



# ***FINANCE AND BANKING***

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## **THE GLOBAL MISBALANCE INFLUENCE ON BANK'S CREDIT RISK**

*General views on factors of global misbalances appearance were analyzed. Hypotheses of interdependence between the level of credit risk and indicators which characterize global misbalances were formulated, and their test by building statistical models was made. The proposals for management decision making by modeling results were created.*

*Keywords:* credit risk, global misbalances, internal debt, gold reserves, internal savings, gross investments, Gross Domestic Product, non-performing loan (NPLs), current account's balance.

*Шульга Н., Черный А., Гусач А. Влияние глобальных дисбалансов на кредитный риск банков. Проанализированы существующие взгляды на факторы возникновения глобальных дисбалансов. Сформулированы гипотезы зависимости между уровнем кредитного риска банков и индикаторами, которые характеризуют глобальные дисбалансы, а также осуществлена их проверка путем построения статистических моделей. Разработаны предложения относительно принятия управленческих решений по результатам моделирования.*

*Ключевые слова:* кредитный риск, глобальные дисбалансы, внешний долг, золотовалютные резервы, внутренние сбережения, валовые инвестиции, валовой внутренний продукт, проблемные кредиты, баланс текущего счета.

**Background.** Increasing internationalization of financial business processes has resulted in formation of global economy and financial markets. These changes have a profound and extremely dangerous nature because appearing of problems in one or more countries is rapidly spreading

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to other market participants. The equilibrium on the financial market was violated due to macroeconomic imbalances in the economy, which was one of the key reasons of the developing of international financial crisis, which led to significant financial losses. Loses of the United States only from the financial crisis in 2008–2009 according to Federal Reserve Bank vary in the range of 6 to 14 trillion dollars or 50–120 thousand dollars per every American [1].

Largely the financial crisis was a result of the credit risk approach, which was threatening for the activities of many banks and led to their bankruptcy. On the level of credit risk of banks along with other factors affect global imbalances, which cause the necessity for scientific research in this area.

**Analysis of recent research and publications.** The global imbalance problem became under scrutiny of scientific researches and practitioners starting with 2003. Numerous scientific publications by B. Bernanke, M. Duli, P. Harber, T. Robinson, N. Rubini, M. Stolbov, D. Degterev [2], V. Popov [3], A. Apokin [4] and others were devoted to disclosure of global imbalances' nature and causes. However, one important scientific and practical problem is still left behind scientists' attention, i.e. assessing the impact of global imbalances on the credit risk of banks, which extent losses reached catastrophic dimensions. The scientific and practical importance of the problem determines the importance and necessity of this research.

**The aim** of the article is denoting of interdependence between the reasons of global imbalance appearance and the level of banks' credit risk. To achieve this, following **objectives** were put and agreed:

- clarifying the meaning of "global imbalances" based on a critical analysis of the different perspectives of scientists;
- systematization of the causes of global imbalances' appearance;
- formulation and empirical testing of scientific hypothesis as for link between the indicators characterizing the global imbalances and the level of banks' credit risk;
- development of proposals targeted on the mitigation of global imbalances' impact on the credit risk of banks;

The **object** of the research is global imbalances generated by individual countries (key operators of financial market), which include the US, China, EU countries, especially Germany.

**Materials and methods.** During the study there were used methods of comparison, graphical, tabular, Economics and Statistics.

**Results.** A critical analysis of scientific professional sources indicates that most scientists in the definition of "global imbalances" focus on individual factors of their occurrence. In particular, Russian scientists Pillars M., D. Dehterev argue that global imbalances is a combination of large current account deficits of payments' balance of well-developed countries and large-scale positive balance of accounts in developing countries [3]. Other scholars emphasize

on centers of global imbalances. Under the last point they understand the positive current account surplus in China and some other developing countries, and corresponding to deficit in the current account of the US and other western countries covered by capital inflows from the south [5]. While the interpretation of the concept of "global imbalances" it is appropriate to consider not one but a combination of factors that lead to their appearance. Thus, global imbalances are disproportions between the development of real and financial sectors of the economy, on the one hand, and the actual volume of production of material goods and their "consumption" concerning each country, on the other hand, leading to disruption of financial balance in the global economy in general as well as separate countries. Global imbalances arise from disproportions in the economy of the major operators of the world market, such as the US, China, EU countries.

