

THE ASSESSMENT OF RISK MANAGEMENT SYSTEM'S ECONOMIC EFFICIENCY IN RETAIL BANKING

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Abstract: The banking risk management is always a relevant topic in financial sector's academic literature, but the detailed analysis of current studies showed that there is a lack of studies in risk management's economic efficiency assessment in retail banking, where the risk management system's administration cost may be a significant part of total credit institution's cost. The scientific problem of this article is: how the economic efficiency of retail banking risk management system could be defined and assessed? To reach the aim, the risk management's economic efficiency concept in retail banking is discussed and the risk management system development relevance in the context of economic efficiency is analyzed. The results of research allows concluding that the change of risk management system's economic efficiency might be expressed as net benefit of risk management, which shows the difference between the change of risk cost and the change of risk management system's administration cost. The research presented in the article allows stating that the gross and net benefit of the change of risk management system could be used as universal rates of the economic efficiency of the banking risk management that include all factors associated with banking risk management system.

Keywords: Banking risk, Risk management, Retail banking, Economic efficiency, Risk assessment.

JEL Classification: G32, G21.

Introduction

The banking risk management is always relevant topic in banking sector and finance area in academic level. In this area the most popular research topics are related to the possibilities of banking risk measurement and assessment, by analyzing various risk minimization sources of statistical, legal, managerial or other nature [13; 16; 17; 18]. The banking risk management is widely analyzed in the context of risk level definition and risk minimization by various authors (i.e. [5; 21; 15] and lot of others), but only a small part of them (i.e. [21; 2]) paid attention to the economic efficiency of risk management system and its improvement. In banking sector the risk management relevance is based on the attitude that the properly managed risk guarantees the higher efficiency of bank's overall performance in the context of cost and common economic benefit. The most of authors analyzing the banking risk management, accent that the bank's risk management leads to higher level of performance efficiency, which may be characterized by bank's financial or economical results [3; 5; 16; 19]. Such the viewpoint highlights the topicality of bank's risk management and bank's performance efficiency interrelations analysis in academic publications.

If looking from the perspective of risk management in retail banking it can be noticed that academic space lacks of publication where the analysis would be concentrate exactly on the risk management in the credit institutions that perform in retail banking sector. The risk management in this sector is specific because of relatively high total cost, which exposes the relevance of risk management efficiency in cost context. The risk management

problems in retail banking were analyzed by [4; 1] but all these authors were more oriented to the specifics of risk assessment and the creation of risk management systems, and paid less attention to the researches of risk management efficiency in the context of cost management. So the assessment of relation between retail banking risk management cost and benefit in the context of economic efficiency is still open for discussion in academic and practical levels.

The review of scientific researches in banking risk management area revealed that, despite several publications in academic space where the question of banking risk management economic efficiency assessment in cost viewpoint is accented, the most of authors who analyze the banking risk management improvement possibilities use to treat the efficiency only as an ability of risk assessment model or risk management system to define risk events and to measure their expected loss. This viewpoint dominates in the researches of [6; 7; 9; 13]. These and most of other authors who perform researches the banking risk management, use not to detail the efficiency concept they use in risk management analysis. For this reason, the **scientific problem** can be described as follows: **how the economic efficiency of retail banking risk management system could be defined and assessed?**

The aim of this article is to define the possibilities to assess the risk management system's economic efficiency in retail banking.

The object of this article is the economic efficiency of risk management in retail banking.

Research methods. The methods of comparative analysis of scientific literature and systemization were used when performing theoretical studies of economic efficiency of retail banking risk management.

