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### **ASSESSMENT OF FACTORS AFFECTING THE RETURN ON EQUITY (ROE) IN BANKS BY THE EXAMPLE OF AMERIABANK CJSC**

*The article is devoted to the definition, analysis, and evaluation of the main indicators of profitability in banks. It is no secret that profitability is one of those simple indicators that allows setting a comprehensive picture of the effectiveness of the bank's activities. With its help, both external and internal beneficiaries evaluate competitive advantages and possible changes in the development of the bank's activities and, as a result, make corporate decisions.*

*On our part, an attempt was made to analyze the main profitability indicators of Ameriabank CJSC (hereinafter the bank). Return on Equity (ROE) and Return on Assets (ROA) for 37 quarters (from the 4th quarter of 2014 to the 4th quarter of 2023) and the main indicators affecting the latter were analyzed. For this purpose, more than 20 variables were identified and calculated, classified into external and internal indicators.*

*The analysis was carried out in three main directions:*

- 1. Key indicators (Spread, Net Interest Margin (NIM)) used in international practice to disclose the policies pursued by banks were calculated and their dynamics were monitored,*
- 2. A DuPont factor analysis was performed to find out which factors primarily influenced the bank's policy,*
- 3. A regression model was built to understand exactly what changes in indicators will make it possible to increase profitability.*

*As a result, a regression correlation model was built, which made it possible to accurately predict the bank's ROE for the next period. The result applies to the bank when the latter wants to change its policy.*

**Keywords:** *Return on Equity (ROE), Return on Assets (ROA), Net Interest Margin (NIM), Spread, DuPont Model, Regression Analyzes*

JEL: G21, G32

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**INTRODUCTION.** Currently, evaluating the effectiveness of banks has become a key corporate goal as each bank aims to secure the most successful competitive position and expand its market share. Internationally, ROE, ROA, and NIM indicators are used for this purpose, and the reasons for their changes are clarified. Scholars and bankers agree that constant analysis and management of ROE is needed to secure adequate returns on investments for shareholders, comply with regulatory requirements, accumulate reserves for future turbulences in the economy, and maintain the accuracy of signals sent to the market. Management and supervisory authorities emphasize the need to periodically examine forecasting and effective management techniques to match the latest methods and economic trends (Jurevičienė D., Rauličkis D., 2020).

Our research aims to address the following scientific task: to identify the main factors influencing the bank's indicators listed above and assess their degree of influence on other variables to make forecasts.

To solve this scientific problem, the goal was set to analyze and evaluate the dynamics of ROE using a polynomial trend line and give appropriate estimates to find out the reasons for the decline in recent years. To achieve the goal, the following tasks were set: to study the degree of influence of Spread and NIM, perform three-factor and five-factor DuPont analysis, and make forecasts by building a Regression Model.

As a result, we found out which factors mainly affect the ROE, based on which we could draw appropriate conclusions.

**LITERATURE REVIEW.** A bank's performance is its capacity to generate sustainable profitability. The European Central Bank defined three traditional performance measures: Return on Equity (ROE), Return on Assets (ROA), and Net Interest Margin (NIM) (Ferrouhi El Mehdi, 2018).

Thus, Return on equity (ROE) measures the rate of return on the ownership interest (shareholders' equity) of the common stock owners. It measures a firm's efficiency in generating profits from every unit of shareholders' equity (also known as net assets or assets minus liabilities). ROE shows how well a company uses investment funds to generate earnings growth. ROEs between 15% and 20% are generally considered good (Alam Sh., 2018).

In particular, ROE is a central measure of a firm's profitability, and as such, it is often considered the starting point of a systematic analysis of the firm's profitability (Palepu et al., 2012). ROE is more than a measure of profit; it is a measure of efficiency. A rising ROE suggests that a company is increasing its ability to generate profit without needing as much capital. It also indicates how well a company's management deploys the shareholders' capital. In other words, the higher the ROE, the better. Falling ROE is usually a problem. (Alam Sh., 2018).

ROE is typically defined as net income divided by the book value of equity. Therefore, a bank's ROE can be changed in two ways: through a change in net income or by operating with more or less equity. (Tijmen, D., Shahin, K., 2016). Moreover, ROE is a central measure of performance in the banking industry, which is used to allocate capital inside and across divisions. The reliance on this metric emerged from the risk management approach to banking, which underlies bank capital regulation (Moussu Ch., Petit-Rome A., 2014). One common criticism against using ROE as a central performance measure is that it plays a role in inducing high leverage in banks (Goodhart 2014; Thakor 2013). This raises the issue that the effect of precrisis ROE on bank risk may be driven by an effect of leverage.

Penman (1991) states that fundamental analysis of the firm's financial statements is characterized by observing information that projects future ROE. Accordingly, we base our information variable on the work by Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997) that studies the relationship between a set of fundamental signals in the financial statements of the firm and current security returns and future earnings changes (Baridwan S., et al 2010).

The summary of previous research studies shows that bank ROE is usually expressed through internal and external variables. Internal determinants refer to factors specific to each bank, while external variables include those linking profitability to industry structure and the macroeconomic environment that affects the operation and performance of the banking system. A non-exhaustive listing of these studies that related to the measurement of financial performance is discussed below: Bourke (1989) examined the performance of banks in twelve countries in Europe, North America, and Australia during the period 1972-1981. He found that concentration, liquidity, inflation, and size affect the bank's performance and profitability positively. The study of Molyneux and Thornton (1992) reproduces the methodology of Bourke (1989). They studied the determinants of banking performance in eighteen European countries between 1986 and 1989. The results confirmed Bourke's findings.

Since ROA is one of the key components affecting ROE, it is necessary to closely examine it. Using return on assets (ROA) to evaluate a bank's performance, Pasiouras and Kosmidou (2007) examined the profitability of 584

commercial domestic and foreign banks operating in the 15 European Union countries from 1995-2001. Results obtained show that the profitability of both domestic and foreign banks in the European Union is affected by the bank's specific characteristics (size, capital adequacy, efficiency of the management), financial market structure (concentration), and macroeconomic conditions (inflation and the real gross domestic product (GDP) growth). The estimated results indicated that most bank-specific determinants (capitalization, financing costs, operational efficiency, and credit quality) significantly affected bank profitability.

Trujillo Ponce (2013) analyzed the factors that determine the profitability of Spanish banks from 1999 to 2009. Firstly, the empirical finding reveals differences in the performance of commercial and savings banks. Secondly, the results indicated a strong positive relationship between asset quality, capitalization, concentration, inflation, economic growth, and real interest rate with ROA and ROE (Ozcan I. et al, 2018).

Net interest margin (NIM) also affects bank profitability. A high NIM value sends a positive signal to investors and outsiders, potentially boosting investor confidence and the bank's reputation. NIM has a good influence on boosting bank profitability (ROA) (Silaban P., (2017)), which is backed up by research, which reveals that NIM has a beneficial effect on bank profitability (ROA and ROE) (Supriyono R., Herdayinta H., (2019)). The net interest margin (NIM) is a measure that is used to assess a bank's capacity to manage productive assets to create profits. Interest revenue is subtracted from interest cost to arrive at net interest income. The larger the net interest margin, the more effective the bank is in converting earning assets into credit and indicating that interest revenue on earning assets is appropriately handled by the bank, indicating that the bank is in excellent shape. Net interest margin has a significant positive effect on return on assets (ROA) (Santioso L., Daryatno A., 2021).

Thus, the literature study suggests that ROE is considered a key indicator characterizing the effectiveness of the bank's performance, which is primarily influenced by metrics such as ROA and NIM. For this reason, we tried to develop this point of view, which is common in the literature, and use the example of a particular bank to show the degree of influence of changes in ROA and NIM and key indicators affecting them on ROE. As a result, we were able to build a predictive model that considered the relationship between these indicators.

**RESEARCH METHODOLOGY.** Assessing changes in banks' profit and profitability levels is an urgent problem since it enables the identification of fluctuations in banks' market competitiveness. Since the change in the level of profitability is influenced by many factors, it is necessary to choose several

methods that will allow comprehensively identify the cause-and-effect relationships of changes.

