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ANALYSIS OF FINTECH AND BANK PROFITABILITY IN KAZAKHSTAN

The sustainable expansion of fintech products increases the value of the banks worldwide. This article examines the relationship between the development of financial technologies and the profitability of commercial banks in the Republic of Kazakhstan. The purpose of the study is to determine the impact of fintech development on bank profitability. Using aggregated banking data from the National Bank of the Republic of Kazakhstan and the Bureau of National Statistics over an 11-year period, the relationship is analyzed by means of correlation analysis implemented in STATA. The analysis employs return on assets (ROA), a fintech index, total loans, total deposits, the cost-to-income ratio, GDP, and inflation as key variables. For the first time for Kazakhstani banks, a fintech index is constructed based on the number of payment cards, ATMs, POS terminals, and cashless payment transactions. The results reveal a strong positive correlation between ROA and the fintech index (81.95%) and demonstrate that the development of fintech products has a substantial positive effect on the profitability of commercial banks. In addition, the financial ratios of Halyk Bank JSC, Bank CenterCredit JSC, and Kaspi Bank JSC were analysed which selected based on their asset sizes.

Keywords: fintech index, commercial bank, correlation analysis, cards, ATM, POS-terminals, non-cash transactions, ratio analysis.

Кітт сөздер: финтех индексі, коммерциялық банктер, корреляциялық талдау, карточкалар, банкоматтар, POS-терминалдар, қолма-қол ақшасыз операциялар, коэффициенттерді талдау.

Ключевые слова: финтех индекс, коммерческий банк, корреляционный анализ, карточки, банкоматы, POS-терминалы, безналичные операции, анализ коэффициентов.

JEL Classification: G21, G29, E44

Introduction. The banking sector is developing sustainably in Kazakhstan due to the combination of various factors that affect supply and demand. On the supply side, advancements in technology and shifts in regulations serve as the primary catalysts for change. Meanwhile, on the demand side, a generation of digitally savvy individuals is reshaping consumer behaviour and expectations more rapidly than ever before [1]. Technology development tries to satisfy customers' needs and preferences through accessible and high-speed services, as well as personalized products that create digital banking services.

Some scholars have been studying the impact of fintech on bank profitability and performance in Kazakhstan [2, 3, 4]. The results of their research showed that the implementation and development of fintech products and services have a positive influence on bank performance and generate greater profit overall.

The purpose of this study is to determine whether digital services and products increase or decrease bank profitability in Kazakhstan. The research method includes correlation analysis in STATA software. The total bank data was gathered from the NBRK reports and statistical bulletins as well as the Bureau of National Statistics of Kazakhstan on an annual basis. The authors tested the correlation between the dependent variable measured by the Return on asset (ROA) of all Kazakhstan's second-tier banks and independent variables measured by total loans, total deposits, the cost-to-income ratio, and a fintech index constructed from the number of cards, ATMs, and POS terminals, number of cashless payment transactions, and the macroeconomic variables such as GDP and inflation. The authors tested and provided an answer for the research question: Does fintech correlate with bank profitability positively or negatively in Kazakhstan?

Literature review. Kazakhstan is considered a leader in fintech development in the Central Asian region, according to the “Overview of Fintech Development in Central Asia” prepared by KPMG in 2020 [5]. In this report, KPMG underlined that Kazakhstan has a relatively developed financial sector and infrastructure, and the key factors include the presence of institutions such as the Astana International Financial Centre (AIFC), investment, innovation, and the growth of e-commerce.

The Kazakhstani researchers studied FinTech development in the banking sector due to the rapid growth of digitalized products and services over the last decade. Mukusheva A.G., Zholamanova M.T., and Kuchukova N.K. [3] used SWOT analysis to specify the strengths, weaknesses, opportunities, and threats of financial technologies to the prosperity of the banking sector in Kazakhstan. Moreover, the authors concluded that there are pros such as switching from traditional banks to modern banks and cons as facing security and cyber-attack problems.

Kredina A.A., Koshkina O. V., and Vasa L. [4] tested the relationship between the payment card numbers and non-cash payment volumes using the Pearson correlation. So, the findings indicated a declining trend in the relationship between the selected indicators and the volume of money transfers over time.

Using the factor analysis Yeveskina Zh.T., Nurgaliyeva A.M., and Chaykovskaya L.A. [2] found that with 95% confidence, the analysis confirmed a significant linear correlation between the examined net profit data and the sets of variables such as ROA, Liability Value Indicator, Operational efficiency level, the efficiency of dealing operations, and the efficiency of revaluation operations.

