THE IMPACT OF ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) PILLAR SCORES ON BANKING SECTOR STOCK RETURNS: AN EMPIRICAL ANALYSIS OF BANKS IN THE MSCI EMERGING MARKET INDEX

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ABSTRACT

This article examines whether investing in ESG impacts banks' stock returns, aiming to illustrate the value generated by ESG investment in the MSCI Emerging Markets Index. The fiscal year-end data of thirty-five financial companies within the Index, covering the period from December 31, 2015, to December 31, 2022, have been utilised. The analysis employs a pooled panel regression model utilising robust least squares estimation. Firm-specific and market-specific variables are used as independent variables. We have observed a significant positive direct relationship between the social pillar score and stock returns. Banks may initiate investments in social pillars in the Index. In addition, firm-specific variables such as market capitalisation, return on equity, capital adequacy, and price-earnings ratio influence the relationship between ESG pillar scores and stock returns. We recommend that portfolio managers closely monitor improvements in ESG pillar scores alongside firm-specific variables to predict banks' stock returns in the index.

KEY WORDS

financial ratios, stock return, portfolio investment, banking, MSCI emerging market index, ESG

JEL CODES

C100, C510, G210, O160, Q500, Q560

1 INTRODUCTION

Since the implementation of the Paris Agreement, there has been a discernible upward trajectory in environmental, social, and governance (ESG) investments. Corporations are encouraged to pursue both financial and non-financial objectives, anticipating long-term benefits for investors and promoting societal welfare through their influence on corporate practices and conduct.

ESG-based bank governance closely aligns with the "stakeholder" perspective introduced by Freeman (1984), which suggests it should

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enhance stakeholder satisfaction, improve financial performance, and increase firm value. However, investing in ESG entails associated costs. Therefore, a delicate balance between costs and benefits should be maintained. Otherwise, overinvestment in ESG reduces profitability and detracts from firm value by diverting limited resources away from investment (Alexander and Buchholz, 1978; Barnea and Rubin, 2010). Banks, a pivotal entity within the financial sector, assume an essential role in sustainable development. Therefore, investors must prioritise sustainable and responsible investment practices by analysing corporate social responsibility, corporate governance frameworks, and environmental concerns when making decisions regarding investments in banking stocks (Nizam et al., 2019). Furthermore, sustainability reporting is increasingly being recognised on a global scale, as stakeholders express a heightened demand for transparency concerning environmental, social, and governance (ESG) issues (Buallay, 2019). Sustainable firms strive to enhance their financial results while also meeting their environmental and social obligations (Pedersen et al., 2021). Although environmental and social responsibility do not have a direct correlation with corporate financial outcomes, they connect firms with essential stakeholders (Feng et al., 2022). Meeting ESG responsibilities can help build positive stakeholder relationships (Raghunandan and Rajgopal, 2022). Investors who adopt the value investing philosophy are particularly concerned with corporate sustainability prospects, as they view firms that surpass in ESG performance as possessing greater potential for value increase (Albuquerque et al., 2018).

A relevant question concerns the ESG investment expectations we have of banks as a key driver of growth within emerging markets. Green banking encompasses sustainable banking practices, with a particular emphasis on environmental concerns. It is also closely linked to sustainability or ESG (environmental, social, and governance) factors, which banks are increasingly emphasising. Climate change remains the most prominent goal integrated into banking institutions' sustainability strategies. Banks are increasingly incorporating environmental sustainability considerations into their services, including lending, investment, and portfolio management, notably through financing renewable energy projects and issuing green bonds. This does not mean that financial institutions are abandoning profit maximisation; instead, they seek to optimise profits while prioritising environmental sustainability (Statista, 2024a). Since ESG investment incurs costs, it should also create value. To serve this purpose, our study examines the impact of ESG pillar scores on the stock returns of banks in the emerging market index.

Furthermore, ESG investments should be financed in the same manner as other long-term investments. To this end, corporations have issued green and social bonds. Green bonds are fixed-income instruments specifically created to fund climate and environmental initiatives. The capital required to finance ESG initiatives leads to an increase in the issuance of green and social bonds. In 2023, China issued over 83 billion U.S. dollars in green bonds, making it the leading country in the world. Germany was second with 67 billion U.S. dollars, followed by the United States with 60 billion U.S. dollars. The United Kingdom ranked fourth, with green bonds worth 33 billion U.S. dollars, and Italy was fifth, with green bonds worth 30 billion U.S. dollars (Statista, 2024b). From 2012 to 2023, China emerged as the primary emerging market for green bond issuance, with nearly $300 billion issued. India, Brazil, Chile, and the United Arab Emirates ranked as the subsequent largest issuers following China (Statista, 2025). Social bond issuance, in terms of value, is not as high as that of green bonds.

This empirical study examines the impact of ESG pillar scores on the stock returns of banks within the MSCI Emerging Market Index, controlling for banking financial ratios. Moreover, market-specific factors such as interest rates, exchange rates, and the Dow Jones Banking Index are considered as independent variables. The objective is to establish whether each ESG pillar score has a positive correlation with stock returns, thereby demonstrating the value created by ESG investments. If the hypothesis

holds, investing in ESG pays back the firm, and investors can reap the benefits of sustainable stocks. Investors in emerging markets can monitor changes in banks' ESG pillar scores and utilise this information to forecast future shifts in banks' market value.

The following section explores the literature, section three introduces the data, section four includes the empirical study, section five discloses the findings, and section six concludes the paper.

2 LITERATURE REVIEW

2.1 Theoretical Framework on ESG Investments

In the prior literature, several theories have examined the impact of ESG scores on stock returns. Two main theories forecast the link between ESG and a company's financial performance: stakeholder theory and trade-off theory. These theories present contrasting predictions, each backed by empirical evidence. The resource-based view of the firm and stewardship theory fall under the umbrella of stakeholder theory, yielding similar predictions. Agency theory offers predictions comparable to those found in trade-off theory.

