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ASSESSMENT OF PROBLEM CREDITS' REAL LEVEL IN THE BANKING SECTOR OF KAZAKHSTAN

Abstract. Macroprudential supervision of banking activities is the primary task of supervisory authorities. But due to the specifics of Kazakhstan's information disclosure practices, the authors attempted to develop a model for assessing the level of credit risk. A preliminary theoretical analysis of foreign theory and practice. Taking into account the specifics of the Kazakhstan banking sector, the main regressors (household debt level, structure of bank liabilities, level of interest rates on loans for enterprises of the non-financial sector, level of profitability of these enterprises, etc.) were calculated to calculate the current level of problem loans. In the article, in order to better understand the dependencies between economic processes and identify problems of the financial system, the goal is to develop a mathematical model of the credit risk of a problem loan (NPL) based on the collection of data from financial statements. The evaluation of the significance of the factors of the obtained regression equation on the basis of T-statistics was carried out, and the adequacy of the model was carried out on the basis of the F-criterion. The approximation error is calculated and the possibility of applying the obtained model is proposed.

Keywords: credit risk, problem credit (NPL), second-tier banks, regulator, dynamic model.

Introduction. Macroprudential supervision is necessary as a means enabling: to identify in a timely manner the sources destabilizing financial and economic processes; predict the likely level of threats and risks; take measures identical to crisis phenomena [1]. The practice of prudential regulation of second-tier banks (STB) of Kazakhstan showed the weakness of the system in terms of information disclosure, in turn, allowing a formalized approach to meeting the requirements of the regulator [2]. Risks that are not fully appreciated form a misconception of the regulator about the state of the banking sector [3]. In this connection, the measures taken, both of the regulatory plan and of direct support, will be either inadequate or belated character.

Main part. Research question: the regulator's assessment of the level of credit risk based on the identification and quantitative assessment of key factors in the formation of problem assets. This will contribute to a better understanding of dependencies in the economy and the identification of problems in the financial system.

Objective: to develop a mathematical model for predicting the level of credit risk, based on the collection of data from the financial statements provided by the STB to the National Bank of the Republic of Kazakhstan (NBRK) on a monthly basis.

The NPL coefficient was used as a simulated credit risk, as it shows the already realized credit risk (current losses of the bank). The model will be a multifactorial multiple regression equation. The development of a qualitative regression model includes the following main steps: determining the formula of the regression equation, determining the regressors of the model, analyzing the quality of the constructed model and diagnosing it for adequacy to the empirical data [4].

To determine the formula of the regression equation and the composition of exogenous factors, foreign works were studied in the field of determining indicators for early warning of crises and modeling

credit risk levels. So, in studies carried out within the framework of international institutions [5, 6, 7] and state organizations [8, 9, 10, 11] in the period up to 2008, non-parametric models are used to identify leading macroeconomic indicators, or if there is no linear relationship between macrofactors and endogenous parameter apply logit or probit models. The developed models are mainly aimed at identifying currency risks. At the same time, studies were conducted by independent organizations and scientists [12,13, 14,15], in order to build a model of monitoring financial stability based on an analysis of the sovereign debt crisis using an econometric apparatus.

With the onset of the global financial crisis, it became apparent that the previously developed forecasting schemes could not be applied, since a number of indicators were limited (the sovereign debt risk and currency risk were studied) and specific (time series are based mainly on data from Asian countries). Despite the shortcomings, the experience gained was laid in the basis of subsequent scientific research in identifying early indicators of crisis phenomena [16,17,18,19].

In later studies, a signaling approach was used to build an early warning system for risks, and not only the financial sector, but also the real economy was evaluated. The indicators include macroeconomic indicators - the growth rate of GDP, inflation, interest rates, money supply - the aggressive growth of these indicators served as a signal of a rise or fall in the next 18 months [18].

Some scholars [19] examined the impact of external shocks on the financial sector of the country, built their model gave significant results in determining the depth of the crisis in one country or another, but not received in identifying compelling depth assessments of the crisis indicators.

In addition to scientific papers on the development of systems for the early detection of crisis situations in the financial sector, studies of foreign central banks in the field of determining macroeconomic factors and predicting the level of credit risk have been studied [20,21,22].

