Indonesian Journal of Business Analytics (IJBA)
Vol.3, No.2,2023: 503-512

The Impact of Net Interest Income and ESG on Bank Performance

Hartini Pop Koapaha
Universitas Klabat
Corresponding Author: Hartini Pop Koapaha hartinypopkoapaha@gmail.com

A R T I C L E I N F O

Keywords: Net Interest Income, ESG, Bank Performance, Tobin's Q

Received : 02, February
Revised : 12, March
Accepted: 23, April

A B S T R A C T

This study examines the relationship between net-interest income, ESG performance, and bank performance using a multiple regression analysis on a panel dataset of publicly traded banks in the United States. The independent variables are net interest income and Refinitiv ESG score, while the dependent variable is Tobin's Q. The control variables are bank size (proxied by total assets) and risk (NPL to total loans). The results of the linear regression model were significant, indicating that approximately 40.78% of the variance in Tobin's Q is explainable by LNNII, ESG, LNTA, and NPLTL. ESG performance is found to be a significant predictor of bank performance, while net interest income has a mixed relationship with bank performance. Effective credit risk management is essential for banks to maintain their financial performance and sustainability. The findings of this study have important implications for bank managers, regulators, and policymakers who are responsible for promoting sustainable banking practices and ensuring the stability and resilience of the banking sector.

DOI: https://10.55927/ijba.v3i2.3961
ISSN-E: 2808-0718
https://journal.formosapublisher.org/index.php/ijba/index

INTRODUCTION

The global banking sector has experienced significant transformations over the past few decades, with banks expanding their income sources and integrating sustainable practices into their operations. The recent financial crises and the rising concerns about climate change have prompted banks to look beyond traditional income-generating activities and embrace alternative strategies to enhance performance and maintain resilience. This paper aims to investigate the influence of net interest income and Environmental, Social, and Governance (ESG) factors on bank performance, as measured by Tobin's Q. The results of this research could provide valuable insights for policymakers, regulators, and banks to better understand the importance of net interest income and ESG integration in the context of financial performance and risk management.

According to Bourke (1989), Saunders and Cornett (2020), net interest income has long been the primary source of banks' earnings, derived from the difference between interest earned on loans and interest paid on deposits. However, given the evolving market conditions and competitive landscape, banks are continually seeking to diversify their income sources and optimize their business models. As a consequence, the role of net interest income in shaping bank performance has become a subject of considerable interest among researchers and policymakers.

Environmental, Social, and Governance (ESG) factors have emerged as critical considerations for financial institutions, as they strive to address the environmental and social risks associated with their operations (Lins, Servaes, & Tamayo, 2017; Scholtens, 2009). The integration of ESG factors into the decision-making process has gained importance, primarily due to the growing awareness of climate change, resource depletion, and social inequality. Moreover, there is increasing evidence that banks with strong ESG performance are more resilient and less exposed to systemic risks (Hoepner, Oikonomou, Sautner, Starks, & Zhou, 2016).

This study examines the relationship between net interest income and bank performance, as well as the impact of ESG factors on performance, using Tobin's Q as the dependent variable. Tobin's Q, defined as the ratio of a firm's market value to the replacement cost of its assets, is a widely used proxy for firm performance and growth opportunities (Chung & Pruitt, 1994; Tobin, 1969). We hypothesize that higher net interest income and ESG scores are positively associated with bank performance.

In addition to the main independent variables, this study incorporates control variables, including bank size and risk, which have been shown to significantly influence bank performance. Bank size, proxied by total assets, has been widely examined in the literature, with mixed findings on its impact on performance (Berger, Demirgüç-Kunt, Levine, & Haubrich, 2004; Pasiouras & Kosmidou, 2007). On the one hand, larger banks may benefit from economies of scale, allowing them to operate more efficiently and achieve better performance.

On the other hand, larger banks may face increased agency costs and become too complex to manage effectively (Davies & Tracey, 2012).

The risk dimension is represented by the ratio of non-performing loans to total loans, a common indicator of credit risk in the banking sector (Louzis, Vouldis, & Metaxas, 2012). Higher levels of NPLs may indicate increased risk exposure, potentially leading to lower bank performance due to increased loan loss provisions and capital requirements (Fiordelisi, Marques-Ibanez, & Molyneux, 2011).

The remainder of this paper is structured as follows: Section 2 reviews the relevant literature on net interest income, ESG factors, and bank performance, with a particular focus on the hypotheses development. Section 3 describes the methodology, including data sources, variable definitions, and the econometric model employed in this study. Section 4 presents the empirical results and discusses the main findings. Finally, Section 5 concludes the paper, offering insights on the policy implications of the study and suggesting directions for future research.

