IMPACT OF NATIONAL CULTURE AND ENVIRONMENTAL PERFORMANCE ON STOCK RESPONSES TO CORPORATE GREEN BOND ISSUANCE ANNOUNCEMENTS

By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

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Chairman : Aslam Izah binti Selamat, PhD
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Climate change, stemming from global warming, poses a significant financial risk for the business world. Green bonds are necessary for mitigating climate change risk and environmental sustainability. Green bonds have gotten much attention from investors due to their sustainable and environmentally friendly nature. There have been some empirical studies on stocks' responses to green bonds' issuance announcements, and results are still inconsistent regarding the positive and negative stocks' responses to such announcements. Further, the role of country-level factors such as national culture and environmental performance that can impact stock's response to corporate green bond issuance announcements is also missing in the literature. Therefore, this study (1) investigates the stocks' responses to corporate green bond issuance announcements, (2) examines the impact of national culture on stocks' response to corporate green bonds' issuance announcements, and (3) investigates the impact of national environmental performance on stocks' response to corporate green bond issuance announcements.

Data from 230 international corporate green bond issuers from 38 countries between 2013 and 2022 was collected from the Climate Bonds Initiative and International Capital Market Association databases to accomplish the first objective. The stock price data of green bond issuers has been gathered from the data stream. After applying the standard event study methodology, the cumulative average abnormal return was calculated to measure the stock's responses to corporate green bond issuance announcements. The results of the first objective show that stocks respond positively to the corporate green bond issuance announcement.

Furthermore, to investigate the second objective, data on three national cultural dimensions, i.e., Individualism, Long-Term vs. Short-Term Orientation, and Uncertainty Avoidance, for 38 countries between 2013 and 2022 has been gathered from the Hofstede Insight website. The cumulative average abnormal return calculated in objective one has been used to measure stocks' response to corporate green bond issuance announcements to achieve objectives 2 and 3. After applying the Random Effect Model, the results of the second objective show that national culture has a significant positive impact on stock responses to corporate green bond issuance announcements.

Similarly, data from the Environmental Performance Index to measure national environmental performance was gathered for 38 countries between 2013 and 2022 from the Environmental Performance Index website to achieve the third objective. After applying the Random Effect Model, the results of the third objective show that national environmental performance has a significant positive impact on stock responses to corporate green bond issuance announcements.

Overall, the results highlight that stocks respond positively to corporate green bond issuance announcements, further national culture and environmental performance significantly and positively impact these responses. The results of this study are expected to contribute to bridging the theoretical gap by examining the role of national culture and environmental performance in green bond research. Therefore, it will allow policymakers to re-examine the current policies on green bond issuance and establish an appropriate green bond issuance policy considering countries' national cultures and environmental performance.

Keywords: Event Study Model, Green bonds, National culture, National environmental performance, Random Effect Model.

SDG: GOAL 13: Climate Action

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

IMPAK BUDAYA KEBANGSAAN DAN PRESTASI ALAM SEKITAR KEPADA REAKSI SAHAM TERHADAP PENGUMUMAN TERBITAN BON HIJAU KORPORAT

Oleh

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Perubahan iklim yang berpunca daripada pemanasan global menimbulkan risiko kewangan yang ketara bagi dunia perniagaan. Bon hijau diperlukan untuk mengurangkan risiko perubahan iklim dan kelestarian alam sekitar. Bon hijau telah mendapat banyak perhatian daripada pelabur kerana sifatnya yang mampan dan mesra alam. Terdapat beberapa kajian empirikal berkaitan reaksi saham terhadap pengumuman terbitan bon hijau, namun penemuan kajian masih tidak konsisten mengenai reaksi positif dan negatif saham terhadap pengumuman tersebut. Tambahan pula, faktor peringkat negara seperti budaya kebangsaan dan prestasi alam sekitar yang boleh memberi kesan kepada reaksi saham terhadap pengumuman terbitan bon hijau korporat tiada dalam literatur. Oleh itu, kajian ini (1) menyiasat reaksi saham terhadap pengumuman terbitan bon hijau korporat, (2) mengkaji impak budaya kebangsaan kepada reaksi saham terhadap pengumuman terbitan bon hijau korporat, dan (3) menyiasat impak prestasi alam sekitar negara kepada reaksi saham terhadap pengumuman terbitan bon hijau korporat.

Data daripada 230 penerbit bon hijau korporat antarabangsa yang terdiri dari 38 negara antara tahun 2013 dan 2022 telah dikumpul daripada pangkalan data *Climate Bond Initiative* dan *International Capital Market Association* untuk mencapai objektif yang pertama. Data harga saham penerbit bon hijau telah dikumpulkan daripada pengkalan data *Datastream*. Menggunakan metodologi kajian peristiwa, purata pulangan abnormal kumulatif dikira untuk mengukur reaksi saham terhadap pengumuman terbitan bon hijau korporat. Keputusan objektif pertama menunjukkan bahawa saham menunjukkan reaksi positif terhadap pengumuman terbitan bon hijau korporat.

Tambahan lagi, untuk menyiasat objektif kedua, tiga skor dimensi budaya kebangsaan, iaitu, Individualisme, Orientasi Jangka Panjang dan Pengelakan Ketidakpastian untuk 38 negara antara tahun 2013 dan 2022 telah dikumpulkan daripada laman sesawang *Hofstede Insight*. Purata pulangan abnormal kumulatif yang dikira dalam objektif satu telah digunakan untuk mengukur reaksi saham terhadap pengumuman terbitan bon hijau korporat untuk mencapai objektif 2 dan 3. Selepas menggunakan *Random Effect Model*, keputusan objektif kedua menunjukkan bahawa budaya negara mempunyai kesan positif yang signifikan kepada reaksi saham terhadap pengumuman terbitan bon hijau korporat.

Selain itu, data daripada *Environmental Performance Index* untuk mengukur prestasi alam sekitar negara telah dikumpulkan untuk 38 negara antara tahun 2013 dan 2022 daripada laman sesawang *Environmental Performance Index* untuk mencapai objektif yang ketiga. Selepas menggunakan *Random Effect Model*, penemuan objektif ketiga menunjukkan bahawa prestasi alam sekitar negara mempunyai impak positif yang signifikan terhadap reaksi saham kepada pengumuman terbitan bon hijau korporat.

Secara keseluruhannya, penemuan menunjukkan bahawa saham bertindak balas secara positif terhadap pengumuman terbitan bon hijau korporat dan seterusnya prestasi budaya dan alam sekitar negara menyumbang kepada reaksi ini dengan positif. Hasil kajian ini menyumbang dalam merapatkan jurang teori dengan mengkaji peranan budaya kebangsaan dan prestasi alam sekitar dalam penyelidikan bon hijau. Oleh itu, ia akan membolehkan penggubal dasar meneliti semula dasar semasa berkaitan penerbitan bon hijau dan mewujudkan dasar bon hijau yang sesuai dengan mengambil kira budaya kebangsaan dan prestasi alam sekitar sesebuah negara.

Kata Kunci: Model Kajian Acara, Bon Hijau, Budaya Kebangsaan, Prestasi alam ekitar Negara, Model Kesan Rawak.

SDG: MATLAMAT 13: Tindakan Memerangi Pembahan Iklim

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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AR	Abnormal return
CBI	Climate Bonds Initiative
CAR	Cumulative Abnormal Return
CAAR	Cumulative Average Abnormal Return
ICMA	International Capital Market Association
IND	Individualism dimension of national culture
LTO	Long-Term Orientation dimension of national culture
UA	Uncertainty Avoidance dimension of national culture
EPI	Environmental Performance Index
IF	Investment Freedom
GDPG	Gross Domestic Product Annual Growth
GDPPC	Gross Domestic Product per Capita
NEP	National Environmental Performance
ESG	Environmental Social and Governance
SRI	Socially Responsible Investment

CHAPTER 1

INTRODUCTION

1.1 Introduction

The first chapter of this thesis starts with the background and rationale of the present study. It provides an overview of stocks' response to corporate green bond issuance announcements and how national culture and environmental performance impact these responses. The chapter subsequently describes the problem of this study, its objectives, its research questions, and significance. The chapter concludes with the organization of this thesis.

1.2 Background of the Study

Climate change, stemming from global warming, is one of humanity's most critical challenges in the twenty-first century. Moreover, it has financial consequences for the business world. The growing recognition of climate change's financial risks is widespread (NGFS, 2019). Previous work describes the three types of climate-associated financial risks: physical, liability, and transitional (Campiglio et al., 2022). Physical risks involve potential disruptions caused by weather and climate-related events, such as storms and floods, which can adversely impact trade (CFRF, 2021). Liability risks emerge when parties incur damages or losses due to climate change (Barker et al., 2021). Lastly, transitional risks refer to the risks that arise while transitioning to a low-carbon economy. For instance, the value of financial assets tied to fossil fuels may decline as individuals and organizations shift away from these energy sources, leading to substantial losses for investors who hold such assets (CFRF, 2021).

Now a day's primary role of financial experts is how efficient they are in managing, controlling, and profiting from financial risk, including transitional, liability, and physical risks related to climate change. It is essential to take rapid, comprehensive steps regarding the use of fossil fuels to reduce carbon emissions and many other environmentally damaging factors to prevent the devastating effects of climate change on the ecosystem and human life. In this regard, one of the significant desires of governmental intuitions and environmental scientists is to attain a green economy. The green economy is another vision of economic growth and development. It refers to the generation of economic development, improvement of the welfare of humanity, and social justice while decreasing climate risk and environmental inadequacies (Özkaynak, 2019).

In light of this, as well as other unfavourable changes in the climate, policymakers have increased their concern about creating a green economy by offering environment-friendly financial instruments. Funding fossil fuels and green initiatives is essential in accomplishing this goal. Green-minded companies can obtain money by issuing financial instruments like green bonds, which are used for environmentally beneficial projects (Park, 2018). Recently, green bonds have been considered an emerging and novel financial instrument used for funding projects that lead to the implementation of the green economy (Banga, 2019). In addition, a reduction in carbon emissions is observed when green bonds are issued, indicating unequivocally that green bonds are used to combat climate change (Fatica & Panzica, 2021).

1.3 Overview of Green Bond

Like regular bonds, green bonds are debt instruments. However, the money raised from the sale of green bonds is used to support eco-friendly initiatives that lessen the damaging effects of human activity on the climate. For example, according to Mihálovits and Tapaszti (2018), green bonds provide funding for initiatives that directly or indirectly promote environmental conservation. Green bonds differ from conventional bonds in how they are used. To be more specific, the goal of green bonds is to increase finance for ecologically beneficial projects that meet moderate profit requirements and allow one to preserve long-term social and environmental advantages.

During the past decade in sustainable finance, the green bond has been among the most innovative and prominent innovations. Green bonds are considered one of the newest market segments, attracting market participants' interest in global financial markets. Green bond income supports environmental pollution prevention, climate change mitigation, and natural resource conservation (Broadstock & Cheng, 2019). The growing body of research on energy finance, climate finance, and green finance has addressed this subject and focuses on the rapid expansion of green bonds (Flammer, 2020; Zhang, 2020).

When the European Investment Bank introduced the "Climate Awareness Bond" in 2007, the market for green bonds began to grow in terms of both issuance and geographic reach (Climate Bonds Initiative, 2022). Green bonds worth USD 2.334 trillion were issued from 2008 till May 2023. Figure 1 illustrates the volume of green bond issuance, showing a continuous increase from 2014 to 2021, with a decline

observed in 2022 due to challenging macroeconomic conditions affecting international bond issuance (Climate Bonds Initiative, 2022). Green bonds' explosive rise illustrates how capital markets use private money to combat climate change and advance a resilient economy (MacAskill et al., 2021). The trend towards environment-friendly investment by bond issuers and ethical investors is evident in the flourishing global green bond market.

