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**BANK HEALTH ANALYSIS BASED ON RISK PROFILE,
EARNINGS AND CAPITAL**

The aim of this study is to determine the health level of conventional banks during 2011–2014 which are measured using a REC approach (Risk Profile – Earnings – Capital). Variables and measurement in this study are of risk profile factors, earnings factors and capital factors. The analysis results show that CAR, ROA, OEOL, LAR, LDR, NPL and NIM significantly affect the health of banks but NPEA does not affect the bank health. This situation reflects that with less productive but more stable asset quality profitability of banks will increase.

Keywords: bank health; risk profile; earnings; capital; profitability.

Ліз Сінта, Ина Приміана, Сулейман Рахман Нидар
**АНАЛІЗ СТАБІЛЬНОСТІ БАНКІВ НА ОСНОВІ ПОКАЗНИКІВ
ПРОФІЛЯ РИЗИКУ, ПРИБУТКУ ТА КАПІТАЛУ**

У статті визначено рівень стабільності традиційних банків в Індонезії за даними 2011–2014 років. Визначення стабільності проведено за методом РПК, згідно з яким всі чинники впливу на роботу банку згруповано як чинники ризику (Р), чинники прибутку (П) та чинники капіталу (К). Результати аналізу показали, що на стабільну роботу банку суттєво впливають: достатність капіталу, повернення на активи, поточні витрати та прибутки, співвідношення кредитів до активів, співвідношення кредитів та депозитів, показник проблемних кредитів та чиста процентна маржа. Показово, що жодного впливу на стабільність роботу банку не було знайдено відносно непрацюючих прибуткових активів. Доведено, що зниження показників продуктивності роботи банку за умови підвищення стабільності активів призводить до підвищення їх прибутковості.

Ключові слова: стабільність банку; профіль ризику; прибуток; капітал; прибутковість.

Табл. 8. Літ. 28.

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**АНАЛИЗ СТАБИЛЬНОСТИ БАНКОВ НА ОСНОВЕ ПОКАЗАТЕЛЕЙ
ПРОФИЛЯ РИСКА, ПРИБЫЛИ И КАПИТАЛА**

В статье определён уровень стабильности традиционных банков в Индонезии по данным за 2011–2014 годы. Определение стабильности проведено по методу РПК, согласно которому все факторы влияния на работу банка сгруппированы как факторы риска (Р), факторы прибыли (П) и факторы капитала (К). Результаты анализа показали, что на стабильную работу банка существенно влияют: достаточность капитала, возврат на активы, текущие расход и прибыль, соотношение кредитов к активам, соотношение кредитов и депозитов, показатель проблемных кредитов и чистая процентная маржа. Характерно, что никакого влияния на стабильность работы банка не было обнаружено для недействующих доходных активов. Доказано, что снижение показателей производительности работы при условии повышения стабильности активов приводит к повышению прибыльности банков.

Ключевые слова: стабильность банка; профиль риска; прибыль; капитал; прибыльность.

Introduction. Bank in its business activities rely on public trust. Due to the main function of banking as a financial intermediary bank institutions are to raise and channel public funds effectively and efficiently. For customer confidence bank's

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health must be maintained. One of the ways to ensure a bank health is by maintaining liquidity so that banks can meet their obligations and sustain performance in order to gain the trust of society. Public confidence in banks would be realized if banks are able to improve their performance to the optimal level.

Bank health should always be assessed to stay fit in serving clients. Banks that are not healthy, not only endanger themselves, but also other parties involved. Bank's health can be viewed from various aspects of assessment. The aim is to determine whether a bank is very healthy, healthy, healthy enough, less healthy or unhealthy. Bank Indonesia Regulation No. 13/1/PBI/2011, in its judgment uses RGEC approach (*risk profile, good corporate governance, earnings, capital*). Assessment stages in RGEC method might be called assessment under full risk management model. Given the importance of banks' health there is a lot of research related to this issue, both in terms of *risk* (Iannotta, et al., 2007; Spong and Sullivan, 2007; Levine, 2009; Martinez and Repullo, 2010; Jokipii and Milne, 2010; Chitan, 2012), *earnings* (De Haan and Poghosyan, 2011), and *capital* (Athanasoglou, 2011; Fiordelisi et al., 2011).

