of the static trade-off theory. The positive sign of the ROE coefficient is not be analyzed because of its relatively low value. However, the negative correlation between bank adequacy and the deposits to non-equity liabilities ratio seems to be very important. Decreasing the amount of core capital with the increase

of the share of deposits in the liabilities structure may be a result of the deposit insurance system. The deposit guarantees protect banks against the risk of loss, so they may feel it is not necessary to retain more capital buffer for protection.

After adjusting the model by deleting the variables with p-value exceeding 0.05, the following results are obtained:

Table 5. Regression results for statistically significant explanatory variables - dependent variable: CET1Ratio

	Coefficient	Std. Error	t-ratio	p-value	
const	0.478304	0.15952	2.9984	0.00450	***
RWA/TA	−0.00143133	0.000808409	-1.7706	0.08372	*
loans/TA	0.138081	0.0733777	1.8818	0.06664	*
avCET1	0.599553	0.228639	2.6223	0.01203	**
lnA	−0.019787	0.00708813	-2.7916	0.00779	***
dep/n-eliab	−0.14482	0.0537508	-2.6943	0.01002	**

Mean dependent var	0.136626	S.D. dependent var	0.090646
Sum squared resid	0.186367	S.E. of regression	0.065834
R-squared	0.527470	Adjusted R-squared	0.472525
F(5, 43)	9.599909	P-value(F)	3.32e-06
Log-likelihood	66.98257	Akaike criterion	−121.9651
Schwarz criterion	−110.6142	Hannan-Quinn	−117.6586

Source: Own study.

Thus the final equation takes the following form (standard errors in parentheses):

CET1Ratio = 0.478 - 0.00143*RWA/TA + 0.138*loans/TA + 0.600*avCET1 - 0.0198*lnA - 0.145*dep/n-eliab (0.160) (0.000808) (0.0734) (0.229) (0.00709) (0.0538)

The analysis fails to confirm the impact of profitability indicators and the inflation rate on the capital adequacy ratio. Nevertheless, most of the findings are in line with the rest of the predictions from the theory. In particular, risk-weighted assets to total assets ratio negatively affects the CAR1 Ratio, which confirms the difference in the risk perception within the regulatory authorities (or internal risk models) and the managers. One could also explain the above described phenomenon with the hypothesis that banks conducting more risky activities (having more risky assets) are managed with a less conservative prudential policy as well. It has been confirmed, however, that more loans in total assets implicates a more prudential capital structure, which refutes this latter assumption. Banks expanding their lending activities seem to strengthen their source of funding by increasing the level of core capital.

There is also a significant impact of competitive pressure in terms of prudential standards and the predicted negative correlation between the CAR1 Ratio and the bank size. Larger banks feel more safe despite their lower capital buffers. This could be connected with the "Too Big To Fail" doctrine (TBTF), which should be revised as one of the causes of the financial crisis. The issue of deposits to non-equity liabilities ratio has already been analyzed and should be considered important when discussing the terms and conditions of a deposit insurance system.

7. Limitations and conclusions

The main limitation with respect to the presented research is the non-random selection of the banks that were examined by EBA, although the 49 banks selected in the sample were randomly chosen, which allows for drawing conclusions in terms of the banks which survived the EBA stress tests. Irrespective of this limitation, the results seem to be significant since they cover more than 70% of total EU banking assets.

The taking into account of only banks examined using the stress-tests was motivated by the fact that CET1 calculations according to Basel III require a detailed specification of equity structure, which is normally not reported in the financial reports. The EBA engaged competent authorities, including the ECB for the Eurozone banks, who were responsible for checking the quality of the data submitted by the banks. In this respect, the EBA has provided competent authorities with a reasonably constrained methodology and consistent data definitions and templates (EBA, 2014a). This should establish a guarantee of the correctness of the data, especially concerning the capital categories. For this reason it was impossible to work out the analyses for previous years. The implementation of Basel III regulations will enable researchers to conduct this kind of research in the future.

Regardless of these limitations, the study provided important findings involving the determinants of the Common Equity Tier 1 Ratio. They prove the different perception of risk assessment made by managers and authorities, as can be concluded from the fact that the higher the risk weights of assets, the lower the capital buffer. Furthermore, banks with a more risky asset structure try to increase their level of security by raising the core capital level. At the same time, banks with a higher total value of assets and higher share of deposits in their non-equity liabilities seem to feel more protected by the externalities (the TBTF doctrine and the deposit insurance regulations). This causes them to tend to lower the CET 1 Ratio while increasing the assets value or the share of deposits in their liabilities structure.

The last significant variable - that stays for the competitive pressure - is positively correlated with capital adequacy, which is justifiable on the basis of likely benefits taken from higher ratings and shareholder confidence. The higher the competitors' CET1 Ratio, the greater are managers' efforts to catch up with the approximate market level so as to be as reliable as the others.

The findings reject the hypothesis of the impact of profitability indicators and the average inflation rate on capital adequacy. Nevertheless, the model explains the CET1 Ratio variation with 53%. And as capital adequacy is the most important prudential indicator in the banking sector, it is necessary to continue researches taking into consideration other financial and macroeconomic measures and some corporate governance data as well. It would also be useful to include lagged variables to incorporate feedback over time.

Pointing out a complete set of bank capital structure determinants should be crucial for regulatory purposes and the working out of good banking practices. It is important to know most of the elements influencing the level of the capital and to be able to effectively increase the stability and security of the banking sector.

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Streszczenie

DETERMINANTY ADEKWATNOŚCI KAPITAŁOWEJ BANKÓW EUROPEJSKICH

W artykule przedstawiono analizę czynników wpływających na poziom wskaźnika CET 1 ratio, będącego miarą relacji pomiędzy kapitałem podstawowym banku a aktywami ważonymi ryzykiem. Badaniu poddano próbę losowo wybraną z grupy banków uczestniczących w tzw. stress-testach przeprowadzonych przez władze Europejskiego Banku Centralnego. EBC przeprowadził testy warunków skrajnych oceniając m.in. poziom współczynnika CET1 obliczanego według regulacji wynikających z III Reżimu Bazylejskiego. Wyniki potwierdzają hipotezę o wpływie wielkości banku i wskaźników ryzyka (aktywa ważone ryzykiem do aktywów ogółem; udział pożyczek w aktywach ogółem) na poziom adekwatności kapitałowej. Potwierdzono również silny wpływ konkurencji, a także ujemną korelację między wskaźnikiem CET1 i udziałem depozytów w zobowiązaniach kapitałowych, którą można uzasadnić istnieniem systemu gwarantowania depozytów. W końcowej części artykułu przedstawiono możliwe słabości przeprowadzonych badań, wynikające z nich ograniczenia wnioskowania oraz koncepcje ewentualnych dalszych analiz przedmiotowego obszaru tematycznego.

***Słowa kluczowe**: adekwatność kapitałowa, Bazylea III, kapitał regulacyjny, wskaźnik lewarowania, kapitał Tier 1*