KHAZAR UNIVERSITY

School: **Graduate School of Economics and Business**

Department: **School of Economics and Management**

Program: **Financial Management**

MASTER'S DISSERTATION

Do Green Bonds Influence Stock Prices? An Emerging Market Perspective

Supervisee: _____ Tural Ahmadli Adalat

(signature)

Supervisor: _____ Dr. Nigar Ismaylova

(signature)

Baku – 2025

XƏZƏR UNİVERSİTETİ

Fakültə: **İqtisadiyyat və Biznes yüksək təhsil fakültəsi**

Departament: **İqtisadiyyat və Menecment departamenti**

İxtisas: **Maliyyə Menecmenti**

MAGİSTR DİSSERTASİYA İŞİ

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İddiaçı: _____ Tural Əhmədli Ədalət

(imza)

Elmi rəhbər: _____ Dr. Nigar İsmaylova

(imza)

Bakı – 2025

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1. Introduction

Environmental problems are the most concerning topic in recent years. To minimize the damage to the environment, the financial sector introduced green bonds. Green bonds are financial debt instruments to capitalize on environmentally friendly projects which were first incepted 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' association 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 dissertation 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.

While investigating the causality relationship between green bond issuance and stock price movements of corporations listed in emerging markets, this dissertation adopted a positivist worldview and quantitative approach. A panel data is established which consists of 77 corporations and 2591 observations from Bolsa De Valores (Brazil), Shanghai Stock Exchange (China), and National Stock Exchange of India (India) stock markets during the period of 2014 to 2024 through the Bloomberg database. Thereafter, the sample was analyzed with the help of STATA software to discover the validity of the research model and the influence of green bond issuance on stock returns. According to the findings of regression results, this study has not found any long-term impact on the stock price movements due to issuing sustainable bonds. However, low R-square,

missing data from the sample, low level of green bond issuance among corporations listed in BRICS, and evaluation methodology might form biases in the findings of the research.

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 dissertation. Lastly, a conclusion and recommendations for future research will be provided in section seven.

2. Literature Review

2.1 Theoretical Foundations of Green Bonds

2.1.1 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 dissertation 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.

2.1.2 Theories

2.1.2.1 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.

2.1.2.2 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.

2.1.2.3 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.

2.2 Empirical Evidence on Green Bonds

2.2.1 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.

2.2.2 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.

2.2.3 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.

2.3 Sustainable Finance and Corporation Value Relationship in Emerging Markets

While sustainable finance is a considerably important topic both in academic literature and in practice, the lack of research in emerging markets such as BRICS obliges this dissertation to focus on these markets. Considering the shortage of data and disclosures in regard to sustainability, this section will focus on the financial performance of corporations listed in the stock market of BRICS and how it is influenced by ESG. This paper believes that there is a direct connection between ESG and green bond issuance as environmental factors in ESG are influenced by environmentally friendly projects that have been financed by issuing green bonds. This argument is supported by the findings of Wang and Wang (2022) which investigated the green bond issuance of firms listed in China from 2016 to 2020 while considering its impact on the factors of ESG. According to Wang et al. (2022), higher ESG scores tend to increase the issuance of green bonds by Chinese corporations, meaning that by analyzing the ESG – financial performance relationship in emerging markets, the tendency of stock price movements regarding the influence of green bonds issuance might be understood.

Fandella, Sergi, and Sironi (2023) investigated the debt and equity costs of 3217 non-financial companies listed in emerging markets between 2014 and 2019 to analyze whether ESG influences the cost of debt and equity of a firm. Considering that a corporation's investment opportunities are contingent on the cost of capital level and any increase in capital may require external financing which in return raises the liquidity risk and reduces competitive advantage, damaging the financial performance of a corporation, there is a significant positive correlation between cost of capital and

financial performance. The findings of Fandella et al. (2023) suggest that although the correlation between ESG and the cost of equity is negative, ESG has a weak positive impact on the cost of debt of a firm.

While examining the ESG – financial performance relationship of 2165 developing and developed markets from 2007 to 2014, Garcia and Orsato (2020) identified that ESG damages the financial performance of corporations which might be a result of overinvestment. Considering that the particular relationship commonly has a positive correlation in developed countries, the findings of the paper indicate that emerging markets do not reward sustainability. Garcia et al. (2020) employed the ROA indicator to understand how the rewarding system operates in emerging markets regarding sustainable investments, discovering that the behavioral difference between developing and developed markets is the expectation of stakeholders. Correspondingly, while analyzing environmentally sensitive sectors such as the oil and gas industry, it is revealed that developed countries perform superior in comparison to developing countries as emerging markets have little incentive to improve ESG scores of sensitive industries (Garcia et al. 2020).

Additionally, Garcia et al. (2017) gathered data from 365 companies listed in BRICS between 2010 and 2012 through the Thomson Reuters Eikon database to analyze how ESG scores influence sensitive industries and their financial performance in emerging markets. According to the research findings, sensitive industries in emerging markets have better ESG performance in comparison to other industries as poor sustainable performance has negative signaling, damaging the reputation of corporations which contradicts the claims of Garcia et al. (2020) that emerging markets do not reward sensitive industries in terms of sustainability. Considering the research findings of Garcia et al. (2017) in regard to signaling theory and preserving reputation in emerging markets, this paper believes that the adoption of sustainability tends to boost the financial performance and reputation of a corporation.

Similarly, Jarvinen (2022) examined the influence of ESG ratings on stock returns of companies listed in BRICS while gathering data from the Refinitiv Eikon database from 2015 to 2019 in regard to 250 corporations that are listed in emerging markets. Interestingly, corporations that are performing better in terms of ESG granted higher returns to their investors than firms with worse ESG scores, indicating that there is a positive correlation between ESG ratings and stock returns in emerging markets. On the other hand, Jarvinen (2022) ignored data regarding stock price movement during the COVID-19 pandemic which would enrich academic literature in terms of

observing whether sustainability protects companies from negative external situations, mitigating the value deterioration. Although the findings of Jarvinen (2022) may not fully cover the relationship between ESG performance and stock price movement as a result of excluding data during the pandemic, the positive effect of ESG scores on stock returns suggests that green bond issuance in emerging markets may increase the stock prices of firms.

