

The Effect of Cost Efficiency on The Financial Performance of Banks: A Research on Public Banks in Turkey

Maliyet Etkinliğinin Bankaların Finansal Performansına Etkisi: Türkiye’de Halka Açık Bankalar Üzerine Bir Araştırma

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ABSTRACT

This research seeks to elucidate the impact of cost efficiency within banking institutions on their overall financial performance. The empirical data utilized in this investigation was sourced from the Bloomberg Terminal database. The research sample comprises public deposit banks operating within the Republic of Turkey. Eight banks were selected for data sampling, with the temporal scope of analysis spanning from 2009 to 2022. Initially, the study employed stochastic frontier analysis to assess cost efficiency, subsequently utilizing the technical efficiency metrics derived from this analysis to evaluate its influence on the financial performance of deposit banks via panel regression methodologies. In the stochastic frontier analysis conducted according to the model of Battese and Coelli (1995), it was concluded that the variables selected as input (Personnel Costs and Interest Costs) affected the output (Loans and Financial Assets) at a 1% significance level. Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM), which are financial performance indicators of banks, were selected as dependent variables. Logarithm of Total Assets (LNASSETS), Total Equity/Total Assets (TETA), Total Loans/Total Deposits (TLTD) and Non-Performing Loans/Total Loans (NPL), which are important variables for banks with cost efficiency levels, were used as independent variables in this study. As a result of the panel regression, it was seen that Cost efficiency affected the dependent variables ROA, ROE and NIM at 5% significance level. This result indicates that banks need to review their credit risk management, non-interest expense control, and capital adequacy strategies with a focus on cost efficiency; for regulators, it highlights the need for close monitoring of high TLTD and rising NPL ratios and the implementation of countercyclical measures.

Keywords:

Cost Efficiency,

Stochastic Frontier Analysis,

Bank Performance

Jel Codes:

M40, M41

ÖZET

Bu araştırma, bankacılık kurumlarında maliyet verimliliğinin genel finansal performansları üzerindeki etkisini aydınlatmayı amaçlamaktadır. Bu çalışmada kullanılan ampirik veriler Bloomberg Terminal veri tabanından elde edilmiştir. Araştırma örneklemini, Türkiye Cumhuriyeti sınırları içinde faaliyet gösteren halka açık bankalardan oluşturmaktadır. Veri örneklemini için sekiz banka seçilmiş ve analiz zaman aralığı 2009 ile 2022 yılları arasında belirlenmiştir. Çalışmada ilk olarak, maliyet verimliliğini değerlendirmek için stokastik frontier analizi kullanılmış, ardından bu analizden elde edilen teknik verimlilik ölçütleri, panel regresyon yöntemi ile halka açık bankaların finansal performansı üzerindeki etkisini değerlendirmek için kullanılmıştır. Battese ve Coelli (1995) modeline göre yapılan stokastik sınır analizinde, girdi olarak seçilen değişkenlerin (Personel Maliyetleri ve Faiz Maliyetleri) çıktıları (Krediler ve Finansal Varlıklar) %1 anlamlılık düzeyinde etkilediği sonucuna varılmıştır. Bankaların finansal performans göstergeleri olan Aktif Karlılığı (ROA), Özkaynak Karlılığı (ROE) ve Net Faiz Marjı (NIM) bağımlı değişkenler olarak seçilmiştir. Maliyet etkinlik seviyeleri ile bankalar için önemli değişkenlerden Toplam Varlıkların Logaritması (LNASSETS), Toplam Özkaynaklar/Toplam Varlıklar (TETA), Toplam Krediler/Toplam Mevduatlar (TLTD) ve Donuk Krediler/Toplam Krediler (NPL) bu çalışmada bağımsız değişkenler olarak kullanılmıştır. Panel regresyon sonucunda maliyet etkinliğinin ROA, ROE ve NIM bağımlı değişkenlerini %5 anlamlılık düzeyinde etkilediği görülmüştür. Bu sonuç, bankaların özellikle kredi risk yönetimi, faiz dışı gider kontrolü ve sermaye yeterliliği stratejilerini maliyet etkinliği ekseninde gözden geçirmeleri gerektiğini ortaya koymaktadır; düzenleyiciler içinse yüksek TLTD ve artan NPL oranlarının yakın takibi ve karşı-döngüsel önlemler alınması gerektiğini göstermektedir.

