

Credit Risks During Economical Crisis: Trends From the Ukraine Banking System

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Abstract: *The Ukrainian banking system, being typical for Eastern European countries, elucidate the dynamics, the structure, the profitability and the risks of the credit portfolio of a developing country's banking system in pre-crisis and crisis periods (in this case from 2006 to 2010). Knowledge of these aspects is instrumental in revealing the main trends and problems in managing the credit risk of national banking systems. This article considers the theoretical and practical implications of macroeconomic research devoted to the credit risk of national banking systems that consider development aspects of the banks crediting policy. Approaches to optimize the crediting policy of national banks are recommended based on identification of the priorities of its formation, focused on the stabilization of both certain banks' activity in the short term and the whole banking system in the long term.*

Keywords: *Credit risk, Credit portfolio, Credit policy, Ukraine banking system, Crisis management*

Introduction

Market globalization, fierce competition, introduction of new operations, and the development of information technologies have fundamentally complicated a bank's activity and increased its risks, i.e., the value of efficiently controlling risks has increased. The crediting activity of commercial banks is a key source of both their income and loss which is determined by the credit risk level. A vital question is thus that of risk minimization, i.e. development of the complex risk management process while crediting bank clients on the basis of the established credit policy. Understanding the credit risk is of course vital for proper risk management.

A credit risk is an available or potential risk of loss of receipt and of capital which arises through the inability of the party, which has undertaken obligations, to meet the conditions of any financial transaction with a bank (or its subdivision), or in any other way to comply with the commitments (Denisenko et al. [11, p. 120-123]; Sinky [32, p. 214]). The credit risk is available in all types of activities wherein the result depends on the counterpart's activity; the emitter or the borrower. Credit risks are the fundamental reason of bank bankruptcies, i.e. about 40 % of bank bankruptcies have occurred through low crediting standards related to fast growth, the size of loans and special attention paid to speculative (and, thereby, highly risky) industries and economy sectors (in particular, real estate) (Begg and Portes [4]; Perotti [26]; Gorton [7]). The bankruptcies mainly occurred due to granting credits to owners, other affiliated members, or sister companies.

Credit risk can be caused by numerous factors, e.g. deterioration of conditions for development of the national economy during crises (an external factor), an imperfect bank crediting policy that can cause excessive concentration or diversification of a credit portfolio (intrabank factor), or deterioration of the borrowers financial condition or liquidity (related to borrower activity). On the whole, the reason for occurrence of credit risks can be considered as the deviation of a real crediting situation from its estimated prediction at the time of decision-making (Greuning et al. [8, p. 123-124]; Morsman [22]; Vovk and Khmelenko [5]). Such deviations can be both positive as a credit risk decrease when the real situation turns out better than the predicted one, or negative as a credit risk increase when the real situation turns out worse than the most pessimistic expectation. However, as practice testifies, credit risk deviations are mainly negative leading to considerable credit losses, loss of reputation and, eventually, bankruptcy.

Therefore, due to the potential negative consequences of a credit risk, it is important to conduct a thorough analysis of a bank's policy and practices related to credit risk management. The majority of Ukrainian and Russian scientists, in particular, Vitlinsky [17, p. 35 - 56], Denisenko et al. [11, p. 13 - 20], Vovk and Khmelenko [5, p. 38 - 47, p. 181-202], Primostka [28, p. 125-192; 9, p. 355 - 405] pay very little attention (if any at all) to the role of macroeconomics of credit risks in national banking systems when forming credit policies that take into account national features and tendencies of specific countries. International researchers, for example, Gruning and Bratanovich [8, p. 123-150], Morisman [22, p. 19 - 130], Rose [30, p. 17-192] only pay attention to general conceptual approaches to the formation of a bank's credit policy, without taking into consideration any national features and modern management conditions. Also, Panova [24] does not consider the influence of modern trends caused by world crisis's to the fundamental parameters of commercial bank crediting.

By taking into account macroeconomic trends of credit risks for national banking systems, the aim of this article is to determine approaches for the formation of a credit policy for banks of different sizes based on their net assets. This will allow individual banks to formulate more flexible bank credit policies permitting them to respond more quickly and to adjust to new external and market conditions, as well as to optimize the risk level of their credit portfolios. The results presented in this article is based on empirical results obtained from the national banking system of Ukraine, during the last global financial crisis (2008 - 2009), as well as from individual groups of banks of various sizes and net assets. Macroeconomic analytical assessment of credit risk of national banking systems are not only essential to effective management but also the foundation for formation of sound crediting policies of individual banks in post-crisis periods, focusing on the stabilization of the entire banking system.

1. Methods for Evaluation of Credit Risks

An adequate indices system is important for quantitative assessment of a credit risk. According to Greuning and Bratanovich [8, p. 132 - 133), the dynamics and structure of a credit portfolio characterize the market position of national banks, i.e., business and risk management strategies as well as the possibility of granting credits is the basis of such an estimation. These factors allow banks to identify their credit risks, which risks they are willing to undertake, choice of rational placement of bank resources, and change of policy for granting credits. Consequently, an effective risk management system permits a bank to improve its bank crediting function which requires consideration of macroeconomic aspects of the development of a national economy.

A reliable bank crediting policy, from the point of view of optimization of the credit risk level, should establish procedures that not only involves quantitative estimation (dynamics and structure), but also involve analytical estimation of the quality of the credit portfolio to periodically correct data. Accordingly, the qualitative estimation of a credit portfolio is performed using relative indices (a coefficient analysis) aimed at reducing the risk of failure to reimburse a loan which leads to considerable losses, potentially leading to bankruptcy.

