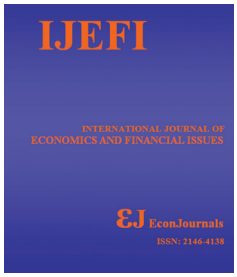

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Bank Performance of State, Private, and Foreign Owned Banks in Türkiye

Serpil Tomak[1]*, Kadir Yılmaz[2]

[1]Department of Management and Organization, Vocational School of Social Sciences, Mersin University, Mersin, Türkiye, [2]Social Sciences Institute, Industrial Policies and Technology Management Program, Istanbul Commerce University, Istanbul, Türkiye. *Email: serpild@mersin.edu.tr

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ABSTRACT

The aim of this study is to identify the bank-specific and macroeconomic factors influencing profitability in Türkiye, using panel data analysis covering 2013-2023. In this study, the profitability determinants are analyzed using annual bank data for specific bank groups. The analysis provides a comparative examination of bank performance based on ownership structures, such as public, private, and foreign capital banks. Return on assets (ROA) is used as an indicator of profitability and also serves as the dependent variable. The Kruskal-Wallis test was employed to examine differences between banking groups, while Spearman's rank correlation was used for univariate correlations. A logit model, a type of generalized linear model (GLM), was applied for multivariable analysis. Key indicators such as Return on Assets (ROA), Bank Size (BS), Asset Quality Ratio (AQR), Capital Adequacy (CAP), Non-Performing Loans (NPL), Net Interest Income (NII), and Liquidity (LIQ) were found to significantly affect ROA across all types of banks. However, the extent of their influence varied depending on the banks' ownership structure.

Keywords: Bank Profitability, Private Banks, State Banks, Foreign Banks, Panel Data Analysis
JEL Classifications: C23, E44, G21, O16

1. INTRODUCTION

Bank profitability plays a crucial role in promoting economic and financial stability. As such, it attracts the attention of various stakeholders, including investors, customers (individuals, businesses, and organizations), creditors, and regulatory authorities. Given that banks hold 82.6% of the assets in the Turkish financial sector (BRSA Report, 2023), they play a dominant role in shaping the country's markets. Therefore, any issues that arise in the banking sector are likely to affect other sectors as well. As a result, the efficient functioning of the banking system is essential not only for its own profitability but also for the overall stability of the economy.

The banking sector is generally classified according to ownership structures: State-owned banks, private banks, and foreign banks. Each type plays a unique role in the economy, offering different advantages and facing distinct challenges. Therefore, bank-specific and macroeconomic factors affecting performance may vary. Identifying these differences is important because it enables the development of customized strategies that enhance performance, reduce potential risks, and support the long-term stability and growth of each type of bank within the broader economy.

State-owned banks typically operate with different motives. They focus on public welfare, providing accessible services and stability through government support. While they promote financial inclusion, they may struggle with inefficiencies and limited innovation. Private banks, by contrast, aim for profit, focusing on customer service and flexibility, though they often charge higher fees and engage in riskier lending. Foreign banks leverage global expertise and infrastructure, offering strong risk management, but

may overlook local needs and face regulatory challenges. The presence, financial performance, and market impact of foreign banks in host countries have been widely studied. In conclusion, each type of bank has distinct strengths and weaknesses, shaped by its priorities and market approaches.

This research conducts a comparative analysis of the performance of Turkish deposit banks, including state-owned, private, and foreign banks. The study aims to determine whether performance differences exist based on ownership structure. While much of the existing research in Türkiye focuses on factors influencing the profitability of commercial banks, studies examining comparative bank performance in relation to ownership structure remain relatively scarce. This study is expected to make a valuable contribution to the literature. Additionally, the inclusion of previously unexplored bank-specific variables offers a unique perspective for this research.

The paper is organized as follows: after the introduction provided above, an overview of the Turkish banking sector is given in Section 2. Literature review is explained in Section 3. Data and methodological framework is situated in Section 4. Empirical findings are shown in Section 5. The 6th and the final section of the study includes conclusion and recommendations information.

2. AN OVERVIEW OF THE TURKISH BANKING SECTOR

The Turkish banking system operates within a comprehensive legal and regulatory framework designed to foster stability, transparency, and consumer protection. Key regulatory bodies, including the Banking Regulation and Supervision Agency (BDDK), the Central Bank of the Republic of Türkiye (TCMB), and other relevant authorities, play critical roles in overseeing banking operations, preserving market confidence, and ensuring adherence to both national and international financial standards. This framework aims to safeguard the interests of depositors, investors, and the broader economy, while adapting to the evolving dynamics of the financial sector.

In recent years, the Turkish banking system has experienced substantial transformation. The increasing prominence of digital banking and financial technology (Fintech) has prompted updates to regulations concerning electronic payments, digital wallets, and online banking. Regulatory agencies, such as the BDDK and TCMB, remain central to the oversight of the banking sector. These bodies ensure the system's stability, transparency, and consumer protection, while adapting regulations to address emerging trends, including digital banking, fintech innovations, cybersecurity, and data protection.

The Turkish banking system consists of various types of financial institutions, including commercial banks, development and investment banks, participation banks (Islamic banking), and foreign banks operating in Türkiye. Table 1 presents an overview of the number of banks and their respective market shares in terms of assets, loans, and deposits across different banking groups for 2023. A total of 63 banks operate in Türkiye, comprising 34 deposit banks, 20 development and investment banks, and 9 participation banks. Among the deposit banks, 3 are publicly owned, 9 are privately owned, and 21 are foreign-owned.