This study is limited to applying REC approach (*risk profile, earnings, capital*) to the group of conventional banks in Indonesia. The purpose of the study is to determine the soundness of the conventional banks group consisting of non-foreign exchange banks, foreign exchange banks, foreign banks, and joint venture banks, all measured using the REC approach the data were considered for the years 2011–2014.

Literature review.

Bank rating. The health of banks is in the interest of all parties concerned, namely owners, managers and service users, and also the Bank of Indonesia as the supervisor of banks in Indonesia (Sunarti, 2011: 144). Health of bank is its ability to conduct normal banking operations and meet obligations properly in the ways that standard banking regulations (Santoso, 2006: 51).

Bank's health assesment factors. Banks are required to assess the level of health using the risk approach (*Risk-based bank rating*) both individually and on the consolidated basis. Banks are required to conduct their own assessment (*self-assessment*) at least every semester, at the end of June and December. Banks can also update their *self-assessment* at any other time if necessary. Bank rating is updated basing on the results of examination, periodic reports submitted by the Bank, and/or other information.

In the framework of bank supervision, if there are differences between the assessment results presented by the Bank with the results of *assessment* ratings shall prevail the result of Rating conducted by the Bank of Indonesia. Factors included in bank rating are: *risk profile; corporate governance; profitability (earnings); capital*.

Banking risk management. Bank's risk management covers several risk management processes, namely the process of identifying, monitoring, risk control and risk management. Risk identification involves understanding various risks across bank's activities undertaken to analyze the source and the cause of a risk and its impact (Goyal, 2010). Types of risk are divided into two groups: namely, financial risks and non-financial ones. Financial risks include market risk and credit risk under the second pillar of Basel II, and non-financial risks are those that may affect bank's business growth, sales of products and services, failure in possible strategies aimed at business growth, risk due to failure in management, competition, non-availability of products/services, external factors etc. Operational risk is part of non-financial risk

defined as the risk of loss due to inadequacy or failure of internal processes and systems or due to external events.

Banks need to perform risk assessment in accordance with features and complexity of business activities. Credit risks include borrowers risk, industrial risk and portfolio risk. Market risk is measured by the risk of changes in interest rates, liquidity risk, foreign currency risk and *hedging risk*. While operational risks include strategic risk, capital risk, political risk and legal risks in banking. Effectiveness of risk management needs to be supported by considering the results of measurement and monitoring of risks (Bank of Indonesia, 2011)

In the context of *financial science* and *economics*, risk can be defined as the *volatility* or standard deviation of the *net cash flow* of a company/business unit (Heffernan, 1995). Some *economists* classify risks according to the activities of bank, namely market risk, risk of changes in economic conditions (Flannery and Gutentag, 1979; Guttentag and Herring, 1988), operational risk, and management risk (Mullin, 1977; Graham and Horner, 1988). In addition there are other risks that may harm banks but are difficult to detect at an early stage, such as interest rate risk and *sovereign risk* (Stanton, 1994).

Concepts and methods of Risk-based bank rating (RBBR). According to Basel II of the Bank for International Settlements (BIS) there are 8 types of risk in banking, namely credit risk, market risk, liquidity risk, operational risk, legal risk, strategic risk, reputation risk and compliance risk. The risks are grouped into 4 main groups, namely the risks associated with:

- 1) credit risk (Sinkey, 1975, 1985; Stuhr and Wicklen, 1974; Fraser, 1990; Hadad et al., 2004);
- 2) market risk (Sinkey, 1975, 1985; Fraser, 1990; Hempel et al., 1994);
- 3) liquidity risk (Sinkey, 1975, 1985; Fraser, 1990; Korobow, Stuhr and Martin, 1977; Hadad et al., 2004);
- 4) operational risk (Sinkey, 1975, 1985; Fraser, 1990; Stuhr, and Wicklen, 1974; Martin, 1977).

Criteria used to be included in RBBR are: 1) *risk profile*; 2) *good corporate governance*; 3) *earnings*; 4) *capital*.