The green bond market's growth pattern can be seen in Figure 1.1. Every year, the amount of green bonds issued increases. Figure 1.1 illustrates how annual green bond issuance is expected to reach USD 1 trillion for the first time in a year by the end of 2022 (Climate Bonds Initiative, 2022).

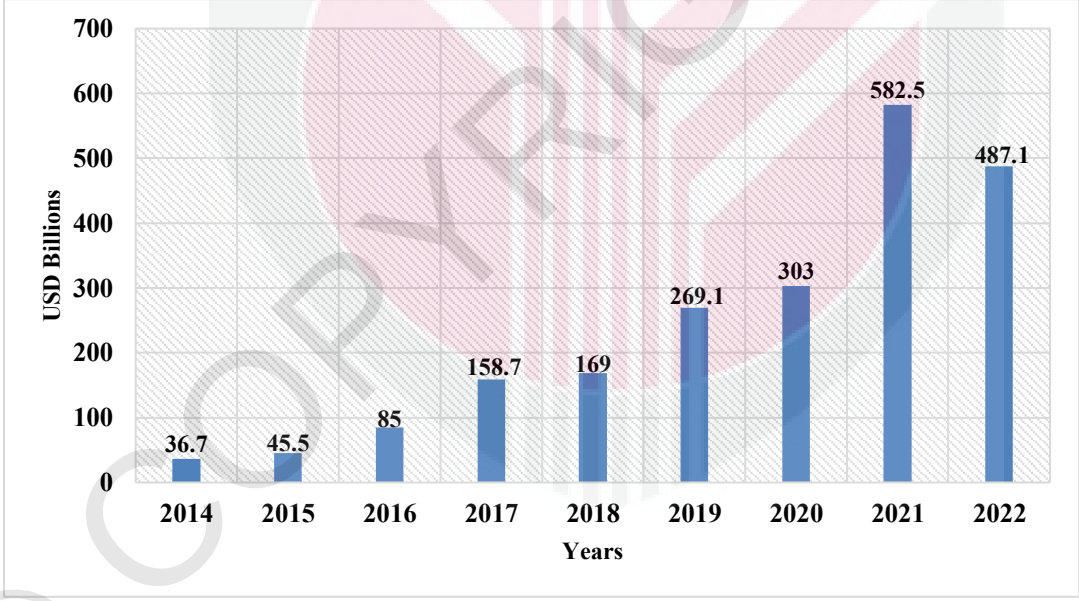

Figure 1.1 : Green bond issuance
(Source: Climate Bonds Initiative)

By the first quarter of 2022, the total volume of green bonds has reached $ 2.334 trillion. The volume of green bonds has grown 50% each year since its introduction in 2007 (Climate Bonds Initiative, 2022). This statistical information presents a precise picture of the green bond issuance cycle and its market value. Developing a green bond issue demonstrates the importance and growing tendency of the worldwide green bond market. Figure 1.2 shows the breakdown of green bond issuance concerning the financial and corporate sectors over the year.

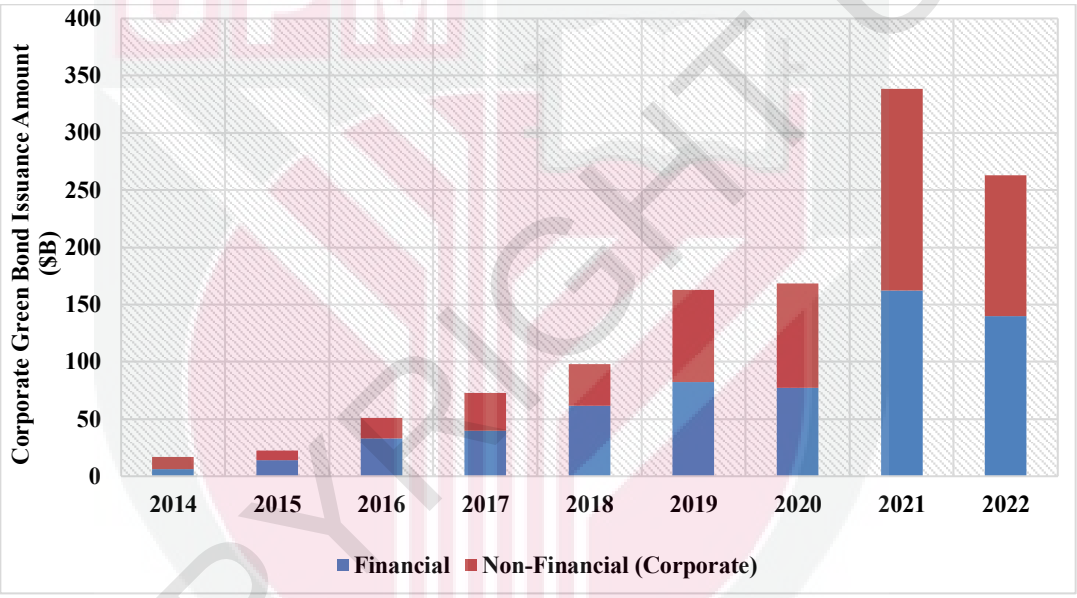

Figure 1.2 : Green Bond issuance by the financial and corporate sector
(Source: Climate Bonds Initiative)

Moreover, Figure 1.3 shows that green bonds are issued more in developed markets, followed by emerging markets (Climate Bonds Initiative, 2022). Green bonds of 1538.9 USD million are issued in developed markets, whereas in emerging markets, the total issuance of green bonds is 444.4 million USD. The primary factors behind the differences in the green bonds' issuance could be national culture and environmental performance. According to Mertzanis and Tebourbi (2023), green bond

issuance varies from country to country due to national culture and environmental performance.

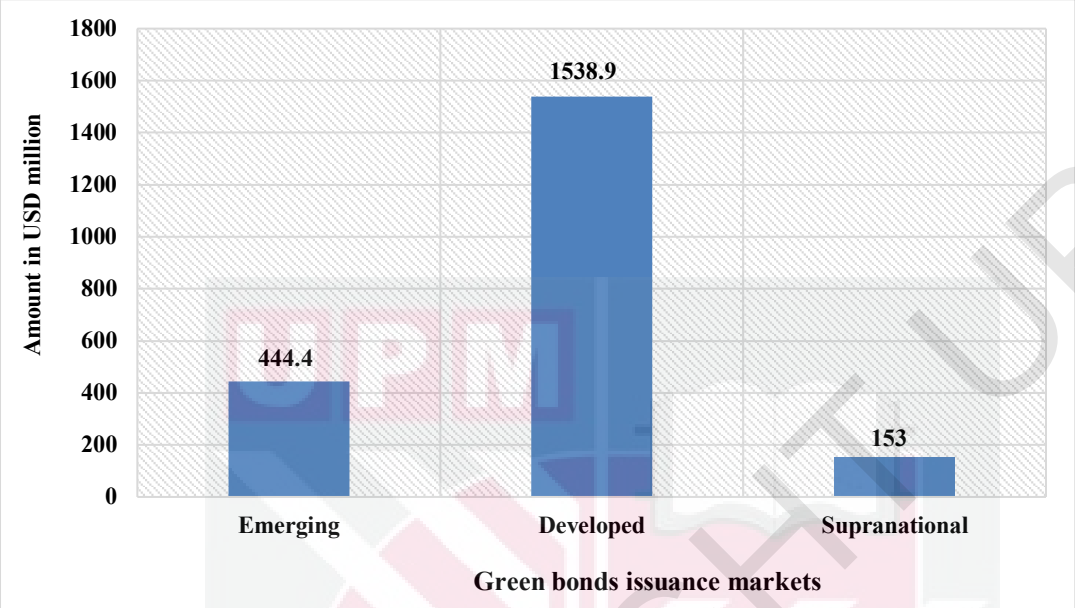

Figure 1.3 : Total green bond issuance in various markets
(Source: Climate Bonds Initiative)

Moving forward, earning from green bonds is a prominent feature supporting demonstrable projects planned to relieve environmental or climate impact. There was no method that had been accepted to characterize the project as "green" before 2014. A group of thirteen financial institutions put up plans at the beginning of 2014 to illustrate the green bond tenets to grow the market for green bonds. The standards for using revenues were proposed by the green bond principles (World Bank, 2021). Green bond proceeds finance building projects, waste and pollution projects, energy efficiency initiatives, sustainable water projects, renewable energy projects, and low-carbon transportation projects (Reboredo & Ugolini, 2020).

Regarding the proportionate usage of revenue from green bonds, Figure 1.4 below highlights that 35 % of proceeds are used in energy projects, 30 % in buildings, 06 %

in water, 18 % in transport, 4 % in waste management, 5 % in Land Use, 1 % in industry, 1 % in ICT and 1 % are unallocated A&R (Climate Bonds Initiative, 2022).

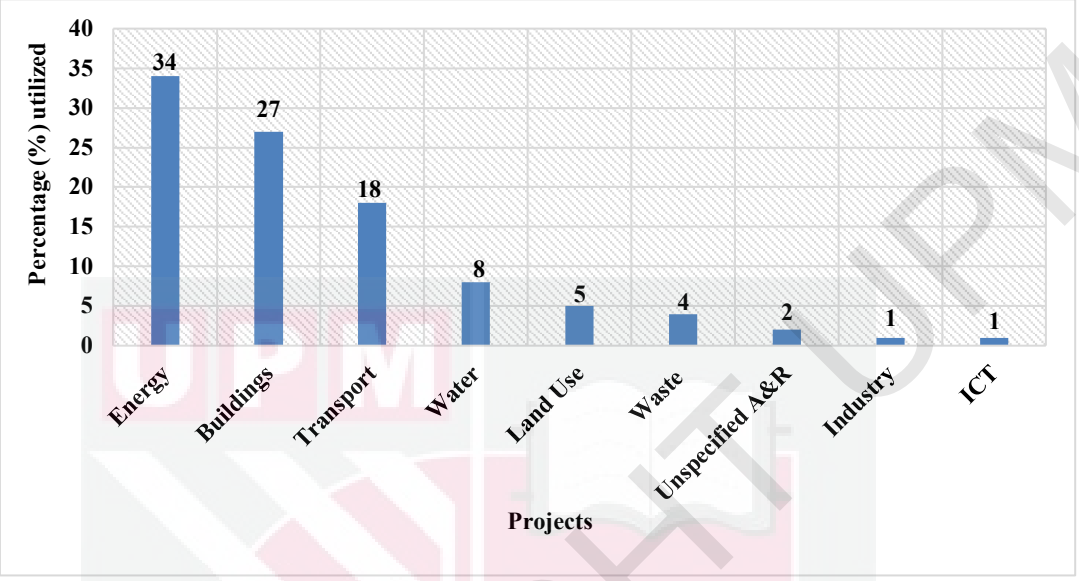

Figure 1.4 : Use of Proceeds from Green Bonds
(Source: Climate Bonds Initiative)

More specifically, the latest progress in business finance is using corporate green bonds. The proceeds from issuing these corporate green bonds finance environmentally beneficial initiatives, including resource preservation, renewable energy development, and green building. In March 2014, for example, Unilever issued a £250 million green bond to halve its operations' waste, water use, and greenhouse gas emissions. In June 2017, the Apple Company released a $1 billion green bond to finance energy efficiency and renewable energy projects throughout its supply chain and facilities. In line with this, Toyota Corporation utilized the proceeds from green bonds to pay for auto loans to purchase electric and hybrid vehicles. Businesses can use the proceeds from green bonds to save expenses, boost productivity, and lessen their environmental impact. Green bonds have become more and more well-liked in recent years. This trend is called the "green bond boom" by Morgan Stanely. Before

2013, there were no corporate green bonds; only USD 5 billion were issued that year. Subsequently, the corporate green bond issuance skyrocketed. The corporate sector released a USD 95.7 billion corporate green bond in 2018.