Stakeholder theory examines the link between firm performance, such as stock returns, and ESG scores. In recent years, investors have raised their expectations of businesses, seeking outcomes beyond mere monetary gains (Abrams et al., 2021). The stakeholder theory highlights that businesses bear responsibilities not only to their shareholders but also to various other stakeholders. To build a sustainable firm, enterprises must fulfil their responsibilities to stakeholders. If they do so, the firm's stakeholders will support it because it adopts a stakeholder approach (Yin et al., 2023). Firms can develop stronger relationships with stakeholders and foster trust more efficiently by providing high ESG performance (Hwang et al., 2021).

The resource-based view suggests that ESG initiatives are strategic investments. These investments enable a firm to achieve a competitive advantage by developing unique skills that are hard to imitate (Russo and Fouts, 1997). El Khoury et al. (2023) noted that sustainable practices that mitigate adverse environmental impacts are regarded as valuable resources for banks to invest in, consequently enhancing their competitive advantage and improving financial performance (FP). Consequently, enhancing ESG is likely to lead to improved financial performance (Ruf et al., 2001).

Stewardship theory views managers as stewards of the firm, committed to maximising its long-term value while addressing the diverse interests of all stakeholders. Managers participate in ESG initiatives to enhance relationships among various stakeholders, including employees, customers, suppliers, and communities, thereby fostering positive business environments (Barnett, 2007; Jo and Harjoto, 2011). The primary objective of a business is to enhance profitability while concurrently addressing its societal responsibilities. Adikaram and Holcomb (2024) propose that financial institutions with a comprehensive focus on social practices attain superior financial performance, attributable to a stronger competitive advantage and an augmented corporate reputation.

Barak and Sharma (2024) state that financial institutions are deemed "knowledge-intensive" due to their increased dependence on intangible assets, such as customer trust, employee capabilities, and connections. This intellectual capital empowers organisations to create value and bolster their competitive advantage. Harjoto and Jo (2011) have examined firms within the Russell 2000, S&P 500, and Domini 400 indices from 1993 to 2004. Researchers' results revealed that effective corporate governance mitigates conflicts of interest between managers and both investing and non-investing stakeholders. This improvement in governance subsequently enhances the firm's operating financial performance and increases its overall

value. Heightened ESG activity is expected to enhance the firm's value.

Furthermore, investors show a stronger inclination to invest in stocks with high ESG scores, likely influenced by institutional mandates (Chava, 2014) and an increasing interest in integrating ESG considerations into investment strategies. As a result, equities with low ESG scores are more likely to be overlooked, whereas those with strong ESG scores might attract greater interest (Chen et al., 2020). In simpler terms, stock returns do not solely dictate portfolio decisions.

The trade-off theory considers ESG initiatives as a potentially inefficient allocation of resources. Funds directed towards ESG initiatives might have been utilised more efficiently by the firm. This perspective contends that managers should maximise the firm's value and refrain from considering societal well-being (Friedman, 1970). Agency theory provides predictions similar to those of trade-off theory. As representatives of shareholders, firm executives are often inclined to prioritise their interests, such as funding expensive ESG initiatives to enhance their status according to the principal-agent theory (Jensen and Meckling, 1976). Consequently, stock returns may decline as a firm diverts its attention from shareholder value to self-interest. In this context, ESG practices are found to be negatively correlated with firm value (Yin et al., 2023).

2.2 ESG Investment and Bank Value

In emerging markets, the banking sector plays a significant role in fostering economic growth by effectively mediating between capital suppliers and demanders (Levine, 2005). Banks require considerably more resources compared to non-financial firms, leading to increased expectations for them to provide societal advantages. In cases of insolvency, banks are more likely to receive government bailouts, which taxpayers often finance. As a result, their operations are typically subject to heightened monitoring from regulators, the public, and the media.

Nonetheless, we presently possess only a limited understanding of how investors assess banks' ESG initiatives. Buallay (2019) highlights a favourable link between the ESG activities of European banks and their value. Finger et al. (2018) investigate the relationship between the Equator Principles and bank performance, pointing out that banks in developing nations adopt the Equator Principles for strategic reasons. ESG initiatives can enhance value by strengthening the connection between a bank and its stakeholders, while also increasing transparency. Banks that achieve higher ESG ratings may be perceived as lower risk (Broadstock et al., 2021) and could outperform the market during times of crisis (Takahashi and Yamada, 2021). Conversely, if a bank participates in few ESG activities, it may inadvertently convey its quality to prospective minority shareholders and bondholders. This idea aligns with stakeholder theory. Bhaskaran et al. (2023) have addressed the role of governance and social initiatives on value creation in banking sector firms. The study covered 472 global banks. The study has demonstrated that intense social and governance activities have a positive influence on market valuations. Well-capitalised banks are more likely to invest in social initiatives.

Investing excessively in ESG initiatives may diminish a bank's value due to the opportunity costs associated with it. After high-net-present-value projects are fully utilised, each subsequent ESG effort is likely to yield decreasing returns (Wang et al., 2008; Haans et al., 2016). This notion supports the trade-off theory. The association between ESG and bank performance is non-linear.

2.3 ESG Investment Transmission Mechanism for Banks

ESG initiatives can impact bank performance through three primary channels, including the cost of capital, cash flow, and operational efficiency.

Firstly, the implementation of ESG initiatives can impact the cost of capital. ESG initiatives ought to lessen conflicts among stakeholders and alleviate information asymmetry (Perrini et al., 2011). This expectation is further supported

by Healy and Palepu (2001), who show that companies participating in ESG activities incur lower monitoring expenses. Cui et al. (2018) highlight a negative correlation between ESG and information asymmetry. Reducing information asymmetry is expected to boost demand for the bank's shares or bonds (Merton, 1987; Heinkel et al., 2001; El Ghoul et al., 2011). Reducing capital costs can help offset the expenses associated with ESG activities. El Ghoul et al. (2011) emphasise the inverse relationship between sustainability reporting and the cost of capital. Dinçer et al. (2014) analysed banks traded on the Borsa Istanbul. Researchers have found that corporate governance lowers the cost of capital because it minimises uncertainties and reduces resource costs.

