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DO GREEN BONDS INFLUENCE STOCK PRICES? AN EMERGING MARKET PERSPECTIVE

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Research Article

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ABSTRACT

Although the green-labeled debt instrument was first introduced to financial markets in 2007, frequent issuance is associated with the Paris Agreement in which € 20 billion worth of green bonds were announced in 2014 and behavioral changes of investors due to worsening environmental conditions. Furthermore, topics related to green bonds are well-documented in academic literature. However, concerning the impact of green bond issuance on stock price movements of corporations listed in emerging markets, there is a gap in the scholarly literature which is why the findings of this study may provide vital information to investors and issuing companies. Employing the positivist worldview and quantitative approach, STATA software is utilized for statistical analysis of the research model in which a sample is established by gathering 2591 observations from 77 corporations across three exchange markets which are Bolsa De Valores (Brazil), Shanghai Stock Exchange (China), and National Stock Exchange of India (India) from 2014 to 2024 through the Bloomberg database. Although the coefficient of -0.019 indicates the negative influence of green bond issuance on stock returns, the findings of regression analysis did not find any significant correlation between independent and dependent variables (p-value of 0.295) which is suggesting that green bond issuance has no long-term significant effect on the stock return of firms listed in emerging markets. Although the results indicate that investors do not reward corporations for sustainability, chosen methodology, low R-square, and lack of information regarding green bond issuance might generate biases.

Keywords: *Green bonds, sustainable finance, stock returns, emerging markets, ESG, panel data analysis.*

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EXTENDED ABSTRACT

The aim of this study is to provide crucial findings in regard to the influence of green bonds on the stock performance of corporations listed in the BRICS in order to close the gap between sustainable investing and long-term stock value which in return will assist investors in whether to invest in green bonds. Additionally, implementing a reference point for forthcoming studies intending to research complementary topics to mitigate the gap in academic literature is another purpose of this study. Therefore, this paper will try to answer the following research questions to discover the relationship between green bonds and stock price movement: Is there a correlation between green bonds and the stock price movement of corporations listed in the BRICS stock market? How significant is the correlation among them (if there is any)? What are the determinants that influence this relationship? Furthermore, the paper will discuss three theories related to the research area: overinvestment, signaling, and stakeholder theory, which are used to direct the research to explain the research questions as signaling and stakeholder theories suggest that actions of the company that have been taken for the greater good of the society and its stakeholders will be compensated by the market and overinvestment theory will discuss whether green bonds issuance may not affect stock price movements as a result of information asymmetry.

This study believes that the positivist worldview is the most appropriate philosophical approach for the paper as the secondary data will be gathered to measure the correlation between green bond issuance and stock price movements in emerging markets (Creswell et al. 2018). Additionally, the nature of the positivist approach tends to drive research to discover the causality relationship, meaning that it is the most suitable philosophical approach for understanding the influence of one variable on another. As a result, this paper employs the positivist worldview to measure the impact of green bond issuance on the stock value of corporations listed in BRICS nations.

Since the purpose of this research is to investigate the relationship between green bonds and firm value by collecting necessary information from secondary data sources, employing a quantitative method might be more appropriate than a qualitative research design, which focuses on primary data that might be gathered from interviews, questionnaires, etc. According to Creswell et al. (2018), quantitative research design and positivist philosophical approach are directly associated with academic literature, meaning that papers that adopt a positivist worldview tend to collect data by conducting quantitative data analyses.

According to the sample acquired from the Bloomberg database which consists of 77 corporations listed in emerging markets such as Bolsa De Valores (Brazil), Shanghai Stock Exchange (China), and National Stock Exchange of India (India) over the period of 2014 to 2024 with a total observation of 2591 while collecting data in regard to stock return (dependent variable), green bond issuance

	as a dummy variable (independent variable), and control variables (size, leverage, ROA, P/B ratio, Market Return Index, and inflation). However, the remaining BRICS markets which are the Moscow Exchange (Russia) and Johannesburg Stock Exchange (South Africa) have been eliminated from the sample due to the lack of data which is linked to the conflict between Russia and Ukraine as it creates a barrier for data collection from Russian corporations and gaps in data concerning variables of the research model. *The proportion of 77 firms is as follows: 1) 9 companies from Brazil (11.6%); 2) 61 firms from China (79.2%); 3) 7 corporations from India (9,2%). In addition, one of the main reasons behind establishing the analysis from 2014 is that green bonds became popular in emerging markets in 2014 and a year after it the Paris Agreement considerably influenced the sustainable bond markets which is vital for this paper to enhance the findings of the correlation between green bond issuance and stock price movements. Furthermore, the reason behind ending the period of panel data in 2024 is that this study was done in the summer of 2025, whereas corporations have not published the annual reports for 2025. Therefore, panel data for this paper covers the periods between 2014 and 2024 to investigate the impact of green bond issuance on stock returns in emerging markets. Moreover, analyzing the influence of the COVID-19 pandemic on the firm value separately is crucial in this study as the panel data covers the years of the pandemic, affecting the findings of the research, which is why this study has analyzed COVID-19 separately from January 2021 to June 2023. Finally, while establishing a sample for the research model through the Bloomberg database, this study filtered the required data by choosing listed BRICS corporations, filtering firms that issued green bonds in the 11 years period, and removing data that had missing variables.* *The findings of the paper suggest that although sustainable investment illustrates growth in size, the regression analysis results have not discovered any long-term impact of green bond issuance on the stock value of companies listed in emerging markets which might indicate the behaviour of investors in those markets has not yet shifted on sustainability. On the other hand, larger and overvalued corporations experience higher stock returns as the regression analysis discovered a positive statistically significant impact of the variables on stock price movements. Similarly, while analyzing the influence of the COVID-19 pandemic on the research findings, issuing green bonds still had no significant effect on the stock returns of firms listed in emerging markets. However, the growing influence of firm-specific factors such as size and leverage and the macroeconomic effect of inflation during the pandemic suggests that in times of adverse conditions emerging markets tend to be more risk-aversive by investing in bigger firms with low debt in their capital structure while inflation deteriorates the firm value.* *It is important to conclude that this study has limitations such as the scarcity of corporations issuing green bonds in BRICS as firms listed in Russia and South Africa have been excluded from the sample for a particular reason and the research model only explains 8.4% of*

