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Article

Analysis of Bank Balance Sheet Indicators in Ensuring Financial Stability in Commercial Banks

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Abstract: Commercial banks are tag repositories of economic development as they help the financial resources to migrate from one sector to another, a process that impact on financial stability. Banks are widely affected by numerous variables, one of the indicators is income from interest and non-interest. These factors have been proven to play an essential role in the long-term health of banks. Allocating balance sheet indicators into the corresponding five category groups is not a researched question, as the literature analysis have shown. However, this is rather contrasted situation to already existing researches that each of them tries to find the specific relations between balance sheet indicators and financial stability of Uzbek commercial banks due to the fact that most of the researches are rather focused on privatization process and on financial crises. The purpose of this research is to examine the impact of core balance sheet indicators, namely, undistributed profit, interest income and non-interest income on the financial safety of commercial banks in the Republic of Uzbekistan. The balance sheet variables captured customer liabilities on financial instruments and Funds to be paid to the Central Bank which were found to play large roles in affectation of undistributed profit and income generation. CDC) Multicollinearity tests and stationarity checks also validated the reliability of the utilized model. Our findings make three noteworthy contributions to the literature of the Uzbek banking sector, as we: (i) provide a new conceptual model based on balance sheet-based metrics linked to financial stability, (ii) present novel time-series raw data illustrating trends in balance sheet metrics which are then further hypothesised and analysed using graphical analysis and (iii) offer a data-driven, level of detail in the relationship between balance sheet metrics and financial stability in the context of the Uzbek banking sector. The results are useful for policy-maker and financial manager as it believe that bank income could be optimize through proper strategies as well as to keep the banking stability in the future.

Keywords: bank income, interest income, non-interest income, financial stability

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1. Introduction

It would not be an exaggeration to say that commercial banks play a special role as the locomotive of the economy. The participation of commercial banks in the process of redistributing financial resources for all sectors of the economy is one of the processes that has a significant impact. Therefore, the financial stability of commercial banks serves to increase the opportunities for creating added value in the national economy [1].

In our opinion, many financial indicators of the bank can influence the financial stability of commercial banks from various perspectives. This requires conducting analyses aimed at determining strategic directions for ensuring the financial stability of commercial banks. In general, we believe that determining and evaluating the impact of balance sheet indicators, interest and non-interest income (expenses) on the formation of financial stability in commercial banks is an important feature [2].

In this regard, if we pay attention to the conducted studies, it can be observed that the financial stability of commercial banks is influenced by various factors. Currently, reforms aimed at reducing the state share in the capital structure of many state banks in Uzbekistan and thereby privatizing them are envisaged. This reflects the importance of financial profitability in ensuring the investment attractiveness of banks [3].

At the forum held in Tashkent in March 2024, Pavel Kaptel, Deputy Director of Fitch Ratings Agency, presented his conclusions on the privatization processes of banks in our country [4]. According to him, the profitability indicators of state banks are necessary during the privatization process, which serves to ensure their attractiveness and leads to accelerating privatization.

It should also be noted that the net profit of the banking system in our country in the first half of 2024 was 5.5 trillion soums, but decreased by 10% or 560 billion soums compared to the same period in 2023. Although the share of state banks is among the banks whose net profit increased compared to the previous year, their number remains small. In particular, it should be shown that the Business Development Bank ended the half-year of 2024 with a loss of -378.1 billion soums [5]. In general, it can be emphasized that both state and private banks are present among the banks operating with financial losses. We think that this also reflects the negative characteristics of general macroeconomic trends.

2. Materials and Methods

Literature Review

Prof. A. Bektemirov and others develop scientific approaches aimed at evaluating the efficiency of commercial banks' activities in their research [6]. According to them, the Return on Assets (ROA) indicator expresses the efficiency of bank management, while the Return on Equity (ROE) coefficient is considered as a measure of profitability for bank shareholders. They also focus on expressing bank profitability indicators such as the ratio of net interest income to total assets, the ratio of interest income from loans to total loans, the ratio of net interest income to total liabilities, and the ratio of net interest margin to total assets.

S. Ziyodullaev attempts to develop his own approaches to evaluating the profitability of bank assets [7]. During his research, he analyzes the development trends of asset profitability levels at TIF National Bank and AT Asakabank. According to him, it is important to implement measures aimed at ensuring the proportionality between the growth rate of net profit and the growth rate of total assets. He also proposes the need to increase the volume of interest income by increasing the volume of operations with securities in the composition of banks' investment activities.