Secondly, implementing ESG initiatives can affect cash flow. A bank's financial constraints often stem from its inability to secure favourable borrowing rates or a lack of incentives for individuals to deposit their money. When facing significant financial limitations, a bank is forced to forgo profitable opportunities. Conversely, a bank with minimal or no capital constraints can invest in any projects that generate positive NPVs (Cheng et al., 2014). As a result, this boost in investment towards positive NPV projects is expected to enhance the bank's cash flow. Implementing strategies aimed at alleviating financial constraints may boost the funds available for investment. Hennessy and Whited (2007) suggest that minimising information asymmetry can further alleviate a bank's financial barriers. Consequently, this allows banks to extend more loans, resulting in increased cash flow (Chauhan and Kumar, 2018). Shakil et al. (2019) have analysed how ninety-three banks' ESG performance influenced their financial outcomes in emerging markets from 2015 to 2018. Researchers' findings reveal a positive correlation between banks' environmental, social performance and financial performance. However, governance performance has no apparent effect. Researchers attribute the lack of impact from the governance component to the weak corporate governance practices prevalent among emerging market banks and the insufficient legal and regulatory pressure from oversight bodies. Additionally, they recommend that top management prioritise investments in the environmental and social aspects, which could enhance the banks' future cash flow. Jo et al. (2015) examined the link between environmental risk investments and operational performance improvements in the banking sector across twenty-nine countries from 2002 to 2011. They found that mitigating environmental risk typically takes one to two years before it has a positive impact on return on assets. Essentially, investing in environmental initiatives leads to a return on investment. Moreover, this reduction has a more immediate positive effect on banks in well-developed financial markets, such as North America, compared to those in less-developed markets, such as the Asia Pacific. According to Tian et al. (2025), green financing enhances banks' market valuation by lowering credit risk and boosting prospects for future cash flows. Ultimately, their study demonstrated that green credit is a valuable tool for financial institutions operating in developing countries, such as China, where legal frameworks and environmental regulations may not be as well-developed as those in more advanced nations.

Ultimately, the bank's efficiency may be influenced by its adoption of ESG initiatives. Porter (1991) suggests that companies participating in ESG endeavours are likely to experience reduced expenses stemming from forthcoming regulations. Garriga and Melé (2004) ascertain that sustainable companies that pursue heightened product and strategic innovation can decrease costs. These insights indicate that engagement with ESG practices may augment the operating margin. Ahmad et al. (2024) examined whether an ESG policy boosts the innovation capacity, innovative activities, value creation, and financial performance of companies. The researchers found a significantly positive relationship between social and environmental performance and business sustainability, indicating that a business's economic performance and its ability to create societal value are closely intertwined.

The literature investigates the relationship between market-specific variables and banking stock returns, as well as firm-specific variables.

The association between stock prices and nominal interest rates highlights how investors adjust their portfolios between stocks and bonds. When interest rates rise, investors are incentivised to shift their portfolios toward bonds, and the opposite occurs when interest rates fall. Consequently, an increase in interest rates typically leads to a decrease in stock prices (Hashemzadeh and Taylor, 1988). On the other hand, studies have found a positive relationship between interest rates and stock prices. Asprem (1989) attributes a positive relationship between interest rates and stock returns to small, illiquid financial markets, which are often observed in the stock exchanges of emerging countries. Barsky (1989) elucidates the positive relationship between interest rates and stock prices, referring to the concept of a changing risk premium. For instance, a reduction in interest rates may occur due to increased risk, leading investors to substitute risky assets, such as stocks, for less risky assets, such as bonds or real estate. Hashmi and Chang (2023) found that, over time, foreign direct investment (FDI), the trade balance, and the industrial production index (IPI) significantly influence emerging stock indices. In the short term, the effects of FDI, the consumer price index, interest rates, and the exchange rate vary under bullish, bearish, and normal conditions in emerging stock markets.

Branson and Henderson (1985) stated that the relationship between exchange rates and stock returns is well-established within theoretical frameworks. The Portfolio Balance Theory posits a negative correlation between the two, attributed predominantly to investor behaviour focused on achieving international portfolio diversification. Investors typically reallocate their assets from countries with lower stock returns to those with higher returns. As a result, exchange rate appreciation frequently signifies lower stock returns, whereas exchange rate depreciation implies higher-yielding stocks.

A notable trend toward liberalisation has accelerated the integration of global financial markets. Syllignakis and Kouretas (2010) have analysed the long-term relationships between emerging European stock markets and two established markets: Germany and the United States. The findings demonstrate that the financial interconnections between these emerging and global markets have intensified.

Bai et al. (2023) analysed the global financial market sentiment concerning stock returns during the COVID-19 pandemic. Researchers indicated that an escalation of the epidemic negatively impacted the stock market. Conversely, an increase in financial market sentiment is associated with improved stock market returns, even amidst the most severe phases of the pandemic.

This study advances the current literature by providing a detailed analysis of how investments in Environmental, Social, and Governance (ESG) factors influence banks' stock returns within the MSCI Emerging Markets Index.

3 DATA

This empirical paper uses environmental, social, and governance (ESG) pillar scores (E score, S score, G score) of thirty-five banks in the MSCI Emerging Markets Index between 2015 and 2021. The one-year lag of ESG pillar data of banks is used as the independent variable since the score's contribution to financial performance is more noticeable (Xu and Zhu, 2024). The MSCI Emerging Markets Index includes banks from the Czech Republic, Egypt, Greece, Hungary, Kuwait, Poland, Qatar, Saudi Arabia, South Africa, Türkiye, and the United Arab Emirates. Stock returns were used as dependent variables for banks between 2016 and 2022. We used the following formula to compute the return. Return of an asset:

$$\frac{P_{t+1} - P_t}{P_t}, \tag{1}$$

where P_{t+1} is the price of the asset at time $t+1$ and P_t is the price of the asset at time t.