1 The risk management's economic efficiency assessment principles in retail banking

In economic literature the efficiency is characterized as ratio of "output" and "input", that indicates the size of value added, in relative expression, is generated experienced certain expenses and investments [11]. Considering [21; 2; 7] applied concept of output and input in context of efficiency valuation, the output of banking operations can be expressed as gross cost, and input – as gross income. The banking sector distinguishes with huge variety of operations, products and services which are quite problematic to structure properly. This was done by [5; 19; 22; 6; 15; 12]. Each of those authors distinguish different parts of banking activities, but, summarizing all of them, there can be defined three typical activities of retail banking, considering peculiarities of income gathering: crediting, investing and administrating (various technical-administrative banking services). Considering the above activities of retail banking, subject to specifics of elements of bank's profit, it is possible to distinguish these elements of bank's income in retail banking sector: (1) crediting income – income from crediting services (including credit lines, leasing, factoring, etc.), that bank usually gathers in form of interests; (2) investing income – income gathered through investment activities in form of interests or capital gain; (3) income of administrating – other income of operation fees (cash, transfer fees and so on), consulting services, and from non-banking activities (such as income of sold assets) gathered by banking institution. Considering the same logic of banking income structuring, based on [5; 19; 6; 15; 12] views, which are analyzed deeper by [10], the retail bank's gross expenses could be resolved into these main groups: (1) financing expenses – expenses, that

is associated with the financial resources, mainly such as interests for lent capital; (2) operating expenses – expenses that are necessary to ensure the major banking operations, which can be divided in (a) administrating costs that include all operations and administrating activities performed by the bank, and (b) risk management costs, that involve all expenses associated with risk management procedures; (3) the expenses of impairment – this is expenses associated with banking risk costs that in bank's financial accountability is recorded as a separate article.

The efficiency of banking on the whole could be assessed via bank's financial results that can be characterized with different rates, subject to the interests of managers: for the owner of the bank that most relevant rate is ROE, for the top executives of the bank – ROA and amount of assets, for the clients – cost of services and so on [14; 8]. Banking results are associated with the net profit that depends on many factors connected to bank's income and expenses. The major part of bank's income usually gathered through crediting and investing activities should have earned possessing sufficient financial resources, which determine certain financial expenses [12]. Assessing these two elements it is possible to calculate the net financial income, which define the gross result of retail banking major activity (crediting and investing), not including the expenses necessary for activity maintenance. The net financial income is directly associated with the market interest rate that determines the expenses of financial resources and profitability of crediting and investing. This means that net financial income is directly associated with the market risk that consists of interest rate risk and foreign exchange risk, as well as with the risk of equity and commodities price volatility [22]. The net financial income traditionally consists of income from crediting and investing – this income is the gross result of banking. To the gross result of banking is oriented to the whole policy and strategy of the bank. The third part of bank's income is administrating income, which is traditionally appointed to cover the administrating costs, in the same way to reduce the part of administrating expenses covered by the net financial income. The uncovered part of administrating expenses is calculated as a difference between the gross administrating costs and the income of administrating activities [20]. Analyzing the presumptions of banking risk management efficiency it is needed to identify two major banking risk cost elements: risk losses and risk management costs, these sum compose gross banking risk costs:

$$\text{BRK} = \text{RN} + \text{RVK} \quad (1)$$

where:

BRK – banking risk cost,

RN – risk losses (credit, market, operating),

RVK – risk administration costs.

The provided expression shows, that the result of implementation of banking risk management solutions depends on the relation between the change in risk losses and change in risk administration cost. If the structure of costs of banking risk management is defined clearly then it is simple to indicate the growth of these costs. But the identification of expected risk loss reduction is more complicated because of the two main reasons: (1) the risk losses quite often are more hypothetical (the losses in the future) than the actual ones, and (2) the changes in banking risk management may influence the banking income [2; 7]. The difference between the change in risk losses and change in risk administration cost may

be treated as the net benefit of risk management (GN), which clearly expresses the economic benefit the bank receives while changing its risk management system:

$$GN = \Delta BRK = \Delta RN - \Delta RVK > 0 \quad (2)$$

The net benefit of risk management system indicates the final result of the change of risk management system – the net benefit enables to indicate if the realized solutions of risk management system are useful economically: (1) if $GN > 0$, then the expected change of risk losses is higher than the change of risk administration costs, and that shows that the change of risk management system is useful economically for banking institution. The net benefit of the change of risk management system could be used as universal rate of the economic efficiency of the banking risk management that include all factors associated with banking risk management system and its changes in retail banking sector. Therefore, the net benefit of the change of risk management system could be treated as major rates that describe the economic efficiency of banking risk management changes in retail banking sector.