To solve this complex, yet multi-content problem, we used the following types of methods:

1. Comparison and Analysis,
2. DuPont's multivariate analysis,
3. Building a Regression Correlation Model.

The first method was applied according to the following logic. The main data for 2014-2023, necessary for assessing the bank's ROE, has been taken from the bank's website (Ameriabank CJSC webpage). It is important to note that all the tables and figures in the Results section were made by the Author. The method was applied to quarterly data. This made it possible to identify the main reasons for the indicator change. As a result, a polynomial trend line was constructed, according to which the dynamics of ROE for the coming period (year) were predicted with an accuracy of 94.71%. The NIM and Spread indicators were considered as the reason for the change in ROE, which is calculated as follows (Bektas E., 2014, Kowoon Y. et al, 2022):

$$ROE = \frac{\text{Profit}_{after\ tax}}{\text{capital}} \quad (1)$$

$$NIM = \frac{\text{Interest Income} - \text{Interest Expenses}}{\text{Assets}} \quad (2)$$

$$\text{Spread} = \frac{\text{Interest Income}}{\text{Assets}} - \frac{\text{Interest Expenses}}{\text{Passives}} \quad (3)$$

Secondly, the DuPont multivariate analysis was applied to determine the main factors that influenced the change in ROE. To this end, DuPont's three-factor and five-factor analyses were performed.

The Three-factor analysis is the following (Doorasamy M., 2016):

$$\begin{aligned} ROE &= \frac{\text{Profit}_{after\ tax}}{\text{Gross Income}} * \frac{\text{Gross Income}}{\text{Assets}} * \frac{\text{Assets}}{\text{Capital}} = \\ &= \text{Return On Sales} * \text{Asset Turnover} * \text{Leverage} = \\ &= ROS * AT * L \end{aligned} \quad (4)$$

The Five-factor analysis is the following:

$$\begin{aligned} ROE &= \frac{\text{Profit}_{after\ tax}}{\text{Profit}_{before\ tax}} * \frac{\text{Profit}_{before\ tax}}{\text{EBIT}} * \frac{\text{EBIT}}{\text{Gross Income}} * \frac{\text{Gross Income}}{\text{Assets}} \\ &* \frac{\text{Assets}}{\text{Capital}} = \text{Tax Burden (TB)} * \text{Interest Burden (IB)} * ROS_{IB} * AT * L \end{aligned} \quad (5)$$

The DuPont analysis allowed us to determine how the bank's strategy has changed over the past 10 years and which operations have led to a change in ROE in the largest volume.

Let us note that (Universalcpareview.com):

(6)

$$EBIT = \text{Operating Income} - \text{Other Expenses}$$

To facilitate the prediction of analysis results of the analysis in the Excel environment, a Correlation Regression Analysis was performed. As a result, a model was built that enabled the prediction of outcomes for the next period and determined which indicators are in a strong correlation with those affecting the result. The construction of the model was based on the following sequence of steps:

1. The data were grouped by quarter from the 4th quarter of 2014 to the 4th quarter of 2023. As a result, 37 observations were obtained. The selected indicators were grouped as follows: internal and external factors. The first group of indicators included indicators of the Bank's Size (as a natural logarithm of assets), Loans, Credit Risk, Equity, Interest Income, Commission Income, Cost Management, Spread, NIM, ROA, ROS, L, AT, IB, TB. GDP and Inflation indicators were included in the composition of external factors.

2. Based on the data presented in the Excel environment, a correlation table was built, which made it possible to identify target correlations between ROE and other variables, as well as between the variables themselves. Values of  $\pm 70\%$  or more are generally considered to indicate a strong correlation.

3. A Regression Analysis was conducted in Excel, enabling us to understand which indicators are included in the Predicting Model and to what extent the latter affect ROE.

4. The adequacy of the model was checked according to the following criteria:

- Estimation of the Coefficient of Determination,
- Evaluation of the ANOVA table data,
- Verification of the significance of the coefficients,
- Evaluation of the clarity of the coefficient estimation (using the “ $\epsilon$ ” parameter)

5. The evaluation of the model quality was carried out according to the Fisher test and p-value criteria. According to the Fisher test (Volodarsky E., Kozyr E., 2013):

(7)

$$F = \frac{R^2}{1 - R^2} - \frac{f_2}{f_1}$$

Where:  $R^2$  – Determination Coefficient,  
 $f_1$  and  $f_2$  – the number of Freedom Degrees.

Table 1

*The main indicators of Ameriabank CJSC for 2014-2023, by quarter, thousand AMD, %*

