



## Credit risk analysis at the level of an operative branch of the bank

*Analiza riscului de credit la nivelul  
unei unități bancare operative*

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### **Abstract**

*Credit risk is most simply defined as the potential that a borrower/counter party will fail to meet its obligations in accordance with agreed terms. The goal of credit risk management is to maintain credit risk exposure within targeted limits so that the bank can maximize risk adjusted return. In such cases, the account of the customer inevitably becomes overdue, the granted loan turns into a non-performing credit and the lending bank registers a decline of its profit. In order to prevent such situations, commercial banks must take certain measures of reducing credit risk. In order to assess the exposure to credit risk, we can operate with a system of indicators based on information obtained from financial statements. The paper presents how the exposure to this type of risk can be evaluated at the level of an operative branch of the bank.*

**Keywords:** *risk management; financial risks; credit risk; overdue credit*

### **Rezumat**

*Riscul de credit este în mod uzual definit ca posibilitatea ca un debitor / contra parte nu va reuși să își îndeplinească obligațiile în conformitate cu condițiile convenite în contract. Scopul managementului riscului de credit este de a menține expunerea la riscul de credit în limitele stabilite astfel încât banca să poată maximiza profitul ajustat în funcție de risc. În astfel de cazuri, contul clientului devine mod inevitabil restant, creditul acordat se transformă într-un credit neperformant, iar banca înregistrează o diminuare a profitului său. Pentru a preveni astfel de situații, băncile trebuie să ia anumite măsuri de reducere a riscului de credit. Pornind de la sistemul indicatorilor de comensurare a riscului de credit și pe baza datelor din situațiile financiare, lucrarea prezintă modul în care se poate evalua expunerea unei unități bancare operative la această categorie de risc.*

**Cuvinte-cheie:** *managementul riscului; riscuri financiare; riscul de credit; credite restante*

**JEL Classification:** C02, D80, G21, G32

## Introduction

In any organization, financial management is designed to solve survival problems, avoiding financial crises and bankruptcy, overcoming competition and maximizing market share, maximizing profit, minimizing risk (Ciuhureanu, 2009). Financial management is a decisional and organization management sub-system that ensures data processing and provides useful information to the management (Ciuhureanu, Balteş & Brezai, 2009). A particularly important role has risk management which is a systematic process that approaches the risk in an organization and has different meanings depending on the persons involved in carrying out this process and on the areas in which it is completed.

In economy, the risk can be characterized according to the factors which produce it and according to its degree, having in view the company's ability to adapt itself and to respond efficiently to any changes that occur in the company's environment (Isac & Rascolean, 2009). Risk management is more often considered as a general function of organization management the objectives of which are to identify, assess and control the causes and the effects of uncertainty and risk within an organization. The main purpose of risk management is helping organizations progress towards achieving its goals and objectives in the most direct, effective and efficient manner (Ciocoiu & Neicu, 2007).

Depending on the extent to which they occur, risks pose a special problem, regarding the speed with which they take effect and how they affect costs and profits. Thus, their identification is essential in order to find the most effective mitigation measures. Knowing the time at which such risks occur is very important because it gives the bank an opportunity to mobilize resources and take appropriate measures to ensure an effective risk management (Monea, 2007).

In banking activities, risks refer to uncertainty resulting from choosing a wrong target and they depend on it and on the specific causes of the wrong target. Specific banking risks can be viewed in terms of losses due to bad decision making. The most common are approached starting with the classical functions of banks. Risks are treated as unexpected losses recorded in the banking activity due to adverse developments of the anticipated results.

Other authors consider that the risks from banking activities are totally random and uncontrollable, considering potential and actual losses. It can be said that banking risks are phenomena that occur during banking operations causing negative effects upon that certain activity by deteriorating the quality of business, less profit or even losses, affecting thus the functionality of the bank.

### Aspects of risk associated with credits

In the business of banking, lending is the main operation of commercial banks, generating significant profits, but it may also lead to losses. Lending is the activity with the highest risk because when granting a loan the bank assumes the risk of any full or partial non-recovery of both principals and interests on loans. This type of risk, characteristic to the banking business, is called credit risk or the risk of the debtor's insolvency or default risk.

Banks are currently registering losses regarding the credit portfolio arising from borrowers' failure to meet their obligations according to signed credit agreement. Thus, the most important function of a bank management is to control permanently the quality of the loan portfolio, to design and implement efficient lending policies, to ensure appropriate default risk management.

