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CRISIS MANAGEMENT IN THE BANKING SYSTEM

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Introduction and research objectives:

The economic and political crisis in the country, led commercial banks to unprofitable activities. Taking into account, the crisis and the number of liquidated banks today remains unresolved question of the banking sector in Ukraine, which until now hampered by a number of factors that negatively affect its status.

The aim of the study is to identify factors that pour the activities of the banking system and to develop methods of integrated assessment of its financial status.

Methodology: regression model used to assess the financial status of the banking system with long-term horizon of its prediction.

Results: Conducted the analysis of the financial status of Ukraine banking system, basic causes of bank failures, factors that affect their financial position. Proved that the regression model shows the dependence of the financial status of the banking system of change of capital assets and real population income. The obtained value of banks performance during the crisis in Ukraine banking system correlates with statistics of certain periods.

Conclusions: The proposed methodology of the financial status assessment of the banking system, allows respond quickly to prevent crisis. This approach can be used for early diagnosis of the banks financial status.

Keywords: the banking crisis, bankruptcy, loss, financial stability, impact factors, regression model.

Formulation of the problem. In a market economy, any company under certain circumstances may find itself in a critical financial condition. The reasons for this situation may be external impacts of the environment on the banks, as well as internal deficiencies in its management system.

Over the years 2014–2015 Ukrainian economy and the banking sector suffered the deepest crisis since independence. This was due to a military conflict, Russian annexation of Ukrainian territory, and large-scale structural imbalances, accumulated over the past decade. An additional source of problems was the fact that the banking sector remained a long time without proper regulation and effective supervision. This led to a rapid increase in the number of institutions that did not intend to serve as a classic financial intermediary and shareholders considered them only as a funding instrument for related business.

For the banking system topical issue is always a qualitative assessment of indicators of its financial status and on time decision-making in the case of deterioration. Achieving financial stability and efficiency of the banks is possible by using their financial recovery. But existing approaches to assess the financial status of banks ascertain mainly the fact of the crisis and have the complexity in calculations. The situation prevailing in the banking system necessitates research and finding measures to stabilize and improve its efficiency.

Setting objectives. The article is a study of factors affecting the bankruptcy of banks and development of recommendations for the implementation of optimization models to assess their financial condition.

Analysis of recent research and publications. A significant contribution to the development of theoretical and methodical thesis of financial security in the banking sector have done such experts as: N.I. Dyba, A.M. Moroz, T.P. Ostapysyn, O.G. Koptyuh, V.S. Biloshapka [1], A. Baranowski [2] and others. In the works of these scholars considered the causes and patterns of distribution of banking crises, internal and external factors that affect its stability.

However, given the economic crisis in the country and the amount of liquidated banks today remain unresolved question of the banking sector in Ukraine is so far hampered by several factors, which affect its condition.

Main material. According to data of the NBU, the banking system of Ukraine entered 2016 with unsolved problems of 2014–2015 years [3]. On September 1, 2016 there are 100 banks in Ukraine (excluding insolvent banks), of which 25 – banks with foreign capital. During 2014–2016 years, 82 banks were withdrawn from the market, seventeen banks were withdrawn from the market in 2016, including four banks for the ownership structure, three – for violations of banking legislation in the area of financial monitoring (liquidation). Two banks chose the self– liquidation. In general, today 4 banks are in a state of insolvency and 78 banks are in a process of liquidation.

The loss of operating banks (without insolvent banks) for 4 months of 2016 has decreased by 16.7% and reached 11.5 billion UAH (13.8 billion UAH – for 4 months 2015). Loss in April compared to March 2016 fell by half to 3 billion UAH. On May 1, losses of 34 operating banks totaled 15.1 billion UAH, including in April – 4.7 billion UAH of 25 banks, with 72% of this amount being a loss of only one bank. Earnings of 75 banks were 3.6 billion UAH, while in April – 84 banks earned 1.7 billion UAH. Analysis of the financial status of the banking system confirms that the financial sector remains vulnerable to external and internal shocks. Let's consider the top 10 of most profitable banks on the July 1, 2016 in the table 1 and most unprofitable banks in the table 2.

Table 1

Top 10 of most profitable banks on the July 1, 2016 (thousands of UAH) [4]

№	Bank	Profit before tax	Profit after tax
1	RAIFFEISEN BANK AVAL	1 639 695	1 455 954
2	ALPHA-BANK	1 391 951	1 287 724
3	CITIBANK	973 411	810 306
4	PRIVATBANK	609 800	530 894
5	ING Bank of Ukraine	562 228	460 847
6	OTP BANK	530 256	471 347
7	CREDIT AGRICOLE BANK	399 024	316 068
8	OSCHADBANK	251 528	251 528
9	CREDOBANK	174 103	142 887
10	PROCREDIT BANK	167 032	124 182

So, the result of NBU diagnostic shows that 16 of 20 largest banks needed additional capitalization, according to the "Report on financial stability" [5].