Deposit banks dominate the Turkish banking sector, controlling the majority of assets ($679,098.15 million, 85%), loans ($338,163.15 million, 85%), and deposits ($454,062.60 million, 90%). This dominance underscores their pivotal role in the financial system, as they are responsible for managing a significant portion of the economy's financial transactions. Deposit banks constitute the core of the Turkish banking sector, with their substantial market share emphasizing their central importance in providing essential banking services. These institutions are essential for maintaining liquidity and facilitating lending within the economy.

Participation banks, which operate according to Islamic finance principles, offer interest-free financial services. While they represent a smaller share of the banking sector ($71,904.51 million, 9% of assets), they have experienced notable growth in recent years. The majority of participation banks are foreign-owned, though state-owned banks also play a significant role (Tomak and Yılmaz, 2024). This sector holds a niche but growing importance within the Turkish banking system.

Development and investment banks constitute a smaller segment of the sector, with assets totaling $47,936.34 million (6% of assets) and loans amounting to $27,848.73 million (7% of loans). These banks focus on financing long-term projects and investments and do not handle customer deposits. They play a key role in supporting infrastructure projects and other long-term investments within the country.

The Turkish banking system is characterized by its diverse structure, with different types of financial institutions working collaboratively. Deposit banks hold the largest share of assets, loans, and deposits, and are crucial to the country's financial system. These banks form the foundation of Turkish financial infrastructure, facilitating liquidity and supporting the flow of credit throughout the economy. Consequently, this study will focus on a comparative analysis of the different groups of deposit banks, including public, private, and foreign-owned institutions.

Table 1: Number of banks and sector shares of banking groups

2023	Number of banks	Assets (%)	Loans (%)	Deposits (%)
Deposit banks	34	85	85	90
Public capital	3	37	39	42
Private capital	9	28	26	28
Foreign capital	21	20	20	20
Development and investment banks	20	6	7	0
Participation banks	9	9	8	10*
Total	63	100	100	100

*Funds collected
Source: TBB, 2024: 28

3. LITERATURE REVIEW

The growing body of literature emphasizes the importance of the financial sector in fostering economic growth within the context of deposit bank financing. Numerous academic studies have analyzed bank performance, with particular attention to comparative evaluations of the banking system based on ownership groups (public, private, and foreign). However, studies that specifically compare the performance of these bank groups remain relatively limited in Türkiye. This section provides an overview of the comparative performance of these ownership categories (public, private, and foreign-owned) and reviews previous international and national academic research on the factors influencing bank profitability.

The performance of banks is typically assessed through various financial ratios and indicators, such as return on assets (ROA), return on equity (ROE), net interest margin (NIM), and net profit margin (NPM), all of which are generally considered favorable when higher (Khalifaturofi'ah, 2023). Additionally, stock return volatility (SRV) serves as an important metric, reflecting the risk inherent in banking operations and capturing both positive and negative elements (Çiçek and Yıldırım, 2024; Erdoğan, 2022; Kendirli and Ergenoğlu, 2022). While lower SRV generally suggests stability in returns, excessively low values may constrain potential economic growth (Singh, 2024). However, these indicators alone may not fully explain performance variations across different ownership structures and governance models.

Ownership structure plays a crucial role in influencing bank performance and efficiency, as evidenced by studies comparing domestic, private, state-owned, and foreign-owned banks. For instance, Figueira et al. (2009) observed that, despite varying ownership structures across Latin American banks, the performance of domestic and foreign-owned banks was remarkably similar. This finding contrasts with Burki and Niazi's (2010) research in Pakistan, which found that private and foreign banks outperformed state-owned institutions in terms of cost efficiency and resource utilization. Similarly, Azam and Sıddıqui (2012) highlighted the superior profitability of foreign banks in Pakistan, suggesting that they are less influenced by local macroeconomic conditions, enabling them to achieve higher profit margins.

The relationship between ownership and bank efficiency extends beyond profitability alone. Muazaroh et al. (2012) noted that foreign banks in Indonesia demonstrated higher profit efficiency compared to their domestic counterparts. Additionally, Lassoueda et al. (2015) found that foreign ownership typically reduces risk-taking in banks, while state ownership tends to correlate with higher risk levels. This dynamic was particularly pronounced following the 2008 financial crisis, as foreign-owned banks adopted more cautious risk mitigation strategies.

The role of state-owned banks is multifaceted. Nga and Duy (2020) found that, in Vietnam, state-owned banks exhibited higher technical efficiency compared to private banks, although they lagged in investment activities. Conversely, state-owned banks in India have underperformed in areas such as credit management and profitability, though they continue to play a significant role in the national economy (Haralayya and Aithal, 2021). Moreover, Gupta and Sivaprasad (2021) demonstrated that public sector banks in India are particularly sensitive to macroeconomic variables, such as GDP and inflation, suggesting that their performance is more susceptible to broader economic conditions than that of foreign or private banks.

Studies also underscore the complex relationship between institutional factors and financial stability. Boulanouar et al. (2021) found that state-owned banks in the GCC region are more stable than privately owned banks, although this stability diminishes as the size of state-owned banks increases. Furthermore, foreign-owned banks in these markets exhibited greater stability and lower default probabilities compared to domestic banks, supporting the global advantage hypothesis. The stability of Islamic versus conventional banks also emerged as a key point of comparison, with conventional banks demonstrating more favorable stability outcomes.

Finally, Thaker et al. (2022) employed Data Envelopment Analysis (DEA) and Random Forest (RF) regression to assess the efficiency of Indian banks across different ownership categories. Their findings revealed that public sector banks were more efficient in terms of profit efficiency over time, though they did not outperform private sector banks in other aspects of banking performance. This suggests that efficiency improvements in public sector banks tend to be more gradual and context-dependent.