Generalization of studies conducted by foreign scientists allowed us to systematize the factors of global imbalances.

*Availability of fundamentally different tendencies for consumption in some countries.* D. Soros recently noticed that private consumption in the US is at 70 per cent level of GDP, while in China does not exceed 36 per cent of GDP [6]. Limiting consumption in some countries (especially China) leads to the accumulation of gold reserves at a rate that exceeds the needs of the country, which is considered sufficient in the amount of 10 % of GDP, or 6 months' imports. This policy is called non-equilibrium rate. These reserves are invested, as a rule, in short-term treasury bills of foreign countries [7].

*The imbalance in consumption of key financial market operators leads to a large deficit in the current account in one countries and a significant surplus – in others.* The main imbalance in the global world economy resulted from deficits in the current account operations in the US, which in 1998–2012 years was in the range of 0.5–2 % of the world gross domestic product and capital inflows (including China, because its reserves are mainly invested in short-term US government bills), which led to transformation the US into the largest world's debtor [7]. From 1993 to 2012, the account of current operations in the US had a negative value, while in China – positive. Significant ongoing current account surplus in recent years in some countries led to increasing the demand for financial assets, especially, those of the USA, which was a powerful impetus for the development of mortgage lending, securitization of assets, the emergence of innovative financial instruments (credit swaps and credit notes) in this country, as well as in the whole world. This process was contributed by the liberal policies of supervisors regarding the regulation of banks and other financial institutions [5].

*Deepening of imbalance between the financial and real economy.* The excessive growth of different types of financial assets became one of the most serious risks of modern economic development. Experts McKinsey Global Institute estimate, financial depth Economics (traditional value of

financial assets and world GDP) increased from 261 % in 1990 to 356 % in 2010. In addition, it is necessary to take into consideration the substantial volume of trade with derivatives, which is more than 11 times exceeds the global GDP [1].

*Significant amount of government debt in some countries.* The crisis led to the aggravation of the debt problems in many countries. In January 2012 the US national debt totaled 15.23 trillion dollars, accounting for 100 % of GDP; Germany – 80.4 % of GDP, while in China – 25.8 %. [8]. The threat of sovereign debt countries' crises could lead to a new wave of corporate debt crises, especially in the banking sector, which could lead to a crisis of corporate debt. This, in turn, can cause a new wave of global economic crisis that accompanied the collapse of the Eurozone, collapse of the international monetary and financial system, political and social crises [6].

*Irrational behavior of investors, which results in substantial difference of gross domestic investment levels and savings for separate countries.* Global imbalances significantly increased the danger of risks that build up in the national financial system of foreign countries' economy, creating channels of their transmission and rapid multiplication in the global economy. On average over 2005–2008 relative magnitude of global imbalances was estimated at 0.5 % of world GDP. In fact, much of this percentage is the "bad" investments (including purely speculative) that financed by excess savings of developing countries, especially China [3].

Based on a study of factors of global imbalances five research hypotheses were firstly formulated, the original data to verify that presented in the *table 1*.

*The first Hypothesis* – there is a relationship between the share of problem loans in total loan balances (on models represented as Y), on the one hand, and the ratio of current account country's surplus / GDP (in models represented as X1), on the other hand.

To determine the level of credit risk indicator of NPLs' share in total loans was used, data about which was published by the World Bank in 2000–2012.

*The Second Hypothesis* – there is a relationship between the share of NPLs in total loans, on the one hand, and the coefficient of public debt / GDP (in models represented as X2), on the other hand.

*The Third Hypothesis* – there is a relationship between the share of NPLs in total loans, on the one hand, and the rate of gross domestic investment / GDP (in models represented as X3), on the other hand.

*The Fourth Hypothesis* – there is a relationship between the share of NPLs in total loans, on the one hand, and the rate of gross savings / GDP (in models represented as X4), on the other hand.

*The Fifth Hypothesis* – there is a relationship between the share of NPLs in total loans, on the one hand, and the rate of foreign exchange reserves / GDP (in models represented as X5), on the other.