Table 2

Top 10 of most unprofitable banks in Ukraine on the July 1, 2016 (thousands of UAH) [4]

№	Bank	Profit before tax	Profit after tax
1	VTB BANK	-4 955 763	-4 955 763
2	Prominvestbank	-3 046 096	-3 046 501
3	SBERBANK	-3 027 319	-3 026 362
4	Ukreximbank	-1 324 933	-1 324 933
5	UkrSibbank	-982 469	-982 817
6	UKRSOTSBANK	-577 222	-577 207
7	DIAMANTBANK	-493 160	-493 160
8	BM BANK	-396 129	-396 129
9	BANK CREDIT DNIPRO	-302 895	-280 956
10	PTB	-275 796	-137 414

It is noted that the quality of banks credit portfolio in 2015 was at its lowest historical level. According to the results of diagnostics, credits of 4–th category (probability of default is 51% – 99%) and 5–th category (default) in the credit portfolios of 20 largest banks is 53%. The banking sector remains unprofitable for 2016 due to significant contributions to reserves for covering loan losses.

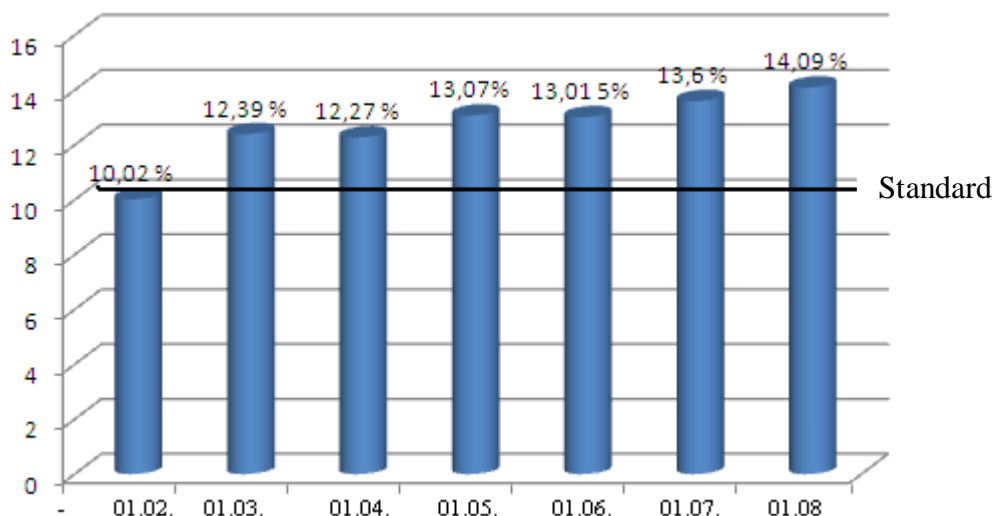
The results of NBU diagnostics allowed identifying gaps in the regulation of banking practices and identifying artificial inflating of credit quality in order to reduce allocations to reserves for active operations. According to the results was found that 16 of 20 largest banks needed additional capitalization.

Thus, considering the crisis in the banking sector of Ukraine, it is advisable to analyze the main indicators of the financial status of the banking system. Will analyze and study the impact of factors on the financial status of banks:

Regulatory capital adequacy (H_2) – (X_1) shows the bank's ability to timely and fully pay for its obligations arising from trade, credit and other monetary operations. The ratio is set to prevent excessive shifting of bank credit risk and risk of not returning bank assets to creditors and depositors. Normative values of H_2 for existing banks should be at least 10%.

The dynamics of regulatory capital adequacy (H_2), % of the banking system in 2016 is given in Fig. 1, [3].

According to Fig. 1, dynamics in the regulatory capital adequacy seems to be increasing by 4% during the period under study and is 14.9% on 01.08.2016 at the standard 10%. Therefore, calculations reflect the banking sector's ability to timely and fully pay for its obligations.



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

Fig. 1. Dynamics of regulatory capital adequacy (H2) in the banking system 01.02.–01.08.2016.

Current Liquidity – (X2). Current liquidity ratio (N5) defined as the ratio of assets with residual maturity up to 31 days for bank liabilities with residual maturity up to 31 days. This standard describes the minimum required amount of bank assets to ensure the performance of current amount of commitments within one calendar month. Normative value of H5 must be at least 40%.

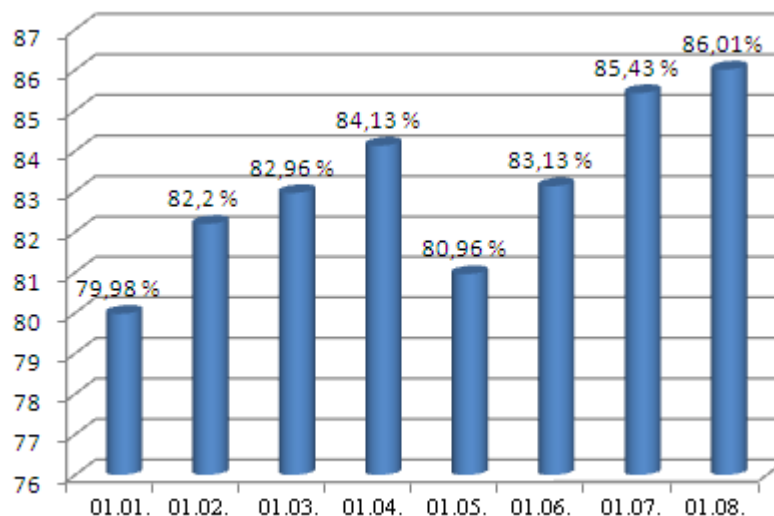
Timeliness and completeness of the performance of its functions by banking institutions and the banking system as a whole is largely dependent on their liquidity, which is one of the common quality characteristics of the bank that determines its reliability, sustainability and competitiveness.