In most cases, an adequate size of a credit risk is reflected by the reimbursement reserve for possible losses, calculated as the sum of standard, controlled, substandard, doubtful and hopeless credits (Prymostka [28; 29]). In this case, as the reserve for the standard indebtedness for credit operations in Ukraine is established for all type of credits, even for the most reliable, it does not testify to a bank increasing risk. Therefore, in many countries, in particular in the USA, a reserve for standard credits is not established at all. More precisely, the cumulative risk of a credit portfolio is reflected by the reserve calculated for a non-standard indebtedness for bank credit operations which actually reflect the sum the bank will most likely be underfinanced with. Analytical accounting data serves as basic information for such calculations.

However, it is not sufficient to merely provide absolute data for the dynamics of reserves for non-standard indebtedness to estimate the cumulative risk of a bank's credit portfolio. It is also necessary to apply relative indicators to estimate the quality of a credit portfolio from the point of view of a credit risk (financial coefficients) (Herasymovych [2, p. 157-158]; Prymostka [28, p. 180]). In particular, using the technique accepted in the USA to estimate the assets quality (primarily all credits granted by banks), the coefficient is calculated as the relation of the average weighted sum of classified credits to the bank equity capital, expressed in %:

$$K = \frac{\text{Average weighted sum of classified credits}}{\text{Bank equity capital}}$$

(1),

where the average weighted sum of the classified assets equals 20 % of substandard, 50 % of doubtful and 100 % of hopeless credits, i.e. it is actually the value of the reserve to cover the loss for non-standard credit operations. Comparison of possible losses for credit operations with a bank's capital is scientifically grounded as it is at the expense of a bank's own money that one can affect compensation of losses from high risk credit operations.

However, other coefficients are necessary for thorough estimation of a portfolio's credit risk. In particular, the ratio of the reserve sum for credit indebtedness (or the weighed classified loans) and the total amount of credits, as well as a ratio of problem credits (overdue and doubtful) and the total loan volume, or a ratio of problem credits and total assets (that characterize the assets quality of foreign practices) (Vitlinsky [17, p. 91]; Sinky [32]) are used in both foreign, and domestic banks to estimate the risk of a credit portfolio. Such coefficients characterize the specific weight of possible losses for credit operations (specified under the reserve volume for credit risks or under the volume of delayed and doubtful credits) in the structure of a bank credit portfolio (or total assets) (Herasymovych [2, p. 157 - 158]).

It should be especially noted that one of the most important parts of the administrative system is estimation of management efficiency in running a bank credit portfolio based on the ratio between such parameters as the level of profitability and the size of a credit risk portfolio. In the effectiveness ratios which were proved in the portfolio theory of Markovits [21] and Sharp et al. [34], the difference between portfolio profitability (real or expected) and the probability of failure to receive revenue for portfolio assets are studied. Since credit operations can be considered as investment activities, Ukrainian authors, such as Primostka et al. [28, p. 181-187; 29, p. 407-410) offer similar indexes

$$Kc = \frac{d - r_0}{IR}$$

(2),

where Kc is the coefficient of effectively running a credit portfolio, d is the profitability of a credit portfolio calculated as a ratio between the revenue from credit operations and the volume of a credit portfolio, r_0 is the risk-free rate which is suggested to be the discount rate of the National Bank of Ukraine, and IR is the index of the credit portfolio risk, calculated as a ratio between the reserve for non-standard credit indebtedness and the volume of a bank credit portfolio. In foreign banks it is suggested to use an index of risk adjusted margin (RAM) to estimate the interrelation between a yield level and the level of risk for a bank's credit portfolio; the index of an interest margin (GI - gross interest margin), adjusted for the risk of credit loss can be determined as:

$$\text{Risk adjusted margin (RAM)} = \frac{\text{Net interest profit} - \text{Losses for loans}}{\text{Total assets}}$$

(3),

in which the losses for loans are suggested to be estimated from cumulative reserves (Vitlinsky [17, p. 91]) which only give a rough estimate of probable losses for loans. It is more adequate to estimate losses for loans from the amount of problem credits (overdue and doubtful).

2. Empirical Analysis

2.1 Trends in Credit Risk Loan Structure in Ukrainian Banks

The Ukrainian banking system is heterogeneous. The Ukrainian system banks are the largest and most influential, predominantly composed of State-owned and private, but former State-owned, banks (for more information see for example Peek and Rosengren [25] and Kishan, Opiela [18]). These banks have close government ties granting them exclusive rights to serve various government accounts and projects (budget accounts, state pension funds, etc.), which explains their large asset size. They have low capitalization and the highest proportion of delinquent loans (Golodniuk et al., [6]). The other system banks and large banks, with assets above the 75th percentile, are successful and well-organized

private banks with good lobbying power and strong governmental ties as well as strong managers and efficient management systems. Medium banks (25th–75th percentiles) compose about 30 % of the total assets of the banking sector. Many of these banks show almost the same level of management proficiency as the successful large banks; however, they are much more exposed to various risks because of a narrower client base. Usually they do not have powerful political or governmental support, nor access to contracts that provide large-scale services. Small banks are also highly dependent on a limited set of clients and face more serious risks than large or medium banks.

