

The Relationship between Macroeconomic Variables and ESG Index: Evidence from Six Emerging Markets

Nabiel Elhakim Al Ahmad Bit & Pananda Pasaribu

Sampoerna University, Jl. Raya Pasar Minggu No.Kav. 16 7, Jakarta, 12780, Indonesia

Abstract

This study examines the relationship between ESG index return and macroeconomic factors in six emerging markets (Indonesia, Brazil, China, Mexico, South Africa, and India). Previous study has shown that the impact of macroeconomic variables on stock/index returns differs according to the country's economic structure and condition. The primary motivation for this study is the growing trend of ESG investment and the contradictory findings of the macroeconomic component influence on stock return. This study utilizes Panel Data Regression to investigate the association between macroeconomic variables and ESG index returns over a five-year period. This analysis reveals that inflation and Gross Domestic Product (GDP) have a positive significant influence on the ESG index return, however, interest rate and foreign exchange rate are not statistically significant. These findings provide useful insight to many stakeholders, including investors, policymakers, and financial experts, on how to develop investment strategies and economic policies to reap economic benefits such as better investment and improved ESG framework implementation in organizations.

Keywords: ESG Index; Emerging Markets; Macroeconomics Factors

Received: 11 October 2024

Revised: 13 December 2024

Accepted: 20 December 2024

1. Introduction

The global financial ecosystem has undergone a historic change toward sustainability and ethical investing. Investors throughout the world are increasingly looking for opportunities that correspond with environmental, social, and governance (ESG) objectives. Asset managers in France, Germany, the United Kingdom, and the United States are increasing their usage of ESG considerations. Asset managers also broaden their view on applicable environmental factors, not only limiting them to greenhouse gas and carbon emissions. The asset classified as ESG continues to expand with the significant growth that comes from commodities that increase from 37% in 2021 to 47% in 2022 and a stunning 62% in 2023 (Boyd, 2023).

Investor interest in ESG-based investments has increased in Indonesia. By the end of 2021, there are already 15 ESG-based mutual funds with total managed funds reached IDR 3.5 trillion, which is a significant increase compared to 5 years before when there was only one ESG-based mutual fund with total managed funds reached IDR 4.5 billion (Malik, 2022). Moreover, IDX has issued a stock index Sri Kehati for companies that promote good corporate governance and environmental awareness (Kehati, 2023). Other developing countries also have followed similar approach by introducing ESG index such as: S&P/B3 Brazil ESG Index, S&P China A 300 ESG Tilted Index, S&P/BMV Total Mexico ESG Index, The S&P South Africa Domestic Shareholder Weighted (DSW) Capped ESG Index, and S&P BSE 100 ESG Index.

Alsayegh et al. (2020) found evidence that the adoption and disclosure of a strong framework incorporating the three pillars of environmental, social, and governance (ESG) in a company enhances its corporate sustainability performance (EES) in Asian firms. Enhancing transparency and providing accurate corporate ESG information boosts stakeholder confidence, leading to improved business performance. As a result, SRI Kehati performed a 15,29% gain, while LQ45 performed a 5,17% loss and IHSIG gained 14,43% in the past 5 years, (Google Finance, 2024). This condition also occurred in India and Mexico, in which ESG index outperformed main index.

* Corresponding author.

E-mail address: pananda.pasaribu@sampoernauniversity.ac.id

Nevertheless, the stock market is a vital element of the economy, and its performance is influenced by a range of macroeconomic factors such as GDP growth, inflation, interest rate, exchange rate, and balance of trade (Amtiran, et al., 2017; Kvietkauskienė & Plakys, 2017; Suharyanto and Zaki, 2021; Verma and Bansal, 2021; Jabeen et al., 2022). Recent study indicates that macroeconomic variables have important role in influencing the performance of ESG index. Hermawan and Purwohandoko (2020) and Kenrick (2022) showed that inflation, BI Rate, and exchange rate have a significant relationship on Sri Kehati Index. Mohammad (2020) shows that the ESG index is only sensitive to macroeconomic changes such as interest rate, exchange rate, and Consumer Price Index in the long run in Malaysia. Kaur & Chaudhary (2022) indicates that there is a linkage between ESG-based Index prices and macroeconomic variables in Egypt.