Anahtar Kelimeler:

Maliyet Verimliliği,

Stokastik Sınır Analizi,

Banka Performansı

Jel Kodları:

M40, M41

1. INTRODUCTION

The banking sector is of key importance for the healthy growth of the Turkish economy. Banks both collect resources and transfer these resources to the areas in need, thus sustaining the economic cycle. However, the continuity of this functioning depends on the banks' survival power, in other words their sustainability. At this point, profitability comes to the fore. Profitable banks can secure themselves in terms of capital, make new investments, improve their technological infrastructure and expand their services. This situation has positive consequences not only for the banks but also for the national economy. On the other hand, the sector is in constant change. Factors such as legal regulations, the rise of digital competitors and changes in customer habits require banks to constantly review their plans for the future. To survive in this complex environment, efficiency is no longer a luxury but a necessity.

The notion of efficiency occupies a pivotal position in enhancing the profitability of financial institutions. The meticulous execution of each phase of banking operations with a high degree of precision and efficiency constitutes the cornerstone of attaining fiscal success. Among these operational processes, efficiency concerning costs and profits emerges as one of the most significant determinants that directly influence the financial architecture of banks. Consequently, banks must scrutinize their expenditure items. Given the inherent characteristics of the sector, there exists a propensity for expenses to escalate rapidly within banking operations. Specifically, strategic decisions such as the establishment of new branches or the recruitment of additional personnel can impose a substantial burden on financial statements. Hence, it becomes essential to formulate strategies aimed at managing costs in a manner that is both balanced and rational.

One of the most important indicators of how effective a bank is in this area is its cost efficiency. In particular, the cost-to-income ratio reveals the extent to which the bank uses its available resources efficiently. A low cost-to-income ratio indicates that waste is prevented and available resources are utilised more profitably. In addition, the success of human resources policies is another factor that directly affects productivity. Indicators such as employee turnover and productivity levels can reflect the effectiveness of personnel management. A well-structured human resources system not only contributes to cost reduction but also increases employee satisfaction and loyalty to the organisation, thereby increasing corporate value in the long term.

Berger & Mester (1997) showed in their study that cost efficiency and profit efficiency are negatively correlated. In this study, it is aimed to reveal whether it is valid for commercial banks operating in Turkey. Cost efficiency is measured by stochastic frontier analysis in the studies in the literature. One of the objectives of this study is to measure the cost efficiency of banks operating in Turkey with this method. Another objective is to reveal to what extent this cost efficiency affects financial performance.

In the present examination, the variables utilized in the Stochastic Frontier Analysis consist of labor-related expenditures in conjunction with interest liabilities, while the outputs are characterized by loans and financial assets. The cost efficiency metrics obtained from this evaluation are subsequently integrated into the model as an input for the Panel Data Analysis. Within this analytical framework, the effect of cost efficiency on the financial performance of commercial banking institutions is meticulously scrutinized. Financial performance indicators pertinent to commercial banks, including return on assets, return on equity, and net interest margin, are frequently cited in the academic discourse. Consequently, this investigation clarifies the cost efficiency of banking institutions and articulates the ramifications of this efficiency on their financial performance. It is anticipated that the results will provide valuable insights for policymakers in their strategic deliberations regarding commercial banks.

In the subsequent sections of this study, the results from previous research that explores the nexus between cost efficiency and financial performance will be presented, followed by a detailed exposition of the data, methodologies, variables, and analytical outcomes employed; concluding remarks and evaluations will subsequently be provided.