Period	Profit before tax and interest	Cost Management	Profit before Tax	Profit after Tax	Profit growth over the base period	Assets	Bank Size, Natural, of Assets	Loans	Loan growth over the base period	Equity	Equity weight	Deposits	Loan risk 1	Loan risk 2	Interest income	Commission income	Operating income	Spread	Net Interest Margin	GDP, mln drams	Inflation	ROE	ROA	L	ROB	AT	TB	IB
2014 4th quarter	4 952 871	0,77%	1 882 216	1 445 747	-	399 744 138	18,806	304 383 619	-	42 354 766	10,595%	294 012 140	103,531%	76,147%	6 144 840	496 634	3 899 035	0,872%	0,764%	1 539 594	103,03%	3,41%	0,36%	9,44	37,08%	0,98%	22,36%	37,80%
2015 1st quarter	6 731 394	1,26%	1 866 779	1 470 728	1,728%	385 781 927	18,771	250 836 896	-17,595%	43 755 358	11,342%	182 650 710	137,331%	65,020%	8 625 985	554 058	5 107 862	0,814%	0,975%	879 566	99,93%	3,36%	0,38%	8,82	28,79%	1,32%	21,22%	27,73%
2015 2nd quarter	6 950 406	1,21%	2 144 796	1 545 499	6,000%	388 752 298	18,804	250 483 355	-17,711%	45 252 286	11,348%	211 144 152	118,631%	62,817%	8 458 555	600 675	5 251 045	0,762%	0,916%	1 105 248	98,59%	3,42%	0,39%	8,81	29,43%	1,32%	27,94%	30,86%
2015 3rd quarter	6 690 742	1,06%	1 998 518	1 828 077	26,307%	442 279 589	19,907	282 325 075	-7,250%	46 949 327	10,615%	246 197 395	114,674%	63,834%	8 781 284	719 820	5 955 548	0,799%	0,925%	1 523 903	100,13%	3,89%	0,41%	9,42	30,86%	1,35%	8,63%	29,87%
2015 4th quarter	6 625 412	1,28%	8 601	31 628	-102,188%	515 816 648	20,061	304 383 619	0,000%	59 323 553	11,501%	294 012 140	103,531%	59,012%	9 867 422	675 377	4 746 016	0,463%	0,830%	1 534 917	101,67%	-0,05%	-0,01%	8,69	-0,67%	0,92%	467,72%	0,13%
2016 1st quarter	8 203 976	1,31%	1 533 668	1 195 896	-17,282%	507 724 323	20,045	311 911 664	2,470%	60 638 997	11,943%	288 820 833	107,965%	61,433%	10 076 454	625 347	4 335 719	0,493%	0,671%	893 634	99,67%	1,97%	0,24%	8,37	27,58%	0,85%	22,02%	18,69%
2016 2nd quarter	7 887 450	1,25%	1 146 533	948 265	-34,410%	522 161 152	20,073	330 472 608	8,588%	60 263 933	11,541%	293 023 237	112,780%	63,289%	10 166 633	691 284	4 855 299	0,531%	0,684%	1 132 261	99,54%	1,57%	0,18%	8,66	19,53%	0,93%	17,29%	14,91%
2016 3rd quarter	8 228 589	1,27%	1 597 788	1 361 935	-5,797%	524 125 690	20,077	339 943 403	11,679%	61 767 890	11,785%	296 150 889	114,017%	64,859%	10 403 485	748 235	5 689 769	0,551%	0,720%	1 525 628	100,14%	2,20%	0,26%	8,49	23,94%	1,09%	14,76%	19,42%
2016 4th quarter	11 361 019	1,10%	3 453 817	2 711 623	87,559%	718 281 085	20,392	499 337 761	64,043%	64 408 800	8,967%	414 608 686	120,436%	69,518%	11 977 681	801 249	6 521 057	0,458%	0,567%	1 515 770	101,15%	4,21%	0,38%	11,15	41,58%	0,91%	21,49%	30,40%
2017 1st quarter	10 686 672	1,26%	2 136 899	1 644 660	13,758%	679 379 081	20,337	461 498 209	51,612%	66 037 902	9,720%	360 731 035	127,934%	67,929%	12 779 982	755 581	5 563 115	0,487%	0,623%	971 041	99,69%	2,49%	0,24%	10,29	29,56%	0,82%	23,04%	20,00%
2017 2nd quarter	10 287 108	1,26%	2 074 630	1 696 441	17,340%	653 324 121	20,298	405 161 909	33,105%	67 784 582	10,375%	385 991 574	104,967%	62,015%	12 753 888	798 748	5 667 210	0,550%	0,695%	1 212 701	99,05%	2,50%	0,26%	9,64	29,93%	0,87%	18,23%	20,17%
2017 3rd quarter	9 668 841	1,07%	2 553 217	2 044 513	41,416%	667 346 057	20,319	416 709 825	36,898%	68 586 689	10,278%	395 720 289	105,304%	62,443%	11 587 813	924 738	6 199 388	0,548%	0,670%	1 587 405	100,15%	2,98%	0,31%	9,73	32,98%	0,93%	19,92%	26,41%
2017 4th quarter	9 826 964	1,04%	2 771 950	2 303 860	59,354%	677 722 097	20,334	467 310 731	53,522%	69 941 358	10,320%	375 170 779	124,599%	68,953%	12 175 515	1 017 958	8 203 846	0,636%	0,756%	1 793 346	100,154%	3,29%	0,34%	9,69	28,08%	1,21%	16,89%	28,21%
2018 1st quarter	9 715 940	0,99%	3 158 375	2 563 493	77,313%	660 032 225	20,308	458 875 670	50,751%	83 137 892	12,598%	340 179 036	134,892%	69,523%	12 461 221	1 087 041	7 409 733	0,751%	0,894%	1 115 564	100,13%	3,08%	0,39%	7,94	34,60%	1,12%	18,94%	32,51%
2018 2nd quarter	10 700 856	0,93%	4 285 436	3 364 075	132,688%	693 491 627	20,357	492 314 628	61,736%	85 292 842	12,299%	351 478 589	140,070%	70,991%	12 839 823	1 068 959	9 260 850	0,793%	0,926%	1 362 704	99,39%	3,94%	0,49%	8,13	36,33%	1,34%	21,50%	40,05%
2018 3rd quarter	9 288 821	0,96%	2 438 005	2 142 089	48,165%	710 253 555	20,381	496 086 871	62,975%	87 415 621	12,308%	363 228 342	136,577%	69,846%	13 008 758	1 180 283	10 201 448	0,732%	0,867%	1 687 018	100,34%	2,45%	0,30%	8,13	21,00%	1,44%	12,14%	26,25%
2018 4th quarter	10 373 119	0,84%	3 887 834	3 099 373	114,379%	775 896 088	20,470	547 393 783	19,831%	93 076 371	11,996%	399 086 132	137,162%	70,550%	14 363 849	1 090 749	9 283 027	0,901%	1,015%	1 851 749	101,48%	3,33%	0,40%	8,34	33,39%	1,20%	20,28%	37,48%
2019 1st quarter	11 017 961	0,92%	3 887 834	3 099 373	114,379%	775 896 088	20,470	537 147 304	76,465%	93 076 371	11,996%	393 872 308	136,376%	69,229%	14 363 849	1 090 749	9 283 027	0,807%	0,932%	1 242 122	100,11%	3,33%	0,40%	8,34	333,97%	0,12%	20,28%	35,29%
2019 2nd quarter	10 609 964	0,93%	3 141 869	2 482 173	71,688%	803 338 231	20,504	560 507 734	84,139%	93 299 176	11,614%	419 517 398	133,608%	69,772%	15 078 963	1 210 156	9 072 425	0,825%	0,947%	1 484 958	98,09%	2,66%	0,31%	8,61	27,36%	1,13%	21,00%	29,61%
2019 3rd quarter	11 382 648	0,90%	4 011 824	3 185 560	120,340%	820 083 827	20,525	566 278 826	86,035%	96 520 244	11,770%	467 742 123	121,066%	69,051%	15 425 792	1 439 697	10 664 911	0,862%	0,982%	1 822 640	100,20%	3,30%	0,39%	8,50	29,87%	1,30%	20,60%	35,25%
2019 4th quarter	12 321 093	0,76%	4 927 988	3 359 769	132,390%	968 081 217	20,691	585 741 899	92,429%	101 227 078	10,456%	583 223 433	98,739%	60,505%	15 492 762	1 698 562	10 982 448	0,747%	0,837%	1 993 602	101,25%	3,32%	0,35%	9,56	30,59%	1,13%	31,82%	40,00%
2020 1st quarter	11 428 139	0,85%	3 674 075	2 982 998	106,329%	910 682 596	20,630	611 074 784	100,752%	104 214 788	11,444%	515 966 737	118,840%	67,101%	16 102 986	2 219 064	985 308	0,807%	0,917%	1 263 059	100,54%	2,86%	0,33%	8,74	302,75%	0,11%	18,81%	32,15%
2020 2nd quarter	9 876 699	0,90%	1 904 848	1 590 430	10,007%	885 393 060	20,602	597 247 962	96,209%	105 749 958	11,844%	496 628 463	122,723%	67,456%	15 739 344	1 110 501	9 641 371	0,755%	0,877%	1 274 459	98,59%	1,50%	0,18%	8,37	16,50%	1,09%	16,51%	19,28%
2020 3rd quarter	10 675 256	0,86%	2 837 686	2 279 034	57,637%	908 651 891	20,627	635 037 259	108,824%	108 140 839	11,901%	495 780 365	128,088%	69,888%	17 692 492	1 473 397	11 291 782	0,968%	1,086%	1 743 631	99,82%	2,11%	0,25%	8,40	20,18%	1,24%	16,99%	26,58%
2020 4th quarter	10 764 724	0,73%	2 765 520	2 148 041	48,577%	1 090 641 724	20,810	696 495 523	128,814%	109 705 602	10,059%	598 839 667	116,308%	63,861%	17 586 521	1 507 260	13 992 526	0,797%	0,879%	1 900 754	103,35%	1,96%	0,20%	9,94	15,35%	1,28%	22,33%	25,68%
2021 1st quarter	17 739 998	0,77%	9 218 713	7 504 678	419,087%	1 113 647 706	20,831	713 001 426	134,237%	135 931 693	12,206%	645 192 115	110,510%	64,024%	18 340 362	1 983 184	1 655 124	0,775%	0,882%	1 282 290	100,98%	5,52%	0,67%	8,19	453,42%	0,15%	18,59%	51,97%
2021 2nd quarter	14 719 197	0,77%	6 800 762	5 515 179	281,476%	1 034 055 919	20,757	680 921 282	123,698%	119 322 193	11,539%	540 192 846	126,052%	65,850%	17 778 119	1 733 146	12 796 193	0,854%	0,953%	1 577 120	99,16%	4,62%	0,53%	8,67	43,10%	1,24%	18,80%	46,20%
2021 3rd quarter	14 637 941	0,78%	6 179 341	5 014 523	246,847%	1 078 886 597	20,799	601 143 314	116,863%	124 099 421	11,503%	561 256 134	117,614%	61,185%	17 522 975	1 899 717	12 985 681	0,840%	0,940%	1 909 559	99,91%	4,04%	0,46%	8,69	36,62%	1,20%	18,85%	42,21%
2021 4th quarter	14 717 028	0,80%	5 965 391	4 820 304	240,303%	1 096 721 050	20,816	673 086 264	121,124%	128 831 249	11,756%	600 614 296	112,066%	61,373%	17 402 843	1 945 755	12 332 029	0,683%	0,789%	2 222 809	101,58%	3,82%	0,45%	8,51	39,90%	1,12%	17,52%	40,53%
2022 1st quarter	17 739 998	0,77%	9 218 713	7 504 678	419,087%	1 113 647 706	20,831	713 001 426	134,237%	135 931 693	12,206%	645 192 115	110,510%	64,024%	18 340 362	1 983 184	1 655 124	0,775%	0,882%	1 487 927	101,73%	5,52%	0,67%	8,19	453,42%	0,15%	18,59%	51,97%
2022 2nd quarter	23 338 797	0,81%	14 296 782	11 604 899	702,692%	1 111 716 123	20,829	684 501 859	124,874%	146 485 481	13,177%	658 437 327	103,959%	61,572%	19 312 155	2 872 779	1 600 603	0,800%	0,924%	1 900 956	100,33%	7,92%	1,04%	7,59	53,09%	1,97%	16,83%	61,26%
2022 3rd quarter	23 447 493	0,78%	14 380 625	11 696 040	722,530%	1 162 527 573	20,874	705 238 906	131,686%	158 258 408	13,613%	695 736 298	101,366%	60,664%	21 334 785	3 365 255	25 985 596	0,932%	1,055%	2 379 443	100,63%	7,52%	1,02%	7,35	45,78%	2,24%	17,28%	61,33%
2022 4th quarter	26 003 676	0,72%	16 972 798	13 263 670	817,427%	1 251 829 806	20,948	735 443 120	141,609%	172 051 545	13,744%	733 605 895	93,854%	58,749%	23 181 785	3 508 260	32 187 724	1,015%	1,130%	2 733 110	101,07%	7,71%	1,06%	7,28	41,21%	2,57%	21,85%	65,27%
2023 1st quarter	22 893 536	0,69%	13 831 976	11 316 721	682,759%	1 307 336 379	20,991	765 963 724	158,206%	165 653 914	12,671%	853 534 828	92,063%	60,119%	24 675 346	3 777 759	23 998 588	1,094%	1,194%	1 788 263	99,30%	6,83%	0,87%	7,89	47,1			

6. The lack of autocorrelation between the indicators included in the model was verified using the Breusch–Godfrey test, according to which (Univer analytical web page):

$$LM = T * R^2$$

(8)

Where:

- T - number of observations,
- R<sup>2</sup> - Determination Coefficient.
- If LM < Breusch–Godfrey Criteria, autocorrelation is absent.