Q. Hamraev studies the development trends of investment funds in his doctoral dissertation. In particular, he focuses on evaluating the profitability of fund assets. According to him, the role of banks as financial intermediaries in investment activities is decreasing [8]. According to I. Tursunov, the influence of banks' financial resources in ensuring the financial stability of corporate structures is of special importance [9]. He also pays attention to the role of bank asset profitability and high-liquidity assets in ensuring financial stability. The directions aimed at rating systems, remote monitoring, and risk analysis in evaluating the financial stability of banks are studied by him [10].

In the research conducted by N. Sharipova, attention is paid to systematizing the factors affecting the financial stability of the bank [11]. According to her, the factors affecting the bank's financial stability are classified into internal and external characteristics. In particular, socio-political, general economic, and force majeure situations are listed as external factors, while organizational, technical, and financial elements are mentioned as internal factors.

I. Sadikov focuses on forming scientific conclusions aimed at ensuring the financial stability of commercial banks in his scientific research [12]. In his studies, he promotes paying attention to the recommendations of international organizations and international standards.

In our opinion, the research conducted by Uzbek researchers focuses on systematizing the factors affecting the financial stability of banks and their specific characteristics. In particular, scientific conclusions aimed at evaluating financial profitability indicators and managing them based on international standards have been formed.

3. Results and Discussion

From this point of view, during our research, we plan to conduct our analyses based on the data of Uzstroysanoatbank ATB for the months from 2017-2024. In analyzing these indicators, we will use the least squares method and implement it using the Stata computer software [13].

Continuing our analyses, we have selected the following indicators that may affect "undistributed profit", "total interest income", and "total non-interest income":

Cash on hand and other payment documents – X1.

The bank's funds at the Central Bank – X2.

Funds to be received from other banks and financial organizations, net – X3.

Securities and investments made in them, net – X4.

Loans and leasing operations, net – X5.

Customers' obligations on financial instruments, net – X6.

Demand deposits – X7.

Term deposits – X8.

Funds to be paid to the Central Bank – X9.

Accounts of other banks and financial organizations – X10.

Obligations on loans and leasing operations – X11.

Accrued interest payable – X12.

First, we focus on determining the mutual correlation between these indicators. In this case, we obtain the situation presented in Table 1 below. From these data, it is evident that there is a high mutual correlation between many indicators. For example, term deposits (X8) can be cited as having high correlation with other indicators. This does not exclude the possibility that the relationship between them may cause multicollinearity issues. Therefore, during the continuation of our analyses, we focus on checking for the presence of multicollinearity by performing the Variance Inflation Factor (VIF) test [14].

In our opinion, based on the results of the correlation analysis, performing the multicollinearity test will reflect a reliable analysis in constructing our model, see Table 1.

Table 1. Correlation coefficients between the bank's balance sheet indicators (independent variables)

X1	1.0000											
X2	0.3643	1.0000										
X3	**0.8427**	0.3514	1.0000									
X4	**0.8712**	0.2806	**0.8364**	1.0000								
X5	**0.9178**	0.3894	0.8241	**0.8923**	1.0000							
X6	0.6753	0.1142	0.6605	0.7901	0.7515	1.0000						
X7	**0.8772**	0.5171	**0.8532**	0.8055	**0.8764**	0.5538	1.0000					
X8	**0.9063**	0.4103	**0.8489**	**0.9284**	**0.9653**	0.7395	**0.8569**	1.0000				
X9	0.3119	0.0495	0.1737	0.4067	0.3071	0.5078	0.1954	0.3151	1.0000			
X10	0.7721	0.2013	0.7819	**0.8611**	0.8259	0.7906	0.6758	0.8266	0.2467	1.0000		
X11	**0.8918**	0.3686	0.8067	**0.8451**	**0.9793**	0.7223	**0.8370**	**0.9166**	0.2914	0.7996	1.0000	
X12	-0.6079	-0.3749	-0.6367	-0.6705	-0.5201	-0.4219	-0.6114	-0.6454	-0.1352	-0.5034	-0.3924	1.0000

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12

We perform a stationarity test for the "retained earnings" indicator chosen as the dependent variable. This will determine whether this factor is reliable in the model being constructed, see Table 2.