The ratio of granted credits to the bank's general assets characterizes the scale of the bank's credit activity. Herasymovych and Alexeyenko [2, p. 116] indicate a dependence between the value of the specified index and the characteristics of a bank's crediting policy; if a portion of credits within the total amount of assets does not exceed 50-60 %, a bank's crediting policy is characterized as passive and cautious which is typical for stable and reliable banks that have sufficient crediting experience. When the portion of credits constitutes 60-70 % and more, a bank credit policy is instead considered to be active and aggressive. Consequently, a credit to asset ration above 75 % is deemed too risky.

The major Ukrainian banks [3] utilized the most aggressive crediting policies in the pre-crisis years from 76 % in 2006 and 2007 to 83 % in 2008, reaching 87 % during the crisis of 2009. This led to a situation where two thirds of the major banks (12 out of 18) finished 2009 with losses, primarily due to substantial losses caused by granted credits. At the same time, average and small banks [3] did not exceed 73.3 % during the pre-crisis period (2006 - 2008) and 74.7 % in 2009. Consequently, the damage caused to small to medium sized banks was considerably smaller; 52.4 % of the average sized banks finished 2009 with losses while the number for small banks was 24.4 %.

Restricting the ratio of credits granted to physical entities (households), to economical agents or to other credit borrowers is also an important constituting part of a bank's credit policy. The specific weight of the credits granted to physical entities to the total credits granted by banks should achieve the greatest attention, such credits that to a large extent determine the risks of banks credit portfolios, the weight of credits granted to physical entities of major and big Ukrainian banks increased from 27.2% and 22.0 % to 30.9 % and 28.0 % respectively from 2006 to 2008, while the weight of granted credits in average and small banks was considerably lower [3].

When exploring the risk of credit portfolios in crisis it should be noted that concentration of currency imbalances in one sector may lead to spillovers of financial difficulties throughout the economy (Allen et al. [1]; Delgado et al. [10]). Luca and Petrova [19] provide evidence that banks' currency matching determine credit dollarization in transition economies; high deposit dollarization is associated with high credit dollarization. In Ukraine, the maximum ratio of credits granted to physical entities in 2008 was caused by a substantial increase of population incomes, first and foremost by a 30.0 % growth of wages which gave an erroneous impression of financial stability that stimulated the population to mainly use credits in foreign currency (Fig.1); credits were mainly granted in US dollars that grew from 59.0 % in 2006 to 68.9% in 2009.

The crediting changes were accompanied by a corresponding growth of middle- and long-term mortgage loans that grew from 25.0 % in 2006 to 55.0 % in 2009 (Fig.2). Such growth of mortgage loan volumes in Ukraine led to additional problems caused by increasing credit risks:

- **Economic.** Increasing costs of mortgage loans for the population, insufficient long-term credit resources in domestic banks, high costs for credit registration of habitations, etc.
- **Legal.** Ukrainian bank employees lack experience of how to apply mortgage legislation and also lack a legal and normative base for mortgage lending.
- **Organizational.** Related to an imperfect interaction with mortgage subjects and an underdeveloped financial market infrastructure.

It can be concluded that further development of mortgage lending in Ukraine is possible only by improving the domestic legislation concerning mortgage lending, developing corresponding mechanisms of mortgage market functions, as well as improving registration procedures for mortgage loans by Ukrainian banks and the provision of their cost decrease.

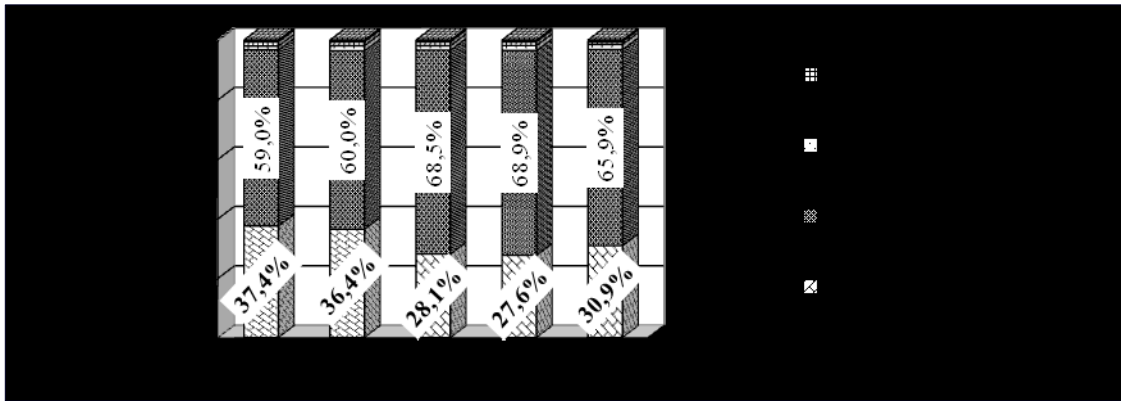


Figure 1. Credits granted by Ukrainian banks to physical entities from 2006 to 2010 [13; 14]