Lastly, while evaluating 292 corporations listed in emerging markets during the years 2014 and 2018, Bahadori (2019) analyzed the influence of ESG scores on the financial performance of BRICS firms with the help of the Refinitiv Eikon database. The research paper investigated each pillar of ESG scores separately to understand the effect of each one by measuring the Return on Asset (hereinafter ROA) of companies and discovered that although environmental and social scores positively influenced ROA, governance score had no significant impact on the financial performance of firms listed in emerging markets. According to the research findings, it is safe to presume that green bonds might have a positive impact on a corporation's value in emerging markets as environmental and social pillars of ESG improved the ROA, but the lack of data regarding ESG may lead to biases in the findings of the paper.

2.4 Challenges and Future Research Directions

2.4.1 Greenwashing Concerns and Investor Scepticism

Although adopting green bonds to invest in environmentally friendly projects has been a strategy of corporations all around the world for more than a decade, weak governance systems lead to agency problems as overinvestment theory suggests. Therefore, it is crucial to understand that the main result of agency problem regarding companies' issuance of green bonds is greenwashing risk whereas empirical evidence discusses the damage of greenwashing to the firm value, ways of detecting the particular risk, and whether third-party certifications mitigates chance of greenwashing. This paper believes that this section will provide insight for both academia and industry as understanding greenwashing and its results will assist investors in mitigating the risk by detecting the problem earlier or discovering instruments to protect themselves while analyzing data in regard to green bond issuance of corporations, this dissertation will consider that any decrease in value after green bond issuance might be related to greenwashing which needs to be considered by academia.

While analyzing the reaction of investors to greenwashing news of companies, Xu, Tse, Geng, Liu, and Potter (2025) gathered 121 global news of greenwashing from 2016 to 2021. Interestingly, the

findings of the research claim that although there is a modest negative correlation between greenwashing news and stock price movement, if the same news concerns a firm with decent ESG scores then the results illustrate a significant negative effect. Furthermore, Xu et al. (2025) suggests that the manufacturing industry and Asia-Pacific market have been impacted more by the greenwashing news. However, it is important to notice the poor allocation of scarce data in a broad region, meaning that lack of data might falsely lead to these results, and industry and market-level analysis should be done to provide more meaningful findings.

To understand the trends of greenwashing cases which is a vital topic to detect the particular practices, Fernandez (2025) investigated 41 countries and gathered data of approximately 27,000 companies from both family and non-family organizations. While family corporations mainly focus on environmentally friendly projects and generally avoid greenwashing, non-family organizations tend to have a higher chance of practicing greenwashing which, as discussed, arises from agency problems (Fernandez 2025). However, the findings of the paper also suggest that a negative correlation between family control and greenwashing risk might not lead to enhanced firm performance which in turn provides the industry with two main outcomes: (1) From an investor's point of view, investing in family corporations that adopt sustainability might not necessarily be more profitable and (2) From management's perspective, companies that practice sustainability boost financial performance more in comparison to their non-family counterparts.

Similar to Fernandez (2025), Lubloy, Kereszturi, and Berlinger (2025) tried to address the issue of identifying greenwashing and possible measures for detection by reviewing academic literature regarding the particular topic up to February 13, 2024, through Google Scholar. According to the findings of Lubloy et al. (2025), although greenwashing measures might be allocated into two main factors which are decoupling and selective disclosure, academic literature tends to adopt decoupling measures more frequently. The term decoupling became popular in 2019 and it has been adopted to identify greenwashing by comparing symbolic information such as ESG disclosures and corporate releases and quantitative data which has been gathered from reports, ESG scores of third-party agencies, and other actions that improved sustainability.

On the other hand, Ehlers et al. (2017) discussed the third-party certification on green bonds and whether this mechanism mitigates the risk of greenwashing by investigating the return characteristics of green bond indices from 2014 to 2017 while considering the certification ratings of third-party agencies. The findings suggest that while certificated green bonds perform similarly

to traditional bonds in terms of return characteristics, unhedged green bonds illustrate considerable volatility in comparison to cumulative bond indices. Overall, the claims of Ehlers et al. (2017) contribute valuable insights and measures to mitigate greenwashing risk as certification of green bonds proves to reduce the volatility of return, meaning that it might mitigate the risk of greenwashing.

2.4.2 Limitations and Future Research Opportunities

Considering that green bonds are a relatively new topic in academic literature, many researchers have investigated these green instruments by analyzing their influence on financial, environmental, and stock performance, discussing the transparency of disclosures, and whether green bonds might be the most efficient tool for gathering capital for green projects. However, the lack of data concerning disclosures and the adoption of green bonds sets a barrier to significant findings. Therefore, this paper believes that understanding the current limitations and research gap of the topic will be valuable for the following sections.

According to Tuhkanen et al. (2022), scarce data regarding green bonds is the main limitation of further research and suggested that the development of a green bond market is required to understand the relationship between green bond issuance and stock market reaction. Similarly, Jarvinen (2022) and Fandella et al. (2023) encountered identical issues while investigating the sustainability of BRICS countries which might affect the findings of this dissertation. However, in comparison to Jarvinen (2022) and Fandella et al. (2023) which have analyzed the ESG scores of corporations listed in emerging markets between the period of, consecutively, 2015 – 2019 and 2014 – 2019, this paper will try to gather data concerning green bond issuance starting from 2015, the Paris Agreement, till 2024 which is believed to contain a considerable amount of data as in the recent years adoption and disclosures of sustainability increased. Additionally, the particular choice of this research regarding to data collection period has been recommended by articles such as Garcia et al. (2020) and Fernandez (2025) as the insufficient longitudinal information has been the limitations of these papers.

2.5 Hypothesis

Although many papers discuss the relationship between green bond issuance and stock price movements to understand the efficiency of these financial instruments, to the knowledge of this paper is the first research that investigates the influence of green bonds on corporations' value in emerging markets as academic literature mainly focuses on countries all around the world (Glavas

2018; Khiari, Flah, Lajmi, and Bouhleli 2024) or a specific market such as European stock exchange (Ingemansson and Stjernfeldt 2022). Moreover, research findings will try to answer two main questions: (1) Is there a significant correlation between green bond issuance and stock price movement in emerging markets? (2) What are the factors that influence this relationship? Therefore, the sole purpose of this dissertation is to analyze corporations listed in the BRICS stock markets while determining whether there is a link between green bonds and the market value of a firm. According to the discussions of empirical evidence in the literature review section, this paper established two hypotheses:

Hypothesis 1: Green bond issuance has a positive impact on the stock value of corporations listed in BRICS.