This study will focus on developing countries because they are often lag in the implementation of environmental and social policies compared with developed countries, hence the knowledge of environmental and social policies from developed countries may not be relevant to developing countries' unique economic situation. Moreover, developing countries are also often more vulnerable to economic shocks, and understanding how macroeconomic factors influence ESG indices can serve as additional proof or insight for creating economic policies and planning to help countries build more resilience towards economic shocks. Given the arguments and previous studies, it is necessary to examine the relationship between macroeconomic variables and ESG performance index in developing countries.

2. Literature Review

2.1. Theories on ESG Investment

ESG investing is a sustainable investment strategy that incorporates three essential elements: social effect, environmental responsibility, and governance practices. The primary goal of ESG investment is to drive positive societal improvements while also achieving financial success (Napoletano, 2023). Active shareholding is a strategy employed by long-term investors who leverage the Environmental, Social, and Governance (ESG) element to motivate corporations to enhance their policies or avoid poor decision-making. This approach aims to enhance or safeguard the value of the organization (Schanzenbach & Sitkoff, 2020). The practice of active shareholding is in accordance with the Stakeholder Theory, which posits that the prosperity of a corporation is mutually dependent on the welfare of all its units.

The organization's practice of following and disclosing its sustainability practices is an attempt for the firm to convince its communities that its businesses are socially responsible, gaining legitimacy in society. This practice can also result in a response to public pressure or avoiding negative media attention and meeting social visibility requirements, which align with the active shareholding practice that pressures the corporation to practice ESG value. The legitimacy theory posits that organizations must consistently exhibit acts that are considered legitimate within established boundaries and norms for societies to perceive them as operating within acceptable parameters (Rahman & Alsayegh, 2021).

2.2. Macroeconomics Variables on Stock Market Index

The stock market is a vital element of the economy, and its performance is impacted by a range of macroeconomic factors. Variables such as GDP growth, inflation, foreign direct investment, exports, imports, interest rates, foreign debt, and foreign reserves offer a comprehensive view of an economy's overall condition. Moreover, empirical research has demonstrated that stock returns exhibit variations in response to certain economic circumstances, showing an upward trend during periods of economic downturns and a downward trend during periods of economic recoveries (Kvietkauskienė & Plakys, 2017).

Inflation is one of the most important macroeconomic variables. Madadpour and Asgari (2019) indicate that inflation has negative significant influences on the real value of stock market return ranging 1930-2018. Inflation negatively influences the stock return by the erodes of purchasing power of the currency, reducing the value of real wages, which in turn discourages investments and reduces the value of savings (Sathyanarayana & Gargesa, 2018).

Jabeen et al. (2022) shows that interest rates have a significantly negative influence on stock return in the US, Turkey, and Hong Kong. Verma and Bansal (2021) also shows that interest rates have a significantly negative influence on the observed developing and developed countries, although some developing countries do not have the same influence.

Eldomiatty et al. (2019) argue the decrease of interest rates results in increased capital inflows to the stock market, leading to anticipated higher returns, vice versa.

The others macroeconomic variables are exchange rate and gross domestic product. Suharyanto and Zaki (2021) found that the foreign exchange rate has a significant negative effect on the Food and Beverage sector stock return in Indonesia. They argue that if the weakening of the exchange rate is a result of government policies to increase the purchasing power of the demand for domestically produced goods, it will benefit companies by increasing their revenue, thus increasing their value and stock price. Bertuah and Sakti (2019) found that GDP has a positive significant influence stock performance in property sector. The study concludes that the rising trend in GDP growth reflects an increase in public investors' purchasing power, which in turn raises stock demand, resulting in a greater stock valuation.