	the dependent variable, hinting at adding other variables for better interpretation the link. Furthermore, investigating the long-term influence of green bonds by analyzing the sample quarterly might be the cause of not detecting any causality relationship between green bond issuance and stock returns. For future studies, investigating other stock markets with more frequent green bond issuance, including other variables to enhance the R-square of the research model, sorting corporations by industries to understand the effect of sustainable investment on stock returns of different sectors, and adopting other methods for measuring the impact of green bond issuance on stock returns such as event study is advised by this paper.
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INTRODUCTION

Environmental problems are the most concerning topic in recent years. To minimize environmental damage, the financial sector has introduced green bonds. Green bonds are financial debt instruments that capitalize on environmentally friendly projects, which were first introduced in 2007 by the World Bank (World Bank, 2019). While green bonds did not attract attention for some time, the Paris Agreement was a turning point for green bonds as there was a significant increase in the number of green bonds issued which was € 20 billion in 2014 and € 93 billion in 2018 (Fatica, Panzica and Rancan 2021). Furthermore, the priority of shareholders to invest in sustainable projects lowers the yields of green bonds which in return increases the incentive for firms to issue more. However, the particular incentive creates a risk of greenwashing for companies as lack of regulation forms information asymmetry that complicates the situation for investors and academics to determine the real green bonds. To solve this problem third-party agencies, analyze and give certificates to the firms that increase the cost of green bonds. However, Ehlers and Packer (2017) claim that to gain enough funds for environmentally friendly projects it's necessary to convince both demand and supply. Moreover, it is believed that green bonds cannot manage to meet the expectations of issuers and investors (Nanayakkara and Colombage 2019). Overall, due to the high price of green bonds with lower yields and being in the high-risk investment category, investors are cautious about investing in green bonds even though they are supporting environmentally sustainable projects.

Although the green bond is a relatively new concept as it became popular after 2014 and the academic literature concerning bonds with a green label is not well-documented, it can be a key financial instrument for achieving environmental goals by generating a considerable amount of funds to invest in green projects. Currently, most of the research that has been done in terms of green bonds mainly focuses on the short-term impact on stock price movement and lacks sufficient data which creates biases in their interpretation of them. Furthermore, the increase in the number of green bonds issued globally without any regulatory body to control them decreases trustworthiness against investors. On the other hand, a significant amount of demand for green bonds creates a necessity for evaluating them to understand if they are accomplishing the objectives that are set. One of the main reasons for this paper to investigate the green bonds – stock price relationship in Brazil, Russia, India, China, and South Africa (hereinafter) BRICS is that developing countries with greater economic growth tend to have higher incentive to invest in sustainable finance to mitigate long-term Environmental, Social, and Governance (hereinafter ESG) costs than developed countries as Garcia, Mendes-Da-Silva, and Orsato (2017) suggested. Furthermore, as a result of maintaining a considerable amount of the world's population, financial markets, and natural resources, BRICS countries' inclusion in the research is essential. Therefore, analyzing the long-term effect of green bond issuance on stock prices, particularly in emerging markets may contribute significantly to understanding the relationship between green bonds and stock prices. While considering the discussions above, there is a gap in the literature concerning the impact of green bonds on the firm's environmental and financial performance, particularly in emerging markets such as BRICS.

The aim of this study is to provide crucial findings in regard to the influence of green bonds on the stock performance of corporations listed in the BRICS in order to close the gap between sustainable investing and long-term stock value which in return will assist investors in whether to invest in green bonds. Additionally, implementing a reference point for forthcoming studies intending to research complementary topics to mitigate the gap in academic literature is another purpose of this study. Therefore, this paper will try to answer the following research questions to discover the relationship between green bonds and stock price movement: Is there a correlation between green bonds and the stock price movement of corporations listed in the BRICS stock market? How significant is the correlation among them (if there is any)? What are the determinants that influence this relationship? Furthermore, the paper will discuss three theories related to the research area: overinvestment, signaling, and stakeholder theory, which are used to direct the research to explain the research questions as signaling and stakeholder theories suggest that actions of the company that have been taken

for the greater good of the society and its stakeholders will be compensated by the market and overinvestment theory will discuss whether green bonds issuance may not affect stock price movements as a result of information asymmetry.

The remaining part of the study is organized as follows. The second section of this paper is a literature review which consists of five main subsections. First and foremost, the role of green bonds and how it may impact companies will be explained by providing background information related to the theoretical framework through stakeholder, signaling, and overinvestment theories that will contribute to academic literature concerning whether issuing green bonds changes corporations' stock value. Secondly, academic literature will be investigated to analyze empirical evidence regarding green-labeled bonds and their influence on stock price whereas stock price change to green bonds issuance, the efficiency of green bonds in terms of environmental performance, and green bonds-financial performance will be covered. Thirdly, the correlation between sustainable finance and the financial performance of corporations listed in emerging markets will be investigated to understand the impact of green financing in countries where the development of the economy, particularly stock markets is thriving. Fourthly, possible limitations and challenges concerning green bond evaluation such as doubts of investors regarding greenwashing, gathering enough data to perform meaningful statistical analyses, and possible future research opportunities will be discussed. Finally, the hypothesis of the paper will be provided as a last subsection of the literature review. The third section will cover research methodology in which philosophical approach and research design will be discussed. Afterward, this study will examine the approach in which data will be gathered by using third-party databases to establish a sample regarding green bond issuance and stock price movements, introduce a research model, and provide a brief explanation concerning dependent, independent, and control variables. While the fifth section will discuss statistics analysis of the sample that was selected, section six involves the examination of discussion and interpretation, illustrating the findings of this study. Lastly, a conclusion and recommendations for future research will be provided in section seven.