Between 2016 and 2022, non-performing assets to total loans (NPL), efficiency (ER), capital adequacy (CAR), return on equity (ROE), price-to-book (P/B), price-earnings (P/E) ratios, and market capitalisation (MCAP) for banks are used as firm-specific control variables. Country interest rates (I), exchange rates (EXR), and the Dow Jones banking index (DJ) are used as market-specific independent variables for the same period. For bank valuation, the most frequently used ratios in academic studies and practice are P/B, ROE, ER, CAR, and the NPL ratio. These jointly measure profitability, risk, and capital strength—key drivers of the bank market value. Researchers used the same firm-specific ratios are Louzis et al. (2012); Čihák and Hesse (2010); Staikouras and Wood (2004); Fiordelisi (2007); Mamatzakis and Bermpei (2014); Berger et al. (2009); Demirgüç-Kunt et al. (2013); Berger and Humphrey (1997); Athanasoglou et al. (2008); Demirgüç-Kunt and Huizinga (1999). Researchers utilised the same market-specific variables include Demirgüç-Kunt and Huizinga (1999), Altunbas et al. (2018), Borio et al. (2017), García-Herrero et al. (2009), Tan and Floros (2012), and Athanasoglou et al. (2008). Dummy variables are also considered independent variables. Moreover, the research highlights the transformative effects of the recent pandemic on the relationship between ESG pillar scores and stock performance. Furthermore, we have thoughtfully divided the banks into two distinct groups—EU and non-EU—enabling a deeper examination of potential disparities and legislative differences that may impact their performance.

Daily data have been retrieved from `investing.com` and the Bloomberg database.

4 EMPIRICAL STUDY

This study employs pooled regression, a modelling technique useful when detailed monitoring at various levels is required. Pooling increases the number of observations, which enhances the robustness of estimates and makes it feasible to analyse regionally oriented activities. However, pooled regression assumes that the average of stacked regions is the same, an assumption that may not always hold in practice. To address issues that may compromise the reliability of ordinary least squares (OLS) estimators, such as the presence of outliers, non-normal error terms, or heteroskedasticity, we employ robust regression techniques, specifically M-estimators. These estimators reduce the influence of extreme observations that could disproportionately impact standard regression estimates. Our dataset, which includes ESG indicators and financial variables for EU and non-EU firms across both pandemic and non-pandemic years, features several variables (e.g., ROE, MCAP, NPL) susceptible to outliers or skewed distributions. Furthermore, the model comprises multiple interaction terms and lagged variables, increasing the likelihood of multicollinearity and estimation sensitivity. In such contexts, robust regression provides more stable and reliable coefficient estimates than traditional OLS.

4.1 Robust Regression with M-Estimators

M-estimators form a class of robust regression techniques that minimise the sum of a chosen function $\theta(\cdot)$ applied to residuals. This technique reduces the impact of outliers by assigning them lower weights in the estimation process.

Formally, the goal is to estimate the parameter θ of the distribution P of observations $X_1, \ldots, X_n$.

A criterion $\theta \to M_n(\theta)$ is defined in terms of functions $m_\theta : X \to \mathbb{R}$:

$$M_n(\theta) = P_n m_\theta \tag{2}$$

The M-estimator is then defined as:

$$\hat{\theta} = \arg\max_{\theta \in \Theta} M_n(\theta) \tag{3}$$

This approach improves the robustness of coefficient estimates in the presence of deviations from standard regression assumptions.

4.2 Model Specification

The empirical model estimates the relationship between stock returns and ESG performance, controlling for key financial indicators and macroeconomic variables. We specify a pooled regression with interaction terms to capture how financial performance moderates the impact of ESG dimensions:

$$\begin{aligned} \mathrm{SR}_{it} = \beta_0 &+ \sum_{j=1}^{3} \beta_j \cdot \mathrm{ESG}_{i,t-1}^{(j)} + \\ &+ \sum_{j=1}^{3}\sum_{k=1}^{7} \gamma_{jk} \cdot \mathrm{ESG}_{i,t-1}^{(j)} \cdot \mathrm{FIN}_{it}^{k} + \\ &+ \theta' \cdot \mathrm{MACRO}_t + \\ &+ \lambda_1 \cdot \mathrm{D}_1 + \lambda_2 \cdot \mathrm{D}_2 + \epsilon_{it}, \end{aligned} \tag{4}$$

where:

- SR_{it} denotes the stock return for firm i at time t,
- $\mathrm{ESG}_{i,t-1}^{(j)}$ includes the lagged Environmental, Social, and Governance scores (with $j = 1, 2, 3$ representing ENV, SOC, and GOV, respectively),
- FIN_{it}^{k} represents six firm-level financial characteristics: the price-to-book ratio (PB), efficiency ratio (ER), return on equity (ROE), non-performing loans to total loans (NPL), capital adequacy ratio (CAR), the price-earnings ratio (PE), and market capitalisation (MCAP).
- MACRO_t is a vector of macroeconomic control variables: the interest rate (I), exchange rate (EXR), and Dow Jones Banking Index (DJ),
- D_1 is a dummy variable equal to 1 for EU corporations and 0 otherwise,
- D_2 is a dummy variable equal to 1 for pandemic years and 0 for non-pandemic years,
- ϵ_{it} is the error term.

4.3 Variable Descriptions

The financial ratios used as control variables are defined as follows.

The non-performing assets to total loans (NPL) ratio measures a bank's health and efficiency. It helps identify problems with asset quality in the loan portfolio. Bloomberg calculates the ratio as:

$$\frac{\text{Non-performing Assets}}{\text{Total Loans}} \cdot 100.$$

The efficiency ratio (ER) measures costs compared to revenues. Bloomberg calculates the efficiency ratio of banks as:

$$\frac{\text{Operating Expenses}}{\begin{array}{c}\text{Net Interest Income}\\ +\ \text{Commissions \& Fees Earned}\\ +\ \text{Other Operating Income (Losses)}\\ +\ \text{Trading Account Profits (Losses)}\\ +\ \text{Gain/Loss on Investments/Loans}\\ +\ \text{Other Income (Loss)}\\ -\ \text{Commissions \& Fees Paid}\\ +\ \text{Taxable Equivalent Adjustment}\\ \text{or Net Revenue}\\ -\ \text{Net of Commissions Paid}\end{array}} \cdot 100.$$