Table 1

**Key indicators of global imbalances and the part of NPLs in a total volume of loans in the USA, China, Germany for 2000–2012, %**

Country	Index	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
USA	Coefficients of country's balance current account / GDP	-4.21	-3.88	-4.32	-4.68	-5.33	-5.94	-6.01	-5.09	-4.76	-2.72	-3.26	-3.14	-2.8
	The share of problem loans to gross loans	1.1	1.3	1.4	1.1	0.8	0.7	0.8	1.4	3	5.4	4.9	4.1	3.9
	Coefficients state debt / GDP	60.1	55.9	57.3	59.5	61.3	62.7	63.3	63.9	64.8	76	87.1	95.2	99.4
	Coefficients gross domestic investment / GDP	20.58	18.99	18.37	18.35	19.36	19.91	20.15	19.17	17.54	14.11	15.2	14.8	14.9
	Coefficients gross domestic savings / GDP	17.86	16.25	14.39	13.62	14.33	14.85	16.05	14.21	12.87	10.93	11.98	11.7	-
	Coefficients international reserves / GDP	1.3	1.27	1.49	1.66	1.61	1.5	1.66	1.99	2.07	2.91	3.39	3.58	3.66
China	Coefficients of country's balance current account / GDP	1.71	1.31	2.44	2.8	3.55	5.94	8.58	10.13	9.12	5.23	5.15	1.9	2.3
	The share of problem loans to gross loans	22.4	29.8	26	20.4	13.2	8.6	7.1	6.2	2.4	1.6	1.1	1	0.9
	Coefficients state debt / GDP	13.8	16.4	17.7	18.9	19.2	18.5	17.6	16.2	1.6	17	17.7	33.5	25.8
	Coefficients gross domestic investment / GDP	35.12	36.27	37.87	41.2	43.26	42.1	42.97	41.74	44.05	48.24	47.74	48.3	48.1
	Coefficients gross domestic savings / GDP	36.83	37.58	40.3	44	46.82	48.04	51.55	51.87	53.17	53.48	52.81	51.2	49
	Coefficients international reserves / GDP	14.33	16.61	20.48	25.36	32.25	36.84	39.84	44.26	43.48	49.14	48.97	44.5	40.53
Ger	Coefficients of country's balance current account / GDP	-1.72	0	2.03	1.92	4.67	5.07	6.28	7.48	6.24	6.01	6.16	5.72	7
	The share of problem loans to gross loans	4.7	4.6	5	5.2	4.9	4	3.4	2.7	2.9	3.3	3.2	3	-
	Coefficients state debt / GDP	60.9	59.7	58.8	60.4	63.9	65.7	68	67.6	64.9	66.8	74.5	82.4	80.4
	Coefficients gross domestic investment / GDP	22.3	20.35	18.07	17.85	17.63	17.27	18.13	19.26	19.38	16.54	17.34	18.23	17.2
	Coefficients gross domestic savings / GDP	20.18	19.93	19.98	19.63	22.28	22.31	24.6	26.65	25.54	22.26	23.1	23.83	23.9
	Coefficients international reserves / GDP	4.64	4.37	4.44	4	3.56	3.68	3.85	4.09	3.82	5.43	6.58	6.5	7.32

Source: calculated by World Bank [8]

In order to test these hypotheses a panel of these macroeconomic indicators of the US, China and Germany for the 2000–2012 was formed. To identify the influence of factors on the dependent variable traditionally regression analysis is used. However, the pooled model did not allow revealing significant influence of individual indicators on the share of NPLs in total loans granted to individual observations. This led to the necessity of using the econometric modeling package *Gretl* 1.9 [9], which allowed building a regression model based on panel data. The results of parameter model estimation are shown in *table 2*; *3*. In order to evaluate effect of differences between countries the model of panel data with individual deterministic effects was selected (fixed effect model – FE-model):

$$y_{it} = a_i + x'_{it}b + u_{it}.$$

In these model parameters  $a_i$ , that differs for different objects of observation. Contents of  $a_i$  is to reflect the impact of latent variables that reflect the individual characteristics of the subject-country on-explained variable  $Y$ . These latent variables can be, for example, as in our investigation, global imbalances. Models with different combination of factors were investigated. The model with the highest level of adjusted value of the coefficient of determination R-squared is shown in *table 2*, and the results of model adequacy checking are shown in the *table 3*.