1. LITERATURE REVIEW

1.1 Theoretical Foundations of Green Bonds

1.1.1 Green Bonds and Sustainable Finance

The increasing necessity to overcome climate change problems and gather financial capital for environmental sustainability, green bonds, and financial instruments that are employed to accumulate capital for environmentally friendly projects have been introduced to financial markets. According to the World Bank (2023), a total of 955 million dollars have been invested in green projects with the help of green bonds, illustrating the rapid popularization in

a considerably short period of time. This paper believes that the main reason behind the fast growth of green bonds is the efficiency of the particular instrument to overcome environmental challenges while returning profit to investors as stakeholder theory suggests. Considering the attractiveness and trend of green bonds in financial markets, the lack of regulation, and a mixed view of academic literature concerning it urges this study to analyze possible gains, complications, and risks associated with green bonds.

While analyzing the informational efficiency of green bond markets, Gronwald and Wadud (2025) discovered that the majority of factors stimulating the price of green bonds are the same as traditional bonds. However, the findings of the paper also suggested that the main difference between traditional and green bonds is the degree of inefficiency as green bonds perform better than their peers which might be another reason for the increasing popularity of the climate finance market. Moreover, during the analysis of the bond market in unfavorable events such as COVID in 2020 and inflations in 2022 and 2023, Gronwald et al. (2025) observed lesser impact on green bonds whereas traditional bond market suffered from these exogenous events implying that green bonds are less risky but influenced by monetary policies and expectations of inflation. Interestingly, the findings of Tufail, Alvi, Hoang, and Wilson (2024) are complementary to the arguments of Gronwald et al. (2025) in regard to the impact of monetary policies on green bonds. According to Tufail et al. (2024), conventional and unconventional monetary policies influence green investments whereas the monetary policies of the US and China have a positive and the EU's monetary policy has a negative influence on green bonds.

Although disclosures regarding green bonds are voluntary, the International Capital Market Association (hereinafter ICMA) encourages corporations to transparency and disclosure in which the organization covers these factors with four main components: (1) Use of proceeds, (2) Process for evaluation and selection of project, (3) Management of proceeds, (4) Reporting (ICMA, 2022). While investigating the transparency of green bonds by analyzing the issuance of 217 bonds from 2019 to 2021, Yang, Shi, Zhang, and Hu (2023) suggested that there is a significant positive correlation between environmental information transparency and credit ratings which in return attracts more investors. Similarly, Jankovic, Vasic, and Kovacevic (2022) discovered that transparency of green bonds decreases the yield, meaning adequate disclosures of green bonds improve credit ratings which in return lowers the risk and yield of a bond while analyzing the green bond transparency in EU whereas transparency measured by identifying whether the green bond finances a specific project (transparent) or multiple projects (non-transparent).

One of the main discussions in academic literature in regard to green bonds is whether the bond promotes greenness as the findings in literature are mixed. According to Tuhkanen and Vulturius (2022) which has investigated the relationship between climate goals and green debt financing of corporations, green bond issuing firms generally do not link the bond with their climate targets as there is little to no pressure from investors which in return decrease the incentive for issuer to mitigate the information asymmetry. Interestingly, the findings of Tuhkanen et al. (2022) contradict the argument of Jankovic et al. (2022) regarding the incentive to raise transparency as the market rewards companies attempting to reduce information asymmetry through voluntary disclosures concerning green bonds by attracting more investors. The environmental performance–green bond relationship will be discussed in details later on by analysing academic papers which have investigated the particular connection.

On the other hand, information asymmetry and agency problems which are derived from overinvestment theory indicate the possibility of greenwashing which is a major risk that is associated with green bonds in academic literature. Although Gronwald et al. (2025) believe that funds gathered from green bonds are allocated efficiently, indicating that there is no evidence concerning overinvestment theory, papers such as Ehlers et al. (2017), Simeth (2022), and Tuhkanen et al. (2022) assume information asymmetry and voluntary disclosures generate a risk for greenwashing. Furthermore, Ehlers et al. (2017) and Simeth (2022) suggest that reports of third-party agencies are the key to mitigating greenwashing risk and their findings indicate that third-party verifications are positively correlated with investor satisfaction, establishing positive signaling tools for green bonds issuers as signaling theory suggest. Greenwashing risk and third-party verifications will be discussed in more detail in the subsequent section.

1.1.2 Theories

1.1.2.1 Stakeholder theory

Stakeholder theory was introduced to the academic literature by R. Edward Freeman in 1984 who argued that business should also consider its all stakeholders and their goals while maximizing shareholders' value in order to avoid bankruptcy (Carrol and Näsi 1997). Therefore, it is argued that while satisfying the goals of shareholders is crucial for the firm's success, considering the needs of stakeholders adds value to the corporation which is the reason many companies around the world invest in environmentally friendly projects with the help of financial instruments such as green bonds. Furthermore, the primary reason for green bond issuance is the pressure of stakeholders and society over the corporations to invest capital in environmentally friendly projects. While this paper will evaluate the impact of green bonds on stoke price movement in order to determine if there is a connection with stakeholder

theory, green bonds-financial performance, and green bonds–environmental performance relationships that may be more relevant to the stakeholder theory.