The total risk-based capital ratio also called the capital adequacy ratio (CAR), protects a bank from insolvency. It is calculated by dividing the total risk-based capital by risk-weighted assets. The Bank of International Settlements in Basel requires a minimum total capital ratio of 8%. The Return on Common Equity (ROE) reveals how much profit a company generates with the money shareholders have invested. Bloomberg calculates the ratio as:

$$\frac{\begin{array}{c}\text{Net Income Available}\\ \text{for Common Shareholders}\end{array}}{\text{Average Total Common Equity}} \cdot 100.$$

The price-to-book ratio (P/B) analyses the market value of the firm's investments with their cost. Book value per share reflects historical costs. To calculate the P/B ratio, Bloomberg divides the last market value per share by the book value per share. The Price-Earnings Ratio (P/E) is a crucial metric that showcases the market's willingness to pay for every unit

of current earnings. A higher P/E ratio is usually indicative of a company's immense growth potential in the future. Nevertheless, a price-earnings ratio (PE) that is too high may not be attractive for investors because the possibility of capital gains will be smaller. To calculate the P/E ratio, Bloomberg divides the last price per share by the earnings per share. Furthermore, the earnings per share is computed by dividing the net income by the outstanding shares. Market capitalisation (MCAP) is the total current market value of a company's outstanding shares, stated in the pricing currency. Capitalisation is a measure of corporate size. Current market capitalisation is calculated as:

$$\text{Current Shares Outstanding} \cdot \text{Last Price}.$$

The Dow Jones Banking Index is designed to measure the performance of U.S. companies in the banking sector.

5 FINDINGS

Tab. 1: Regression result (dependent variable: SR)

Variable	Coefficient	Std. error	*p*-value
Intercept (C)	−0.010259	0.042202	0.8079
ESG Pillar Scores			
ENV	0.628324	0.322857	0.0516*
SOC	0.109246	0.055343	0.0484**
GOV	−0.058346	0.035572	0.1010
Interaction Terms: ENV			
ENV×PB	−0.206780	0.044813	0.0000***
ENV×ER	−0.002384	0.002487	0.3377
ENV×ROE	0.016849	0.001838	0.0000***
ENV×NPL	−0.003533	0.005239	0.5000
ENV×CAR	−0.027033	0.014266	0.0581*
ENV×PE	0.001698	0.004252	0.6897
ENV×MCAP	−0.199567	0.046924	0.0000***
Interaction Terms: SOC			
SOC×PB	0.003628	0.008958	0.6855
SOC×ER	−0.000498	0.000545	0.3601
SOC×ROE	−0.002111	0.000923	0.0222**
SOC×NPL	0.000572	0.001186	0.6295
SOC×CAR	−0.004090	0.002068	0.0479**
SOC×PE	5.98e−05	0.000419	0.8865
SOC×MCAP	0.063603	0.015498	0.0000***
Interaction Terms: GOV			
GOV×PB	−0.003245	0.005712	0.5700
GOV×ER	0.000202	0.000367	0.5825
GOV×ROE	0.001216	0.000612	0.0468**
GOV×NPL	−0.000301	0.000550	0.5838
GOV×CAR	0.002030	0.001338	0.1293
GOV×PE	−6.37e−05	0.000228	0.7795
GOV×MCAP	0.096346	0.010604	0.0000***
Macro-level Terms			
I	0.883022	0.263343	0.0008***
EXR	−0.613444	0.126355	0.0000***
DJ	0.085103	0.043291	0.0493**
D_1 (Dummy)	−0.000820	0.032365	0.9798
D_2 (Dummy)	0.051802	0.023399	0.0268**
Model Statistics			
R-squared	0.576905		
Rw-squared	0.845829		

Note: Coefficients are reported with standard errors in parentheses below. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Based on Eq. 1, the results of the regression in Tab. 1 are discussed below.

5.1 The Baseline Effect of the ESG Pillar on Stock Returns

The regression results demonstrate a significant direct positive relationship between the environmental pillar score (ENV) at the 10% level, the social pillar score (SOC) at the 5% level, and the stock return (SR). However, there is no significant direct relationship between the governance pillar score (GOV) and the stock return (SR). The findings for the social, environmental, and governance pillar scores align with Shakil et al. (2019) and Ahmad et al. (2024) in the literature section. Shakil et al. (2019) have analysed the ESG performance of banks in emerging markets. Their findings reveal a positive correlation between banks'

environmental and social performance and their financial outcomes. However, governance performance appears to have no significant effect. The researchers attribute the absence of impact from the governance component to the weak corporate governance practices common among banks in emerging markets, as well as the insufficient legal and regulatory pressures exerted by oversight bodies. Furthermore, they recommend that top management prioritise investments in environmental and social initiatives, which could potentially enhance the banks' future cash flows. Ahmad et al. (2024) examined whether an ESG policy improves a company's innovation capacity, innovative activities, value creation, and financial performance. The researchers identified a markedly positive relationship between social and environmental performance and business sustainability, indicating that a company's economic results are closely linked to its capacity to generate societal value.

5.2 The Relationship Between the ESG Pillar and Stock Returns with Control Variables

When the market capitalisation (MCAP) effect is removed from the social capital (SOC) pillar concerning stock returns, the positive relationship between the social pillar and stock returns becomes more significant compared to the direct relationship between the social pillar and stock returns. However, the impact of the social pillar on stock returns is slightly less pronounced than the direct relationship. Businesses with high market capitalisation are more liquid and can invest in sustainability-related initiatives. When we exclude the impact of market capitalisation, the costs of ESG initiatives for firms become apparent. This result aligns with those of Friedman (1970), Jensen and Meckling (1976) and Yin et al. (2023) in the literature.