A lot of foreign scientists have been studying fintech and bank profitability using different measurements. Bank profitability was measured by ROA and ROE (Return on equity), and fintech was described by products, patents, index, number of fintech companies, and so on, due to the specific characteristics of the economic and regulatory conditions of each country.

Ashiru O., Balogun G., Paseda O. [6] in their research investigated how financial innovation influences the financial performance of Nigerian deposit money banks (DMBs) between 2012 and 2021. Employing ARDL and Granger causality tests, the results show that POS, mobile banking, and ATMs positively affect bank profitability, while National Electronic Fund Transfer and NIBSS Instant Payments show minimal effect. The study suggests increasing e-banking services.

Jihen Bousrih [7] explores how digitalization influences banking performance in 24 leading fintech nations between 2012 and 2019. The results indicate that cashless transactions and e-money improve banks' ROA, while mobile transactions reduce profitability by shifting funds away from conventional banking. The study emphasizes policy considerations for banking stability and operational efficiency.

Recent research has explored fintech's influence on bank performance across various markets. In Indonesia, fintech lending was found to have a long-term negative effect on banks [8]. A cross-country study showed that fintech credit lowers bank profitability but enhances stability, with stricter regulations strengthening this stabilizing effect [9]. In contrast, an analysis of European banks found a positive correlation between technological innovation and profitability, while physical branches had a negative impact [10]. Similarly, in the UK, fintech firms contributed to improved bank performance, with each new fintech entity increasing net interest margin and asset yield [11]. These varied results suggest that fintech's impact on bank performance depends on market dynamics and regulatory frameworks.

No research has been conducted to calculate the fintech index for the Kazakhstani banking sector. So, this article will make a practical and scientific contribution to the existing literature with a new variable, such as the "fintech index" generated by the authors using the available data from the official resources for the Kazakhstani commercial banks.

The main part. In the banking sector of Kazakhstan, many banks ceased operations and merged between 2014-2024. The number of banks significantly declined from 38 commercial banks in 2014 to 21 commercial banks in 2024. However, this reduction in the number of banks does not have an effect on fintech products and service development in the country. The top leaders in the fintech industry by their assets are Halyk Bank JSC (34,48%), Kaspi Bank JSC (15,20%), and Bank CenterCredit JSC (12,42%) (FinTech Market in Kazakhstan, 2024) [12].

Established in 1923, Halyk Bank JSC ranks among the largest and oldest commercial banks in Kazakhstan's financial sector, offering a comprehensive range of financial services to individuals, small and medium-sized enterprises, and large corporations. Over the spanning period from 2014 to 2024, Halyk Bank's assets increased more than 6,8 times - from 2,63 trillion tenge to 17,94 trillion tenge. Particularly significant growth was seen in 2018 when assets almost doubled year-on-year due to the M&A process

with Kazkommertsbank JSC. Halyk Bank JSC had started integrating the mobile app of Kazkommertsbank JSC, which was a leading mobile app at that time. In the following years, a stable positive dynamic was observed: annual asset growth averaged around 1-2 trillion tenge. By 2023, assets reached 14,94 trillion tenge, and in 2024, for the first time, exceeded the mark of 17 trillion tenge. It proves the continued strengthening of Halyk Bank's position as the largest financial institution in Kazakhstan.

For investors and analysts, the primary financial performance measures include the Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) [1, 14]. ROA reflects how efficiently a bank uses its assets to generate profit for each tenge of assets. ROE reflects how efficiently a bank uses its shareholders' funds to generate profits. NIM shows how profitably a bank makes money on the difference between the interest it earns on assets and what it pays on liabilities. Figure 1 shows the change of the latter indicators for Halyk Bank JSC over 11 years.

