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Beyond Interest Income: Revenue Diversification and Financial Stability in Emerging Markets

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Abstract

This study examines the relationship between non-interest income and bank earnings stability in emerging market banking systems, using panel evidence from 26 commercial banks over a six-year period. As financial sectors in developing economies increasingly diversify revenue sources beyond traditional intermediation, the stability implications of such diversification remain empirically contested. Guided by Modern Portfolio Theory, this study evaluates the effect of disaggregated components of non-interest income fees and commissions income, foreign exchange trading income, dividend income, and other operating income on bank insolvency risk measured by the Z-score. Quantitative research design was employed using balanced panel data, and both pooled Ordinary Least Squares (OLS) and fixed effects regression models were estimated to account for time and bank-specific heterogeneity. The findings indicate that fees and commissions income and other operating income are positively associated with financial stability, suggesting that certain forms of revenue diversification enhance earnings resilience. In contrast, foreign exchange trading income and dividend income exhibit statistically insignificant effects on insolvency risk. The results demonstrate that the composition of non-interest income, rather than diversification per se, determines stability outcomes in emerging markets. These findings provide important implications for bank management and regulatory policy, highlighting the need for targeted diversification strategies that strengthen, rather than undermine, financial stability.

Keywords: Non-interest income; Earnings stability; Modern Portfolio Theory; Credit risk; Income diversification; Foreign exchange trading income; Dividend income

1. Introduction

Financial stability remains a central policy priority across both developed and emerging economies. Commercial banks play a pivotal role in economic development by mobilizing savings, allocating credit, facilitating payments, and supporting productive investment. However, rapid financial innovation, regulatory reforms, technological transformation, and increasing competition have fundamentally altered traditional banking models [1]. In particular, the sustainability of interest-based income has come under pressure due to narrowing interest margins and structural shifts in financial intermediation [2].

In response, banks in emerging markets have increasingly diversified revenue sources beyond traditional intermediation activities. Non-interest income defined as revenue generated from activities other than deposit-taking and lending has become an important component of banks' earnings structures [3,4]. From a theoretical perspective, Modern Portfolio Theory suggests that diversification across income streams may reduce volatility and enhance

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stability by spreading risk [5]. However, subsequent research challenges this view, arguing that diversification may increase systemic vulnerability if financial institutions converge toward similar portfolios and income-generating activities [6].

The empirical evidence on revenue diversification and bank stability remains inconclusive. Some studies report that non-interest income positively influences bank stability and reduces insolvency risk [4]. Others suggest that diversification into non-traditional income may heighten systemic risk, particularly during periods of financial stress [7,8]. Furthermore, evidence indicates that the relationship may be nonlinear or dependent on institutional characteristics and business model orientation [9–11]. These mixed findings are particularly relevant in emerging markets, where financial systems are still evolving and regulatory institutions continue to strengthen prudential frameworks. Following the Global Financial Crisis of 2007–2009, regulators worldwide enhanced supervisory regimes to safeguard financial stability [12]. Central banks have emphasized capital adequacy, liquidity requirements, and risk monitoring to strengthen resilience [13].

Despite the growing importance of non-interest income, much of the existing literature measures diversification using aggregate indices such as the Herfindahl–Hirschman Index, without disaggregating income components. Additionally, most studies focus on developed economies, leaving emerging markets relatively underexplored. The differential impact of specific components of non-interest income such as fees and commissions versus foreign exchange trading income remains insufficiently examined in developing financial systems.

This study contributes to the literature by examining how disaggregated components of non-interest income influence bank insolvency risk in an emerging market context. Using panel data from 26 commercial banks over a six-year period, the study evaluates the stability implications of fees and commissions income, foreign exchange trading income, dividend income, and other operating income. Bank stability is measured using the Z-score, a widely accepted proxy for insolvency risk. By decomposing non-interest income and applying both pooled OLS and fixed effects estimation techniques, this research provides nuanced evidence on whether revenue diversification enhances or undermines financial stability in emerging banking systems.

2. Literature Review

2.1. Conceptual Foundations

Non-interest income represents revenue generated from banking activities other than traditional deposit-taking and lending. It typically includes fees and commissions, foreign exchange trading income, dividend income, and other operating revenues such as rental income or gains on asset disposals [14]. As financial systems deepen particularly in emerging markets, these income streams have grown in importance as banks seek to diversify revenue structures beyond interest-based intermediation.

Fees and commissions arise from transactional services such as fund transfers, custodial services, agency banking, settlement services, card issuance, and credit-related services [14]. Foreign exchange trading income reflects realized gains and losses from currency trading operations, which expose banks to exchange rate and market risk [15]. Dividend income is generated from equity investments and is inherently more volatile because returns depend on firm-level performance rather than contractual interest obligations [15]. Other operating income includes rental income, grant amortization, gains or losses on disposal of fixed assets, and miscellaneous revenue streams [16].

Bank stability is commonly proxied by the Z-score, which combines profitability, leverage, and earnings volatility to measure the distance to insolvency. A higher Z-score implies greater financial soundness and lower probability of bank failure [17].

2.2. Conceptual Framework

This study conceptualizes the relationship between revenue diversification and financial stability within emerging market banking systems. The framework is grounded in the premise that the structure and composition of bank income influence earnings volatility and, consequently, insolvency risk. Drawing from Modern Portfolio Theory [5], diversification across income streams is expected to reduce overall earnings volatility when income sources are imperfectly correlated. However, the stability effect may vary depending on the risk characteristics of each income component.

In this study, earnings stability serves as the dependent variable and is proxied by the Z-score, a widely used measure of bank insolvency risk. The Z-score captures the distance to default by combining profitability, leverage, and earnings volatility. A higher Z-score indicates greater financial stability and lower insolvency risk. The independent variables consist of four disaggregated components of non-interest income: fees and commissions income, foreign exchange trading income, dividend income, other operating income

The conceptual model assumes a direct relationship between each component of non-interest income and bank earnings stability. Rather than treating non-interest income as a single aggregate measure, this study disaggregates income components to evaluate whether specific revenue streams enhance or undermine financial stability in emerging markets. The framework therefore hypothesizes that the composition of non-interest income, rather than diversification per se, determines its effect on bank insolvency risk.

2.3. Theoretical Framework

The theoretical foundation of income diversification is grounded in Modern Portfolio Theory (MPT), which posits that diversification reduces overall portfolio risk by combining assets with imperfectly correlated returns [5]. Applied to banking, this theory suggests that diversifying income streams beyond interest income should reduce earnings volatility and enhance financial stability.

However, diversification may not always produce stabilizing effects. Wagner [6] argues that while diversification can reduce idiosyncratic risk at the individual bank level, it may increase systemic risk if institutions adopt similar portfolios and converge toward comparable income-generating activities. Furthermore, critiques of MPT emphasize that it relies on assumptions of normally distributed returns and stable covariance structure conditions that are often violated during financial crises and structural breaks [18]. Thus, while diversification theory predicts a positive relationship between income diversification and stability, the net effect remains an empirical question.

2.4. Empirical Evidence

2.4.1. Fees and Commissions Income

Empirical findings regarding fees and commissions income are mixed. Evidence from Kenya indicates that fee-based income significantly improves insolvency risk measures, enhancing bank stability [19]. Similar findings have been documented in Nepal and other emerging markets, where certain fee-related income components significantly influence return on assets and return on equity [20]. Conversely, studies in South Asian banking systems report that fee and commission income may negatively affect stability and profitability [21]. Other research suggests that the relationship may be statistically insignificant depending on bank size and institutional characteristics [22].