Depending on the procedures used by each bank in the assessments prior to granting loans, a loan has varying degrees of risk, which requires permanent awareness of the risk exposure of each bank, taken separately. In this regard, banks are forced to adopt special measures which ensure an appropriate management of the credit risk (Nițu, 2000).

The loan itself carries a risk that is to say that it is very easy to lend money, but there are cases when it takes an expert to recover it. Credit risk can be defined as the risk of a loss or failure to record profits arising from a borrower who does not comply with his contractual obligations. The decision of granting a loan is based on anticipating the borrower's activity (cash flow forecast and financial indicators), which implies risk assessment and awareness. Consequently, risk cannot be avoided; it can only be prevented and reduced.

Thus, a bank's exposure to the customer is a credit risk generator, expressed in the context of not making payments according to contractual obligations or according to off-balance sheet commitments (Badea, Socol, Drăgoi & Drigă, 2010). Credit risk expresses, in fact, the possibility of not cashing in due payments (advanced capital and interest) and its implementation leads to situations in which a part of bank loans can not be recovered for various reasons, becoming non-performing credits, which negatively affects profits because most of the money used in granting a loan come from customers' deposits (Olteanu, Olteanu & Badea, 2003).

Exposure to this risk category is influenced by several factors: the quality of loans reflected by the volume of nonperforming assets, credit losses and the adequacy of provisions for credit losses; credit assessment according to the criteria taken into consideration by the bank when granting a loan; strategic factors which imply the identified target market; the volume of different types of credits, the balance established between risk and price; external factors which include economic and market conditions, demands for loans, competition, technological and legislative changes etc.

### The system of indicators that measure credit risk

Within the business of banking, risk quantification allows their interpretation in terms of causes, consequences and temporal effects on bank profitability. A careful study of the dynamic structure of bank assets and liabilities results in obtaining more information on bank profits and risk exposure. Financial risks in banking activities are the only risks that can be quantified through a system of indicators, which are the result of ongoing imbalances that occur between bank assets and liabilities on which the management has control (Drigă, 2007).

The specialized literature tackles the system of indicators used for assessing financial risks characteristic to banking activities in terms of subsystems associated with the main categories of risk, focusing on a correct assessment by measuring the components, ensuring a proper interpretation and comparability with international or national standards.

Most often risks are managed globally, throughout the bank, although there is an opportunity to assess, analyze and manage them at the level of each operative unit. The determination of certain specific indicators could reveal the extent to which the bank is exposed to major risks.

As far as credit risk is concerned, the bank can use the following indicators to determine the exposure to this risk category:

➤ *The rate of total loans to total assets* - the higher the value of this indicator is, the riskier the banking business is. The loan policy may set a ceiling of this measure and / or alert thresholds.

$$R_{L_t/A_t} = \frac{L_t}{A_t} \cdot 100 \quad (1)$$

where:  $L_t$  - total loans,  
 $A_t$  - total assets.

If the portfolio of securities is significant, then the ratio of total receivables from borrowers (loans, debt securities in the portfolio) to the total assets must be calculated.

➤ *The rate of overdue loans* - the value of this report should be as small as possible in order that the portfolio is managed efficiently in terms of credit risk. According to international standards, the maximum allowed limit is 6%.

$$R_L = \frac{L_o}{L_t} \cdot 100 \quad (2)$$

where:  $L_o$  - overdue loans,  
 $L_t$  - total loans.

This indicator can be expressed depending on the structure of the loan portfolio, and it may result in:

a) The rate of overdue short-term loans:

$$R_{lst} = \frac{L_{ost}}{L_{tst}} \cdot 100 \quad (3)$$

where:  $L_{ost}$  - overdue short-term loans;  
 $L_{tst}$  - total short-term loans.

b) The rate of overdue medium and long term loans:

$$R_{lmlt} = \frac{L_{omlt}}{L_{tmlt}} \cdot 100 \quad (4)$$

where:  $L_{omlt}$  - overdue medium and long term loans;  
 $L_{tmlt}$  - total medium and long term loans.

c) The rate of overdue loans granted to legal entities

$$R_{lle} = \frac{L_{ole}}{L_{tle}} \cdot 100 \quad (5)$$

where:  $L_{ole}$  - overdue loans granted to legal entities;  
 $L_{tle}$  - total loans granted to legal entities.

d) The rate of overdue loans granted to individuals:

$$R_{li} = \frac{L_{oi}}{L_{ti}} \cdot 100 \quad (6)$$

where:  $L_{oi}$  - overdue loans granted to individuals;  
 $L_{ti}$  - total loans granted to individuals.

e) The rate of overdue loans granted in foreign currency:

$$R_{lfc} = \frac{L_{ofc}}{L_{tfc}} \cdot 100 \quad (7)$$

where:  $L_{ofc}$  - overdue loans granted in foreign currency;  
 $L_{tfc}$  - total loans granted in foreign currency.

