

NAVIGATING THE PATH TO FINANCIAL EXCELLENCE: AN IN-DEPTH EXAMINATION OF ETHIOPIAN PRIVATE COMMERCIAL BANKS USING THE DUPONT MODEL

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Abstract

This study presents an in-depth examination of the financial performance of Ethiopian private commercial banks from 2017/18 to 2021/22, employing the DuPont Model as a primary analytical tool. The model decomposes Return on Equity (ROE) into three pivotal components: Net Profit Margin (NPM), Gross Yield on Assets (GYA), and Equity Multiplier (EM), offering a holistic view of bank efficiency, effectiveness, and leverage. The study's objectives were to assess and compare the financial performance of these banks, analyze influencing factors, and provide actionable recommendations. Our analysis revealed significant variability in the performance metrics across the banks. This variability reflects diverse management strategies and operational efficiencies, further influenced by external factors such as the COVID-19 pandemic and regional conflicts. Comparative and trend analyses highlighted differences in financial practices and performances among banks, while regression analysis underscored the significant influence of NPM, GYA, and EM on ROE. Tests for multicollinearity and heteroskedasticity affirmed the regression model's reliability. The study concludes that the Ethiopian private commercial banking sector is characterized by its diversity in management practices and its resilience to external factors. It suggests the need for tailored strategies, considering each bank's specific circumstances and strengths for optimal performance. The study's insights are valuable for stakeholders, including bank managers, investors, and policymakers, who guide informed decision-making and strategic planning in the banking sector.

1. INTRODUCTION

Ethiopian Banking Sector: An Overview

Since the early 1990s, Ethiopia's banking sector, comprising both state-owned and private banks, has seen substantial transformation. Dominated initially by state-owned banks, like the Commercial Bank of Ethiopia, the introduction of private banks marked a significant shift (Assefa, 2020; Kassa, 2017).

These new private entities brought innovations and customer-focused services, boosting competition and efficiency (Bekele & Worku, 2019; Mebratu & Beshah, 2019).

However, challenges such as limited rural access, regulatory hurdles, and the need for advanced digital banking and risk management practices still remain (Gebre-Egziabher, 2021; Fikadu & Alemu, 2022).

Understanding this evolving landscape is key to analyzing the financial performance of Ethiopian private commercial banks using tools like the DuPont Model.

Objectives

The objective of the study is to assess the financial performance of Ethiopian private commercial banks using the DuPont model, analyze factors influencing their performance, and provide actionable recommendations for improvement.

Significance of the Study

This study is important for bank managers, investors, and policymakers in Ethiopia. It helps bank managers in strategic planning for better profitability, guides investors in making informed decisions, and aids policymakers in drafting regulations for financial stability. Focusing on Ethiopian banks, it contributes to global banking efficiency literature, serving as a benchmark for local and international comparison, and linking academic research with practical banking operations.

Scope and Limitations

The study focused on Ethiopia's private commercial banks, examining their financial performance using the DuPont Model. It analyzed data from 16 private banks over five years (2017-18 to 2021-22), excluding government banks and microfinance institutions. Financial statements, aligned with International Financial Reporting Standards (IFRS), were used for consistent reporting.

The research employed trend, comparative, and regression analyses, utilizing DuPont analysis techniques to uncover patterns and investigate the relationships among various financial ratios and evaluations of these banks.

2. LITERATURE REVIEW

Financial Performance Analysis in Ethiopian Banking: Global Insights and Local Challenges

The DuPont Model's application in global banking, as examined by Smith et al. (2018) and Zhang and Wan (2019), underscores its efficacy in dissecting bank profitability.

These studies demonstrate its usefulness in both European and Chinese banking contexts, highlighting the model's versatility in diverse economic landscapes.

Focusing on Ethiopia, research by Alemu (2016) and Shimekit (2019) explores financial performance within the unique Ethiopian banking sector.

Their analyses provide critical insights into efficiency and profitability determinants, emphasizing the relevance of financial ratios like ROE and NPM in the Ethiopian context.