2.4.2. Foreign Exchange Trading Income

Foreign exchange trading income has been found to positively influence financial performance and insolvency risk in some emerging economies [19,23]. However, given that foreign exchange operations expose banks to currency volatility and open position risk, the stability effect may depend on macroeconomic conditions and risk management practices [24].

2.4.3. Dividend Income

Dividend income is generally associated with higher volatility because returns are contingent upon equity market performance. Some empirical studies report a positive association between dividend income and insolvency risk [19,25], while others find weak or insignificant effects on bank financial performance [23]. These inconsistencies suggest that dividend income may not consistently provide diversification benefits.

2.4.4. Other Operating Income

Other operating income has been found to positively influence profitability and risk-adjusted returns in certain emerging markets [21,24]. Diversification into non-traditional activities generating other operating income may stabilize earnings for retail-oriented or savings-focused banks [26].

2.5. Synthesis and Research Gap

The empirical literature presents conflicting evidence on the impact of non-interest income on bank stability. While some studies document a stabilizing diversification effect, others identify increased volatility or systemic vulnerability. These divergent findings may stem from differences in methodological approaches, measurement of diversification,

regulatory frameworks, and macroeconomic environments. A key limitation in prior studies is the reliance on aggregate measures of non-interest income or diversification indices, such as the Herfindahl–Hirschman Index, without decomposing individual income components. Moreover, much of the existing literature concentrates on developed markets, leaving emerging financial systems relatively underexamined.

Given the structural characteristics of emerging markets including exchange rate volatility, evolving prudential regulation, and concentrated banking sectors the stability implications of non-interest income may differ substantially from those observed in advanced economies. There remains limited empirical evidence that disaggregates non-interest income components and evaluates their distinct effects on insolvency risk within emerging market banking systems. This study addresses this gap by examining the individual effects of fees and commissions income, foreign exchange trading income, dividend income, and other operating income on bank stability, measured by the Z-score, using panel data from an emerging market context.

3. Material and methods

3.1. Research Approach and Design

This study adopts a quantitative research approach within a deductive framework to empirically test the relationship between non-interest income components and bank earnings stability in an emerging market context. A causal research design is employed to examine whether variations in specific revenue streams influence bank insolvency risk. Quantitative methods are appropriate for hypothesis testing and numerical analysis of financial performance indicators [27,28].

The study utilizes panel data techniques combining cross-sectional and time-series dimensions, enabling control for unobserved heterogeneity across banks and over time. Panel data estimation improves efficiency and reduces omitted variable bias compared to purely cross-sectional or time-series models [29].

3.2. Population, Sample, and Data

The study population consists of all licensed commercial banks operating within the selected emerging market during the study period. From a total population of 34 banks, a probabilistic sampling technique was applied. Using Yamane's (1967) sample size determination formula at a 95% confidence level and 10% margin of error, a sample of 26 commercial banks was obtained [30,31]. The study covers six years (2017–2022), generating 24 quarterly observations per bank and yielding a balanced panel of 624 observations.

Secondary data were used exclusively. Quarterly financial statements were obtained from published bank reports, regulatory disclosures, and supervisory publications. Secondary financial data are appropriate for quantitative financial analysis due to their regulatory validation and standardization [31].

3.3. Variable Measurement

Bank earnings stability is proxied by the Z-score, a widely accepted measure of insolvency risk [17,32]. The Z-score measures the number of standard deviations by which returns must decline before equity is depleted.

$$Z\text{-Score} = \frac{ROA + (E/TA)}{\sigma_{ROA}}$$

Where:

- ROA = Return on Assets
- E/TA = Equity-to-Total-Assets ratio
- σROA = Standard deviation of ROA

A higher Z-score indicates greater financial stability

3.4. Independent Variables

The independent variables represent disaggregated components of non-interest income: fees and commissions income, foreign exchange trading income, dividend income and other operating income. These components are extracted from quarterly financial statements and are consistent with measures used in prior studies on income diversification and

bank risk [19,22,25]. To reduce skewness and heteroscedasticity, all variables are transformed into natural logarithmic form prior to estimation.

3.5. Econometric Model

Data es.

The baseline panel regression model is specified as:

$$Y_{it} = \alpha + \beta X_{it} + \mu_{it}$$

Where:

- Y_{it}represents the Z-score of bank *i* at time *t*
- $X_{it}$is a vector of independent variables
- βrepresents estimated coefficients
- $\mu_{it}$is the error term

To account for unobserved heterogeneity across banks and over time, a fixed effects (FE) model is employed. Fixed effects estimation is appropriate when controlling for time-invariant characteristics specific to individual banks [33]. The expanded model takes the form:

$$\ln\ BR_{it} = \alpha + \alpha_n DB_{ni} + \beta_1 \ln\ FC_{it} + \beta_2 \ln\ FE_{it} + \beta_3 \ln\ D_{it} + \beta_4 \ln\ OI_{it} + \alpha_n DT_{nt} + \mu_{it}$$

Where:

- ln BR= Natural log of Z-score
- ln FC= Natural log of fees and commissions income
- ln FE= Natural log of foreign exchange income
- ln D= Natural log of dividend income
- ln OI= Natural log of other operating income
- DB = Bank dummy variables
- DT = Time dummy variables

Fixed effects estimation controls for omitted variable bias arising from time-invariant unobserved heterogeneity [29,33]. The statistical analysis was conducted using panel regression techniques.

3.6. Ethical Considerations

Ethical considerations were observed throughout the research process. Participation in the study was voluntary, and respondents were informed of the purpose of the study prior to data collection. Confidentiality and anonymity were maintained by excluding personal identifiers and sensitive institutional information from the analysis and reporting of results.

3.7. Reliability and Validity

Data validity was ensured through reliance on audited and regulator-supervised financial statements. Content validity was strengthened by adopting measurement approaches established in prior literature [31]. Reliability was enhanced by cross-verifying data across multiple official financial disclosures and supervisory publications. Secondary financial data derived from audited reports provide consistent and replicable measures [34].

4. Results and discussion

This section presents and discusses the findings of the study based on the research objectives. The analysis draws on interview data from selected commercial banks and Credit Reference Bureaus, as well as secondary data from regulatory and institutional reports. Results are organized thematically and interpreted in relation to existing literature.

4.1. Descriptive Statistics

The summary statistics for the study variables show the average Z-score across the sample is 13.59, indicating moderate financial stability among banks over the study period. However, the wide dispersion (standard deviation = 8.48) and range (-2.70 to 47.60) suggest substantial heterogeneity in insolvency risk across institutions and time. Among the non-interest income components, foreign exchange trading income constitutes the largest share (approximately 68%) of total non-interest income, followed by fees and commissions (22%), other operating income (9%), and dividend income (1%). The dominance of foreign exchange income highlights the increasing exposure of emerging market banks to currency-related activities.

The descriptive trends further indicate that total assets expanded significantly during the latter part of the study period, consistent with accommodative monetary conditions and increased private-sector credit growth. However, shareholders' funds grew at a slower pace, implying potential pressure on capital buffers during expansion phases. Return on Assets (ROA) exhibited variability across banks, with some institutions recording persistent profitability while others experienced episodic losses. This dispersion reinforces the importance of examining stability through a risk-adjusted metric such as the Z-score rather than profitability alone.