**RESULTS.** Gaining competitive positions is a top priority for banks, since it impacts their ability to grow, attract customers, and ensure an increase in business value depends on it. The values of profit and profitability most clearly reflect the change in the bank's capabilities. Analyses of specialized consulting companies for 2022 and 2023 (Banks. am analytical website) document that the largest profit was recorded by Ardshinbank, amounting to 63 billion AMD, surpassing Ameriabank, which has held a leading position over the past 10 years. To identify the causes of this phenomenon, we conducted a comprehensive analysis of Ameriabank CJSC's profit and profitability indicators. The analysis was done by comparing and analyzing many factors (Table 1.). Figure 1 shows that both quarterly and annual indicators of the bank's ROE decreased in 2023. On the graph presented below, a polynomial trend line has been added as a forecasting tool (with a significance level of R<sup>2</sup>=0.95), according to which it was predicted for 2024 that ROE will constantly decrease.

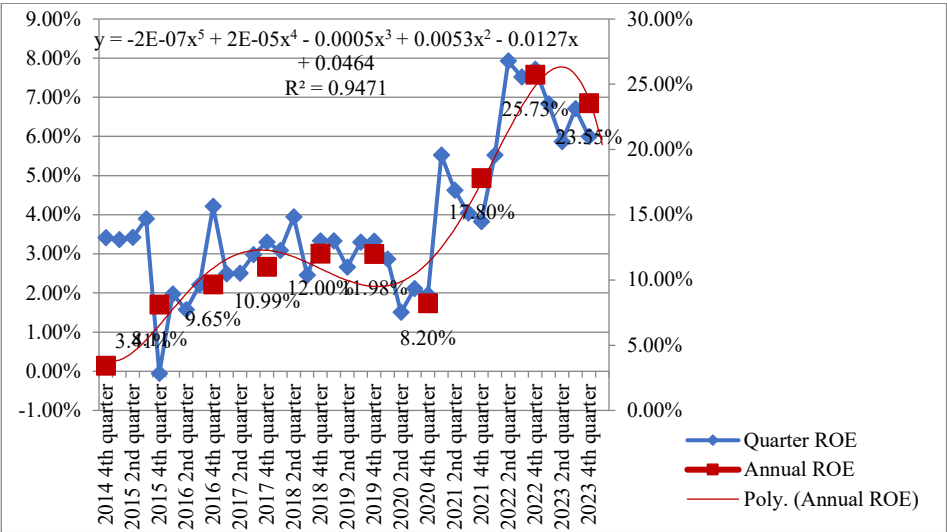
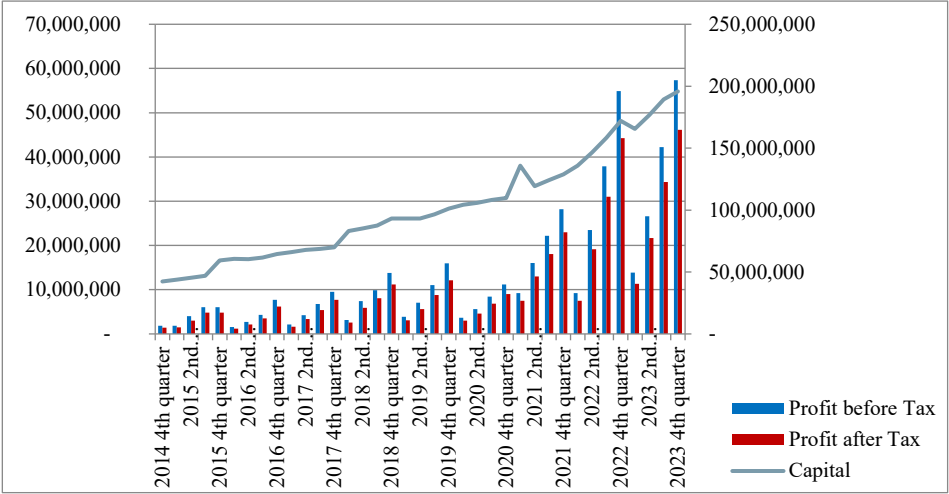


Figure 1. Quarterly and annual ROE of Ameriabank CJSC in 2014-2023, %

To determine the reason for the decline, the dynamics of the bank's Profit Before Tax, Profit After Tax and Equity were presented (Figure 2)



**Figure 2. Quarterly and annual ROE of Ameriabank CJSC for 2014-2023 (cumulative), thousand AMD**

The graph clearly shows that the bank's equity grew faster than profit. It turns out that the bank has focused on ensuring financial stability and curbing risk appetite. We face the difficult task of finding out what caused this policy. Let us analyze in the following directions:

1. Calculate the main indicators used in international practice to disclose the policies pursued by banks and consider their dynamics (Spread, NIM),
2. Make a DuPont factor analysis to find out which factors mainly influenced the bank's policy,
3. Build a regression model to understand exactly what changes in indicators will make it possible to increase profitability efficiency.

From the data presented in Figure 3, it can be seen that both quarterly and annual spreads changed more slowly than NIM. In particular, if NIM for the period under review has changed maximum by 4.350%, Spread has changed maximum by 4.031%. It turns out that NIM had a greater impact on the change in the level of ROE. At the same time, please note that the difference between the two indicators has constantly changed over the years but, on average, remained at the level of 0.398%. It turns out that the bank tried to maintain a low level of cost of assets and liabilities. As a result, the difference of 0.398% is used to reimburse the owners' investments.

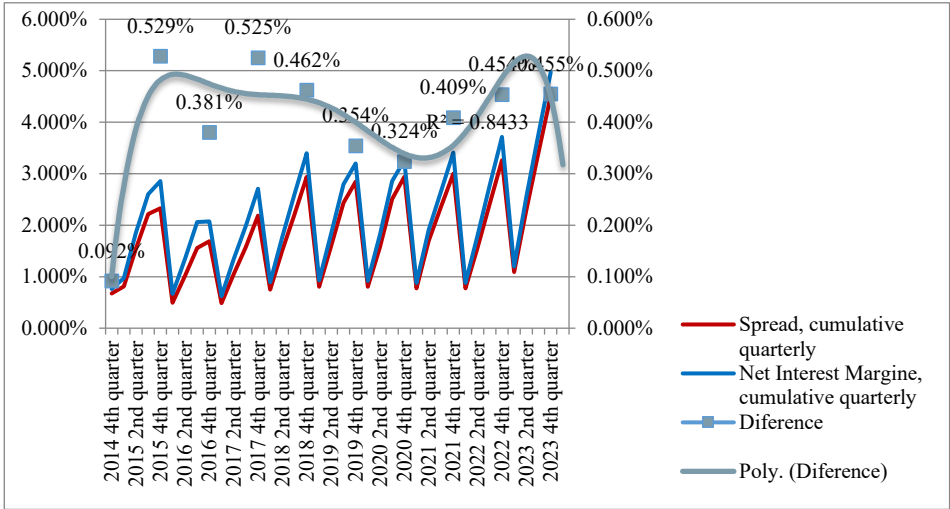


Figure 3. Quarterly dynamics of Spread and NIM for 2014-2023, %

It should be noted that an expanding proactive policy could help to increase the expected ROE. However, Figure 3 shows that the bank, despite the increase in the difference over the past two years, did not reach the 2015 indicator. At the same time, using a Polynomial Trendline, it becomes clear that over the next year, the difference will decrease even more, and the main reason for this may be an insufficient level of Assets. As a result, the bank's profitability may decrease again, which is confirmed by the result of the forecast obtained using the Polynomial Trendline.