2.3. Macroeconomics Variables on ESG Index

In the Indian stock market, there is a linkage between ESG-based Index prices and macroeconomic variables in the long run. In contrast, in the short run, only interest rates that have a significant impact and the rest of the variables (CPI, exchange rate, foreign exchange rate) do not drive the price (Kaur & Chaudhary, 2022). In Egypt's stock market, interest rate and inflation have a significant negative impact on Egypt's ESG index, but the effect is lower compared with the traditional company (Dawood et al., 2021). Hermawan and Purwohandoko (2020) shows that inflation and exchange rate have a significant negative relationship with the SRI Kehati Index, while the Shanghai Stock Exchange index has a significant positive relationship, and BI rate and money supply have no relationship with the SRI Kehati index. Kenrick (2022) adds that BI rate also influences the SRI Kehati Index.

3. Hypothesis Development

Dawood et al. (2021) shows that inflation along with other macroeconomic variables has a significant influence on the companies that are listed in the Egypt ESG Index, with inflation having a negative influence. Furthermore, the study also found that macroeconomic variables have less influence on ESG-listed companies compared with the non-ESG-listed company. While study of common stock returns in the Amman Stock Exchange shows that inflation has a positively significant influence on the stock returns (Al-Abdallah et al., 2017.) In addition, study that assesses the stock returns of companies listed on the Indonesia Stock Exchange shows that in short and medium periods, inflation has a significantly positive influence on the stock return (Assagaf et al., 2019). The study explains that this result is caused by the inflation and unemployment rate that has an inverse relationship, where the increase of inflation can decrease the unemployment, thus leading to more spending for consumers, which leads to the increasing value of the company. Given the previous studies, first hypothesis is as follows:

H₁: Inflation has a significant influence on ESG Index Return

Iqmal and Putra (2020) found that interest rates had a significant negative impact on the stock returns of companies listed on the Indonesia Stock Exchange. The analysis indicates that this result can be ascribed to the government's choice to decrease interest rates to encourage economic expansion. Consequently, this has led to an increase in both corporate valuations and stock performance. A study examining the stock performance of Indonesia's automotive, and component sub-sector has found that interest rates do not exert significant effects on stock performance (Santosa, 2019). Based on these findings, the second hypothesis is suggested as follows:

H₂: Interest Rate has a significant influence on ESG Index Return

Khan (2019) indicates that the exchange rate has a significant negative impact on stock returns in the Shenzhen stock exchange. Using the ARDL Approach, the researcher found that the exchange rate, along with inflation and the interest rate has a significant negative influence on the stock performance. The study conducted in the Indonesian stock market, specifically in manufacturing sectors, shows that the exchange rate has a significant influence on a company's financial performance. The study used the exchange rate as a mediating variable and shows that it has a significant influence on the financial performance of the company (Santosa, 2019). The study explained that the manufacturing sector still depends on importing raw materials and the issuers of the business operation have a high use of USD dollars. Given the previous studies, the third hypothesis is as follows:

H₃: Foreign Exchange Rate has a significant influence on ESG Index Return

Bertuah & Sakti (2019), with a focus on the property sector, shows that GDP, shows that GDP as the most dominant factor in explaining on Indonesia's stock market performance. The study deduces that the upward trend of GDP growth indicates the increase in the purchasing power of public investors, which in turn increases the demand for stock which leads to higher stock value. Kvietkauskienė and Plakys (2017) found a direct correlation between GDP and stock prices in their investigation. Moreover, the authors propose that real GDP is a significant indicator that has a favorable effect on stock market returns. Given the previous studies, the fourth hypothesis is suggested as follows:

H₄: GDP has a significant influence on ESG Index Return

4. Research Method

4.1. Research Observation and Observation Period

The research will use the developing countries which are members of the G20 countries. This research excludes Argentina and Turkey due to their unique economic condition that may not be the representative of the broader trends in other G20 developing countries. Given this condition, the countries that are chosen are Indonesia, with SRI Kehati Index as ESG Index representative; Brazil with S&P/B3 Brazil ESG Index; China with S&P China A 300 ESG Tilted Index; Mexico with S&P/BMV Total Mexico ESG Index; South Africa with The S&P South Africa Domestic Shareholder Weighted (DSW) Capped ESG Index; India with S&P BSE 100 ESG Index. The observation period will be between January 2019 to December 2023. Data will be collected on a quarter basis throughout this period to capture a comprehensive and representative sample of economic conditions and the ESG index performance.