2. LITERATURE

There are numerous studies in the literature concerning cost efficiency. Some studies merely calculate cost efficiency values, while others have conducted research on the determinants of cost efficiency. In some studies, the effects of cost efficiency values on other variables have been examined.

Maudos et al. (2002) evaluated the relationship between cost efficiency and profit efficiency on European banks. They stated that the number of articles discussing the efficiency of banks has increased and especially the articles

investigating cost efficiency constitute the majority of them. They found that efficiency values vary from country to country and that medium-sized banks have the highest efficiency values. They also revealed that efficiency increases as the Total Loans/Total Assets ratio increases.

Pasiouras et al. (2009) examined the effect of legal regulations on banks' profit and cost efficiency. Using the data of 615 banks traded on the stock exchange between 2000 and 2004, the study's results show that legal regulations increase banks' efficiency and that competition will increase when this market is not regulated.

Hanif Akhtar (2013) estimates the cost efficiency value of banks before and after the crisis. As a result of the study, the author showed that the cost efficiency of Saudi Arabian banks decreased slightly during the crisis periods.

Nițoi & Spulbar (2015) investigated the differences in the cost efficiency of commercial banks operating in central and western European countries between 2005 and 2011. The study revealed that as long as macroeconomic factors are stable, the cost efficiency of commercial banks will be high. In addition, the cost-efficiency values of banks with high risks were found to be low.

Acar et al. (2015) conducted an efficiency analysis using the data of banks operating in Turkey between 2009 and 2013. As a result of the study, it was determined that the most efficient banks are state-owned banks.

Yalçinkaya & Kök (2016) determined the cost efficiency of 21 banks operating in Turkey by using the data between 2005-2013 and made policy recommendations on how to eliminate inefficiency. According to the results of the authors, the year in which the cost efficiency of banks is the highest is 2011.

In another study, Adeabah & Andoh (2020) tried to reveal the relationship between cost efficiency and social costs of banks operating in Ghana by using data between 2009-2017. The results of the study showed that banks with high-cost efficiency are better able to cover their social costs.

Khalifaturafi'ah (2023), in his study on the factors affecting the financial performance of Indonesian banks, examined factors such as financial innovations, financial ratios and cost efficiency. One of the striking findings of the study was that cost efficiency has a negative impact on bank performance. Nevertheless, it was emphasized that both cost efficiency and financial innovations play a decisive role in the overall financial success of banks.

Rakshit (2023) examines the effects of cost, revenue, and profit efficiency on profitability for 70 Indian commercial banks during the period 1997-2017. In the first stage, cost, revenue, and profit efficiency scores are estimated using stochastic frontier analysis (SFA); in the second stage, the effects of these scores on ROA/ROE/NIM are tested using a two-stage system GMM dynamic panel model. The findings show that all types of efficiency significantly increase banks' profitability and that public banks are the most cost-efficient group; bank-specific, macro and institutional variables also play a role in determining profitability. As a policy recommendation, the study emphasises that banks should focus on increasing profit, cost and revenue efficiency simultaneously to counter declining profitability in the sector.

Wang et al., (2024) analyzed the effect of the efficiency of banks operating in Türkiye on their financial performance. In the study, first, the efficiency values of the banks were determined and then panel data analysis was performed. As a result of the study, it was shown that the unemployment rate, debts to the state, and exchange rates had a significant effect on the efficiency of banks. The results of the study also showed that rising inflation jeopardized financial sustainability.

Hamarat (2024) posits that traditional banking institutions within Türkiye display enhanced cost efficiency in comparison to participation banks during the period from 2011 to 2016. The application of stochastic frontier analysis (SFA) elucidates that extrinsic factors, notably inflation and interest rates, exert a considerable detrimental effect on the cost-effectiveness of Turkish banking institutions, particularly in the interval from 2012 to 2014. This implies that while commercial banks exhibit superior efficiency, their financial outcomes are concurrently shaped by overarching economic circumstances.