To understand the reason for these results, let us conduct a five-factor DuPont analysis, which will determine changes in the bank's policy.

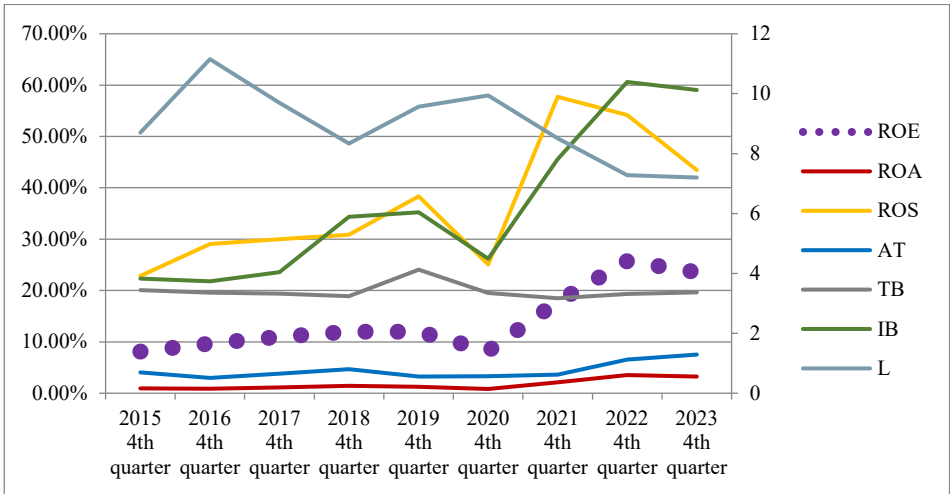
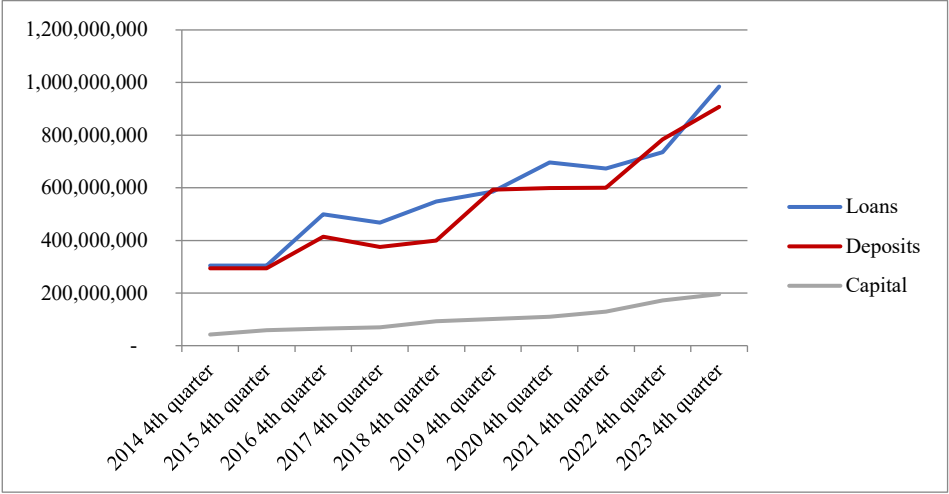


Figure 4. ROE Five-factor DuPont analysis for 2015-2023., %

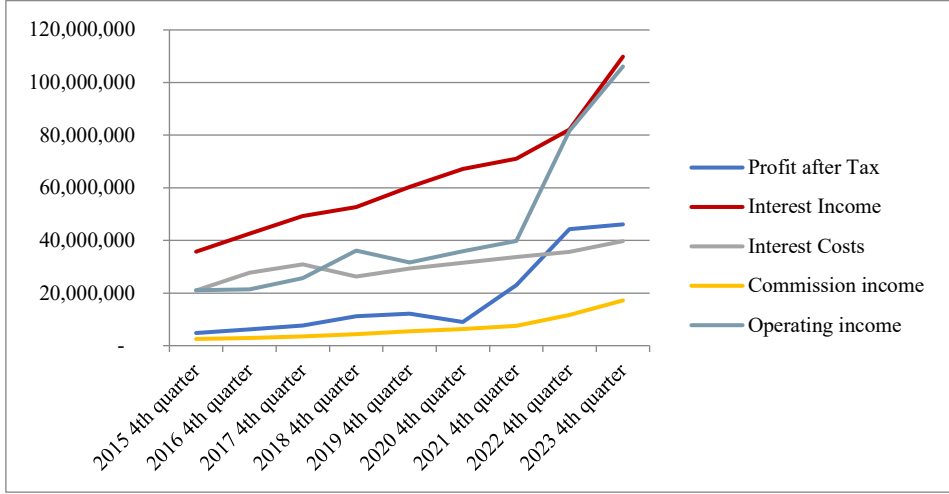
To understand trends, it is recommended to analyze data only for 4th quarters to smooth out the impact of intermediate quarters. Figure 4 shows that

the decrease in ROE was influenced by ROS, L, and ROA. It is noteworthy that, for example, the decrease in L in 2018 did not affect the ROE: the latter grew steadily, and, for example, in 2020, on the contrary, the increase in L led to a decrease in ROE. It turns out that L affects ROE. However, the effect is secondary and indirect. That is, the change in the deposit base did not have a big impact on fluctuations in ROE from the point of view of risk management (see Figure 5). The main reason was the changes in the Assets. From Figure 4, we can also see that the dynamics of ROS are more consistent with the dynamics of ROE, which means that ROE is more dependent on ROS.



**Figure 5.** *Changes in the dynamics of Deposits, Loans, and Capital for 2014-2023, thousand AMD*

The data in Figure 6 prove that the bank's profitability was directly influenced by its Operating Income.



**Figure 6.** *Change in the main elements of Operating Income for 2015-2023, thousand AMD*

Note that in this case, over the entire period under review, the bank's Assets increased by 3.53 times, Loans by 3.23 times, Interest Income by 4.98 times, Operating Income by 7.73 times, and Commission Income by 10.15 times. At the same time, all indicators recorded continuous growth. It turns out that Operating Income continued to grow, and other indicators influenced the decline in ROS. It should be noted that Interest Income has increased not only over these years but also over the past year to the maximum extent over the years under review, amounting to approximately 27 billion AMD. However, it should be noted that the bank's Profit has increased by only 2 billion AMD over the past year. It turns out that profit was influenced by indicators such as net income from foreign exchange transactions, other operating expenses, staff costs, and other general administrative expenses.

Figure 7 shows the main strong impact on the bank's profit, which is net income from foreign exchange transactions and staff expenses, while other administrative expenses and operating expenses, although steadily increasing, grew faster than profit after tax. It should be added that Staff expenses have almost tripled over the past two years compared to 2021, while Interest Income has increased by only 1.55 times. Regarding net income from foreign exchange transactions, please note that 95% of net gains from spot transactions increased 7 times in 2022 compared to 2021 and 4.5 times in 2023, while exchange rates increased in 2023. It turns out that in 2022, the bank increased its income due to migration flows, and in 2023, without suppressing risk appetite, it was impossible to provide a higher income. As a result, the bank pursued an aggressive policy, the consequences of which it did not hedge. As for Other operating expenses, in recent years, the bank has constantly increased expenses on payment systems, professional services, staff training, and various other costs. It turns out that the bank has adopted a policy in the field of fintech, as well as conducting training in this direction, which, to some extent, reduced the amount of profit. However, this created a long-term opportunity to increase profits in other years.