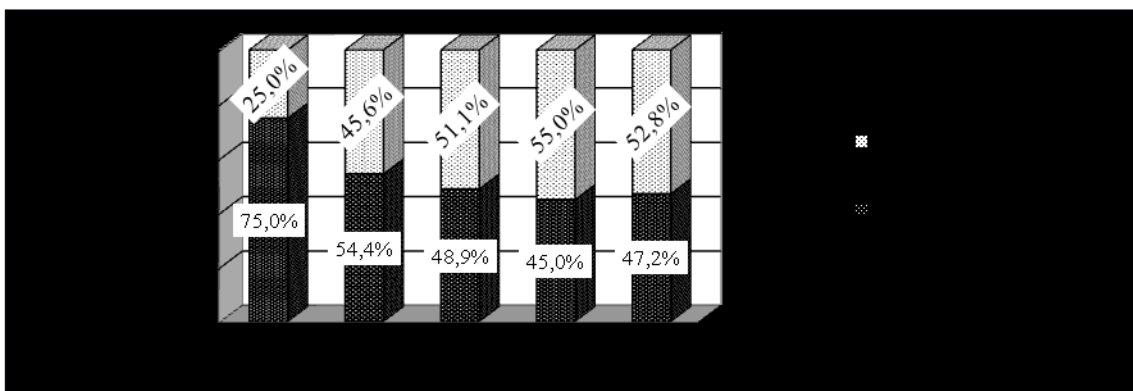


Figure 2. Use of credits granted by Ukrainian banks to physical entities from 2006 – 2010 [14]

Overall, the above dynamics and structure of credits granted by Ukrainian banks in an unstable national economy with considerable political risks, characterize the credit policy of Ukrainian banks as risky enough. After all, it was already in 2009 when the sharp decrease in population incomes and growth of unemployment occurred due to deterioration of the economic situation, i.e. there were already realized currency risks related with such credit operations (due to considerable devaluation of native currency) and solvency risks of physical entities (especially, as to the mortgage loans granted in foreign currency). Decrease in purchasing capacity of the population on the one hand, and on the other hand decrease in ability to meet payments under accepted credit obligations for the specified group of borrowers became general consequences. The above results from the Ukrainian banking system indicate that:

- From the point of view of risk level optimization for a credit portfolio of a bank, it is necessary to establish more rigid restrictions for specific ratios of currency credits granted to physical entities, whereas it is possible to tolerate some deviations to other categories of borrowers if they are supported by the bank management.
- Ukrainian banks have paid more attention to the development of consumer crediting than to crediting of the economic sector, i.e. their activity has been more focused on short-term profits instead of conducting stable work in the bank services market.

Similar steady negative trends, as the presented data in Fig.3 testify to, were caused by insignificant changes within the structure of the credits granted to non-financial corporations in the analyzed period (2006 – 2010). The basic part of the credits granted to non-financial corporation's concentrated on financing current activity (concentrating on wholesale and retail commerce, the manufacturing industry, agriculture and forestry) that gradually decreased from 85.9 % in 2006 to 80.9% in 2009.

The long-term credits granted to non-financial corporations for acquisition, construction and reconstruction of real estate decreased from 4.0% in 2006 to 2.7% in 2010 while investment activity gradually increased from 14.1% in 2006 to 15.3% in 2009. However, both of these changes are marginal. Therefore, the growth of long-term crediting in Ukraine mainly occurred through an escalation of consumer crediting, primarily mortgage lending (Fig.3), while the ratio of credits to non-financial corporation reduced the banks credit portfolios.

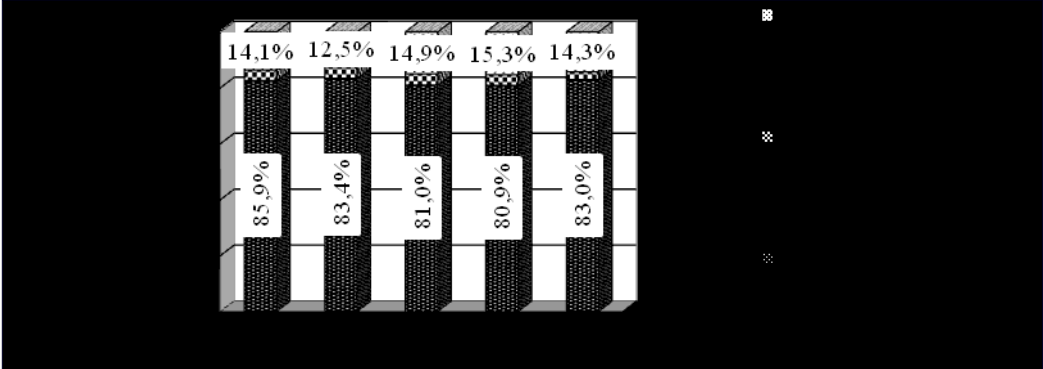


Figure 3. Credits granted by Ukrainian banks to non-financial corporation’s from 2006 to 2010 [15]

It is worth noting that active development of population crediting (mortgage, automotive and consumer credits) occurred in Ukraine at the expense of foreign interbank loans. However, during the financial crisis, banks had to re-credit under much higher rates in order to repay them. It led to the growth of mortgage rates by on average 5-7 %. In order to prevent a financial crisis, the national bank of Ukraine considerably toughened the requirements of borrowers’ financial status, and reserved consumer credit operations and credits in foreign currency which also resulted in the increase of credits price and, consequently, to lack of profitability of the domestic construction sector (being an indicator of the level of economic development).

Similar trends caused additional credit risk related to the growth of unemployment and the decrease of the population real income, especially for consumer crediting in foreign currency whose rate, as practice shows, increases as the economic situation in the country deteriorates. Consequently, one may conclude that the redistribution of long-term credit resources of Ukrainian banks in favor of consumption, instead of modernization and real estate investment, causes an increase of credit risk leading to deteriorations of efficiency and long-term development. In order to achieve conformity between credit policy and credit practice of Ukrainian banks with acceptable credit risks the latter requires the following:

- Establish more rigid restrictions on the ratio of credits granted to physical entities (especially in foreign currency), whereas it is possible to tolerate some deviations to other categories of borrowers if they are supported by the bank management.
- Redistribute long-term credit resources in favor of crediting the real economic sector. Primarily prioritize Ukrainian industries by establishing rigid conditions as to the purpose and target of credits received.
- Determine the principal types of credits, which when granted in the past, have caused unforeseen loss (for example, consumer credits in foreign currency, mortgage loans) in order to provide their rigid monitoring or to cease granting them at all.