4.2. Diagnostic Tests

Prior to regression estimation, key statistical assumptions were tested. Normality tests (Shapiro–Wilk) indicated non-normal distribution of variables. To address skewness and heteroscedasticity, all variables were transformed into natural logarithmic form. Multicollinearity diagnostics showed acceptable levels of Variance Inflation Factors (VIFs), all below the critical threshold of 10 [35], indicating no serious multicollinearity concerns. Homoscedasticity tests revealed heterogeneity in variances, further justifying the use of log transformation and fixed effects estimation.

4.3. Correlation Analysis

Pearson correlation results reveal a weak positive relationship between fees and commissions income and the Z-score ($r = 0.115$). Foreign exchange trading income and dividend income show very weak correlations with stability ($r = 0.027$ and $r = 0.033$ respectively), while other operating income exhibits a weak negative correlation ($r = -0.026$). These preliminary findings suggest that simple bivariate relationships may not fully capture the effect of income diversification on bank stability, necessitating multivariate panel regression analysis.

4.4. Regression Results

4.4.1. Pooled OLS Model

The pooled OLS model yields an R^2 of 2.4%, indicating limited explanatory power when ignoring bank-specific heterogeneity. The model is statistically significant ($p < 0.01$), suggesting that non-interest income components collectively influence bank stability. Fees and commissions income demonstrates a positive and statistically significant relationship with the Z-score ($\beta = 0.082$, $p < 0.01$), implying that increased fee-based activities enhance earnings stability. Foreign exchange trading income, dividend income, and other operating income are statistically insignificant in the pooled model. However, pooled estimation does not account for unobserved heterogeneity across banks, which may bias results.

4.4.2. Fixed Effects Model

The fixed effects model, which controls for time-invariant bank characteristics and time effects, significantly improves explanatory power ($R^2 = 93\%$). The model is highly significant ($p < 0.001$). Consistent with diversification theory, fees and commissions remain positively and significantly associated with the Z-score ($\beta = 0.038$, $p < 0.01$). This suggests that recurring transactional income streams enhance financial stability in emerging market banks.

Foreign exchange trading income exhibits a negative but statistically insignificant coefficient ($\beta = -0.003$, $p > 0.05$). This implies that although currency trading increases exposure to market risk, it does not significantly affect insolvency risk over the sample period. Dividend income also shows a positive but insignificant relationship with the Z-score, indicating limited contribution to stability. Given the relatively underdeveloped equity markets in many emerging economies, dividend income may be too small or volatile to materially influence overall bank risk.

Notably, other operating income becomes positively significant in the fixed effects model ($\beta = 0.015$, $p < 0.05$), suggesting that certain non-core income streams may enhance stability when controlling for institutional heterogeneity. Time dummy coefficients reveal a gradual decline in Z-scores over the study period, indicating increasing insolvency

risk across banks, particularly during later quarters. This may reflect tightening financial conditions or macroeconomic pressures affecting emerging markets.

4.5. Discussion of Findings

The results indicate that not all forms of non-interest income contribute equally to financial stability. Fees and commissions consistently enhance bank stability, supporting the hypothesis that stable, recurring service-based revenues reduce earnings volatility. This finding aligns with diversification theory and empirical evidence from several emerging markets.

In contrast, foreign exchange trading income does not significantly improve stability. The insignificance may reflect exchange rate volatility common in emerging economies, which introduces market risk that offsets potential diversification benefits.

Dividend income similarly fails to significantly influence stability. In emerging markets characterized by shallow equity markets and limited liquidity, dividend income may not constitute a sufficiently stable income stream to materially affect insolvency risk.

The positive significance of other operating income in the fixed effects model suggests that certain supplementary revenue streams can enhance stability when bank-specific characteristics are considered. However, the relatively small magnitude implies limited systemic impact.

Overall, the findings suggest that the composition of non-interest income, rather than diversification alone, determines stability outcomes. Revenue streams that are recurring and less market-sensitive appear to strengthen resilience, while those exposed to market volatility provide limited stabilization benefits

5. Conclusion and Policy Implications

5.1. Summary of Findings

This study examined the influence of disaggregated non-interest income components on bank earnings stability in an emerging market context. Using panel data from 26 commercial banks over the period 2017–2022 and employing both pooled OLS and fixed effects estimations, the analysis assessed the impact of fees and commissions income, foreign exchange trading income, dividend income, and other operating income on insolvency risk, proxied by the Z-score.

The empirical results indicate that the composition of non-interest income matters for financial stability. Fees and commissions income consistently exhibits a positive and statistically significant relationship with the Z-score, suggesting that stable, recurring service-based revenue enhances earnings resilience. Other operating income becomes significant only after controlling for bank-specific and time effects, implying that supplementary income streams may contribute to stability when institutional heterogeneity is accounted for. In contrast, foreign exchange trading income and dividend income show statistically insignificant effects on insolvency risk, indicating that market-sensitive revenue sources do not necessarily provide stabilizing benefits in emerging market banking systems.

The findings therefore suggest that diversification alone does not guarantee improved stability; rather, the type and risk characteristics of income streams determine stability outcomes.

5.2. Policy Implications

The results carry important implications for bank management and regulators in emerging markets.

First, commercial banks should prioritize the expansion of stable, recurring fee-based services such as transactional banking, digital payment services, custodial services, and agency banking. These income streams appear to strengthen earnings stability and reduce insolvency risk.

Second, caution is warranted when expanding into market-sensitive activities such as foreign exchange trading and equity investments. While these activities may enhance short-term profitability, their contribution to long-term stability appears limited in environments characterized by exchange rate volatility and shallow capital markets.

Third, regulators should recognize the heterogeneous effects of income diversification. Prudential frameworks should not uniformly encourage diversification without considering the risk profile of specific revenue sources. Supervisory monitoring of trading exposures and non-core income activities remains critical.

Finally, macroeconomic stability, including exchange rate management and capital market development plays an important role in shaping the risk-return dynamics of non-interest income activities in emerging markets.

5.3. Study Limitations and Areas for Further Research

This study is subject to certain limitations. The analysis was constrained to a six-year period (24 quarters), which may not fully capture long-term structural dynamics or crisis cycles. Future research could extend the time horizon to assess whether the stability effects of non-interest income persist over longer periods.

Additionally, the study examined aggregated categories of fees and other operating income. Future research could further decompose these categories to distinguish between digital banking fees, credit-related fees, custodial services, real estate income, and other components to determine which subcategories contribute most to stability.

Finally, comparative cross-country studies across multiple emerging markets would enhance external validity and provide deeper insights into institutional and macroeconomic moderating factors.

5.4. Overall Conclusion

The study concludes that revenue diversification does not uniformly enhance financial stability in emerging market banks. While stable fee-based income strengthens earnings resilience, market-sensitive income sources such as foreign exchange trading and dividend income do not significantly reduce insolvency risk. These findings challenge the broad assumption that diversification automatically lowers risk and highlight the importance of revenue composition.

For policymakers and bank managers in emerging markets, the strategic focus should shift from diversification per se toward structured, risk-adjusted revenue optimization aimed at sustainable financial stability.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no competing interests, financial or personal, that could have influenced the results presented in this study.