Empirical evidence also highlights the higher proportion of non-performing loans and lower profitability of state-owned banks, particularly when compared to private and foreign banks. Studies by Panizza (2024), Priharta and Gani (2024), and Yesmine et al. (2023) support the view that state-owned banks generally underperform their counterparts in terms of financial results, reinforcing the notion that ownership structure plays a significant role in determining bank success. In summary, while traditional performance indicators such as ROA, ROE, and NIM provide foundational insights into bank performance, the influence of ownership structure, risk management practices, and macroeconomic conditions remains critical in shaping the financial outcomes of banks across various global contexts.

Numerous studies have explored the performance of banks across different ownership structures, both in Türkiye and internationally, revealing significant insights into the factors influencing bank profitability and efficiency. In Türkiye, the role of ownership structure has been a key focus of research. For instance, Kansoy (2012) investigates the determinants of net interest margin (NIM) using a panel data approach, identifying operational diversity, credit risk, and operating costs as key factors affecting margins. The study reveals that the effect of these factors varies based on whether the bank is foreign-owned, state-controlled, or privately owned, though operational diversity and costs have a consistent impact across all ownership types.

Gökalp (2015) employs the PROMETHEE method to evaluate the financial performance of state-owned, private, and foreign banks in Turkey, with a focus on the pre- and post-crisis periods. The study highlights that state-owned banks outperformed their peers before the financial crisis but experienced a notable

decline in performance afterward. In contrast, foreign-owned banks improved their performance post-crisis, suggesting that ownership structure can significantly affect resilience during periods of financial instability. Similarly, Isik (2017) analyzes the profitability determinants of 26 commercial banks in Turkey, finding that income diversification, deposit levels, bank size, and stability positively impact profitability, while credit risk and operating expenses detract from profitability.

The comparison between different ownership groups is further explored by Çelik (2018) and Akyüz and Emir (2018), both of whom use the CAMELS analysis method. Çelik's study reveals that while ownership structure does not significantly affect performance across different bank groups, asset size does lead to performance variation. Akyüz and Emir's research further differentiates performance across foreign, public, and private banks, highlighting that foreign banks tend to excel in capital adequacy, asset quality, and liquidity, while public banks perform better in management and profitability. Private banks, on the other hand, show a superior response to market risk sensitivity.

International studies offer broader insights into the relationship between ownership and performance. Sarı (2019) synthesizes findings from the global literature, noting that foreign-owned banks generally outperform domestic banks in terms of efficiency, profitability, and risk management. Factors such as access to low-cost financial resources, management expertise, and advanced financial services contribute to the efficiency of foreign banks (Assaf et al., 2013; Muazaroh et al., 2012). However, the performance advantage of foreign banks is not always universal, as the comparative efficiency of foreign versus private banks often depends on regional factors and specific performance metrics.

The dynamics of ownership structure in Türkiye are also explored by Bal and Sönmezer (2022), who find that credit risk, funding costs, and GDP growth have a positive impact on the profitability of banks, with private and foreign banks being more sensitive to illiquidity and operating costs. Notably, the study reveals that labor productivity has a positive effect on the profitability of foreign banks but a negative impact on larger private banks. Demirel (2024) did not identify any significant differences in the macroeconomic factors affecting consumer loans within the banking sector in Türkiye, when analyzed by bank groups (participation, domestic, foreign, and public).

In sum, while ownership structure plays a pivotal role in shaping bank performance, the findings across different studies suggest that its impact is complex and varies depending on a range of factors, including bank size, market conditions, and regional context. The comparative advantage of foreign banks, while evident in many cases, is not universally observed and depends on specific circumstances and performance metrics.

4. DATA AND METHODOLOGY

4.1. Data

This paper aims to investigate the bank-specific determinants affecting the profitability of 25 commercial banks: 3 public, 8 domestic, and 14 foreign capital, operating in the Turkish banking sector. One local bank and 7 foreign banks were excluded from the analysis because recorded data were not available, as they were not part of the banking system during the analyzed period. The annual dataset used for the analysis covers the period from 2013 to 2023, with bank-specific financial data obtained from the Turkish Banks Association (TBB) website (www.tbb.org.tr). The macroeconomic variables are sourced from the website of the Turkish Statistical Institute (TUIK). The period from 2013 to 2023 offers an adequate time frame to examine trends, fluctuations, and patterns in the profitability of various types of banks (public, domestic, and foreign-owned). This timeframe facilitates the identification of both short-term effects and long-term trends, thereby providing a more comprehensive understanding of the factors influencing profitability in the Turkish banking sector.

4.2. Methodology and Definition of the Variables

A series of banking groups were described using means, standard deviations, and ranges. The Kolmogorov-Smirnov test was used to assess the normal distribution of research parameters. Since all parameter distributions were non-normal, nonparametric tests were employed. The Kruskal-Wallis test was used to examine differences between banking groups. Spearman's rank correlation analysis was used for univariate correlations. A generalized linear model (logit) was used for multivariable analysis, due to deviations in linearity (Yılmaz and Turanlı, 2023; Yılmaz and Turanlı, 2022). SPSS 25.0 for Windows was used for parameter analysis.

This study uses bank-specific and macroeconomic variables to determine the profitability indicators for all bank groups, which are widely used in the literature (Table 1). Therefore, both internal and external determinants are included in the regression model. The regression model is as follows:

$$ROA_{jt} = \delta_j + \alpha X_{ijt} + \beta X_{et} + \varepsilon_{jt}$$

Here:

ROA_{jt} refers to dependent variable and observation on profitability for bank i at time t

j refers to an individual bank

t refers to year,

X_i refers to the internal variables of a bank

X_e refers to the annual time effects of a bank

δ refers to the speed of adjustment to equilibrium

α and β are coefficients while ε_{jt} is the error term.