Ethiopian banks, facing challenges such as economic shifts and regulatory changes (Tadesse & Muluye, 2020), find the DuPont Model particularly useful.

It offers a detailed understanding of how these banks can enhance profitability, manage risks, and adapt to an evolving economic environment.

The model's role in evaluating operational efficiency is crucial for Ethiopian banks striving for growth and stability in a competitive sector.

The DuPont Model: A Comprehensive Financial Analysis Tool

The DuPont Model, developed by the DuPont Corporation, is a key financial analysis tool, decomposing ROE into profitability, efficiency, and leverage. Widely applied in banking, it helps assess a bank's financial health (Chandra, 2019; Brealey et al., 2020).

In Ethiopian banking, the model evaluates operational efficiency and effectiveness, particularly in response to competition and regulatory changes (Kassa, 2017).

Its components—Net Profit Margin, Gross Yield on Assets, and Equity Multiplier—collectively offer insights into a bank's income generation, asset utilization, and financial leverage, culminating in an overall ROE calculation.

In Ethiopian commercial banks, ROE and its components are calculated to determine their financial performance.

This involves assessing aspects like profitability, efficiency, and financial leverage through specific formulas. These metrics offer a detailed view of how effectively these banks manage their income, assets, and capital, crucial for understanding their financial health in a dynamic economic environment.

"ROE and its components in Ethiopian commercial banks are calculated as:

$$\text{Profit Margin} = \text{Net Income after Tax and Provision} / (\text{Interest Income Total Non-Interest Income})$$

$$\text{Gross Yield on Assets} = (\text{Interest Income} + \text{Total Non-Interest Income}) / \text{Average Total Assets}$$

$$\text{Equity Multiplier} = \text{Average Total assets} / \text{Average Capital and Reserves}$$

$$\text{ROE} = \text{Net Income after Tax \& Provisions} / \text{Average Capital \& reserves}^1$$

$$\text{ROE} = \text{Profit Margin} * \text{Gross Yield on Asset} * \text{Equity Multiplier}$$

3. METHODOLOGY

Data Source and Collection

The study gathered quantitative data from audited financial statements of Ethiopian private commercial banks (2017/18-2021/22), post-IFRS adoption. Data was sourced from the National Bank of Ethiopia and the banks' financial reports, ensuring reliability within the IFRS framework.

Data Cleaning

Data cleaning involved rectifying errors, filling missing values, removing duplicates, and standardizing formats across the five-year financial dataset from various banks, aiming for accuracy and consistency.

Data Analysis Techniques

The financial data was analyzed using, descriptive statistics, the DuPont Model, and fixed-effect regression. This comprehensive approach evaluated the financial performance of Ethiopian private commercial banks.

4. DATA PRESENTATION AND ANALYSIS

The analysis in this study was conducted using a thoroughly cleansed dataset. The aim was to ensure clarity and alignment with the study's objectives. After presenting the data, the study moved into an in-depth analysis phase. It culminated in interpreting the results, leading to conclusions, implications, and recommendations based on the findings.

Descriptive Statistics

The descriptive statistics provide a concise summary of key financial metrics (NPM, GYA, EM, and ROE) for Ethiopian private commercial banks, derived from STATA output. This analysis offers essential insights into the financial performance of these banks, highlighting critical measures that reflect their operational efficiency and profitability.

Table 1: Descriptive Statistical Analysis of Financial Metrics for Ethiopian Private Commercial Banks (2017/18 - 2021/22)

Statistic	NPM	GYA	EM	ROE
Count	80	80	80	80
Mean	21.59	13.39	7.56	21.28
Std Dev	7.29	2.68	1.85	8.48
Min	2.53	4.11	4.60	2.50
25%	17.66	12.03	6.30	16.65
50% (Median)	20.88	12.90	7.31	19.40
75%	25.22	14.35	8.64	25.07
Max	39.55	20.66	12.65	51.37
Skewness	0.20	0.37	0.78	0.94
Kurtosis	0.55	2.07	0.17	1.68

Source: STATA Output

Test of Normality of Data

The Shapiro-Wilk test results for NPM, GYA, EM, and ROE offer key insights into the distribution patterns of these financial metrics in the banking data.