Diko (2024) articulates that Turkish banking institutions exhibit a relatively enhanced cost efficiency when juxtaposed with profit efficiency. It underscores a diminishing trend in profit efficiency, thus raising apprehensions regarding the overarching health and stability of the banking sector. Factors such as Total Assets, Deposit Share, Asset Growth, Time Deposits, Non-Performing Loans (NPL), and Ownership Structure exert a considerable influence on both cost and profit efficiency. Notably, foreign banking institutions demonstrate inferior performance in efficiency relative to their domestic counterparts, indicating divergent financial outcomes across various ownership models within the Turkish banking environment.

Studies show that cost efficiency is an important value for banks. Banks should take cost efficiency into account when determining their future strategies. To strengthen this policy recommendation, the purpose of this study is to determine whether cost efficiency has a significant effect on financial performance.

In studies conducted specifically in Turkey, cost efficiency values have been calculated, but their effects have not been empirically examined, leaving this area unexplored. This study aims to contribute to the literature in this field by revealing the impact of cost efficiency data on the financial performance of banks traded on the BIST.

In this study, initially, the levels of cost efficiency are ascertained through stochastic frontier analysis. Subsequently, this data is incorporated into the panel data model as an independent variable. The ratios indicative of the financial performance of banking institutions are identified as return on assets (ROA), return on equity (ROE), and net interest margin (NIM) by existing literature. Based on the information provided, the hypotheses are articulated as follows;

H₀: The degree of cost efficiency does not affect the financial performance of deposit banks.

H₁: The degree of cost efficiency affects the financial performance of deposit banks.

H_{1a}: The degree of cost efficiency affects the return on assets of deposit banks.

H_{1b}: The degree of cost efficiency affects the return on equity of deposit banks.

H_{1c}: The degree of cost efficiency affects the net interest margin of deposit banks.

3. METHODOLOGY and RESULTS

By the purpose of the study, the sample was selected as deposit banks traded in BIST. The data used in this study was obtained from the Bloomberg Terminal Database. Eight deposit banks were selected from this sample according to data availability, and their data between 2009 and 2022 was used in the analysis. The banks included in the sample are given in Table 1.

Table 1. Banks Included in the Sample

QNB FİNANSBANK	ŞEKERBANK
AKBANK	TÜRKİYE İŞ BANKASI
TÜRKİYE HALK BANKASI	TÜRKİYE GARANTİ BANKASI
VAKIFBANK	YAPI KREDİ

Source: The table was created by the author.

The Data Envelopment Analysis (DEA) method and the Stochastic Frontier Analysis (SFA) method are the primary methods used in cost-efficiency analysis. It is used the SFA method in our study. The reason for this is that SFA separates noise in the data from inefficiency and yields better results in panel data (Greene, 2008).

Table 2. Methods And Variables Used in The Study

Panel Regression Analysis		Stochastic Frontier Analysis	
Dependent Variables	Independent Variables	Dependent Variables (Outputs)	Independent Variables (Inputs)
ROA (Return on Assets)	LNASSETS (Natural Logarithm of Assets)	Loans	Personnel Expenses
ROE (Return on Equity)	TETA (Total Equity / Total Assets)	Financial Assets	Interest Expenses
NIM (Net Interest Profit)	TLTD (Total Loans / Total Deposits)		
	NPL (Non-Performing Loans/Total Loans)		
	CEF (Cost Effectiveness)		

Source: The table was created by the author.

The Panel data analysis method is used to test the hypotheses. The variables used in the analysis are shown in Table 2. Descriptive statistics of the data used in the analysis are given in Table 3.