Table 2

Dickey-Fuller test for unit root				
Interpolated Dickey-Fuller			Number of obs =92	
	Test Statistic	1%Critical Value	5% Critical Value	10%Critical Value
Z(t)	1.745	-3.521	-2.896	-2.583
MacKinnon approximate p-value for Z(t) = 0.9982				

From the data in Table 2, it is evident that the undistributed profit indicator is not stationary. Therefore, we create a new time series by determining the difference rows of this indicator. As a result, we can see the new Dickey-Fuller test presented in Table 3. This situation expresses that our dependent variable has been brought to a stationary state.

Table 3

Dickey-Fuller test for unit root				
Interpolated Dickey-Fuller			Number of obs =92	
	Test Statistic	1%Critical Value	5% Critical Value	10%Critical Value
Z(t)	-7.440	-3.523	-2.897	-2.584
MacKinnon approximate p-value for Z(t) = 0.0000				

Based on the dependent variable being brought to a stationary state, we begin testing the model. Here, first, based on the correlation state presented in Table 1, and using the new dependent variable "d.undistributed profit" created in Table 3, we construct the model and test them. As a result, after each model is constructed, we check for multicollinearity and emphasize the possibility of excluding certain indicators from the model. With this, we focus on justifying the reliability of the model.

Continuing our analyses, we examine the Variance Inflation Factor (VIF) test presented in Table 4. Before performing this test, we constructed a model reflecting the impact on undistributed profit with the participation of 12 independent variables obtained from the balance sheet. However, we gradually check the multicollinearity of the independent variables participating in this model. In the Variance Inflation Factor (VIF) test based on the model with the initial 12 independent variables, balance sheet indicators such as Net loans and leasing operations (X5), Obligations on loans and leasing operations (X11), Term deposits (X8), and Net securities and investments made in them (X4) have high mutual multicollinearity, so it is appropriate to exclude these factors from the model. As a result, we reduce the number of indicators participating in the model to four and continue shaping the model, see Table 4.

Table 4. Indicators of Multicollinearity of Independent Variables

Variable	VIF	1/VIF
Loan and leasing operations, net – X5.	181.11	0.005522
Liabilities for loan and leasing operations – X11.	82.55	0.012114
Term deposits – X8.	44.48	0.022482
Securities and investments in them, net – X4.	15.84	0.063148
Demand deposits – X7.	13.24	0.075554
Funds due from other banks and financial institutions, net – X3.	9.84	0.101581
Cash and other payment documents on hand – X1.	9.22	0.108474
Accounts with other banks and financial institutions – X10.	6.15	0.162615
Accrued interest payable – X12.	5.76	0.173740

Liabilities to customers under financial instruments, net – X6.	5.09	0.196465
Bank's funds with the Central Bank – X2.	1.98	0.504813
Funds payable to the Central Bank – X9.	1.90	0.526072
Mean VIF	31,43	

From the data in Table 5, we can observe the overall state of our model constructed with the participation of 8 independent variables.

In the model presented in Table 5, it can be seen that the impact of the selected balance sheet indicators (those retained in the model, with multicollinearity levels confirmed as acceptable by the Variance Inflation Factor (VIF) test presented in Table 6 is statistically significant.

Table 5. Model for Analyzing the Impact of Balance Sheet Indicators on Undistributed Profit

Source	SS	df	MS	Number of obs	=	92
				F(8, 83)	=	2.96
Model	1.5580e+17	8	1.9475e+16	Prob > F	=	0.0058
Residual	5.4570e +17	83	6.5747e+15	R-squared	=	0.2221
Total	7.0150e +17	91	7.7088e+15	Adj R-squared	=	0.1471
				Root MSE	=	8.1e+07

Model variables	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Cash and other payment documents on hand – X1.	-.01043	.0533376	-0.20	0.845	-.1165167	.0956558
Bank's funds with the Central Bank – X2.	.009844	.0173557	0.57	0.572	-.024675	.0443645
Funds due from other banks and financial institutions, net – X3.	-.007122	.0084487	-0.84	0.402	-.0239269	.0096815
Customer liabilities under financial instruments, net – X6.	.871664	.3139527	2.78	**0.007**	.2472252	1.496104
Deposits held on demand – X7.	.010096	.0131787	0.77	0.446	-.0161157	.036308
Amounts due to the Central Bank – X9.	-14.0532	3.635122	-3.87	**0.000**	-21.28338	-6.82315
Accounts with other banks and financial institutions – X10.	.0013244	.0071866	0.18	0.854	-.0129694	.0156183
Accrued interest payable – X12.	.0328541	.0430742	0.76	0.448	-.0528186	.1185269
_cons	-1.83e+7	4.08e+07	-0.45	0.654	-9.94e+07	6.27e+07

In Table 6, we can see the Variance Inflation Factor (VIF) test for our model with 8 independent variables.