Dynamics respect Ukraine banks liquidity ratios considered in Figure 2 [3].

In the course of business, banks are constantly exposed to liquidity risk, i.e. the likelihood of the situation of mismatch between demand and supply of money and bank insolvency of its financial obligations on time.

Moreover, the negative impact on the bank has not only insufficient liquidity but the excess liquidity as well. The low level of bank liquidity limits its ability to pay, causing the loss of customer confidence, reduces access and increases cost of external financing to maintain liquidity, and therefore also causes financial problems. Excess bank liquidity indicates its inability to effectively use available free resources and causes damage and capital wasting. Excess liquidity throughout the banking system reduces the effectiveness of instruments of monetary policy, and therefore also its effectiveness in achieving its goals. In addition, excess liquidity creates inflation in the economy.

Dynamics of Ukraine banks liquidity ratios are shown in Fig. 2, [3].



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

Fig. 2. Dynamics of Ukraine banks liquidity ratios 01.01.–01.08.2016.

Therefore, during 01.01 – 08.01.2016, the commercial banks kept liquidity ratios established by the NBU in addition, there is considerably exceeded thresholds. This indicates the excess of available to the banks short-term liquid assets over their liabilities with the corresponding deadlines.

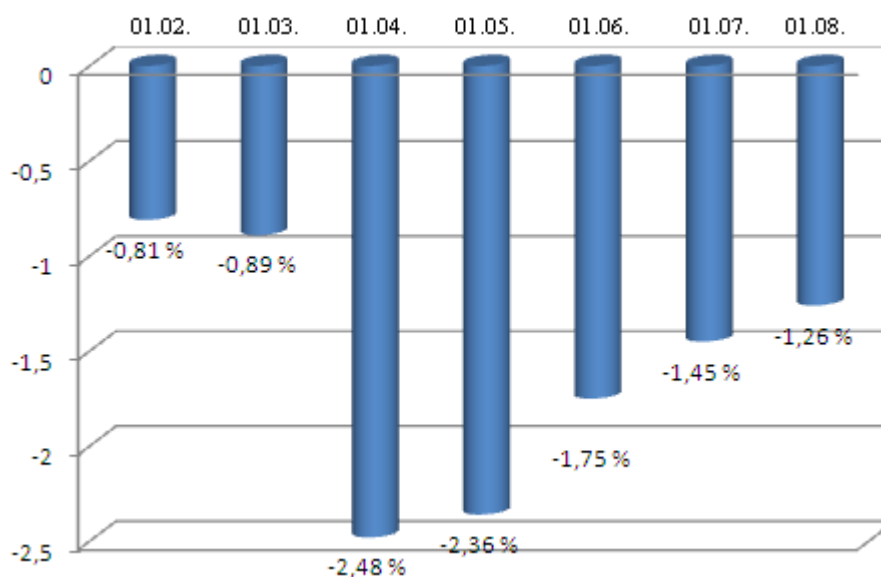
The situation shows commercial banks improving their liquidity in their accounts involving significant amounts of money but thus reducing their profits. This in turn can lead to the insolvency of the banking institution, despite its ability to meet current obligations.

Despite that, the liquidity of the banking sector is at highest historical level, bank lending is limited for 2016. Key risks that hinder the resumption of lending by banks: a significant debt burden of enterprises, still weak solvency of most sectors of the economy and high legal risks.

Return on assets, ROA – ($X_3, \%$): Return on assets ROA is one of the key indicators that allow you to provide a quantitative assessment of the profitability of the bank. Return on assets describes the ability of bank assets to generate income. The low value of the indicator may be the result of conservative credit policy or excessive operating costs.

Analysis of return on assets (ROA) is to identify the causes of high or low performance, which are not established in the previous stages, including the bank's capacity to generate non-interest income per unit of assets. Moreover, return on assets serves as integral indicator of banks profitability. This indicator reflects the performance, reliability and prospects of the bank.

The dynamics of return on assets in the banking system is given in Fig. 3 [3].