The bank profitability model previously determined above is first estimated for the entire bank sample. Then, three separate sub-samples (public banks, private banks and foreign banks) are classified in terms of the capital ownership of the banks. Thus, it will be possible to evaluate both the aggregate performance of the commercial Turkish banks and the comparative performance on the basis of individual subgroups.

ROA refers to dependent variable, which reflects observations on bank performance. The study's data set and relevant information

are given in Table 2. As indicated in Table 2, the study employs return on assets (ROA) as dependent variable, and measures of firm's financial performance which are widely accepted measures of financial performance. The independent variables are classified into two groups. The first group includes bank-specific (controllable) internal factors. The second group includes macroeconomic (uncontrollable) conditions such as inflation and economic growth (Table 1). Banks cannot be separated from the macroeconomic factors that affect their operations.

The next section outlines the independent variables, which are listed in Table 1 and utilized in the analysis:

4.2.1 Bank-specific factors

1. Bank size (BS): Bank size is measured by the natural logarithm of total assets. This variable typically refers to the scale or magnitude of a bank and is used to capture the relative size of a financial institution. Understanding bank size is essential for analyzing its impact on financial performance, risk, and overall market behavior. While some studies predict a negative relationship between bank size and bank performance (Çöllü, 2021; Al-Matari, 2021; Javaid et al., 2015; Sufian and Chong, 2008), others suggest a positive relationship between the two (Nguyen et al., 2021; Saif-Alyousfi, 2020; Topak and Talu, 2017; Belke and Unal, 2017; Turgutlu, 2014). On the other hand, some studies suggest that bank size is not a significant factor in measuring bank performance (Kantharia and Biradar, 2022).
2. Asset quality (AQR): Asset quality, measured by the ratio of total loans to total assets, indicates the proportion of a bank's assets that are tied up in loans. A higher ratio suggests that a larger portion of the bank's assets is invested in loans, which may indicate higher risk, as loans can be more vulnerable to defaults. A lower ratio may indicate a more diversified asset base, potentially reducing risk. This ratio helps assess the risk exposure of the bank's assets and its focus on lending activities compared to other types of investments (Akyol and Başar, 2024).
3. Credit risk (NPL): Bank or credit risk is calculated by the ratio of non-performing loans (NPLs) to total loans. The NPL ratio is an important indicator of a bank's loan portfolio health and risk management. Banks aim to keep this ratio as low as possible to maintain financial stability and profitability. Therefore, credit risk is generally expected to negatively affect bank profitability (O'Connell, 2022; Horobet et al., 2021; Jreisat and Bawazir, 2021; Diko, 2019).
4. Liquidity ratio (LIQ): Liquidity is measured by the ratio of liquid assets to total assets. The liquidity ratio measures a bank's ability to meet its short-term obligations by comparing its liquid assets (such as cash, government securities, and loans) to its total assets. A higher liquidity ratio indicates that the bank has sufficient easily accessible funds to cover potential withdrawals or unexpected expenses, ensuring financial stability. A low ratio might signal liquidity risks and the possibility of financial strain during periods of high demand for withdrawals or in times of crisis. Increased liquidity risk is expected to negatively affect bank stability (Akyol and Başar, 2024; O'Connell, 2022; Çöllü, 2021; Diko, 2019). However, some research suggests that a positive correlation between ROA and the deposit ratio is expected (Koroleva et al., 2021; Saif-Alyousfi, 2020).
5. Capital strength (CAP): This term refers to the proportion of a company's assets that are financed by its shareholders' equity. It is calculated by dividing the shareholder's equity by the total assets. A higher ratio indicates that the company is less reliant on debt and has a stronger financial foundation, which is generally seen as a sign of stability and lower financial risk. Conversely, a lower ratio may suggest higher reliance on debt, potentially increasing financial risk (Akyol and Başar, 2024; Khalifaturofi'ah, 2023; O'Connell, 2022; Saif-Alyousfi, 2020).
6. Deposit level (DTA): A ratio of deposits to assets is used as a proxy variable representing the stability of funding (O'Connell, 2022: 161). The deposit level, as measured by the ratio of deposits to total assets, refers to a financial metric that indicates the proportion of a financial institution's assets funded by customer deposits. This ratio indicates how reliant the institution is on deposits to fund its operations and assets. A higher ratio suggests that the institution relies more on customer deposits, which may be seen as a stable source of funding, while a lower ratio could indicate a greater reliance on other forms of financing. This metric is used to assess the financial structure and liquidity of banks. Therefore, a positive correlation between ROA and the deposit ratio is expected (Acaravcı and Çalım, 2013).
7. Income diversification (NII): The income diversification variable is measured by the ratio of non-interest income to total assets. Income diversification in banks is a strategy of generating revenue from multiple sources, rather than being dependent on a single source such as traditional loan interest income. While revenue diversification has the potential to increase the profitability of banks, it can also increase the risks that the bank manages. Some studies suggest that diversifying

Table 2: Definition of the variables

Name of variables	Notation	Measurement
Dependent variables		
Return on assets	ROA	Net income over total assets
Bank-specific variables		
Bank size	BS	Natural logarithm of total assets
Asset quality	AQR	Total loans over total assets
Bank or credit risk	NPL	Nonperforming loans over total loans
Liquidity ratio	LIQ	Liquid assets over total assets
Capital strength/ Capitalization	CAP	Shareholder's equity over total assets
Deposits	DTA	Deposits/total assets
Income diversification	NII	Non-interest income over total assets
Management of expenses	OPE	Other operating expense over total assets
Macroeconomic variables		
Inflation	INF	Inflation rate (CPI growth rate)
GDP growth rate	GDP	Growth rate of real GDP per capita

income increases bank profitability by providing a broader income base and making them more resilient to economic fluctuations (Jreisat and Bawazir, 2021; Saif-Alyousfi, 2020; Isik, 2017). On the other hand, other studies argue that excessive diversification may lead banks to take risks in areas outside their expertise, potentially reducing profitability or offering minimal diversification benefits (Stiroh, 2004).