2.2 Identification Credit Risk Trends of Ukrainian Banks in Crisis

As noted in section 3.1, the banks with more capital also must have a higher degree of protection for investors. Thus, the scientifically grounded system for estimation of the quality of a credit portfolio should be based on country specific statistical data. The ratio of reserves for credit indebtedness to bank equity capital (Table 1, Row 3) testify that even in the pre-crisis period of 2006-2007, the greatest banks of Ukraine had a credit portfolio which was risky enough (constituting 36 % in 2006 and 30 % in 2007 for major banks), and the quality of banks credit portfolios for this group was

estimated as mediocre whereas the small banks which conducted more careful credit policy, formed much better (and accordingly, less risky) credit portfolio (the value of the analyzed coefficient fluctuated from 13 % in 2006 to 14 % in 2007) which permitted to estimate banks assets quality of this group as satisfactory.

Table 1. Characterization of portfolio credit risks for Ukrainian banks. Numbers are given in % if not otherwise states while number in brackets represents the deviation from the previous year [3; 23]

INDICES	2006	2007	2008	2009	2010
1. Ratio of problem credits (overdue and doubtful) to total assets	1,31	1,06 [- 0,25]	1,95 [+ 0,89]	7,94 [+ 5,99]	9,01 [+ 1,07]
2. Ratio of problem credits (overdue and doubtful) to total credit portfolio	1,65	1,31 [- 0,34]	2,27 [+ 0,96]	9,36 [+ 7,07]	11,24 [+ 1,88]
3. Ratio of total reserves for credit indebtedness to bank equity capital:	0,27	0,25 [- 0,02]	0,36 [+ 0,11]	0,89 [+ 0,53]	0,99 [+0,10]
- for major banks;	0,36	0,30 [- 0,06]	0,42 [+ 0,12]	0,94 [+0,52]	1,05 [+0,11]
- for big banks;	0,17	0,17 [+ 0,00]	0,25 [+ 0,08]	0,99 [+0,74]	1,40 [+0,41]
- for middle-sized banks;	0,23	0,21 [- 0,02]	0,27 [+ 0,06]	0,68 [+ 0,41]	1,06 [+0,38]
- for small banks	0,13	0,14 [- 0,01]	0,21 [+ 0,07]	0,64 [+ 0,43]	0,17 [- 0,47]
4. Ratio of total reserves for credit indebtedness to total credit portfolio	4,54	3,81 [- 0,73]	5,62 [+ 1,81]	13,28 [+ 7,66]	14,96 [+1,68]
Including ratio of total reserves for credit indebtedness to total granted credits:					
- for major banks;	5,13	4,15 [- 0,98]	6,08 [+ 1,93]	14,54 [+ 8,46]	18,32 [+3,78]
- for big banks;	2,80	3,07 [+ 0,27]	4,15 [+ 1,08]	14,89 [+ 10,74]	22,23 [+7,34]
- for middle-sized banks;	5,14	4,50 [- 0,64]	6,00 [+ 1,50]	15,76 [+ 9,76]	20,06 [+4,30]
- for small banks	4,62	4,21 [- 0,41]	5,37 [+ 1,16]	15,86 [+ 10,49]	5,60 [-10,26]
5. Credit risk adjusted margin	2,71	2,65 [- 0,06]	2,11 [- 0,54]	- 1,84 [- 3,97]	- 3,50 [- 1,66]
REFERENCE VALUES:					
1. Vvolume of net interest revenues in Million UAH	13 680	22 229 [162,5]	37 552 [168,9]	53 709 [143,0]	51 925 [96,7]
2. Volume of problem credits in Million UAH	4 456	6 357 [142,7]	18 015 [283,4]	69 935 [388,2]	84 851 [121,3]
3. Total assets in Million UAH	340 179	599 396 [176,2]	926 086 [154,5]	880 302 [95,1]	942 088 [107,0]

In 2008, the value of the analyzed indices for all groups of Ukrainian banks worsened, reaching 42 % for major banks (Table 1, Row 3). In the crisis year of 2010 the value of the analyzed indices was unsatisfactory for all groups of Ukrainian banks, and for the major and big banks they reached critical values (105 and 140 % respectively), having caused a high loss ratio for the banks of this group (as previously indicated 66.7 % of major banks finished 2009 with losses, and out of the small banks only 24 % were unprofitable).

Thereby, estimation of credit risks for Ukrainian banks based on a possible loss ratio for credit operations (specified as the volume of reserves for credit risks) and the bank equity capital in 2006–2010 testify to the fact that small banks of Ukraine, having a smaller stock of financial durability carried out more weighed credit policies permitting them to generate better credit portfolios (admittedly, under lower credit risk). Major and big banks, on the other hand, trying to receive superprofits, lowered the level of the investors' protection to a critical level and had unsatisfactory quality of the assets under the ultrahigh level of their portfolios credit risk.