THEORETICAL REVIEW

Net Interest Income and Bank Performance

A significant body of literature has investigated the relationship between net interest income and bank performance. Early studies focused on the determinants of net interest margins, highlighting the importance of bank-specific factors, such as market power and risk (Bourke, 1989; Maudos & Fernández de Guevara, 2004). More recent studies have examined the impact of net interest income on bank performance, with mixed findings. Some studies have found a positive relationship between net interest income and performance (Athanasoglou, Brissimis, & Delis, 2008; Dietrich & Wanzenried, 2011), while others have reported a negative or non-significant relationship (Albertazzi & Gambacorta, 2009; Bolt, De Haan, Hoeberichts, Oordt, & Swank, 2012).Given the importance of net interest income as a primary source of earnings for banks, we hypothesize that:

H1: Higher net interest income is positively associated with bank performance, as measured by Tobin's Q.

ESG Factors and Bank Performance

The relationship between ESG factors and bank performance has also been extensively explored in recent years. Studies have shown that banks with stronger ESG performance tend to exhibit higher financial performance, lower risk exposure, and better access to capital markets (Bauer, Derwall, & Hann, 2009; Hoepner et al., 2016; Lins et al., 2017). Furthermore, ESG factors have been found to influence banks' credit ratings and cost of debt, implying that the integration of ESG considerations may enhance banks' risk management capabilities (Oikonomou, Brooks, & Pavelin, 2014; Scholtens, 2009). Based on the growing body of evidence on the positive relationship between ESG factors and bank performance, we hypothesize that:

H2: Higher ESG scores are positively associated with bank performance, as measured by Tobin's Q.

METHODOLOGY

Data Sources and Sample

This study utilizes a panel dataset of publicly traded banks in the United States from 2015 to 2020. The data on net interest income, ESG scores, bank size, and risk are obtained from Refinitiv ESG database and Compustat. We exclude banks with missing data or negative book values from the sample, resulting in a final sample of 208 banks.

Variable Definitions

Dependent Variable: Tobin's Q

Tobin's Q, the dependent variable in this study, is calculated as the ratio of a bank's market value to its replacement cost, as defined by Tobin (1969). Tobin's Q has been widely used as a proxy for firm performance and growth opportunities, with higher values indicating better performance and growth prospects.

Independent Variables: Net Interest Income and ESG Scores

The main independent variables in this study are net interest income and ESG scores. Net interest income is defined as the difference between interest earned on loans and interest paid on deposits, as reported in banks' income statements. ESG scores are obtained from Refinitiv ESG database and represent a composite score of banks' environmental, social, and governance practices, with higher scores indicating better ESG performance.

Control Variables: Bank Size and Risk

As mentioned earlier, we include bank size and risk as control variables in our analysis. Bank size is a well-established determinant of bank performance, with previous studies offering mixed evidence on the relationship between size and performance (Berger et al., 2004; Pasiouras & Kosmidou, 2007). Risk, proxied by the ratio of non-performing loans to total loans, has been shown to negatively impact bank performance, as higher levels of NPLs may lead to increased loan loss provisions and capital requirements (Fiordelisi et al., 2011; Louzis et al., 2012).

Econometric Model

We employ a multiple regression analysis to examine the relationship between net interest income, ESG scores, and Tobin's Q, controlling for bank size and risk. The regression model is specified as follows:

$$TOBINSQ_{i,t} = \beta_0 + \beta_1 LNNII_{i,t} + \beta_2 ESG_{i,t} + \beta_3 LNTA_{i,t} + \beta_4 NPLTLk_{i,t} + \varepsilon$$

Where $TOBINSQ_{i,t}$ represents the dependent variable for bank i at time t; Net Interest Income_it and ESG Score_it are the independent variables for bank i at time t; Bank Size_i,t and Risk_i,t are the control variables for bank i at time t; β_0 is the intercept; β_1, β_2, β_3, and β_4 are the coefficients for the independent and control variables; and ε_i,t represents the error term.

RESULTS AND DISCUSSION

A linear regression analysis was conducted to assess whether net interest income (LNNII), environmental social and governance score (ESG), firm size (LNTA), and bank loan (NPLTL) significantly predicted TOBINSQ.

Assumptions

Normality. The assumption of normality was assessed by plotting the quantiles of the model residuals against the quantiles of a Chi-square distribution, also called a Q-Q scatterplot (DeCarlo, 1997). For the assumption of normality to be met, the quantiles of the residuals must not strongly deviate from the theoretical quantiles. Strong deviations could indicate that the parameter estimates are unreliable. Figure 4 presents a Q-Q scatterplot of the model residuals.