8. Management of expenses (OPE): The operating expenses variable included in the regression model to determine the effect of operational efficiency on bank profitability is measured by the ratio of other operating expenses to total assets. A high ratio typically indicates low management efficiency. Well-managed banks can control their operating expenses effectively, contributing to increased efficiency. In other words, efficient management of operating expenses (i.e., reducing costs) can positively impact bank profitability by improving efficiency. Therefore, the effect of this variable on profitability is expected to be negative (O'Connell, 2022; Jreisat and Bawazir, 2021; Isik, 2017).

4.2.2 Macroeconomic factors

1. Inflation (INF): Inflation, as measured by the Consumer Price Index (CPI), can have significant effects on bank performance in different ways: Moderate inflation can signal a healthy, growing economy, which may benefit banks. But when inflation is high, it often leads to increased operational expenses and reduced consumer spending power, which can negatively affect banks' profits (Akyol and Başar, 2024; Isayas, 2022).
2. GDP growth (GDP): GDP growth is one of the most commonly used variables in analyses of factors influencing bank performance. It is expected to have a positive effect on bank profitability, as evidenced by the positive correlation between GDP growth and banking sector performance (Bal and Sönmezer, 2022; Isayas, 2022; Saif-Alyousfi, 2020; Acaravcı and Çalım, 2013).

5. EMPIRICAL FINDINGS

Table 3 presents descriptive statistics (mean, standard deviation, minimum, and maximum) for various financial indicators across three types of banks: State, Private, and Foreign. Additionally, the Kruskal-Wallis test results are provided for each variable, including the Chi-square statistic (χ^2) and P-value. The ROA, BS, AQR, CAP, and DTA levels of bank groups were significantly different ($P < 0.05$), while the differences in NPL, LIQ, NII, and OPE levels were not significant ($P > 0.05$). The BS, AQR, and DTA levels were highest in state-owned banks, ROA was highest in private banks, and CAP was highest in foreign banks (Table 3). These findings suggest that bank type plays a role in several financial indicators, particularly in areas like profitability (ROA), size (BS), asset quality (AQR), capital adequacy (CAP), and financial leverage (DTA), while factors like liquidity (LIQ), net interest income (NII), and operating efficiency (OPE) do not differ significantly.

Table 4 provides Spearman's rho correlation values between Return on Assets (ROA) and various financial parameters for different types of banks: State, private, and foreign banks.

In state-owned banks, return on assets (ROA) showed significant correlations with non-performing loans (NPL) ($r = -0.443$, $P < 0.01$), liquidity (LIQ) ($r = 0.585$, $P < 0.01$), capital adequacy (CAP) ($r = 0.591$, $P < 0.01$), net interest income (NII) ($r = 0.412$, $P < 0.05$), operating efficiency (OPE) ($r = 0.468$, $P < 0.01$), and gross domestic product (GDP) ($r = 0.522$, $P < 0.01$):

- Non-performing loans (NPL): A strong negative correlation ($r = -0.443$, $P < 0.01$) indicates that as non-performing loans increase, the return on assets decreases.
- Liquidity (LIQ): A positive correlation ($r = 0.585$, $P < 0.01$) suggests that higher liquidity is associated with better profitability.
- Capital adequacy (CAP): A strong positive correlation ($r = 0.591$, $P < 0.01$) indicates that higher capital adequacy ratios improve profitability.
- Net ınterest ıncome (NII): A positive correlation ($r = 0.412$, $P < 0.05$) suggests that higher interest income enhances profitability.
- Operating efficiency (OPE): A moderate positive correlation ($r = 0.468$, $P < 0.01$) implies that more efficient operations lead to better profitability.
- Gross domestic product (GDP): The positive correlation ($r = 0.522$, $P < 0.01$) suggests that a higher GDP is associated with better bank performance.

In private banks, ROA was significantly correlated with bank size (BS) ($r = 0.607$, $P < 0.01$), asset quality ratio (AQ) ($r = -0.579$, $P < 0.01$), non-performing loans (NPL) ($r = -0.237$, $P < 0.05$), capital adequacy (CAP) ($r = 0.265$, $P < 0.05$), net interest

Table 3: Descriptive statistics and difference analysis results between bank types

Parameter	Group												χ^2	p value*
	State				Private				Foreign					
	Mean	SD**	Min	Max	Mean	SD**	Min	Max	Mean	SD**	Min	Max		
ROA	1.31	0.62	0.19	2.94	1.69	1.52	−2.21	6.73	1.63	2.49	−11.90	15.67	10.549	0.005
BS	13.12	0.94	11.82	15.15	11.04	2.00	7.03	14.90	10.23	1.57	6.01	14.47	21.377	0.000
AQR	63.12	5.34	51.88	69.64	62.68	8.53	36.78	77.95	55.73	13.97	1.87	78.91	6.983	0.030
NPL	2.93	1.22	1.08	5.93	4.22	2.55	0.79	13.05	5.17	6.87	0.09	48.59	4.721	0.094
LIQ	18.87	7.81	8.37	36.72	22.93	7.72	11.65	52.34	30.84	13.97	12.47	88.26	0.200	0.905
CAP	8.52	1.84	4.83	11.53	10.91	2.70	5.19	19.77	11.56	6.87	2.88	76.92	22.617	0.000
DTA	0.65	0.07	0.54	0.85	0.65	0.07	0.54	0.82	0.58	0.17	0.00	0.88	20.123	0.000
NII	0.93	0.66	−0.24	2.87	1.82	1.76	−0.30	10.42	1.57	1.99	−4.41	16.16	2.911	0.233
OPE	1.28	0.51	0.55	1.97	2.01	0.85	0.69	4.22	1.98	1.08	0.17	4.92	2.219	0.330