1.4 Corporate Green Bonds' Issuance Announcements and Stocks' Response

As the corporate green bond is a new market instrument, the world knows less about it. Naturally, it may look confusing that firms, rather than issuing conventional bonds, issue green bonds, as the earnings from green bonds are dedicated to environment-friendly schemes, which limit the investment strategies of the corporations. Furthermore, to meet the requirements as a certified green bond, firms need third-party confirmation to build that amount from green bond issuance invested in projects producing environmental benefits, which ultimately enhance compliance and administrative costs.

Given the restrictive nature of green bonds, it would seem more prudent for companies to issue conventional bonds and use the proceeds to fund environmentally friendly initiatives if they appear to be more financially feasible than other projects. On the other hand, the rationale for issuing corporate green bonds is that the companies want to convey to the market that they are serious about protecting the environment. Since investors don't know much about the environment, this signal is essential (Lyon & Maxwell, 2011; Lyon & Montgomery, 2015).

Corporate green bond issuance impacts the stock market because, according to several researchers, it causes equities to rise, suggesting that owners may profit from the issue of corporate green bonds (Tang & Zhang, 2020; Wang et al., 2020; Baulkaran, 2019;

Mohd Roslen et al., 2017). Investors could see green bonds as a company's attempt to raise money from people with ESG mandates. For example, Electricite de France (EDF) issued 60 percent of its green bonds in 2013 to investors who upheld ESG mandates (EDF, 2013). The increase of wealth is not the primary ruling approach for investment in organizations among these investors. Therefore, if green bond issuers attempt to use a new approach to financing, a negative or neutral impact can be expected, e.g., the market responds negatively to the green bonds' issuance; still, this response is not the same for all countries (Lebelle et al., 2020).

Due to third-party certification, issuing green bonds can be expensive and time-consuming for first-time issuers. As a result, it's critical to consider whether the stocks' response to corporate green bond issuance will be positive, neutral, or negative.

However, it is noticed in the literature that stock responses to new announcements in the market may vary from country to country due to national culture (Ashraf, 2021; Fernandez-Perez et al., 2021) and environmental performance (Yildiz & Karan, 2020). Therefore, the impact of environmental performance and national culture on stock response to corporate green bond issuance announcements is essential.

1.5 Role of national culture in stocks' response

Previous studies have observed that stock responses differ between nations. These differences can be attributed to different degrees of anticipated future financial loss (Gormsen & Koijen, 2020) and investors' sentiments (Zhang et al., 2020). Investment sentiment is an investor's perception of investment risk, expected cash flows, or the tendency to gamble (Baker & Wurgler, 2006). It is crucial to notice that culture is an

essential factor in shaping investor sentiment, which is described in the literature as well, e.g., Schmeling (2009) explained that cultural values vary from nation to nation, influencing investor sentiment and, consequently, their response to new market information.

Previous studies highlighted that cultural differences can be described as investors' risk tolerance and preference (Li et al., 2013; Anderson et al., 2011; Chui & Kwok, 2008). The existing literature focuses on the concept that cultural differences are vital to investors' understanding and ability to respond to new information (Dou & Qi, 2019; Schneider & Meyer, 1991). Additionally, national culture also has an impact on the financial conduct, decisions, and preferences of investors (Cetenak et al., 2017)

Generally speaking, culture is the amalgamation of common standards, values, beliefs, traditions, and behaviours that set members of a group apart from one another (Houseet al., 2004; Hofstede, 1980). Human behaviour is shaped by culture, which also determines what is appropriate and inappropriate in a community (Hofstede, 2001). More specifically, national culture is the shared mental framework that sets one nation's citizens apart from those of other countries (Hofstede & Minkov, 2010: Hofstede, 1980). National culture has been classified into six dimensions, i.e., Power Distance, Indulgence vs. Restraint, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance, Short-Term vs. Long-Term Orientation (Hofstede, 1983). In summary, research on country cultures yields a deeper comprehension of how cultural norms influence business finance practices, investor decision-making, and overall financial performance. Numerous studies have

emphasized how national cultures affect investors' decisions, financial decisions, and the financial performance of the companies.

1.6 Role of National Environmental Performance in Stocks' Response

Moreover, one more consent opinion is that the stock market risk and performance may vary from country to country due to environmental performance (Yildiz & Karan, 2020; Dasgupta & Mamingi, 1998). This study focuses on the impact of national environmental performance on stocks' response to corporate green bonds' issuance announcements. National environmental performance is the country's performance on climate change, environmental health, and ecosystem vitality. The Environmental Performance Index (EPI) indicates a nation's environmental performance (Dangelico et al., 2020).

The Environmental Performance Index (EPI) provides a thorough, fact-based summary of global sustainability. As illustrated in Figure 1.8, the Environmental Performance Index (EPI) evaluates 180 countries' ecosystem vitality, environmental health, and climate change performance. This evaluation uses a comprehensive set of 40 performance indicators spanning 11 distinct issue categories. These indicators serve as a means of assessing the proximity of countries to defined environmental policy targets on a national level. The Environmental Performance Index (EPI) comprehensively assesses countries' environmental performance, distinguishing between those that excel and those that fall behind. Additionally, it offers valuable recommendations for nations aspiring to transition towards a sustainable future.

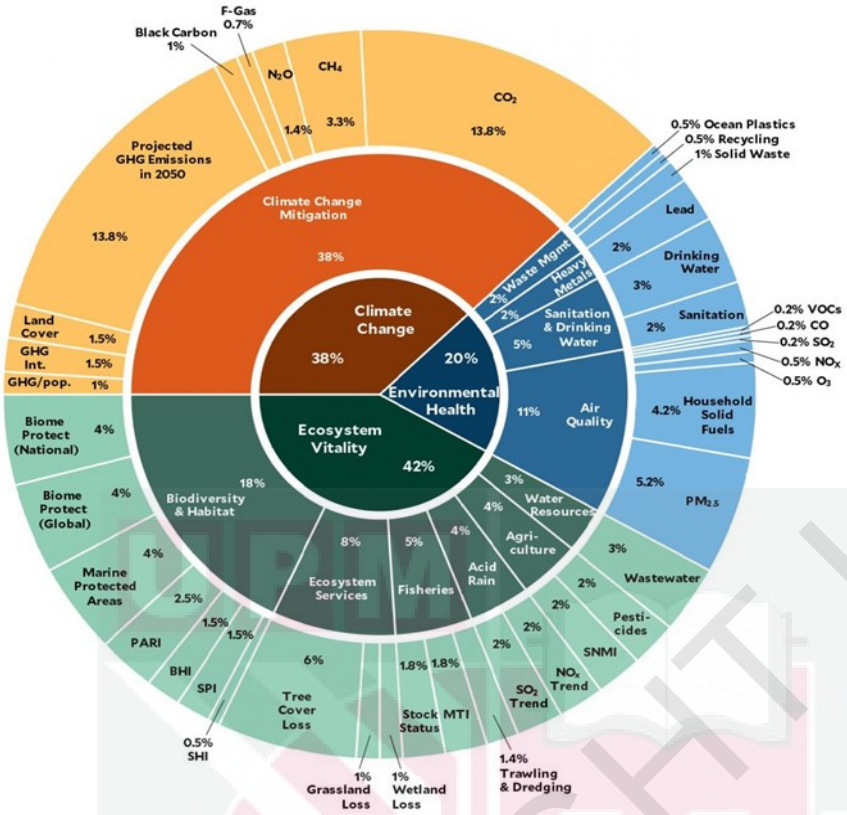

Figure 1.5 : EPI Framework
(Source: Yale Center for Environmental Law and Policy)

Previous studies have highlighted how corporate environmental performance affects firms' stock prices. For example, according to Castro et al. (2021), investors respond positively to the firms' superior environmental performance. Environmental performance is value-relevant and relates significantly to stock prices; stock prices increase due to better environmental performance has been observed. Corporate environmental performance refers to a company's ability to minimize and reduce its environmental effects, usually compared to an industry average or peer group.

As previously discussed, corporate environmental performance affects a firm's stock prices. However, few studies focus on how national environmental performance affects investor decisions. For example, according to Yu et al. (2021), a country that provides better policies on environmental issues may help the firms enhance their

environmental performance, and better firm environmental performance leads to an increase in the firm's stock prices (Castro et al., 2021). Similarly, Yildiz and Karan (2020) discover a significant non-linear relationship between stock price crash risk and environmental performance at the national level. Dasgupta and Mamingi (1998) also find that capital markets respond positively to favourable environmental incidents and negatively to adverse environmental news.

Therefore, it is vital to consider the impact of national environmental performance on stocks' response to corporate green bond issuance announcements. Specifically, the difference in stocks' response to corporate green bond issuance across the countries based on national environmental performance. Is there any difference in stocks' response to corporate green bond issuance for countries leading in environmental performance compared to countries' laggards? It is pertinent to mention that previous studies have highlighted the firm's environmental performance, but limited studies have highlighted the role of national environmental performance on stock response.

1.7 Problem Statement

Green bonds are important because they grow every day because of the changing climate. Proceeds from green bonds are used to assist with sustainable and environmentally friendly tasks. Recently, climate change has been the most highlighted area globally because of its severe physical and financial damages. Climate change significantly impacts the economy; for instance, a rise in global temperature will probably decrease the global economy by $ 23 Trillion by 2050 (Swiss Reinstitute, 2022). Moreover, the significant expected negative impact on the

world and regional GDP due to global change can be depicted in Table 1.1 in the Appendices.

Due to climate change, 250 corporations out of 500 world's biggest firms might see a $1 trillion loss within five years (Forbes, 2021). Major disasters are brought on by climate change, which in turn also affects the stock market. For instance, researchers find the negative impacts of natural disasters on stock market volatility and returns (Nguyen & Chaiechi, 2021; Tavor & Teitler-Regev, 2019). In the same way, environmental disasters also appear to have a negative impact on stock market returns (Seetharam, 2017). Figure A1.1 in the Appendices highlights the relationship between abnormal stock returns and climate disasters. Moreover, problems due to climate change alter investor decision-making. For example, Santi (2023) demonstrates investor overreaction to climate change risk and reversal in more prolonged periods.

The previously highlighted economic aspects of climate change have made research on green bonds even more critical. The money earned from green bonds is put toward eco-friendly initiatives that lessen the detrimental effects of climate change on business and society. Moreover, research has demonstrated that different countries are affected differently by climate change. As a result, considering the financial risks involved, the use of green bonds to combat climate change has significantly increased. Current research supports the idea of issuing green bonds to mitigate climate effects. For example, Fatica and Panzica (2021) discovered that most corporate green bonds are issued to fund climate mitigation projects, ultimately increasing the firm's worth. Similarly, green bonds are financial instruments that reduce carbon emissions and are associated with a rise in environmentally beneficial activities (JRC, 2020). Issuing

green bonds helps minimize risk related to climate change and boosts shareholder value and stock liquidity (Tang & Zhang, 2020).