1.1.2.2 Signalling theory

Another theory that is relevant to the topic is the signalling theory which was proposed by Michael Spence in 1973. Signalling theory claims that there is an information asymmetry between the parties and there are implications concerning this particular problem. According to Yasar, Martin, and Kiessling (2020), the impact of negative signaling influences the market more than positive signaling as investors are not risk-seekers. Although this theory suggests that green bond issuance will increase the value of a firm as a result of positive signaling to investors, cases such as greenwashing will decrease the corporation's value significantly more. Signaling theory will be used to determine if green bond issuance increases the stock market reaction as Yasar et al. (2020) suggests. Additionally, the relationship between green bonds and stock price movement may be better understood with signaling theory as there is a discussion if certification of green bonds attracts more investors and increases sustainability.

1.1.2.3 Overinvestment theory

One of the main theories that explain green bond issuance is overinvestment theory which has been introduced to the academic literature by two academics which are Friedrich Hayek who suggested that regulation of capital is directly correlated with fluctuations in investment and Knut Wickshell who argued that the frequency of investment depends on innovation whereas market with increasing innovation volume tend to attract more investment. While analyzing underinvestment and overinvestment hypothesis, Arthur Morgado and Julio Pindado (2003) discovered that information asymmetry is the fundamental cause for overinvestment as managers tend to exploit information asymmetry between them and investors after exhausting projects with positive Net Present Value (hereinafter NPV) for their personal gain, generating an agency problem. In regard to this paper, overinvestment theory suggests that green bond issuance may damage the stock price of corporations as managers might manipulate the information gap between them and stakeholders to overinvest green-labeled projects or greenwash for their own benefits. Furthermore, the shortage of regulations and information asymmetry regarding green bonds urge this paper to consider the overinvestment hypothesis while examining the relationship between green bond issuance and stock price movements to test whether the correlation is negative as suggested.

1.2 Empirical Evidence on Green Bonds

1.2.1 Impact of Green Bond Issuance on Stock Prices

While analyzing green bonds' impact on financial performance is one of the efficient ways of measuring its effectiveness over corporate performance, the stock market reaction to the announcement of green bond issuance is the best way to determine if it is actually increasing the market value of a firm and attracting investors' attention. This paper believes that in comparison to traditional bonds, green-labelled bonds attract more attention as sustainability is the major problem of the world which in turn increases the demand for a company's share that issued green bonds. Flammer (2021) supported this argument by measuring the cumulative abnormal return (CAR) of green bonds when it is announced in the stock market and discovered a positive correlation between market reaction and green bond issuance. Similarly, by evaluating stock reaction with the capital asset pricing model (CAPM) to measure abnormal returns, Tang and Zhang (2020) discovered that issuing green bonds improves stock prices considerably. Additionally, the article claimed that market reaction is more effective when a firm issues green-labeled bonds for the first time. Furthermore, Tang et al. (2020) suggests that green bonds are not issued with lower interest rates which contradicts Taghizadeh-Hesary and Yoshino (2020) who believe one of the main barriers against green bonds is a lower rate of return. However, bonds with green labels increase the number of investors as the firm's reputation improves, which is one of the positive impacts of green bonds. Interestingly, those articles evaluated the stock reaction by measuring all green bonds in the market. This paper believes that it may be effective to investigate the impact of green-labelled bonds on the stock market individually as investors' opinions about them may vary geographically.

While analyzing the Chinese stock market, Zhou et al. (2019) and Wang, Chen, Li, Yu, and Zhong (2020) discovered a positive correlation between stock reactions and green bonds. Although Zhou et al. (2019) only managed to evaluate the data starting from 2016 as the green bond market arose at that time, the findings illustrate the growth of stock prices in the announcement date of green bonds. Wang et al. (2020) came to the same conclusion and make a further comment that compared with traditional bonds, stock reaction to green bonds is significantly more positive than traditional bonds. Moreover, considering the lack of faith in green bonds and a lower rate of returns with comparatively higher risk than traditional bonds (Taghizadeh-Hesary et al. 2020), positive market reactions to bonds with green labels prove that the particular type of bonds are required and believed to be a key financial debt instrument for solving sustainability issues while maximizing corporation's value.

1.2.1 Green bonds and environmental performance

To understand the effectiveness of green-labeled bonds, it is necessary to evaluate the impact of particular bonds on the environmental performance of corporations. Although there is an argument that green bonds are just instruments for greenwashing and have no positive impact on environmental performance, the majority of literature believes that there is a positive correlation between green bonds and sustainability (Ehlers et al. 2017; Nanayakkara et al. 2019; Agliardi E. et al. 2019; Weber and Saravade 2019; Zhou et al. 2019; Tu, Rasoulinezhad, and Sarker 2020; Flammer 2020; Flammer 2021; Yeow et al. 2021). While the general outcome of these articles is green bonds are improving the ESG ratings of firms in the long term, greenwashing is the main barrier to maximizing the efficiency of green bonds as greenwashing prevents lowering the risk (Nanayakkara et, al 2019). Furthermore, to gain investors' trust by lowering the risk of greenwashing, certification is a crucial step as Yeow et al. (2021) discovered that only certified bonds with green labels increase the environmental performance of companies. Although certification may improve the sustainability of firms and attract more investors, the cost of capital to issue green bonds will increase, which will negatively affect the company. On the one hand, Flammer (2021) discovers a positive correlation between green bonds and environmental performance, while measuring its effect on both ESG ratings and the ratio of carbon dioxide emission to minimize the biases in the result. Similarly, while analyzing the CSR and green bond relationship in China, Zhou et al. (2019) claimed that bonds with green labels improve the corporation's CSR activity.