Friedman (1970) asserted that the principal obligation of managers is to serve the interests of shareholders. Participation in "socially responsible" initiatives (for example, pollution reduction and charitable contributions) is deemed justified solely when such actions also enhance long-term shareholder value. Otherwise, managers are essentially "taxing" shareholders, employees, or customers without their approval. Today, this idea remains central, but is challenged by stakeholder theory and ESG-driven perspectives. As representatives of shareholders, corporate executives often tend to prioritise their own interests, such as allocating funds to costly ESG initiatives to elevate their status, in accordance with the principal-agent theory (Jensen and Meckling, 1976). Consequently, stock returns may decline as a firm shifts its focus from shareholder value to self-interest. Within this context, ESG practices are demonstrated to have a negative correlation with firm value (Yin et al., 2023).

When the capital adequacy (CAR) and return on equity (ROE) effects are removed from the social pillar (SOC) regarding stock returns, the previously positive association between the social pillar score and stock returns shifts to a negative one. This could be attributed to well-capitalised banks being more likely to invest in social initiatives. This result is similar to that of Bhaskaran et al. (2023) in the literature section. CAR protects a bank from insolvency during economic downturns. Banks with a high Capital Adequacy Ratio are better positioned to withstand various forms of risk. Well-capitalised banks are more likely to invest in social initiatives. When the influence of CAR is excluded from consideration, the costs associated with banks' social initiatives become evident.

When the effects of the price-to-book ratio (P/B) and market capitalisation (MCAP) are excluded from the environmental pillar score concerning stock returns, the previously positive association between the environmental pillar score and stock return shifts to a negative one, and this change is statistically more significant. The observed finding may be attributed to the short-term costs associated with investing in environmental initiatives. This finding aligns with the work of Friedman (1970) and Yin et al. (2023) in the literature. When the impact of the return on equity (ROE) is neutralised from the environmental pillar score in relation to stock return, the relationship between the

environmental score and stock return is slightly lower but still positive and significantly stronger compared to the direct relationship between return and environmental score. The finding may stem from reduced environmental risks, positively impacting ROE, as noted by Jo et al. (2015) in the literature section. Consequently, investors value this development, leading to an increase in stock prices. Jo et al. (2015) found that mitigating environmental risk typically requires a period of one to two years before yielding a positive effect on the return on equity. Fundamentally, investments in environmental initiatives generate a return on equity. Moreover, this risk mitigation exerts a more rapid positive influence on banks operating within well-developed financial markets relative to those in less developed markets.

As mentioned before, the regression results show no significant direct relationship between the governance pillar score (GOV) and the stock return (SR). However, when the effects of market capitalisation (MCAP) and return on equity (ROE) are controlled for the GOV score concerning stock returns, there is a statistically significant positive relationship between the governance pillar score and stock returns. These findings resemble those of Wang et al. (2008) and Haans et al. (2016) in the literature section. As stated by Wang et al. (2008) and Haans et al. (2016), the relationship may stem from investing excessively in ESG initiatives, which could reduce a bank's value due to opportunity costs. After high-net-present-value projects are fully utilised, each additional ESG effort is likely to generate diminishing returns.

5.3 The Relationship Between the Macro Variables and Stock Returns

The regression result also includes the impact of market-specific variables on banking stock returns. The interest rate and the stock return have a significant positive relationship. This finding is similar to those of Asprem (1989), Hashmi and Chang (2023) and Barsky (1989) in the literature section.

Asprem (1989) links a positive relationship between interest rates and stock returns to small, illiquid financial markets, which are often found in the stock exchanges of emerging countries. Meanwhile, Barsky (1989) explains the positive correlation between interest rates and stock prices by examining fluctuations in risk premiums. For instance, a decline in interest rates may occur due to increased risk, leading investors to shift from riskier investments, such as stocks, to safer assets, like bonds or real estate.

The exchange rate and the stock return have a significant negative relationship. The finding is associated with Portfolio Balance Theory and is similar to that of Branson and Henderson (1985) in the literature section. As Branson and Henderson (1985) state, investors usually reallocate their assets from countries with lower stock returns to those with higher returns. As a result, exchange rate appreciation often indicates lower stock returns, while exchange rate depreciation suggests higher-yielding stocks.

The Dow Jones banking index and stock returns have a significant positive relationship. This finding is similar to Syllignakis and Kouretas (2010) in the literature section, and due to a notable trend toward liberalisation, has accelerated the integration of global financial markets.

5.4 The Relationship Between the Dummy Variables and Stock Returns

In our regression model, we have incorporated two dummy variables. One variable assesses the influence of pandemic and non-pandemic periods. At the same time, the other examines potential disparities between EU and non-EU companies to encompass any regulatory distinctions that could impact the correlation between ESG pillar score and stock returns. The regression result indicates a significant positive relationship between the pandemic years and stock returns. This finding aligns with Bai et al. (2023) in the literature. The regression results do not indicate a significant relationship between EU and non-EU stock returns.

The coefficient of determination of the Robust least squares (R-squared) in our model indicates that when the control variables are included, the independent variables (E, S, G, I, EXR, DJ, and dummy variables) can explain 0.84 of the variation in the stock return.

6 CONCLUSIONS

This article aims to assess whether each ESG pillar score has a positive relationship with stock returns for banks across the MSCI Emerging Markets Index, thereby demonstrating the value generated by investing in ESG. Additionally, the study examines the impact of market-specific variables on the returns of banking stocks. Moreover, the research highlights the transformative effects of the recent pandemic on the relationship between ESG pillar scores and stock performance. Finally, we have thoughtfully divided the banks into two distinct groups—EU and non-EU—enabling a deeper examination of potential disparities and legislative differences that may impact their performance.

The regression results demonstrate a significant direct positive relationship between the environmental pillar score (ENV), the social pillar score (SOC), and the stock returns (SR). Banks might pursue investments in social initiatives, as the advantages of investing in the social pillar outweigh the associated costs. Additionally, banks should evaluate market capitalisation, capital adequacy, and return on equity metrics before engaging in social pillar investments. Investors may recognise social initiatives, and as a result, increase their demand for the stock, since banks rely on intangible assets such as customer trust, employee skills, and professional relationships with clients. While banks are considered among the most environmentally conscious industries, they could also invest in eco-friendly initiatives as a secondary option. Furthermore, banks should evaluate the price-to-book ratio, market capitalisation, and return on equity metrics before investing in such initiatives, as these metrics influence the sign of the relationship between each ESG pillar and stock returns.