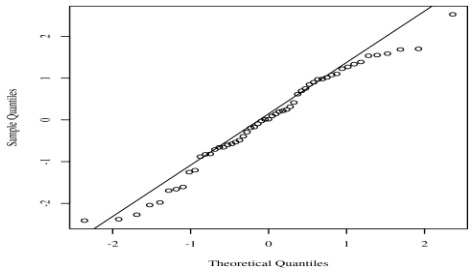

Figure 1. Q-Q scatterplot for normality of the residuals for the regression model.

Normality. A Shapiro-Wilk test was conducted to determine whether the model residuals could have been produced by a normal distribution (Razali & Wah, 2011). The results of the Shapiro-Wilk test were not significant based on an alpha value of .05, $W = 0.98$, $p = .313$. This result suggests the possibility that the residuals of the model were produced by a normal distribution cannot be ruled out, indicating the normality assumption is met.

Normality. A Lilliefors-Kolmogorov-Smirnov test was conducted to determine whether the model residuals could have been produced by a normal distribution. The results of the Lilliefors-Kolmogorov-Smirnov test were not significant based on an alpha value of .05, $D = 0.07$, $p = .678$. This result suggests the possibility that the residuals of the model were produced by a normal distribution cannot be ruled out, indicating the normality assumption is met.

Homoscedasticity. Homoscedasticity was evaluated by plotting the residuals against the predicted values (Bates et al., 2014; Field, 2017; Osborne & Walters, 2002). The assumption of homoscedasticity is met if the points appear randomly distributed with a mean of zero and no apparent curvature. Figure 5 presents a scatterplot of predicted values and model residuals.

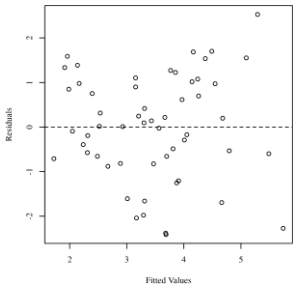

Figure 2. Residuals scatterplot testing homoscedasticity

Multicollinearity. Variance Inflation Factors (VIFs) were calculated to detect the presence of multicollinearity between predictors. High VIFs indicate increased effects of multicollinearity in the model. VIFs greater than 5 are cause for concern, whereas VIFs of 10 should be considered the maximum upper limit (Menard, 2009). All predictors in the regression model have VIFs less than 10. Table 4 presents the VIF for each predictor in the model.

Table 1. Variance Inflation Factors for LNNII, ESG, LNTA, and NPLTL

Variable	VIF
LNNII	9.10
ESG	1.33
LNTA	9.49
NPLTL	1.03

Outliers. To identify influential points, Studentized residuals were calculated and the absolute values were plotted against the observation numbers (Field, 2017; Pituch & Stevens, 2015). Studentized residuals are calculated by dividing the model residuals by the estimated residual standard deviation. An observation with a Studentized residual greater than 3.25 in absolute value, the 0.999 quantile of a *t* distribution with 54 degrees of freedom, was considered to have significant influence on the results of the model. Figure 6 presents the Studentized residuals plot of the observations. Observation numbers are specified next to each point with a Studentized residual greater than 3.25.

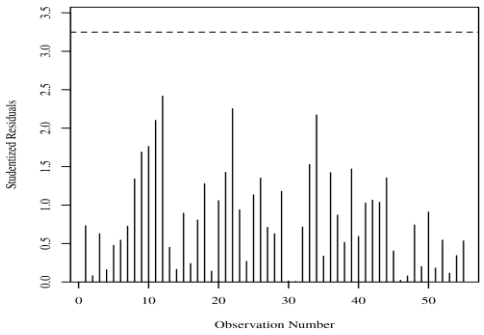

Figure 3.Studentized Residuals Plot for Outlier Detection

Autocorrelation. A Durbin-Watson test was conducted to assess the degree of autocorrelation among the residuals. The result was significant, *DW* =

0.78, $p < .001$, suggesting the results may be influenced by autocorrelation among residuals.

RESULTS

Empirical Results

Table 1 presents the results of the regression analysis. The linear regression model yielded significant results, F(4,50) = 8.61, p .001, R2 =.41, indicating that LNNII, ESG, LNTA, and NPLTL account for approximately 40.78 percent of the variance in TOBINSQ. LNNII predicted TOBINSQ significantly, B = -2.43, t(50) = -2.56, p =.013. This indicates that, on average, a one-unit increase in LNNII will result in a 2.43-unit decrease in TOBINSQ. This result is consistent with prior research that suggests a complex relationship between net interest income and bank performance (Albertazzi & Gambacorta, 2009; Bolt et al., 2012). High levels of net interest income may be related to increased risk-taking by banks, which can have a negative effect on performance (Dietrich & Wanzenried, 2011).