2 The methodic for empirical assessment of net benefit of banking risk management in the case of Lithuanian credit unions

The described principles of the net benefit of banking risk management assessment become important in case the bank is going to improve its risk management system and is interested in assessment the final economic results of expected changes. This question encouraged to test the usage of net benefit assessment principles in Lithuanian credit unions sector. The case study was made using the data of one credit union performing in Lithuanian financial sector. The chosen credit union “N” is the one that closely matches the average characteristics of Lithuanian credit unions: in 2011 its assets were 26.3 mio LTL, the loan portfolio 15.2 mio LTL. The credit union “N” together with fast growth of assets faces the need to improve risk management to avoid too high level of risk loses that may condition the long-term disorders in credit union’s development. For this reason the several solutions for credit union’s risk management system’s improvement are being implemented with the goal to reached not just the higher level of risk management, but, firstly, the higher economic efficiency of risk management system. To assess the net benefit of risk management system’s improvement, the five-step procedure was performed.

1. The portrait of credit union’s planned risk management system characteristics.

To identify all the planned changes in credit union’s risk management system, the portrait of credit union’s planned risk management system characteristics should be formed. This portrait is supposed to consists of three main parts: (1) the risk type; (2) the changes planned; (3) the effect expected. In the case study of credit union “N” the three risk types were identified: the credit, market and operational risk, which are treated as the main risks the credit union faces.

2. The impact of changes in risk management system on risk losses. The expected change in risk losses are assessed for credit and operational risk, while the market risk management improvement solutions are expected to have impact only on income. The expected changes of credit risk losses are expressed as the changes of ratio of written-off loans in loan portfolio and ratio of provisions in loan portfolio. To assess the expected changes of these two ratios the statistical analysis of historical credit union’s loans portfolio was performed. In case of ratio of written-off loans in loan portfolio, the aim of statistical research is to review the last 100 written-off loans in credit union “N” and to identify, if the written-off loan would be issued if the going-to-be-implement solution for credit risk

management were used at the moment then the loan was issued. Such analysis allows identifying the “negative” part of portfolio which can be projected in the future loan portfolio as the reduced losses after the implementation of credit risk management solution. Using the same logic the expected ratio of provisions in loan portfolio is calculated. In this case the changes of risk losses is calculated as the difference between factual provisions for loan portfolio and expected provisions for loan portfolio, which depends on the calculated expected ratio of provisions in loan portfolio. The expected changes of operational risk losses are identified using the method of experts’ survey, where the experts are the managers of Lithuanian credit unions. The expected changes of operational risk losses are based on the economy of salary because of improved risk assessment instruments.

3. The impact of changes in risk management system on credit union’s income. The impact of risk management system’s improvement on credit union’s income is expected for credit and market risks. The impact on credit union’s income in credit risk case is expected to appear because of changed policy of loans issuance, because the more thorough assessment of borrower’s credit risk would reduce the total loan portfolio and interest income. The impact on credit union’s income in market risk is expected to appear because of new instruments for efficient free funds management.

4. The impact of changes in risk administration cost. The risk administration cost in the research were identified using economic calculations and experts survey methods, which are not widely discussed in this paper because it falls out of the main topic line of the research. The method of economic calculations was used in cases when the factual data allows calculating the expected additional cost and the changes in total cost related to the changes in risk management system. The method of experts survey was used in cases when there are not enough factual data to identify the expected additional risk administration cost, such as the salary cost for new employees or additional salary for new functions, cost for training and internships and etc.

5. The net benefit of changes in risk management system. The net benefit was calculated using formula (2), which allows comparing the reduction of risk losses, assessed in the previous steps of this research, and the growth of risk administration cost, which depends on the specifics of the portrait of credit union’s planned risk management system characteristics. The net benefit is calculated for every risk type and this allows concluding if the presented solutions for credit union’s risk management system’s improvement are economically useful for credit union or not. Parallel the total net benefit is calculated including all the presented risk management systems’ improvement solutions for all types of risk.

3 The results of empirical assessment of net benefit of banking risk management in the case of Lithuanian credit unions

The research of net benefit of risk management assessment in credit union “N” is performed using the steps described in previous chapter.

1. The portrait of credit union’s planned risk management system characteristics. The first step is the formation of the portrait of credit union’s planned risk management system characteristics (table 1), which shows the planned changes in risk management system and the expected effect after the implementation of those changes.