Recently, various firms have been using green bonds as a source of funding for their businesses along with the benefits of shareholders; e.g., stocks respond positively to corporate green bonds' issuance, and as a whole, this issuance benefits investors (Flammer, 2021). Still, little but mixed academic evidence is available relating to green bond issuance and stock market response, e.g., it has been noted that the issuance of green bonds causes stock markets to decline; however, this response is not the same in all countries, developing markets respond differently from developed markets (Lebelle et al., 2020). This variation of stock market responses to green bond issuance announcements (e.g., positive and negative) leads to further investigation of this concept for in-depth understanding.

However, it is also noticed in the literature that stock market responses may vary from country to country not only due to various levels of projected future financial loss (Gormsen & Koijen, 2020) but also because of investors' sentiment (Zhang et al., 2020). National culture significantly influences how investors think and respond to new information. Due to cultural effects, investors' different responses to new information across countries are also observed (Fernandez-Perez et al., 2021). The issuance of green bonds is new information for investors in the market. Hence, this difference in stock market response leads to the study of the influence of National culture on the stock's response to corporate green bonds' issuance announcements.

Similarly, market response to green bond issuance may vary from country to country due to the national environmental performance. For example, Yildiz and Karan (2020) determine a strong correlation between national environmental performance and the probability of stock price crashes. Further, a country providing better policies on environmental issues may help the firms enhance their environmental performance (Yu et al., 2021); better environmental performance leads to increased firm stock prices (Castro et al., 2021). Hence, the role of national environmental performance is new and still unexplored, especially in the context of stocks' response to corporate green bonds' issuance. Therefore, this indication motivates research into how the stock market responds to the issuing of green bonds concerning environmental performance at the national level. Thus, in light of the study's background and problem statement, the research objectives and questions are as follows.

1.8 Objectives of the Study

This study aims to achieve the following research objectives**.**

i. To investigate the stocks' response to corporate green bonds' issuance announcement.

ii. To investigate the impact of national culture on stocks' response to corporate green bonds' issuance announcement.

iii. To investigate the impact of national environmental performance on stocks' response to corporate green bonds' issuance announcement.

1.9 Research Questions

The following research questions are addressed in this study.

i. What is the stock's response to the corporate green bond issuance announcement?

ii. Does national culture impact the stocks' response to corporate green bonds' issuance announcement?

iii. Does national environmental performance impact the stocks' response to corporate green bonds' issuance announcement?

1.10 Significance of the Study

This study examines the investor response to corporate green bond issuance announcements for publicly traded corporations. It contributes by enhancing corporate green bond literature in which stocks respond to corporate green bonds' issuance announcements. This study has a theoretical contribution regarding the role of national culture on stock responses to corporate green bonds' issuance announcements. Previous studies have highlighted the impact of national culture on stock responses to new information in the market.

For example, Fernandez-Perez et al. (2021) find that countries' stock responses to Covid-19 differ due to the national culture. Hence, the impact of national culture on stocks' response has been studied. However, to the best of the researcher's knowledge, there are currently limited studies that specifically investigated the impact of national culture on stocks' response to corporate green bonds' issuance announcements. Therefore, this study will fill this gap, and that is its theoretical contribution.

Moreover, this study has also made a theoretical contribution regarding the role of national environmental performance on stock responses to corporate green bonds' issuance announcements. Previous studies have highlighted the impact of corporate environmental performance on the stock prices of green bonds' issuers; for example, Castro et al. (2021) discovered a positive correlation between the stock prices of companies that issue green bonds and their corporate environmental performance. Thus, research has been done on how business environmental performance affects stock response. However, the research does not address the effect of national environmental performance on stocks' response to issuing corporate green bonds. As a result, this study's theoretical contribution will also close this gap.

This study benefits investors regarding their portfolio construction; for example, Tang and Zhang (2020) suggested that green bond issuance benefits firms' existing shareholders regarding resource allocation. Krueger et al. (2020) proposed that investors can 50 percent protect themselves from climate change risk through portfolio construction. This study is also essential regarding management perspective for shaping their corporate financing strategies.

This study is essential for various policymakers in formulating and reviewing green bonds and climate risk mitigation strategies. As the impact of climate change may differ from nation to nation, this study also assists policymakers in understanding the variations of investors' interest/preferences in green bonds due to environmental performance/policies and cultural differences at the national level, which ultimately helps them in formulating the strategies to reduce the climate effect.

This study is valuable for the international agencies and regulatory bodies working on green bond growth, certification of green bonds, and framework. This study is worthwhile for the government, business managers, investors, international organizations, and regulatory bodies looking for funds to manage the climate change risk. For instance, it is predicted that Europe alone will need to invest 180 billion euros more annually to meet the 2030 climate change targets outlined in the 2015 Paris Climate Agreement; this also entails a 40% reduction in greenhouse gas (GHG) emissions. Governments can use the results of this study to increase foreign reserves, promote long-term investment, enhance energy security, and lessen the adverse effects of climate change.

With the help of this study, the government will be able to issue more green bonds from various local issuers, allowing the funds to be used toward environmentally friendly projects. In light of this study, the government may encourage financial institutions and businesses to issue more green bonds to expand the green economy. It will be valuable if these players issue green bonds, as doing so will increase investor returns and firm value and decrease the adverse effects of climate change (Tang & Zhang, 2020). Consequentially, state responsibility will be shared with the corporate sector, reducing the government's financial burden in coping with climate change issues. This study tremendously benefits regulatory bodies like the Securities and Exchange Commission, especially in nations brutally affected by climate change and still have an underdeveloped green bond market.

1.11 Definition of Key Terms

The definitions of important terminology used in this study are as follows:

1.11.1 Green Bonds

Green bonds are debt securities like conventional bonds, but the money raised through issuance goes toward funding environmentally friendly initiatives.

1.11.2 National Culture

National culture can be elaborated as the shared arrangement of mind differentiating the people of one society from another. National culture has six further dimensions, i.e., Power Distance, Indulgence vs. Restraint, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance, and Long-Term vs. Short-Term Orientation.

1.11.3 Power Distance

It simply describes how inequality and power are tolerated in society.

1.11.4 Indulgence vs. Restraint

This dimension considers how much a society achieves its goals; in other words, it concerns how civilizations control their needs and wants.

1.11.5 Individualism vs. Collectivism

The Individualism vs. Collectivism dimension considers a society's degree of group integration, reliance on these groupings, and beliefs about its duties.

1.11.6 Masculinity vs. Femininity

The Masculinity vs. Femininity dimension, often known as the gender role difference dimension, measures how much a society values conventional male and female roles.

1.11.7 Uncertainty Avoidance

The degree to which people in a society have established institutions and beliefs to protect themselves from unclear or unknown circumstances because they feel threatened.

1.11.8 Long-Term vs. Short-Term Orientation

The Long-term vs. Short-Term Orientation components consider how society perceives its temporal horizon.

1.11.9 National Environmental Performance

It assesses and measures a nation's environmental health, ecosystem vitality, and sustainability practices.

1.11.10 Stock Response

A stock's response to a particular news or event is called its "stock response" in the stock market setting. The stock response is captured through abnormal returns. An abnormal return is the extremely high gains or losses produced over a specific length of time by a particular investment or portfolio. The discrepancy between expected and actual returns is used to compute abnormal returns.

1.12 Summary of the Chapter

This chapter presents an introductory overview of the critical issues of the study. It has been reported that most studies on green bond issuance announcements are fragmented and examined separately by the issuers' specific characteristics, such as firm size, environmental and financial performance, etc. This chapter justifies this study based on the problems identified, including past empirical findings on stocks' response to green bonds' issuance announcements, which are typically too broad, ambiguous, and inconsistent. This inconsistency is probably due to multiple factors, including national culture and environmental performance differences. Furthermore, this chapter raises the research questions and objectives to drive and guide this investigation. In the last section of the chapter, the significance of the findings of this study is mentioned, including those who will benefit, such as policymakers, investors, academia, and the research community. The theories and empirical data are further discussed in the next chapter, further developing the conceptual framework based on the hypothesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review chapter includes revising and exploring the existing data and information related to the subject of the study. However, research papers, books, conference proceedings, articles, and reports are usually considered for data collection. In the next chapter, the researcher assessed the green bond data, the stocks' response to issuing green bonds, and the significance of national culture and environmental performance. This chapter begins with a statement of the concept of green bonds, and the researcher also considers the historical aspects of green bonds. The chapter then examines the literature regarding how stocks have responded to the announcement of green bonds.

Furthermore, the chapter examines research on how national environmental performance and national culture affect the stocks' response to the issuance of green bonds. After reviewing the existing literature and theoretical background, the researcher postulates the study's hypotheses. At the end of this chapter, the researcher describes the conceptual framework and summary.

Green bonds represent a notable advancement in the financial sector. They are acknowledged as a financial innovation created to help institutional investors, such as sovereign wealth funds, insurance firms, pension funds, and mutual funds, make sustainable investments. Green bonds are sometimes reflected as an innovation that can assist in the rise of sustainable infrastructure investment from institutional

investors by enhancing the liquidity of infrastructure assets (Merk et al., 2012). Currently, no legislature governs a bond's greenness; proceeds from the green bonds clause of the green bonds principles (GBPs) determine what constitutes a green bond. Financial actors have established and recommended these principles through ICMA (International Capital Market Associations). According to these principles, projects that can be supported through green bond procedures include pollution reduction, conservation, renewable energy, water and waste management, energy and resource efficiency, and climate adaptation (ICMA, 2018).

Kila (2019) thoroughly defines and assesses green bonds, highlighting their essential use as funding sources for climate change-related expenses. Green bonds are similar to conventional bonds, comprising interest payments and a principal amount to be paid at maturity; the main difference between them is that the capital generated through green bonds is used for environmentally friendly projects and or by sustainable firms (Flammer, 2020). Projects are designated green projects by obtaining certification from an independent third-party assurance.

However, the certificate can be used to assure the investors about the green project and the use of their funds to reduce greenwashing risks. Known as "climate awareness bonds," the European Investment Bank issued the first green bond in 2007; the World Bank followed likewise in 2008. The investment amount in green bonds is over $1 trillion worldwide (Climate Bonds Initiative, 2022). Paris's agreement of 2015, which made crucial awareness about climate change and raised awareness about it in international forums, became the moment when international executives started to invest in green bonds.

The European Commission's 2019 proposal for a European Green Accord was another vital step toward stabilizing green bond investments. The deal aimed to make the European Union a fair, sustainable, healthy, and prosperous society. The agreement aimed to have all parties involved on the same page, and they all voluntarily demonstrated motivation to act sustainably and make environmentally conscious choices. The Green Deal advocates for dedication, openness, accountability, honesty, aspiration, and urgency and supports inclusion, diversity, and local population facilitation. The agreement aims to shield individuals and natural resources from environmental threats (European Commission, 2024).

2.2 Green Bond Issuance Announcement, Event Study, and Stocks' Response

One innovative approach to sustainable finance is using green bonds as a financial instrument. Different responses from the investor community were stimulated after the green bonds' issuance. A more thorough analysis of the existing literature is necessary to understand better how stocks respond to corporate green bond issuance announcements.

The financial sector is debating whether green bonds are an effective way to combat climate change, as they are still a relatively new tool in the history of the financial markets. Since the launch of the green bond market, most research has been carried out by private financial institutions. Academic studies on green bonds are still in their infancy. Due to the increasing amount of data available and the growing interchange of information about this innovative financial product between the academic and professional worlds, most research articles on green bonds have been published in the

previous three years. While there is a wealth of material on green bonds, the most troubling part of this study is analyzing the stocks' response to issuing this new product. This section summarizes the research that has been done on the topic of the green bond issue and stocks' response.