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

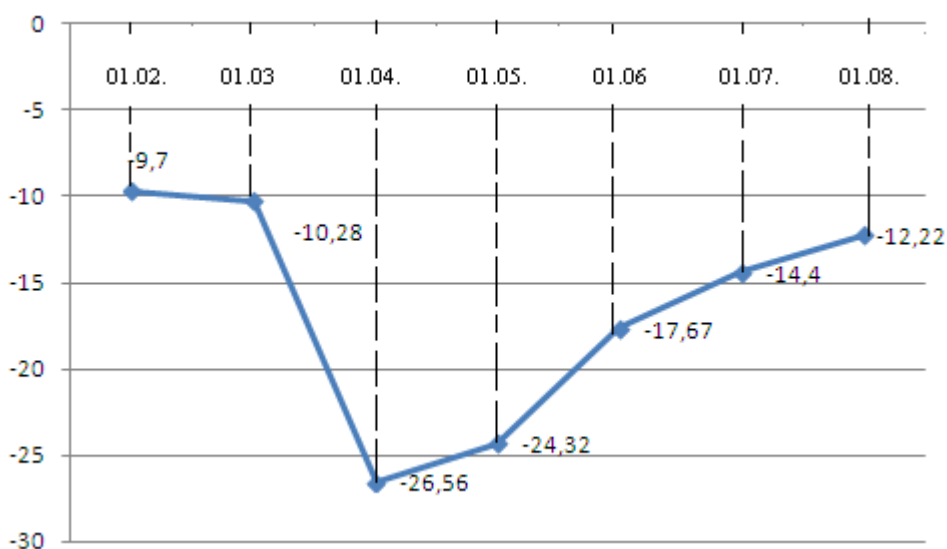
Fig. 3. The dynamics of return on assets in the banking system 01.02.– 01.08.2016 p.

Since the values of return on assets is negative for the period analyzed, the banking system of Ukraine should be considered unprofitable. These figures show loss of banking system per asset unit. Thus negative values indicate inefficient use of resources, as bank costs are higher than income. Therefore, banks gain losses.

Return on equity, %, ROE – (X4) index, which measures the profitability of the share capital. The indicator shows how efficiently used means of owners during the year. It shows the approximate size of profit, which is obtained from the shareholders equity investment. To improve the financial stability of the bank it is essential to increase its income, and as a result – profitability, which is one of the main sources of bank's equity replenishment.

Let us consider the dynamics of return on equity of the banking system during the period 01.02. – 01.08.2016 Fig. 4, [3].

The indicators of return on equity (ROE) during the period studied, show negative values in the banking system. Although the value of return on equity remains negative – they still increased by almost two times – indicating improvement in the efficiency of the Ukraine banking system. The banking system that is not getting the proper development also becomes bankrupt, which demonstrates its inability to withstand internal and external shocks and does not perform its core mission of efficient reallocation of financial resources in the economy.



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

Fig. 4. Return on equity (ROE) during period 01.02. – 01.08.2016.

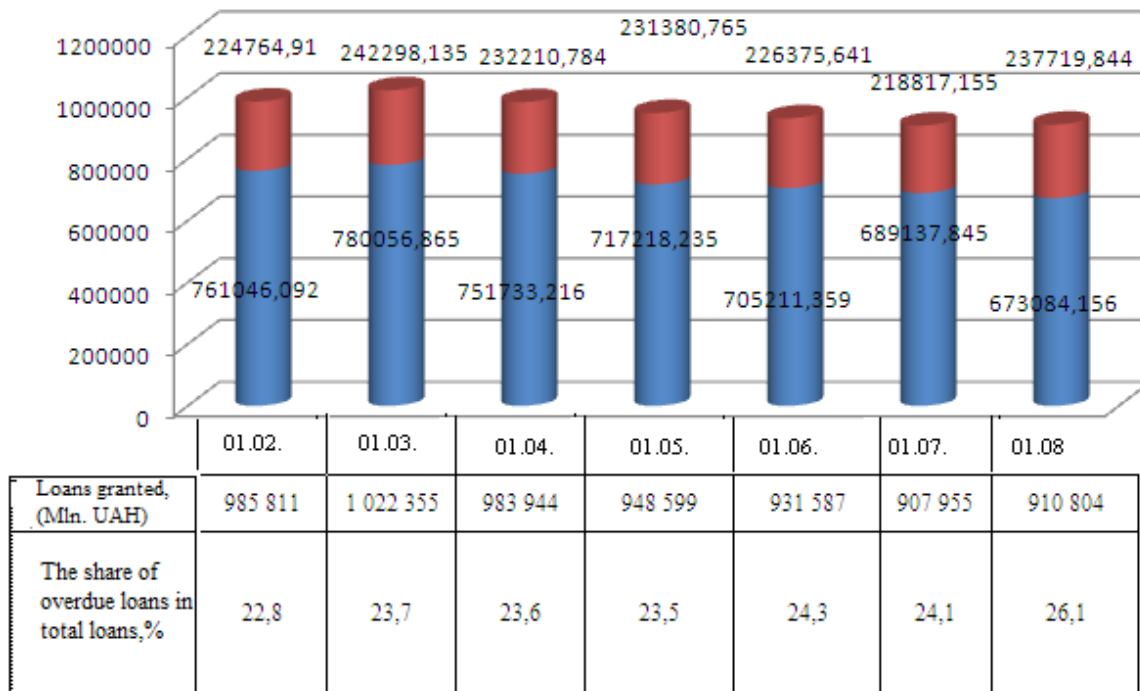
Thus, the profitability of banking capital with almost zero (0.81%) at the beginning of 2014 acquired a substantial negative value (–) 26.56% at the beginning of April 2016.