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Appendix

- Summary of Operationalization and Measurements of Variables

Variables	**Authors**
Independent Variables Fees and commissions income Dividend income Foreign exchange trading income Other operating income: Profit on disposal of property and equipment, Rental income, grant income, grant amortisation	(Emongor, Musau, & Mwasiaji, 2020) (Karanja, 2012) (Ekanayake & Wanamalie, 2017) (Mutuma & Mungatu, 2016)
Dependent Variable	(Emongor, Musau, & Mwasiaji, 2020) (Adem, 2022)

Bank insolvency risk	

- **Descriptive statistics**

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Bank Risk (Z Score)	624	-3	48	8,477	14	8
Fees and commissions income	624	-1,624	15,641	1,372,847	2,200	2,874
Foreign exchange trading income	624	-254	90,505	4,252,954	6,816	14,682
Dividend income	624	-500	6,500	45,386	73	525
Other operating income	624	-728	26,587	568,248	911	2,426
Valid N (listwise)	624					

- **Skewness and Kurtosis Test**

		Statistic	Std. Error	Bootstrap			
				Bias	Std. Error	95% Confidence Interval	
						Lower	Upper
Z-score (bank insolvency risk)	Skewness	0.782	0.098	-0.007	0.099	0.586	0.967
	Kurtosis	0.590	0.195	-0.019	0.335	-0.037	1.297
Fees and commissions income	Skewness	1.774	0.098	-0.010	0.127	1.537	2.015
	Kurtosis	2.868	0.195	-0.048	0.656	1.680	4.114
Foreign exchange trading income	Skewness	3.472	0.098	-0.003	0.286	2.972	4.091
	Kurtosis	11.688	0.195	0.048	2.343	8.024	16.847
Dividend income	Skewness	8.914	0.098	0.227	1.577	6.819	13.089
	Kurtosis	85.259	0.195	7.316	36.725	48.671	190.327
Other operating incomes	Skewness	6.445	0.098	-0.174	0.727	4.721	7.672
	Kurtosis	52.812	0.195	-1.658	12.664	29.811	78.349

- **Tests of Normality**

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Bank Risk (Z Score)	0.092	623	0.000	0.958	623	0.000
Fees and commissions income	0.210	623	0.000	0.765	623	0.000
Foreign exchange trading income	0.375	623	0.000	0.442	623	0.000
Dividend income	0.481	623	0.000	0.128	623	0.000
Other operating income	0.325	623	0.000	0.388	623	0.000
a. Lilliefors Significance Correction						

- **Multicollinearity Test**

		Fees and commissions income	Foreign exchange trading income	Dividend income	Other operating income
Fees and commissions income	Pearson Correlation	1	0.720**	0.156**	0.389**
	Sig. (2-tailed)		0.000	0.000	0.000
	N	624	624	624	624
Foreign exchange trading income	Pearson Correlation	0.720**	1	0.211**	0.522**
	Sig. (2-tailed)	0.000		0.000	0.000
	N	624	624	624	624
Dividend income	Pearson Correlation	0.156**	0.211**	1	0.165**
	Sig. (2-tailed)	0.000	0.000		0.000
	N	624	624	624	624
Other operating income	Pearson Correlation	0.389**	0.522**	0.165**	1
	Sig. (2-tailed)	0.000	0.000	0.000	
	N	624	624	624	624
**. Correlation is significant at the 0.01 level (2-tailed).					

- **Test of Homoscedasticity**

Levene's Test for Equality of Variances		t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Bank Risk (Z Score)	Equal variances assumed	32.034	0.00	-8.236	622	0.000	-13.817	1.678	-17.111	-10.523
	Equal variances not assumed			-35.82	280.833	0.000	-13.817	0.386	-14.576	-13.058

- **Model Summary of Pooled OLS Model**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.154a	0.024	0.017	0.83127
a. Predictors: (Constant), lnOI, lnD, lnFC, lnFE				

- **ANOVA of Pooled OLS Model**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.323	4	2.581	3.735	0.005[b]
	Residual	427.736	619	0.691		
	Total	438.059	623			
a. Dependent Variable: lnBR						
b. Predictors: (Constant), lnOI, lnD, lnFC, lnFE						

- **Coefficients in Pooled OLS Model**

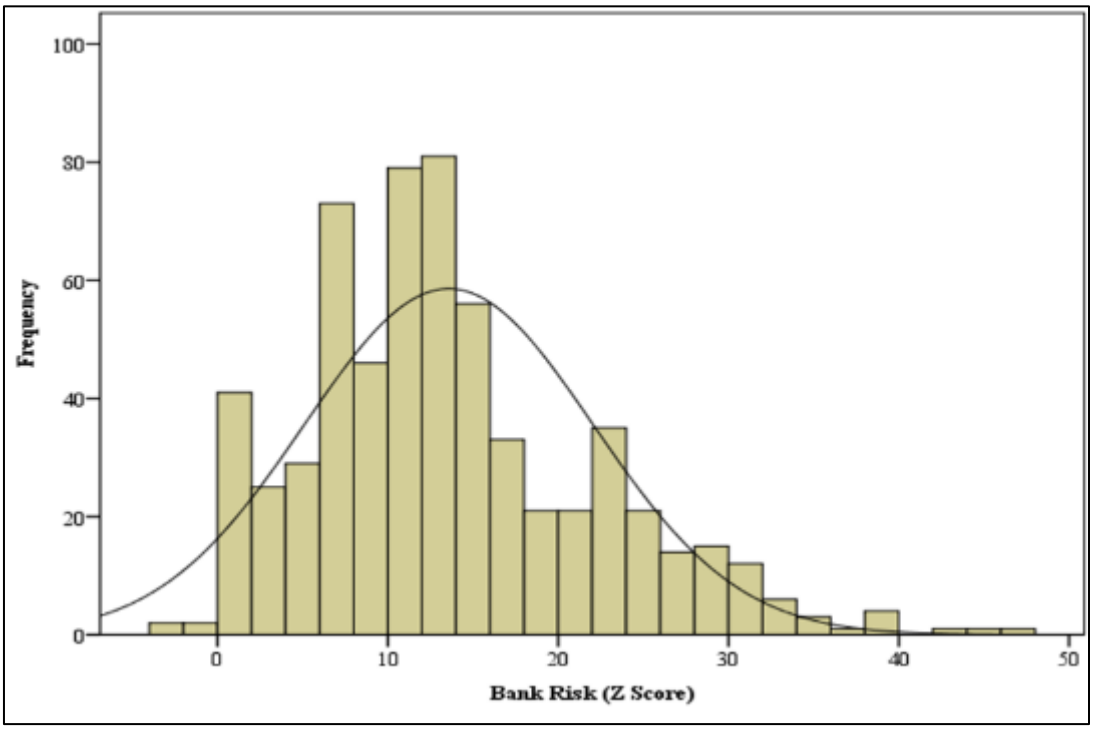
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.332	0.177		13.171	0.000
	LnFC	0.082	0.023	0.209	3.512	0.000
	LnFE	-0.059	0.035	-0.109	-1.676	0.094
	LnD	0.018	0.023	0.033	0.802	0.423
	LnOI	-0.015	0.014	-0.049	-1.057	0.291
a. Dependent Variable: lnBR						