Null Hypothesis: Green bond issuance has a negative impact on the stock value of corporations listed in BRICS.

3. Research Methodology

3.1 Philosophical Approach

While employing a philosophical approach for conducting research one may choose one of four distinguished worldviews which are constructivism (interpretivism), pragmatism, positivism, and transformative, according to Creswell and Creswell (2018). Furthermore, academics tend to adopt positivist and transformative worldviews while organizing quantitative research whereas qualitative research is usually associated with constructivism and pragmatist worldviews convening both research designs as papers that employ mixed methods suggest. Therefore, this dissertation 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. Considering three main theories that were developed for the research which are stakeholder, signaling, and overinvestment theories, combined with the positivist philosophical approach to collect secondary data, this paper will evaluate the causality relationship between green bonds and firm value. On the other hand, employing the positivist approach forms limitations in regard to relevance and accuracy as data has been gathered from third-party agencies which in turn might lead to biases in the research findings. However, this paper tries to mitigate the particular limitations by collecting data from the universally recognized Bloomberg database which is trusted by academic literature and employed by the majority of research conducted to measure green bonds issuance and stock market reactions.

3.2 Research Design

While academics conduct research to discover the uncertainties in academic literature, the design of research might adopt quantitative, qualitative, or mixed methods in which a paper includes both methods to investigate the research questions. 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. Additionally, investigating at least two variables to measure the correlation between them, in this case, green bond issuance and stock price reaction, is a sub-category of the quantitative research design that is referred to as correlational design (Creswell et al. 2018). This dissertation believes that to measure the correlation between green bond issuance and the value of a corporation efficiently, a respected third-party agency should be chosen to minimize biases in collected secondary data in regard to dependent, independent, and control variables. Moreover, considering that the dissertation topic of this paper might not be suitable for qualitative data collection, as the green bond disclosures and stock price movements have been shared with the public, gathering particular data from secondary data sources is an ideal choice. Therefore, while conducting research on similar topics, academic papers such as Febi, Schafer, Stephan, and Sun (2018); Baker, Bergstresser, Serafeim, and Wurgler (2018); Barua et al. (2019); Nanayakkara et al. (2019); Tang et al. (2020); Singh, Jain, and Singh (2025) adopted quantitative research design and employed Bloomberg database for data collection. However, it is essential to mention that the probability of biases in the collected data and the limited depth of secondary data analysis are the main limitations of the quantitative research design.

4. Data

4.1 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 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. 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%), according to Table 1. 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 dissertation 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 dissertation has analyzed COVID-19 separately from January 2021 to June 2023. The period of panel data for the research is similar to the academic literature whereas other papers that studied the topic related to green bonds observed a period of 8 years (Barua et al. 2019), 2 years (Nanayakkara et al. 2019), 11 years (Tang et al. 2020), 11 years (Tolliver et al. 2020), 4 years (Wang et al. 2020), 12 years (Fatica et al. 2021), 11 years (Ge et al. 2024), and 9 years (Singh et al. 2025).

Finally, while establishing a sample for the research model through the Bloomberg database, this dissertation 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.

Company name	Country
Ambipar Participacoes e Empreendimentos S/A	Brazil
Camil Alimentos SA	Brazil
Co de Electricidade do Estado da Bahia Coelba	Brazil
Engie Brasil Energia SA	Brazil
Equatorial Energia SA	Brazil
Isa Energia Brasil sa	Brazil
Jalles Machado SA	Brazil
Movida Participacoes SA	Brazil
Transmissora Alianca de Energia Eletrica S/A	Brazil
Angang Steel Co Ltd	China
Bank of Beijing Co Ltd	China
Bank of Changsha Co Ltd	China
Bank of Guiyang Co Ltd	China
Bank of Jiangsu Co Ltd	China
Bank of Nanjing Co Ltd	China
Bank of Suzhou Co Ltd	China
Bank of Xi'an Co Ltd	China
Baoshan Iron & Steel Co Ltd	China
Beijing Originwater Technology Co Ltd	China
Black Peony Group Co Ltd	China
CECEP Wind-Power Corp	China
China Everbright Bank Co Ltd	China
China Green Electricity Investment of Tianjin Co Ltd	China
China International Marine Containers Group Co Ltd	China
China Merchants Bank Co Ltd	China
China Merchants Shekou Industrial Zone Holdings Co Ltd	China
China Three Gorges Renewables Group Co Ltd	China

China West Construction Group Co Ltd	China
China Yangtze Power Co Ltd	China
Chongqing Sanfeng Environment Group Corp Ltd	China
Contemporary Amperex Technology Co Ltd	China
Dazhong Transportation Group Co Ltd	China
ENN Natural Gas Co Ltd	China
Eve Energy Co Ltd	China
GD Power Development Co Ltd	China
GEM Co Ltd	China
GEPIC Energy Development Co Ltd	China
Grandblue Environment Co Ltd	China
Guangxi Guiguan Electric Power Co Ltd	China
Guodian Nanjing Automation Co Ltd	China
Huaneng Lancang River Hydropower Inc	China
Huaxia Bank Co Ltd	China
Hubei Energy Group Co Ltd	China
IEIT Systems Co Ltd	China
Industrial & Commercial Bank of China Ltd	China
Industrial Bank Co Ltd	China
Jiangsu Financial Leasing Co Ltd	China
Jiangsu Jiangyin Rural Commercial Bank Co Ltd	China
Jiangsu Zhangjiagang Rural Commercial Bank Co Ltd	China
Jilin Electric Power Co Ltd	China
Jinko Power Technology Co Ltd	China
Liuzhou Iron & Steel Co Ltd	China
NYOCOR Co Ltd	China
Ping An Bank Co Ltd	China
Poly Developments and Holdings Group Co Ltd	China
Qilu Bank Co Ltd	China
Shanghai Lingang Holdings Corp Ltd	China
Shanghai Pudong Construction Co Ltd	China