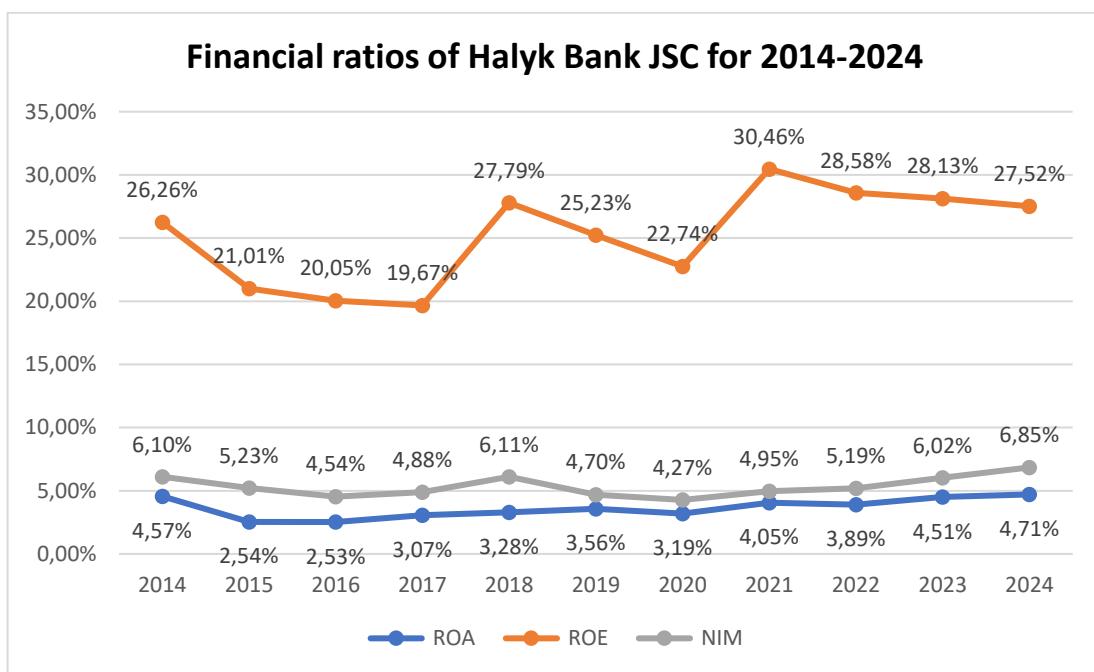


Figure – 1. Dynamics of ROA, ROE, and NIM of Halyk Bank JSC over 11 years

*composed by the authors based on the data from the NBRK website [13]

Halyk Bank's ROA ranged from 2,5% to 4,7% during the analysed period. The lowest value was recorded in 2015-2016, which was due to macroeconomic factors and decreasing profitability of assets. Since 2021, there has been a steady increase, and by 2024, the bank has reached the max ROA of 4,71%.

ROE consistently demonstrated strong performance over the period, remaining above 19% even during the weakest years. The peak value of 30,46% was recorded in 2021, reflecting effective capital utilization. In recent years, the ratio has stabilized within the range of 27–28%, which indicates strong shareholder returns.

NIM reflects the stability of Halyk Bank's interest income and has fluctuated between 4,27% and 6,85%. The lowest value was observed in 2020, but the margin has been growing steadily since then. In 2024, the bank showed a record level of NIM – 6,85%, which indicates increased efficiency of asset and liability management.

Bank CenterCredit JSC has operated in the financial market since 1988 and is one of the oldest commercial banks in Kazakhstan. BCC also provides various financial services in the retail and corporate banking sectors. In recent years, it has demonstrated stable growth in assets and strengthened its position in the country's banking sector. Between 2014 and 2024, BCC's assets expanded more than sixfold, increasing from 1,1 trillion tenge to 7,03 trillion tenge, despite temporary declines in 2016 and 2017. Since 2021, asset growth has accelerated, with a particularly pronounced surge observed in 2022. The rapid expansion trend continued in 2023 and 2024, which can be attributed to the bank's active expansion, growing customer base, and investments. Figure 2 demonstrates the development of asset volume in BCC over 11 years.