Table 3. Descriptive Statistics

	ROA	ROE	TETA	TLTD	NPL	NIM	LNASSETS	CEF
Mean	1,6652	16,5236	0,1031	1,0548	0,0425	5,2272	12,1564	0,7675
Median	1,4872	14,8230	0,1067	1,0587	0,0389	4,8637	12,1973	0,7832
Maximum	6,2851	55,5943	0,1494	1,3516	0,1398	10,8391	14,8660	0,9729
Minimum	-2,3622	-35,3349	0,0472	0,7600	0,0119	2,8088	9,1291	0,0123
Std. Dev.	1,0223	10,6465	0,0213	0,1522	0,0199	1,5992	1,1630	0,1642
Skewness	1,3098	0,6015	-0,4887	-0,1470	1,4359	1,5768	-0,3176	-1,7668
Kurtosis	10,0472	10,8148	2,8501	2,1587	7,2147	5,7718	2,9228	8,7416
Jarque-Bera	263,7923	291,7537	4,5634	3,7063	121,3920	80,2698	1,9107	212,1214
Probability	0,0000	0,0000	0,1021	0,1567	0,0000	0,0000	0,3846	0,0000
Sum	186,5078	1850,653	11,5483	118,1469	4,7691	585,4559	1361,525	85,9630
Sum Sq. Dev.	116,0150	12581,51	0,0505	2,5741	0,0441	283,8844	150,1577	2,9938
Observations	112	112	112	112	112	112	112	112

Source: The table was created by the author.

Stochastic Frontier Analysis model used by Battese & Coelli (1995) was used to determine the cost-efficiency. As indicated in Table 2, Financial Assets and Loans are taken as dependent variables. Independent variables consist of Personnel Expenses and Interest Expenses (Khalifaturafi'ah, 2023). It is tried to determine the efficiency with which the expenses incurred are converted into income. Dependent variables represent total output, and independent variables represent total input. The results of the stochastic frontier analysis are shown in Table 4.

Table 4. Stochastic Frontier Analysis Results

	COEFFICIENT	PROBABILITY
TOTAL OUTPUT		
LABORCOST	0.7756	0.000
INTERESTCOST	0.4331	0.000
CONSTANT	2.3132	0.000

Source: The table was created by the author.

It is seen that the model is significant, and the independent variables affect the dependent variable at a 1% significance level. Therefore, the Technical Efficiency values to be estimated from this model were included in the panel analysis by using them as cost efficiency values and the following models were formed.

$$ROA_{it} = \beta_0 + \beta_1 CEF_{it} + \beta_2 NPL_{it} + \beta_3 LNASSETS_{it} + \beta_4 TETA_{it} + \beta_5 TLTD_{it} + e_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 CEF_{it} + \beta_2 NPL_{it} + \beta_3 LNASSETS_{it} + \beta_4 TETA_{it} + \beta_5 TLTD_{it} + e_{it} \quad (2)$$

$$NIM_{it} = \beta_0 + \beta_1 CEF_{it} + \beta_2 NPL_{it} + \beta_3 LNASSETS_{it} + \beta_4 TETA_{it} + \beta_5 TLTD_{it} + e_{it} \quad (3)$$

At the beginning of the panel analysis, the relationship coefficients between the independent variables are calculated and presented in Table 5.

Table 5. Relationship Between Variables

	ROA	ROE	TETA	TLTD	NPL	NIM	LNASSETS	CEF
ROA	1,0000							
ROE	0,9294	1,0000						
TETA	0,4404	0,1676	1,0000					
TLTD	-0,3431	-0,3650	0,0509	1,0000				
NPL	-0,4003	-0,4325	-0,1275	-0,0552	1,0000			
NIM	0,5663	0,5868	0,2048	-0,3453	0,2589	1,0000		
LNASSETS	0,2134	0,3246	-0,2791	0,0035	-0,4069	-0,1085	1,0000	
CEF	-0,3497	-0,2852	-0,1997	0,3862	-0,2607	-0,5296	0,0293	1,0000

Source: The table was created by the author.

As seen in Table 5, the correlation coefficients between independent variables are not greater than 0.70. Therefore, there is no multicollinearity problem. Then, Breesch-Pagan LM, Paseran Scaled LM, and Paseran CD tests were

conducted to determine whether the three models established to test the hypotheses have horizontal cross-section dependence. The test results are shown in Table 6.