4.2. Data Sources

The research data is collected from various sources, depending on the country, from the chosen countries' stock exchange for the index performance and World Bank Data for macroeconomic variables. To be specific, the indices and the foreign exchange rate are gathered from Yahoo! Finance, with the currency for the foreign exchange rate being the US dollar (USD) to each respective country. All the macroeconomic data will be gathered Organisation for Economic Cooperation and Development (OECD) database.

4.3. Research Variables

This research will use ESG index return as the dependent variable and macroeconomic indicators, namely inflation rate, interest rate, foreign exchange rate, and gross domestic product (GDP), as the independent variables. The definition of each variable can be seen in Table 1.

4.4. Research Model

This research will use is a panel data model, which enables deeper comprehension of the dynamics between the variables. The panel data set consists of quarterly data from the selected countries. The Index Return Model aims to find the relationship between inflation rate, interest rate, foreign exchange rate, and gross domestic product with the ESG Index. The general form of research model:

$$IRP = \beta_0 + \beta_1 IFR_{i,t} + \beta_2 INR_{i,t} + \beta_3 FER_{i,t} + \beta_4 GDP_{i,t} + \varepsilon_{i,t}$$

Where IRP is index return percentage, IFR is inflation rate, INR is interest rate, FER is foreign exchange rate, GDP is gross domestic product. β_0 is the intercept of model, while β_1 , β_2 , β_3 , β_4 are the coefficient of the independent variables. i is country, t shows observation period in quarter, and ε is Error term.

Table 1. Research Variables

Research Variables	Notation	Definition	Type/Unit
Index Return Percentage	IRP	The percentage change in an index value over consecutive months $(Index_{t1} - Index_{t0}) / Index_{t0}$	Percentage
Inflation Rate	IFR	The percentage change in the general price level of goods and services in an economy over a specific period.	Percentage
Interest Rate	INR	The cost of borrowing money or the return on investment is expressed as a percentage.	USD
Foreign Exchange Rate	LOG_FER	The value of one currency in terms of another. Converted to natural logarithm.	USD
Gross Domestic Product	LOG_GDP	The total market value of all final goods and services produced within a country in a specific period. Converted to natural logarithm.	USD

5. Results and Discussion

5.1. Descriptive Analysis

During the past 5 years, ESG index returns in these six countries experienced a sideways trend. Most ESG indexes during the early period of COVID-19 experienced a sharp decline in return, except China. However, all of the ESG index returns managed to climb back to positive later in the next year. Countries such as Indonesia, Mexico, and Brazil even managed to reach positive returns higher than the pre-Covid 19 period in the observable period. The detail of ESG index return can be seen in Figure 1.