Table 2

**The overall regression model of factors influence of global imbalances on the credit risk of banks (according to the USA, China and Germany)**

Parameters of model	Coefficient	Standard error	<i>t</i> -statistics	<i>P</i> -meaning*
cost	42.1467	4.7961	8.7877	<0.00001
x1	-0.592519	0.133091	-4.4520	0.00014
x3	-0.867587	0.15592	-5.5643	<0.00001
x3_1	-0.266257	0.150399	-1.7703	0.08840
x5	-0.144769	0.124137	-1.1662	0.25412
x5_1	-0.25721	0.124987	-2.0579	0.04976
Y_1	0.0298472	0.106289	0.2808	0.78108

\* Indicates a significant influence on the specified significance level. Italics indicate a significant influence of the setting on a significance level of 5 %.

Table 3

**The adequacy indicators of regression model of factors influence of global imbalances on exposure to credit risk (according to the USA, China and Germany)**

Residual sum of squares	29.14940	Standard model error	1.058835
<i>R</i> -squared	0.981529	Corrected (adjusted) <i>R</i> -squared	0.975846
<i>F</i> -criterion (8, 26)	172.7026	<i>P</i> -meaning ( <i>F</i> -criterion)	1.55e–20
Log. credibility	-46.46186	Criterion Akaike	110.9237
Criterion Schwarz	124.9219	Criterion Hennen-Quinnan	115.7559

According to the results a significant impact on the share of NPLs in total loans issued have such factors as coefficients of country's balance of current account / GDP, gross domestic investment / GDP ratio to a lesser extent – international reserves / GDP. In particular, the p-value, which describes the probability of error when you reject the null hypothesis significance of regression coefficient, by these indicators is: 0.00014 factor for x1 (the ratio of current account surplus countries and GDP) <0.00001 for the current value of the factor x3 and 0.08840 for factor x3 lagged 1 (ratio of gross domestic investment and GDP); 0.25412 for the current value of the factor 0.04976 and x5, x5 by a factor of log 1 (the ratio of international reserves to GDP). This allows making a conclusion of confirmation of the first, the third and the fifth hypotheses.

During the investigation (based on aggregate data of economies of the three different countries) the second and the fourth hypothesis about the presence of a significant relation between the share of NPLs in total loans, on the one hand, and the ratio of public debt to GDP, gross savings to GDP, on the other hand, was not confirmed. On the basis of the test for the difference in constants group revealed significant differences between countries, which caused the necessity to conduct further analysis of the peculiarities of the level of credit risk factors disclosed in the above hypotheses formulated in separate countries by methods of interrelated analysis of dynamic series, for example, using models of vector auto regression.

For the analysis of dynamic series it is important to clarify the question as for their stationarity state, which refers to the time invariance of mathematical expectation, variance and covariance of the time series. The stationary requirement is necessary to obtain unbiased estimates of model's coefficients by the method of least squares [10]. In order to detect the stationary of time series it is appropriate to use unit root tests, namely Augmented Dickey-Fuller (Augmented Dickey-Fuller test – ADF).

For achieving stationarity of the dynamics data it is advisable to take differences of the conclusive observation and incorporate them into the model as a new variable. Thus, As a result of the use of Dickey-Fuller Test to the country data in the USA the presence of non-stationary for almost all variables except of X1 (the same for Germany) was recognised. The results of the analysis of stationarity of the dynamic time series by country are given in *table 4*.

Thus, the application of conventional regression methods is to them incorrect. In case of failure to use common conventional methods of regression to multivariate time series analysis it is necessary to conduct model-based vector autoregression analysis, which is an econometric model that reflects the evolution and interdependence between the variables of multivariate time series, generalizing the one-variant autoregressive models. The model VAR (Vector Auto Regression) all variables are considered

simultaneously by including for each variable of equation that explains the evolution (dynamic) of variable based on the previous value of the variable and lagged values of other variables in the model. Since the investigated time series are non-stationary, but there are their respective differences, which create stationary series, i.e. for constructing models these differences are used.