Tab. 1: The portrait of credit union's planned risk management system characteristics

The type of risk	The changes planned	The effect expected
Credit risk	To hire the professional credit risk assessor	The additional salary cost; The additional cost for training and internships
	To implement the business subjects' quantitative risk assessment methodic	The additional cost for training and internships; The additional cost for documentation and calculation forms preparation; The reduced ratio of written-off loans in loan portfolio; The reduced ratio of provisions in loan portfolio; The reduced income from interest
Market risk	To assign the function of active investment of free funds to the current employee	The additional salary cost; The additional cost for training and internships
	To implement the calculator for the planning of liquid funds usage	The additional cost for training and internships; The additional cost for documentation and calculation forms preparation; The additional income from investment
Operational risk	To assign the function of active operational risk management to the current employee	The additional salary cost; The additional cost for training and internships
	To implement the automated profitability management form	The additional cost for training and internships; The additional cost for automated forms creation; The additional cost for documentation preparation; The reduced salary cost
	To implement the automated business plan form	The additional cost for training and internships; The additional cost for automated forms creation; The additional cost for documentation preparation; The reduced salary cost

Source: Author

Credit risk. The analyzed credit union “N” like the most of credit unions in Lithuania faces the problem of credit risk assessment in case of business crediting. This problem is related to the lack of practice in business crediting, low risk assessors’ competence and primitive client’s credit risk assessment instruments, which lead to the low quality client’s credit risk assessment and faulty loans issuance decisions. The need to improve the assessment of business clients’ credit risk and to reduce the credit risk in business loans’ portfolio conditioned the creation of new methodic for business subjects’ quantitative risk assessment. This methodic, based on the automated client’s credit risk assessment, using specific software instruments, allows more precise assessment of business client’s financial state using the results of the assessment of business project’s pay-off, cash flow risk, business growth, financial structure and loan coverage ability. Such assessment reduces the possibility that loan will be issued for business client who will be unable to redeem the credit and to pay interest.

Market risk. Because of the need to raise the efficiency of free funds (the funds which cannot be invested in the loan portfolio because of the need to match the liquidity requirements) investment the calculator for the planning of liquid funds usage is prepared, which allow the modeling of the free funds allocation to maximize the profit. The calculator for the planning of liquid funds usage allows identification of credit union's current free funds and to determine the surplus free funds that can be invested in loans or fixed-term deposits, and the minimal free funds that can be invested in government bonds or current deposits. In such way the calculator for the planning of liquid funds usage creates the possibility to raise credit union's income because of more efficient investment of free funds.

Operational risk. For the operation risk two decisions are being implemented, which are oriented to the reduction of operational cost related to operational risk management and control. The management of operational risk usually is related to a high demand of working hours so it is important to find the solutions to reduce the non-automated operations. For this reason two instruments for more efficient operational risk management were prepared: (1) the automated profitability management form, which automatically calculates the prime cost of loans and allows defining the minimum level of loans' interest, which reduces the possibility of false calculations and mistakes and eliminates the need for secondary check of calculations; (2) the automated business plan form, which allows assessment of business subject's financial state and perspectives after the input of primary data, and in such way reduces the working hours for credit managers and reduces the probability of frauds.

The presented solutions for credit union's "N" risk management system's improvement have a dual impact on risk management economic efficiency: the solutions for credit and operational risk management have an impact on credit union's risk losses; credit and market risk have an impact on credit union's income.

2. The impact of changes in risk management system on risk losses. The impact on risk losses is expected from the solutions in credit and operational risk areas.

Credit risk. The implementation of the business subjects' quantitative risk assessment methodic is expected to have a positive impact on the ratio of provisions in loan portfolio and the ratio of written-off loans in loan portfolio. To measure the expected changes of above mentioned ratios, the statistical analysis of historical data was performed with an example of 100 written-off loans and, by analogy, with 100 loans having provisions formed. The analysis results showed that in case the business subjects' quantitative risk assessment methodic was used the 50 written-off loans would be identified as unacceptable for credit union. This allows concluding that in the future, the implementation of business subjects' quantitative risk assessment methodic could impact a reduction of written-off loans cost by 50.01 percent. In such case the ratio of written-off loans in loan portfolio could reduce from 0.50 percent to 0.25 percent and the average losses from written-off loans in credit union "N" could reduce from 76.0 to 38.0 thousands LTL. Using the same logic the impact of the business subjects' quantitative risk assessment methodic on provisions is measured. The calculations show that for the credit union "N" the usage of the business subjects' quantitative risk assessment methodic could cause the reduction of the ratio of provisions in loan portfolio from 1.30 to 0.91 percent and the cost of provisions could reduce from 197.6 to 138.3 thousands LTL.