Shanghai Pudong Development Bank Co Ltd	China
Shanghai Rural Commercial Bank Co Ltd	China
Shenergy Co Ltd	China
Shenzhen Energy Group Co Ltd	China
Sichuan New Energy Power Co Ltd	China
Tianjin Capital Environmental Protection Group Co Ltd	China
Tongwei Co Ltd	China
Wuxi Huaguang Environment & Energy Group Co Ltd	China
Wuxi Rural Commercial Bank Co Ltd	China
XCMG Construction Machinery Co Ltd	China
Xiamen Bank Co Ltd	China
Zhejiang Feida Environmental Science & Technology Co Ltd	China
Axis Bank Ltd	India
Indian Railway Finance Corp Ltd	India
Mindspace Business Parks REIT	India
Power Finance Corp Ltd	India
REC Ltd	India
VA Tech Wabag Ltd	India
Yes Bank Ltd	India

Table 1: List of green bond issuing corporations listed in BRICS

4.2 Variables

4.2.1 Dependent Variable

4.2.1.1 Stock Return

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. While it is a key indicator for measuring the market performance of a company and is significantly efficient in catching the effect of new information such as green bond issuance, this paper believes that it is the most efficient method for analyzing the long-term impact of the green-labeled financial instruments. 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. To construct a sample, the stock return for each company is collected quarterly between the period of 2014 and 2024 through the Bloomberg database.

4.2.2 Independent Variable

4.2.2.1 Green Bond Issuance

While investigating the impact of green bond issuance on the stock of corporations listed in emerging markets, the research model requires a causality relationship for evaluation whereas as a dependent variable data concerning the stock return (effect) has been gathered to analyze whether it is influenced by green bond issuance (cause), this paper employs it as an independent variable. Furthermore, articles in the academic literature concerning the causality analysis between green bonds and stock performance have adopted green bond issuance either as a dependent variable (Barua et al. 2019) or as an independent variable (Nanayakkara et al. 2019; Zhou et al. 2019; Tang et al. 2020; Wang et al. 2020; Fatica et al. 2021; Tan et al. 2022; Singh et al. 2025) to investigate the effect of green bond issuance and whether it is an effective debt instrument for enhancing sustainability. Moreover, while investigating the influence of green bond issuance on stock performance, researchers tend to adopt the event study method in which the model analyses the change in stock price before, at the time, and after the green bond issuance of a corporation to evaluate whether there is a correlation between them. This type of study is efficient for examining the short-term impact of green bonds which generally employs yield spread and cumulative abnormal returns as dependent variables. However, the long-term impact of green bond issuance of a firm on its stock price is not well-documented, according to the knowledge of the author.

Therefore, 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.

4.2.3 Control Variables

Many papers in academic literature employ control variables in their research model to mitigate the risk of obtaining biased regression results as the change in the dependent variable is not only affected by the independent variable but also other factors which are regulated by control variables. To enhance the effectiveness of the research findings in regard to the correlation between green bond issuance and stock price movements in emerging markets, this dissertation employs size, leverage, ROA, Price-to-book ratio (hereinafter P/B), market return index, and inflation of firms as control variables.

4.2.3.1 Size

The size of a corporation is included in the research model as a control variable to analyze the influence of green bonds on firm value without considering the effect of the company's size and is commonly adopted by researchers while investigating topics related to a corporation's financial performance. One of the main purposes of size being a highly influential factor is the signaling effect of a company tends to correlate with the size where large firms receive a less volatile market reaction to news whereas the impact of corporate events on the stock price is more volatile in smaller corporations. Furthermore, considering the size of a corporation tends to have a positive correlation with credit ratings, media attention, and investor attraction, news of green bond issuance might be moderated by the factors above in large companies which in turn raises a question regarding the proportion of a change in stock price that is the direct result of a green bond issuance. In addition, while there are various methods for estimating the size of a company, this paper will employ the most common method that is chosen by a considerable amount of researchers while analyzing the green bond and stock performance relationship such as Barua et al. (2019); Tang et al. (2020); Wang et al. (2020); Fatica et al. (2021); Ge et al. (2024) whereas size is calculated as a natural logarithm of total assets to mitigate the probability of error in the dataset as a result of large numbers. Therefore, this paper has gathered data regarding the size of corporations listed in BRICS from the Bloomberg database as total assets which was then converted to the natural logarithm.

4.2.3.2 Leverage

While leverage is a considerably important ratio that illustrates the capital structure of a firm, adopting it as a control variable is critical for achieving a meaningful result concerning the green bond–stock price relationship among BRIC corporations. The ratio is calculated by dividing a company's total debt by total assets, as the Bloomberg database suggests, which provides information regarding the proportion of a firm that is financed by equity and debt. Additionally, a high leverage ratio indicates the riskiness of the investment, which in turn might significantly impact the stock prices, regardless of the corporation's green bond issuance strategy. Furthermore, green bond issuance increases the total debt of a firm, diluting the cost of capital, and without a control for leverage, the research model might perceive the change in the stock price as higher debt rather than its reaction to the issuance of green bonds. Therefore, employing leverage in the research model is common for papers that investigate topics related to the firm performance and green investments, as companies with a higher leverage ratio tend to issue green bonds more often to mitigate the risk of damaging the firm value, which in turn enhances the financial performance of a corporation. In addition, while analyzing the correlation between green bonds and stock price movements, the majority of researchers adopted leverage as a control variable (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). Considering that the leverage ratio measures the unsystematic risk of a corporation and boosts the volatility of share prices of firms, especially ones in emerging markets, the tendency of companies with high leverage ratio to invest in green projects is considered to be probable and by adding leverage in the research model, this paper will test this assumption. The leverage of corporations listed in BRICS has been gathered and analyzed through the Bloomberg database.