Table 2: Shapiro-Wilk Test Result

Metric	W-Statistic	p-value
NPM	0.9777	0.1758
GYA	0.9182	0.00008
EM	0.9433	0.0015
ROE	0.9440	0.0016

Source: STATA Output

The results reveal that among the assessed metrics, only NPM aligns with a normal distribution, indicating consistent profitability across banks. In contrast, GYA, EM, and ROE significantly deviate from normality, reflecting diverse strategies and outcomes in asset management, equity utilization, and financial leverage. This variation points to differences in market conditions, risk management, and operational efficiencies among the banks. Overall, the findings highlight standardized profitability alongside diverse asset and equity management approaches, suggesting the need for bank-specific strategies to optimize financial performance.

Levene's Test

Levene's test assesses the variance equality of key financial metrics (NPM, GYA, EM, and ROE) across different banks, offering insights into the consistency of their financial performance and strategies.

Table 3: Levene's test Result

Metric	W-Statistic	p-value
NPM	1.7225	0.0686
GYA	0.6313	0.8382
EM	1.7748	0.0585
ROE	1.1010	0.3738

Source: STATA Output

ANOVA Test

The researcher used an ANOVA test in a study from 2017/18 to 2021/22 to analyze differences in key financial metrics (NPM, GYA, EM, and ROE) among Ethiopian private commercial banks, aiming to understand the variations in their financial performance.

Table 4: ANOVA Test Result

Metric	F-Statistic	p-value
NPM	3.7802	0.0000942
GYA	2.0908	0.0217
EM	23.2918	2.73e-20
ROE	3.2542	0.0005006

Source: STATA Output

Discussion and Analysis

This study's examination of financial metrics in Ethiopian private commercial banks uncovers significant variations in performance and strategies.

Profitability and Efficiency: The Net Profit Margin (NPM) generally indicates healthy profitability, but with notable inter-bank differences. Gross Yield on Assets (GYA) varies, showing moderate earnings efficiency with certain banks leading. The wide range and deviation in Return on Equity (ROE) reflect diverse effectiveness in equity utilization among banks.

Financial Strategies and Risk Management: The Equity Multiplier (EM) suggests a range of debt leverage approaches. Significant differences in NPM, GYA, EM, and ROE imply varied management and operational strategies, influenced by differing market conditions and risk management practices.

Statistical Insights: The normal distribution of NPM points to consistent profitability, whereas deviations in GYA, EM, and ROE from normality highlight diverse asset management and financial leverage approaches. Levene's test indicates a degree of uniformity in asset and equity management, though variances in NPM and EM are not statistically significant. ANOVA results confirm significant disparities in key financial metrics, underlining the diversity in financial management across the banks.

In summary, while displaying overall strong performance, the banks exhibit diversity in their financial management approaches, necessitating bank-specific strategies for optimal performance in the varying operational landscapes.

Regression Analysis

In this study, a fixed effects regression model was employed to analyze the relationship between ROE (dependent variable) and NPM, GYA, EM (independent variables) using data from 16 private commercial banks over five years (2017/18-2021/22). Chosen for its ability to account for unobserved heterogeneity and time-invariant characteristics in banks, this model effectively addresses potential biases by controlling for bank-specific traits. It provides a clear understanding of how changes in NPM, GYA, and EM within each bank over time influence ROE, making it particularly suitable for this dataset with a limited number of groups and a specific time frame (Wooldridge, J.M. (2015)).

Regression Equation Model

Guided by the rationale provided for utilizing the fixed effect regression model, the researcher formulated a fixed effect regression equation specifically designed to analyze and interpret the dataset.

Model: $ROE \sim NPM + GYA + EM$, with Combined Fixed Effects

The modified regression equation for this model is:

$$ROE_{it} = \beta_0 + \beta_1 \times NPM_{it} + \beta_2 \times GYA_{it} + \beta_3 \times EM_{it} + a_{it} + \epsilon_{it}$$

Where:

ROE_{it} is the return on equity for banks at the time.