For example, studies have been conducted on the response of the stocks to the issuance of green bonds. This study was undertaken on 72 publicly traded firms worldwide (Baulkaran, 2019). A significant rise in cumulative abnormal return (CAR) was seen using event study methodology (-10 to +10 days), indicating that investors responded positively to the issuing of green bonds. Additionally, it was discovered using regression analysis that green bonds with higher coupon rates cause investors to respond negatively, but firm size, Tobin's Q, and growth of the firm have positive relationships with CAR, but cash flow has a negative link with CAR.

Another study was done on the advantages of issuing green bonds for shareholders. After applying the conventional event study technique to a sample comprising green bond issuers from 28 countries from 2008 to 2017, the researchers concluded that the issuance of green bonds increased stock prices (Tang & Zhang, 2020). However, the first-time issuer's response was more substantial than repeated issuers of green bonds. A strong response was also seen from the corporate issuer of green bonds instead of the financial institution issuer. Researchers also discovered that institutional ownership and stock liquidity improved following the issuance of green bonds. Thus, the issuance of green bonds benefits existing shareholders.

Zhou and Cui (2019) investigated the corporate performance, green bonds, and CSR of seventy Chinese listed businesses. Their investigation, which employed the event study method, discovered that green bond issuance improved the firms' stock values. Additionally, regression analysis was done to determine how green bond issuance would affect firms' profitability (return on asset), operational performance (gross profit margin), innovation capacity (ratio of R&D to total operational income), and corporate social responsibility. The results showed that green bond issuance positively impacts firms' operational performance, profitability, and innovation capability. Moreover, after the issuing of green bonds, an improvement in firms' CSR was seen.

A research study was also undertaken to assess the connection between green bond issuance and shareholder wealth (Mohd Roslen et al., 2017). This study documented shareholders' responses to the news of the issuing of green bonds. The event study method of research revealed that investors responded positively the day after announcements about the issue of green bonds.

Laborda and Sánchez-Guerra (2021) conducted a European study to evaluate the impact of green bond issuance on the stock market. Data on daily stock prices and the announcement dates of the green bond issue were acquired for this study. It was shown using the Event Study Methodology that returns on the issuers' green bond shares rose following the announcement of the bonds' issuance.

Further, during a study on green bonds, researchers found that investors respond positively to issuing green bonds (Flammer, 2021). Additionally, it was shown that this response was more substantial for businesses issuing green bonds for the first time

and third-party certified bonds. The study also determined that green bond issuers' environmental performance (i.e., reduced CO2 emission and higher environmental ranking) and ownership of green investors increased after issuing green bonds. These results support the Signalling argument that the issuance of green bonds effectively communicates the issuer's commitment to the environment.

Research on European insurance firms examined the impact of green bond policy announcements on stock prices (Jakubik & Uguz, 2021). Researchers did not find any significant (positive) impact of green bond policy announcements on stock prices, but when these policies were studied separately, the authors found that green bond issuance and the introduction of green funds seemed to influence the stock prices positively.

Wang et al. (2020) carried out another study in China to examine the debt and stock market responses to the issuing of green bonds. This study was the first to concurrently document the debt and market responses to the issuance of green bonds. The study demonstrated that investors respond positively to issuing green bonds in debt and equity markets. A price premium for corporate green bonds over traditional bonds was also established. For new issuers of green bonds, this price premium was more pronounced. The price premium was similarly higher for institutional long-term investors with less ownership concentration.

Verma and Bansal (2021) further studied the stock market's response to the issuing of green bonds from 20 Indian listed firms. An event study approach with a 21-day [1-10 and +10 days] event window was applied to record the investor response.

Researchers observed that the issue of green bonds had a positive impact on stock prices (positive CAR of 10 days), which reflects investors' positive attitudes toward the issuance of green bonds.

Pedersen and Thun (2019) also explored the impact of green bond issuance on European stock markets from 2013-2019. For this purpose, 54 firms from Europe were selected as a sample. After employing the event study methodology, a CAAR of 0.13% in two two-day event windows surrounding the event day showed the positive behaviour of stock returns in response to green bond issuance. Additionally, differences in the stock market's response to the issuance of green bonds were found based on regional differences in Europe. It was discovered that northern Europe experienced a higher stock market return with a CAAR of 0.67%, whereas no significant returns were seen for the rest of the continent. That suggests that the issue of green bonds in northern Europe is the leading cause of the positive stocks' response.

Similarly, research examined how stock investors reacted to the news of green bond issuance before and after the Paris Agreement. (Glavas, 2020). The study sample comprised 780 green bond issuance announcements from 18 countries between 2013 and 2018. The event study's conclusions showed that investors reacted positively to the announcement of green bonds. The sample was split into two periods: before and after the Paris Agreement. Separate analyses of the two sample periods revealed that, compared to the period before the Paris Agreement, the positive stock market response massively increased after the Paris Agreement.

Researching the green bond issuances of 145 distinct firms worldwide, Lebelle et al. (2020) discovered that the stock market responded negatively to the issuance of green bonds. When comparing the developed market to the developing market, the first-time issuer of green bonds had a more negative response. Investors received a message from this sort of green bond issuance response that they Respond to green bonds similarly to convertible or conventional bonds.

Wu (2022) conducted a follow-up study on global green bond issuers to evaluate the impact of green bond issuance on the share prices of these firms. The conclusion reached after using the event research approach was that green bond issuers' stock market performance had decreased due to the issuance of green bonds. The author discovered a decline in stock returns after issuing the green bonds.

Scholars mainly agreed that issuing green bonds positively impacts a firm's share prices, even in the face of evidence to the contrary from Lebelle et al. (2020) and Wu (2022). The data from the conventional bond market, which indicates that the announcement of a corporate bond issue reduces the firm's share price, seems to contradict the evidence of a positive response in the green bond market (Hemmingson & Ydenius 2017; Ammann et al., 2011; Dann & Mikkelson, 1984).

The above literature review highlights the most recent studies on green bonds. It shows that most studies have positive stocks' responses to green bonds' issuance announcements, except two studies by Lebelle et al. (2020) and Wu (2022) showed a negative response. Therefore, explaining why stocks Respond positively or negatively to issuing corporate green bonds is necessary. The issuance of corporate green bonds

may be a credible indication of the firm's environmental commitment, and since the stock market responds positively to firm commitments (Flammer, 2021; Castro et al., 2021), it makes sense that the stock market will react positively to the corporate green bond issuance.

The reason behind the negative stock response to green bond issuance is greenwashing, which states that corporations purport to be environmentally sensible for marketing, but in an actual sense, they are not making any prominent sustainable efforts. Hence, if corporations issue green bonds for greenwashing purposes and investors recognize them, it conveys a reputational risk to investors; consequently, investors punish these greenwashing practices by divesting, resulting in negative stock responses.

2.2.1 Research Gap and Hypothesis Development

The previous literature highlights that stocks respond to corporate green bonds' issuance announcements, but there are still mixed results regarding the direction of the response of the stock. For example, Flammer (2021) observed that stocks respond positively to corporate green bond issuance announcements, whereas Wu (2022) found that stocks respond negatively to corporate green bond issuance announcements. Furthermore, (Lebelle et al., 2020) observed that stocks' response to corporate green bond issuance announcements differs in all countries.

Hence, mixed evidence regarding direction and difference in the stock response to corporate green bonds issuance announcements across countries creates a clear gap for further investigation on stocks' response to corporate green bonds' issuance

announcements with the comprehensive dataset. Moreover, previous literature highlights both the positive and negative stock responses to corporate green bond issuance announcements, but it is observed that except for two studies, all studies discussed here have shown positive stock responses to green bond issuance announcements. Therefore, this study expects positive stock responses to corporate green bond issuance announcements. This study proposes the following hypothesis in consideration of the preceding discourse.

H1: Stocks respond positively to the corporate green bonds' issuance announcement.

2.3 National Culture and Stocks' Response

When management was seen as universal and the same principles would apply everywhere, it seemed unimaginable in the mid-1950s and early 1960s that culture could impact corporate management. (Hofstede, 1983). In 1970, the idea of universal management began to erode. That happened due to growing cultural distinctions within a given nation or region instead of declining. (Hofstede, 1983). As a result of this notion of increasing regional differences in culture, scholars focused on creating models to analyze culture (Trice & Beyer, 1984).

The collective mental programming that divides people into several categories is national culture (Hofstede, 1983; Houseet al., 2004). It also discusses how different groups in different countries or areas have different values (Hofstede, 2011). These variations are one of the problems in managing multinational and multicultural firms, whether public or private (Hofstede, 1983). Hofstede (1983) describes that nationality is significant for at least three reasons: political (because nations are political units

with histories, institutions, and systems), sociological (because nationality or regionality has symbolic value for citizens), and psychological (because national cultural factors partially condition thinking).

Hofstede's national culture model is one of the most widely used theories on how culture influences corporate values from 1983 to the present. The study that created this model considered a vast database of employee value scores that IBM collected between 1967 and 1973. After gathering information from more than 70 nations, the researcher initially used 40 essential respondents before extending the analysis to 50 countries and three regions (Hofstede, 2011). One could argue that Hofstede's cultural measures are outdated date because they were created decades ago rather than reflecting contemporary cultural shifts (Kirkman et al., 2006; Baskerville, 2003).

The first four national cultural dimensions were Individualism vs. Collectivism, Power Distance (from large to small), Uncertainty Avoidance (from strong to weak), and Masculinity vs. Femininity (Hofstede, 1983); the researcher included two more dimensions: Indulgence vs. Restraint and Short-Term vs. Long-Term Orientation. The six cultural dimensions distinguish nations (and not people) from one another and reflect personal preferences for one situation over another (Hofstede, 2011).

Culture influences human behaviour and establishes social norms around what is and is not acceptable (Hofstede, 2001). The collective mental programming that sets one nation apart is its national culture (Hofstede, 1980; Hofstede, 2001; Hofstede & Minkov, 2010). The six dimensions of national culture are Power Distance, Indulgence vs. Restraint, Uncertainty Avoidance, Individualism vs Collectivism,

Masculinity vs. Feminity, and Long-Term vs. Short-Term Orientation (Hofstede, 1980). The degree and propensity of a community to fulfill its desires are called Indulgence vs. Restraint. The difference between Individualism and Collectivism refers to how much a member of a society can identify as someone other than a community member. The dichotomy of Masculinity vs. Femininity determines the degree to which the community accepts or rejects the traditional male labour role model.

The degree to which community members perceive and avoid risk is expressed as Uncertainty Avoidance. Short-Term vs. Long-Term Orientation is the degree to which individuals value the short-term approach to thinking more highly than the long-term approach (Hofstede, 1980; Hofstede, 2001). National culture plays a significant role in determining financial performance, namely how the stock market responds. National cultures impact stock market responses, which differ between nations (Fernandez-Perez et al., 2021). Hofstede's cultural dimensions theory provides a theoretical explanation for this.

Furthermore, there is literature on the connection between national culture and corporate decisions. This research looked at how national culture affects specific business ideas, like keeping cash on hand and making financial decisions for the firm (Antonczyk & Salzmann, 2014; Chen et al., 2015; Chui et al., 2002; Chui et al., 2010). The literature also emphasized how national culture influences financing decisions, impacting the business's financial performance. Farooq et al. (2020) Farooq et al. (2020) investigated a country's culture and firms' performance through financial decision mediation. The authors researched 7623 non-financial sector firms operating

in 13 Asian nations. The study's findings showed that countries with high levels of Individualism, Power Distance, and Long-Term Orientation do poorly economically because of high transaction and agency costs and the problem of asymmetric knowledge when making financing decisions. However, nations that exhibit high levels of Individualism, Masculinity, and Uncertainty Avoidance also have high levels of firm performance. The conclusion is that national culture, even mediating finance decisions, substantially impacts firms' financial efficiency and performance.