4.2.3.3 Return on Asset (ROA)

The majority of academic papers which have investigated the relationship between stock price movement and green bond issuance such as Barua et al. (2019); Tang et al. (2020); Wang et al. (2020); Fatica et al. (2021) and Ge, Yue, Tang, and Zhu (2024) employed ROA as a control variable which is the most common ratio of profitability to mitigate the effect of change in stock price that is associated with the profitability of a corporation. According to the Bloomberg database, the ROA ratio is measured by dividing the total net income by the average total assets multiplied by a hundred to discover the ROA percentage, whereas a higher ROA% indicates that a firm operates its assets more efficiently and gains more profit from them. On the other hand, while analyzing whether green innovation damages the financial performance of oil and gas companies, Aastvedt,

Behmiri, and Lu (2021) claimed that employing ROA in the correlation analysis to discover the influence of anything on financial performance may result in biases if data includes cross-industry information as the ROA% trend varies depending on the industry a corporation operates. However, the particular drawback of ROA should not have a significant impact on the findings of this dissertation, as it is a control variable in this research model. Furthermore, considering the fact that the efficient financial performance of a corporation has significant positive signaling to investors, leading to a boost in the share value of a firm, adopting ROA as a control variable is vital for investigating the effect of green bonds on the company value appropriately. To conclude, this paper has collected the ROA ratios of corporations listed in BRICS from the Bloomberg database and has analyzed them as a percentage.

4.2.3.4 Price to Book (P/B)

To understand how the market perceives the share of corporations in emerging markets, the P/B or market-to-book (M/B) ratio will be employed as a control variable that measures the market efficiency of a firm. While it is a common practice in academic literature to adopt the P/B ratio for measuring the stock value of a company, it is calculated by comparing the stock price with the book value of a firm. Furthermore, one of the main reasons to add the P/B ratio in the research model as a control variable is to examine the impact of green bond issuance on stock price without the influence of investors' perception concerning the market performance of a corporation. According to the Bloomberg database, the P/B ratio is calculated by dividing the latest closing share price by Book Value per Share (hereinafter BVPS) whereas BVPS is estimated by dividing total common equity by the number of shares outstanding. In addition, Tang et al. (2020) and Ge et al. (2024) have appointed a P/B ratio in their research to measure stock efficiency while analyzing the relationship between green bonds and company value. The results of the P/B ratio might be interpreted in three ways: (1) If the P/B ratio is higher than one, indicates that the current stock value of a firm is higher than its book value, suggesting positive signaling to investors regarding the profitability of a corporation. (2) If the P/B ratio is equal to one, the company has no difference between stock price and book value. (3) If the P/B ratio is lower than one, it illustrates that the firm's book value is valued higher than its current stock price which signals investors concerning the poor management of a company, damaging its share price. Data concerning the P/B control variable of corporations listed in BRICS will be collected from the Bloomberg database.

4.2.3.5 Market Return Index

The purpose of the market return index is to discover the movement of the particular stock market as a result of macro-level influences which might affect the findings of any research that analyzes firm-specific stock efficiency. Moreover, employing a market return index might enhance the effectiveness of the research model by controlling the systematic risk of emerging markets while focusing on the impact of green bond issuance on the stock market return of corporations listed in BRICS. In addition, controlling market return will assist this paper in mitigating the influence of the stock market crash during the COVID-19 pandemic which in return increases the validity of the research model and accuracy of the regression results. Although according to the knowledge of the author, the majority of the papers that investigated the green investment and stock value did not adopt the market return index as a control variable, Febi et al. (2018) employed it to mitigate the systematic risk while analyzing the liquidity risk of green bond issuance. While the Bloomberg database calculates the market return index by dividing the difference between the index level at time t and the index level at time t-1 by the index level at time t-1 which results in the percentage change in market return as time passes, the sample of this dissertation includes the quarterly logarithmic results of corporations listed in BRICS from 2014 to 2024, meaning that the change in market return index will be analyzed quarterly. Although estimating the market return index daily or at the time of the event might present more efficient findings, considering that the purpose of this paper is to investigate the long-term impact of the green bond issuance, quarterly sample collection is chosen to employ panel data. To establish a sample for the control variable, this paper will import the quarterly market indexes for each stock market in BRICS separately through the Bloomberg database.

4.2.3.6 Inflation

Inflation is another crucial control variable to increase the research model validity for discovering the correlation between stock return of a corporation listed in emerging markets and green bond issuance by mitigating the macroeconomic influences on stock price. Considering the stock market of any country is influenced by inflation and the volatility in emerging markets tends to be higher as a result of weak monetary policies, the volatile value of currencies, and unstable political situations, controlling inflation will further support the research model to isolate the influence of green bond issuance on stock returns. According to Frankel (2010) which studied the monetary policy in emerging markets, in comparison to developed markets, inefficiencies regarding the supply side and heavy reliance on a particular industry such as commodity exports as well as the

reasons listed above generate more volatile inflation rates in emerging markets. For example, news concerning the fall of the Brazilian real which increases the prices of imported goods, dependence of India's economy on agriculture which might boost the prices of food, and growth in production expenses as a result of problems in the energy supply in South Africa are some of the reasons enhancing the volatility of inflation rates in BRICS. Although both, inflation and market return index have been employed to mitigate the systematic risk from the research model and partially capture the same external effects, excluding inflation as a control variable might limit the research findings from measuring the direct impact of inflation on individual firms such as borrowing costs which might lead to biases. Therefore, this dissertation adopts inflation as a control variable and gathers the quarterly year-on-year inflation sample for each stock market in BRICS from the Bloomberg database.

Name	Type	Description
Stock Return	Dependent variable	The percentage difference between the stock price at year t and t-1
Green Bond Issuance	Independent variable	Dummy variable where green bond issuance identified as "1" and "0" if no issuance
Size	Control variable	Natural logarithm of total assets
Leverage	Control variable	Total debt divided by total assets
ROA	Control variable	Total net income divided by the average total assets
P/B ratio	Control variable	Latest closing share price divided by Book Value per Share
Market Return Index	Control variable	The percentage difference between the index level at year t and t-1
Inflation	Control variable	Quarterly inflation rate of a country

Table 2: Variables

4.3 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 dissertation 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 dissertation 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:

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

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 dissertation encounter limitations such as the accuracy, relevance, and the missing years in the panel data tend to enhance biases of the research findings.