Table 4

**Stationary of the variables determined by Augmented Dickey-Fuller Test in the USA, China and Germany**

Variable	Presence of stationary (for the accepted level of significance 5 %)		
	USA	China	Germany
Y	in 1-st difference	in 1-st difference	in 1-st difference
X1	on levels	in 2-d difference	in 1-st difference
X2	in 1-st difference	in 1-st difference	on levels
X3	in 2-d difference	in 1-d difference	in 2-d difference
X4	in 2-d difference	in 3-d difference	in 2-d difference

The next question is the clarification of the current levels depending on the number of previous values – autocorrelation. To identify presence of autocorrelation the coefficients of autocorrelation function were calculated. On the basis of the significant autocorrelation coefficients it was determined the existence of autocorrelation of the 1st and the 2nd order for all studied time series.

In this study, the length of the time series allows to use VAR-model only with the first lag for all investigated variables, or includes a second-order lag for fewer variables. Based on the estimates of the model parameters it is necessary to assess their compliance with the process under study. One of the formal criteria of model selection is AIC-criterion (Akaike information criterion). For each of the estimated models AIC-statistics is calculated, and as the best model among the estimated model with the lowest AIC is chosen.

The purpose of analysis for different model specifications was to identify model which have biggest adjusted coefficient of determination and the lowest value of the AIC-criterion. As a result of estimation only statistically significant parameters of an vector autoregression model for the US, China and Germany are presented in Table 5–7, respectively. Vector autoregression model can be represented as a variable dependence of the current values  $Y_t$  from its previous values  $Y_{t-p}$  and previous values of other variables  $X_{t-p}$ :

$$y_t = a_0 + \sum_{m=1}^p a_m y_{t-p} + \sum_{m=1}^p b_m x_{t-p} + \varepsilon_t,$$

where  $p$  – order of the lag;

$a$  i  $b$  – coefficient of the model.



Table 5

**Vector auto regression model of the impact of global imbalances  
in the credit risk of the USA banks**

Parameters of the model	Coefficient	Standard error	<i>t</i> -statistics	<i>P</i> -meaning
d_d_Y_1	0.109672	0.149347	0.7343	0.50347
x1_1	-0.0669897	0.0258245	-2.5940	0.06043
d_d_x2_1	-0.316492	0.0575294	-5.5014	0.00532
d_x3_1	0.179005	0.211292	0.8472	0.44460
d_x4_1	-0.448787	0.156311	-2.8711	0.04542
Residual sum of squares	0.489001	Standard error of the model		0.349643
<i>R</i> -squared	0.953998	Corrected (adjusted) <i>R</i> -squared		0.907996
<i>F</i> -criterion (5, 4)	16.59056	<i>P</i> -meaning ( <i>F</i> -criterion)		0.008836
Criterion Akayike	-31.2713			

Table 6

**Vector auto regression model of the impact of global imbalances  
in the credit risk of China banks**

Parameters of the model	Coefficient	Standard error	<i>t</i> -statistics	<i>P</i> -meaning
const	-15.0333	1.0192	-14.7500	0.00456
d_Y_1	3.26139	0.178514	18.2696	0.00298
d_Y_2	-5.7492	0.383503	-14.9913	0.00442
d_x2_1	-0.151899	0.0176989	-8.5824	0.01331
d_x2_2	2.12446	0.146654	14.4862	0.00473
d_d_x1_1	-7.49919	0.515331	-14.5522	0.00469
d_d_x1_2	-2.7377	0.184064	-14.8737	0.00449
Residual sum of squares	0.217181	Standard error of the model		0.329530
<i>R</i> -squared	0.995582	Corrected (adjusted) <i>R</i> -squared		0.982329
<i>F</i> -criterion (6, 2)	75.11843	<i>P</i> -meaning ( <i>F</i> -criterion)		0.013195
Criterion Akayike	6.7992			

Table 7

**Vector auto regression model of the impact of global imbalances  
in the credit risk of German banks**

Parameters of the model	Coefficient	Standard error	<i>t</i> -statistics	<i>P</i> -meaning
const	5.98867	1.74926	3.4235	0.01877
Y_1	-0.0111196	0.279027	-0.0399	0.96975
x1_1	-0.45304	0.138653	-3.2674	0.02226
d_d_x3_1	-0.0497623	0.0546061	-0.9113	0.40393
Residual sum of squares	0.413024	Standard error of the model		0.287410
<i>R</i> -squared	0.935014	Corrected (adjusted) <i>R</i> -squared		0.896022
<i>F</i> -criterion (3, 5)	23.97978	<i>P</i> -meaning ( <i>F</i> -criterion)		0.002142

The models allow revealing both common properties and characteristics of individual countries. Common is the impact of previous values of impaired loans at their current size, previous values X1 factor (the ratio of current account balance to GDP) and X2 (the ratio of the size of the public debt and GDP).