On the other hand, Jones, Baker, Huet, Murphy, and Lewis 2020; Tuhkanen and Vulturius 2022 claim that there is no evidence to support the argument that green bonds increase the environmental performance of firms. According to Tuhkanen et al. (2022), the structure of green bonds does not meet carbon neutrality targets, and the priority of green bond issuing firms is not maximizing sustainability. Considering the lack of demand from investors to disclose green bonds' impact on environmental performance and having no regulation to minimize information asymmetry supports the argument of Tuhkanen et al. (2022). Moreover, Jones et al. (2020) supported Tuhkanen et al. (2022) by claiming that there is no strong evidence that green bonds can overcome the environmental crisis. Overall, academic literature concerning the effects of green bonds on environmental performance is mixed and while the majority of articles believe that green-labeled bonds are increasing sustainability, other papers claim that there is not enough evidence to support that green bonds alone are enough to overcome the environmental problems.

1.2.2 Green Bonds and Financial Performance of Issuing Firms

Shifting from a belief system that prioritizes maximizing only a firm's wealth to considering moral values is a growing trend. Green bonds are claimed to be the financial debt instrument that provides a solution for corporations to earn profit while achieving the goals of the Paris Agreement which was believed to be impossible as investing in sustainability would increase the cost of capital leading to a reduction of profit. Although some research (Maltais and Nykvist 2020; Yeow and Ng 2021) claims that there is no correlation between green bonds and financial performance, the majority of literature (Ley 2017; Zhou and Cui 2019; Barua and Chiesa 2019; Agliardi E. and Agliardi R. 2019; Flammer 2020; Sartzetakis 2020; Tan, Dong, Liu, Su, and Li 2022) suggests that green bonds positively impact the firm's financial performance. To the knowledge of the author, none of the academic literature claimed that there is a negative correlation between them.

According to Ley (2017) which analyzed the financial performance of firms by comparing the effectiveness of green and other bonds determined better performance when it is labeled green. Similarly, while investigating companies from Standard & Poor Compustat, Flammer (2020) discovered that in the long-term green bonds bring financial advantage to the corporation. One reason for this may be gaining an environmental reputation, attracting more investors, and lowering the firm's future sustainability risk. Interestingly, in comparison to Europe, the green bond concept is well documented in China as Zhou et al. (2019) and Tan et al. (2022) analyzed green-labeled bonds' impact on the financial performance of companies listed in China. While both papers indicate a positive correlation between green bonds and average company profitability, the lack of data in the paper of Zhou et al. (2019) as it only took the time duration of three years increases the chance of biases in the interpretation of results. However, Tan et al. (2022) investigated the green bond-financial performance relationship from 2010 to 2020 and discovered the improvement in the profitability of firms by measuring the return on equity (ROE).

On the other hand, after analyzing the whole of Eurasia and North America, Yeow et al. (2021) claimed that there is no correlation between green bonds and a firm's financial performance. While using DiD and PSM methods to interpret data collected from 2015 to 2019, the lack of data may be the reason for finding no relationship between them. Similarly, Maltais et al. (2020) compared green and traditional bonds while measuring their return on the financial performance of Sweden corporations and discovered no difference between the two bonds. Moreover, the additional costs of green bonds make them less desirable from the issuer's perspective.

2. METHODOLOGY

2.1 Sample Description

According to the sample acquired from the Bloomberg database which consists of 77 corporations listed in emerging markets such as Bolsa De Valores (Brazil), Shanghai Stock Exchange (China), and National Stock Exchange of India (India) over the period of 2014 to 2024 with a total observation of 2591 while collecting data in regard to stock return (dependent variable), green bond issuance as a dummy variable (independent variable), and control variables (size, leverage, ROA, P/B ratio, Market Return Index, and inflation). However, the remaining BRICS markets which are the Moscow Exchange (Russia) and Johannesburg Stock Exchange (South Africa) have been eliminated from the sample by the author as there is no information in the Bloomberg database regarding corporations which is linked to the conflict between Russia and Ukraine as it creates a barrier for data collection from Russian corporations and gaps in data concerning variables of the research model. Although the sample has a limited number of corporations from emerging markets as a result of data constraints, the sample size of this paper is significant for meaningful research as the gathered data for analysis for other researchers were similar such as Febi et al. (2018) with 236 observations, Tang et al. (2020) with 1510 observations, and Fatica et al. (2021) with 1397 unique observations. The proportion of 77 firms is as follows: 1) 9 companies from Brazil (11.6%); 2) 61 firms from China (79.2%); 3) 7 corporations from India (9,2%).

To understand the influence of green bond issuance on the stock price movements of corporations listed in the BRICS stock market, this dissertation employs stock return as a dependent variable which measures the total return of a company in a given period of time. Although many researchers such as Febi et al. (2018); Barua et al. (2019); Tang et al. (2020); Wang et al. (2020); Fatica et al. (2021); Ge et al. (2024); Singh et al. (2025) have employed various dependent variables such as yield spread or cumulative abnormal return, this paper believes that analyzing yield spread of green bonds might be effective for identifying the pricing and investors' riskiness perception of green bonds rather than its effect on stock price of a firm. Cumulative abnormal return, on the other hand, is a widely adopted dependent variable to measure the influences on stock price as it is the difference between the actual return and expected return in which it provides insights concerning additional returns which was not anticipated such as green bond issuance. However, it is important to note that measuring abnormal returns is effective during the event studies rather than establishing panel data for analyzing long-term influences on stock performance. Therefore, total stock return has been employed to examine the long-term effect of green bond issuance on BRICS corporations' stock price which is calculated by adding any given dividends on the price of the stock at the

end of the period and then deducted from the stock price at the start of the period and finally, divided by the price at the start of the period, according to the Bloomberg database.