Overall, the banking system return on capital tend to improve and accounted from (–) 26.56% on 01.04.2016 to (–) 12.22% on 01.08.2016, i.e. return on equity of the banking system increased by 14.34 points. Thus, we can say that on 01.08.2016 each hryvnia in the capital of the banking system had a loss of 14 kopeck.

The sharp decline in profitability associated with high ROE volatility due to significant amounts of losses in Ukraine banks. Because of unprofitable performance of most Ukraine banks, the profit as a method of increasing the capital – becomes unavailable. In addition, ROE negative values indicate inefficient use of banking institutions capital that operate in Ukraine.

The share of overdue debts in total loans, % – (X_5). Timely repayment of debts has become a serious problem for many bank customers, which influenced the deteriorating of loan portfolios quality and increased the share of distressed assets, because of increasing of overdue debts. The main risks for the banking system concentrated in loans for individuals in foreign currency, which form the largest share in total bank loans. Strengthening of the negative impact of the identified risk factors on the stability of the banking system is possible due to deterioration of the creditworthiness and financial status of customers, entities and individuals.

According to the NBU data share of overdue debts of total loans for the period 01.02. – 01.08.2016 is given in Fig. 5, [3].



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

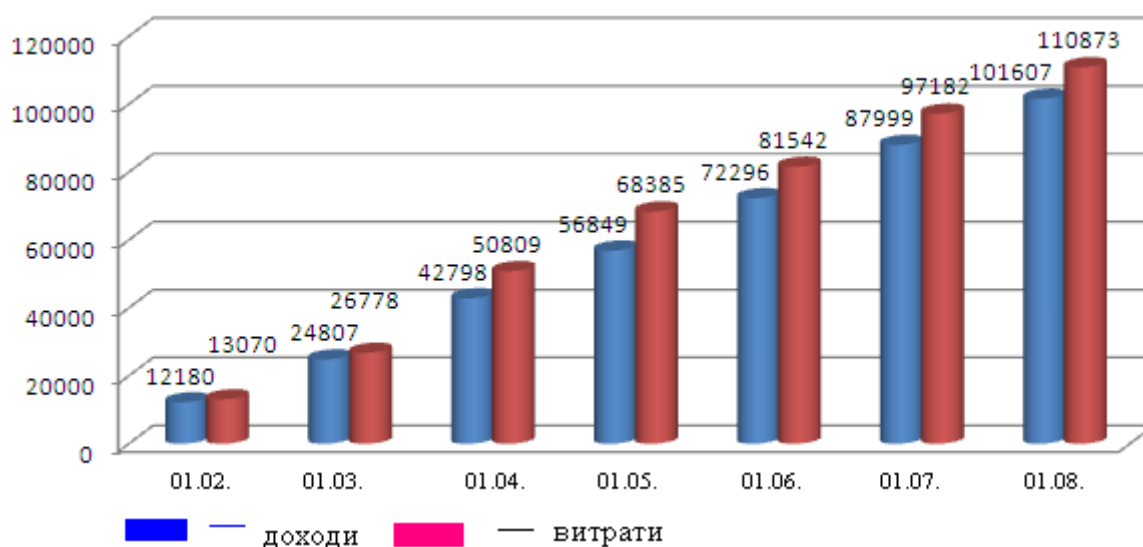
Fig. 5. Share of overdue debts of total loans for the period 01.02. – 01.08.2016

The share of overdue credit debt (excluding insolvent banks) in Ukraine in January–February 2016 increased by 1.6 percentage points – to 23.7% of the loans. Comparing to the total amount of loans: from 7.7% on 01.01.2014 to 22.1% on 01.02.2016 and 26.1% on 01.08.2016. We can see a steady trend of distrust and bankruptcy (default) – business and people do not fulfill their financial obligations to the banks. During the research period, the share of overdue credit debt increased to 12954,934 million UAH. At the end of July 2016 the amount of loans granted to residents in the annual calculation reduced by 11% (or 111551 million UAH), in comparison with February which amounted 1022355 million UAH.

Financial result – (X6 mln. UAH). Assessment of bank financial stability is based on the analysis of income and expenditure. The financial results of commercial banks determine the effectiveness of its income management, its reserves for increasing the banking profitability. The negative effects of unpredictable factors, can lead to financial losses that directly affect the degree of bank resistance.

Income and losses in the banking system during the period 01.02. – 01.08.2016 are given in Fig. 6 [3].

According to statistic of 2015, Ukraine banks income increased by 19.4% and totaled 199.2 mln. UAH, expenses increased by 34% – to 265.8 mln. UAH.