4.4 Ethical Concerns

This dissertation collected all of the relevant data concerning variables in the sample for analyzing the correlation between green bond issuance and stock price movements from the Bloomberg database. 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. Therefore, this paper only collects secondary data from the Bloomberg database which acquires data either from publicly available sources or approved agreements. As a result, there are no ethical concerns regarding to data collection of the research.

5. Descriptive Statistics

To understand the basic characteristics of the sample for the initial interpretation of the variables in the research model, this study provides a section on descriptive statistics. Furthermore, it is vital to screen for possible outliers in the sample before further analysis in which descriptive statistics assist in addressing the particular issue by illustrating summarized observation for each variable in the research model which also enhances the transparency of the collected data. On the other hand, the causality relationship between green bond issuance and stock returns in emerging markets can not be investigated through descriptive statistics as it is mainly adopted in academic literature to introduce the sample to the audience. As Table 3 illustrates, the analysis of descriptive statistics includes information concerning the number of observations, mean, standard deviation, minimum, and maximum values of variables in the sample.

Variable	Obs	Mean	Std. Dev.	Min	Max
Green Bond Issuance	2591	.047	.212	0	1
Stock Return	2591	.019	.197	-.495	4.519
Size	2591	8.382	1.438	4.332	12.795
Leverage	2591	34.327	16.269	0	160.926
ROA	2591	3.049	5.571	-74.674	54.256
P/B ratio	2591	2.061	2.564	.317	74.101
Market Return Index	2591	6.568	1.199	5.796	10.177
Inflation	2591	2.186	2.041	-.3	11.92

Table 3: Descriptive Statistics

According to Table 3, the independent variable, green bond issuance, has been observed for 2591 times in a period of 11 years which is lower than the original observation number as a result of gaps in the sample. Considering that green bond issuance is employed as a dummy variable, a mean of 4.7% indicates an unbalance between quarters in which corporations listed in BRICS issued green bonds and did not, damaging the quality of the research findings as the difference in stock returns might be analyzed more efficiently when issuance spread evenly. The low percentage of mean also suggests that companies listed in emerging markets do not issue green bonds often which might be one of the limitations of the paper. Furthermore, observed data regarding green bond issuance has deviated from the mean by 0.212 which is an acceptable standard deviation for data. Finally, the minimum and maximum values of the independent variable are 0 and 1, respectively as the method of this dissertation to evaluate the green bond issuance includes it as a dummy

variable and cross-analyzes it with the change in stock returns quarterly to estimate the long-term impact of green bond issuance.

A dependent variable of the research model, stock return which is adopted to measure the change in the stock price of firms in emerging markets, includes 2591 observations and 0.019 mean, indicating that on average corporations listed in BRICS have illustrated a small positive stock return over the period of 11 years. In addition, with only a 0.197 standard deviation, the stock return variable has the lowest deviation from the mean among all variables of the research model, meaning that the tendency of stock price movements has followed a similar trend which is interesting as the panel data includes the COVID-19 pandemic. On the other hand, the minimum value of -0.495 and maximum value of 4.519 suggests that while the stock price of firms has experienced negative returns during some quarters, overall the stock return has increased 1.9%, quarterly, which is expected for developing countries with growing stock markets.

Size is one of the control variables of the research, which is observed 2591 times, according to Table 3, and has a mean of 8.382 and standard deviation of 1.438 which is evaluated as the logarithm of total assets to mitigate the skewness of data and balance the distribution. Additionally, the minimum (4.332) and maximum (12.795) values suggest that the sample consists of both small and large corporations which is valuable for the research model in terms of evaluating the impact of green bond issuance on stock price movements of different-sized companies listed in emerging markets.

While leverage is observed in the sample 2591 times as a control variable, the mean of the control variable suggests that on average proportion of debt in the capital structure of corporations listed in BRICS is 34.327. However, the standard deviation of 16.269 indicates that although the mean debt of firms in emerging markets is 34.327, a high variation from the average is observed, meaning the firm structure of leverage is volatile in emerging markets. Moreover, while some corporation in the sample has 0 leverage (minimum value), other companies are financed through debt by 160.926 (maximum value) which explains the high level of standard deviation.

As Table 3 illustrates, ROA, a control variable adopted to measure the operating performance of BRICS-listed corporations has 2591 observations in the dataset and a mean of 3.049, suggesting a positive financial performance over an 11-year period in general. Similar to leverage, the ROA variable also has a considerable amount of standard deviation which is the second largest in the dataset (5.571), indicating that the profitability of corporations in emerging markets varies. While

analyzing the minimum and maximum values of the control variable which are -74.674 and 54.256, respectively, the findings suggest that although some firms had significant losses as a negative minimum value indicates, others had substantial profitability which highlights the riskiness of investments in developing stock markets.

Another control variable which P/B ratio, has an observation of 2591, mean of 2.061, standard deviation of 2.564, and minimum and maximum values of 0.317 and 74.101, respectively. Although the standard deviation of the P/B ratio is relatively lower than its peers, the wide range of results suggests that while the majority of corporations were trading close to their book values, some companies listed in BRICS were either traded in premium as a result of expectations or sustainability goals or undervalued by investors. Overall, while the findings regarding the P/B ratio might explain the increase in the share value of companies, controlling it in the research model mitigates the influence of other external factors on price changes.

According to Table 3, the Market Return Index is a control variable adopted to evaluate the market-level performance of stock markets where the corporations in the sample listed have 2591 observations. In addition, the relatively evenly distributed standard deviation of 1.199 indicates that data concerning the Market Return Index is distributed around the mean of 6.568. The minimum (5.796) and maximum (10.177) values of the control variable illustrate that observations are relatively outlier-free, suggesting that market-level fluctuations are modest and that the change in stock prices of corporations listed in BRICS is not significantly affected by externalities. Nonetheless, the particular effects have been controlled by the model to enhance the quality of the research findings.

Lastly, inflation which has an external impact on the stock returns of companies listed in BRICS while investigating the correlation between green bond issuance and stock price movements, has been observed 2591 times as a control variable in the research sample. A mean of 2.186 and a standard deviation of 2.041 provide information regarding the average inflation rate of developing countries included in the sample and the moderate variations from the mean. While the maximum value of 11.92% inflation rate indicates a possibility of a relatively high negative impact on firm value, the minimum value of -0.3 illustrates a diverse range of macroeconomic conditions that might influence the result of this paper.