Operational risk. To measure the impact of changes in risk management system on operational risk losses the expert survey was performed, where the managers

of Lithuanian credit unions were questioned. The results of this survey show that the implementation of the automated profitability management form could cause the reduction of salary cost by 7.4 thousands LTL, and the implementation of the automated business plan form could cause the reduction of salary cost by 13.7 thousands LTL. The implementation of both instruments could cause the total 21.2 thousand LTL cost economy and this would condition the reduction of total operational cost from 423.4 to 402.2 thousand LTL.

The results of the impact of changes in risk management system on risk losses (in both credit and operation risk cases) are summarized in table 2.

Tab. 2: The cost and economic efficiency indicators of credit union's risk management system

Indicator	Value before	Value after
Ratio of provisions in loan portfolio, %	1.3	0.91
Ratio of written-off loans in loan portfolio, %	0.5	0.25
Provisions, 000' Lt	197.6	138.3
Written-off loans, 000' Lt	76.0	38.0
Operational expenses, 000' Lt	423.4	402.2

Source: Author

3. The impact of changes in risk management system on credit union's income. The other important area of the impact of changes in risk management system is the changes in credit union's income caused by implemented solutions in case of credit and market risks.

Credit risk. In case of credit risk management improvement the presumption is made that the newly adopted business subjects' quantitative risk assessment methodic would cause in some cases the negative assessment result for the client who is capable in returning the credit, but who's financial data are weak. In such cases the credit union because of the new assessment methodic could lose some clients, and this means the reduction of loans portfolio, and consequent the reduction of interest income. The statistical analysis of historical loans data of credit union "N" showed that the expected loss of interest income could reach 2.0 percent which is equal to 28.9 thousands LTL. This loss of income in the performed research is included in the cost of planned credit union's additional risk administration (see table 2).

Market risk. The implementation of the calculator for the planning of liquid funds usage is supposed to guarantee a more efficient investment of free funds. The performed experimental adoption of this calculator in case of credit union "N" showed that credit union's free funds available for additional investment are equal to 1,530.25 thousands LTL, of which 732.80 thousands LTL might be invested in the loans, and 797.45 thousands LTL are available for investment in to the liquid assets. The efficient investment of these free funds could additionally generate the 45.60 thousands LTL income and this means that credit union's "N" income from investment could increase from 152.0 to 197.6 thousands LTL.

4. The impact of changes in risk administration cost. The implemented risk management solutions requires investment cost, which include the costs of training and internships, documentation and calculation forms preparation, and automated forms creation. Those costs in the performed research are amortized in 3 years with residual value

of 0 LTL. Also the changed risk management system requires additional maintenance cost, which includes the costs of salary and interest income reduction (table 3).

Tab. 3: The planned credit union's additional risk administration cost, LTL

	Credit risk	Market risk	Operational risk	Total risks
Investment cost	52,500.00	17,400.00	63,233.33	133,133.33
Annual amortization	17,500.00	5,800.00	21,077.78	44,377.78
Maintenance cost	68,180.90	3,930.00	7,860.00	79,970.90
Risk administration cost in total	85,680.90	9,730.00	28,937.78	124,348.68

Source: Author

5. The net benefit of changes in risk management system. To determine if the proposed risk management solutions are economically reasonable for credit union "N" the net benefit of changes in credit union's risk management system should be calculated, using the results of analysis of impact of changes in risk management system on risk losses, credit union's income and risk administration cost. The assessment of net benefit of risk management systems improvement (table 4) allows identifying the economic benefit of planned solutions in risk management area of credit union in case of every risk type (credit, market and operational).