We identified common approaches used in modeling. Parametric analysis methods are used, most of the risk prediction is carried out within the framework of linear regression. Macroeconomic indicators are used as exogenous variables, risk indicators - GDP growth rate, unemployment rate, inflation rate, interest rates on bank loans (in Greece, the model includes real interest rate, inflation rate is excluded from the equation), national currency exchange rate change. When using panel data in an econometric model, the composition of independent variables is expanded by including specific regressors describing individual features of banking institutions, for example, asset growth rates, market share, the ratio of deposit and loan portfolios, and others. Some models include lag variables, since a change in the value of a regressor may affect the modeled value not in the current period, but with a certain time gap - a lag [23].

The European Central Bank conducted a study of spatio-temporal data series of 80 countries, from 2001-2010. The constructed model, the linear regression equation, yielded the following results: the main factors for increasing problem loans are GDP growth rates, feedback, but there is a direct relationship with lag variables with a gap of 4 periods, interest rates - a direct relationship; the higher the rates, the higher the proportion of problem loans, the national currency, the dynamics of stock prices - is important in countries with developed stock market. The effect of the currency exchange rate was twofold, if in the country crediting in national currency was predominant, and loans in foreign currency were less than the average value for the entire sample, devaluation reduced the level of problem loans, and vice versa.

In determining the regression formula, the approach applied by the ECB was used. The equation of the estimated regression is as follows (dynamic model):

$$NPL_t = \beta_0 + \beta_1 * x_{1t} + \beta_2 * x_{2t} + \beta_3 * x_{3t} + \dots + \beta_n * x_{nt} + \varepsilon_t \quad (1)$$

where β_n – the coefficient in front of the corresponding endogenous variable, t is the annual values of the indicators; NPL_t – the share of loans with overdue debt on the principal and/or accrued interest over 90 days in the aggregate loan portfolio of banks (excluding established provisions for them).

A time series of data on the NPL share and selected factors was collected for 2008-2014, data for 2015-2016. not included, since during this period there was an artificial decrease in the share of problem loans. In the period up to 2008 there is no statistics on loans with overdue debts on the principal debt and/or accrued interest.

Based on international experience and the specificity of the influence of internal factors on the development of the banking system of Kazakhstan, we selected the following indicators (regressors): the

ratio of non-performing loans and loans to total gross loans (NPL); the ratio of loans in foreign currency to gross gross loans (L_SKV); the growth rate of the financial intermediation depth ratio (L/GDP); the ratio of household debt to GDP (ID/GDP); corporate debt value (DC); the ratio of total loans and borrowings (excluding loans extended to other banks and organizations carrying out certain types of banking operations) to customer deposits (LDR); the ratio of foreign currency liabilities to total liabilities (VP); the ratio of earnings before interest and taxes of non-financial corporations to assets (ROA); growth rate of money supply (M2). To analyze and build a regression model, quarterly data for the period from 2008 was used. In 2017 Baseline data are taken from a number of sources: the official site of the National Bank of the Republic of Kazakhstan; official website of the Committee on Statistics of the Republic of Kazakhstan.

In most cases, not all the regressors of the equations collected in the first stage are significant, as they may not be related to the dependent variable. In addition, the possible presence of multicollinearity between the selected factors must be taken into account. To determine the closeness of the relationship and its direction, between the level of the NPL and the selected factors, we will conduct a correlation analysis. Let us compare the calculated correlation coefficients between one pair and many pairs of regressors, in order to determine the statistical relationships between them (Table 1).

Table 1 - Correlation matrix of potential model regressors

L SKV	L/GDP	ID/GDP	LDR	VP	ROA	DC	M2
L SKV	1.0	0.7	0.8	0.6	0.9	0.2	0.6
L/GDP	0.7	1.0	1.0	1.0	0.9	0.5	0.5
ID/GDP	0.8	1.0	1.0	0.9	1.0	0.3	0.6
LDR	0.6	1.0	0.9	1.0	0.8	0.5	0.5
VP	0.9	0.9	1.0	0.8	1.0	0.2	0.7
ROA	0.2	0.5	0.3	0.5	0.2	1.0	-0.1
DC	0.6	0.5	0.6	0.5	0.7	-0.1	1.0

Note - calculated by the author according to the source [24]

To determine the multicollinearity of potential factors, let us find the determinant of the inter-factorial correlation matrix. If the determinant of the matrix is close to zero, the stronger the correlation relationship, which in turn results in ineffective results of multiple regression. On the contrary, the closer the determinant is to unity, the less is the interrelation of factors [25]. The determinant of the matrix is calculated using the matrix calculator - matrix.reshish. The program calculates the determinant by reducing the matrix to a stepwise form, and then multiplying the elements of the main diagonal [26]. The determinant of the correlation matrix of potential regressors is $\Delta = 0.00001182$, therefore, it is necessary to exclude interdependent factors. Table 2 shows the pairwise correlation coefficients between the level of non-performing loans and the potential factors of the regression equation.