Table 6. Cross-Section Dependence Test Results

MODELS	TEST	PROBABILITY
ROA	Breesch-Pagan LM	0,0000
	Paseran Scaled LM	0,0000
	Paseran CD	0,0009
ROE	Breesch-Pagan LM	0,0000
	Paseran Scaled LM	0,0000
	Paseran CD	0,0000
NIM	Breesch-Pagan LM	0,0000
	Paseran Scaled LM	0,0000
	Paseran CD	0,0000

Source: The table was created by the author.

As indicated in Table 6, the presence of horizontal cross-section dependence was identified across all three analytical models. Consequently, it became imperative to employ second-generation unit root tests to ascertain the stationarity of the examined variables. Table 7 delineates the findings of the unit root tests conducted. As illustrated in Table 7, none of the variables exhibits stationarity at the same significance level. Therefore, the implementation of a cointegration test is essential before advancing to the panel data analysis.

Table 7. 2nd Generation Unit Root Test Results

VARIABLES	AT LEVEL	AT 1ST LEVEL
ROA	X	
ROE	X	
NIM		X
CEF		X
NPL	X	
LNASSETS		X
TETA		X
TLTD		X

Source: The table was created by the author.

Table 8 presents the outcomes of the Kao (1999) cointegration test. As demonstrated in Table 8, the null hypothesis asserting the absence of cointegration is rejected at the 5% significance threshold. Given the presence of cointegration, it is feasible to conduct panel data analysis.

Table 8. KAO Cointegration Test Result

MODELS	T STAT	PROBABILITY
ROA	-1,8451	0,0325
ROE	-1,8357	0,0332
NIM	-1,9302	0,0268

Source: The table was created by the author.

The Panel-Corrected Standard Error (PCSE) estimation technique is used to test hypotheses. PCSE is used as the primary estimator due to its robustness in addressing issues such as CSD, heteroskedasticity, and serial correlation (Tawiah et al., 2024; Zhu et al., 2024). PCSE results by models are shown in Table 9.

TETA exhibits statistical significance exclusively within the Return on Assets (ROA) model and exerts a positive influence on asset returns. Conversely, TLTD demonstrates statistical significance across all models while manifesting a negative impact. NPL is statistically significant in both the ROA and ROE models, revealing a detrimental effect on ROA and ROE. The degrees of cost efficiency were determined to have a statistically significant and adverse effect across all three models incorporating variables indicative of the financial performance of deposit banks. Consequently, the null hypothesis (H0) was repudiated, whereas the alternative hypothesis (H1), along with its corresponding sub-hypotheses, could not be rejected.

Khalifaturafi'ah (2023) found that cost efficiency has a negative and significant effect on ROA and NIM and there is no significant effect on ROE. Contrary to Khalifaturafi'ah (2023)'s study, this study found a significant

and negative relationship between ROE and cost efficiency. This result shows us that there may be differences between the capital structures of banks in Turkey and those in Indonesia. These differences may stem from legal regulations between countries or regulations imposed by other regulatory bodies.

Rakshit (2023) found that cost efficiency in public sector banks has a positive and significant effect on ROA and ROE variables. Contrary to Rakshit (2023)'s study, this study found that cost efficiency had a negative impact on ROA and ROE.

According to these results, banks listed on the BIST operating in Turkey may face problems that will reduce revenue while optimising costs. For example, banks with high cost efficiency can apply the savings they achieve here as interest rate reductions. In this case, a decline in the bank's profitability will also be observed. Another example is that cost efficiency does not always mean profit efficiency. Berger & Mester (1997) demonstrated this in his study.

Banks can also increase cost efficiency by shifting towards low-risk portfolios. However, this shift will also lead to a decrease in returns. Therefore, while cost efficiency increases, profitability will decrease (Hughes & Mester, 2012).

