

University of Economics in Katowice

Volume 18

2014

Journal of

**Economics &
Management**

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**GLOBAL SYSTEMICALLY IMPORTANT
BANKS – HOW TO IDENTIFY
AND REGULATE THEM?**

Abstract

In this paper we investigate the issues of identification and capital regulation of global systemically important banks (G-SIBs). Both issues are fundamental for global financial stability. However, there are many open questions that remain on the political and academic agenda. We underline that the simple ratio-based solution for the identification and regulation of G-SIBs presents many drawbacks and the idea to increase loss absorption capacity may generate new risks that are not covered under the current regulatory framework.

Keywords: *bank capital, risk, G-SIBs.*

JEL classification: *G21, G15.*

Introduction

The global financial crisis which started in 2007-2008 revealed many weaknesses in the financial sector regulations. In the wake of criticism, the Basel Committee on Banking Supervision (BCBS) introduced necessary changes called Basel 2.5 and presented the Basel 3 framework, which is to be implemented progressively from 2013 to 2019 in order to reduce acute imperfections in the banking sector regulations. Quantitative impact studies (QISs) conducted by the BCBS and the European Commission proved that big international banks are not ready to comply in a short term with the Basel 3 regulations, especially in the case of high quality capital (common equity tier 1 and capital buffers) and liquidity (BCBS, 2010; CEBS, 2010). Therefore G-SIBs like other large international banks are required to improve their capital and liquidity, but additionally, after the high level political decisions (G-20 summit in October 2010), they shall comply with other new requirements (such as additional loss absorbency, living wills and resolution regime), which are supposed to curtail the excessive risk taking and moral hazard. The proposal to identify and regulate loss absorbency is in a very advanced stage, however, it will come into force in 2019. Frameworks for G-SIBs' living wills and resolution regime are under progress. All these regulations are supposed to improve the safety and soundness of the global banking system. Would this work as it should and with no doubts? Academics have already raised some problems related to the identification of G-SIBs, but the problem of the relation between capital increase and risk taking behavior especially for the G-SIBs case has not been explored so far.

The article is structured as follows. In the first Section we present groups of methods used to identify systemically important financial institutions. The second Section is devoted to the review of the literature and analysis of the relation between capital and the banks safety. In the third Section we present the capital position and efficiency of G-SIBs. The last section concludes.

1. The identification of global systemically important banks

The starting point shall be the definition of G-SIBs. We shall indicate the following features of a G-SIB:

- active globally,
- important for global financial stability,
- large in terms of assets and off-balance sheet items,
- running “complicated” operations, not just pure deposit & credit operations,
- facing different types of risk,
- listed on the stock-exchange.

Bongini and Nieri (2014) differentiated two approaches for the identification of G-SIBs: academic, using a market-based measurement approach, and policy-making, using an indicators-based approach. From the literature review, they mentioned: a contribution approach (the Shapley value from the game theory and CoVar) and a participation approach (systemic expected shortfall). The policy-making approach was presented by the Basel Committee on Banking Supervision (BCBS) framework and the US Dodd-Frank Act. Our focus below is to try to answer if both approaches may generate similar results. However we do not intend to describe the methodologies themselves.

The Basel Committee on Banking Supervision (BCBS) worked out a methodology for the identification of G-SIBs (BCBS, 2011). This methodology is based on 12 ratios divided into 5 groups for which the same weights have been applied. The indicators cover the following areas: size, cross-jurisdictional activities, interconnectedness in the financial system, substitutability by another institution and complexity. On the basis of these indicators a “synthetic indicator” is calculated. The value of a single indicator for a given bank is calculated as a relation to the aggregate value of all the banks in the sample, which has its pros and cons for the results of the analysis. The advantage of this solution is simplicity, but it has many drawbacks (for details see: Iwanicz-Drozowska and Schab, 2013). The

most important drawbacks are different sources of data which questions the verification ability and thus the reliability of the methodology and superficial approach to the analysis, since BCBS uses only very aggregate data.