Other coefficients can also be used for more thorough estimation of a portfolios credit risk level. The indices that determine the ratio of the reserves for credits indebtedness (or the weighed classified loans) and the total amount of loans (Table 1, Rows 4 and 1), as well as a ratio of problem credits (overdue and doubtful) and the total loan volume (Table 1, Row 2) or a ratio of problem credits to total assets are used in both foreign, and domestic bank practice to estimate of level of a portfolio credit risk. Such coefficients, characterize the specific weight of possible losses for credit operations (specified as the reserve volume for credit risks or as volume of problem credits (delayed and doubtful)) in the structure of a bank credit portfolio (or total assets). Estimation of a portfolios credit risk for Ukrainian banks based on the specified coefficients reveals the following basic tendencies (Table 1. Rows 1, 2 and 4):

- The Ukrainian bank crisis in 2009 was preceded by deterioration of bank credit portfolios owing to an increase of the portfolio credit risk which was characterized by an increase of the specific weight of possible losses from credit operations including specific weight of losses specified for credit risk reserves (from 4.54 % in 2006 to 14.96 % in 2010), as well as the specific weight of losses specified for problem credits (from 1.65 % in 2006 to 11.24 % in 2010). In the analyzed period, the lowest value of the specified coefficients was observed in 2007, the highest one in the crisis year of 2009, and the very highest one in the post crisis year of 2010.

- The losses for problem credits grew about 5 times from 2008 to 2010 (from 2.27 % to 11.24 %) which significantly exceeds the estimate growth of probable losses specified for the credit risk reserves during the specified period (from 5.62 % to 14.96 %, i.e. more than 2 times higher). Thus, during times of economic deterioration, the losses from credit operations can exceed the reserves generated to cover them and can serve as a cause of security threat potentially leading to bankruptcy of certain banks.

- The ratio between the reserves for credit indebtedness and granted credits (Table 1, Row 4) indicates that the specified ratio was somewhat higher in major Ukrainian banks than small banks during the pre-crisis period (in 2008 6.08 % against 5.37 % in small banks). However, in the post crisis year of 2010, it was the lowest (18.32 % in major against 5.60 % in small banks).

Considering the conditions of the Ukrainian banking system and the above conclusions, it is evidence of the fact that the smaller a bank is, the more it strives to provide reserves to cover for problem credits, whereas major banks carry out a more risky crediting policy.

2.3 Relation between Credit Risk and Profitability of the Loan Portfolio in Crisis

The managerial decision making system is no less important for evaluation of the effectiveness of the management of credit portfolios, based on the correlation between such parameters as the level of income and the amount of the credit risk portfolio. Unfortunately, statistical data of Ukrainian banks do not contain information on non-standard credit indebtedness (the only available data is the cumulative sum of a reserve) which makes it impossible to calculate the specified coefficient. Besides, a discount rate can be accepted as risk-free only when the National Bank of Ukraine continuously refinances commercial banks and buys out the excessive dues through depositary auctions, which under crisis conditions are problematic enough.

The RAM indicator is used widely by foreign banks to estimate the credit risk level; its optimal (average) values are within the limits 3.0-3.5 %. In this case (Table 1, Row 5), the value of the given indicator for Ukrainian banks did not exceed 2.71 % (even during the year of 2006–2007 which was the best in the analyzed period) and in the crisis year of 2009 it reached negative values (-1.86 %) having caused unprofitability of the Ukrainian banks' activity this year. Similar negative tendencies was observed with ultrahigh mean annual interest rates for credits, as was also the case in the European countries, which were granted by banks to non-financial corporations and households (Figure 4).

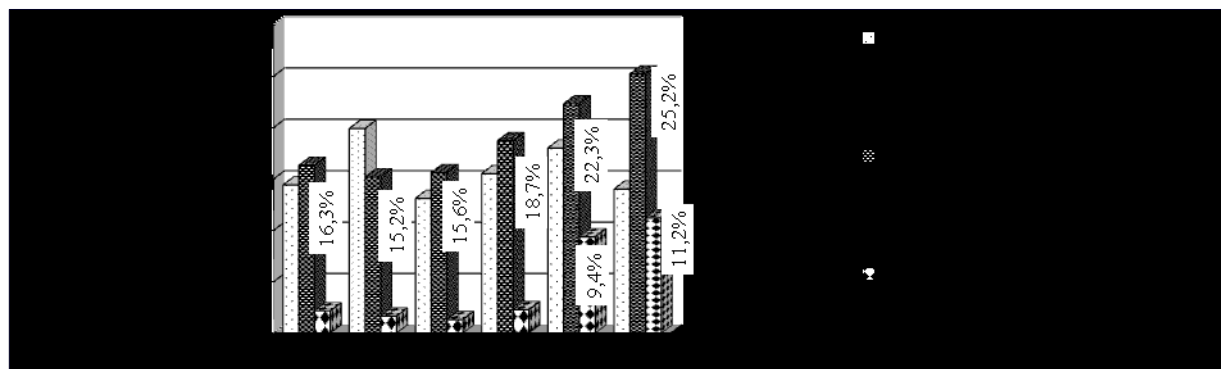


Figure 4. The changes of mean annual interest rates for the credits granted by Ukrainian banks to the economic entities (non-financial corporation's) and households in 2005 – 2010 [3; 23]

The results presented in Figure 4 prove that there exists a direct relation between the level of interest rates for bank credits and the level of the portfolio credit risk, estimated from the level of problem credits (overdue and doubtful). Namely, the lowest level of probable losses for credits (1.31 %) was observed in 2007 which was connected to the lowest level of mean annual interest rates of the credits granted by Ukrainian banks to non-financial corporation's (13.1 %) and to households (15.6 %). In the post crisis year of 2010, one could observe both the highest estimate level of a portfolio credit risk (11.24 %), and the highest interest rates of the credits granted by banks to households (25.2 %). Similar results have been obtained in previous studies (Prasolova [27, p. 170]) indicating that the Ukrainian banks in the crisis year of 2009 were at the highest level of net interest margins and loss of net assets (the most significant over the past six year period).