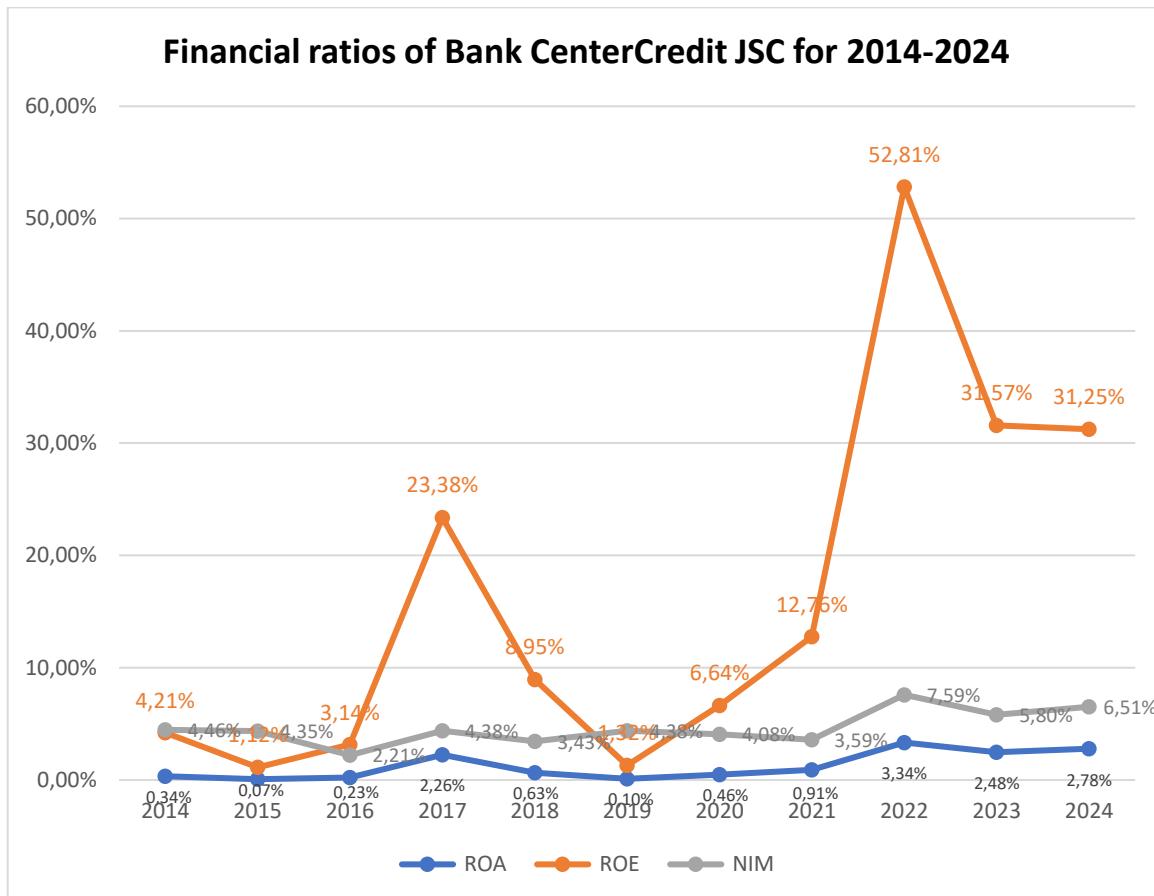


Figure – 2. Dynamics of ROA, ROE, and NIM of Bank CenterCredit JSC over 11 years.

*composed by the authors based on the data from the NBRK website [13]

Between 2014 and 2024, ROA of Bank CenterCredit JSC showed significant fluctuations. ROA remained at a low level of less than 0,5%, indicating weak profitability between 2014 and 2016. A sharp rise in ROA occurred in 2017 (2,26%), but in the following two years, the indicator dropped again. From 2021, there was a steady improvement, with ROA rising to 3,34% in 2022, the peak for the entire period. In 2024, the figure was 2,78% demonstrating a strong recovery in asset utilisation efficiency.

BCC's ROE also varied quite a bit over the period under review. In 2015 showed one of the lowest levels at only 1,12% indicating weak returns to shareholders. In 2017 and especially in 2022, the bank performed strongly with ROEs of 23,38% and 52,81% respectively. These surges could be attributed to improved operating profit and capital structure. In 2024, ROE remained at a high level of 31,25%, indicating high quality of capital management.

In 2016, there was a sharp decline in the margin to 2,21%, which is likely due to changes in interest rate policy and asset mix. NIM stabilised subsequently between 3,4%-4,4% until 2021. A significant increase occurred in 2022 when the ratio reached 7,59%, indicating a significant improvement in the profitability of the loan portfolio. In 2024, BCC's NIM was 6,51%, confirming the sustainable effectiveness of the bank's interest rate policy.

Kaspi Bank JSC is one of the leading and most innovative banks in Kazakhstan, and it has been operating in the market since 1991. The bank has become known for its unique digital ecosystem that combines mobile payments, online shopping, and banking services. In recent years, Kaspi Bank has demonstrated rapid asset growth which as shown in Figure 3 and has confidently taken a leading position in the country's financial sector.