The academic approach, as mentioned above, is based on the market data, such as share prices, CDS spreads or spreads on debt securities as well as other publically available data. So far, we have found no comprehensive research comparing the results of those two approaches, namely confronting the list announced by the Financial Stability Board with a market-based approach. According to our knowledge, only Castro and Ferrari (2014) applied Adrian and Brunnermeier's (2011) Δ CoVaR approach to test the systemic importance of 26 of the largest European banks with the conclusion that very few banks may be recognized as systematically important with the use of that approach. They used weekly stock return data from 4 January 1999 to 13 March 2012 for those banks and STOXX Europe 600 Financials index. Out of these 26 banks, 13 have been classified as G-SIBs on the FSB list either in 2011 or 2012. Risk contribution scaled by the size of the bank improved the results. If we merely compare the results of Castro and Ferrari (2014) and the official list of G-SIBs, we need to indicate that some important banks, whose risk contributions dominated other banks of the FSB's list, are missing. These are: Natixis, Intensa Sanpaolo and the Royal Bank of Scotland. At this stage, we could conclude only that the list of G-SIBs prepared with the use of this approach may differ from the official list provided by the FSB.

The comparison of the results of bankruptcy prediction with the use of accounting-based and market-based approaches, indicated that the market-based approach outperformed the accounting-based approach (e.g. Agarwal and Taffler 2008, Bauer and Agarwal 2014). The one applied by BCBS may be classified as the accounting-based approach. However, data are emerging from many different and incomparable data sources. The BCBS declared a refining of the methodology, but did not mention the wider use of market data. The only market parameter in the group of ancillary indicators, that are supposed to be used rarely is "peak equity market capitalization", reflecting the potential loss of counterparties holding shares of a given G-SIB. The question is: in which direction? Adhering to the accounting-based approach requires verifiable data sources and also unification of the accounting standards which is proceeding very slowly. Although it is treated in academic research as inferior, it still provides a lot of useful information. The accounting-based approach may be either complemented or substituted by the market-based approach. In order to find an answer to this question, in-depth and comprehensive research should be conducted.

2. Capital and the banks safety

The answer to the question of the relation between capital and the banks' safety in the literature is rather ambiguous. In the case of the relationship between capital and bank risk-taking behavior we shall distinguish two strands of research related to: (1) the changes in risk exposure and (2) the changes in the banks' default risk or asset risk (see Table 1). From the practical point of view, financial data on risk exposure are presented in the financial statements and are easily available, whereas the measurement of inherent asset risk and thus default risk is based on many assumptions and can only be undertaken with limited information resources. The bank managers are capable of measuring the asset risk, but external stakeholders are facing an informational barrier.

Table 1. Review of the literature on the relation between capital and risk

Author (-s)	Type of analysis and population	Strand of literature	Does more capital increase bank risk?	Comments
1	2	3	4	5
R. Merton (1977)	theoretical	risk exposure and default risk	Indirect answer: the higher the level of debt to assets, the higher the cost of deposit guarantee (insurance); in order to maximize the value of the deposit insurance option, banks increase leverage and asset risk	Option pricing theory is used to model the cost of deposit insurance
W. Sharp (1978)	theoretical	default risk	Indirect answer: liability of the deposit insurer may be reduced by new capital injection; not related to risk taking behavior	Analysis from deposit insurance perspective
M. Keeley, F. Furlong (1990)	theoretical	default risk	Direct answer: no, for insured, value-maximizing banks which was opposite to utility maximization models which assumed that higher capital increased the probability of bank failure	Strong criticism of utility maximization models due to improper assumptions of: no bankruptcy, no deposit insurance and no risk measures (Kahane, 1977; Koehn, Santomero, 1980 – called The KKS model). The KKS model referred to risk exposure and default risk
G. Genotte, D. Pyle (1991)	theoretical	default risk	Direct answer: an increase in capital reduces the bank's default risk if the elasticity ratio of the loan portfolio risk decreases, otherwise the bank's default risk increases	Authors assumed that bank managers are seeking to maximize the market value of equity. Analysis included also the deposit insurance perspective (subsidy) and imperfect regulatory control

table 1 cont.