Table 2 - Correlation coefficients between the NPL and potential regressors

Indicators	L_SKV	L/GDP	ID/GDP	LDR	VP	ROA	DC	M2
NPL	-0.47	-0.91	-0.86	-0.94	-0.79	-0.46	-0.48	0.71

Note - calculated by the authors according to the source [24]

Their criteria are ranked by the Cheddok Scale:

0.1 <R (NPL _ Y) <0.3: weak;

0.3 <R (NPL _ Y) <0.5: moderate;

0.5 <R (NPL _ Y) <0.7: noticeable;

0.7 <R (NPL _ Y) <0.9: high;

0.9 <R (NPL _ Y) <1: very high.

Due to the fact that the correlation coefficient has a rather complicated distribution, we use the t-test (Student's t-test) to determine the most significant parameters of the regression equation. As a result, Pearson's coefficients between the NPL and the share of household loans in GDP, the LDR ratio, the cost

of loans and profitability of enterprises in the non-financial sector of the economy are the most significant at the five-percent level (Table 3).

Table 3 - Dynamics of indicators - regressors of the regression equation

Date	NPL	ID/GDP	LDR	ROA	DC	Date	NPL	ID/GDP	LDR	ROA	DC
1Q_2008	3.8	21.0	212.7	5.5	22.6	4Q_2012	21.8	10.2	119.5	3.7	17.6
2Q_2008	4.6	19,3	202.8	8.6	31.7	1Q_2013	22.4	10.2	109.7	3.7	16.3
3Q_2008	5.6	17.5	181.6	7.3	87.4	2Q_2013	22.7	10.8	110,1	3.1	17.5
4Q_2008	7.5	16.8	199.6	3.5	72.4	3Q_2013	22.6	11.1	114.1	3.1	20.5
1Q_2009	9.0	17.9	164.8	3.0	84.2	4Q_2013	22.3	11.7	117.9	3.2	20.8
2Q_2009	15.1	17.5	161.0	2.6	174.4	1Q_2014	23.9	12.1	113.2	2.5	19.4
3Q_2009	18.7	17,2	138.4	3.7	93.1	2Q_2014	22.0	12.2	110.4	3.6	22.2
4Q_2009	21.6	15.1	130.8	3.7	35.2	3Q_2014	18.3	11.9	108.1	3.3	22.1
1Q_2010	24.5	13.9	122.0	3.8	17.8	4Q_2014	13.2	11.0	110.7	2.3	20.2
2Q_2010	25.6	12,7	118.2	4.5	21,9	1Q_2015	13.2	10.6	114.8	1.3	21.3
3Q_2010	26.3	12.2	121.3	3.9	18.6	2Q_2015	10.7	10.6	109.7	2.5	22.2
4Q_2010	24.2	11,2	120.4	4.3	17,2	3Q_2015	9.7	11.0	103.2	-1.6	21.1
1Q_2011	25.9	10.6	114.5	4.6	43.3	4Q_2015	8.4	11.1	99.5	0.4	18.8
2Q_2011	25.2	10.4	114.8	4.7	6,4	1Q_2016	8.8	10.5	97,4	2.6	33.5
3Q_2011	23.8	9.7	113.1	4.9	13.8	2Q_2016	8.3	10.4	93.5	4.1	36.7
4Q_2011	23.1	9.6	118.2	4.1	22.4	3Q_2016	8.3	10.6	90.7	3.4	40.1
1Q_2012	23.9	9.5	110.0	4.7	17.0	4Q_2016	7.1	10.6	89.5	3.6	39.0
2Q_2012	23.5	9.4	113.3	4.7	20.8	1Q_2017	8.1	10.6	91.3	3.8	46.7
3Q_2012	23.5	9.8	119.0	4.0	27.2						

Note - compiled by the author by source [24].