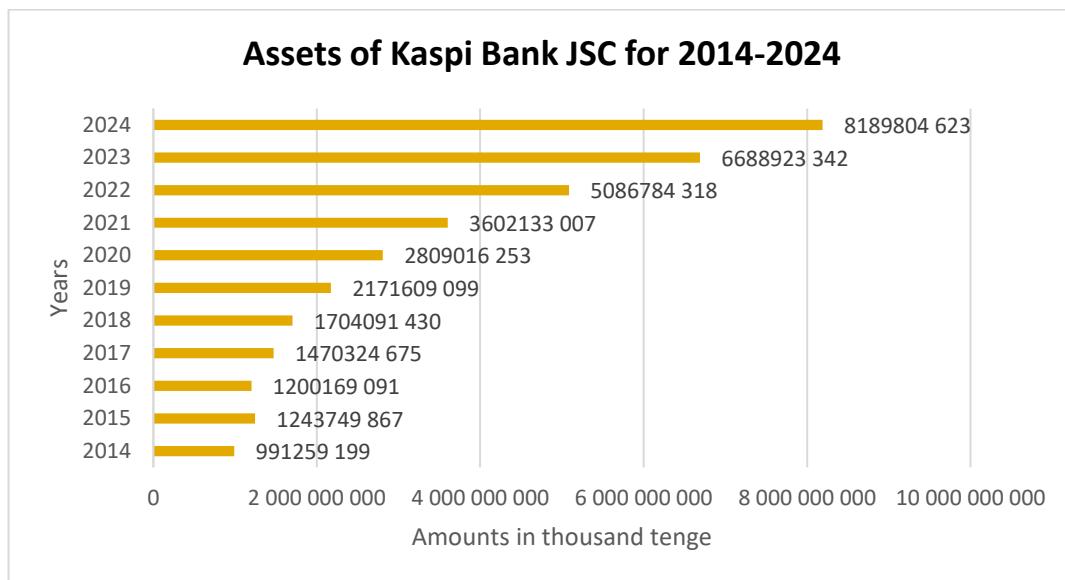


Figure – 3. Asset dynamics of Kaspi Bank JSC
**composed by the authors based on the data from the NBRK website [13]*

Between 2014 and 2024, the assets of Kaspi Bank increased more than 8 times - from 991 billion tenge to 8,19 trillion tenge. There was a slight correction in 2016, but steady growth started as early as 2017. Particularly dynamic asset expansion is noted after 2019, which coincides with the active development of the Kaspi.kz ecosystem and digital services during the pandemic period. Between 2022 and 2024, Kaspi Bank has been growing assets by more than 1 trillion tenge annually, strengthening its market position. The overall trend demonstrates confident business expansion and high adaptability to the digital transformation of the financial sector.

Figure 4 shows some financial ratios of Kaspi Bank during the analysed period of time.