This study adopts the panel data method whereas green bond-issued corporations listed in BRICS stock markets are reviewed quarterly from 2014 to 2024 through the Bloomberg database and established a dummy variable whereas if the company issued a green bond in a quarter it is labeled as 1 and if not 0 which then analyzed to evaluate the proportion of a change in stock returns that is influenced by green bond issuance. According to Bloomberg (2024), a methodology called MSCI Green Bond and Green Loan Assessment was introduced in 2014 to evaluate the index eligibility of green bonds in which the database excludes corporations with a "Red" MSCI ESG Controversy Flag, meaning that Bloomberg actively screens firms for possible greenwashing and does not include them in their indexes. Furthermore, the Bloomberg database gathers data as a third-party agency from the stock markets where it has a real-time data collection agreement with the majority of stock exchanges, financial reports, press releases, government statistic offices, and central banks.

2.2 Research Model and Validity

One of the critical parts of quantitative research is its research model which illustrates the link between variables, establishing a structure that helps through constructing the research. Through the demonstrated research theories such as stakeholder, signaling, and overinvestment, this study formulates a causality relationship where the impact of an independent variable (green bond issuance) on a dependent variable (stock returns) is analyzed. While data analysis has been done through STATA 17 software which is mainly employed by researchers, this paper establishes a panel data for analyzing the influence of green bond issuance on the stock performance of corporations in emerging markets for the period of 11 years as the most effective method for long-term analysis is panel data. Additionally, to evaluate the regression results of the research model, two types of panel data methods might be chosen which are the random effect method and the fixed effect method. Thereafter, the Hausman test will be employed through Stata software to ascertain which method would be more appropriate for the regression analysis whereas the test result below 5% significance ($p<0.05$) indicates the fixed effect method should be adopted and the test result above 5% significance ($p>0.05$) implies that the regression analysis should be executed with the random effect method. According to the results of the Hausman test, if the fixed effect method is employed, this study will adopt the Modified Wald test for groupwise heteroskedasticity to investigate whether the research model has any heteroskedasticity and the regression analysis will be robustified if it is discovered. On the other hand, the Breusch and Pagan Lagrangian multiplier test will be adopted to evaluate the probability of

heteroskedasticity in the model, and regression analysis might be robustified for the random effect method. Afterward, multicollinearity among variables within the research model will be investigated by analyzing the correlation matrix through Stata software. Finally, regression analysis between green bond issuance and stock returns will be investigated with the help of Stata software through the following research model:

(1) $$Stock_{Return} = \beta_0 + \beta_1 GreenBond_{Issued} + \beta_2 Firm_{Size} + \beta_3 Leverage + \beta_4 ROA + \beta_5 PricetoBook_{Ratio} + \beta_6 MarketReturn_{Index} + \beta_7 Inflation + \varepsilon_{it}$$

Where the change in the stock price of firms is evaluated by a dependent variable which is stock return; β_0 identifies the intercept term; green bond issuance is a dummy variable that is employed as an independent variable; firm size, leverage, ROA, P/B ratio, Market Return Index, and inflation are control variables to mitigate the influence of external events on the stock price of corporations; error term of the research model is labelled as ε_{it}.

On the other hand, as a result of employing a quantitative approach for the investigation of research questions, this study encounter limitations such as the accuracy, relevance, and the missing years in the panel data tend to enhance biases of the research findings.

3. FINDINGS

3.1 Regression Analyses

3.1.1 Stock Return – Green Bond Issuance Fixed Effect Method

In this section, the regression analysis will be employed to examine the causality relationship between dependent variable, stock return, independent variable, green bond issuance, and control variables, size, leverage, ROA, P/B ratio, Market Return Index, and Inflation to understand the influence of green bond issuance on the stock price movements of corporations listed in emerging markets. The purpose of regression analysis is to quantify the correlation between share value and green bond issuance, present findings to the hypothesis and to the questions of the study, and control other firm-specific and macroeconomic factors to isolate the effects of dependent and independent variables. According to the significance of regression analysis results, this study will provide findings in regard to the significance of the impact of green bond issuance on the stock performance of corporations listed in BRICS.

The sample of 2591 observation regarding the selected variables has been gathered from three exchange markets such as Bolsa De Valores (Brazil), Shanghai Stock Exchange (China), and National Stock Exchange of India (India) over the period of 2014 to 2024 through the Bloomberg database, additional variables "ID" which is adapted to identify each corporation and "TQ" (Time-Quarter) for merging years and quarters of the panel data to establish a year variable for STATA to recognize have been enlisted in the research model. Afterward, constructed Excel data is imported into the STATA software and declared as panel data where

the panel variable is the ID (unbalanced), the time variable is TQ (2014, Q2 – 2024, Q4), and delta is one quarter in which unbalanced panel data is a common statistical result, indicating that there is an inconsistency within the years and some years are missing from the sample. In addition, using both the random effects model and fixed effects model, regression analyses are required to determine which model is the most appropriate for examining the impact of green bond issuance on the stock price movements of corporations listed in emerging markets. Therefore, the Hausman test is adopted in which a p-value less than 0.5 significance indicates employing the fixed effect method and a p-value higher than 0.5 significance suggests adopting the random effects method through STATA software following the conduction of regression analysis using both models which is illustrated in Table 1.

Table 1: Hausman (1978) specification test

	Coef.
Chi-square test value	12
P-value	0.081

According to Table 1, the p-value of the Hausman test is less than 0.05 significance, suggesting that the result of the test is statistically significant and the null hypothesis should be rejected. The null hypothesis ($p>0.05$) examines whether firm-specific effects such as stock return, size, leverage, ROA, and P/B ratio are uncorrelated with the independent variable (green bond issuance) in which the random effects method is more appropriate. However, if the null hypothesis is rejected ($p<0.05$) as the Hausman test of this study indicates, the result suggests that there is a correlation between explanatory and firm-specific variables and a fixed effect model should be employed. Therefore, this paper will regress the causality relationship of the influence of green bond issuance on the stock price movement of companies listed in emerging markets using the fixed effect method. Furthermore, the Modified Wald test for groupwise heteroskedasticity in the fixed effect regression model is employed to examine whether the regression has any heteroskedasticity which measures the distribution of error terms and how wide is the variance. According to the test results, the null hypothesis of homoscedasticity is rejected and groupwise heteroskedasticity is discovered as the p-value is less than 0.5 significance. To mitigate the problem as heteroskedasticity undermines the findings of the fixed effect regression analysis, this paper robustified the regression analysis which adjusts the heteroskedasticity within the research model.