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

Fig. 6. Income and losses in the banking system during the period 01.02. – 01.08.2016 (mln. UAH)

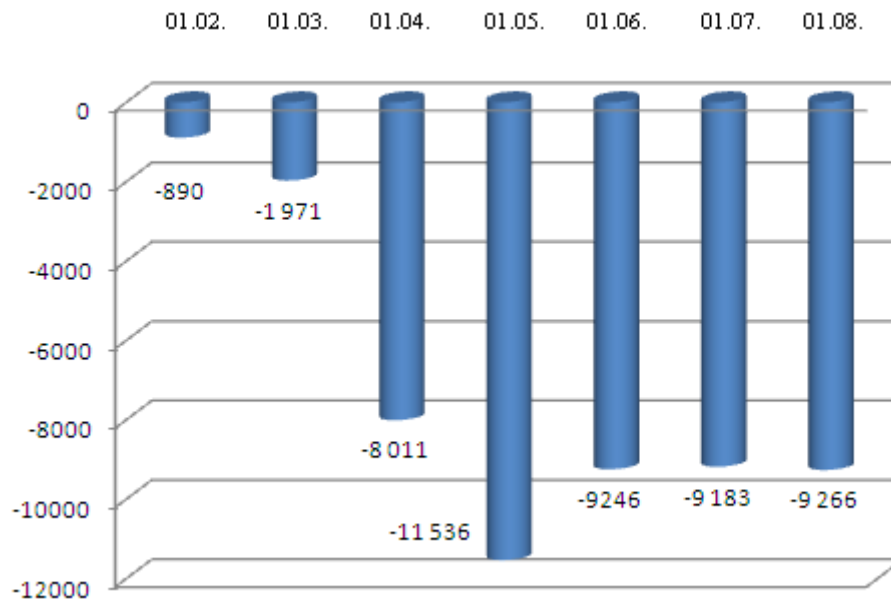
Banking system income of Ukraine during the period 01.02. – 01.08.2016 increased by 89427 mln. UAH. (101607 mln. UAH). The increase in income associated with profit from trading and higher interest income. Expenses increased by 97803 mln. UAH (110873 mln. UAH), Growth of expenses associated primarily to the increase in reserve funds allocations and administrative expenses. The financial result of the Ukraine banking system during the period 01.02. – 01.08.2016 was negative and on 01.08.2016 totaled – 9266 mln. UAH (Fig. 7) [3].

It should be noted that the vast majority of losses in early second quarter of 2016 was received in April (– 11536 mln. UAH). In the first quarter of 2016 Ukrainian banks lost 80 bln. UAH (80.89 billion. UAH loss in the first quarter of 2015).

According to the results of first quarter 2016, 28 solvent banks have worked with losses (in 2014 – 37, in 2015 – 46). Significantly reduced the number of banks that have received negative operating profit: compared to 34 banks in 2015. Instead, negative income in the first quarter 2016 was received by 10 banks (in the same period in 2015 – 7 banks).

Losses of Ukrainian banks for seven months of 2016 totalled 9.3 bln. UAH. It is 3.3 times less than it was during the same period last year, when the amount of losses reached 30.2 bln. UAH.

"Reduction of the amount of losses was exclusively due to reduction of allocations to reserves for active operations. However, the financial results of banks before the allocations to reserves and taxes in the current year is 60 % lower than in the past and totalled 13.9 bln. UAH against 34.4 bln. UAH in 2015". Banking system income in January–July this year totalled 101.6 bln. UAH, which is 13% less than last year during the same period.



Source: Constructed by the author based on the difference <http://www.bank.gov.ua>.

Fig. 7. The financial result of the Ukraine banking system during the period 01.02. – 01.08.2016 (mln. UAH).

First seven months, 33 banks have finished with losses, and 68 – with profits. Although the trend is improving – only 75 institutions were profitable in July, but due to losses in previous months, some of them referred to as unprofitable. In Ukraine, 81 banks is about to be liquidated.

Real disposable income – (X_7 , %). Real incomes are purchasing power including consumer–banking services. The deterioration of welfare affects the decrease in activity of banks and its financial stability.

Nominal incomes in Ukraine in first quarter of 2016 compared to the same period last year increased by 13.2% [6]. According to the statistical office, real disposable income, with taking into account the price factor, fell by 14.9%. Disposable income per person in the first quarter of 2016 totaled 6950.7 UAH, which is 728.5 UAH more than in first quarter of 2015. Personal expenditures in the first quarter of 2016 compared with the corresponding period last year increased by 24.3%. Population income of Ukraine in first quarter of 2016 totaled 111.3%.

Thus, the above classification factors are common to all commercial banks, which significantly affect the achievement of sustainable financial status. To assess the financial status of the banking system, multifactor regression model is proposed, which involves determining its actual status [7]:

$$Var_I = 0,273752 + 0,0124*Factor_X_1 + 0,01315*Factor_X_2 + 0,07*Factor_X_3 + 0,00849*Factor_X_4 - 0,004*Factor_X_5 + 0,00001*Factor_X_6 + 0,0024*Factor_X_7.$$

Indicator of financial stability was taken as a figure of effective (Y). This figure was determined using Harrington verbal–numeric scale [8]. Intervals of qualitative assessments for this indicator presented in table 3.