1	2	3	4	5
R. Shrieves, D. Dahl (1992)	empirical, 1800 FDIC insured US commercial banks with assets higher than 100 M USD	risk exposure	Direct answer: banks reduce the effect of increased capital by increasing the risk exposure; in the case of well-capitalized banks a positive relation between risk and capital shall be explained rather by private incentives of the owners and/or managers than by regulations. The authors also analyzed the asset risk, taking into account non-performing loans, but the conclusions present an impact of macroeconomic factors, rather than the level of capital	The changes in risk and capital levels are determined by both endogenous and exogenous factors
K. Jacques, P. Nigro (1997)	empirical, US banks	risk exposure	Direct answer: risk-based standards increased capital ratios and reduced risk. Risk is measured as a relation of risk-weighted assets to assets	Analysis of the implementation of risk-based capital standards; modified Shrieves & Dahl model (1992) in order to incorporate risk based on capital standards
R. Aggarwal, K. Jacques (2001)	empirical, US banks	risk exposure	Direct answer: increase in capital and capital ratios did not cause higher credit risk. Credit risk is measured as a relation of risk-weighted assets to assets	Prompt corrective action was regarded as a positive factor for bank capital and risk taking; modified Shrieves & Dahl model (1992)
B. Rime (2001)	empirical, Swiss banks	risk exposure	Direct answer: increase in capital did not cause higher risk	Modified Shrieves & Dahl model (1992)
F. Gonzales (2005)	empirical, 251 banks in 36 countries	risk exposure	Direct answer: stricter regulations cause lower charter value (measured by Tobin's Q) and do not provide incentives to reduce risk. Higher charter values (in countries with less regulation) stimulate the bank to take risk prudently. Risk is measured as a share of non-performing loans (NPL) for credit risk and the standard deviation of daily bank stock returns for each year for overall risk	The analysis embraced charter value, risk-taking, deposit insurance, quality of contracting environment, and the legal origin of the country
T. Jokipii, A. Milne (2011)	empirical, US bank holding companies and commer- cial banks	risk exposure	Direct answer: well capitalized banks maintain capital buffers by increasing risk if capital increases; banks with small buffers increase capital and reduce the risk in order to improve the capital buffers. Risk is measured by risk-weighted assets to total assets, the NPL and share of commercial and industrial loans in the loan portfolio	Positive and two-way relationship between capital buffers and risk

As presented in Table 1, the research focused on the risk exposure prevails, since data allowing the calculation of ratios or other measures of risk exposures are usually available. As the review of the literature indicates, there are two common measures of risk exposure, i.e. the relation of risk-weighted assets (RWA) to assets and the share of non-performing loans (NPL). The first risk measure is regarded as quite uniform across countries because of the BCBS methodology, but in case of the NPL the accounting standards differ between the US (US-GAAP), Europe (IAS/IFRS) and Japan (JP-GAAP). Additionally, not all banks or capital groups decide to publish data on non-performing loans.

Conclusions from the theoretical research, focused on the default risk, show that new capital reduces the risk of the bank's default, especially in the case of value-maximizing banks (Keeley, Furlong, 1990; Gennotte, Pyle, 1991). Value maximizing banks are those, which have a long-term perspective for profit generation, which discourages them from excessive risk-taking, rooted mostly in the loan portfolio. If bank managers prefer other goals than value-maximization, the increase in capital levels will cause an increase in default risk.

The results of empirical research focused on the risk exposure are mixed. Those based on Shrieves and Dahl's model proves that more capital did not cause higher risk. In the case of Gonzales (2005) and Jokipii, Milne (2011) the scope of analysis was broader and the empirical results are differentiated respectively for banks with high charter value and high capital buffers. According to Gonzales (2005), banks operating in the environment with restrictive regulations which have a high charter value are prudent in their risk taking behavior. This suggests that they have more to lose and are not willing to destroy their value. Jokipii and Milne (2011) took into account the level of capital buffers which banks usually hold in excess of the regulatory requirements. They concluded that a bank with small capital buffers sought capital increase and risk reduction in order to improve the capital buffers. On the other hand, banks with high capital buffers used capital increase to expand the risk exposure in order to improve profits and thus ROE (Return on Equity).

The theoretical and empirical results are mixed. We discovered that it may be attributed to the following factors:

- since the banking sector credit activity, credit portfolio quality (measured by the NPL) and thus earnings are pro-cyclical also due to capital regulations, the models are the missing information on the cycle, which affects the bank risk taking behavior;

- deposit insurance is actually applicable to small and medium sized banks; in the case of any “big” bank (not even exactly a G-SIB) no deposit insurer is capable of paying deposits back to the customers; thus in the case of a big banks, deposit guarantee should be taken into account in the models, since it plays no significant role for bank behavior; resolution should be included instead;
- the psychological and demographic factors are missing – risk taking behavior is related to some psychological and demographic features of the managers like personality, age, gender or education;
- competition on the market – albeit competition may stimulate aggressive risk-taking;
- management compensation – which may stimulate aggressive risk-taking if a bonus system is not related to the long term perspective; as a reaction to the crisis, regulators imposed a new approach to shape management compensation schemes;
- as well as ownership structure – if shareholders are very dispersed they are not able to exercise actual discipline over the management, thus having at least one institutional investor seems to be a good risk reducing factor, especially in terms of managerial moral hazard.