On the whole, the profitability and risks of a bank credit activity (Figure 8) depends on the development cycle of both the national economy and the bank system. Such interrelations was mentioned already in the work by Karl Marx [20, p.396] who stated that *"the greatest level of an interest rate is reached during crises when one has to borrow to effect payments whatever it may cost"*. The lowest level of interest rate corresponds to the period of prosperity which was characterized by the lowest credit risk level (2007) for all groups of banks, and the highest level of interest rate corresponds to the crisis (2009) under the highest level of a credit risk for almost all groups of banks. Therefore, when estimating the risks of the domestic banks activity and predicting the level of their portfolio credit risk, it is necessary to consider the development cycle of the national economy which will allow adjusting a more objective risk policy, especially during periods of predicted economic recession.

The dynamics and structure of the credit portfolio for Ukrainian banks in 2006-2010 which led to an increase of credit risks during the crisis period testify that they, to a lesser degree, have been caused by "the world crisis infection" from the globalization of the bank services market. However, the redistribution of the long-term credit resources within the Ukrainian bank system during the pre-crisis period in favor of consumption (first of all the credits granted to physical entities, the overwhelming majority of which is used to acquire foreign goods, i.e. development of foreign economies), instead of being invested into the Ukrainian real sector, which in the long term cause deterioration of bank efficiency and worsened conditions for county development. This means that the latest bank crisis of 2009 was caused by a steep increase in credit portfolio of Ukrainian banks, i.e. by the so-called "credit

boom", but also by a significant redistribution of credit resources to numerous other countries, including the USA, Ukraine and others in favor of consumption (personnel or production).

According to Canes [16], the growth of long-term investment credits into the development of a national economy, caused by a decrease of interest rates, determines the increase of occupational growth level (and, accordingly, the growth of solvent demand of the population), the increase of production volume and, as a result, the increase of economic growth (nominal GDP rates). Thus, in the long-term, the important thing is a transition from the dynamic models of bank strategy focused on gaining short-term profits using speculative financial tools and operations (including consumer credits) to a long-term bank strategy focused on the expansion of investment crediting into the development of the Ukrainian real sector or any other country.

To obtain more objective results for estimation of the dependency between a portfolio credit risk and the level of the country's economic development it is also important to study the credit risks that accompany certain spheres of bank credit investments. What this means is that each kind of economic activity of a non-financial corporation has a conventional credit risk coefficient which can be specified based on the interrelation between the specific weight of overdue credits to non-financial corporations and the level of profitability of corresponding kinds of economic activity. Comparing the probability of credit losses in certain areas of the Ukrainian economy to the corresponding levels of their profitability (Table 2), the following tendencies emerge:

- In the pre-crisis years of 2006-2008, higher profitability was accompanied by increased credit risk. In particular, in agriculture, hunting and forestry one could observe the highest level of profitability (in 2007 it reached 19.0 %) accompanied by a higher level of probable credit losses (estimated from the specific weight of overdue credits to the total volume for the area in question) which fluctuated from 2.29 % in 2007 to 4.26 % in 2008 against 0.77 to 2.90 % in all other areas.

- In the crisis year of 2009, the highest estimate levels of a portfolio credit risk were observed in areas which had become unprofitable as early as in the pre-crisis year of 2008. So, the highest level of overdue credits was noted in the field of construction (14.46 %) and in the sphere of trade and repairs (12.38 %).

- In the post crisis year of 2010, the lowest estimate levels of a portfolio credit risk were observed in the agriculture, hunting and forestry where the level of probable credit losses did not exceed 5.08 % and in transportation and communication with 3.27 % whose level of profitability was highest (14.70 % and 8.50% respectively) during the crisis period (2009).

- The growth of unprofitability of certain industry and the increase of credit risks related to crediting resulted in unemployment growth and high inflation rates. This was caused by both internal and external factors, primarily due to considerable involvement of Ukraine in the worldwide economy which led to import inflation, unemployment and a sharp fall in population purchasing power, which in turn led to significant loss of unprofitability of certain industry.

- One can assume that the financial crisis is associated with the economic crisis as the global financial crisis not only caused losses for banks but also for construction, metallurgy, the chemical industry and other businesses within the real sector. To protect the credit risk system it is necessary to prevent an unprofitable real sector and to preserve its competitiveness through state financial support of infrastructural objects as a means to safeguard workplaces. It is also important to reduce or to optimize the external commitments of the real sector.