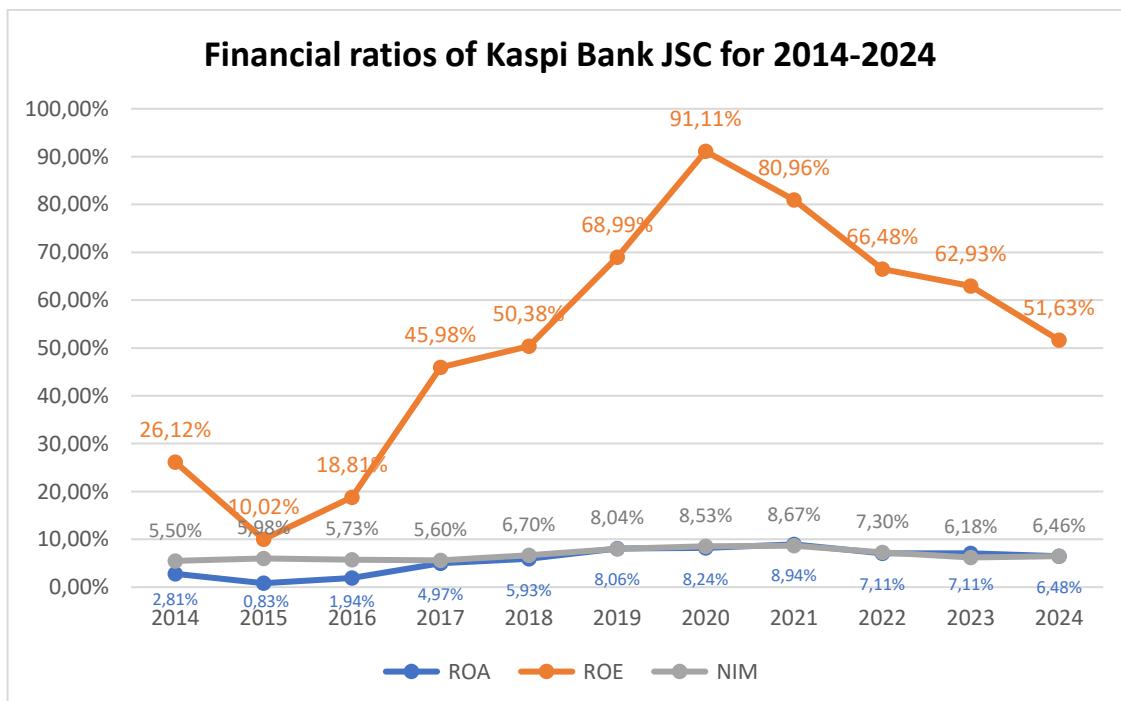


Figure – 4. Dynamics of ROA, ROE, and NIM of Kaspi Bank JSC over 11 years
**composed by the authors based on the data from the NBRK website [13]*

Kaspi Bank's ROA shows high asset utilization throughout the period. After a temporary decline to 0,83% in 2015, the figure began to grow steadily. In 2018, it reached 5,93%, and in 2020 it peaked at 8,24%.

There has been a slight decline since 2021, but the values remain high – 6,48% in 2024. It demonstrates a strong operating model and the ability of the bank to effectively extract returns from assets.

Kaspi Bank's ROE is one of the highest in Kazakhstan's banking sector. Its ROE was consistently above 45% from 2017 to 2021 and reached a record 91,11% in 2020. This means that the bank uses its shareholders' funds efficiently, ensuring a high return on investment. Despite a gradual decline to 51,63% in 2024, ROE remains very high. It reflects high profitability of the business and the bank's solid financial position.

Kaspi Bank's NIM has been consistently high, especially since 2018. In 2020-2021, the bank achieved margin of more than 8,5%, which indicates a strong ability to generate income from interest transactions. Even with a decline to 6,46% in 2024, Kaspi Bank remains the leading indicator among banks. The high NIM reflects an efficient lending model as well as low funding costs. Overall, NIM demonstrates the strength of Kaspi Bank's business strategy focused on high-income retail segments using FinTech products and services.

The study adopts a qualitative research design and relies on secondary data to analyze the relationship between innovative fintech variables and bank profitability. The annual data was collected from the aggregated reports of the second-tier banks and Statistics of payment instruments of the National payment system statistics of the NBRK website [13], as well as the Bureau of National Statistics of Kazakhstan [15]. Aggregated data are employed in this research such as the number of cardholders, POS terminals, and ATMs.

ROA is the Return on Assets, which means Net Income to Total Assets. ROA is a dependent variable that describes bank profitability.

There is no specific index for fintech in Kazakhstan. Therefore, the Fintech index was calculated in this article by the average number of Quantity of Automated Teller Machines (total, thousand units), Quantity of POS-terminals (total, thousand units), the volume of cashless payments and money transfers executed via payment cards (total, thousand transactions), along with the Total payment cards in circulation (total, thousand units). This index helped to diminish the multicollinearity of these independent variables, which were linearly dependent on each other.

The cost-to-income ratio (CIR) is calculated by dividing the operating expenses by operating income [14].

ROA, fintech index, and CIR were calculated manually.

Total loans and deposits were used to check how these variables are related to financial technology development.

There are two macroeconomic variables, such as Gross Domestic Product (GDP) and Inflation, that were collected from the Bureau of National Statistics on an annual basis. GDP growth and inflation are included as macroeconomic control variables to account for economic scale and business cycle effects. Existing literature generally indicates that higher GDP growth and inflation are positively associated with bank profitability (ROA, ROE), reflecting increased lending activity and wider interest margins [9], although they may also heighten risk and reduce bank stability during economic expansions. However, empirical evidence remains mixed, as several studies report no statistically significant impact of GDP and inflation on bank performance [11].

Correlation analysis provided the following matrix. See the Table 1 below.