The experience of foreign researchers in this field also confirms the results of the choice, the dependence between the considered macroeconomic indicators in countries with identical specifics of the economy and the financial market [27].

In the econometric model of the ECB, there are lag variables, in particular the lag dependent variable NPL (t-1), this parameter is entered into the equation from the position that the level of problem loans of the previous period, with the constancy of the other macro factors, has a greater impact.

However, taking into account the formal nature of the measures taken by second-tier banks in meeting the requirements of the regulator to reduce the proportion of problem loans, the inclusion of this parameter in the model will not be effective. The calculated Pearson coefficient between non-performing loans (NPL) and lagged NPL variables (t-1), loans with overdue debts (t-1) with the inclusion of the period 2015-2016 confirms our assumption (Table 4).

Table 4 - Correlation coefficients between NPL, lagging variables NPL (t-1), overdue loans (t-1)

	NPL	NPL (t-1)	Overdue loans (t-1)
NPL	1		
NPL (t-1)	0.819333	1	
Overdue loans (t-1)	0.84424	0.984127	1

Note - calculated by the author according to the source [24].

As a result, the regression equation is as follows:

$$NPL_t = b_0 + b_1 * ID/GDP + b_2 * LDR - b_3 * ROA - b_4 * DC + \alpha \quad (2)$$

where, α is the regression error

The coefficients were calculated using the Data Analysis package in Microsoft Excel. An assessment of the significance of the regression parameters yielded the following results. T-statistics showed a greater

significance of the first and second regression coefficients, since the probability of a statistical hypothesis (Table 5): $H_0: b_j = 0$ when adopting a 5% level of significance, 4.88% and 4, 41% are quite small.

Table 5 - Results of T-statistics

Indicators	Ratios	Standard error	t-statistics	P-Value	Lower 95%
Y-intersection	47.46318	2.273348	20.87809	5.42E-16	42.74854642
ID/GDP	0.14129	0.359117	0.39344	0.06978	0.048860545
LDR	0.19145	0.04039	0.72898	0.00010	0.127476667
ROA	-0.11131	0.486796	-0.22867	0.82123	-0.12086711
DC	-0.04313	0.018131	-0.23723	0.81467	-0.04419036

Note - calculated by the author according to the source [24].

The model was tested for regression adequacy on the basis of F-statistics. F-criteria is determined by the ratio of ESS and RSS values, normalized to their degrees of freedom m and $n-m-1$: $P(F > 45.26) = 2.60841E-10$ (Table 6). Since there is a low probability, the hypothesis of regression inadequacy can be discarded.

Table 6 - analysis of variance

Indicators	df	SS	MS	F	Significance F
Regression	4	1153.047	288.2617	45.26672	2.60841E-10
Remainder	22	140.0976	6.368072		
Total	26	1293.144			

Note - calculated by the author according to the source [24].

Let us evaluate the quality of the regression equation using the error of absolute approximation:

$$\bar{A} = \frac{\sum |Y_i - Y_x| / Y_i}{n} * 100\% \quad (3)$$

where Y_i is NPL; Y_x - predicted NPL; n - number of observations.

Table 7 - presents baseline data for non-performing loans, a simulated NPL level and a deviation for each date.

Table 7 - Calculation of the error of the absolute approximation of the regression equation

Observation	Predicted NPL	Remains	NPL	Observation	Predicted NPL	Remains	NPL
1	3.16392	0.6645	3.82842	15	23.8928	-0.1391	22.7011
2	4.9085	-0.3301	4.57836	16	22.9827	0.14167	23.1244
3	9.1165	-3.4818	5.63473	17	24.5332	-0.6353	23.4598
4	6.27183	1.24289	7.51472	18	23.8825	-0.4227	23.5254
5	12.7597	-3.7521	9.00756	19	22.799	0.72641	23.7537
6	13.1951	1.85845	15.0535	20	22.7229	-0.9257	23.8793
7	17.7789	0.94881	18.3161	21	24.5946	-2.1583	23.8979
8	19.7831	1.82925	18.7277	22	24.4965	-1.7954	24.1846
9	21.7103	2.76669	21.6124	23	23.6629	-1.0602	24.477
10	22.4915	3.10011	21.7971	24	22.8519	-0.5096	25.2238
11	22.052	4.22087	22.0414	25	23.7673	0.11198	25.5916
12	22.3366	1.84803	22.3423	26	24.1724	-2.1311	25.919
13	23.3943	2.5247	22.4363	27	24.6765	-6.3604	26.2728
14	23.5063	1.71749	22.6027	$\bar{A} = 8.7\%$			

Note - calculated by the author according to the source [24].