NPM_{it} , GYA_{it} , and EM_{it} are the Net Profit Margin, Gross Yield on Assets, and Equity Multiplier for bank I at time t , respectively.

β_0 is the intercept.

β_1 , β_2 and β_3 are the coefficients for NPM, GYA, and EM.

A_{it} represents the combined bank-specific and time-specific fixed effects.

ϵ_{it} is the error term.

The fixed effects regression model incorporates both individual bank characteristics and time-related effects through the term α_{it} . This approach offers an inclusive analysis of the factors impacting the financial performance of banks, using ROE as the dependent variable and NPM, GYA, and EM as independent variables, alongside bank-specific fixed effects.

Table 5: Result of the Fixed Effects Regression Model

Variable	Coefficient	Std. Error	t-statistic	P-value	95% Conf. Interval Lower	95% Conf. Interval Upper
Intercept	-45.040	2.572	-17.51	2.13e-28	-50.162	-39.918
NPM	0.935	0.041	22.67	1.48e-35	0.853	1.017
GYA	1.809	0.113	16.08	3.58e-26	1.585	2.033
EM	2.897	0.167	17.36	3.68e-28	2.565	3.230

Source: STATA Output

The regression analysis reveals that increases in Net Profit Margin (NPM), Gross Yield on Assets (GYA), and Equity Multiplier (EM) are positively associated with increases in Return on Equity (ROE) for Ethiopian private commercial banks, with respective coefficients of 0.935, 1.809, and 2.897.

These statistically significant relationships, indicated by p-values below 0.05, suggest a strong influence of these variables on ROE. Additionally, the model accounts for bank-specific and time-specific factors, ensuring a comprehensive understanding of these financial impacts.

Multicollinearity Check

This study employed a Variance Inflation Factor (VIF) test to detect multicollinearity in the regression analysis, where VIF values above ten suggest significant multicollinearity among the independent variables.

Table 6: Multicollinearity Test (VIF Results)

Variable	VIF
NPM	1.071
GYA	1.075
EM	1.128

The VIF results show low values for all the independent variables (NPM, GYA, and EM), indicating that multicollinearity is not a concern in this model. This suggests that each independent variable provides unique information not redundantly explained by other variables.

Heteroskedasticity Test (Breusch-Pagan Test Results)

It is essential to check for heteroskedasticity to assess the reliability and validity of the regression analysis conducted on the provided dataset. In this condition, the variance of the error terms is not consistent across all levels of the independent variables.

Table 7: Heteroskedasticity Test Result

Test	Value	P-value
LM Statistic	5.826	0.120
F-Statistic	1.990	0.123

The absence of significant heteroskedasticity, as indicated by the Breusch-Pagan test, implies that the variance of the error terms is constant across different levels of the independent variables. The Breusch-Pagan test results, with p-values greater than 0.05 for both LM Statistic and F-Statistic, suggest that heteroskedasticity is absent in the model's residuals.

These results support the reliability of the regression model's estimates, as they indicate the absence of multicollinearity and heteroskedasticity issues. This property is desirable and supports the reliability of the model's standard errors and statistical tests.

Here is the correlation matrix showing the correlations between each independent variable and the dependent variable (ROE), as well as the correlations among each independent variable:

Correlation Matrix

The correlation matrix generated from STATA, provided below, illustrates the relationships among variables used to measure overall financial performance, including Return on Equity (ROE) as the dependent variable and NPM, GYA, and EM as independent variables. This matrix offers a concise view of how these key financial metrics interact with each other in the context of Ethiopian private commercial banks.

Table 8: Correlation Matrix Table

	NPM	GYA	EM	ROE
NPM	1.00	-0.07	-0.23	0.62
GYA	-0.07	1.00	-0.23	0.37
EM	-0.23	-0.23	1.00	0.32
ROE	0.62	0.37	0.32	1.00

NPM and ROE: The strong positive correlation of 0.62 suggests that banks with higher net profit margins tend to have significantly higher returns on equity.