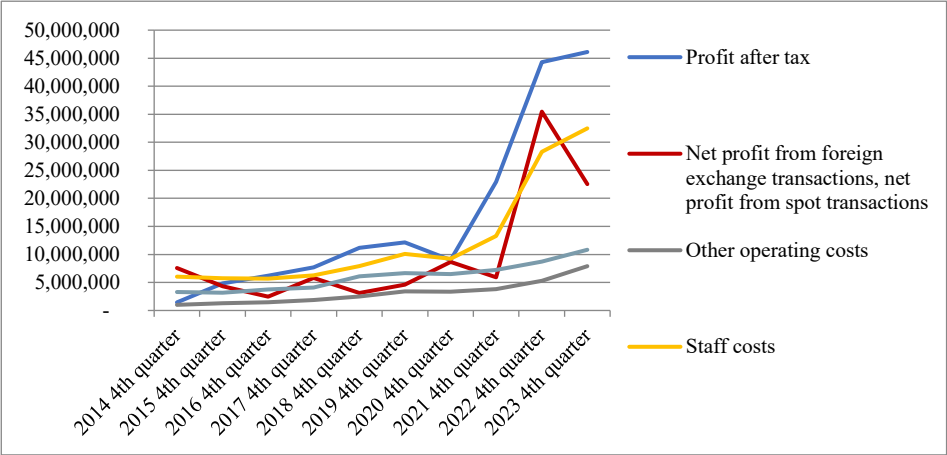


Figure 7. Changes in other elements of Profit for 2015-2023, thousand AMD

A Regression Correlation Model was built to understand the potential for increasing Profitability. For the analysis, indicators were divided into Internal and External categories. The main Internal indicators were the size of the bank (natural logarithm of assets), Equity, Loans, Deposits, Credit Risk (loans/deposits, loans/assets), Interest Income, Spread, Net Interest Income, Cost Management, ROA, L, ROS, AT, IB. GDP and the Inflation rate were taken as external indicators. Table 1 Quarterly data have been reviewed for a thorough assessment of the degree of impact of the indicators. ROE was designated as an impact indicator, or Y, and the remaining variables were numbered from X1 to X18. The model was built using the Excel Data Analysis tool. To identify indicators that are in direct correlation with ROE, a table of mutual correlation relationships between Y and X was built, which allowed finding X, which establishes the strongest connection with Y (Table 2, Table 3).

Indicators directly related to ROE are highlighted in yellow, indicators with a correlation between variables of 90% or more are highlighted in red, and indicators with a correlation of 78-90% are highlighted in green. This coloring allows us to understand how the selected variables affect each other and what effect this has on the final value of ROE. Table 3 shows that, for example, a change in the Size of a bank has a strong impact on the amount of Loans, Capital, Deposits, Interest, and Commission Income and vice versa; the Size of the bank also has no less impact on GDP, and vice versa. It is noteworthy that NIM and Spread form a strong mutual relationship. Revealing the strength of all these connections may allow the bank to change its policy in favor of increasing profitability. It also follows from Table 2 that ROA is closely related to the amounts of Capital, Deposits, Interest Income, and Commission Income, while the indicators of ROA and IB have the greatest impact. Please note that the impact of all indicators is directly proportional. Because in addition to calculating ROE, it is necessary to determine the impact each of the indicators has on the final assessment, we propose to build a Regression Correlation Model.

Table 2

*Indicators that have a major impact on the bank's ROE, from the 4th quarter of 2014 to the 4th quarter of 2023, thousand AMD, %*

Coefficients	Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18
Period	ROE	Cost management	Bank size	Loans	Capital	Deposites	Loan Risk 1	Loan Risk 2	Interest Income	Comission Income	Spread	NIM	GDP, mln dram	Inflation	ROA	L	ROS	AT	IB
2014 4th quarter	3.413%	0.773%	19,806	304 393 619	42 354 766	294 012 140	103.531%	76.147%	6 144 840	496 634	0.672%	0.764%	1 539 594	103.025%	0.362%	9.438	37.080%	0.975%	37.599%
2015 1st quarter	3.361%	1.261%	19,771	250 836 896	43 755 358	182 650 710	137.331%	65.020%	8 625 985	554 058	0.814%	0.975%	879 566	99.927%	0.381%	8.817	28.795%	1.324%	27.732%
2015 2nd quarter	3.415%	1.205%	19,804	250 483 355	45 252 286	211 144 152	118.631%	62.817%	8 458 555	600 675	0.762%	0.916%	1 105 248	98.586%	0.388%	8.812	29.432%	1.317%	30.859%
2015 3rd quarter	3.889%	1.061%	19,907	282 325 075	46 949 327	246 197 395	114.674%	63.834%	8 781 284	719 820	0.799%	0.925%	1 523 903	100.131%	0.413%	9.420	30.661%	1.347%	29.870%
2015 4th quarter	-0.053%	1.283%	20,061	304 393 619	59 323 553	294 012 140	103.531%	59.012%	9 867 422	675 377	0.463%	0.630%	1 534 917	101.666%	-0.006%	8.695	-0.666%	0.920%	0.130%
2016 1st quarter	1.972%	1.314%	20,045	311 911 664	60 638 997	288 820 833	107.995%	61.433%	10 076 454	625 347	0.493%	0.671%	893 634	99.667%	0.236%	8.373	27.582%	0.854%	18.694%
2016 2nd quarter	1.574%	1.253%	20,073	330 472 608	60 263 933	293 023 237	112.780%	63.289%	10 166 633	691 284	0.531%	0.694%	1 132 261	99.537%	0.182%	8.665	19.531%	0.930%	14.914%
2016 3rd quarter	2.205%	1.265%	20,077	339 943 403	61 767 890	298 150 889	114.017%	64.859%	10 403 485	748 235	0.551%	0.720%	1 525 628	100.143%	0.260%	8.485	23.937%	1.086%	19.418%
2016 4th quarter	4.210%	1.101%	20,392	499 337 761	64 408 800	414 608 686	120.436%	69.518%	11 977 681	801 249	0.458%	0.567%	1 515 770	101.150%	0.378%	11.152	41.583%	0.908%	30.401%
2017 1st quarter	2.490%	1.258%	20,337	461 498 209	66 037 902	360 731 035	127.934%	67.929%	12 779 982	755 581	0.487%	0.623%	971 041	99.690%	0.242%	10.288	29.564%	0.819%	19.996%
2017 2nd quarter	2.503%	1.257%	20,298	405 161 909	67 784 582	385 991 574	104.967%	62.015%	12 753 888	798 748	0.550%	0.695%	1 212 701	99.053%	0.260%	9.638	29.934%	0.867%	20.167%
2017 3rd quarter	2.981%	1.066%	20,319	416 709 825	68 586 889	395 720 289	105.304%	62.443%	11 587 813	924 738	0.548%	0.670%	1 587 405	100.150%	0.306%	9.730	32.979%	0.929%	26.407%
2017 4th quarter	3.294%	1.041%	20,334	467 310 731	69 941 358	375 170 779	124.559%	68.953%	12 175 515	1 097 958	0.636%	0.756%	1 793 346	101.538%	0.340%	9.690	28.083%	1.211%	28.208%
2018 1st quarter	3.083%	0.994%	20,308	458 875 670	83 137 892	340 179 036	134.892%	69.523%	12 461 221	1 017 041	0.751%	0.894%	1 115 564	100.127%	0.388%	7.939	34.596%	1.123%	32.507%
2018 2nd quarter	3.944%	0.925%	20,357	492 314 628	85 292 842	351 478 589	140.070%	70.991%	12 839 823	1 068 959	0.797%	0.926%	1 362 704	98.389%	0.485%	8.131	36.326%	1.335%	40.048%
2018 3rd quarter	2.450%	0.965%	20,381	496 086 871	87 415 621	363 228 342	136.577%	69.846%	13 008 758	1 180 283	0.732%	0.867%	1 687 018	100.343%	0.302%	8.125	20.998%	1.436%	26.247%
2018 4th quarter	3.330%	0.836%	20,470	547 393 183	93 076 371	399 086 132	137.162%	70.550%	14 363 849	1 090 749	0.901%	1.015%	1 851 749	101.481%	0.399%	8.336	33.388%	1.196%	37.480%
2019 1st quarter	3.330%	0.919%	20,470	537 147 304	93 076 371	393 872 308	136.376%	69.229%	14 363 849	1 090 749	0.807%	0.932%	1 242 122	100.111%	0.399%	8.336	333.974%	0.120%	35.286%
2019 2nd quarter	2.860%	0.930%	20,504	560 507 734	93 299 176	419 517 398	133.608%	69.772%	15 078 863	1 210 156	0.825%	0.947%	1 484 958	98.090%	0.309%	8.610	27.360%	1.129%	36.612%
2019 3rd quarter	3.300%	0.899%	20,525	566 278 826	96 520 244	467 742 123	121.066%	69.051%	15 425 792	1 439 697	0.862%	0.982%	1 822 640	100.195%	0.388%	8.496	29.870%	1.300%	35.245%
2019 4th quarter	3.319%	0.764%	20,691	585 741 899	101 227 078	593 223 433	98.739%	60.505%	15 492 262	1 698 562	0.747%	0.837%	1 993 602	101.253%	0.347%	9.563	30.592%	1.134%	39.996%
2020 1st quarter	2.862%	0.851%	20,630	611 074 784	104 214 788	515 066 738	118.640%	67.101%	16 102 986	2 219 064	0.807%	0.917%	1 263 059	100.544%	0.328%	8.739	302.748%	0.108%	32.149%
2020 2nd quarter	1.504%	0.901%	20,602	597 247 962	105 749 958	486 628 443	122.732%	67.456%	15 739 344	1 110 501	0.755%	0.877%	1 274 459	98.594%	0.180%	8.373	16.496%	1.089%	19.282%
2020 3rd quarter	2.107%	0.863%	20,627	635 037 259	108 140 839	495 780 365	128.088%	69.888%	17 692 492	1 473 397	0.968%	1.085%	1 743 631	99.817%	0.251%	8.402	20.180%	1.243%	26.582%
2020 4th quarter	1.958%	0.733%	20,810	696 495 523	109 705 602	598 839 667	116.308%	63.861%	17 586 521	1 507 260	0.797%	0.879%	1 900 754	103.352%	0.197%	9.942	15.351%	1.283%	25.691%
2021 1st quarter	5.521%	0.765%	20,831	713 001 426	135 931 693	645 192 115	110.510%	64.024%	18 340 362	1 983 184	0.775%	0.882%	1 282 290	100.978%	0.674%	8.193	453.421%	0.149%	51.966%
2021 2nd quarter	4.622%	0.766%	20,757	680 921 282	119 322 193	540 192 846	126.052%	65.850%	17 778 119	1 733 146	0.854%	0.953%	1 577 120	99.156%	0.533%	8.666	43.100%	1.237%	46.203%
2021 3rd quarter	4.041%	0.784%	20,799	660 116 314	124 099 421	561 256 134	117.614%	61.185%	17 522 975	1 899 717	0.738%	0.840%	1 909 559	99.915%	0.465%	8.694	38.616%	1.204%	42.215%
2021 4th quarter	3.816%	0.798%	20,816	673 086 264	128 931 249	600 614 296	112.066%	61.373%	17 402 843	1 945 755	0.683%	0.789%	2 222 809	101.577%	0.449%	8.506	39.899%	1.124%	40.534%
2022 1st quarter	5.521%	0.765%	20,831	713 001 426	135 931 693	645 192 115	110.510%	64.024%	18 340 362	1 983 184	0.775%	0.882%	1 487 927	101.754%	0.674%	8.193	453.421%	0.149%	51.966%
2022 2nd quarter	7.922%	0.813%	20,829	684 501 859	146 485 481	658 437 327	103.959%	61.572%	19 312 155	2 872 779	0.800%	0.924%	1 900 956	100.328%	1.044%	7.589	53.086%	1.966%	61.258%
2022 3rd quarter	7.517%	0.780%	20,874	705 238 906	158 258 408	695 736 298	101.366%	60.664%	21 334 785	3 365 255	0.932%	1.055%	2 379 443	100.636%	1.023%	7.346	45.779%	2.235%	61.331%
2022 4th quarter	7.709%	0.721%	20,948	735 443 120	172 051 545	783 605 895	93.854%	58.749%	23 181 785	3 508 260	1.015%	1.130%	2 733 110	101.071%	1.060%	7.276	41.207%	2.571%	65.271%
2023 1st quarter	6.832%	0.693%	20,991	785 963 724	165 653 914	853 534 828	92.083%	60.119%	24 675 346	3 777 759	1.094%	1.194%	1 788 263	99.305%	0.866%	7.892	47.156%	1.836%	60.419%
2023 2nd quarter	5.864%	0.807%	20,948	839 915 513	176 590 481	837 256 441	100.318%	67.085%	26 333 179	4 081 007	1.164%	1.296%	2 138 376	98.551%	0.827%	7.090	41.415%	1.997%	55.858%
2023 3rd quarter	6.705%	0.744%	21,009	902 244 516	189 378 933	891 435 665	101.213%	67.817%	28 248 136	4 294 855	1.256%	1.379%	2 574 593	100.881%	0.954%	7.025	47.052%	2.028%	61.170%
2023 4th quarter	5.993%	0.758%	21,067	984 746 562	195 787 335	907 749 557	108.482%	69.861%	30 583 544	5 039 613	1.290%	1.412%	3 001 547	100.938%	0.832%	7.200	38.953%	2.157%	58.661%