Furthermore, sociology literature argues that culture is essential in how societies observe and Respond to new information (Ashraf, 2021). Numerous studies have shown that cultural values and beliefs influence people's perceptions of information and responses to it (Brochet et al., 2019; Chui & Kwok, 2008; Nguyen et al., 2018). Given this, researchers found that different degrees of expected future economic loss cause market responses to new information to vary between countries (Gormsen & Koijen, 2020) and investors' sentiment (Zhang & Hu, 2020). Simultaneously, investor sentiment can be seen in their perceptions of future cash flow and investment risk or, conversely, in their propensity for investment speculation (Baker & Wurgler, 2006). In addition, Schmeling (2009) concluded that attitudes among investors are influenced by variations in cross-national cultural values, which characterize investors' responses to the news.

Few studies highlighted the effect of national culture on the stock market's response to new information, explaining that stock markets respond differently across countries because of cultural differences. For instance, Ashraf (2021) studied how national culture influences the relationship between COVID-19 and the stock market response.

The study's findings indicate that nations with greater levels of national uncertainty aversion see a more significant reduction in stock market returns in response to a 1% increase in the number of COVID-19 confirmed cases. The study's findings indicated that national culture is the critical element that illustrates the differences between nations in how investors respond to news.

Similarly, Fernandez-Perez et al. (2021) researched how country culture affected stocks' response to the COVID-19 pandemic. For this analysis, data from 63 nations were taken into account. The method of event studies computed the abnormal returns, which indicated the stock market's response to the COVID-19 pandemic. Additionally, the impact of national culture on the stock market's response to COVID-19 (abnormal returns) was captured by panel regression. Upon analyzing the effect of national culture on the relationship between COVID-19 and stock market response, it was found that countries with high levels of Uncertainty Avoidance and low levels of Individualism respond more negatively and experience greater volatility than countries with low levels of Uncertainty Avoidance and high levels of Individualism.

Yildiz and Karan (2020) conducted additional research to examine the impact of national culture on the likelihood of a stock market crash. The researchers used information from 632 renewable energy firms across 31 nations to conduct this investigation. The scholar focused on Long-Term Orientation, Uncertainty Avoidance, and Individualism. The study's findings showed that managers from Individualistic cultures make decisions with greater assurance and optimism, which motivates them to pursue even unsound investments for extended periods and raises the possibility of a stock market crash. Additionally, there is a minimal chance of a

stock price fall for renewable energy firms that operate in cultures with greater levels of Uncertainty Avoidance. Long-Term Orientation revealed a negative but insignificant value, indicating that the Long-Term Orientation culture does not influence energy firms' stock price crash risk.

Overall, the literature on national culture notes that Individualism, Uncertainty Avoidance, and Long-Term Orientation have been extensively researched in financial decision-making, particularly emphasizing how stocks respond to new announcements. During their research on national culture, Hofstede and Minkov (2010) and Hofstede (1980) defined these dimensions. The Individualism vs. Collectivism dimension of national culture expresses the level of social integration within a society. The degree to which community members accept unclear and confusing conditions is known as the Uncertainty Avoidance dimension. The degree to which people value the short-term over the long-term way of thinking is known as Short-Term vs. Long-Term Orientation.

2.3.1 Individualism and Stocks' Response to the Announcements

Countries with Individualistic (high Individualism) cultures emphasize self-abilities or self-attributes, focusing more on individual success than collective success (Fernandez-Perez et al., 2021). Individuals from Individualistic cultures tend to be overconfident, optimistic, and prone to self-attribution biases (Chui et al., 2010). Self-attribution bias describes the propensity of investors to give credit to themselves for their success due to their capabilities, skills, and knowledge and blame others/external factors in case of failure (Czaja & Röder, 2020). Self-attribute makes the individuals more confident.

Self-attribution bias makes people more confident (Trehan & Sinha, 2018). For example, Dawson (2019) states that self-attribution bias motivates investors' risk-taking behaviour and makes them overconfident. For instance, investors who exhibit self-attribution bias may feel prepared to participate in the stock market because of their superior performance. According to Chou et al. (2021), the self-attribute bias tackles the widely accepted notion of the earning announcement anomaly in the stock market. An et al. (2018) show that managers in an Individualistic culture are likely to hold the negative news and share the good news about their firms because of self-attribution bias. Because of this, management quickly announces news about issuing green bonds in Individualistic culture nations because they are environmentally benign. Issuing green bonds makes firms seem more environmentally conscious and reputable, which improves their corporate-environmental performance (Flammer, 2021), ultimately leading to higher stock prices (Castro et al., 2021).

Investors from an Individualistic culture are more overconfident and over-optimistic, and they have more willingness to take risks (Cheon & Lee, 2018; Chui et al., 2010). This behaviour could result in higher volatility and increased trading to a salient event (Odean, 1998). Boubakri et al. (2016) also described that an increased willingness to take risks is correlated with Individualism. The association between high Individualism and increased trading is also observed in the literature (Chui et al., 2010; Statman et al., 2006). Connelly (2017) further asserted that there is a correlation between high Individualism and an increase in socially responsible investing (SRI). Research by Broadstock et al. (2022) shows that purchasing green bonds is a socially responsible investment (SRI).

Therefore, investors in an Individualistic culture are more confident and willing to invest more in green bonds that are considered socially responsible investments. In return, they can get more advantages through higher abnormal returns. Tang (2021) discovered that countries with higher Individualism have more green bonds. Due to self-attribution bias, investors are willing to purchase green stocks in Individualistic cultures. Therefore, we expect that investors may over-respond to the news of green bond issuance and can earn more returns if issuing firms belong to an Individualistic culture.

2.3.1.1 Research Gap and Hypothesis Development

Prior research has demonstrated how the Individualism dimension of national culture affects stock responses to fresh market information. For instance, Fernandez-Perez et al. (2021) discovered that national cultures' Individualistic dimension contributes to the variation in stock responses to COVID-19 among nations. As a result, the effect of national culture's Individualism dimension on stock response has been researched; moreover, the literature needs to particularly address how national culture impacts stocks' response to the issuing of corporate green bonds. This investigation will, therefore, fill this gap. Based on the above discussion, the following hypothesis can be proposed.

H2a: There is a significant positive relationship between the Individualism dimension of national culture and abnormal stock returns around the corporate green bonds' issuance announcements.

2.3.2 Uncertainty Avoidance and Stocks' Response to the Announcements

Another dimension of national culture that could explain the investor's responses to new information may vary across the countries due to Uncertainty Avoidance behaviour. According to the literature, Uncertainty Avoidance refers to a society's attempt to reduce ambiguity as a coping mechanism for anxiety or the propensity of individuals and businesses to perceive danger and express aversion to it. Hofstede (1980) also defined Uncertainty Avoidance as the extent to which culture members feel threatened by ambiguous or unknown situations and have created beliefs and institutions to try to avoid these. Members of the Uncertainty Avoidance Society are involved in selling the panic to evade the uncertainty (Ashraf, 2021).

It has been noted that individuals with higher levels of Uncertainty Avoidance tend to purchase more life insurance (Chui & Kwok, 2008). On the other hand, businesses that are part of a high Uncertainty Avoidance culture take low business risk (Li et al., 2013), follow conventional cash-holding strategies (Chen et al., 2015), and refrain from making investments in global financial markets (Anderson et al., 2011). Moreover, investors tend to limit their investment in countries with high levels of Uncertainty Avoidance because of their riskier markets (Inklaar & Yang, 2012). Mihet (2013) also noted that inventive and risk-taking attitudes are lower in societies with high levels of Uncertainty Avoidance. Keswani et al. (2016) reported that higher Uncertainty Avoidance countries' investors love to stay with conventional investments and prefer to ignore alternative investments. While green bonds as an alternative investment are considered a source of firms higher innovative performance (Khurram et al., 2023), as well as a source of improvement in green innovation (Wang et al., 2022). According to Labidi et al. (2021), investors from nations with high levels

of Uncertainty Avoidance may find it challenging to abandon conventional investment methods and incorporate ESG into their choices.

Researchers also show that nations with higher levels of Uncertainty Avoidance have lower capital flows associated with socially responsible investment (SRI). Broadstock et al. (2022) documented that investing in green bonds is a socially responsible investment (SRI), and investment in green bonds increases ESG practices (Wang & Wang, 2022). Therefore, investors from Uncertainty Avoidance cultures are reluctant to take additional risks and are happy to stay with the traditional investment. They are even hesitant to invest in innovative and socially responsible investments like green bonds due to their Uncertainty Avoidance behaviour. Because they cannot profit or lose money from green bond issuance announcements, they don't care about them, and as a result, stocks don't respond to them in a culture that values Uncertainty Avoidance.

2.3.2.1 Research Gap and Hypothesis Development

Prior research has emphasized the influence of the national culture's Uncertainty Avoidance dimension on stock responses to fresh market information. For example, Ashraf (2021) discovered that country cultures' Uncertainty Avoidance dimension accounts for the variations in stock responses to COVID-19 across nations. As a result, the effect of the national culture's Uncertainty Avoidance dimension on stock response has been researched; however, the literature does not particularly address the impact of Uncertainty Avoidance on stocks' response to the issuing of corporate green bonds. This study will consequently fill this gap. Based on the above discussion, the following hypothesis can be proposed.

H2b: There is no significant relationship between Uncertainty Avoidance and stocks' abnormal returns around the corporate green bonds' issuance announcements.

2.3.3 Long-Term Orientation and Stocks' Response to the Announcements

According to Hofstede (1980), Long-Term orientation is the desire to attempt to transform society to prepare it for the future. Long-Term orientation culture has few values such as thrift, sense of shame, persistence, learning honesty, ordering relationships by status, self-disciplined, dependability, and adaptability, while Short-Term Orientation consists of the fulfilment of social obligations and respect for traditional values; it states features connected to past and present (Hofstede & Minkov, 2010).

However, firms that are long-term oriented agreed on a long-run result-oriented approach, whereas firms that are short-term oriented agreed on profit in a short period (Hofstede et al., 2014). Consequently, managers of short-term oriented firms are hesitant to adopt business strategies concerned with innovation and environmental sustainability, while these practices need long-term focused investment, due to which economic performance in the short run may be sacrificed (Hofstede et al., 2014; Nakata & Sivakumar, 1996).

Businesses that emphasize the long-term make investments to establish new, permanent market positions, even if they sacrifice short-term profits (Hofstede et al., 2014). The significance of adopting a long-term perspective to achieve environmental sustainability is that long-term-oriented societies are more likely than short-term societies to invest in environmental safety (Dangelico et al., 2020). Environmental

sustainability may be increased through investment in green projects. For this investment, green bonds' proceedings are used (Climate Bonds Initiative, 2022), which ultimately mitigate the climate change risk (Fatica & Panzica, 2021).

Long-term-oriented investors prefer investing more in green bonds than short-term-oriented investors (Flammer, 2021; Tang & Zhang, 2020). Additionally, it has been noted that the issue of corporate green bonds increased the firm's environmental performance and the ownership of long-term and environmentally conscious investors (Flammer, 2021). Connelly (2017) also demonstrates a positive correlation between Long-Term Orientation culture and socially responsible investing (SRI) capital flow.

Broadstock et al. (2022) documented that investing in green bonds is a socially responsible investment (SRI), and the issuance of green bonds fascinates investors with having a green agenda and socially responsible funds (Tang & Zhang, 2020). Green bonds are a trustworthy indicator of a firm's environmental commitment. Investors with a long-term perspective and care about the environment are more likely to find these firms fascinating. Therefore, it can be justified that stock markets in long-term societies may respond positively to corporate green bonds' issuance announcements; consequently, investors may benefit from it in the form of significantly higher positive abnormal returns.