Since in Aggarwal and Jacques (2001), prompt corrective action was regarded as a positive factor for bank capital and risk taking, we found it necessary to include in the future models at least a factor called “resolution cost” or “resolution factor” due to the fact that both in Europe and globally, policy makers are inclined to implement resolution regimes (with living wills) also for big banks in order to reduce moral hazard. So far, the resolution has been used for dealing with small and medium-sized financial institutions. Although the bail-out of banks is criticized, this factor should also be incorporated into the future models in the case of big banks. The first theoretical model with a “resolution factor” and a “management compensation factor” for SIFIs, not G-SIFIs as a special case, was presented by Freixas, Rochet (2013). The authors suggested the construction of a systemic risk authority with the above mentioned responsibility, as well the levy of a systemic tax. The first measure has already been implemented in many major economies. The other factors have not yet been included into the models. The ongoing global financial crisis opened a new chapter in modelling bank behavior. Many factors have to be taken into account, also psychological, with differentiation between small or medium sized banks and big banks.

3. The financial standing of G-SIBs

In this section we analyse the capital position, measured by the solvency ratio (CAR)^{*} and leverage (assets/capital), and profitability, measured by the ROE^{**}.

Since the FSB's decision on assessing a bank as a G-SIB is of a discretionary nature we decided to use all the banks selected by the FSB in 2011 and 2012 which constitute the total sample of 31 banks. The G-SIBs we divided into 3 groups (Iwanicz-Drozdowska and Schab, 2013):

- G-SIB H – financial institutions concentrating mostly on the home country market (7) in terms of assets and/or earnings,
- G-SIB E – financial institutions concentrating on the European market (12) in terms of assets and/or earnings,
- G-SIB G – global financial institutions (12) in terms of assets and/or earnings or activities.

We need to bear in mind however that there are differences in accounting standards between Europe (IAS/IFRS) and the US (US-GAAP)^{***}. This is a very important issue because in some cases differences in leverage may be significant if we use different accounting standards. G-SIBs shall be required to use one set of standards to inform the wide public about their financial standing in order to increase comparability. Without that change the market and regulatory discipline could not be exercised properly.

As presented in Table 2 in the year 2012 in comparison to 2006 the median solvency ratio for G-SIBs improved by about 4.5 percentage points (ppts), the median ROE dropped by 12.5 ppts and the median leverage (assets/capital) dropped by 5.2 ppts. G-SIBs concentrated on their home country faced the smallest drop in median return on equity and the smallest increase in the level of solvency ratio among 3 distinguished groups of G-SIBs. In the case of the leverage, G-SIBs H increased their leverage, while G-SIBs E and G-SIBs G decreased their leverage to about $\frac{3}{4}$ of the 2006 year level. At the year-end of 2012, G-SIBs H represented the highest median ROE, the lowest median solvency ratio. The lowest median ROE and the highest leverage was shown by G-SIBs E, while the highest median solvency ratio and the lowest leverage was shown by G-SIBs G. The indicated differences may suggest different managerial reactions to higher capital levels. In order to prove the managerial reactions a longer track record is required.

* For years 2006 and 2007 Morgan Stanley and Goldman Sachs did not report their solvency ratios.

** More detailed ratios that might be defined and used for our analysis were skipped due to the fact that not all G-SIB provide the same scope and structure of detailed information.

*** There are also Japanese accounting standards (JP-GAAP), but Japanese banks publish also reports according to US-GAAP, which were used in the sample.

Table 2. Selected ratios for G-SIBs

G-SIBs	2006	2007	2008	2009	2010	2011	2012
Solvency ratio							
MAX	18.40%	15.20%	26,80%	20.60%	22.00%	21.60%	25.20%
MIN	7.40%	7.40%	7.40%	9.80%	10.02%	10.30%	12.50%
Median	11.77%	11.01%	12.49%	14.15%	15.20%	14.84%	16.30%
ROE*							
MAX	26.65%	27.10%	17.13%	34.93%	16.22%	17.24%	16.89%
MIN	5.28%	-10.74%	-132.38%	-17.07%	-5.53%	-2.59%	-8.24%
Median	17.30%	14.34%	3.41%	7.74%	8.58%	7.41%	4.84%
Leverage*							
MAX	47.3	51.9	18,3	52.9	52.8	39.6	37.0
MIN	9.0	6.7	6.7	7.3	7.5	9.3	9.0
Median	23.0	24.4	25.0	19.6	19.7	19.8	17.8

* Without Dexia in 2011-2012 due to the extreme values of ratios.