Given the error $\bar{A} = 8.7\%$, this is less than the standard minimum level of 15%, so the resulting equation can be used as a regression.

Checking the regression model for the presence of autocorrelation, based on the Durbin-Watson criterion, gave a negative result, but the resulting coefficient $DW = 0.956$ is at the minimum level $DL = 0.95$.

As a result of correlation and regression analysis, the following regression equation was obtained:

$$NPL_t = 47.46 + 0.14 * ID/GDP + 0.19 * LDR - 0.11 * ROA - 0.043 * DC + \alpha \quad (4)$$

where $\alpha = \pm 8.7\%$.

The statistical parameters of the equation are at an acceptable level: R-squared - the coefficient of determination is 0.89; standard error 2.52 (Table 8); F-criterion is much higher than the critical value and is equal to 45.2. The minus of the equation is the small significance of the coefficients of the second and fourth regressors.

Table 8 - Regression Statistics

Indicators	Meanings
Plural R	0.944278
R-squared	0.891661
Normalized R-squared	0.871963
Standard error	2.523504
Observations	27
Note - calculated by the author according to the source [24].	

Based on the resulting equation, we will calculate the NPL according to the regressors in 2015-2016, the results are presented in Figure 1.

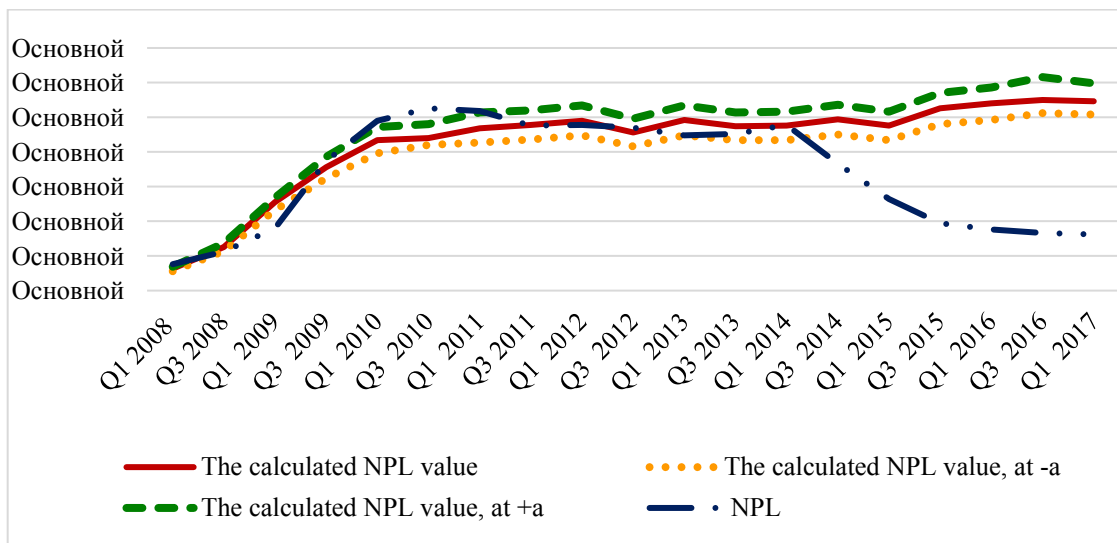


Figure 1 - Assessment of the level of NPL, %

Note - compiled by the author according to the source [24].

Modeling the level of credit risk using the multiple regression equation yields the following range of $25.5\% < NPL < 30.3$. This level is much higher than the official data of second-tier banks on problem loans. The range of possible values of NPL with $\alpha = \pm 8.7\%$ is given in table 9.

According to the National Bank, the share of non-performing loans in 2017 was 7.1%. The decrease in this indicator is due, firstly, to the introduction of a mandatory ratio that limits the share of loans with overdue debts at the level of no more than 10% of the loan portfolio. At the same time, indicators for non-performing loans having a period of delay on the principal debt or remuneration from 30 to 90 days were canceled. It is possible to transfer part of non-performing loans to loans with overdue loans from 30 to 90 days.