REC approach. Variables and measurements in this study consisted of *risk profile* factors, *earnings* factors, *capital* factors. *Risk profile* factors were assessed via LAR, LDR, NPEA and NPL. *Earnings* or *profitability* factors consisted of ROA, OEOI and NIM. For *capital* factors we used CAR and CAR (Tier 1)

1. *Risk profile.* This research measures 4 indicators of risk profile factors – non-performing loan (NPL), non-performing earning assets (NPEA), loan-to-deposit ratio (LDR) and loan to asset ratio (LAR).

2. *Earnings (Profitability).* The assessment of earnings is based on 3 ratios: return on assets (ROA) or the ratio of profit before tax to average total assets; operating expenses operating income (OEOI); net interest margin (NIM) as the ratio of net interest income to average total assets.

3. *Capital.* Quantitative assesment and qualitative approach to capital factor are done through assessment of the adequacy of compliance with the capital adequacy ratio (CAR) of the applicable regulations. In accordance with the Regulation of Bank Indonesia, matrix parameters/indicators of capital factors in this study are: minimum

capital adequacy ratio and core-capital-to-risk-assets ratio. Through this ratio we will know the ability to refute assets, mainly bank loans (Abdullah, 2003: 60).

Research methods.

Data and sample. The population in this study is a group of banks in Indonesia 2011 to 2014. Sampling was based on financial reporting data for these years, available at www.bi.go.id. Analytical technique in this study is multiple linear regression analysis technique used as a tool to determine the influence of *risk profile, earning and soundness capital of banks*.

Types of research. This study is a descriptive research with quantitative approach, explaining the object under study by providing a description or picture of the problems identified and carried out in detail to the bank group.

Variables research. Variables and measurements serve to restrict information which is not related to the study. Variables and measurements in this study are:

1. *Risk profile* factors with 4 indicators of NPL, NPEA, LDR and LAR.
2. *Earnings* factor (profitability) has 3 indicators, namely ROA, OEOI and net interest margin (NIM).
3. *Capital* factors has two indicators – minimum capital adequacy ratio and core-capital-to-risk-assets ratio.

Research hypothesis.

1. Risk profile.

NPL ratio shows the ability of bank's management to manage problem loans. The higher is this ratio the worse is the quality of bank loans causing greater number of problem loans (Almilia and Herdiningtyas, 2005). *NPL* reflects the credit risk, the smaller is *NPL*, the lesser is credit risk borne by a bank. If *NPL* of a bank is high, it will increase the provisioning costs of productive assets and other costs, so the potential losses are also high. The higher is this ratio, the more acute is the credit quality of banks leading to a large number of nonperforming loans increasing the likelihood of problematic conditions.

The LDR is used to assess the liquidity of a bank by dividing the number of loans granted by the bank to its deposits. The higher is this ratio, the lower is bank's liquidity. Higher *LDR* shows increasingly risky bank liquidity conditions, otherwise, lower *LDR* shows the lack of effectiveness in lending. Higher *LDR* is diminishing the health of banks (liquidity conditions are threatened). Thus, it can be formulated that *LDR* negatively affects the health of banks.

LAR is used to measure bank's ability to meet credit demand through a number of collateral assets (Abdullah, 2003). This ratio is the comparison of how much are bank loans as compared to the size of total assets. The relationship of credit risk with *LAR* is not unidirectional because larger loans under lower credit risk may be encountered due to loans funded by assets.

NPEA. The level of management efficiency for productive assets can be seen from the level of non-performing earning assets (*NPEA*), which is a percentage of earning assets to total earning assets (bank's ability to utilize its productive assets). The smaller is the rate of *NPEA* higher is the velocity in assets use. Turnover is high in assets utilization, and this will lead to relatively low capital so that the cost of capital invested is low too. Low capital costs could encourage the increase in profitability. Asset quality is better reflected through smaller *BDR* value. Under higher value of

BDR the bank will bear the cost of allowance for uncollectible accounts and the bank lost revenue can be obtained from productive assets. Thus, further research hypothesis can be stated as follows:

H1: Risk profile has positive influence on the health of banks.