- **Coefficients of Fixed Effects Model**

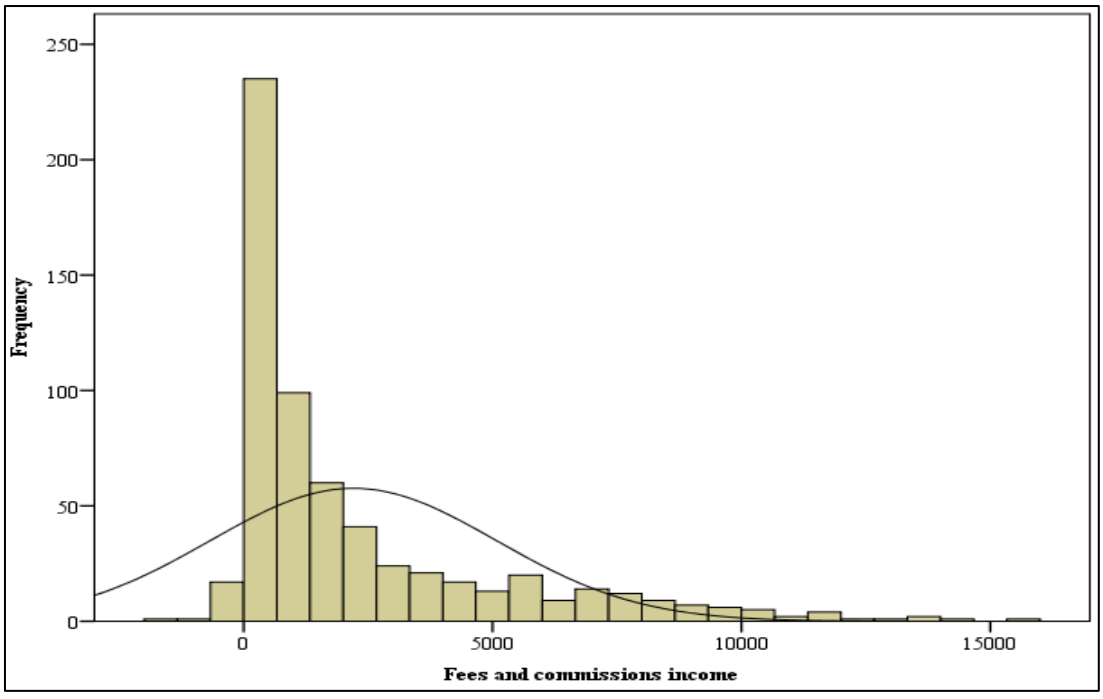
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.227	0.209		10.677	0.000
Akiba	-1.313	0.096	-0.301	-13.675	0.000
Amana	-0.273	0.083	-0.063	-3.303	0.001
Azania	0.526	0.075	0.121	6.992	0.000
BancABC	-0.199	0.099	-0.046	-2.012	0.045
Bank of Baroda	0.892	0.100	0.205	8.944	0.000
Bank of India	0.829	0.113	0.190	7.360	0.000
BOA	0.080	0.075	0.018	1.072	0.284
Citibank	0.224	0.072	0.051	3.090	0.002
CRDB	-0.227	0.089	-0.052	-2.543	0.011
DCB	-0.554	0.103	-0.127	-5.367	0.000
DTB	0.401	0.068	0.092	5.883	0.000
Ecobank	-1.811	0.086	-0.416	-21.028	0.000
Equity	-0.394	0.071	-0.091	-5.582	0.000
Exim	0.019	0.081	0.004	0.237	0.813
I & M	-0.592	0.076	-0.136	-7.808	0.000

	KCB	0-.552	0.072	-0.127	-7.687	0.000
	MCB	1.098	0.145	0.252	7.593	0.000
	NMB	0.035	0.087	0.008	0.398	0.691
	PBZ	0.337	0.078	0.077	4.338	0.000
	Stanbic	0.889	0.067	0.204	13.233	0.000
	Standard Chartered	-0.095	0.071	-0.022	-1.339	0.181
	TCB	0.725	0.076	0.167	9.517	0.000
	UBA	-2.381	0.083	-0.547	-28.715	0.000
	Mkombozi	0.542	0.092	0.124	5.874	0.000
	NBC	0.036	0.073	0.008	0.489	0.625
	LnFC	0.038	0.012	0.097	3.060	0.002
	LnFE	-0.003	0.019	-0.005	-0.140	0.889
	LnD	0.001	0.008	0.001	0.095	0.924
	LnOI	0.015	0.006	0.050	2.285	0.023
	Q22017	-0.014	0.064	-0.003	-0.223	0.823
	Q32017	0.002	0.065	0.000	0.028	0.978
	Q42017	-0.112	0.064	-0.027	-1.734	0.083
	Q12018	-0.049	0.065	-0.012	-0.754	0.451
	Q22018	-0.037	0.065	-0.009	-0.566	0.572
	Q32018	-0.022	0.065	-0.005	-0.335	0.738
	Q42018	-0.112	0.064	-0.027	-1.734	0.083
	Q12019	-0.078	0.065	-0.019	-1.202	0.230
	Q22019	-0.049	0.065	-0.012	-0.759	0.448
	Q32019	-0.054	0.065	-0.013	-0.832	0.406
	Q42019	-0.084	0.064	-0.020	-1.302	0.193
	Q12020	-0.050	0.065	-0.012	-0.768	0.443
	Q22020	-0.111	0.065	-0.027	-1.723	0.085
	Q32020	-0.099	0.065	-0.023	-1.523	0.128
	Q42020	-0.170	0.065	-0.041	-2.627	0.009
	Q12021	-0.124	0.065	-0.030	-1.917	0.056
	Q22021	-0.133	0.065	-0.032	-2.060	0.040
	Q32021	-0.137	0.065	-0.033	-2.112	0.035
	Q42021	-0.183	0.065	-0.044	-2.820	0.005
	Q12022	-0.118	0.066	-0.028	-1.806	0.071
	Q22022	-0.156	0.066	-0.037	-2.375	0.018
	Q32022	-0.114	0.066	-0.027	-1.729	0.084
	Q42022	-0.309	0.066	-0.074	-4.718	0.000
a. Dependent Variable: LnBR						