Table 9 - Range of possible NPL level

Date	Calculated value of NPL	Calculated NPL value, with a = (+ 8.7%)	The calculated NPL value, with a = (- 8.7%)	NPL level, according to RBO
4Q 2014	24.4	26.5	22.3	13.2
1Q 2015	23.8	25.9	21.7	13.2
2Q 2015	24.6	26.8	22.5	10.7
3Q 2015	26.3	28.6	24.0	9.7
4Q 2015	26.8	29.1	24.4	8.4
1Q 2016	26.9	29.3	24.6	8.8
2Q 2016	27.5	29.9	25.1	8.3
3Q 2016	28.1	30.5	25.6	8.3
4Q 2016	28.3	30.8	25.8	7.1
1Q 2017	27.9	30.3	25.5	8.1

Note - calculated by the author according to the source [24].

Thus, our assumptions that the real level of credit risk, expressed in the share of loans with overdue principal and / or accrued interest in total loans, is higher than those reported in the financial statements of banks based on the results obtained. This fact is also confirmed in government programs to improve the financial sustainability of the banking sector of the Republic of Kazakhstan, where the regulator recognizes the potential non-performing loans, taking into account restructured loans, at a level of 25% of the banks' loan portfolio, the regulator assesses based on a detailed analysis of the assets of the largest banks [28, p.4].

According to the study of the influence of macroeconomic factors on the financial system by the National Bank of the Republic of Kazakhstan in the form of a survey of financial market participants, there are three factors that have a negative impact on the financial system of Kazakhstan: the exchange rate adjustment of the national currency, the growth of inflation and unemployment. (Figure 2).

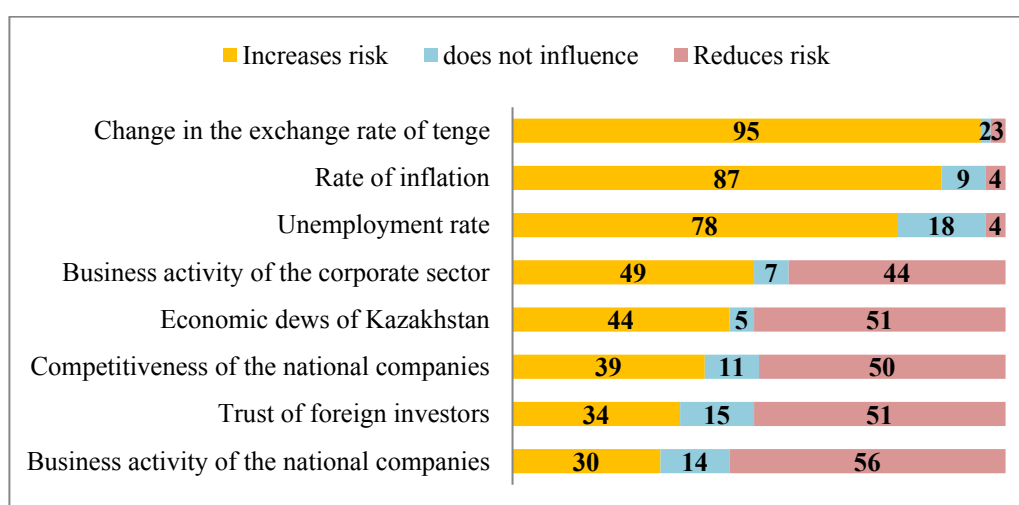


Figure 2 - Effect of environmental risk factors,%

Note - compiled by the author by source [24].

Regressors of the equation take into account the impact of negative trends in the whole economy. The fall in prices for major export products is accompanied by a weakening of the national currency, which primarily affects the bank's currency position (VP). The resulting rise in prices for imported products leads to an increase in the level of inflation and, accordingly, to a rise in the cost of borrowing in the non-financial sector (DC). Higher remuneration rates result in lower profitability of enterprises (ROA) and inability to service liabilities. Imbalances in the structure of lending, the predominance of consumer loans (lending to the sphere of trade) are mainly short-term, are explained in the equation by coefficient (LDR).