2.3.3.1 Research Gap and Hypothesis Development

According to earlier research, nations with a national culture emphasizing a long-term approach issue more green bonds. For instance, Mertzanis and Tebourbi (2023) discovered that countries with high Long-Term Orientation culture issue more green

bonds. As far as the researchers are aware, there is a research gap about how stocks respond to the issuance of green bonds in the Long-Term Orientation dimension of national culture. Thus, this research will fill this gap. Based on the above discussion, the following hypothesis can be proposed.

H2c: There is a significant positive relationship between Long-Term Orientation culture and abnormal stock returns around the corporate green bonds' issuance announcements.

2.4 National Environmental Performance and Stocks' Response to the Announcements

Emissions of greenhouse gases are acknowledged as a significant contributor to climate change. Climate change is thought to cause future social and economic harm, significantly impacting business performance (TCFD, 2017). While most sectors are worried about the risks posed by climate change and the shift to a clean energy economy, there are also new opportunities for businesses committed to spearheading and supporting this shift (TCFD, 2020).

Currently, most firms consider green bonds to be a significant tool against climate-related risk and to enhance environmental performance. After issuing green bonds, the carbon intensity of the issuers' assets was reduced. When large sums of money from the issuing of green bonds were used to finance brand-new, environmentally beneficial initiatives, the reduction in carbon emissions became more notable, substantial, and long-lasting. There was also a discernible decrease in carbon emissions with green bonds issued after the Paris Agreement (Fatica & Panzica, 2021).

In this regard, few researchers give a concrete analysis that corporate green bonds may serve as reliable signals in the market about the corporation's commitment to the environment. Given that investors are unaware of the firm's environmental commitment, such a signal may be necessary (Lyon & Maxwell, 2011; Lyon & Montgomery, 2015). From the investor's point of view, this signal creates a robust and credible difference between the corporations dedicated to the environment and those not. It's argued that by offering corporate green bonds, firms demonstrate their support for the environment. It is also acknowledged that this signal is regarded as trustworthy for the following reasons: First, businesses issue green bonds to allocate substantial sums of money to environmentally friendly projects. Second, third parties certify that the funds raised from the sale of green bonds are utilized to finance environmentally friendly projects and are the primary certifiers of green bonds (Flammer, 2021).

Additionally, the researcher looked into the connection between firm environmental performance and green bonds. The study's time frame was from 2013 to 2018. In this case, the green bond was a treatment dummy variable that would equal "0" if a corporation had not issued any green bonds and "1" otherwise. Two metrics were employed for environmental performance. The environmental rating was the first metric, and the CO2 emission ratio divided by book value was the second. A significant correlation between the green bond and environmental performance was shown via panel regression analysis. The environmental rating of firms issuing green bonds increased by 8.7%, and CO_2 emission reduced by 12.9%. These results showed that firms enhance their environmental performance after issuing green bonds. The study's findings were consistent with the Signalling theory, which recommends that green bond signals follow environmental performance enhancement (Flammer, 2021).

In another study, researchers also looked at the effect of environmental performance on stock prices. For this, a sample of 2638 firms listed in 16 European countries for 2005-2017 was taken. The study revealed that environmental performance is value-relevant and relates significantly to stock prices. Investors responded positively to the environmental performance. It was also observed that during the crisis years, the environmental performance effect was lower or insignificant (Castro et al., 2021).

In addition, the study explored the stock market's response to the disclosure of information about pollution. Pollution information disclosure has been used to publicize environmental information; this study collected data from 111 listed firms from 20 industries from 2015 to 2016. After employing the event study, a significant negative impact of pollution disclosure on stock market performance was observed. Investors respond negatively to the pollution information disclosure for firms on the blacklists. It was also observed that firms with large sizes suffer less from pollution news disclosure. It was suggested that polluted firms are penalized due to pollution disclosure through the stock market response mechanism (Zhou et al., 2021). During a study on stock market response to environmental performance, authors found that the stock market responded negatively to inferior environmental performance / adverse environmental events. In addition, capital markets respond positively to the superior environmental performance (Dasgupta & Mamingi, 1998).

A study was conducted in the literature to observe whether or not the shareholders are sensitive to firms' environmental footprint. Stock price data from US publicly listed firms from 1980 to 2009 was taken. After applying the event study methodology, the researcher found an increase in stock prices for firms who behave responsibly toward

the environment; however, firms who behave irresponsibly toward the environment face a decrease in stock prices. Further, it is shown that positive stock responses to the announcements of environment-friendly initiatives have decreased over time. In contrast, the significant adverse response to the announcements of environment-harmful behaviour has increased (Flammer, 2015).

Few studies have also drawn attention to the connection between environmental management and the financial performance of businesses. The environmental performance awards demonstrated that strong environmental management generated positive returns using the event research technique and the firm's stock price data. Environmental crises demonstrate that inadequate environmental management produces significant negative returns. A firm's financial performance greatly benefits from strong environmental performance. On the other hand, poor environmental performance has a substantial detrimental effect on the business's financial performance (Klassen & McLaughlin, 1996).

The above discussion highlights the studies of corporate environmental performance on corporate financial outcomes. These studies provided more detail on the relationship between a firm's environmental performance and financial results. Nevertheless, only limited research is available in the literature highlighting how national environmental factors affected the financial outcome and investor welfare and decisions. The national environment is considered an external business environment, meaning that the external environment influences financial outcomes and investor decisions.

For instance, Yildiz and Karan (2020) researched how national environmental performance affected the stock price crash risk for 626 renewable energy firms from 31 nations. The national environmental performance was measured using an Environmental Performance Index (EPI) stand-in. This analysis showed a strong non-linear correlation between the likelihood of a stock price crash risk and national environmental performance.

Similarly, by mediating the environment, García-Sánchez and Martínez-Ferrero (2019) examined the connection between a CEO's skill, CSR, and a firm's financial performance. The study's findings show that more knowledgeable and able CEOs invest in environmental and social practices, leading to better financial outcomes. In contrast, less knowledgeable and less able CEOs may underinvest or overinvest opportunistically for their benefit and at the cost of shareholders. Furthermore, the Chief executive officer's ability to perform in environmental and social strategies is essential for a generous environment that encourages managerial decision; in these situations, managers with higher ability invest more in socially responsible performance, which ultimately benefits the shareholders by releasing the moral hazards.

An inverse association between environmental performance and stock price crash risk was also noted to bolster the theory that a rise in environmental performance results in a fall in the likelihood of a stock market crash. Furthermore, a study found that environmental laws and policies significantly impact a firm's financial performance and decisions. (Huang et al., 2018; Rassier & Earnhart, 2015). According to

researchers, national environmental sustainability is the primary determinant of the award for environmental practices (Xiao et al., 2018).

Researchers have demonstrated that a firm's environmental performance has increased its shares' value, indicating that investors will respond positively to corporate environmental performance (e.g., Castro et al., 2021). Further, a few researchers highlighted the impact of national environmental performance on financial outcomes (e.g., Yildiz & Karan, 2020). Thus, we anticipate that a firm's domestic environmental performance may influence stock market responses resulting from the issue of green bonds. The justification behind this impact is established on the idea of asymmetric information (otherwise symmetric information) of investors. National Environmental Performance Index information has recently become available to investors and stockholders. Different organizations, such as the Yale Center of Environmental Law and Policy, have constructed the ranking of countries based on environmental issues.

Further, investors from nations with better environmental performance respond positively to green bond issuance announcements because the countries that provide better policies on environmental issues may help the firms enhance their environmental performance (Yu et al., 2021); better firm environmental performance increases the firm’s stock prices (Castro et al., 2021). It is also observed that countries with better environmental performance issue more green bonds (Mertzanis & Tebourbi, 2023), as well as more socially responsible investment (SRI) decisions, are linked to higher national environmental performance rankings (Diouf et al., 2016).

Further, the green bond is considered an essential financial instrument for enhancing environmental performance (Flammer, 2021; Tang & Zhang, 2020) and a tool against climate risk mitigation by reducing the carbon footprint (Fatica & Panzica, 2021). Broadstock et al. (2022) documented that investing in green bonds is a socially responsible investment (SRI), and the issuance of green bonds fascinates investors with a green agenda and socially responsible funds (Tang & Zhang, 2020).

Therefore, it can be said that nations with better environmental performance also have more environmentally dedicated firms that issue maximum green bonds, and investors respond positively to this issuance because they consider investing in green bonds as environmentally and socially responsible investing. Stock markets also perform better around corporate green bond issuance if the issuer belongs to nations with better environmental performance than issuers from lower environmental performance nations. This strong investor response can be seen in the form of higher positive abnormal returns. The discussion above leads to the following hypothesis.

2.4.1 Research Gap and Hypothesis Development

Previous studies have highlighted the impact of corporate environmental performance on the stock prices of green bonds' issuers; for example, Castro et al. (2021) found that corporate environmental performance has a positive relationship with the stock prices of green bonds' issuers. Hence, the role of corporate environmental performance on stock response has been studied, but to the best of the researcher's knowledge, the impact of national environmental performance on stock response to corporate green bonds' issuance is missing in the literature. Therefore, this study will

also fill this gap, which is its theoretical contribution. Based on the above discussion, the following hypothesis can be proposed.

H3: There is a positive relationship between national environmental performance and stocks' abnormal returns around the corporate green bonds' issuance announcements.

2.5 Theoretical Framework

This study employed the Signalling theory, Hofstede cultural Dimension Theory, and Resource-Based theory.

2.5.1 Signalling Theory

The theoretical background on stocks' response to corporate green bond issuance is quite adequate, and the Signalling theory is suitable for describing it. Signalling theory was introduced by Michael Spence (1973). Signalling theory defines behaviour when two parties (organization or individual) have information asymmetry. Typically, the decision to convey (or signal) information rests with the sender or one party, and the receiver or other party must decide how to interpret the signal. In the business world, firms are more aware of their capabilities than their investors are. Because of the information asymmetry, identifying businesses with desirable attributes is more expensive (Akerlof, 1970; Williamson, 1985).

Consequently, it is advantageous for the firm to reduce its asymmetric information by acting in a way that reliably transfers it or by sending out a signal. According to the Signalling theory, a signal is trustworthy if it is expensive for businesses to copy it and provide less appealing attributes (Riley, 1979; Spence, 1973). The Signalling theory

can explain the issuing of corporate green bonds. Typically, investors don't know how to evaluate a firm's environmental commitment (Lyon & Maxwell, 2011; Lyon & Montgomery, 2015). According to the investors' perspective, this creates a need to (credibly) distinguish between environmentally conscious firms and those that are not.

Businesses communicate their commitment to the environment in the market by issuing corporate green bonds. The reasons that make this signal seem trustworthy are as follows. Firstly, firms that issue corporate green bonds pledge large sums for eco-friendly initiatives. Secondly, to guarantee that the money raised from the sale of corporate green bonds is utilized to finance environmentally favourable projects, the green bonds were certified by impartial third parties. The issue of green bonds may demonstrate the firm's commitment to the environment.

This Signalling theory has a testable implication. Prior research has demonstrated, for instance, that equities react favourably to businesses' environmental engagement. Several event studies revealed that firms that practice environmental responsibility receive positive atypical returns. For example, Flammer (2015) found that when green policies are adopted, the stock market reacts favourably. Flammer (2021) uses the Signalling theory to discover favourable stock responses to corporate green bond issuance announcements. Therefore, one would anticipate that the stocks will respond favourably to the corporate green bond issuance to the degree that it symbolizes a dependable dedication of the firm to the environment.