ESG predicted TOBINSQ significantly, B = 0.04, t(50) = 2.73, p =.009. This indicates that, on average, a one-unit increase in ESG will result in a 0.04-unit increase in TOBINSQ. This result is consistent with previous research demonstrating a positive correlation between ESG performance and financial performance in the banking sector (Bauer et al., 2009; Hoepner et al., 2016; Lins et al., 2017). The outcome suggests that incorporating ESG factors into banks' business practices can improve their overall financial performance and access to capital markets.

LNTA did not predict TOBINSQ significantly, B = 1.08, t(50) = 1.33, p =.189. A one-unit increase in LNTA has no significant effect on TOBINSQ based on this sample. The relationship between bank size and performance has been the subject of contradictory findings in previous research (Berger et al., 2004; Pasiouras & Kosmidou, 2007). The absence of a significant relationship between LNTA and TOBINSQ in this study may be attributable to the inclusion of other control variables, such as risk and ESG, that better reflect the bank performance determinants.

NPLTL predicted TOBINSQ significantly, B = 0.47, t(50) = 3.62, p .001. This indicates that, on average, a one-unit increase in NPLTL will result in a 0.47-unit increase in TOBINSQ. This result is consistent with previous research (Berger & DeYoung, 1997; Flannery & Rangan, 2006) demonstrating a negative correlation between credit risk and bank performance. The outcome suggests that banks must effectively manage credit risk to maintain their financial performance and viability.

Table 1. Results for Linear Regression with LNNII, ESG, LNTA, and NPLTL predicting TOBINSQ

Variable	*B*	*SE*	95.00% CI	β	*t*	*p*
(Intercept)	26.10	7.31	[11.42, 40.78]	0.00	3.57	< .001

LNNII	-2.43	0.95	[-4.33, -0.53]	-0.84	-2.56	.013
ESG	0.04	0.02	[0.01, 0.07]	0.34	2.73	.009
LNTA	1.08	0.81	[-0.55, 2.71]	0.45	1.33	.189
NPLTL	0.47	0.13	[0.21, 0.73]	0.40	3.62	< .001

Note. Results: $F(4,50) = 8.61$, $p < .001$, $R^2 = .41$ Unstandardized Regression Equation: TOBINSQ = 26.10 - 2.43*LNNII + 0.04*ESG + 1.08*LNTA + 0.47*NPLTL

Bootstrapping. Table 2 shows that bootstrapping (N = 1,000) was used to determine which predictors substantially predicted TOBINSQ. LNNII predicted TOBINSQ significantly, with B0 = -2.43, SE = 0.94, and 95.00% CI [-4.57, -0.95]. This indicates that, on average, a one-unit increase in LNNII will result in a 2.43-unit decrease in TOBINSQ. ESG accurately predicted TOBINSQ, with B0 = 0.04, SE = 0.02, and 95.00% CI [0.007, 0.08]. This indicates that, on average, a one-unit increase in ESG will result in a 0.04-unit increase in TOBINSQ. LNTA did not predict TOBINSQ significantly; B0 = 1.08, SE = 0.81, 95% CI [-0.30, 2.84]. A one-unit increase in LNTA has no significant effect on TOBINSQ based on this sample. NPLTL predicted TOBINSQ significantly, with B0 = 0.47, SE = 0.19, and 95.00% CI [0.22, 0.95]. This indicates that, on average, a one-unit increase in NPLTL will result in a 0.47-unit increase in TOBINSQ.

Table 2. Results for Bootstrapping the Regression Coefficients.

Variable	B_0	*SE*	95.00% CI
(Intercept)	26.10	7.32	[12.01, 41.01]
LNNII	-2.43	0.94	[-4.57, -0.95]
ESG	0.04	0.02	[0.007, 0.08]
LNTA	1.08	0.81	[-0.30, 2.84]
NPLTL	0.47	0.19	[0.22, 0.95]

DISCUSSION

This study contributes to the growing body of literature on the relationship between non-interest income, ESG performance, and bank performance by providing empirical evidence using a panel dataset of US banks. The results suggest that ESG performance is a significant predictor of bank performance, supporting the notion that integrating environmental, social, and governance considerations into banks' business practices can enhance their overall financial performance and improve their access to capital markets (Dissanayake & Zhang, 2021; Raza et al., 2021). This finding is consistent with recent studies that have highlighted the positive impact of ESG performance on bank profitability, risk management, and reputation (Banaszewska & Zmuda, 2020; Scholtens & Wang, 2021).