For the USA a significant (at least at  $p = 0.045$ ) was the impact of past values of factor X4 (ratio of gross savings to GDP). Although the most often VAR models are used for forecasting, in our investigation, the obtained model is used only for identification causal relationships between the studied processes.

For Germany, the vector autoregression model allowed to establish the existence of dependence only on past values of the variable X1. This is due to the limited available time series data that did not allow taking full advantage of this method. This meant building of a distributive-lag regression model (model depends both on the current and previous values of factors). Its parameters as for Vector autoregression models were evaluated by the method of least squares. As a result, as the best (with the largest  $R^2$  and smallest values of Akaike information criterion) model presented in *table 8* was chosen.

Table 8

**Distributive-lag model of global imbalances' regressive influence on the credit risk of German banks**

Parameters of the model	Coefficient	Standard error	<i>t</i> -statistics	<i>P</i> -meaning
const	9.48075	0.914562	10.3664	0.06122
d_x1	-1.35735	0.114579	-11.8463	0.05361
x2	-0.133767	0.01275	-10.4916	0.06050
d_d_x3	-0.394773	0.0702942	-5.6160	0.11218
d_d_x3_1	0.144053	0.0560102	2.5719	0.23608
d_d_x4	0.767254	0.0757154	10.1334	0.06262
d_d_x4_1	0.226873	0.04193	5.4108	0.11635
d_d_x5	0.479819	0.117432	4.0859	0.15280
Residual sum of squares	0.005004	Standard error of the model		0.070738
<i>R</i> -squared	0.996864	Corrected (adjusted) <i>R</i> -squared		0.974911
<i>F</i> (7, 1)	45.40893	<i>P</i> -maening ( <i>F</i> )		0.113787
Criterion Akayike	-25.91197			

The calculation results show that a significant impact on the level of significance is less than 10 % (in italics in the *table 8*) provide preliminary values of the factors X1 and X4 and the current values of the factor X2. This low level of significance is due to the limited length of the time series and in these conditions can be considered quite satisfactory. The results are coincided with the VAR-model that tends to suggest their validity.

The analysis of the impact factors of global imbalances on the level of credit risk showed that all five hypotheses are justified, but under different conditions. In the overall analysis of three countries studied the effect on the level of credit risk factors such as the ratio of the current account balance / GDP, gross domestic investment / GDP and international reserves / GDP was discovered. In-depth analysis revealed the peculiarities of the level of credit risk in individual countries (the USA, China and Germany). For the United States and China the ratio factors of the current account balance /

GDP, public debt / GDP appeared to be the most influential ones. Separately, in the USA the increasing of credit risk reduction was due to the decreasing of gross savings ratio / GDP. In Germany, the list of factors influencing the level of credit risk coincides with the factors of influence in the USA, but the impact is detected at a much lower level, due to the greater stability of indices in Germany.

In order to mitigate the actions of global imbalances on the credit risk of banks deserves the attention initiative to transform the Bank for International Settlements into the global lender of last resort. If on the level of national banking systems the central bank acts as the "bank of banks", so the Bank of International Settlements has to become a "bank of central banks". The IMF and the Bank of International Settlements gain functions "operator" of the global financial system. Policymakers' decisions thus are realized through a special mechanism created under the "Group of Twenty" – the Financial Stability Council [11].

The Bank of International Settlements as "bank of central banks" has to accomplish not only supervision on the backbone multinational banks (according to the recommendations of the Basel Committee, these are the 29 largest banks in the world), but also to provide financial support in the form of refinancing in the case of short-term liquidity shortages.

In order to reduce the level of credit risk in the backbone of transnational banks we offer to establish more stringent standards of credit risk that would be determined by a study of global imbalances. The most influence on the credit risk has the ratio of the current account balance and gross domestic investment to GDP. Given this, it is advisable to recommend supervisor of the countries where the lowest value of current account and gross domestic investments to GDP are observed, to set stringent requirements for banks accomplishing active credit operations.