*Kruskal Wallis test, **SD: Standard Deviation

Table 4: Spearman's rho correlation between ROA and research parameters according to banking types

Parameter	State		Private		Foreign	
	r	P	r	P	r	P
BS	−0.231	0.197	0.607**	0.000	0.223**	0.005
AQR	−0.146	0.418	−0.579**	0.000	−0.478**	0.000
NPL	−0.443**	0.010	−0.237*	0.026	−0.329**	0.000
LIQ	0.585**	0.000	−0.029	0.792	0.186*	0.021
CAP	0.591**	0.000	0.265*	0.013	0.412**	0.000
DTA	0.002	0.990	−0.128	0.235	0.068	0.401
NII	0.412*	0.017	0.594**	0.000	0.519**	0.000
OPE	0.468**	0.006	−0.395**	0.000	−0.124	0.125
INF	−0.244	0.172	0.427**	0.000	0.501**	0.000
GDP	0.522**	0.002	0.218*	0.041	0.001	0.999

*P<0.05, **P<0.01

income (NII) (r = 0.594, P < 0.01), operating efficiency (OPE) (r = −0.395, P < 0.01), inflation (INF) (r = 0.427, P < 0.01), and GDP (r = 0.218, P < 0.01):

- Bank size (BS): A strong positive correlation (r = 0.607, P < 0.01) suggests that larger banks tend to be more profitable.
- Asset quality ratio (AQ): A strong negative correlation (r = −0.579, P < 0.01) indicates that poorer asset quality, such as higher levels of non-performing loans, reduces profitability.
- Non-performing loans (NPL): A negative correlation (r = −0.237, P < 0.05) shows that higher non-performing loans are associated with lower profitability, although the effect is weaker compared to state banks.
- Capital adequacy (CAP): A positive correlation (r = 0.265, P < 0.05) suggests that a moderate improvement in capital adequacy has a small but positive impact on profitability.
- Net ınterest ıncome (NII): A strong positive correlation (r = 0.594, P < 0.01) implies that higher net interest income leads to greater profitability.
- Operating efficiency (OPE): A negative correlation (r = −0.395, P < 0.01) suggests that greater operational inefficiency is linked to lower profitability.
- Inflation (INF): A positive correlation (r = 0.427, P < 0.01) indicates that inflation is positively associated with profitability.
- Gross domestic product (GDP): A small positive correlation (r = 0.218, P < 0.01) implies a slight positive relationship between GDP growth and higher profitability.

In foreign banks, ROA was significantly correlated with bank size (BS) (r = 0.223, P < 0.01), asset quality ratio (AQ) (r = −0.478, P < 0.01), non-performing loans (NPL) (r = −0.329, P < 0.01), liquidity (LIQ) (r = 0.186, P < 0.05), capital adequacy (CAP) (r = 0.412, P < 0.01), net interest income (NII) (r = 0.519, P < 0.01), and inflation (INF) (r = 0.501, P < 0.01):

- Bank Size (BS): A small positive correlation (r = 0.223, P < 0.01) indicates a weak positive relationship between bank size and profitability.
- Asset Quality Ratio (AQ): A negative correlation (r = −0.478, P < 0.01) suggests that poorer asset quality significantly reduces profitability.
- Non-Performing Loans (NPL): A negative correlation (r = −0.329, P < 0.01) implies that higher levels of non-performing loans negatively affect profitability, but less strongly than in state and private banks.
- Liquidity (LIQ): A small positive correlation (r = 0.186, P < 0.05) indicates a modest link between liquidity and profitability.
- Capital Adequacy (CAP): A positive correlation (r = 0.412, P < 0.01) suggests that better capital adequacy contributes to higher profitability.
- Net Interest Income (NII): A strong positive correlation (r = 0.519, P < 0.01) indicates that higher net interest income significantly boosts profitability.
- Inflation (INF): A strong positive correlation (r = 0.501, P < 0.01) suggests that inflation is positively related to profitability.

These findings indicate that factors such as asset quality, liquidity, capital adequacy, and net interest income are critical for bank profitability across different types of banks. The effects of non-performing loans and inflation vary by bank type, with state and private banks being more sensitive to these factors compared to foreign banks.

In state-owned banks, the effects of Non-Performing Loans (NPL) (B = −0.154, P < 0.05), Capital Adequacy (CAP) (B = 0.224, P < 0.01), and Net Interest Income (NII) (B = 0.471, P < 0.01) were statistically significant. In contrast, the effects of Liquidity (LIQ), Operating Expenses (OPE), and GDP were insignificant (P > 0.05). Specifically, the effect of NPL was negative, while the effects of CAP and NII on Return on Assets (ROA) in state-owned banks were positive (Table 5). Both Capital Adequacy (CAP) and Net Interest Income (NII) have a strong, positive impact on ROA in state banks. This suggests that improving capital reserves and increasing net interest income can help boost profitability. On the other hand, Non-Performing Loans (NPL) negatively affect ROA, indicating that efforts to reduce bad loans could enhance profitability. However, Liquidity (LIQ), Operating Expenses (OPE), and GDP do not significantly influence the return on assets of state-owned banks in this analysis. In conclusion, the primary drivers of ROA in state banks are Capital Adequacy, Net Interest Income, and Non-Performing Loans. Managing these factors effectively could be crucial for improving the profitability of state-owned banks.