6. Data Analyses

6.1 Correlation Analyses

6.1.1 Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) StockReturn	1.000							
(2) GreenBondIssua~e	-0.016	1.000						
(3) Size	0.051	0.040	1.000					
(4) Leverage	0.075	0.032	-0.126	1.000				
(5) ROA	0.005	0.033	0.039	-0.231	1.000			
(6) PB	0.192	-0.035	-0.093	0.079	0.029	1.000		
(7) MarketReturnIn~x	0.039	0.017	-0.181	0.133	0.261	0.021	1.000	
(8) Inflation	0.015	-0.044	-0.168	0.105	0.175	0.017	0.620	1.000

Table 4.1: Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) StockReturn	1.000							
(2) GreenBondIssua~e	0.019	1.000						
(3) Size	0.075	0.058	1.000					
(4) Leverage	0.050	0.019	-0.116	1.000				
(5) ROA	0.092	0.014	0.032	-0.004	1.000			
(6) PB	0.255	-0.012	0.110	0.028	0.096	1.000		
(7) MarketReturnIn~x	-0.003	0.043	-0.217	0.205	0.418	0.088	1.000	
(8) Inflation	-0.032	0.042	-0.189	0.207	0.219	0.021	0.645	1.000

Table 4.2: Matrix of Correlations (COVID-19)

Tables 4.1 and 4.2 illustrate the correlation matrix of variables in the research model to study the linear relationship among variables in which a strong correlation might indicate a multicollinearity concern, damaging the findings of the paper. The difference between the tables is while the first correlation analysis covers the period from 2014 to 2024, Table 4.2 only investigates the pandemic years (January 2020 to June 2023). The main purpose of employing correlation analysis is to determine the relationship among variables by investigating the values in which -1 indicates a strong negative linear link between variables, no linear relationship has a value of 0, and 1 suggests that the variables have a significant positive relation. The high level of correlations might question

the validity of the research model and indicate replacement variables with significant negative or positive correlations. Therefore, this dissertation sets a threshold of 0.8 significance correlation as it is frequently employed in academic literature. According to the statistical results of the correlation matrix, this study has not detected any correlation above 0.8 significance, meaning that there is no multicollinearity in the sample. In addition, the dataset will evaluate the possibility of multicollinearity issues by adopting the variance inflation factor (hereinafter VIF) to further investigate the particular problem which will be discussed in the next section. It is vital to underline the fact that although the matrix of correlation illustrates the linear link among variables, it does not explain the causality relationship between green bond issuance and stock price movements which will be discussed in the regression analysis section.

As Table 4.1 illustrates, the dependent variable of the research model, stock returns, has a negative insignificant correlation with green bond issuance (-0.016), indicating that issuing green-labeled bonds does not add financial value to the corporations listed in emerging markets, on the contrary, opposite linear link with firm value. Except for the green bond issuance, all other variables have a positive relation with stock returns, but no significant correlation is observed while interpreting the statistical results of the correlation matrix. On the other hand, size, leverage, ROA, and Market Return Index have a weak positive correlation with green bond issuance, suggesting that big companies tend to issue more sustainable bonds than small firms, leverage of corporations increases as a result of issuing more debt securities (green bonds) while the P/B ratio and inflation has a negative insignificant link with green bond issuance. Furthermore, the findings suggest that bigger corporations in emerging markets perform better in terms of profitability which might be linked to the attention of the investors, the efficient loan agreements with banks, and the effectiveness of signaling. Interestingly, the size of firms is negatively correlated with other variables such as leverage which contradicts the argument of positive ROA of bigger corporations related to debt financing, P/B ratio, indicating that larger firms might be undervalued in comparison to smaller corporations, Market Return Index, and inflation. According to Table 4.1, the higher the proportion of debt in the capital structure of companies listed in BRICS, the lower the financial performance is (-0.231) which might be associated with the riskiness of the firm that finances its operations with loans. Finally, although the highest correlation observed in the matrix is between the Market Return Index and inflation which has been previously discussed that while both of the variables control the macroeconomic effects within the research model, the control variables differ

in focus which is why the correlation is 0.620, the research model of this dissertation did not discover any significant multicollinearity.

According to Table 4.2 which analyses the matrix of correlation over the period of pandemic to understand the impact of COVID-19 on the research findings of this study, stock return has a positive correlation with green bond issuance (0.019), size (0.075), leverage (0.050), ROA (0.092), and P/B ratio (0.255) and a weak negative relation with Market Return Index (-0.003) and inflation (-0.032). Furthermore, the comparatively high correlation between stock return and the P/B ratio suggests that corporations that are valued higher than their book value tend to gain more stock returns. Similar to the findings of Table 4.1, during the COVID-19 period no significant correlation has been observed between stock returns and green bond issuance within the companies listed in emerging markets. On the other hand, the P/B ratio is the only variable that has a weak negative correlation of -0.012 with green bonds whereas size, leverage, ROA, Market Return Index, and inflation are positively linked with the values of 0.058, 0.019, 0.014, 0.043, and 0.042, respectively. Although, the size control variable of the research has a positive insignificant relationship with ROA and P/B ratio, larger corporations listed in BRICS tend to have a reverse linear correlation with leverage, Market Return Index, and inflation. Interestingly, a weak negative linear correlation between leverage and ROA has been observed according to the matrix of correlation during the pandemic period, suggesting that debt financing might be damaging the financial performance of corporations listed in emerging markets as the correlation between the two variables is -0.004 while P/B ratio, Market Return Index, and inflation has a positive relation with the leverage of a firm. In addition, the ROA of a company has a moderate positive correlation with the Market Return Index (0.418) which is also the second strongest correlation value in the matrix, indicating that while the stock markets of BRICS perform well, the operating performance of organizations listed in emerging markets will be positively influenced. Lastly, the highest linear relationship among variables is between inflation and the Market Return Index, according to Table 4.2, with a value of 0.645 which is still below the threshold of 0.8 significance, suggesting that although there is a moderate correlation between the two macroeconomic control variables, overall, this dissertation has not detected any multicollinearity within the matrix of correlation.