There is a statistically significant indirect positive relationship between the governance pillar score and stock returns. Banks should evaluate the market capitalisation and return on equity metrics before investing in the governance pillar, as these metrics influence the sign of the relationship between each ESG pillar and stock returns.

Furthermore, the study examines market-specific factors that may impact stock returns. The regression results reveal a significant positive relationship between interest rates and stock returns. This could be due to the illiquid financial markets often observed in the stock exchanges of emerging countries. Additionally, a decline in interest rates may occur as a result of increased risk, prompting investors to shift from riskier assets like stocks to safer assets such as bonds or property. The relationship between exchange rates and stock returns is notably negative. This finding aligns with the portfolio balance theory. Moreover, there is a significant positive correlation between the Dow Jones Banking Index and stock returns. This may be attributed to the ongoing trend of liberalisation, which has considerably accelerated the integration of global financial markets.

The regression findings do not indicate a regulatory disparity between EU and non-EU banks that could influence the correlation between ESG pillar scores and stock returns. However, the regression results indicate a significant positive relationship between the ESG pillar score and stock returns during the pandemic.

Consequently, we have observed a significant positive direct relationship between the social pillar score and stock returns. Banks may initiate investments in social pillars in the MSCI Emerging Markets Index. In addition, firm-specific variables such as market capitalisation, return on equity, capital adequacy, and price-earnings ratio influence the relationship between ESG pillar scores and stock returns. We recommend that portfolio managers monitor ESG pillar score improvements closely to predict banks' stock returns in the index.

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8 ANNEX

The results of the descriptive analysis are presented in Tab. 2.

The CAR has a mean of 18.73%, with a standard deviation of 3.57, indicating moderate variability. Banks' CAR exceeds 8% which Basel Act III mandates. DJ values are low and have a wide range. Many values are zero (Median = 0), with most entities exhibiting low or zero scores on the environmental pillar variable. Additionally, some outliers contribute to an upward bias in the mean. ER exhibits high variability (Std. Dev = 16.23) and a wide range (Min = 17.74, Max = 174.36). EXR has a minimal average (Mean = 0.021), but a wide range from −0.14 to 0.44. Although the average risk is low, some institutions may have faced significant exchange rate fluctuations. The quality of the governance pillar remains relatively consistent across banking institutions, exhibiting minimal variability. MCAP has a wide dispersion, meaning that a few banks may have dominated the market. NPL shows significant variation in loan quality, indicating that some banks may have encountered a high number of non-performing loans. The P/B ratio varied significantly across banks. Similarly, the P/E ratio exhibited a wide variation in investor expectations and valuations. ROE has a negative minimum value (−46.81), indicating that some banks may have suffered significant losses, and profits fluctuate considerably. The SOC varies, but values remain modest overall. SR has a skewed distribution with some notable positive and negative values.

The correlation coefficients among firm-specific and market-specific variables are presented in Tab. 3.

CAR has a strong positive relationship with P/B (0.59), suggesting that banks with higher capital are capable of granting more loans, which in turn boosts the price-to-book ratio. Furthermore, CAR has a moderate positive relationship with ROE (0.31).

MCAP and SR have a strong positive correlation (0.77), indicating that banks with higher MCAP tend to have better SR.

OE and P/B demonstrate a moderate positive correlation (0.39), indicating that bank shares with high ROE tend to trade at a premium over their book value. ROE and SR also have a moderately positive correlation; banks with high ROE tend to offer better stock returns.

NPL and ROE have a moderate negative correlation (−0.40), indicating that banks with higher levels of bad loans generally exhibit lower profitability. NPL and P/B also exhibit a moderate negative correlation (−0.40), indicating that a higher credit risk (more NPLs) is associated with a lower market price of the stock.

ENV and ROE have a moderate positive correlation (0.48), meaning that better environmental scores are associated with higher profitability.

Tab. 2: Descriptive analysis

	CAR	DJ	ENV	ER	EXR	GOV	I
Mean	18.725140	0.049852	0.112905	43.098490	0.021153	4.193952	0.046464
Median	18.100000	0.005470	0.000000	41.159000	0.000000	4.060000	0.027500
Max	36.700000	0.347847	1.930000	174.357900	0.442611	7.770000	0.270400
Min	13.370000	−0.205466	0.000000	17.745700	−0.144578	1.620000	0.000000
Std. Dev	3.565751	0.242030	0.260242	16.226780	0.097362	1.313763	0.058567
	MCAP	**NPL**	**P/B**	**P/E**	**ROE**	**SOC**	**SR**
Mean	0.173987	6.018485	1.571181	14.567110	11.927010	2.088762	0.104171
Median	0.112385	4.062900	1.385900	12.025350	12.751200	1.740000	0.044101
Max	2.597259	46.619000	6.994200	158.730200	55.594300	7.270000	2.888982
Min	−0.996695	0.534200	0.049600	0.000000	−46.808500	0.000000	−0.999999
Std. Dev	0.485041	8.271193	1.117947	15.810460	10.317270	1.736791	0.433174

Notes: All variables are expressed as averages of firm-level data over the study period. Std. Dev denotes standard deviation.