Conclusion. Thus, the crisis in the banking sector is manifested in the deterioration of the quality of the loan portfolio, the growing share of non-performing loans leads to the need to increase reserves for possible losses and significantly capitalize banks. The banking system of the country is vulnerable to the

dynamics of the foreign exchange rate, at this stage of development it is one of the main macroeconomic shocks which destabilizes the banking system of the country. Banks, raising interest rates by including a high risk premium, further aggravate this problem, forming a vicious circle. Understanding this fact is necessary to develop effective measures to prevent crisis trends in the banking and real sectors of the economy.

The resulting regression equation can be used by the regulator to estimate the real level of problem loans, in order to develop a plan of measures to improve the banking sector.

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ҚАЗАҚСТАН БАНК СЕКТОРЫ ПРОБЛЕМАЛЫҚ НЕСИЕЛЕРІНІҢ НАҚТЫ ДЕҢГЕЙІН БАҒАЛАУ

Аннотация. Қазақстан қаржы нарығы континенталды үлгі бойынша қалыптасады. Осы жағдайда банктік сектор нақты нарық субъектілерін қаржыландырудың негізгі көзі болып табылады. Отандық нарықтағы капитал ағындарының қозғалысы банктік несиелер механизмі арқылы жүзеге асырылды. Осыған байланысты, ел экономикасы тиімді дамуының кепілі коммерциялық банктер негізгі қызметтерін сәтті орындауы болып табылады.

Банк қызметінің макропруденциялық қадағалауы - қадағалау органдарының басты міндеті. Бұл қадағалау Базель келісімдерінің қағидаларына негізделген. Қазақстанның ақпаратты ашу тәжірибесі ерекшелігіне байланысты, авторлар несиелік тәуекел деңгейін бағалау үлгісін әзірлеуге тырысты. Алдын-ала шетел теориясы мен тәжірибесіне теориялық талдау жүргізілді. Қаржы нарығын реттеуде Еуропа Одағы мен АҚШ-ғы жаңа енгізілімдер тәжірибесі неғұрлым қызықты болды. Арнайы қадағалау орган құруының мақсаты тәуекелдерді ескерту және т.б. болып табылады. Нәтижесінде бұл қадағалау субъектілерінің тізімін кеңейтуге және қадағалау органының өзінің қызметіне бақылауды күшейтуге әкеп соқты. Халықаралық және мемлекеттік ұйымдар шеңберінде озық индикаторларды анықтау бойынша жүргізілген зерттеулер параметрлік емес үлгілер немесе логит/пробит үлгілері қолданылған. Уақыт өте келе бірқатар индикаторлар шектеулі және ерекше болды. Бірақ бұл кемшіліктерге қарамастан, бұл тәжірибе кейінгі ғылыми ізденістердің негізіне алынды. Жаһандық қаржы дағдарысы мен Қазақстандық банк секторының ерекшелігін ескере отырып, авторлармен проблемалық несиелердің ағымдағы деңгейін есептеу үшін негізгі регрессорлар (үй шаруашылығы қарызының деңгейі, банк міндеттемелерінің құрылымы, қаржылық емес сектор кәсіпорындарының несиелері бойынша пайыздық мөлшерлемелер деңгейі, аталмыш кәсіпорындардың тиімділік деңгейі және т.б.) анықталды. Мақалада экономикалық процестер мен қаржы жүйесі мәселелерін айқындау арасындағы тәуелділіктерін жақсы түсіну үшін, қаржылық есептіліктен алынған деректерді жинау негізінде проблемалық несиенің (NPL) кредиттік тәуекелі математикалық үлгісін әзірлеу мақсаты қойылған. Алынған регрессия бағалануы Т-статистика негізінде жүргізілді. Факторлардың маңыздылығы теріс нәтиже берді, осыдан 5 пайыздық деңгейде регрессия коэффициенттері маңызды екені көрсетілді. Өз кезегінде үлгінің барабарлығы F-критерий негізінде тексерілді. Бағалау регрессия тепе-теңсіздігі гипотезасының төмен пайыз екені көрсетілді. Абсолюттік аппроксимация қатесі 8,7% тең болды. Қолайлы деңгей шегіндегі теңдеу статистикасының параметрлері, атап айтқанда: детерминация коэффициенті-0,9, стандартты қате-2,5. Аппроксимация қатесі есептелген (8% шегінде) және алынған үлгіні қолдану мүмкіндігі ұсынылған.