Table 6. Multicollinearity Indicators of Independent Variables

Variable	VIF	1/VIF
Талаб қилиб олингунча сақланадиган депозитлар – X7.	6.75	0.148112
Бошқа банклар ва молиявий ташкилотлардан олиниши лозим бўлган маблағлар, соф – X3.	6.47	0.154585
Кассадаги нақд пул ва бошқа тўлов ҳужжатлари – X1.	5.72	0.174843
Бошқа банклар ва молиявий ташкилотларнинг ҳисобварақлари – X10.	4.37	0.228626
Тўланиши лозим бўлган ҳисобланган фоизлар – X12.	3.87	0.258425
Молиявий инструментлар бўйича мижозларнинг мажбуриятлари, соф – X6.	1.89	0.529279

Банкнинг Марказий банкдаги маблағлари – X2.	1.59	0.629393
Марказий банкка тўланиши лозим бўлган маблағлар – X9.	1.51	0.660889
Mean VIF	4.02	

Based on our research, we were able to create the following model. We can see it in formula (1):

$$Y\ (t.f.) = 0{,}8716x_6 - 14{,}0532x_9 - 1{,}83e^7$$

Here, **Y (t.f.)** represents the bank's undistributed profit. Based on **Formula 1**, in our constructed model, it can be observed that indicators such as **Net obligations of customers on financial instruments (X6)** and **Funds to be paid to the Central Bank (X9)** have a statistically significant impact (based on p-values). From this, we believe the following scientific conclusions can be drawn:

1. **Firstly**, an increase of one unit in the obligations of customers on financial instruments contributes to a small increase in undistributed profit.
2. **Secondly**, it should be noted that an increase in funds to be paid to the Central Bank has an impact on reducing undistributed profit.

In conclusion, the bank's participation in the financial market through operations with financial instruments serves to increase the level of profitability. At the same time, we believe that the funds to be paid to the Central Bank can be noted as a factor leading to a reduction in the bank's income.

The fact that two of the bank's balance sheet indicators affect the formation of undistributed profit highlights the need to analyze how these indicators impact interest and non-interest income. Therefore, using this analysis methodology, we conduct our research by sequentially replacing the dependent variables while keeping the independent variables unchanged.

To this end, we first perform stationarity tests for interest and non-interest income to determine the possibility of constructing a model with these as dependent variables. From **Table 7**, it can be seen that the series of total interest income values is non-stationary. However, stationarity is achieved by determining the differences of this series (i.e., **d.Interest Income**). This reflects the possibility of testing the construction of a model with this indicator.

Table 7. Dickey-Fuller test for unit root

Dickey-Fuller test for unit root				
Interpolated Dickey-Fuller			Number of obs =90	
	Test Statistic	1%Critical Value	5% Critical Value	10%Critical Value
Фоизли даромадлар (t)	-2.244	-3.524	-2.898	-2.584
	MacKinnon approximate p-value for Z(t) = 0.1905			
d.Фоизли даромадлар (t)	13.044	-3.524	-2.898	-2.584
	MacKinnon approximate p-value for Z(t) = 0.0000			

Since the multicollinearity of the independent variables has been checked in Table 6, we will try to form a model that reflects the degree of influence of these indicators on Interest income.

Based on the test results of the model presented in Table 8, it can be observed that the model is not statistically significant. For this reason, we did not report the coefficients and their significance values for this model. In conclusion, it can be seen that balance sheet indicators do not play a significant role in the variation of total interest income. In other words, the bank's financial policy does not fully reflect a systematic approach to ensuring its financial stability.