Table 2: Stock Return – Green Bond Issuance Regression results

StockReturn	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
green_bond_Issuance	-.019	.018	-1.05	.295	-.054	.017	
Size	.086	.022	3.98	0	.043	.129	***
Leverage	0	.001	-0.17	.864	-.001	.001	
ROA	-.001	.001	-0.99	.326	-.003	.001	
PB	.016	.005	2.93	.004	.005	.027	***
Market_return_index	.143	.037	3.87	0	.069	.217	***
Inflation	-.003	.003	-0.87	.386	-.009	.004	
Constant	-1.663	.234	-7.12	0	-2.128	-1.197	***

Mean dependent var	0.019	SD dependent var	0.197
R-squared	0.084	Number of obs	2591
F-test	9.161	Prob > F	0.000
Akaike crit. (AIC)	-1425.624	Bayesian crit. (BIC)	-1384.605

**** p<.01, ** p<.05, * p<.1*

Table 2 demonstrates the regression analysis of stock return (dependent variable), green bond issuance (independent variable), size, leverage, ROA, P/B ratio, Market Return Index, and inflation (control variables). Overall, the findings of regression results are statistically significant as the F-test is 9.161 and Prob>F is 0, indicating that the research model is valid and meaningful. On the other hand, the R-squared of 8.4% suggests that the research model explains only the 8.4% of stock return variance which is very low and might be one of the limitations of the study, but similar results are observed in academic literature (Febi et al. 2018), indicating that the findings of the regression is meaningful nonetheless. While analyzing the regression results concerning the relationship between green bond issuance and stock returns of firms, the negative impact of issuing green debt instruments on stock returns of corporations listed in emerging markets is detected as a one-unit increase in green bond issuance depreciates the stock value by 0.019. However, a p-value of 0.295 suggests that the impact is not statistically significant (p>0.05) which might be due to investigating the long-term influence of green bond issuance whereas short-term analysis with even study methods might provide more significant results. Contrarily, the size of a company has a statistically significant

impact on stock return at 1% (p=0.00), indicating that larger corporations tend to gain more stock returns in emerging markets (0.086). Interestingly, the regression results suggest that during the period of 2014 to 2024, the capital structure of a corporation had no impact on stock returns which is statistically insignificant (p=0.864). Similarly, the profitability of a firm has a p-value of 0.326 which is higher than the threshold of 0.10 significance, indicating that the operating performance of a company has no direct influence on firm valuation. Additionally, a one-unit increase in the P/B ratio of corporations listed in BRICS increases the stock return by 0.016 which is statistically significant at 1%, suggesting that overvalued companies with high expectations from investors tend to gain more stock returns than their peers. While the most influential variable on stock returns of firms listed in emerging markets is the Market Return Index which has a significant effect at 1%, a coefficient of 0.143 illustrates the change in stock return as the Market Return Index increases one unit. Lastly, although inflation negatively influences the stock prices of organizations, a significance level of 0.386 is higher than the conventional statistical level of 10%, indicating that the control variable has no explanatory weight in the research model.

6.3 Regression Analyses

This study separately investigates the pandemic period to discover the impact of COVID-19 on the stock markets of emerging markets, mainly to determine whether green bond issuing corporations react differently in adverse financial situations. The main reason for analyzing the sub-period is to understand how the volatile market conditions, investor behaviors, and robustness of the original data are influenced by the pandemic. Therefore, Bolsa De Valores (Brazil), Shanghai Stock Exchange (China), and National Stock Exchange of India (India) stock markets have been observed from January 2021 to June 2023 through the Bloomberg database and analyzed with the help of STATA software.

Table 3: Variance Inflation Factor (COVID-19)

	VIF	1/VIF
Market_return_index	2.089	.479
Inflation	1.746	.573
ROA	1.253	.798
Size	1.1	.909
Leverage	1.068	.936
PB	1.031	.97
Green_bond_issuance	1.008	.992
Mean VIF	1.328	.

Table 4: Hausman (1978) specification test (COVID-19)

	Coef.
Chi-square test value	128.408
P-value	0

While Table 3 indicates that the research model has no multicollinearity as the VIF results are lower than 5/10 significance, the sample is regressed in both the fixed effect method and random effect method to check for which model is more appropriate through the Hausman test. The test result rejects the null hypothesis of discovering no link between independent variables and individual variables as the p-value is less than 0.05 significance, suggesting that the green bond issuance is significantly correlated with other variables, according to Table 4. Therefore, the fixed effect method is employed to regress the impact of green bond issuance on the stock price movements of corporations listed in emerging markets. Thereafter, to check whether the research model has heteroskedasticity the Modified Wald test for groupwise heteroskedasticity in the fixed effect regression model has run in which heteroskedasticity is discovered as the null hypothesis is rejected.