Жұмыс істемейтін кредиттердің үлес салмағы өсуі банктерді резервтер өсіруге және жинақтауға мәжбүрлейтіні айқындалған. Бұл өз кезегінде несиелер қоржынының сапасын нашарлатады және елдің банк секторындағы дағдарыс құбылыстарына әкеледі. Қазақстан банк жүйесі шетелдік валюта бағамының өзгеруіне қатысты осал болып отыр. Сондай-ақ, банктер пайыздық мөлшерлемелерді, тәуекел үшін жоғары сыйақыны қоса алғанда, арттыруға мәжбүр, сондықтан бұл мәселе одан әрі тереңдетіледі. Осы факторларды ұғыну ел экономикасында дағдарыстық үрдістерді болдырмау үшін пәрменді іс-шаралар әзірлеуі қажет.

Түйін сөздер: несиелік тәуекел, проблемалық несиелер (NPL), екінші деңгейдегі банктер, реттеуші, динамикалық үлгісі (моделі).

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ОЦЕНКА РЕАЛЬНОГО УРОВНЯ ПРОБЛЕМНЫХ КРЕДИТОВ БАНКОВСКОГО СЕКТОРА КАЗАХСТАНА

Аннотация. Финансовый рынок Казахстана функционирует согласно континентальной модели. И в этих условиях основными источниками финансирования субъектов реального рынка является банковский сектор. Движение потоков капитала на отечественном рынке осуществлялось посредством банковского кредитного механизма. В этой связи залогом эффективного развития экономики страны становится успешное выполнение коммерческими банками своих ключевых функций.

Макропруденциальный надзор банковской деятельности является первостепенной задачей надзорных органов. Этот надзор базируется на принципах Базельских соглашений. Но в связи со спецификой казахстанской практики раскрытия информации авторами произведена попытка разработать модель оценки уровня кредитного риска. Предварительно проведен теоретический анализ зарубежной теории и практики. Наиболее интересным в регулировании финансового рынка явился опыт нововведений в странах Европейского Союза и США. Создание специального органа надзора преследовало цель предупреждения рисков и др. В последствии это привело к расширению списка субъектов надзора и к усилению контроля за деятельностью самого надзорного органа. Исследования, проведенные в рамках международных и государственных организации, по выявлению опережающих индикаторов использовали непараметрические модели либо логит/пробит модели. Со временем ряд индикаторов стал ограниченным и специфичным. Но несмотря на данные недостатки, данная практика легла в основу последующих научных изысканий. Авторами с учетом глобального финансового кризиса и особенностей казахстанского банковского сектора выявлены основные регрессоры (уровень задолженности домашних хозяйств, структура пассивов банка, уровень процентных ставок по кредитам для предприятий нефинансового сектора, уровень рентабельности данных предприятий и другие) расчета текущего уровня проблемных кредитов. Для лучшего понимания зависимостей между экономическими процессами и выявлению проблем финансовой системы поставлена цель – на основе сбора данных из финансовой отчетности разработать математическую модель величины кредитного риска проблемного кредита (NPL). Оценка полученной регрессии произведена на основе Т-статистики. Значимость факторов дала отрицательный результат, отсюда следует, что на 5 процентном уровне значимы коэффициенты регрессии. В свою очередь адекватность модели проверялась на основе F-критерия. Оценка показала низкий % гипотезы неадекватности регрессии. При этом отсутствует в модели автокорреляция. Ошибка абсолютной аппроксимации равна 8,7%. Параметры статистики уравнения в пределах приемлемого уровня, а именно: коэффициент детерминации - 0,9, стандартная ошибка - 2,5. Рассчитана ошибка аппроксимации (в пределах 8%) и предложена возможность применения полученной модели.

Выявлено, что рост удельного веса неработающих кредитов заставляет банки наращивать резервы и докапитализироваться. Это в свою очередь ухудшает качества ссудного портфеля и приводит к кризисным явлениям в банковском секторе страны. Банковская система Казахстана становится уязвимым по отношению к изменениям курса иностранной валюты. Также банки вынуждены повышать процентные ставки, включая в них высокую премию за риск, что еще больше усугубляет данную проблему. Осмысливание данных факторов необходимы при разработке действенных мероприятий для предотвращения кризисных тенденций в экономике страны.

Ключевые слова: кредитный риск, проблемный кредит (NPL), банки второго уровня, регулятор, динамическая модель.

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