2. Earning.

OEOI is often called the efficiency ratio used to measure the ability of bank management to control operational costs of operational revenues. Given the bank's main activities in principle is to act as an intermediary, i.e. collect and distribute funds, then bank's operational costs and revenues are dominated by interest expense and interest income (Dendawijaya, 2001). According to D. Siamat (1993), the decreased rate of *OEOI* shows higher operational efficiency achieved by a bank, this means more efficiency in generating profits. Under the provisions of BI, the maximum limit for *OEOI* is 92%. According to Circular Letter No. 3 / 30DPNP as of December 14, 2001, *OEOI* is measured through the ratio of operating expenses to operational revenues. Operating costs are the costs incurred by the bank in order to carry out business activities principally (interest costs, labor costs, marketing and other operating costs). Operating income is the main income of a bank that the interest income earned from the placement of funds in the form of credit and other operating income. Greater *OEOI* reflects the lack of bank's ability to reduce operating costs so that it can result in losses because banks are less efficient in managing business. Thus, it can be formulated that *OEOI* has positive effect on the health of banks.

NIM. Sources of bank funds consist of 3 types: first funds (own capital), second-party funds (from other banks), and funds from third parties (public funds). *NIM* is used to measure the ability of bank's management to manage its productive assets as to generate net interest income. *NIM* is used to determine the net interest income in 12 months which the bank is able to obtain comparing with average earning assets of banks. Net interest income is derived from interest income minus interest expense. Productive assets are taken into account as earning assets that have the ability to produce further (BI Circular Letter No. 3/30 / DPNP, 14/12/2001).

L.S. Almilialia and W. Herdiningtyas (2005) suggested that the *NIM* ratio has a negative and significant impact on the health of banks. This means that the lower is the ratio, the larger is the possibility a bank would be in more problematic conditions.

ROA illustrates the ability of bank management in profit and overall managerial efficiency. The higher is *ROA*, the more effective is bank's asset management. In other words, *ROA* is used to measure bank's ability to use its assets to generate gross profit (BI Circular Letter No. 3/30/DPNP, 14/12/2001). T. Ahmad and W.K. Kusuno (2003) show that *ROA* has significant negative effect on both bankrupt banks and those which are not bankrupt. This is supported by research V.D. Lestari (2009) in that the ratio of *ROA* is significant for all groups of banking soundness. Thus, under higher *ROA*, the likelihood of bank failure is vanishingly small. Thus, it can be formulated that *ROA* has negatively affect on the health of banks, and further research hypothesis can be stated as follows:

H2: Earning has negative influence on the health of banks.

3. Capital.

CAR. Under the provisions of Bank Indonesia, banks that are included as healthy banks should have *CAR* of at least 8%. It is based on the conditions set by the BIS

(Bank for International Settlements). CAR has significant influence on the problematic and negative effects means that under lower CAR, the possibility of bank is having problematic conditions is higher. Because banks can be unable to cover the risk of losses arising from the investment of funds in productive assets that contain risks and may not be used to finance fixed assets and investments. This can lead to financial distress. Thus, it can be formulated that CAR negatively affects the health of banks.

Risk-weighted assets (RWA). Calculation of capital adequacy is based on RWA. What is meant by assets in these calculations include both assets listed in the balance sheet and the assets of administrative nature as reflected in still contingent liabilities or commitments provided by a bank to third parties. Against each asset type there are set risk weightings based on the levels of risk inherent in the asset itself or the risk weight based on customer group undertaking or the nature of collateral (Siamat, 1993: 48). According to Sri Y. Susilo (2000: 27) capital adequacy is a very important factor for banks' business development. Bank of Indonesia sets the CAR namely capital as adequacy which must always be maintained by each bank as a certain proportion of the total RWA. It can be concluded that the minimum capital adequacy ratio is the division of capital (primary and secondary one) with the total RWA. Thus, it can be formulated that capital has positive influence on the health of banks, further research hypothesis can be stated as follows:

H3: Capital has positive influence on the health of banks.

Results. From the regression equation below: $\text{Total Bank} = 94.074 + 0.475\text{CAR} - 7.494\text{ROA} - 0.118\text{OEOI} - 0.636\text{LAR} - 0.482\text{LDR} + 0.429\text{NPEA} - 6.236\text{NPL} + 1.310\text{NIM} + \varepsilon$.