Tab. 3: Correlation analysis

	CAR	DJ	ENV	ER	EXR	GOV	I	MCAP	NPL	PB	PE	ROE	SOC	SR
CAR	1	−0.01	−0.15	−0.24	−0.02	−0.05	0.08	0.07	−0.18	0.59	0.11	0.31	−0.04	0.07
DJ	−0.01	1	−0.11	0.05	−0.12	−0.04	−0.06	0.30	0.00	0.06	−0.06	−0.06	−0.07	0.29
ENV	−0.15	−0.11	1	0.17	0.15	0.51	0.12	0.10	0.09	−0.18	−0.15	0.04	0.27	0.06
ER	−0.24	0.05	0.17	1	0.02	0.55	−0.05	−0.06	0.22	−0.25	−0.08	−0.48	0.27	−0.03
EXR	−0.02	−0.12	0.15	0.02	1	0.09	0.67	0.15	−0.14	−0.16	−0.15	0.25	0.20	0.14
GOV	−0.05	−0.04	0.51	0.55	0.09	1	0.08	−0.02	0.13	−0.05	−0.05	−0.11	0.33	−0.04
I	0.08	−0.06	0.12	−0.05	0.67	0.08	1	0.21	−0.19	−0.05	−0.18	0.45	0.18	0.28
MCAP	0.07	0.30	0.10	−0.06	0.15	−0.02	0.21	1	0.02	0.06	−0.03	0.16	−0.04	0.77
NPL	−0.18	0.00	0.09	0.22	−0.14	0.13	−0.19	0.02	1	−0.40	−0.12	−0.40	−0.09	−0.04
PB	0.59	0.06	−0.18	−0.25	−0.16	−0.05	−0.05	0.06	−0.40	1	0.27	0.39	−0.12	0.10
PE	0.11	−0.06	−0.15	−0.08	−0.15	−0.05	−0.18	−0.03	−0.12	0.27	1	−0.05	−0.07	−0.02
ROE	0.31	−0.06	0.04	−0.48	0.25	−0.11	0.45	0.16	−0.40	0.39	−0.05	1	0.04	0.35
SOC	−0.04	−0.07	0.27	0.27	0.20	0.33	0.18	−0.04	−0.09	−0.12	−0.07	0.04	1	−0.03
SR	0.07	0.29	0.06	−0.03	0.14	−0.04	0.28	0.77	−0.04	0.10	−0.02	0.35	−0.03	1

Notes: The table reports Pearson correlation coefficients. Correlation values close to +1 (−1) indicate strong positive (negative) linear relationships.

The variance inflation factor (VIF) analysis used to detect multicollinearity among independent variables in the regression is presented in Tab. 4.

DJ, D_1, D_2, interaction of ENV×PE, and ENV×MCAP are considered suitable for inclusion in the regression analysis, as their respective values are below 5. Additionally, ENV×ROE, ENV×ER, and SOC×MCAP may lead to moderate inflation in standard errors. It remains appropriate to include them with caution.

The remaining variables are highly collinear with each other. ENV has a centred VIF of 254.6, which is extremely high, indicating that ENV is almost a linear combination of other predictors. Although ENV exhibits high multicollinearity, it remains in the regression due to its conceptual importance in assessing the environmental commitment of banks. Omitting this aspect would neglect a crucial component of sustainability performance. Although multicollinearity may increase the standard errors, the ENV variable is retained for the sake of theoretical completeness and policy relevance.

Tab. 4: Variance inflation factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.002969	26.514910	NA
ENV	0.422869	302.695300	254.553600
SOC	0.005110	336.113300	137.004400
GOV	0.002067	356.346100	31.704340
ENV×PB	0.009303	10.115420	8.785265
ENV×ER	2.03e−05	33.787030	28.157420
ENV×ROE	4.29e−05	13.379710	12.571260
ENV×NPL	7.17e−05	5.787521	5.293802
ENV×CAR	0.001093	240.307300	202.149400
ENV×PE	0.000122	9.098160	7.913300
ENV×MCAP	0.011554	4.334583	4.226029
SOC×PB	0.000184	32.381770	16.995820
SOC×ER	3.87e−07	69.688140	36.766290
SOC×ROE	1.70e−06	31.028920	21.110990
SOC×NPL	3.42e−06	10.407780	6.564127
SOC×CAR	7.68e−06	177.372500	73.736270
SOC×PE	5.62e−07	21.177310	17.069430
SOC×MCAP	0.000321	5.572999	5.264699
GOV×PB	4.77e−05	31.682830	13.625830
GOV×ER	1.90e−07	86.456510	23.734820
GOV×ROE	5.46e−07	23.828950	12.340560
GOV×NPL	5.01e−07	9.648464	6.484372
GOV×CAR	2.62e−06	163.176200	19.871190
GOV×PE	1.97e−07	16.845090	10.493040
GOV×MCAP	0.000119	5.600511	5.057085
I	0.102542	5.103367	3.126302
EXR	0.025947	2.289869	2.186184
DJ	0.002438	1.323651	1.269531
D_1	0.001439	4.038297	2.769118
D_2	0.000701	2.088290	1.392193

Notes: VIF = Variance Inflation Factor, C denotes the intercept term.

The inclusion of interaction terms demonstrates that the financial and ESG pillars do not operate in isolation. The influence of ESG pillars on performance outcomes, such as stock returns, is often interconnected and context-sensitive. For example, the impact of ENV on stock returns may differ depending on the level of ROE or MCAP. Interaction terms are incorporated to examine these moderation effects rigorously. For example, ENV×ROE assesses whether the influence of environmental performance is contingent upon profitability. In financial systems characterised by diverse institutional, regulatory, and operational contexts, interaction effects facilitate the consideration of the conditional nature inherent in variable relationships. For instance, within emerging markets, the impact of ESG scores on performance may differ across various capital levels of banks.

The interaction terms enhance the model's ability to capture non-additive effects, where the combined influence of two variables differs from the sum of their individual impacts. This is especially relevant when variables like SOC, GOV, ENV, and financial ratios are conceptually linked.

In regression analysis, the inclusion of interaction terms leads to enhancements in R-squared and Rw-squared metrics. The model integrates multiple interaction terms to address prospective moderation effects between ESG indicators and financial variables. These interactions are founded on theoretical premises, predicated on the expectation that the impact of ESG performance is not uniform but varies by firm-specific factors such as profitability, risk, or market size. Incorporating these terms augments the model's proficiency in representing complex dynamics within emerging markets, thereby aligning with the multidimensional characteristics of corporate sustainability and performance.

Despite the relatively limited sample size, the model is meticulously specified to emphasise theory-driven interactions rather than exploratory ones. To address this, we estimate the regression using robust least squares. Although incorporating several interaction terms in a model with a limited sample size may raise concerns regarding degrees of freedom and statistical power, these terms are retained due to their theoretical significance and the need to consider the interdependent effects of ESG and financial variables.

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