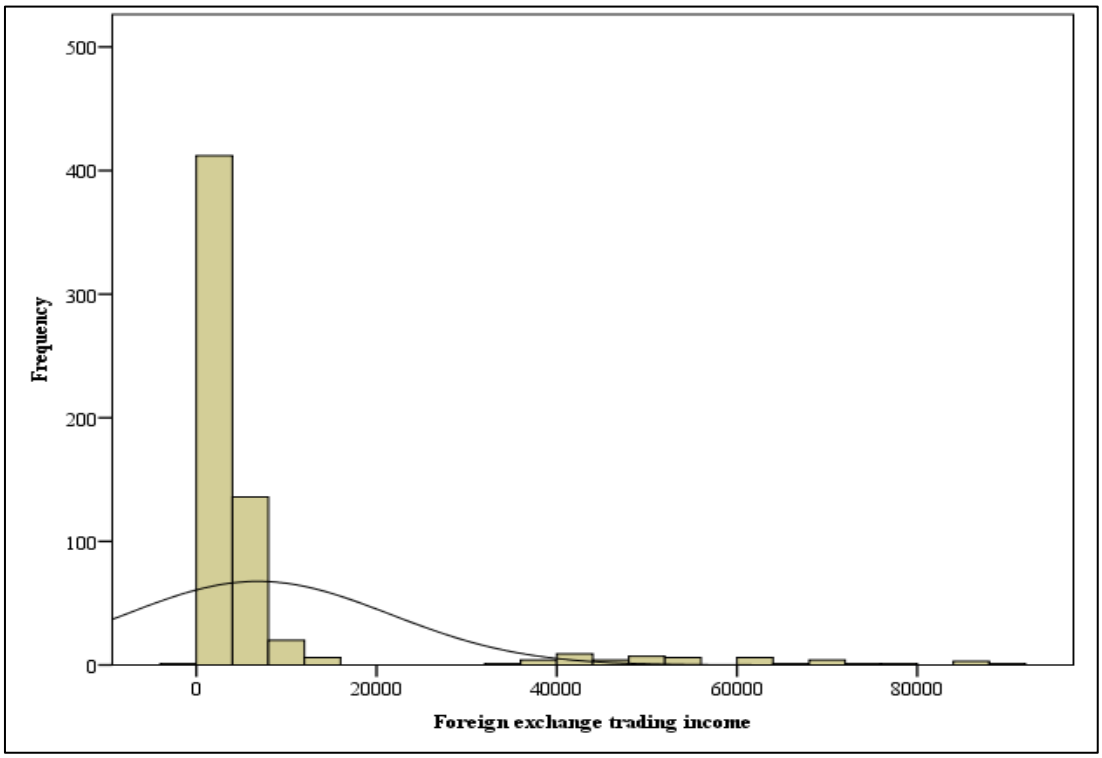
- **List of figures**
  - **Normality Test for Z-Score (Bank Insolvency Risk)**



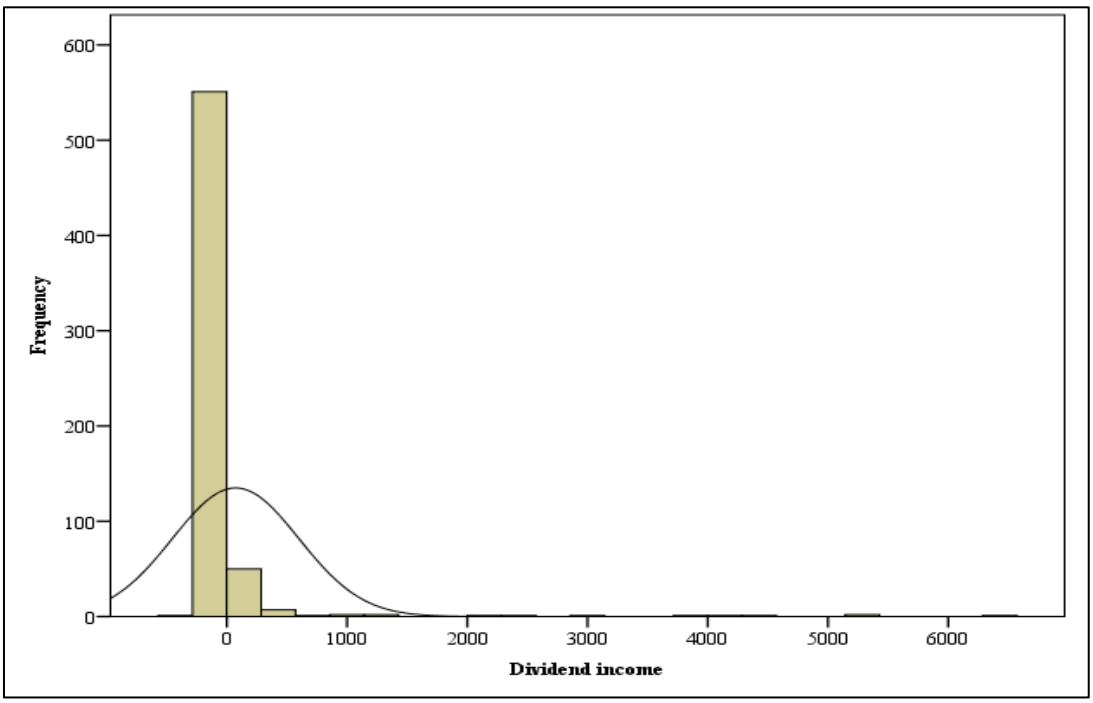
  - **Normality Test for Fees and Commissions Income**



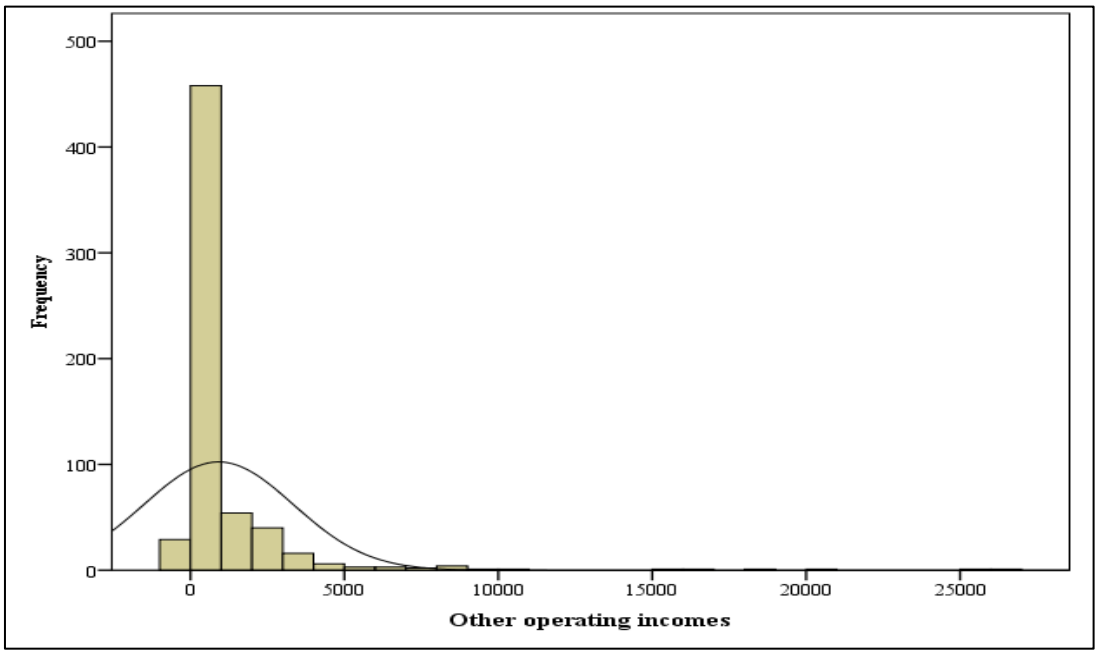
- **Normality Test for Foreign Exchange Trading Income**