In this case the variable Risk Profile as measured by NPL, LDR and LAR, obtained a significant value of $< \alpha$ (0.05), and it can be concluded that NPL, LDR and LAR significantly influence bank health predictions. The research results allow us state that NPL, LDR and LAR have a significant impact on bank bankruptcy prediction.

But NPEA have no effect on banks health, and this shows that banks' asset quality is getting better, it is reflected in the ratio of NPEA. According to the Bank of Indonesia, Bad Debt Ratio (BDR) on average banks is smaller than 3.5 which means banks are increasingly able to improve this profitability. The smaller is the rate of NPEA/BDR, the higher is the turnover in assets use. Turnover is high in harnessing the assets will require relatively low capital so that the cost of capital invested us low too. Low capital costs can encourage the profitability increase. Asset quality is better reflected through smaller BDR.

In this case the variable of earnings, is measured by ROA, NIM and OEOI. From the results of logistic regression ROA, NIM, OEOI significantly affect the prediction of bank health. This shows the influence of any increase in ROA will be followed by increasing level of bank health. Otherwise, any reduction in ROA will be followed by further decline in bank soundness. The results support the research conducted by Titik Aryati & Hekinus Manao stating that ROA has a significant influence on the prediction of banks in trouble. However, our research results NIM and OEOI do not correspond to the research conducted by P. Mulyaningrum stating that NIM and OEOI do not have significant influence on predicting the health of the banking system. This determines that overall OEOI of banks is very efficient as the mean OEOI is greater than 96%.

Capital is measured here by the ratio of CAR. It can be concluded that CAR affects bank's health prediction. This study supports the research conducted by L.S. Almilia and W. Herdiningtyas (2005) stating that CAR has a significant influence on the conditions of troubled banks.

This occurs because the Bank of Indonesia regulation on CAR states that the CAR of commercial banks has to be minimum of 8%. But banks tend to keep the CAR of no more than 8% since this means idle funds or even waste, because in fact the main capital of banks is trust, while the CAR of 8% is only meant by the Bank of Indonesia to adjust to the conditions of international banking.

But in reality, profitable business does not have to include CAR of 8% as long as there is public confidence. Public confidence in banking may come due to the factor of government guarantees on funds deposited in a bank.

Conclusions. The results of this statistical analysis using multiple linear regression and hypothesis testing under the significance level of 5% show that risk profile factor is the ratio of NPL, LDR and LAR; earnings factors, i.e. NIM; factors of capital, the minimum capital adequacy ratio and the ratio of core capital to RWA significantly affect the health of banks, with less than 5% alpha value. While NPEA have no effect on the health of banks, with significance level of more than 5% alpha value.

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Appendix

Table 1. Descriptive statistics, authors'

	Mean	Std. Deviation	N
Total Bank	19.9896	11.49321	288
CAR	20.6638	6.02641	288
ROA	2.9952	.61130	288
OEOI	80.0490	8.42573	288
LAR	14.4819	7.71122	288
LDR	91.9471	18.37585	288
NPEA	1.6972	.73411	288
NPL	1.0170	1.28405	288
NIM	5.4343	2.04989	288

Table 2. Correlations, authors'

		Total Bank	CAR	ROA	OEOI	LAR	LDR	NPEA	NPL	NIM
Pearson Correlation	Total Bank	1.000	-.326	-.385	-.098	-.029	-.450	.014	-.352	.425
	CAR	-.326	1.000	.027	.182	.204	.694	-.369	-.265	-.434
	ROA	-.385	.027	1.000	-.197	.271	-.284	.322	.298	.365
	OEOI	-.098	.182	-.197	1.000	-.415	.127	-.002	.269	-.115
	LAR	-.029	.204	.271	-.415	1.000	-.001	.110	-.581	.047
	LDR	-.450	.694	-.284	.127	-.001	1.000	-.569	-.331	-.726
	NPEA	.014	-.369	.322	-.002	.110	-.569	1.000	.394	.384
	NPL	-.352	-.265	.298	.269	-.581	-.331	.394	1.000	.165
	NIM	.425	-.434	.365	-.115	.047	-.726	.384	.165	1.000
Sig. (1-tailed)	Total Bank	.	.000	.000	.048	.311	.000	.407	.000	.000
	CAR	.000	.	.324	.001	.000	.000	.000	.000	.000
	ROA	.000	.324	.	.000	.000	.000	.000	.000	.000
	OEOI	.048	.001	.000	.	.000	.016	.484	.000	.025
	LAR	.311	.000	.000	.000	.	.495	.031	.000	.213
	LDR	.000	.000	.000	.016	.495	.	.000	.000	.000
	NPEA	.407	.000	.000	.484	.031	.000	.	.000	.000
	NPL	.000	.000	.000	.000	.000	.000	.000	.	.003
	NIM	.000	.000	.000	.025	.213	.000	.000	.003	.