Tab. 4: The assessment of net benefit of risk management systems improvement

	Credit risk	Market risk	Operational risk	Total risks
Current profit, Lt	-	-	-	81,725.90
Profit after improvement, Lt	179,008.93	142,525.49	109,950.87	268,033.48
The change of expected risk losses, Lt	97,283.02	60,799.58	28,224.97	186,307.57
The risk administration costs, Lt	85,680.90	9,730.00	28,937.78	124,348.68
The net benefit of risk management, Lt	11,602.12	51,069.58	-712.81	61,958.89
Is it useful to implement the risk management solutions?	Yes	Yes	No	Yes

Source: Author

The calculations show that in case of credit risk, the net benefit is equal to 11.6 thousands LTL (14.2 percent of current profit). This means that the proposed solutions for credit risk management improvement cause the positive economic result, including the expected reduction in losses and growth in administration cost. This allows stating that the solutions for credit risk management improvement for credit union "N" would be economically useful and would increase the risk management's economic efficiency. The same conclusions might be done in case of market risk. As the presented calculations show, the net benefit of market risk management improvement is equal to 51.1 thousands LTL (62.5 percent of current profit), and it means the positive impact on credit union's "N" risk management's economic efficiency in case of market risk. The different results are generated in case of operational risk management. The research results show that the operational risk's net benefit is negative (-712.81 LTL) and this means that the increase in risk administration cost because of improved operational risk management is higher than the reduction in operational cost, caused by proposed operational risk management solutions.

The total net benefit of risk management in case of all risk types is equal to 62.0 thousands LTL or 75.8 percent of current profit. This shows the total positive effect for credit union's risk management's economic efficiency.

4 Discussion

The economic efficiency of banking risk management is highly related with the links between bank's financial statements, which conditions the size of bank's net profit, and the banking risk objects, which can be group in three forms: market, credit and operational risks. In retail banking market risk mostly impacts the size of net financial income, credit risk is mostly related to credit risk cost and the operational risk is mainly related to net administrating cost. Based on the analysis of various authors it could be stated that the banking risk management efficiency should be treated as banking risk quality ratio when the gross risk-free income and expenses are constants, defined in the time interval, and banking risk costs is the variable that determines the banking efficiency. In such context it can be presumed that the connection between the change of efficiency and banking risk variable enables to reveal banking risk cost influence on banking financial results and allow assessing the efficiency of banking risk management solutions in the economic view.

The analysis of presented calculations of economic efficiency improvement in case of credit union "N" allows identifying the economically reasonable risk management solutions for this credit union. But the analysis of the results from banking risk management perspective requires mentioning that the generated results are valid only in concrete case and might be different for other credit unions or in other time period, depending on factual results of credit union. The other important factor in the analysis of presented results is the viewpoint to the idea of risk management from supervision bodies. The main idea, usually accented by banking supervision bodies, is the safety and reliability of entire financial system and the trust from clients. For this reason in some cases the negative net benefit of risk management system's improvement might not be an issue in judging the acceptability of specific risk management solutions, because these solutions might be important for the stability of entire financial sector, while for individual banks or other credit institutions it might cause the decrease in performance and profits. The presented way to measure the economic efficiency of risk management improvement allows identifying the weak areas of bank's risk management system in cost – benefit viewpoint, and might be useful in deciding whether the risk management instrument is useful for the bank or not, and what impact on final results of the banks might be expected after the implementation of such instrument.

Conclusion

The change of risk management system's economic efficiency might be expressed as net benefit of risk management, which shows the difference between the change of risk cost (loss, default or similar), showing the gross benefit of risk management, and the change of risk management system's administration cost. Gross and net benefit of the change of risk management system allow assessment of overall risk management system, because they include all factors associated with banking risk management system and its changes in retail banking sector. The assessment of changes in credit union's "N" risk management system's economic efficiency in the context of different risk types and risk management improvement solutions in the performed research allowed define useful and non-useful solutions in economic efficiency viewpoint. This confirm the statement that the presented

solutions for banking risk management's economic efficiency assessment create the conditions to assess the economic effect the changes in banking risk management system could have, considering the final bank's performance results and defining if the planned changes in risk management system are useful in economic viewpoint.

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