Table 8. Model for analyzing the impact of balance sheet indicators on total d.Interest income

Source	SS	df	MS	Number of obs	=	91
				F(8, 83)	=	1.84
Model	1.6949e+17	8	2.1186e+16	Prob > F	=	0.0810
Residual	9.4352e +17	82	1.1506e+16	R-squared	=	0.1523
Total	1.1130e +18	90	1.2367e+16	Adj R-squared	=	0.0696
				Root MSE	=	1.1e+08

Continuing our research, we focus on analyzing the trends that may affect non-interest income, see Table 9.

Table 9. Model for Analyzing the Impact of Balance Sheet Indicators on Total Non-Interest Income

Source	SS	df	MS	Number of obs		=	92
				F(8, 83)		=	32.79
Model	6.3648e+19	7	9.0926e+18	Prob > F		=	0.0000
Residual	2.3293e+19	84	2.7730e+17	R-squared		=	0.7321
Total	8.6941e+19	91	9.5540e+17	Adj R-squared		=	0.7098
				Root MSE		=	5.3e+08
Model Variables			Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Cash on hand and other payment documents – X1			.8777453	.3338017	2.63	**0.010**	.213944	1.541546
The bank's funds at the Central Bank – X2			.1231825	.1145044	1.08	0.285	-.104522	.3508872
Funds to be received from other banks and financial organizations, net – X3			.0424213	.054184	0.78	0.436	-.065329	.1501722
Net obligations of customers on financial instruments – X6			4.758634	1.866949	2.55	**0.013**	1.046002	8.471267
Demand deposits – X7			.075099	.0858835	0.87	0.384	-.095689	.2458878
Funds to be paid to the Central Bank – X9			2.940294	23.65811	0.12	0.901	-44.1064	49.98705
Accounts of other banks and financial organizations – X10			-.310500	.2726544	-1.14	0.258	-.852703	.2317026
Accrued interest payable – X12			-2.81e+8	2.52e+08	-1.11	0.268	-7.82e+8	2.20e+08
_cons			.8777453	.3338017	2.63	0.010	.213944	1.541546

The impact of balance sheet indicators on total non-interest income can be observed in Table 9. It can be noted that cash on hand and other payment documents (p=0.010) have a statistically significant impact, and net obligations of customers on financial instruments (p=0.013) also exhibit a statistically significant impact on total non-interest income.

In our opinion, it is important to emphasize that the use of cash and financial instruments plays a significant role in increasing banks' non-interest income in the formation of total non-interest income.

Continuing our research, we aim to evaluate the impact of total interest and non-interest income on the formation of undistributed profit. Considering that these indicators are non-stationary, we include their differenced (d.) values in our model. In this case, d.undistributed profit serves as the dependent variable, while d.interest income and d.non-interest income are designated as independent variables, see Table 10.

Table 10. Impact of Interest and Non-Interest Income on Undistributed Profit

Source	SS	df	MS	Number of obs			=	89
				F(8, 83)			=	39.71
Model	3.2932e+17	2	1.6466e+17	Prob > F			=	0.0000
Residual	3.5660e+17	84	4.1465e+15	R-squared			=	0.4801
Total	6.8592e+17	86	7.7946e+15	Adj R-squared			=	0.4680
				Root MSE			=	6.4e+07
Model variables			Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Total interest income			.5474771	.0626168	8.74	0.000	.4229991	.6719551
Total non-interest income			.0036299	.0137337	0.26	0.792	-.0236718	.0309317
_cons			.8777453	.3338017	2.63	0.010	.213944	1.541546

The data in Table 10 shows that interest and non-interest incomes can be considered as factors that have a statistically significant impact on undistributed profit. It should also be noted that the formation of interest income has a noticeable effect on the change in undistributed profit [15].

4. Conclusion

Finally, findings of this study confirm that,among balance sheet indicators,customer liabilities effect on financial instruments and funds which must be paid to Central Bank making a significant role in formation of undistrubuted profit and income creation of commercial banks. The results highlight the pivotal nature of these variables for financial stability; thus commercial banks ought to prioritize these key indicators and aim to optimize them. The findings imply that financial management techniques must prioritize efficient management of non-interest income and proper allocation of funds to enhance financial performance. Additionally, policy-makers and banking managers should take these dimensions into account when formulating their policies on how to operate sustainable banking. Future work should broaden the scope of this analysis by investigating the role of external factors including macroeconomic trends and shifts in regulation in the financial soundness of commercial banks. Finally, we recommend additional research into the long-term implications of privatization for the profitability and stability of banks.

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