Continuation of Table 2

		Total Bank	CAR	ROA	OEOI	LAR	LDR	NPEA	NPL	NIM
Z	Total Bank	288	288	288	288	288	288	288	288	288
	CAR	288	288	288	288	288	288	288	288	288
	ROA	288	288	288	288	288	288	288	288	288
	OEOI	288	288	288	288	288	288	288	288	288
	LAR	288	288	288	288	288	288	288	288	288
	LDR	288	288	288	288	288	288	288	288	288
	NPEA	288	288	288	288	288	288	288	288	288
	NPL	288	288	288	288	288	288	288	288	288
	NIM	288	288	288	288	288	288	288	288	288

Table 3. Variables entered/removed^a, authors'

Model	Variables entered	Variables removed	Method
1	NIM, LAR, NPEA, OEOI, ROA, CAR, NPL, LDR ^b	.	Enter

^a Dependent variable: Total Bank.

^b All requested variables entered.

Table 4. Model summary^b, authors'

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.886 ^a	.785	.779	5.40791	.389

^a Predictors: (Constant), NIM, LAR, NPEA, OEOI, ROA, CAR, NPL, LDR.

^b Dependent variable: Total Bank.

Table 5. ANOVA^a, authors'

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	29751.490	8	3718.936	127.163	.000 ^b
	Residual	8159.479	279	29.245		
	Total	37910.969	287			

^a Dependent variable: Total Bank.

^b Predictors: (Constant), NIM, LAR, NPEA, OEOI, ROA, CAR, NPL, LDR.

Table 6. Coefficients^a, authors'

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
1	(Constant)	94.074	5.611		16.767	.000		
	CAR	.475	.084	.249	5.622	.000	.394	2.541
	ROA	-7.494	.737	-.399	-10.172	.000	.502	1.991
	OEOI	-.118	.045	-.086	-2.595	.010	.697	1.436
	LAR	-.636	.073	-.427	-8.769	.000	.326	3.071
	LDR	-.482	.036	-.770	-13.424	.000	.234	4.269
	NPEA	.429	.605	.027	.709	.479	.517	1.935
	NPL	-6.236	.451	-.697	-13.838	.000	.304	3.286
	NIM	1.310	.243	.234	5.397	.000	.412	2.428

^a Dependent variable: Total Bank.

Table 7. **Collinearity diagnostics**^a, authors'

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions								
				(Constant)	CAR	ROA	OEOI	LAR	LDR	NPEA	NPL	NIM
1	1	7.815	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.733	3.266	.00	.00	.00	.00	.02	.00	.00	.19	.00
	3	.226	5.880	.00	.03	.00	.00	.04	.01	.09	.01	.04
	4	.105	8.619	.00	.00	.00	.00	.18	.00	.06	.11	.25
	5	.067	10.817	.00	.00	.03	.01	.21	.00	.59	.24	.04
	6	.026	17.222	.02	.71	.00	.02	.07	.03	.12	.01	.08
	7	.018	20.994	.00	.02	.84	.03	.40	.00	.05	.36	.11
	8	.008	31.293	.00	.02	.07	.46	.00	.49	.07	.07	.28
	9	.002	58.412	.98	.22	.06	.49	.07	.47	.02	.00	.20

^a Dependent variable: Total Bank.Table 8. **Residuals statistics**^a, authors'

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-11.4467	40.7630	19.9896	10.18154	288
Residual	-14.12296	15.44667	.00000	5.33200	288
Std. Predicted Value	-3.088	2.040	.000	1.000	288
Std. Residual	-2.612	2.856	.000	.986	288

^a Dependent variable: Total Bank.

Стаття надійшла до редакції 24.12.2015.