Table – 1

Matrix of correlation analysis of all Kazakhstani banks

	ROA	Fintech index	Total loan	Total deposit	Cost-to-income ratio	GDP	Inflation
ROA	1.0000						
Fintech index	0.8195* 0.0020	1.0000					
Total loan	0.7538* 0.0074	0.9684* 0.0000	1.0000				
Total deposit	0.7876* 0.0040	0.9829* 0.0000	0.9744* 0.0000	1.0000			
Cost-to-income ratio	-0.0796 0.8161	0.0718 0.8338	0.1652 0.6274	0.1266 0.7107	1.0000		

GDP	0.3059 0.3603	0.3386 0.3085	0.3307 0.3205	0.2718 0.4187	-0.4168 0.2022	1.0000	
Inflation	0.2063 0.5428	0.3446 0.2994	0.3359 0.3126	0.3654 0.2691	0.3029 0.3653	-0.0910 0.7901	1.0000

*composed by the authors based on the data from the NBRK website and Official website of the Bureau of National Statistics [13, 15]

The relationship between ROA and the fintech index equals 0.8195 ($p = 0.0020$), which means a strong positive connection. The development of fintech in the banking sector has a favourable influence on bank profit.

The correlation coefficient between ROA and total loans is 0.7538 with a p-value of 0.0074, indicating a statistically significant positive relationship. This indicates that the expansion of the loan portfolio is positively correlated with improvements in bank profitability.

The correlation coefficient between ROA and total deposits is 0.7876 with a p-value of 0.0040, indicating a strong and statistically significant positive relationship between the two variables and an increase in deposits is associated with higher bank profitability.

ROA and Cost-to-Income Ratio: The correlation coefficient is -0.0796 with a p-value of 0.8161, indicating a very weak and statistically insignificant relationship. It suggests that cost efficiency relative to income has little impact on profitability.

ROA and GDP: The correlation coefficient is 0.3059 with a p-value of 0.3603, showing a moderate positive relationship, but it is not statistically significant. This implies that while economic growth may have some influence on profitability, the effect is not strong or reliable.

ROA and Inflation: The correlation coefficient is 0.2063 with a p-value of 0.5428, suggesting a weak and statistically insignificant relationship. This means that inflation does not have a notable impact on bank profitability.

The authors believe that during the sample period, monetary and regulatory interventions may have mitigated the transmission of macroeconomic volatility to the banking sector. In Kazakhstan, active policy measures by the central bank such as including interest rate adjustments, liquidity support, and prudential regulation, could have insulated banks' balance sheets from macroeconomic shocks, thereby weakening observable correlations.

The FinTech Index demonstrates a robust positive association with total loans (0.9684, $p = 0.0000$) as well as with total deposits (0.9829, $p = 0.0000$), and it shows that fintech development is closely linked to increased lending and deposit growth. In contrast, its correlation with the cost-to-income ratio (0.0718, $p = 0.8338$) is weak and statistically insignificant, suggesting little impact on cost efficiency. Additionally, ROA is positively correlated with total loans (0.7538, $p = 0.0074$) and total deposits (0.7876, $p = 0.0040$), reinforcing the idea that higher lending and deposit volumes contribute to bank profitability, while its relationships with GDP, inflation, and cost efficiency remain weak and insignificant.

The relationship between GDP and ROA (0.3059, $p = 0.3603$) suggests that economic growth is associated with increased bank profitability, but the effect is weak and not statistically significant. Similarly, inflation and total deposits (0.3654, $p = 0.2691$) show a moderate positive correlation, indicating that inflation may encourage savings, though the relationship is not statistically significant. Overall, while macroeconomic factors like GDP and inflation may influence banking performance, their impact appears to be limited in this analysis.

The FinTech Index exhibits a strong correlation with both total loans and deposits, implying that fintech advancement may foster the expansion of the banking sector. Furthermore, ROA demonstrates a positive association with fintech adoption, loan portfolios, and deposit growth, indicating that banks with greater fintech integration and larger volumes of credit and deposits tend to achieve higher profitability. However, the Cost-to-Income Ratio has no significant correlation with either ROA or the FinTech Index, implying that operational efficiency in banks is not necessarily influenced by FinTech adoption. Furthermore, macroeconomic factors such as GDP and inflation demonstrate weak correlations with key banking variables, indicating that the linkage between economic growth, inflation, and bank profitability is inconclusive.