Table 3

*ROE and other indicators' Correlation Matrix*

Coefficients		Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18
		ROE	Cost management	Bank size	Loans	Capital	Deposites	Loan Risk 1	Loan Risk 2	Interest Income	Comission Income	Spread	NIM	GDP, mln dram	Inflation	ROA	L	ROS	AT	IB
Y	ROE	1																		
X1	Cost management	-0,617	1,000																	
X2	Bank size	0,628	- 0,797	1,000																
X3	Loans	0,659	- 0,814	0,972	1,000															
X4	Capital	0,755	- 0,767	0,936	0,962	1,000														
X5	Deposites	0,738	- 0,772	0,938	0,958	0,974	1,000													
X6	Loan Risk 1	-0,444	0,232	- 0,330	- 0,304	- 0,430	- 0,546	1,000												
X7	Loan Risk 2	-0,182	- 0,095	- 0,164	- 0,023	- 0,171	- 0,196	0,594	1,000											
X8	Interest Income	0,700	- 0,703	0,920	0,964	0,980	0,969	- 0,403	- 0,121	1,000										
X9	Comission Income	0,785	- 0,670	0,828	0,889	0,953	0,946	- 0,519	- 0,161	0,960	1,000									
X10	Spread	0,646	- 0,697	0,638	0,755	0,793	0,742	- 0,168	0,136	0,819	0,828	1,000								
X11	NIM	0,625	- 0,624	0,591	0,715	0,771	0,708	- 0,158	0,124	0,801	0,818	0,994	1,000							
X12	GDP, mln dram	0,602	- 0,657	0,696	0,736	0,769	0,777	- 0,465	- 0,106	0,765	0,797	0,665	0,637	1,000						
X13	Inflation	0,045	- 0,293	0,099	0,105	0,053	0,137	- 0,249	0,016	0,007	0,046	-0,070	- 0,122	0,341	1,000					
X14	ROA	0,986	- 0,616	0,655	0,694	0,811	0,775	- 0,459	- 0,190	0,756	0,841	0,707	0,697	0,645	0,018	1,000				
X15	L	-0,539	0,428	- 0,480	- 0,540	- 0,701	- 0,557	0,196	0,088	- 0,640	- 0,684	-0,711	- 0,750	- 0,465	0,206	- 0,657	1,000			
X16	ROS	0,212	- 0,271	0,248	0,234	0,200	0,186	0,012	0,010	0,135	0,099	0,055	0,029	- 0,182	0,173	0,184	- 0,128	1,000		
X17	AT	0,565	- 0,297	0,341	0,394	0,518	0,485	- 0,342	- 0,158	0,530	0,616	0,594	0,612	0,705	- 0,084	0,620	- 0,492	- 0,611	1,000	
X18	IB	0,96	- 0,779	0,724	0,767	0,831	0,810	- 0,390	- 0,084	0,773	0,829	0,755	0,722	0,661	0,081	0,956	- 0,601	0,261	0,520	1,000



- The “Intercept” row contains information about the free member and the coefficients of the indicators. In this case, it is necessary to check the significance of the coefficients using the “p-value” column presented in the third subsection of Table 5. If the values in the column are  $< 0.05$  (significance level), they can be included in the calculations. In this case, the p-values of the coefficients for all indicators are less than  $\alpha=0.05$  (except the “Intercept” row).

- In addition, it is necessary to clarify the assessment. Since  $p < \alpha$ , the confidence ranges are as follows.

$$\begin{aligned}
 & - 0,00000000038 < Z1 < - 0,00000000010 \\
 & 0,00000000001 < Z2 < 0,00000000006 \\
 & - 0,00000000040 < Z3 < 0,00000000175 \\
 & - 0,00000000751 < Z4 < - 0,00000000040 \\
 & 5,58736157401 < Z5 < 8,28904980582 \\
 & 0,00458279585 < Z6 < 0,04877590868
 \end{aligned}$$

That is, the accuracy of the estimate ( $\epsilon$ ) for the indicators is equal to the value of the indicator exceeding 99.5%, plus the value of the coefficient corresponding to the indicator. To demonstrate the level of significance of an indicator, it is necessary to correlate the accuracy of the assessment of each indicator with the value of its coefficient:

- $Z1 = 143\%$
- $Z2 = 264\%$
- $Z3 = 359\%$
- $Z4 = 110\%$
- $Z5 = 219\%$
- $Z6 = 283\%$

As a result, it becomes clear that all the coefficients are significant and can be included in the model.