Table 5: Effects of significantly correlated factors on ROA for state banks

Parameter	B	Standard error	95% Wald confidence interval		Hypothesis test		
			Lower	Upper	Wald χ^2	df	P
(Intercept)	−4.175	10.161	−24.090	15.740	0.169	1	0.681
NPL	−0.154	0.070	−0.292	−0.016	4.811	1	0.028
LIQ	0.012	0.011	−0.009	0.034	1.264	1	0.261
CAP	0.224	0.048	0.131	0.318	22.049	1	0.000
NII	0.471	0.113	0.249	0.693	17.240	1	0.000
OPE	−0.399	0.317	−1.022	0.223	1.581	1	0.209
GDP	0.416	1.093	−1.726	2.558	0.145	1	0.703
(Scale)	0.093	0.023	0.057	0.150			

Dependent variable: ROA
Model: (Intercept), NPL, LIQ, CAP, NII, OPE, GDP

Table 6: Effects of significantly correlated factors on ROA for private banks

Parameter	B	Standard error	95% Wald confidence interval		Hypothesis test		
			Lower	Upper	Wald χ^2	df	P
(Intercept)	−13.787	7.729	−28.935	1.362	3.182	1	0.074
BS	0.208	0.035	0.140	0.276	35.668	1	0.000
AQR	0.051	0.010	0.032	0.070	27.204	1	0.000
NPL	−0.130	0.031	−0.190	−0.069	17.507	1	0.000
CAP	0.186	0.020	0.146	0.226	83.223	1	0.000
NII	0.154	0.046	0.065	0.243	11.400	1	0.001
OPE	−0.315	0.108	−0.527	−0.103	8.462	1	0.004
INF	0.051	0.004	0.042	0.060	128.222	1	0.000
GDP	0.828	0.852	−0.843	2.499	0.943	1	0.331
(Scale)	0.236	0.036	0.176	0.317			

Table 7: Effects of significantly correlated factors on ROA for foreign banks

Parameter	B	Standard error	95% Wald confidence interval		Hypothesis test		
			Lower	Upper	Wald χ^2	df	P
(Intercept)	−7.318	1.4073	−10.076	−4.560	27.039	1	0.000
BS	0.333	0.0758	0.184	0.481	19.244	1	0.000
AQR	0.019	0.0118	−0.004	0.042	2.607	1	0.106
NPL	−0.128	0.0141	−0.156	−0.101	82.291	1	0.000
LIQ	0.032	0.0128	0.007	0.057	6.358	1	0.012
CAP	0.242	0.0296	0.184	0.300	66.774	1	0.000
NII	0.385	0.0876	0.213	0.556	19.266	1	0.000
INF	0.030	0.0070	0.016	0.043	18.071	1	0.000
(Scale)	1.067	0.1314	0.839	1.359			

State banks indicate a stronger and more statistically significant negative correlation between ROA and NPL compared to both private and foreign banks. This indicates that for state banks, higher NPLs are more detrimental to their profitability. Private banks seem to be the least affected by NPLs in terms of their profitability, while foreign banks fall in between. Besides, private banks benefit most from increases in NII in terms of profitability, followed by foreign banks, with state banks showing a less pronounced impact.

In private banks, effects of BS (B = 0.208; P < 0.01), AQR (B = 0.051; P < 0.01), NPL (B = −0.130; P < 0.01), CAP (B = 0.186; P < 0.01), NII (B = 0.154; P < 0.01), OPE (B = −0.315; P < 0.01) and INF (B = 0.051; P < 0.01) were significant. Effect of GDP was insignificant (P > 0.05). NPL and OPE had negative effect on ROA, whereas BS, AQR, CAP, NII and INF had positive effect on ROA for private banks (Table 6). For private banks, factors like bank size (BS), asset quality (AQR), capital adequacy (CAP), net interest income (NII), and inflation (INF) all have a positive impact on profitability, while non-performing loans (NPL) and operational inefficiency (OPE) are detrimental to profitability. The broader economic factor of GDP, however, does not appear to have a significant impact on ROA in this model.

In foreign banks, the effects of Bank Size (BS) (B = 0.333; P < 0.01), Non-Performing Loans (NPL) (B = 0.128; P < 0.01), The effect of BS (B = 0.333; P < 0.01), NPL (B = 0.128; P < 0.01), LIQ (B = 0.032; P < 0.01), CAP (B = 0.242; P < 0.01), NII (B = 0.385; P < 0.01) and INF (B = 0.03; P < 0.01) were significant. Effect of AQR was insignificant (P > 0.05). Effects of BS, LIQ, CAP, NII and INF on ROA in foreign banks were positive, and effect of NPL was negative (Table 7). Bank size (BS), Liquidity (LIQ), capital adequacy (CAP), net interest income (NII), and inflation (INF) all have positive coefficients, meaning that increases in these factors are associated with higher profitability (ROA) for foreign banks. Non-performing loans (NPL) has a negative coefficient, indicating that an increase in non-performing loans decreases the profitability (ROA) of foreign banks. But asset quality (AQR), in this specific analysis, does not have a measurable impact on the

profitability of foreign banks. Overall, foreign banks can improve their ROA by focusing on expanding their size, ensuring adequate liquidity and capital, and improving net interest income, while also managing non-performing loans effectively.