Table 3

Limits of financial stability areas – modified Harrington scale

The limits of the stability zone	Characteristics of the stability zone
From $<-0,1$	Default
From $-0,1$ to $0,20$	Crisis
From $0,21$ to $0,40$	Low critical level
From $0,41$ to $0,60$	Mid level
From $0,61$ to $0,80$	Sufficient level
More then $0,81$ to 1	High level

Indicators of financial status of Ukraine banking system is presented in Table 4.

Table 4

Indicators of financial results of Ukraine banking system of 01.01.2008 – 01.01.2016.

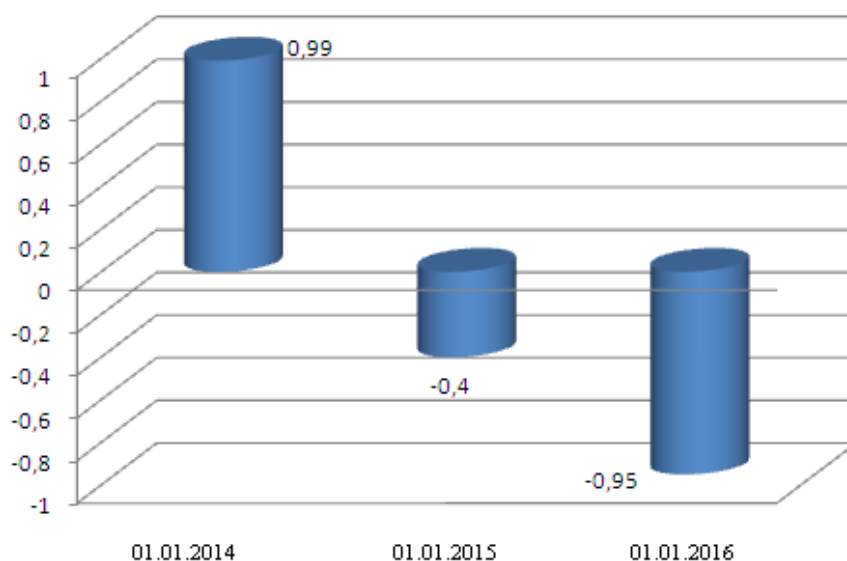
Date	X_1	X_2	X_3	X_4	X_5	X_6	X_7
01.01.2008	13,92	0,7516	1,5	12,67	1,3	6 620	112,5
01.01.2015	15,6	0,8086	-4,07	-30,46	13,5	-52 966	101,9
01.01.2016	12,74	0,7991	-5,46	-51,91	22,1	-66 600	76,5

According to Table 4, will calculate indicators for assessing the financial status of the banking system:

$$Var_I(Y_1)_{01.01.2008} = 0,99; Var_I(Y_2)_{01.01.2015} = -0,4; Var_I(Y_3)_{01.01.2016} = -0,95.$$

The evolution of the financial condition of Ukraine banking system present in Fig. 8.

The result ($Var_I(Y_1)_{01.01.2008} = 0,99$) of regression model confirms that the financial status of Ukraine banking system of for the period 01.01.2008 was high and its development was dynamic. At that time, Ukraine banking system of had 175 banks and their paid authorized capital amounted 42,873 bln. UAH, which amounted to about 6% of country GDP. Average share capital, for one bank increased from 7.76 million euros in 2003 to 33.60 mln. euros in 2007, that is more than 4.3 times [9]. Therefore, we can say that in this period Ukraine banking system was much stronger than that of 01.08. 2016.



Source: Developed by the author

Figure 8. Dynamics of financial status of Ukraine banking system on 01.01.2008 – 01.01.2016

According to calculations ($Var_I (Y_2)_{01.01.2015} = -0,4$) on 01.01.2015 the financial status of Ukraine banking system was at low (critical) level. During this period, the number of banks that had banking licenses of Ukraine National Bank decreased from 180 to 165 banks. Thus, 2014 was the year of challenges for Ukrainian banking system, the hryvnia depreciated by half; depositors withdrew 29% of deposits. During the year, 33 banks become insolvent, 17 of which were liquidated. Taking into account the liquidation of some banks and loss-making activities, the amount of equity for banks in 2014 decreased by 44.58 billion UAH on 01.01.2015 and totaled 148,023 mln. UAH.

Significant outflow of term resources from the start of the year negatively affected the liquidity and solvency of the banking system. Thus, during 2014 amount of liquid assets decreased by 3.76% (6.08 bln. UAH). And, on the first of January 2015 totaled 155.64 bln. UAH.

Following the 2014, financial result of BSU was negative – losses reached almost (-) 52 966 mln. UAH. Negative financial result of 2014 was primarily due to the deterioration in asset quality of banks, which in turn necessitated subsequent formation of reserves. Thus, the volume of provisions of 2014 compared to 2013 was increased by 269.25% (75 322 mln. UAH) and on 01.01.2015 totaled 103297 mln. UAH. Taking into account the significant share of foreign currency loans in the credit portfolio and quality of service for credit borrowers, banks were forced to form reserves, which in turn negatively affected the performance and profitability of banks as well as their financial status.