➤ *The weight of short, medium and long term loans*, respectively within the total of loans, takes into consideration the fact that granting medium and long term loans carries a higher risk than short-term credit. Thus, as the greater the weight of short-term loans is, the lower the credit risk is.

The following calculation can be made:

a) The rate of short-term loans to total loans

$$R_{st/tl} = \frac{L_{st}}{L_t} \cdot 100 \quad (8)$$

where:  $L_{st}$  - short-term loans,  
 $L_t$  - total loans.

b) The rate of medium and long term loans to total loans

$$R_{mlt/tl} = \frac{L_{mlt}}{L_t} \cdot 100 \quad (9)$$

where:  $L_{mlt}$  - medium and long term loans,  
 $L_t$  - total loans.

### The analysis of credit risk within a bank

Starting from the system of indicators that measure credit risk and based on financial statements, one can evaluate the exposure of an operational bank unit "A" to this risk category. To make a correct analysis of the exposure to credit risk we can use a specific system of indicators based on data contained in the centralizer of granted credits and trial balances prepared by the bank "A". (Drigă, 2007)

✓ *Rate of total loans to total assets* - formula (1) yields the following:

$$R_{L_t/A_{tN}} = \frac{19153752}{300061580} \cdot 100 = 6.3833\%$$

$$R_{L_t/A_{tN+1}} = \frac{43474626}{299387950} \cdot 100 = 14.5212\%$$

$$R_{L_t/A_{tN+2}} = \frac{53369026}{453315374} \cdot 100 = 11.773\%$$

✓ *The rate of overdue loans* - formula (2) yields the following:

$$R_{LN} = \frac{279825}{19153752} \cdot 100 = 1.4609\%$$

$$R_{LN+1} = \frac{754722}{43474626} \cdot 100 = 1.736\%$$

$$R_{LN+2} = \frac{1187928}{53369026} \cdot 100 = 2.2259\%$$

✓ *The rate of overdue short term loans - using formula (3) we get:*

$$R_{\text{lst } N} = \frac{268381}{10539542} \cdot 100 = 2.5464\%$$

$$R_{\text{lst } N+1} = \frac{658715}{10069053} \cdot 100 = 6.542\%$$

$$R_{\text{lst } N+2} = \frac{789558}{14316458} \cdot 100 = 5.515\%$$

✓ *The rate of overdue medium and long term loans - using formula (4) we get:*

$$R_{\text{mlt } N} = \frac{11444}{8614210} \cdot 100 = 0.1328\%$$

$$R_{\text{mlt } N+1} = \frac{96007}{33405573} \cdot 100 = 0.2874\%$$

$$R_{\text{mlt } N+2} = \frac{398370}{39052568} \cdot 100 = 1.0201\%$$

✓ *The rate of overdue loans granted to legal entities - formula (5) yields the following:*

$$R_{\text{le } N} = \frac{258787}{14459112} \cdot 100 = 1.7898\%$$

$$R_{\text{le } N+1} = \frac{688275}{15495229} \cdot 100 = 4.4419\%$$

$$R_{\text{le } N+2} = \frac{968965}{18283020} \cdot 100 = 5.2998\%$$

✓ *The rate of overdue loans granted to individuals - formula (6) yields the following:*

$$R_{\text{li } N} = \frac{21038}{4694640} \cdot 100 = 0.4481\%$$

$$R_{\text{li } N+1} = \frac{66447}{27979397} \cdot 100 = 0.2375\%$$

$$R_{\text{li } N+2} = \frac{218963}{35086006} \cdot 100 = 0.6241\%$$

- ✓ *The rate of overdue loans granted in foreign currency - formula (7) yields:*

$$R_{\text{afc N}} = \frac{139}{1968186} \cdot 100 = 0.0071\%$$

$$R_{\text{afc N+1}} = \frac{61}{3804011} \cdot 100 = 0.0016\%$$

$$R_{\text{afc N+2}} = \frac{4431}{8303321} \cdot 100 = 0.0534\%$$

- ✓ *The rate of short term loans to total loans - using formula (8) we get:*

$$R_{\text{stl/tl N}} = \frac{10539542}{19153752} \cdot 100 = 55.026\%$$

$$R_{\text{stl/tl N+1}} = \frac{10069053}{43474626} \cdot 100 = 23.1608\%$$

$$R_{\text{stl/tl N+2}} = \frac{14316458}{53369026} \cdot 100 = 26.8254\%$$

- ✓ *The rate of medium and long term loans to total loans - using formula (9) we get:*

$$R_{\text{mtrl/tl N}} = \frac{8614210}{19153752} \cdot 100 = 44.974\%$$

$$R_{\text{mtrl/tl N+1}} = \frac{33405573}{43474626} \cdot 100 = 76.8392\%$$

$$R_{\text{mtrl/tl N+2}} = \frac{39052568}{53369026} \cdot 100 = 73.1746\%$$

Based on the resulted information from Table1, one can analyze the exposure of bank "A" to credit risk by comparing the results from the three periods of time taken into consideration.