6. CONCLUSION

The distinctive behaviors of public sector, private, and foreign banks have garnered significant attention in academic literature. A comparative analysis of Turkish deposit banks, focusing on the impact of ownership structure on performance, addresses a gap in existing research and contributes valuable insights into how different banking models function within the broader economic context. This analysis aids in identifying the advantages, challenges, and growth opportunities for each bank group. Several studies have been conducted on the comparative performance of banks, both nationally and internationally. This study incorporates two macroeconomic variables: inflation and GDP growth.

The analysis of bank-specific and macroeconomic factors influencing bank profitability (ROA) aligns with, and in some cases contrasts with, previous research findings. The relationship between bank size and profitability is mixed. Some studies indicate a negative relationship (Çöllü, 2021; Al-Matari, 2021), while others suggest a positive correlation (Nguyen et al., 2021; Belke and Unal, 2017). This study reveals that in state and foreign banks, bank size does not significantly affect profitability. However, in private banks, a positive correlation is observed, suggesting that larger banks tend to be more profitable, aligning with the findings of Nguyen et al. (2021).

Asset quality is commonly understood to affect profitability, with poor asset quality (i.e., high NPLs) negatively impacting performance (Akyol and Başar, 2024). Consistent with this, poor asset quality negatively impacts ROA, particularly in private and foreign banks. The negative correlation with ROA is significant across all bank types, supporting earlier research.

Non-performing loans (NPLs) are known to negatively impact profitability (Horobet et al., 2021; Diko, 2019). This analysis confirms that NPLs have a strong, negative effect on profitability, particularly in state banks, in line with previous research indicating a significant relationship between NPLs and bank performance. Liquidity is often linked to financial stability, with a higher liquidity ratio expected to positively influence profitability (Akyol and Başar, 2024). The analysis finds a positive relationship between liquidity and ROA in state banks, suggesting that liquidity enhances profitability. This finding aligns with Akyol and Başar (2024) but contrasts with private and foreign banks, where liquidity is not significantly correlated with ROA.

Efficient management of operating expenses is expected to have a positive impact on profitability (O'Connell, 2022). The analysis shows that operating expenses significantly negatively affect profitability, especially in private banks, supporting the view that high operating costs reduce profitability.

The impact of inflation on profitability is mixed, with moderate inflation potentially benefiting banks, while high inflation is detrimental (Isayas, 2022). Inflation is positively correlated with ROA in both private and foreign banks, suggesting that inflation may have a beneficial effect in certain contexts. This finding aligns with Saif-Alyousfi (2020) for private banks but contrasts with the negative correlation observed in state banks. GDP growth is generally associated with improved bank performance, as it signals economic expansion (Bal and Sönmezer, 2022). GDP growth is positively correlated with ROA in state banks, consistent with previous studies. However, the correlation is weaker in private banks and non-significant for foreign banks, which may reflect differences in the exposure of foreign banks to local economic conditions.

Capital adequacy is generally considered a positive factor for bank profitability and stability (O'Connell, 2022; Saif-Alyousfi, 2020). The analysis supports this view, showing a strong positive correlation between capital strength and ROA across all bank types, consistent with earlier findings. Non-interest income (NII) is often viewed as a key driver of profitability (Isik, 2017). The current analysis corroborates this, revealing a strong positive relationship between NII and ROA, particularly in private and foreign banks.

The empirical findings of this study offer valuable insights into the financial performance and profitability determinants across various bank types-state-owned, private, and foreign. Key indicators such as Return on Assets (ROA), Bank Size (BS), Asset Quality Ratio (AQR), Capital Adequacy (CAP), Non-Performing Loans (NPL), Net Interest Income (NII), and Liquidity (LIQ) were identified as significant factors influencing ROA across all bank types. However, the impact of these factors varied according to the ownership structure of the banks.

For state-owned banks, Capital Adequacy (CAP), Net Interest Income (NII), and Non-Performing Loans (NPL) were the primary drivers of profitability, emphasizing the importance of strong capital reserves and effective management of bad loans. In private banks, the most significant factors were Bank Size (BS), Asset Quality (AQR), Capital Adequacy (CAP), Net Interest Income (NII), and Inflation (INF), while Non-Performing Loans (NPL) and Operational Efficiency (OPE) negatively impacted profitability. Foreign banks displayed a similar pattern, with Bank Size (BS), Liquidity (LIQ), Capital Adequacy (CAP), Net Interest Income (NII), and Inflation (INF) contributing positively to profitability, while Non-Performing Loans (NPL) had a negative effect. Interestingly, Asset Quality (AQR) did not significantly impact the profitability of foreign banks, suggesting that their operational model may be less sensitive to this factor.

Overall, the results underscore the importance of sound management practices in capital adequacy, loan quality, and income generation across all types of banks. These findings suggest that strategies focusing on improving these key financial indicators can lead to enhanced profitability and operational effectiveness, particularly in state and private banks. For foreign banks, managing liquidity and capital adequacy plays a crucial role in improving performance. Therefore, banks across all ownership types should prioritize effective risk management, operational

efficiency, and strategic planning to ensure long-term profitability and sustainability.

The limitations of this study should be considered when interpreting the findings. The study employs a cross-sectional research design, with variables measured at a single point each year. Consequently, this design does not allow for the establishment of causal relationships between the examined variables and profitability. Due to the absence of temporal depth, causality cannot be conclusively inferred. Future research could enhance the understanding of these relationships by employing panel data or longitudinal approaches, enabling a more comprehensive exploration of causal dynamics over time.

Comparative performance assessments of foreign, private, and public banks are typically conducted to evaluate the efficiency and effectiveness of various banking groups. Furthermore, such comparisons provide valuable insights for policymakers and bank management, enabling them to make informed decisions and develop more effective management strategies by identifying the distinctions between these banking groups.

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