Source: Based on financial data from G-SIBs annual statements and author's own calculations.

In the eyes of the value-based approach, the ROE shall be at least higher than the cost of equity capital to allow shareholders to create value added. The ROE below the cost of equity capital means value destruction. We defined the cost of equity capital as follows:

$$c = r_{yf} + \beta \cdot \text{risk premium},$$

whereas:

r_{yf} – is risk free rate calculated with the use of 10-years treasury bonds

β – is the CAPM parameter

Data for the calculation of r_{yf} and β were taken from publically available data sources. We assumed the flat risk premiums for G-SIBs for each year. For 2006-2007 (pre-crisis period) the risk premium was set at 5%, for the remaining period at 10%, since the market participants, risk perception for the banking sector has significantly changed.

In the pre-crisis period the number of G-SIBs generating losses and/or destructing value was low (see Table 3). It increased significantly in 2008 and remained high until 2012. The last two analysed years (2011-2012) show however that G-SIBs generating losses are concentrated in Europe, which is associated with the sovereign debt crisis which started in 2010.

Table 3. Number of “value destructors” among G-SIBs

Group of G-SIBs	Number of G-SIBs	
	ROE<0	value destructors
2006		
G-SIBs H	0	2
G-SIBs E	0	0
G-SIBs G	0	0
2007		
G-SIBs H	1	3
G-SIBs E	0	2
G-SIBs G	1	4
2008		
G-SIBs H	3	5
G-SIBs E	4	11
G-SIBs G	3	10
2009		
G-SIBs H	1	5
G-SIBs E	3	12
G-SIBs G	4	12
2010		
G-SIBs H	1	6
G-SIBs E	2	12
G-SIBs G	0	12
2011		
G-SIBs H	0	6
G-SIBs E	3	12
G-SIBs G	0	12
2012		
G-SIBs H	0	5
G-SIBs E	5	12
G-SIBs G	1	12

Source: Ibid.

G-SIBs will still face the need to attract new capital, especially classified as the additional Tier 1 or Tier 2 under Basel 3 from 2013 until 2023 when the phase out period ends. Attracting new capital requires the interest of investors. It will be necessary for the banking industry to prove to the market participants that it is able to generate a reasonable ROE and increase the value of their investments. The long-term investors would regard the banking sector as attractive from the ROE perspective, while the short-term investors would rather focus on the stock price. We found that long-term investors are more suitable for G-SIBs in order to increase their stability and control risk-taking behavior, thus we attached importance to the ROE and value creation.

The question arises of how to improve ROE in order to avoid value destruction in the regulatory environment, in which banks are requested to hold higher

capital ratios, reduce leverage, improve liquidity, bear the costs related to the resolution mechanism or new taxes. There are some proposals, e.g.:

- cut the fixed costs such as staff costs – used during the crisis to a large extent,
- enter new geographical markets and attract new customers – financial institutions were rather reluctant to do that during the crisis,
- switch to cheaper in-house maintenance, modern distribution channels in the case of retail financial services – it is rather heavily used by institutions concentrating on the retail market,
- enter new areas that are unregulated or introduce some innovations in the business model and/or financial services – which places higher demands on regulators, supervisors (micro- and macro-prudential) and institutional market participants to react in due time and not allow the risk to accumulate in the financial sector.

Which tools will be used by the G-SIBs depends on their financial standing, geographical coverage, strategy, market opportunities, the managers and owners approach to risk taking. However, there might be anxiety that the fourth proposal is the only solution to meet both regulatory requirements and the shareholders expectations.

Conclusions

Both academics and policy makers should focus on the proper identification and regulation of G-SIBs and other financial institutions. It should not be taken for granted that the BCBS methodology, based on the set of aggregated ratios, is fully correct. The FSB's list of G-SIBs should be confronted with the alternative methodologies like CoVaR (Adrian and Brunnermeier, 2011) or systemic expected shortfall (Acharya et. al, 2012). Comprehensive and multifaceted research is needed. It requires a wide range of data and access to many databases.

The assumption that additional capital and a higher level of CAR will be enough to increase the safety and soundness of the global financial system may be misleading, since the investors and providers of additional capital require an adequate level of ROE and so far G-SIBs are destroying, not creating, value for shareholders. This may generate undesirable activities and business solutions that would increase the risk in the global banking sector, even if it complied with regulations. Policy makers and regulators should not assume that more capital regulation is the best remedy for global financial stability, even if going hand in hand with the resolution regime.