Table 2. Weight of overdue credits to non-financial corporation's for different types of activity [3; 33]
Numbers in brackets represents deviation from previous year

ECONOMIC ACTIVITY	2006	2007	2008	2009	2010
Agriculture, hunting and forestry	3,23	2,29 [- 0,94]	4,26 [+ 1,97]	12,23 [+ 7,97]	5,08 [- 7,15]
Reference : profitability level	10,00	19,00 [+ 9,00]	12,90 [- 6,10]	14,70 [+ 1,80]	22,9 [+ 8,20]
Processing industry	1,26	0,97 [- 0,29]	2,90 [+ 1,93]	10,22 [+ 7,32]	24,10 [+ 13,88]
Reference : profitability level	5,80	5,80 [+ 0,00]	4,90 [- 0,90]	1,80 [- 3,10]	3,5 [+ 1,70]

Construction	0,76	0,60 [- 0,16]	2,11 [+ 1,51]	14,46 [+ 12,35]	11,96 [- 2,50]
Reference : profitability level	3,10	2,60 [- 0,50]	- 2,70 [- 5,30]	- 0,90 [+ 1,80]	- 1,0 [- 0,10]
Trade and repairs	1,26	0,80 [- 0,46]	2,52 [+ 1,72]	12,38 [+ 9,86]	37,10 [+ 24,72]
Reference : profitability level	12,70	13,10 [+ 0,40]	- 0,21 [- 3,31]	4,5 [+ 4,70]	9,5 [+ 5,00]
Transportation and communication	1,16	0,73 [- 0,43]	2,33 [+ 1,60]	13,56 [+ 11,23]	3,27 [- 10,29]
Reference : profitability level	9,90	9,80 [- 0,10]	6,90 [- 2,90]	8,50 [+ 1,60]	7,10 [- 1,40]
Real estate transactions	0,39	0,21 [- 0,18]	0,77 [+ 0,56]	10,09 [+ 9,32]	14,92 [+ 4,83]
Reference : profitability level	2,90	3,70 [+ 0,80]	4,00 [+ 0,30]	5,10 [+ 1,10]	- 4,2 [- 9,30]

3. Discussion

The ratio between granted credits and Ukrainian GDP testifies to an underdeveloped capital market, unavailable long-term native currency, a weak stock market infrastructure, political instability, and unpredictable financial legislation. In this environment, major Ukrainian banks, having a certain financial strength, carried out excessive aggressive crediting during the periods of economic growth in order to obtain super-profits while facing increased credit risks. However, during economic recession (characterized by the bank crisis of 2009) they turned out to be less protected from the influence of risk.

The majority of the Ukrainian banks in the crediting sphere are consumer-oriented; the major part of granted credits was to finance current activities in non-financial corporation's (credit portfolio focused on the wholesale and retail trade, the manufacturing industry, and agriculture and forestry). However, long-term credits granted for acquisition, construction and real estate reconstruction as well as for investments were insignificant (decreasing from 4.0 % in 2006 to 2.7 % in 2010). It resulted in redistribution of long-term credits in favor of consumption, including production, instead of modernization and investments in the real economic sector. In the long term, it caused an increased credit risk that was accompanied by a deterioration of bank efficiency as well as reduced conditions for future development. The bank crisis in Ukraine was preceded by considerable growth of granted credits, which occurred during a credit portfolio deterioration as overdue credits granted into the Ukrainian economy grew significantly prior to the previous year; especially in 2008-2009 when such growth multiplied mainly due to credits in foreign currency, i.e., it was accompanied by an increased currency risk.

The specified trends characterize a portfolio credit risk of Ukrainian banks, reflecting its local characteristics during the crisis and pre-crisis periods which were determined by macro- and microeconomic preconditions of an unstable economy. Overall, the results show that during an unstable macro-environment, the most optimal bank strategy concerning credit risk is credit diversification, providing a rational profitability/reliability ratio of a bank's credit operations with different degrees of risk. Thus it is important to take into account risk coefficients (profitability level and probable credit losses) whilst crediting certain industries.

Conclusions

Generalization of indices and factors that characterize the risk of credit portfolios in Ukrainian banks allows a number of conclusions of how to optimize a national bank's credit policy:

- A reliable credit policy should not only **determine the bank's risk management strategy**, but also **limit the total sum of granted credits**. The amount of granted credits should not exceed 65-70 % of the bank's cumulative assets; exceeding the specified value even in the short-term entails a substantial increase of a credit risks.

- A high risk credit strategy increases general profitability during economic growth, but also decreases liquidity and reliability due to the increased probability of financial loss whilst carrying out high risk credit operations (especially during economic recession). Therefore, **a high risk credit strategy requires a stable macro-environment** and is only realizable within short-term time periods.

- To optimize the level of risk of a bank's credit portfolio, it is necessary to **establish more rigid restrictions on the ratio of credits granted to physical entities**. However, it is possible to allow some deviations from established restrictions for other categories of borrowers if they are supported by a bank management.

- To decrease credit risks and to provide conditions for long-term development of domestic banks it is necessary to **redistribute long-term credits in favor of crediting the real economy sector**. Industries should be prioritized by **establishing rigid conditions as to the purpose and target of credits received**.

- To predict the level of a bank's credit risk it is necessary to **consider the development cycle of the national economy** which will allow an objective adjustment of the risk management policy, especially during periods of predicted economic recession and crisis.

- To form a long-term bank credit policy it is important to shift from a dynamic strategy focused on short-term profits through speculative financial instruments and operations (including consumer credits) to **a long-term strategy focused on investment into the development of the real economy sector** of the Ukrainian economy.

To sum up, taking into account the specified recommendations whilst developing the credit policy of national banks will allow not only long-term efficiency of their credit activity but also provide a stable growth of the population's solvent demand and an increased rate of economic growth (nominal GDP). In future, in order to eliminate the existing shortcomings within the risk management system for Ukrainian bank's credit portfolios, it is necessary to identify the major risk factors based on a qualitative analysis which results are used to form a reliable bank credit policy and to determine the credit risk strategy.

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