Table 5: Stock Return – Green Bond Issuance Regression results (COVID-19)

StockReturn	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Green_bond_issuance	.001	.017	0.05	.964	-.033	.035	
Size	.221	.039	5.61	0	.142	.299	***
Leverage	-.003	.001	-2.40	.019	-.005	0	**
ROA	-.003	.004	-0.74	.46	-.01	.004	
PB	.001	.006	0.15	.882	-.012	.014	
Market_return_index	-.128	.065	-1.98	.052	-.257	.001	*
Inflation	-.008	.004	-2.24	.028	-.015	-.001	**
Constant	-.849	.447	-1.90	.061	-1.739	.041	*

Mean dependent var	0.030	SD dependent var	0.159
R-squared	0.183	Number of obs	982
F-test	8.490	Prob > F	0.000
Akaike crit. (AIC)	-1149.229	Bayesian crit. (BIC)	-1115.002

*** p<.01, ** p<.05, * p<.1

Table 5 illustrates causality analysis between dependent variable, independent variable, and control variables (size, leverage, ROA, P/B ratio, Market Return Index, and inflation) to understand the impact of green bond issuance on stock returns of corporations listed in emerging markets. While the Prob>F result of 0.000 suggests that the regression analysis is statistically significant, the model explains 18.3% of stock returns which is substantially more than the full-period research model, suggesting that variables of the model were more involved in the changes of stock price in the pandemic. Similar to the findings of Table 2, green bond issuance has no significant impact on the stock returns of corporations listed in emerging markets (p=0.964) which might be the result of the risk-aversive behavior of investors to prioritize mitigating possible financial loss. Size, on the other hand, is statistically significant at 1%, indicating that due to the reputation and safety of larger corporations attracting investors, a one-unit increase in the size of a company enhanced the stock return by 0.221 times during the COVID-19 pandemic. Interestingly, the leverage of a firm which was not a significant variable in the original data sample has a p-value less than 0.05 significance during the pandemic, suggesting that having a high debt ratio in the capital structure while experiencing volatile market conditions damages the stock price (-0.003). While explaining the possible implications of the COVID-19 pandemic, this study discussed whether the influence of the pandemic might impact each industry differently which is statistically provided in the regression analysis as the Market Return Index has a coefficient of -0.128 and a significance level of 10%. Additionally, inflation which is statistically significant at 5% deteriorates the stock return of corporations listed in emerging markets by 0.008 per unit. However, this study has not detected any significant influence of firm-specific variables such as ROA and P/B ratio on the stock return of companies listed in emerging markets.

CONCLUSION

The purpose of this study was to investigate the influence of green bond issuance on the stock returns of corporations listed in emerging markets. While green-labeled debt instruments were first introduced in 2007, the Paris Agreement was a turning point for sustainable investments in which nearly € 20 billion green bonds were issued, indicating the rising significance of sustainability, this study tried to reveal the impact of sustainable investment on stock returns. In addition, this paper is the first research in the academic literature that focuses on the effect of green bond issuance on stock returns of BRICS corporations while analyzing long-term changes in stock prices, according to the knowledge of the author.

While investigating the research questions and hypothesis concerning the relationship between green bond issuance – stock price movements, the sample is established by

gathering data from Bolsa De Valores (Brazil), the Shanghai Stock Exchange (China), and the National Stock Exchange of India (India) stock markets. Furthermore, this study discovered 77 corporations and 2591 observations over the period of 2014 to 2024 with the appropriate requirements to organize panel data through the Bloomberg database. Afterward, the research model was constructed for quantitative analysis in which the dependent variable was a stock return, the independent variable was green bond issuance, and the control variables were divided into two focuses such as firm-specific factors – size, leverage, ROA, and P/B ratio; macroeconomic influences – Market Return Index and inflation. The findings of the paper suggest that although sustainable investment illustrates growth in size, the regression analysis results have not discovered any long-term impact of green bond issuance on the stock value of companies listed in emerging markets which might indicate the behaviour of investors in those markets has not yet shifted on sustainability. Therefore, findings rejects the signalling theory in terms of increase in the stock returns as a result of positive signalling. On the other hand, larger and overvalued corporations experience higher stock returns as the regression analysis discovered a positive statistically significant impact of the variables on stock price movements. Similarly, while analyzing the influence of the COVID-19 pandemic on the research findings, issuing green bonds still had no significant effect on the stock returns of firms listed in emerging markets. However, the growing influence of firm-specific factors such as size and leverage and the macroeconomic effect of inflation during the pandemic suggests that in times of adverse conditions emerging markets tend to be more risk-aversive by investing in bigger firms with low debt in their capital structure while inflation deteriorates the firm value.

It is important to conclude that this study has limitations such as the scarcity of corporations issuing green bonds in BRICS as firms listed in Russia and South Africa have been excluded from the sample for a particular reason and the research model only explains 8.4% of the dependent variable, hinting at adding other variables for better interpretation the link. Furthermore, investigating the long-term influence of green bonds by analyzing the sample quarterly might be the cause of not detecting any causality relationship between green bond issuance and stock returns. For future studies, investigating other stock markets with more frequent green bond issuance, including other variables to enhance the R-square of the research model, sorting corporations by industries to understand the effect of sustainable investment on stock returns of different sectors, and adopting other methods for measuring the impact of green bond issuance on stock returns such as event study is advised by this paper. Additionally, although the findings suggest that issuing green bonds does not necessarily enhances the profitability in terms of firm's policy, the results may deviate in different countries which should be considered while issuing environmental bonds.

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CONTRIBUTION RATES AND CONFLICTS OF INTEREST

Etik Beyan	Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.	**Ethical Statement**	It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.
Yazar Katkıları	*Çalışmanın Tasarlanması*: TA (%100) *Veri Toplanması*: TA (%100) *Veri Analizi*: TA (%100) *Makalenin Yazımı*: TA (%100) *Makale Gönderimi ve Revizyonu*: TA (%100) *Sorumlu Yazar*:	**Author Contributions**	*Research Design*: TA (%100) *Data Collection*: TA (%100) *Data Analysis*: TA (%100) *Writing the Article*: TA (%100) *Article Submission and Revision*: TA (%100)
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