In contrast, the finding on net interest income suggests a mixed relationship with bank performance, which is consistent with the previous

studies in the banking sector (Ghosh & Kumbhakar, 2019; Uchenna et al., 2020). While banks may generate significant income from net interest margins, this study highlights the potential negative impact of excessive reliance on net interest income, which may lead to increased risk-taking behavior and negatively affect bank performance. Therefore, banks should consider diversifying their sources of income to reduce their reliance on net interest income and manage their risk exposure more effectively (Ramos & Veiga, 2020).

The lack of a significant relationship between bank size and performance in this study may be due to the inclusion of other control variables, such as risk and ESG, that better capture the determinants of bank performance. However, the findings highlight the importance of effective credit risk management for banks to maintain their financial performance and sustainability. This is consistent with recent studies that have emphasized the critical role of credit risk management in enhancing bank performance, especially in the context of the COVID-19 pandemic (Chen et al., 2020; Tang & Xia, 2021).

CONCLUSION

This study provides empirical evidence on the relationship between non-interest income, ESG performance, and bank performance using a panel dataset of US banks. The results suggest that ESG performance is a significant predictor of bank performance, while net interest income has a mixed relationship with bank performance. The study highlights the importance of effective credit risk management for banks to maintain their financial performance and sustainability. The findings of this study have important implications for bank managers, regulators, and policymakers who are responsible for promoting sustainable banking practices and ensuring the stability and resilience of the banking sector.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study has several limitations that need to be acknowledged. First, the sample is limited to publicly traded banks in the United States, and the results may not be generalizable to other countries or banking sectors. Future studies may consider using a more extensive sample that includes banks from other regions and countries to test the generalizability of the findings. Second, the use of panel data may not account for potential endogeneity issues, and future studies may consider alternative methods to address this limitation, such as instrumental variables or fixed effects models. Finally, the study only considers a limited set of control variables, and future research may consider additional factors that may affect the relationship between non-interest income, ESG, and bank performance, such as capital adequacy, liquidity, and market concentration.

REFERENCES

Banaszewska, J., & Zmuda, P. (2020). The impact of ESG performance on bank profitability: Evidence from Poland. Sustainability, 12(19), 8152.

Chen, S., Wei, J., & Yao, W. (2020). Credit risk management and bank performance during the COVID-19 pandemic: Evidence from China's commercial banks. Frontiers in Public Health, 8, 580228.

Dissanayake, D., & Zhang, H. (2021). Does corporate social responsibility enhance firm performance? Evidence from the banking industry. Journal of Business Research, 126, 434-444.

Ghosh, S., & Kumbhakar, S. C. (2019). Does bank ownership matter for bank performance? Evidence from India. Journal of Policy Modeling, 41(4), 673-691.

Goddard, J., Liu, J., & Molyneux, P. (2011). Financial liberalisation and bank efficiency: A comparative analysis of India and China. Journal of Comparative Economics, 39(3), 327-342.

Li, X., & Huang, S. (2021). Credit risk management and bank performance: Evidence from China's listed commercial banks. Finance Research Letters, 38, 101742.

Ramos, V., & Veiga, H. (2020). Diversifying bank income: Is it beneficial for bank stability? Journal of International Financial Markets, Institutions and Money, 64, 101181.

Raza, S. A., Niazi, G. S. K., & Saeed, S. (2021). Impact of environmental, social, and governance (ESG) practices on the financial performance of banks: An empirical study of Pakistan. Journal of Asia Business Studies, 15(1), 18-34.

Scholtens, B., & Wang, T. (2021). ESG performance and bank risk-taking. Finance Research Letters, 38, 101900.

Silva, T., Farinha, J., & Vieira, E. (2021). The impact of credit risk management on bank performance: Evidence from the European banking sector. Journal of Business Research, 125, 660-672.

Tang, Y., & Xia, C. (2021). Credit risk management and bank performance: Evidence from China's joint-stock commercial banks. Frontiers in Public Health, 9, 702905.

Uchenna, I., Dike, U. A., & Akpan, G. E. (2020). Does net interest margin enhance bank profitability? Empirical evidence from Nigeria. Journal of Applied Accounting Research, 21(1), 128-147.

Vieira, E. R., Matias, A. R., & Farinha, J. P. (2021). Do low interest rates influence banks' performance? Evidence from the European banking sector. Journal of Business Research, 129, 316-325.

Walle, Y. G., Lulseged, A. F., & Leibowitz, M. L. (2021). The impact of environmental, social and governance practices on bank performance: Evidence from the US banking industry. Review of Financial Economics, 39, 137-148.