While conducting a comparative analysis of the correlation matrix between the original sample period of 2014 to 2024 and the COVID-19 pandemic period from January 2021 to June 2023, this study tried to understand the implications of the pandemic on the financial performance of

companies listed in emerging markets. The findings suggest that although the linear relationship among variables followed a similar trend in both matrices, small deviations from the mean can be seen such as the change in the correlation value of stock return – Market Return Index (Δ -0.042) and stock return – inflation (Δ -0.047) which might be associated with the varying impact of pandemic on different industries as negative correlation between Market Return Index and stock return is observed in Table 4.2. Furthermore, the influence of inflation has increased in the COVID-19 period, indicating that corporations listed in BRICS witnessed share value deterioration as a result of inflation. On the other hand, the ROA of companies has illustrated a 0.157 increase in correlation with the Market Return Index as the volatility of stock markets during the pandemic considerably influenced the profitability of firms and a significant drop of 0.227 with leverage which indicates that while high debt ratio in the capital structure of a firm considerably damage the operating performance (-0.231), during the pandemic this effect nearly ceased as a result of softening government regulations. Interestingly, larger corporations were overvalued in the pandemic in comparison to a negative correlation between size and P/B ratio in Table 4.1 (Δ 0.203) which might happen as investors tend to protect their capital during economic uncertainties such as a pandemic. In conclusion, the financial performance of corporations became more dependent on the market conditions, the risk valuation of firms shifted away from the traditional methods such as leverage, larger companies were preferred by investors, and increase in the correlation between stock return and green bond issuance have been observed during the COVID-19 pandemic.

6.1.2 Variance Inflation Factor (VIF)

	VIF	1/VIF
Market Return Index	1.752	.571
Inflation	1.645	.608
ROA	1.174	.852
Leverage	1.122	.892
Size	1.065	.939
P/B Ratio	1.018	.983
Green Bond Issuance	1.011	.989
Mean VIF	1.255	.

Table 5: Variance Inflation Factor

To understand whether the research model of this study has any multicollinearity issue in the

regression analysis, VIF has been adopted which is frequently employed by papers with quantitative research in academic literature. While the results of correlation matrix analysis have not detected any multicollinearity among variables as the results were lower than the threshold of 0.8 significance, the findings of VIF provide further information concerning the possibility of the problem. Generally accepted results of VIF analysis are the following: 1) If VIF=1, the research model has no multicollinearity; 2) If VIF<5/10, low to moderate level of multicollinearity has been observed whereas academic literature discusses that VIF results lower than 5/10 (2.5 for others) approves the validity of the research model; 3) If VIF>10, variables are highly correlated with each other, meaning that validity of the research model is questionable and will generate biases in the findings of the regression analysis in which research model might require to be re-established and highly correlated variables to be removed. Similar to the findings of the correlation matrix, this dissertation has not detected any multicollinearity as the result of the VIF test is 1.255, indicating no to very low correlation among the variables in the research model and the regression analysis is free from biases regarding multicollinearity, according to Table 5.

6.2 Regression Analyses

6.2.1 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 dissertation, 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 dissertation 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 6.

	Coef.
Chi-square test value	120.081
P-value	0

Table 6: Hausman (1978) specification test

According to Table 6, the p-value of the Hausman test is less than 0.5 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 dissertation 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.

StockReturn	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GreenBondIssuance	-.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	***
MarketReturnIndex	.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 7: Stock Return – Green Bond Issuance Regression results

Table 7 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 COVID-19 and Its Implications

This dissertation 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 8 illustrates the descriptive statistics of the COVID-19 period which consists of the number of observations, mean, standard deviation, and minimum and maximum values of each variable within the sample.

Variable	Obs	Mean	Std. Dev.	Min	Max
Green Bond Issuance	982	.062	.241	0	1
Stock Return	982	.03	.159	-.495	1.639
Size	982	8.367	1.462	4.332	12.579
Leverage	982	34.495	16.412	5.236	85.966
ROA	982	3.158	3.91	-26.682	19.285
PB	982	1.775	1.826	.361	19.906
Market Return Index	982	6.658	1.206	6.005	10.067
Inflation	982	2.533	2.486	0	11.92

Table 8: Descriptive Statistics (COVID-19)

According to Table 8, 982 observations have been detected over the period of the pandemic for each variable which consists of 77 corporations listed in emerging markets and have issued green bonds. The independent variable, green bond issuance, is employed by firms listed in BRICS by 6.2% which is nearly 2 % higher than the main period, indicating that sustainable investing might be attractive even in adverse and volatile economic conditions. Furthermore, while a standard deviation of 0.241 is the second lowest variation from the mean within the research model, minimum and maximum scores of 0 and 1, respectively mean that green bond issuance is adopted as a dummy variable in this study. Interestingly firms have gained slightly higher returns (0.03) in comparison to original data (0.019) which might be the result of government intervention while a decrease in standard deviation suggests that gains were more consistent during the pandemic. Although some firm-specific variables such as the size and leverage of a corporation had no noticeable changes during the COVID-19 period, the profitability metric of companies, ROA, had a sharp decrease in standard deviation as the gap between the minimum (-26.682) and maximum (19.285) values narrowed in comparison to the period between 2014 and 2024. Similar to the financial performance metric, the P/B ratio of corporations is also influenced by the pandemic as a decrease from 2.06 to 1.78 of the mean indicates that cautious behavior of investors and lower probability of growth opportunities are associated with COVID-19. Macroeconomic effects, on the other hand, illustrate an increase as the control variables of the Market Return Index have a mean of 6.658 (Δ 0.09) and inflation has a mean of 2.533 (Δ 0.347) whereas the considerable increase of inflation is consistent with the rising inflation levels all over the world (International Monetary Fund, 2025).

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

Table 9: Variance Inflation Factor (COVID-19)

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

Table 10: Hausman (1978) specification test (COVID-19)

While Table 9 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 10. 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.

StockReturn	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GreenBondIssuance	.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	
MarketReturnIndex	-.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 11: Stock Return – Green Bond Issuance Regression results (COVID-19)

Table 11 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 7, 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 dissertation 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.

7. Conclusion

The purpose of this dissertation 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. 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 dissertation 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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