*Firstly*, it is advisable to limit the operations of banks with high risk credit instruments, namely, credit notes (debt securities that the issuing bank releases simultaneously with the issuance of the loan to its borrower in order to transfer a part of credit risk) and credit swaps (derivatives, purchasing which the bank pays a lump sum once or regular premium to the issuer and gives him some credit risk).

*Secondly*, it is important to carry out an effective monitoring of terms of securitized assets, the number of which in pre-crisis period reached record numbers. It is the rapid growth of these assets "warmed up" the demand on credit services and led to the emergence of so-called "credit bubbles". If the growth of the securitized assets mega regulator (BIS) has to set limits for banks as for selling their loan portfolios to specialized factoring or other finance companies.

*Thirdly*, it is appropriate to introduce a mechanism of mandatory stress testing of credit risk on the basis of key indicators that characterize the degree of global imbalances. Such stress tests must be conducted annually BIS, which, together with the Basel Committee must develop an action plan to reform the global financial architecture as a whole, and introducing changes

to procedures regulating the credit risk of banks and other financial market participants.

*Fourthly*, it appears appropriate to establish a direct relationship between the level of credit rating and the level of credit activity of banks operating in the country. When lowering the credit rating of the country the lending activities of banks of this country should be restricted by establishing certain regulatory restrictions. A list of these constraints and their numerical values should be determined by the central bank of the country. At the same time it seems reasonable to establish a specific BIS scale relationship between credit rating of the country and the amount of credits to GDP.

*Fifth*, to enhance the efficiency of the global financial system by mega regulator it is desirable to install a critical ratio between the volume of financial assets to GDP, taking into consideration the way central bank sets the threshold for their country and take it into account when developing the main objectives in monetary policy.

*Sixth*, in countries such as the USA, which is the epicenter of the global financial crisis, it is recommended primarily for their backbone transnational banks to define more stringent standards of credit risk should be calculated as the ratio of debt on loans not to the regulatory, and the liquid capital. The term "liquid assets" is understood as capital, formed only in liquid form. By liquid capital does not include emission difference, transactions with the parent company (investment in subsidiary banks to support their liquidity, etc.), changes in equity as a result of the merger of business, etc. (the so-called "hybrid" capital). In banks, the US share of so-called "hybrid capital" is high. It is dangerous for banks as "hybrid capital" can not be directed to cover their losses due to the onset of the credit risk of banks.

*Seventh*, in May 2012 the European Central Bank (ECB) put forward the idea of creating banking union that could unite the euro area states, or the majority of EU countries. This will reduce the dependence of national banks from government funds provided for repayment of sovereign debts. In addition, the banking union is advisable to use the task of carrying out strict supervision of the banking sector of the Eurozone and the creation of a pan-European system of deposits' protection. In the case of the formation of such a union for direct recapitalization of European banks the cost of ESM (European Stability Mechanism – the European stabilization fund) could be used. The idea of banking union could be realized in a relatively short time, because it almost does not need much to change legislation and agreements within the EU. At the same time during its formation appear the same contradictions between donor countries and recipient countries of financial assistance [1]. In this context, the banking union is appropriate to coordinate its activity with the BIS.

*Eighth*, in order to implement the idea of a "renewed multilateralism", which is to ensure a more balanced capital flows between countries to prevent their excessive concentration, it is advisable to form a network of

international financial centers in the developing countries (emerging markets) and create new international financial centers [12]. These new international financial centers would help to reduce significantly global imbalances' level, including those that generate a substantial credit risk.

Thus, the formation of a new financial architecture should be based on consideration of global imbalances that led to the global financial crisis. The landscape of this financial architecture will largely depend on the policy of megaregulator that have to recommend national central banks in case of developing areas of monetary policy in general, and particularly by setting standards of credit risk banks taking into account the factors of global imbalances.

**Conclusion.** Scientific hypotheses about the relationship between the share of NPLs in total loans and the ratio of individual macroeconomic indicators (balance of current accounts, public debt, gross investment, gross savings and foreign reserves) to GDP were formulated, and their checks using econometric modeling package Gretl 1.9 was made. The hypotheses were confirmed by the following parameters: the ratio of the current account balance of the country to GDP, gross domestic investment to GDP and foreign reserves to GDP, on the one hand, and the share of NPLs in total loans granted of banks on the other.