One can notice an increasing trend of credit risk in the period N+1 as compared to the previous one, given that the weight of loans in total assets has increased by 2.2749 times, which characterizes riskier banking activity. During N+2 the weight of loans in total assets has decreased as compared to the previous period, but it registers an increasing trend by 1.8443 times in comparison to period N.

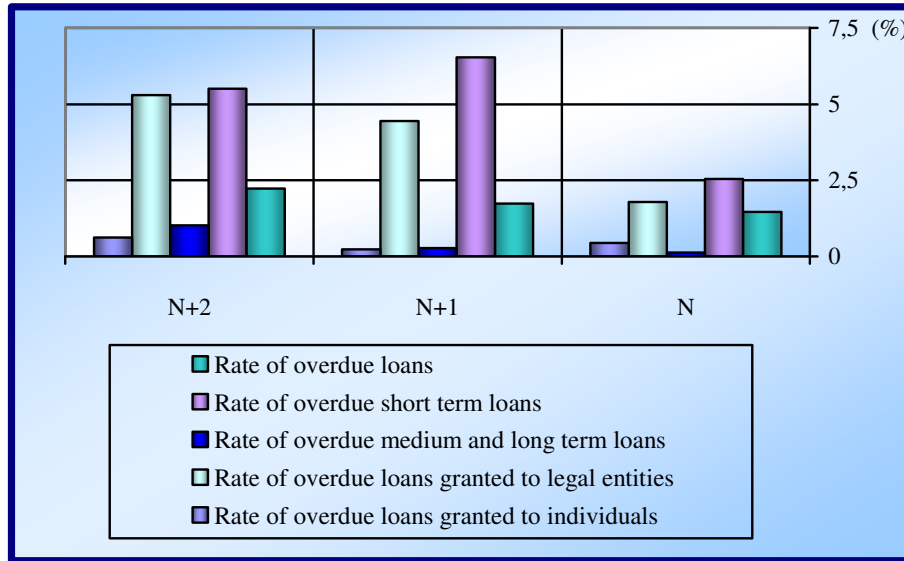


Summarizing table of credit risk indicators

Table 1

No.	Indicator	Period			Dynamics		
		N	N+1	N+2	N+1/ N	N+2/ N+1	N+2/ N
1.	Rate of total loans to total assets	6.3833	14.5212	11.7730	2.2749	0.8107	1.8443
2.	Rate of overdue loans	1.4609	1.7360	2.2259	1.1883	1.2822	1.5236
3.	Rate of overdue short term loans	2.5464	6.5420	5.5150	2.5691	0.8430	2.1658
4.	Rate of overdue medium and long term loans	0.1328	0.2874	1.0201	2.1642	3.5494	7.6815
5.	Rate of overdue loans granted to legal entities	1.7898	4.4419	5.2998	2.4818	1.1931	2.9611
6.	Rate of overdue loans granted to individuals	0.4481	0.2375	0.6241	0.5300	2.6278	1.3928
7.	Rate of overdue loans granted in foreign currency	0.0071	0.0016	0.0534	0.2286	33.3750	7.5211
8.	Rate of short-term loans to total loans	55.0260	23.1608	26.8254	0.4209	1.1582	0.4875
9.	Rate of medium and long term loans to total loans	44.9740	76.8392	73.1746	1.7085	0.9523	1.6270