Conclusion. The study identified a strong positive correlation between fintech development (FinTech Index) and the expansion of banks' loan and deposit portfolios, suggesting that digital technologies have contributed to the expansion of the banking sector in Kazakhstan over the past eleven years. In addition, banks with larger loan and deposit volumes, and with high adoption of fintech solutions, show higher

profitability (ROA), which confirms the importance of digital transformation in improving banking efficiency.

At the same time, operating costs (Cost-to-Income Ratio) showed no significant relationship with either ROA or the Fintech Index, which may indicate that the level of banks' operating efficiency is not directly influenced by fintech innovation. Moreover, macroeconomic factors such as GDP and inflation are weakly related to bank variables, indicating that there is no clear relationship between economic growth, inflation, and bank profitability.

The findings support the stated objectives of the study that fintech correlates positively with bank profitability. The practical application of the findings is the need for further introduction of digital technologies in the banking sector to increase its sustainability and competitiveness. In the future, it is advisable to deepen the research on the impact of individual fintech products on banks' profitability and risks, as well as to study the impact of digital technologies in different institutional and regulatory environments.

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ҚАЗАҚСТАНДАҒЫ ҚАРЖЫЛЫҚ ТЕХНОЛОГИЯ МЕН БАНКТЕРДІҢ ТАБЫСТЫЛЫҒЫН ТАЛДАУ

Аннотация

Қаржылық технология өнімдерінің тұрақты таралуы әлемдегі банктердің құнын арттырады. Финтех өнімдерінің тұрақты дамуы әлемдегі банктердің құнын арттырады. Осы мақалада Қазақстан Республикасындағы коммерциялық банктердің қаржылық технологияларды дамытуы мен олардың табыстылығы арасындағы өзара байланыс қарастырылады. Зерттеудің мақсаты – қаржылық технологияларды дамытудың банктердің табыстылығына әсерін анықтау. Қазақстан Республикасының Ұлттық Банкі мен Ұлттық статистика бюросының 11 жылдық агрегаттالған банктік деректерін пайдалана отырып, өзара байланыс STATA бағдарламасында корреляциялық талдау арқылы талданады. Талдауда негізгі айнымалылар ретінде активтердің қайтарымдылығы (ROA), финтех индексі, жалпы несиелер көлемі, жалпы депозиттер көлемі, шығындар мен табыстар қатынасы, ЖІӨ және инфляция қолданылады. Қазақстан банктері үшін алғаш рет төлем карталарының, банкоматтардың, POS-терминалдардың және қолма-қолсыз төлем операцияларының саны негізінде финтех индексі құрылады. Нәтижелер ROA мен финтех индексі арасындағы жоғары оң корреляцияны (81,95%) көрсетеді және финтех өнімдерін дамыту коммерциялық банктердің табыстылығына елеулі оң әсер ететінін байқатады. Сонымен қатар, банктер активтерінің көлемі бойынша таңдалған «Халық Банк» АҚ-тың, «Банк ЦентрКредит» АҚ-тың және «Kaspi Bank» АҚ-тың қаржылық коэффициенттеріне талдау жүргізілді.

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АНАЛИЗ ФИНТЕХА И ДОХОДНОСТИ БАНКОВ В КАЗАХСТАНЕ

Аннотация

Устойчивое распространение финтех-продуктов увеличивает стоимость банков во всем мире. В данной статье рассматривается взаимосвязь между развитием финансовых технологий и прибыльностью коммерческих банков в Республике Казахстан. Цель исследования — определить влияние развития финансовых технологий на прибыльность банков. Используя агрегированные банковские данные Национального Банка Республики Казахстан и Бюро национальной статистики за 11-летний период, анализируется взаимосвязь с помощью корреляционного анализа в программе STATA. В анализе используются такие ключевые переменные, как рентабельность активов (ROA), индекс финтех, общий объем кредитов, общий объем депозитов, соотношение затрат и доходов, ВВП и инфляция. Впервые для банков Казахстана построен индекс финтех на основе количества платежных карт, банкоматов, POS-терминалов и безналичных платежных операций. Результаты показывают сильную положительную корреляцию между ROA и индексом финтех (81,95%) и демонстрируют, что развитие финтех-продуктов оказывает существенное положительное влияние на прибыльность коммерческих банков. В дополнение, были проанализированы финансовые коэффициенты АО «Халық Банк», АО «Банк ЦентрКредит» и АО «Каспи Банк», которые были выбраны на основе активов.