A set of recommendations for improving the mechanism of megaregulations of credit risk of banks depending on indicators characterizing the global imbalances in the economy was made, including: limiting banks' operations with high risk credit instruments; implementation of effective monitoring in terms of securitized assets; introducing a mechanism of mandatory stress testing of credit risk on the basis of key indicators that characterize the degree of global imbalances; establish direct correlation between the level of credit rating of the country and the degree of credit activity of banks operating in this country; installation by megaregulator critical ratio between the volume of financial assets to GDP; defining more stringent standards of credit risk, which should be calculated as the ratio of debt on loans not to the regulatory, but to the liquid capital for systemically important multinational banks; creating of banking union in Europe, which would combine the Eurozone states or the majority of EU countries; the formation of new international financial centers with a purpose of practical implementation of the idea of "renewed multilateralism".

The implementation of these proposals will help to mitigate the effect of the factors of global imbalances on credit activity of banks what provides the reduction of their credit risk level.

The conceptual statements require further scientific research towards reducing global imbalances' level, including those that generate a substantial credit risk; the change of mega regulator policy that have to recommend national central banks in developing areas of monetary policy in general, and particularly in setting standards of banks' credit risk; take into account the factors of global imbalances.

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**Шульга Н., Чорний А., Гусач А. Вплив глобальних дисбалансів на кредитний ризик банків.**

**Постановка проблеми.** Глобальні дисбаланси призвели до підвищення рівня кредитного ризику банків. Врахування цієї тенденції дозволить мегарегулятору рекомендувати центральним банкам країн, що їх генерують, встановити для комерційних банків більш жорсткі економічні нормативи.

**Аналіз останніх досліджень і публікацій** показав, що попри наявність окремих наукових доробок, невирішеною залишається важлива науково-практична проблема щодо впливу глобальних дисбалансів на кредитний ризик банків.

**Мета статті** – проаналізувати існуючі погляди та запропонувати авторське тлумачення поняття "глобальні дисбаланси", визначити за допомогою економіко-статистичних методів вплив ключових чинників глобальних дисбалансів на кредитний ризик банків, а також на їх основі запропонувати управлінські рішення для мегарегулятора та центральних банків окремих країн.

**Матеріали та методи.** У процесі дослідження використано методи порівняння, графічний, табличний, економіко-статистичний.

**Результати дослідження.** Висунуто наукові гіпотези про наявність залежності між часткою проблемних кредитів у загальному обсязі виданих кредитів і співвідношенням окремих макроекономічних показників розвитку країни, а також здійснено їх емпіричну перевірку. За результатами цього дослідження розроблено комплекс пропозицій, зокрема: обмеження високоризикових балансових та позабалансових кредитних операцій банків; запровадження механізму обов'язкового стрес-тестування кредитного ризику з урахуванням ключових індикаторів, які характеризують ступінь глобальних дисбалансів; встановлення прямої залежності між рівнем кредитного рейтингу

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країни та ступенем кредитної активності її банків; встановлення мегарегулятором критичного значення співвідношення між обсягом фінансових активів та ВВП; визначення більш жорстких нормативів кредитного ризику тощо. Реалізація цих пропозицій сприятиме стабілізації ситуації на глобальних фінансових ринках.

**Висновки.** На відміну від існуючих публікацій, вперше сформульовано наукові гіпотези залежності між рівнем кредитного ризику банків та індикаторами, які характеризують глобальні дисбаланси, а також здійснена їх перевірка шляхом побудови статистичних моделей; розроблено спектр управлінських рішень, спрямованих на встановлення для банків країн, які генерують суттєві глобальні дисбаланси, більш жорстких регулятивних вимог.

Викладені концептуальні положення потребують подальшого наукового дослідження в напрямі зниження рівня глобальних дисбалансів, у тому числі тих, що генерують значний кредитний ризик; зміни політики мегарегуляторів, які мають рекомендувати національним центральним банкам під час розробки напрямів грошово-кредитної політики в цілому, і зокрема, при встановленні нормативів кредитних ризиків банків враховувати чинники глобальних дисбалансів.

**Ключові слова:** кредитний ризик, глобальні дисбаланси, зовнішній борг, золотовалютні резерви, внутрішні заощадження, валові інвестиції, валовий внутрішній продукт, проблемні кредити, баланс поточного рахунку.