The result ($Var_1(Y_3)_{01.01.2016} = -0,95$) of the financial status on 01.01.2016 shows that Ukraine banking system was in deep crisis. During research period there was a significant deterioration in the financial stability of banks and the withdrawal of a number of banking institutions from the market.

Ukraine banking system (including insolvent banks) in 2015 received (-) 66,600 bln. UAH loss, excluding insolvent banks. According to the result of 2015, of NBU, the share of overdue debt increased to 22.1%. The amount of overdue debt in the credit portfolio of the NBU on 01.04.2016 totaled 232,21 bln. UAH. Based on the results of 2015 income of Ukraine banks grew by 19.4% and totaled 199.2 bln. UAH, but expenses increased by 34.4% – up to 265,8 bln. UAH. Therefore, the financial result of the year was negative and on first of January 2016 was (-) 66.6 bln. UAH. This only proves that in the banking system remains number of issues that have suspended development banks and undermined confidence in the banking as a whole.

Next indicators for assessing the financial status of the banking system on 01.04. – 01.08.2016 accumulated in Table 5.

Table 5

Indicators of financial results of Ukraine banking system on 01.04.2016 and 01.08.2016.

Date	X1	X2	X3	X4	X5	X6	X7
01.04.2016	12,7	0,8413	-2,48	-26,25	23,6	-8011	85,1
01.08.2016	14,09	0,8601	-1,26	-12,22	26,1	-9266	85,1

According to Table 5 it is possible to calculate indicators for assessing the financial condition of the banking system on 01.04.2016 and 01.08.2016

$$Var_1_{01.04.2016}(Y_4) = 0,1; Var_1_{01.04.2016}(Y_5) = 0,29.$$

In first quarter of 2016 Ukrainian banks had a loss in the amount of 8,0 bln. UAH (80,89 bln. UAH in first quarter of 2015) table 4. Income in the first quarter of 2016 compared with the corresponding period of 2015 decreased by 28.9% and totaled 42,8 bln. UAH, expenses decreased by 33.1% and totaled 50.8 bln. UAH. Results show that the stability of the banking sector is gradually recovering during 2016 but stability will largely depend on the ability of banks to minimize risks.

Conclusions

1. Results show that the financial position of the banking system was on a high critical level and on 01.01.2016 indicator defined deep crisis. Bank sector is contains many problems caused by the crisis.

2. To identify the financial condition of the banking system and individual banks, regression model of optimization implementation process was used to enhance financial stability. Given model adapted to display negative values of which are quite often, result of assessing the financial situation of crisis banks.

Regressive model has proven ability to identify the actual financial position of the banking system and the ability to influence its outcome.

3. Stability of Ukraine banking system and its development in modern terms is largely dependent on the use of analytical methods by commercial banks based on economic–mathematical modeling. It allows analyzing and studying the strategic directions of banks development, providing real and comprehensive evaluation of the bank performance, identifying their strengths and weaknesses, identifying concrete solutions to problems that arise.

References:

1. M. Dyba, A. Moroz, T. Ostapyshyn, O. Koptiukh, V. Biloshapka (2014) Heneza bankivskykh kryz [Tekst]: monohrafiia;/ red.: M. Dyba, A. Moroz; DVNZ “Kyiv. nats. ekon. un–t im. V. Hetmana”. – Kyiv: KNEU, 578.
2. O. Baranovs'kyj (2014) Specyfika finansovoi' bezpeky v bankivskij sferi // Visnyk Nacional'nogo banku Ukrai'ny, 9 (223), 17–23.
3. Finansovi rezul'taty bankiv/ Nacional'nyj bank Ukrai'ny. [elektronyj resurs], rezhym dostupu//<http://www.bank.gov.ua>.
4. Rejting bankov Ukrainy – TOP 100 – Forinsurer/<http://forinsurer.com/ratings/banks>.
5. Bankivska kryza/ Nacional'nyj bank Ukrai'ny. [elektronyj resurs], rezhym dostupu//: <http://www.bank.gov.ua/control/uk/publish/article>
6. Naiavnyi dokhid naseleattia Ukrainy/ Derzhavna sluzhba statystyky. [elektronyj resurs], rezhym dostupu//<http://www.dkrp.gov.ua/>.
7. V. Kravchenko, O. Kotsiurba (2015) The prevention of the banking institutions' bankruptcy [The International Multidisciplinary Congress “KNOWLEDGE IS POWER, POWER ISKNOWLEDGE!”] //Published by order of the Scientific Presidium of the Council of the International Scientific Association “Science & Genesis”. Scientific and practical edition: Vienna, Austria, 27 (07), 204–211.
8. Harrington, J. (1965) The desirability function // Industrial Quality Control, 21(10), 494 – 498.
9. Issledovanie informacionnoi prozrachnosti bankov Ukraini (2008). Sovmestnoe issledovanie Standard & Poor's i Agenstva finansovih iniciativ. – Kyiv.
10. Sovmestnoe yssledovanye Standard & Poor's y Ahenstva fynansovikh ynytsyatyv. [elektronyj resurs], rezhym dostupu <http://finbalance.com.ua/category/ukrayinska-economika>