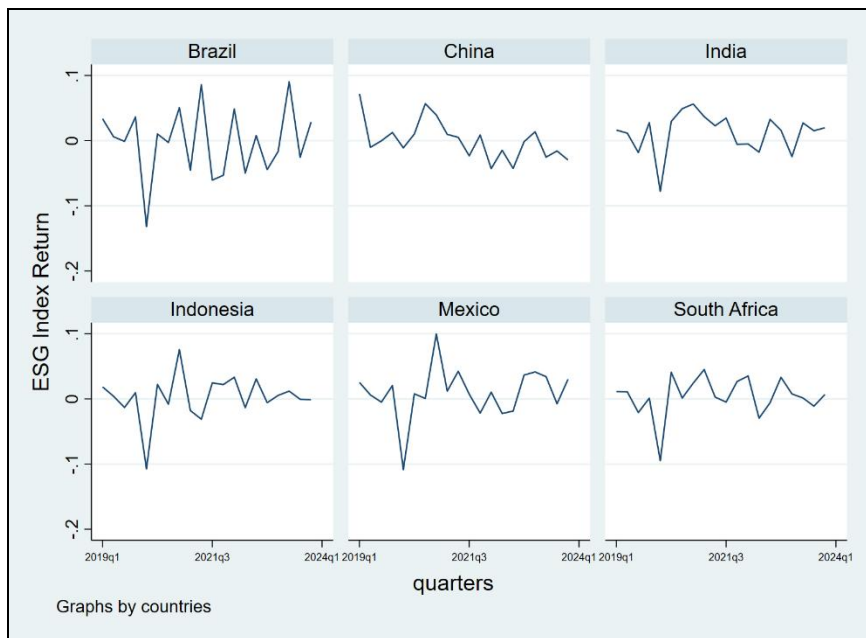


Figure 1. ESG Index Return 2019-2023

Table 2 shows the descriptive statistics of dependent and independent variables. There will be 120 observations in this research. Index Return Percentage (IRP) has a positive mean value (0.005), meaning that in the past 5 years, the ESG Index among these developing countries generated positive returns. The standard deviation value of this variable is 0.037, which can be considered as lower-end volatility compared with other investment instruments such as the

ordinary stock index. The average inflation rate among the developing countries is moderate (0.041), and the standard deviation value (0.018) is also relatively low, indicating that during the past 5 years, inflation rates have not fluctuated significantly. The high standard deviation (2.718) also indicates that there is significant variation in exchange rates across the countries. Lastly, the average natural log of GDP (14.917) is positive, meaning that a higher value corresponds to a higher GDP.

Table 2. Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Min	Max
IRP	120	0.005	0.037	-0.131	0.099
IFR	120	0.041	0.018	0.002	0.092
INR	120	0.053	0.026	0.020	0.137
LOG_FER	120	-3.863	2.718	-9.651	-1.328
LOG_GDP	120	14.917	0.749	13.394	16.211

Note: IRP: Index Return Percentage; IFR: Inflation Rate; INR: Interest Rate; LOG_FER: Foreign Exchange Rate in natural logarithm; LOG_GDP: Gross Domestic Product in natural logarithm

This study also conducts correlation analysis to examine the relationship among independent variables. The rule of thumb to examine the acceptable value of the test is between -0.7 to 0.7. If the value of the test is above 0.7 or below -0.7, then the models suffer from severe multicollinearity. Based on Table 4.3, all the variables belong to the acceptable value, with inflation and index return having the highest positive correlation (0.162). The detail of correlation coefficient for each variable can be seen Table 3.

Table 3. Correlation Statistics

Variable	IRP	IFR	INR	LOG_FER	LOG_GDP
IRP	1				
IFR	0.162	1			
INR	-0.032	0.103	1		
LOG_FER	-0.018	0.093	0.1263	1	
LOG_GDP	0.025	-0.165	-0.059	-0.177	1

Note: IRP: Index Return Percentage; IFR: Inflation Rate; INR: Interest Rate; LOG_FER: Foreign Exchange Rate in natural logarithm; LOG_GDP: Gross Domestic Product in natural logarithm

5.2. Regression Analysis

This study utilizes robust panel data regression to find the significance of the model and the chosen variables in influencing the ESG index return. The regression model used for this study is a random-effects generalized least squares (GLS) model as the Hausman Test probability greater than level of 5%. Table 4 shows that there are two variables that significantly influence ESG index, which are inflation rate (IFR) and GDP (LOG_GDP). On the other hand, interest rate and foreign exchange do not significantly influence ESG index in developing countries. The detail of regression output can be seen in Table 4.