- **Normality Test for Dividend Income**

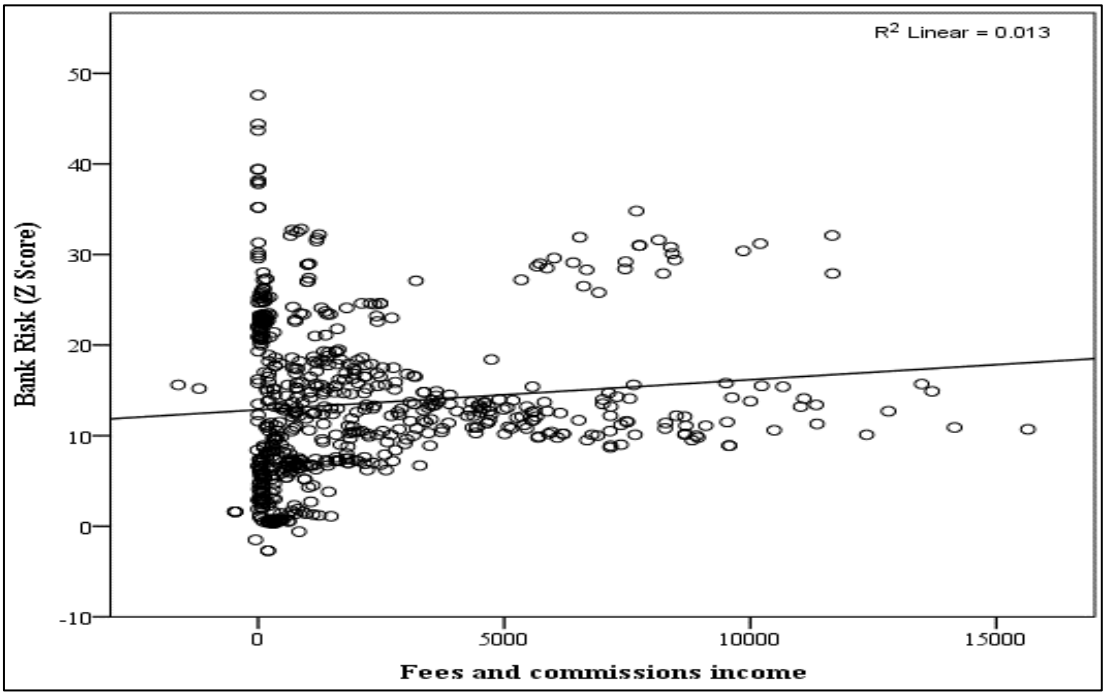


- **Normality Test for Other Operating Incomes**

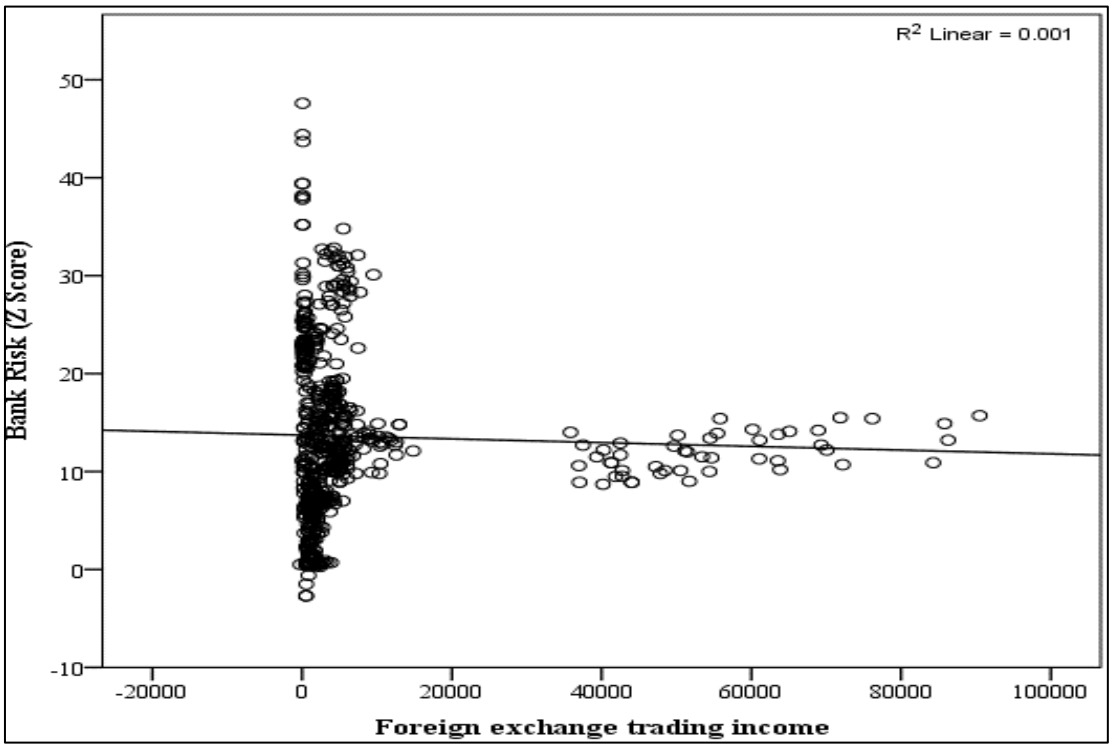


Source: Researcher, 2023

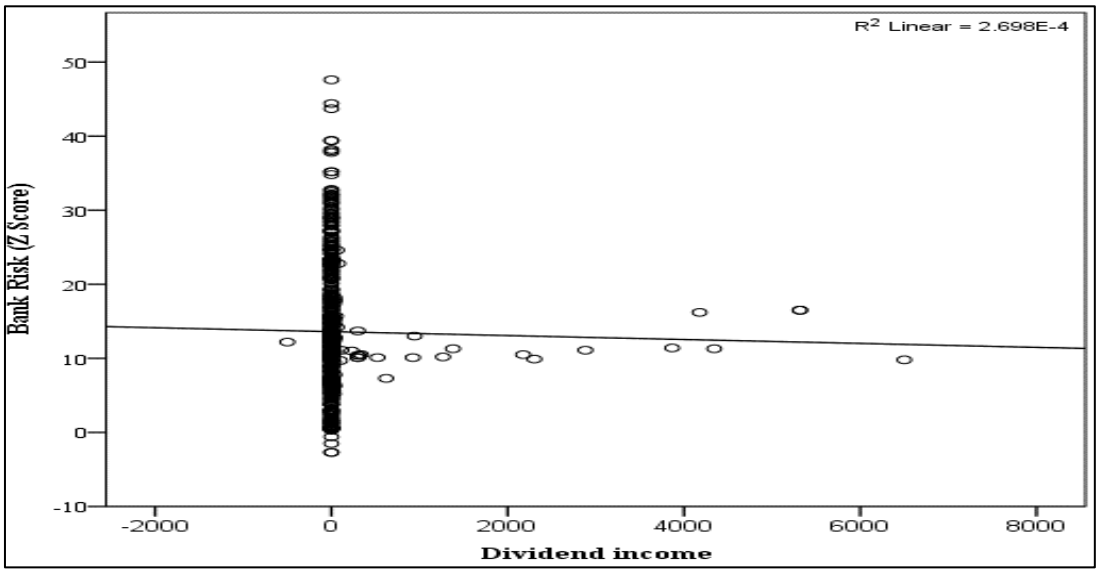
- **Test of linearity of fees and commission income**