References

- Acharya V., Pedersen L., Philippon T., Richardson M. (2012): *Measuring Systemic Risk*. “CEPR Discussion Paper”, No. DP8824.
- Adrian T., Brunnermeier K. (2011): *CoVaR*. “NBER Working Paper”, No. 17454.
- Agarwal V., Taffler R. (2008): *Comparing the Performance of Market-based and Accounting-Based Bankruptcy Prediction Models*. “Journal of Banking and Finance”, Vol. 32, No. 8.
- Aggarwal R., Jacques K.T. (2001): *The Impact of FDICIA and Prompt Corrective Action on Bank Capital and Risk: Estimates Using a Simultaneous Equations Model*. “Journal of Banking and Finance”, Vol. 25, No. 6.
- Bauer J., Agarwal V. (2014): *Are Hazard Models Superior to Traditional Bankruptcy Prediction Approaches? A Comprehensive Test*. “Journal of Banking and Finance” March, Vol. 40.
- BCBS (2010): *Results of the Comprehensive Quantitative Impact Study*. December, Basel.
- BCBS (2011): *Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement. Rules Text*. November, Basel.
- BCBS (2013): *Global Systemically Important Banks: Updated Assessment Methodology and the Higher Loss Absorbency Requirement*, July, Basel.
- Bongini P. and Nieri L. (2014): *Identifying and Regulating SIFIs*. “Economic Notes by Banca Monte dei Paschi di Siena SpA”, Vol. 43, No. 1
- Castro C., Ferrari S. (2014): *Measuring and Testing for the Systemically Important Financial Institutions*. “Journal of Empirical Finance”, Vol. 25, No. 1.
- CEBS (2010): *Results of the Comprehensive Quantitative Impact Study*. December, London.
- Freixas X., Rochet J.-Ch. (2013): *Taming Systemically Important Financial Institutions*. “Journal of Money, Credit and Banking”, Vol. 45, No. 1, doi: 10.1111/jmcb.12036.
- Genotte G., Pyle D. (1991): *Capital Controls and Bank Risk*. “Journal of Banking and Finance”, Vol. 15, No. 4-5.
- Gonzales F. (2005): *Bank Regulation and Risk-taking Incentives: An International Comparison of Bank Risk*. “Journal of Banking and Finance”, Vol. 29, No. 5.
- Iwanicz-Drozdowska M., Schab I. (2014): *Capital Regulation of G-SIBs: Does One Size Fit All?* June 14, SSRN, <http://ssrn.com/abstract=2450529>.
- Jacques K., Nigro P. (1997): *Risk-Based Capital, Portfolio Risk, and Bank Capital: A Simultaneous Equations Approach*. “Journal of Economics and Business”, Vol. 49, No. 6.
- Jokipii T., Milne A. (2011): *Bank Capital Buffer and Risk Adjustment Decisions*. “Journal of Financial Stability”, Vol. 7, No. 3.

- Kahane Y. (1977): *Capital Adequacy and the Regulation of Financial Intermediaries*. "Journal of Banking & Finance", Vol. 1 (2), pp. 207-218.
- Keeley M., Furlong F. (1989): *Capital Regulation and Bank Risk-Taking: A Note*. "Journal of Banking and Finance", Vol. 13, No. 6.
- Keeley M., Furlong T (1990): *A Reexamination of Mean-Variance Analysis of Bank Capital Regulation*. "Journal of Banking and Finance", Vol. 14, No. 1.
- Koehn M., Santomero A. (1980): *Regulation of Bank Capital and Portfolio Risk*. "The Journal of Finance", Vol. 35 (5), pp. 1235-1244.
- Merton, R. (1977): *An Analytical Derivation of the Cost of Deposit Insurance and Loan Guarantees*. "Journal of Banking and Finance", Vol. 1, No. 1.
- Rime B. (2001): *Capital Requirements and Bank Behavior: Empirical Evidence for Switzerland*. "Journal of Banking and Finance", Vol. 25, No. 4.
- Sharp W. (1978): *Bank Capital Adequacy, Deposit Insurance and Security Values*. "The Journal of Financial and Quantitative Analysis", Vol. 13.
- Shrieves R., Dahl D. (1992): *The Relationship between Risk and Capital in Commercial Banks*. "Journal of Banking and Finance", Vol. 16, No. 2.