5.3. Research Discussion

Table 4 shows that inflation rate has positive relationship with ESG index. This result is consistent with previous studies (Hermawan and Purwohandoko, 2020; Kenrick, 2022). The reason inflation positively influences ESG index return among developing countries can be explained from several perspectives. From the ESG-based corporate perspective, the increase of the commodities price is a net positive for their profit, meaning that the increase of the price brings them more profit through sales and other income resources. In other words, the purchasing power of their consumer is not decreasing regardless of inflation. The other perspective that can explain this behavior is the investor perspective. The upward trend of inflation that occurs may be perceived as economic instability for most investors. The investor sees ESG-based companies as safer investment alternatives in the long term compared to others, as most ESG companies are perceived for better decision-making as they need to follow ESG principles. The increase in the demand for the stock will lead to an increase in the ESG stock price, which translates to a better return.

Gross Domestic Product has a positive significant influence on ESG index return, which aligns with many previous studies (Bertuah & Sakti 2019; Kvietkauskienė and Plakys, 2017; Verma and Bansal, 2021). Higher GDP, in general, indicates economic growth, which typically leads to increased corporate earnings and profitability. Better performance translated to better values, which increased the return of the ESG indices. Furthermore, the robust economic growth also indicates the increase in the spending power of the investor, which leads to an increase in demand for investment, and ESG-based investment is one of the attractive investments that is available.

Table 4. Panel Data Regression Result

Item	Coefficient	Standard Error	t-stat	P-value
IFR	0.355	0.120	2.960	0.003***
INR	-0.062	0.064	-0.980	0.328
LOG_FER	-0.0003	0.001	-0.510	0.608
LOG_GDP	0.002	0.001	2.530	0.011**
C	-0.043	0.019	-2.280	0.023
Chi Square				33.000
Prob (Chi Square)				0.000
R-squared (within)				0.023
R-squared (between)				0.513
R-squared (overall)				0.032
Hausman Test				
Chi-Square (4)				5.92
Prob > Chi-Square				0.2053

Note: IRP: Index Return Percentage; IFR: Inflation Rate; INR: Interest Rate; LOG_FER: Foreign Exchange Rate in natural logarithm; LOG_GDP: Gross Domestic Product in natural logarithm; C: Constanta; **: Statistically significant in 5% and 10%; ***: Statistically significant in 1%, 5%, and 10%

The t-test shows that foreign exchange rates do not significantly influence ESG index returns in developing countries. This finding is contradictory with previous studies such as the study conducted by Hermawan and Purwohandoko (2020). This study argues that long-term investors tend to focus on the ESG principles, since their goal is for long-term profit and stability. This type of investor believes that the ESG aspect motivates corporations to enhance their policies or avoid poor decision-making. Since investor also plays an important role in the demand for ESG stocks, which also affects the price and return of this investment, their motive on buying these stocks that do not include exchange rate as part of their consideration makes the foreign exchange rate less relevant in predicting the ESG index return, at least in developing countries.

Interest rate plays a crucial role in the overall economy since it affects borrowing costs, investment decisions, and economic growth. However, this study's results show that interest rates do not have a significant relationship with the ESG index similar to Hermawan and Purwohandoko (2020). This investor behavior could happen due to differing priorities, such as hedging against inflation and political risks rather than responding to interest rate changes. Furthermore, ESG-based companies may benefit more from government policies and initiatives aimed at sustainable development, rather than market-driven interest rate changes.

6. Conclusion

This research highlights the relationship between macroeconomic variables and ESG index return, giving practical implications for various stakeholders including investors, corporations, and the government. Understanding the relationship between macroeconomic variables and the ESG index can help policymakers, companies and investors create better decision-making in the market, especially in developing countries. This finding indicates that ESG investments can thrive during inflationary periods. This relationship shows that ESG investment can be used as an inflation mitigation strategy in developing countries, where almost every developing country is currently experiencing inflationary periods. This study shows that economic growth and sustainable development can be mutually beneficial, enhancing the appeal of ESG investment in developing countries. In conclusion, these findings reinforce the importance of ESG considerations in investment strategies and economic policies, highlighting the potential benefits of sustainable practices for different stakeholders.

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