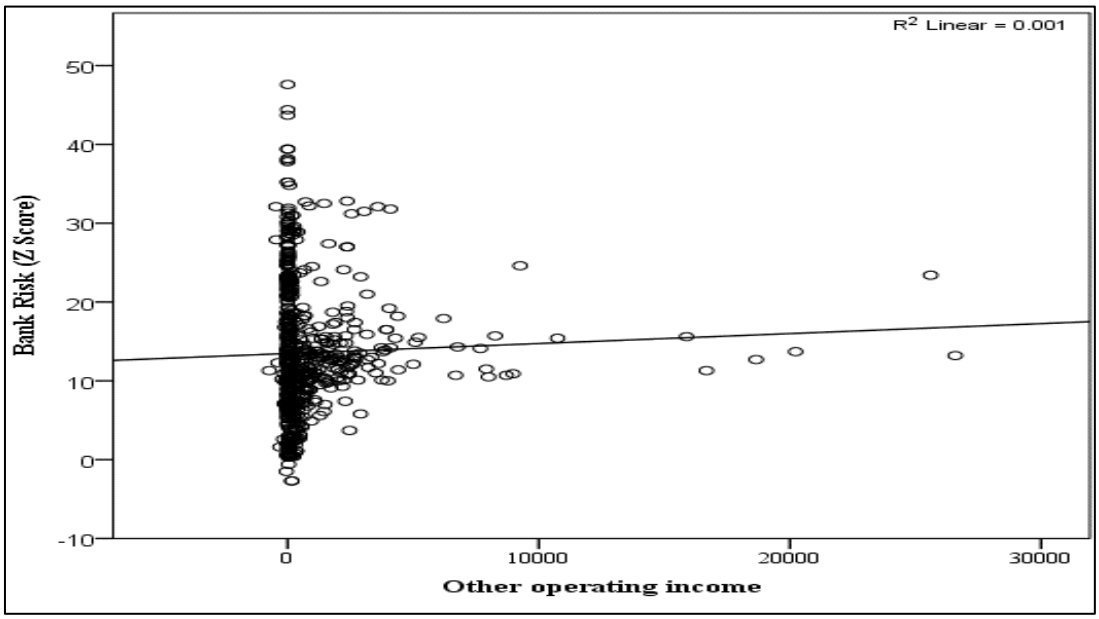
- **Test of linearity of foreign exchange trading income**



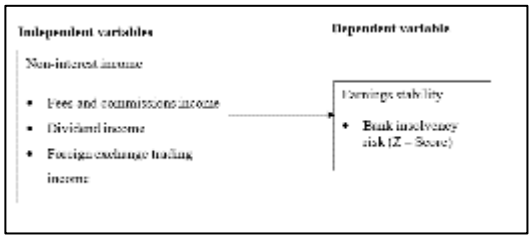
- **Test of linearity of dividend income**



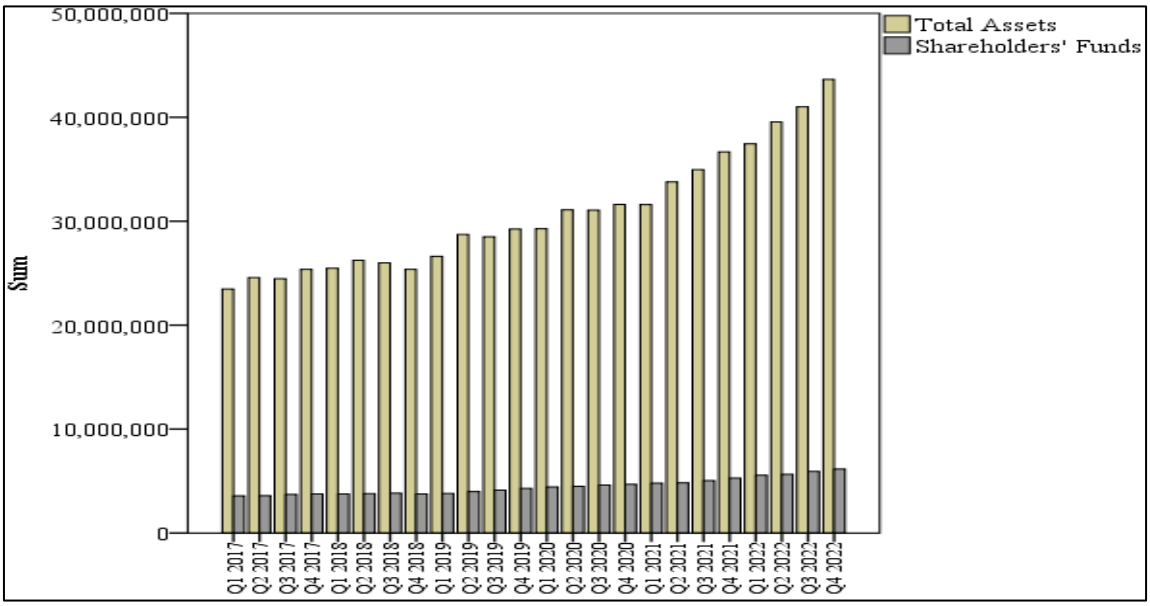
- **Test of linearity of other operating incomes**



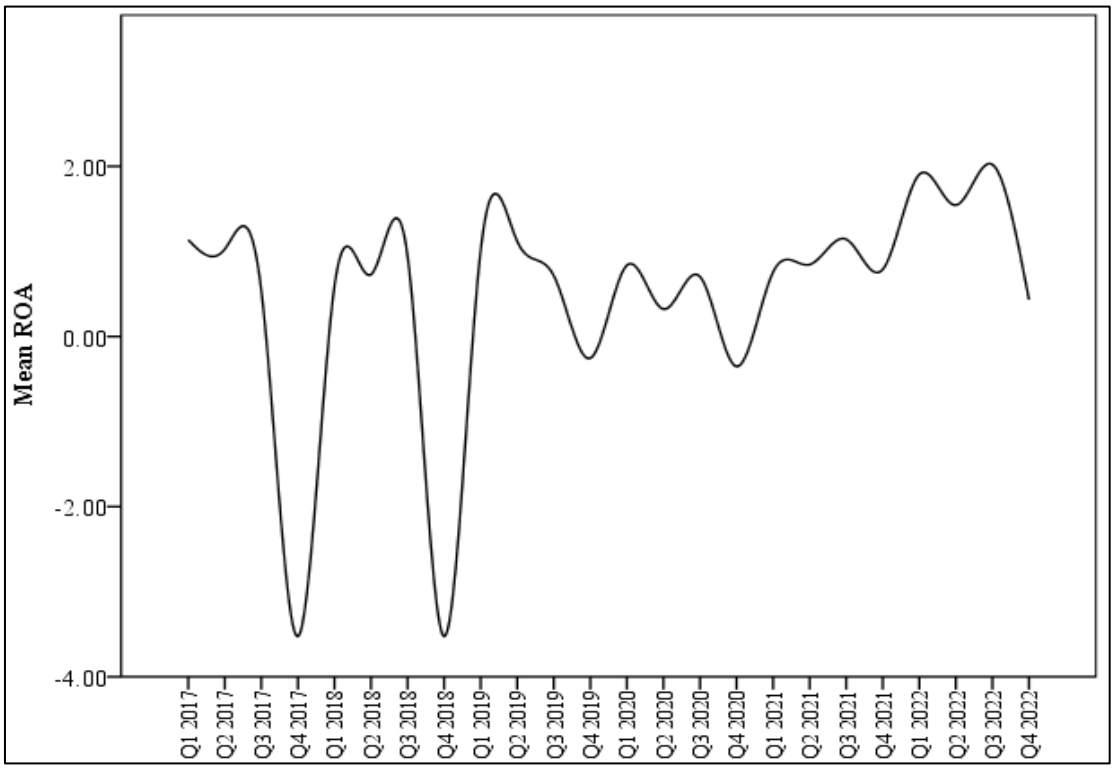
- **Conceptual Framework**



- **Trend Analysis of Banks Total Assets**



- **Trend Analysis of Banks ROA**



- **Trend analysis of independent variables**