Table 9. Panel Data Analysis

	COEFFICIENT	T STAT	PROBABILITY
ROA MODEL			
LNASSETS	0,1561	1,81	0,070
TETA	19,6878	4,15	0,000
TLTD	-1,9504	-3,84	0,000
CEF	-1,5110	-2,56	0,010
NPL	-18,1960	-2,85	0,004
CONSTANT	1,7287	1	0,319
ROE MODEL			
LNASSETS	1,6723	1,71	0,087
TETA	65,0426	1,34	0,179
TLTD	-20,9603	-3,23	0,001
CEF	-16,0980	-2,42	0,016
NPL	-225,7787	-3,12	0,002
CONSTANT	33,5671	1,76	0,079
NIM MODEL			
LNASSETS	-0,0091	-0,05	0,959
TETA	11,9014	1,49	0,137
TLTD	-2,0812	-1,84	0,066
CEF	-3,6810	-3,12	0,002
NPL	13,3958	1,06	0,290
CONSTANT	8,5609	2,64	0,008

Source: The table was created by the author.

4. CONCLUSION

This research endeavors to examine the influence of cost efficiency on the financial performance of deposit banks listed on BIST. The dataset utilized in this investigation was sourced from the Bloomberg database. Based on the availability of data, the analysis encompasses the years 2009 to 2022 and includes a sample of eight banks.

Cost efficiency represents a critical variable regarding financial performance across numerous sectors. In the context of assessing cost efficiency within the banking sector, personnel expenditures and interest costs were utilized as input parameters, while loans and financial assets were designated as output measures. By employing these variables, the levels of cost efficiency among deposit banks were ascertained and incorporated into the models as an independent variable.

The results derived from the PCSE estimator indicate that cost efficiency exhibits statistical significance across all three performance metrics and exerts a negative influence on the financial performance of the sampled banks.

The models reveal that as the conversion rate of deposits into loans escalates, the banks' financial performance is adversely impacted. This phenomenon may be attributed to the propensity for extending a greater volume of loans, particularly to high-risk groups, which could lead to an increase in non-performing loans. Consequently, in the process of converting deposits into loans, it may be prudent to consider lending to lower-risk groups, even at reduced interest rates. As anticipated, an abundance of non-performing loans detrimentally impacts the financial performance of banks within the model.

The analytical results suggest that banks ought to enhance their cost efficiency while simultaneously striving to improve their financial performance. Additionally, banks should augment their shareholders' equity and mitigate their non-performing loans to bolster their overall financial performance.

The outcomes of this study indicate that deposit banks should exercise caution and refrain from overly aggressive strategies in converting deposits into loans. The adverse impact of the TLTD ratio on financial performance suggests that banks have engaged in high-risk lending practices. It is anticipated that when banks avoid high-risk loans, the TLTD ratio will yield a positive effect on financial performance metrics. Furthermore, the analysis disclosed that total assets do not exert a statistically significant influence on NIM.

The financial performance and cost efficiency of banks are interrelated dimensions that fundamentally influence their competitiveness and long-term viability within the market. By prioritizing enhancements to their financial indicators and operational efficiency, banks can improve profitability, deliver superior services to clients, and adeptly navigate the complexities of the financial environment. This comprehensive strategy not only positions banks for immediate achievement but also cultivates resilience against potential economic fluctuations and regulatory transformations.

On the other hand, regulatory bodies cannot directly improve banks' cost efficiency, but the incentives, rules and infrastructure they introduce can enable banks to take the same risks at lower costs. They can play a significant role in increasing cost efficiency by developing technology/regulation for regulatory bodies, crisis management and resolution, process simplification and proportionality, transparency and benchmarking, and operational efficiency.

This study demonstrates the impact of cost efficiency on banks' financial performance through econometric model tests. Following this study, a separate study could be conducted to determine what factors influence the cost efficiency of BIST banks operating in Turkey.

AUTHORS' DECLARATION:

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

AUTHORS' CONTRIBUTIONS:

The entire research is written by the author.

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