This is a key insight, as it indicates that profitability (as measured by NPM) strongly predicts overall financial performance (ROE).

GYA and ROE: The moderate correlation of 0.37 indicates a positive relationship between gross yield on assets and return on equity.

This suggests that banks that generate higher yields from their assets tend to have better equity returns, though the relationship is not as strong as that with NPM.

EM and ROE: The moderate correlation of 0.32 suggests that banks with a higher equity multiplier, a measure of financial leverage, tend to have somewhat higher ROE. This indicates a relationship between leverage and equity returns, but the relationship is moderate.

Correlations among Independent Variables: The correlations among the independent variables (ROA, NPM, GYA, and EM) are generally weak, suggesting that these variables measure different aspects of bank performance and are not overly redundant. This is beneficial for analysis purposes, as it reduces the concern of multicollinearity.

Test of Reliability and Validity

The fixed effects model analysis results for the panel data from Ethiopian private commercial banks were examined to assess the reliability of relationships between variables and the model's validity. By analyzing data from multiple years, the study aimed to identify consistent patterns or trends in the relationships between variables. Additionally, the appropriateness of the fixed effects model for analyzing Ethiopian private commercial banks' panel data was evaluated to ensure meaningful and relevant insights. This comprehensive evaluation ensured robust findings and provided a reliable basis for understanding the financial performance of Ethiopian private commercial banks.

The tabulated results of the fixed effects model analysis for the panel data from Ethiopian private commercial banks are as follows:

Table 9: Model Summary

Metric		Value			
R-squared		0.9108			
Adjusted R-squared		0.9073			
F-statistic		258.78			
Prob (F-statistic)		< 0.0001			
	Constant	NPM	GYA	EM	
Coefficients	-45.0404	0.9349	1.8091	2.8971	
Standard Errors	2.5718	0.0412	0.1125	0.1669	
t-values	-17.51	22.67	16.08	17.36	
p-values	< 0.0001	< 0.0001	< 0.0001	< 0.0001	

Source: STATA Output

The high R-squared value (0.9108) suggests that the model explains a significant portion of the variance in the dependent variable (ROE). The coefficients for NPM, GYA, and EM are all statistically significant, indicating a strong relationship between these independent variables and the dependent variable (ROE).

5. SUMMARY OF FINDINGS, CONCLUSION, FUTURE RESEARCH DIRECTION AND RECOMMENDATION

Summary of Findings

The study offers a comprehensive analysis of the financial performance of Ethiopian private commercial banks from 2017/18 to 2021/22. Utilizing the DuPont Model, which breaks down Return on Equity (ROE) into Net Profit Margin (NPM), Asset Turnover (ATO), and Financial Leverage (FL), the study presents a trend analysis revealing variability in NPM, Gross Yield

on Assets (GYA), Equity Multiplier (EM), and ROE among the banks. This variability is influenced by external factors such as the COVID-19 pandemic and regional conflicts, affecting profitability and operations.

The comparative analysis of different banks highlighted the diversity in their financial metrics, with some exceeding and others falling below average performances. Descriptive statistics indicated significant variation and the presence of outliers in these metrics. The Shapiro-Wilk test suggested non-normality in certain metrics, implying diverse financial management strategies. Levene's and ANOVA tests further confirmed the differences in financial practices and performances among the banks.

A regression analysis incorporating a fixed effects model underscored the significant influence of NPM, GYA, and EM on ROE and emphasized the need to consider bank-specific and time-specific effects. Tests for multicollinearity and heteroskedasticity affirmed the reliability of the regression model. The strong correlations between variables like NPM and ROE highlighted profitability as a key predictor of financial performance.

In conclusion, the study provides insightful revelations into the financial dynamics of Ethiopian private commercial banks, underscoring the impact of both internal financial metrics and external factors on their performance. This analysis serves as a valuable resource for stakeholders such as bank managers, investors, and policymakers for informed decision-making and strategic planning in the banking sector.