Let us check the adequacy of the model:

**1. Breusch – Godfrey test:**

$$LM = 37 * 0.993 = 36.63$$

Since  $36.63 < 46.97$  then autocorrelation is absent.

**2. Fisher test:**

$$F = \frac{0.993}{1 - 0.993} - \frac{37 - 6 - 1}{5} = 495$$

As  $495 > 2.48$ , the model is of good quality.

**3. A graphical method.** According to Table 4 and Figure 8, the differences between the predicted and actual ROE are small, indicating the high quality of the model.

Table 5

Predicted and actual ROE and Residuals, %			
Observation	Predicted ROE	Actual ROE	Residuals
2014 4th quarter	3,73%	3,41%	0,32%
2015 1st quarter	3,33%	3,36%	-0,03%
2015 2nd quarter	3,49%	3,42%	0,08%
2015 3rd quarter	3,70%	3,89%	-0,19%
2015 4th quarter	-0,05%	-0,05%	0,01%
2016 1st quarter	2,11%	1,97%	0,14%
2016 2nd quarter	1,64%	1,57%	0,07%
2016 3rd quarter	2,28%	2,20%	0,07%
2016 4th quarter	3,81%	4,21%	-0,40%
2017 1st quarter	2,44%	2,49%	-0,05%
2017 2nd quarter	2,60%	2,50%	0,09%
2017 3rd quarter	2,97%	2,98%	-0,01%
2017 4th quarter	3,12%	3,29%	-0,17%
2018 1st quarter	3,18%	3,08%	0,10%
2018 2nd quarter	4,05%	3,94%	0,10%
2018 3rd quarter	2,36%	2,45%	-0,09%
2018 4th quarter	3,46%	3,33%	0,13%
2019 1st quarter	3,38%	3,33%	0,05%
2019 2nd quarter	2,69%	2,66%	0,03%
2019 3rd quarter	3,41%	3,30%	0,11%
2019 4th quarter	3,47%	3,32%	0,16%
2020 1st quarter	2,62%	2,86%	-0,24%
2020 2nd quarter	1,53%	1,50%	0,03%
2020 3rd quarter	2,18%	2,11%	0,08%
2020 4th quarter	2,08%	1,96%	0,13%
2021 1st quarter	5,49%	5,52%	-0,03%
2021 2nd quarter	4,45%	4,62%	-0,17%
2021 3rd quarter	3,75%	4,04%	-0,29%
2021 4th quarter	3,58%	3,82%	-0,23%
2022 1st quarter	5,49%	5,52%	-0,03%
2022 2nd quarter	7,81%	7,92%	-0,11%
2022 3rd quarter	7,46%	7,52%	-0,06%
2022 4th quarter	7,85%	7,71%	0,14%
2023 1st quarter	6,77%	6,83%	-0,06%
2023 2nd quarter	6,05%	5,86%	0,19%
2023 3rd quarter	7,00%	6,70%	0,30%
2023 4th quarter	5,86%	5,99%	-0,14%

4. If the average value in a series of residues is 0, the model is of high quality. In our case, the data in Table 4 show that the average value of a series of residues is 0.
5. The data distribution checking. According to the histogram, the data are normally distributed (Figure 9).

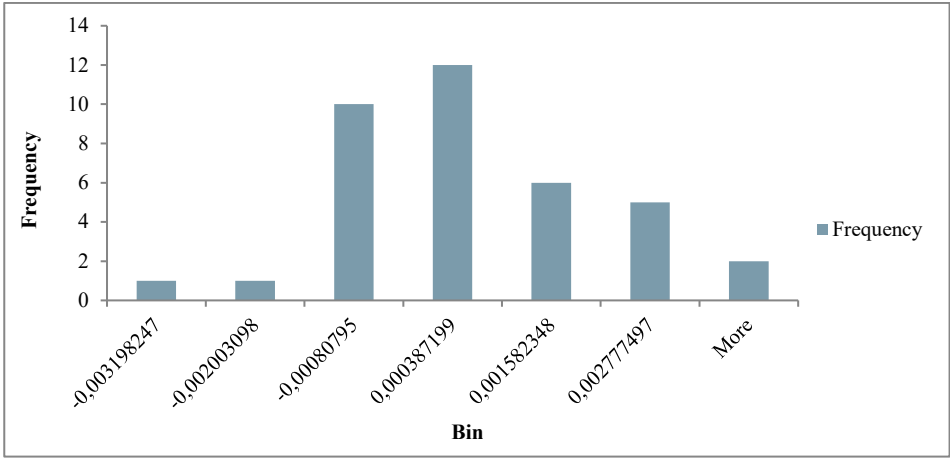


Figure 9. The Table 9 data histogram

In 60% of cases, the differences between the actual and predicted ROE are insignificant, ensuring the high quality of the model.

Thus, we can say that the model is of high quality and can be shown in the following way:

$$Y = -0,000000000024 * X4 + 0,000000000003 * X5 + 0,000000000068 * X8 + -0,000000000395 * X9 + 6,93820568992 * X14 + 0,02667935226 * X18 \tag{9}$$

As we can see from the model, all indicators, except X14 and X18, affect the model to a small extent; that is, an increase or decrease in the latter by one point will have a weak impact on ROE. Only the indicators X14 and X18 have an impact by their change. For example, changing the X14 by one point may result in a 6.94-point change in ROE. That is, the ROE of the bank is influenced by the bank's ROA and IB. We can say that the following modification of the model is applicable to predict the bank's ROE:

$$Y = 6,938 * X14 + 0,027 * X18 \tag{10}$$

Referring to the data in Table 2, we can say that if the bank wants to increase ROA, it should prioritise the indicators that are in the strongest correlation with the latter, namely the amount of the bank's Total Capital, Commission Income, and IB. The following result was obtained in the data for the 1st quarter of 2024.  $ROE_{model/prediction}=6,297\%$ ,  $ROE_{actual}=6,086\%$ ,  $ROE_{residual}=0.210$ :  $ROE_{residual}$  is 3.459% of  $ROE_{actual}$ , which is  $< 5\%$  (error value). It turns out that the model provides high forecasting results that can be used when planning indicators that make up an integral part of the model.

**CONCLUSIONS.** The analysis allows us to draw the following conclusions:

1. Among the most important indicators showing the effectiveness of the bank's activities, ROE, ROA, and NIM must be analyzed, evaluated, and

predicted for long periods and short intervals of time. This is especially important when the bank is faced with the task of making such changes to its policy, which will subsequently affect the position and share held in the market. The ROE is one of the most important and decisive to ensure a high level of other indicators of the bank. This is primarily due to the attitude and satisfaction of the owners. After all, the reduced productivity that the owner receives for each unit of investment is a cause for concern for the latter and, in the worst case, a risk of withdrawal.

2. The comprehensiveness of the conducted analyses indicates that ROE is a good enough tool for assessing the dynamics of NIM and Spread and their impact. The latter are transport-dependent and are crucial in determining the bank's ROE.

3. Explaining the reason for the change in ROE only by a change in Profit or Equity is quite simplistic and does not allow for a comprehensive assessment of the bank's performance. One of the most common models for evaluating results in international practice is the two-factor, three-factor, and five-factor DuPont model. DuPont analysis is an excellent method of determining a bank's strengths and weaknesses. This model made it possible to identify the main factors affecting the bank's ROE. In a particular case, it would be more appropriate for the bank to expand its deposit and credit activities and not focus on obtaining other aggressive income. After all, the latter brings short-term results.

4. At the same time, it is necessary to determine whether the influencing indicators are strongly correlated or not. To this end, it is proposed that a correlation matrix of indicators be built to find out which indicators are most strongly related to ROE. Moreover, the constructed correlation matrix can serve as a roadmap for identifying the strengths and weaknesses of the Bank's policy. Thus, the main indicators affecting ROE are first identified, and then the indicators are determined, which strongly influence certain indicators. In our case, the ROE indicator was strongly influenced by the indicators of ROA, IB, Capital, Deposits, Interest Income, and Commission Income. If we try to figure out how we should increase, for example, the indicator of Interest Income, we will see that the latter is influenced by the Size of the bank, Deposit and Credit activities and, oddly enough, the amount of Non-Interest Income. In order to increase the bank's ROE, non-traditional activities must be developed.

Evaluating the bank's performance should not be an end in itself. This should contribute to forecasting the bank's performance. Constructing a regression correlation model allowed us to determine that the bank's ROE is mainly explained by ROA and IB. As a result, it becomes clear that to increase the bank's ROA, the bank needs to focus on commission income and increase IB, on the amount of deposits.

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