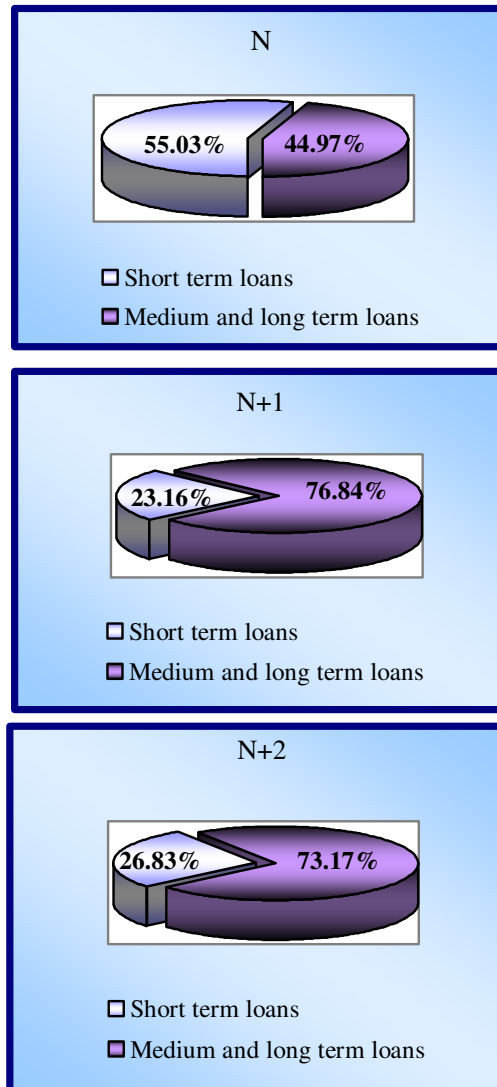
A more detailed analysis of exposure to credit risk from Figure 1, concerns weighting overdue loans in the total of loans, both overall and in structure. If the maximum allowable rate of the overdue loan indicator is 6%, according to international standards, the values recorded by this indicator in the periods mentioned above are very good, 1.4609% for period N, 1.736% for period N+1, and 2.2259 % during period N+2; one may notice a slight upward trend here, which reveals riskier lending activities conducted by the operative bank unit 'A' during this period.



**Figure 1 The evolution of indicators that measure credit risk**

Considering that the granting of medium and long term loans carries a higher risk than short-term loans, one can easily find by studying the data in Table 1 and Figure 2 that the lending activity conducted by bank "A" during N+1 and N+2 is riskier than the activity registered during period N. Thus, if during period N short-term loans represented 55.03% of all loans, while medium and long term loans represented only a share of 44.97%, for periods N +1 and N +2 the situation reversed; the largest share of total loans being held by medium and long term loans, 76.84% for the period N+1, and 73.17% for the period N+2. Nevertheless, the greatest defaults have occurred in the case of short-term loans during the three periods analyzed. During period N+1 the weight of overdue short-term loans in the total of short-term loans reached a high level of 6.542%, the indicator value being 2.5691 times greater this year as compared to the previous year. During N+2 the rate of overdue short term loans was lower as compared to the previous year, but it was 2.1658 times higher as compared to the year N.

The risky activity of bank "A" for the periods N+1 and N+2 as compared to period N can be noticed in the analysis of loans granted to legal entities. Thus, during N+1 the back payments of loans granted to legal entities were 2.4818 times higher than during the same period last year, and during period N+2 they were 2.9611 times higher as compared to period N.



**Figure 2 The structure of loans granted by bank "A"**

In the case of loans granted to individuals the situation is reversed, and one could find a reduction to almost a half of the back payments to this type of loan for the period N+1 as compared to the previous period (from 0.4481% - N to 0.2375% - N+1); for the next period the indicator would resume its ascending trend, the rate of overdue loans granted to individuals reaching 0.6241%.

However, during period N+1 one can notice a decreasing trend of the risk exposure of the loans granted in foreign currency; the weight of defaults in the total of loans granted in foreign currency is an insignificant quantity of 0.0016%, although the level recorded in the previous period measures very low (0.0071%). During N+2 there is an ascending trend, the rate of loans in foreign currency reaching a level of 33,375 times higher than the previous period, however the indicator value remains low, only 0.0534%.

### Conclusions

Although none of the indicators mentioned above is a perfect predictor of the bank's exposure to credit risk, it appears that the inadequacy of one of them is itself a barometer of future problems in granting a loan. The value of indicators makes it possible to evaluate the quality of credit portfolio and to make a credit risk analysis for the exposed bank unit. All these indicators can be calculated and interpreted, correlated, analyzed and used to substantiate the credit policy.

Thus, in order to evaluate, mitigate and manage a risk corresponding to the credit portfolio and to credit type products we can use methods and tools included in the internal regulations set by the credit policy in accordance with international practice in this area. These methods imply a thorough analysis of the credit costs, a risk exposure quantification, in order to make safe and profitable transactions by monitoring quantitative criteria (measurable) which express the economic and financial status of these particular entities (solvency, liquidity, profitability, level of debt) as well as qualitative criteria (quality of ownership, management, reputation in business, accounting reports auditing).

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