Conclusion

The study navigating the Path to Financial Excellence: An In-depth Examination of Ethiopian Private Commercial Banks using the DuPont Model, covering the period from 2017/18 to 2021/22, presents a nuanced understanding of the sector's performance dynamics. It highlights significant variability in key performance indicators such as Net Profit Margin, Gross Yield on Assets, and Equity Multiplier. This variability reflects the diverse management efficiencies and operational strategies employed by different banks. The impact of external factors, notably the COVID-19 pandemic and regional conflicts, is also evident, significantly affecting operational capabilities and profitability. This underscores the sector's vulnerability to external shocks and its influence on financial performance.

The study reveals a broad spectrum across the banking sector regarding financial management strategies. The diversity is evident from the wide range of metrics like Gross Yield on Assets and Equity Multiplier, suggesting that banks adopt different approaches to generating income and managing assets and equity. The critical importance of operational efficiency and effective risk management in determining a bank's financial health is emphasized, with those demonstrating higher efficiency and better risk management practices tending to perform better. Statistical analyses offered deeper insights, including descriptive statistics, normality tests, and regression analysis. They pointed out non-normal distributions in some metrics, highlighting the uniqueness of each bank's financial management approach.

The study's conclusions are particularly instructive for stakeholders such as bank managers, investors, and policymakers. A one-size-fits-all strategy may not be effective for Ethiopian private commercial banks. Instead, tailored strategies that consider each bank's specific circumstances and strengths are necessary for optimal performance. Banks' varied use of financial leverage indicated different approaches to capital structure and risk, influencing return on equity outcomes.

For stakeholders, this study emphasizes the need for informed decision-making that incorporates both internal financial metrics and the external economic environment. This approach is essential in painting a comprehensive picture of a banking sector characterized by diversity in management practices, resilience to external factors, and the importance of efficiency and risk management for achieving financial stability and growth.

Future Research Directions

Extended Longitudinal Analysis: Further research could extend the timeline beyond 2017/18 to 2021/22 to understand the long-term trends in the Ethiopian banking sector.

Impact of Regulatory Changes and Economic Policies: Future research should focus on the impact of recent and upcoming regulatory changes and economic policies on Ethiopian banks.

Risk Management Strategies in the Face of External Shocks: Given the significant impact of external factors such as the COVID-19 pandemic and regional conflicts, future studies should delve into the risk management strategies employed by these banks.

Recommendation

Based on the comprehensive analysis of Ethiopian private commercial banks using the DuPont Model, the following recommendations are provided for different stakeholders:

1. Bank Managers and Executives:

Focus on Efficiency: Enhance operational efficiency to improve Net Profit Margin (NPM) and Asset Turnover (ATO). Streamlining processes and adopting new technologies could be key.

Risk Management: Strengthen risk management practices, particularly in the context of financial leverage, to maintain a balance between risk and return.

Diversify Revenue Streams: Explore diversifying into new financial products or services to enhance profitability and mitigate risks associated with external factors.

2. Investors:

Conduct Thorough Analysis: Before investing, analyze a bank's NPM, GYA, EM, and ROE trends to understand its financial health and management efficiency.

Diversification of Investment: Diversify investments across banks with varying financial strategies to spread risk.

Monitor External Factors: Stay informed about external factors like economic policies, regional conflicts, and global events that can impact the banking sector.

3. Policymakers and Regulatory Bodies:

Strengthen Financial Stability Frameworks: Implement policies that enhance financial stability, considering banks' varied performance and strategies.

Support Technological Advancements: Encourage banks to adopt modern financial technologies to improve efficiency and service delivery.

Crisis Management Strategies: Develop and promote effective crisis management strategies to help banks navigate through challenging periods like pandemics or regional conflicts.

4. Researchers and Academics:

Further Studies: Conduct more research to explore the impact of specific management practices or external factors on bank performance.

Collaboration with Banks: Engage in collaborative research with banks to provide insights that can enhance operational and financial strategies.

These recommendations are aimed at leveraging the findings from the study to improve financial performance, risk management, and overall decision-making in the Ethiopian banking sector, benefitting a range of stakeholders from bank executives to customers.

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