2.5.2 Hofstede's Cultural Dimensions Theory

This study uses Hofstede's cultural dimensions theory to examine how national culture impacts stocks' response to corporate green bond issuance announcements. Hofstede (1980) presented a theory of national culture. He defined national culture as the collective programming of mind differentiating one country's members from another. He further developed a framework for understanding cultural differences from country to country and differentiating how business is performed across various cultures. In this cultural framework, he determined the multiple dimensions: Uncertainty Avoidance, Power Distance, Indulgence vs. Restraint, Collectivism vs. Individualism, Long-Term vs. Short-Term Orientation, and Masculinity vs. Femininity, in which cultures differ.

This theory is widely used in finance literature to highlight the relationship between national culture dimensions, financial decisions, financial performance, and investor sentiments (Farooq et al., 2020). Furthermore, various researchers have explained how differences in cultural values from country to country influence investor sentiment, which determines investors' response to news (Schmeling, 2009). In recent literature, this theory has also been studied to examine the effect of national culture on the stock's response to new information (Ashraf, 2021; Fernandez-Perez et al., 2021); as the green bond announcements spread new information in the market, so the response of investor to this information may vary across the countries due to differences in cultural values determined by this theory.

2.5.3 Resource-Based Theory

The theoretical justification for how national environmental performance impacts the stocks' response to corporate green bond issuance announcements can be explained through Resource-Based theory. Resource-Based theory was initially introduced by Wernerfelt (1984). According to Resource-Based theory, the external environment in which the organizations operate significantly influences managers' decision-making and, in turn, firms' financial outcomes. Recently, researchers have applied this theory to environmental performance literature and highlighted that environmental performance significantly affects firms' stock prices. For example, Yildiz and Karan (2020) find a significant association between national environmental performance and stock price crash risk.

According to this theory, the external environment in which firms operate significantly influences the managers' decision-making. The firm's external environment represents its national environment, and the performance of the external environment of a country where the firm operates represents its national environmental performance. Further, national environmental performance influences the manager's decision-making, so firms operating in countries with better environmental performance issues have more green bonds (Mertzanis & Tebourbi, 2023). This issuance sends a positive environment-friendly signal in the market, and in response, stocks of these firms respond to these issuances.

2.6 Conceptual Framework

A conceptual framework is a visual representation used to explain study variables and possible relationships among these variables based on underlying theories. Figure 2.1

highlights the conceptual framework, which can be presented in two parts. The cumulative average abnormal return (CAAR) is used in the first section to gauge the stock response to corporate green bond issuance. The theory of Signalling justifies this section. Businesses communicate their commitment to the environment in the market by issuing corporate green bonds. The reasons that make this signal seem trustworthy are as follows. Firstly, firms that issue corporate green bonds pledge huge funds for eco-friendly initiatives. Secondly, to guarantee that the money raised from the sale of corporate green bonds is utilized to finance environmentally favourable projects, the green bonds were certified by impartial third parties. The corporate green bond issuance may signal the firm's environmental dedication.

The second part of the study examines the impact of national environmental performance and culture on stocks' response. As CAAR represents the stocks' response to green bonds, it is defined as a dependent variable, whereas national culture and environmental performance are marked as independent variables. Hofstede's theory of cultural dimensions justifies the impact of national culture on stocks' response. This hypothesis has been applied recently to explain how national culture affects the stock's response to fresh information (Ashraf, 2021; Fernandez-Perez et al., 2021). As the green bond issuance announcements spread new information in the market, investors' responses to this information may vary across the countries due to differences in cultural values determined by this theory.

Similarly, the impact of national environmental performance on stock response to corporate green bond issuance announcements is justified through Resource-Based theory. According to this theory, the external environment in which firms operate significantly influences the managers' decision-making. The firm's external

environment represents its national environment, and the performance of the external environment of a country where the firm operates represents its national environmental performance. Further, national environmental performance influences the manager's decision-making, so firms operating in countries with better environmental performance issues have more green bonds (Mertzanis & Tebourbi, 2023). This issuance sends a positive environment-friendly signal in the market, and in response, stocks of these firms respond to these issuances.

Few country-level variables are used as control variables in the conceptual framework to observe the real-time effect of main variables. Figure 2.1 depicts the conceptual framework of this study.

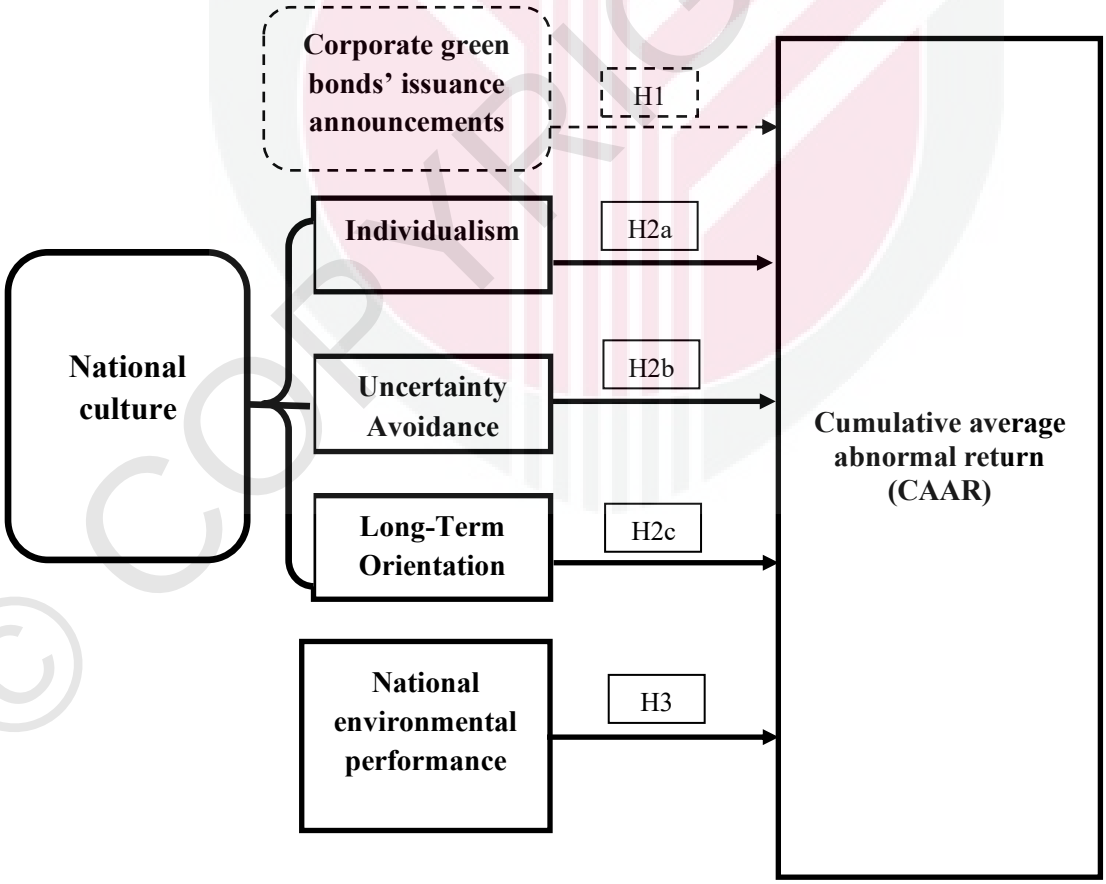

Figure 2.1 : Conceptual Framework of the Study

2.7 Summary of the Chapter

These sections describe the summary of the second chapter, consisting of a literature review backed by theories and conceptual frameworks. In this chapter, the researcher provides an overview of green bonds, including their inception, benefits, and determinants, as identified in section 2.1. Section 2.2 of the chapter offers a comprehensive overview of empirical studies on the stocks' response to issuing green bonds. That is followed by a presentation of the hypotheses proposed about this phenomenon. Section 2.3 of the literature review examines the impact of national culture on the response of stocks to green bond issuance, followed by the hypothesis.

Similarly, section 2.4 of this chapter focuses on the influence of national environmental performance on the response of stocks to green bond issuance, along with the presentation of relevant hypotheses. Section 2.5 highlights the theoretical framework, and in section 2.7, the researchers construct and elucidate the conceptual framework by considering previous empirical studies supported by relevant theories. The next chapter explains the methodology used to analyze the variables as displayed in the conceptual framework.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 Introduction

This section of the study describes the data, the nature of the data, the sample selection, the variables of the study, and the data analysis. This study deals with corporate green bond data, firm-level data, and country-level data. The details of each one are as follows.

The majority of market players have created their dataset of green bonds. For example, institutional shareholders possess a dataset of green bonds. Correspondingly, because of its leading position in the primary bond market, large commercial banks that participate as underwriters in issuing green bonds possess their list of green bonds. These organizations are regarded as forerunners in gathering and using green bond data.

Over the past few years, other organizations that work on comparable data collection have emerged. There are various recognized sources of green bond data, which vary from each other in terms of accessibility, geographic scope, and the kinds of information offered. New organizations working on similar data collection have arisen during the past few years. Several established sources of green bond data differ regarding information available, accessibility, and geographic reach. The most well-known green bond databases are those maintained by the International Capital Market Association (ICMA), Bloomberg, and the Climate Bonds Initiative (CBI).

3.2 Corporate Green Bond Data

As mentioned, there isn't a single consolidated database regarding green bonds, and the many data sources used today are very different. The principal task of this chapter is to compile a thorough inventory of green bonds issued on a global scale, covering the entire history of this market, to offer an accurate depiction of its present condition. This study employed numerous strategies to achieve its objective.

This study concentrated on corporate green bonds within the green bond area. The Climate Bonds Initiative (CBI) and the International Capital Market Association (ICMA) provide the extensive corporate green bond data collection used in this study. The CBI, ICMA, and Bloomberg are the most organized green bond data sources. These sources share similar selection criteria, such as project selection, use of proceeds, eligibility verification, and reporting. For this study, the International Capital Market Association (ICMA) and Climate Bonds Initiative (CBI) are used as sources of green bond data set for the following reasons: Climate Bonds Initiative has extensive coverage of green bonds. In 2007, the European Investment Bank issued its first climate awareness bond, which was only included in the CBI green bond database and approved by the green bond market.

On the other hand, issuers included in the ICMA database show compliance with the green bond requirements if they have made their external review reports publicly available or completed the required forms or templates. The ICMA database provides users convenient and efficient access to a complete list of green bond issuers. Users could research based on criteria such as issuer, nation, jurisdiction, and external review provider. This feature is precious for conducting cross-country studies.

The study encompassed the time frame spanning from June 2013 to December 2022. The initial issuance of green bonds occurred in 2007; however, for this study, the sample was limited to data from 2013 onwards. This decision was made due to the absence of corporate green bonds before 2013. In that particular year, a total of 16 corporate green bonds were issued by various corporations (Flammer, 2021; Tang & Zhang, 2020). Climate Bonds Initiative defined the corporate green bond as a financial instrument issued by corporations to fund initiatives that have favourable climate advantages.

Corporate green bonds have become more significant in the last few years. Table 1.3 shows the progression of corporate green bonds throughout time. It illustrates how the market for corporate green bonds has recently grown explosively. The total amount of corporate green bonds issued surged from $5 billion in 2013 to $734.1 billion in 2021.

Table 3.1 : Corporate Green Bonds Issuance

Year	Corporate green bonds issuance amount ($B)
2013	5
2014	16.8
2015	22.4
2016	50.9
2017	72.6
2018	97.9
2019	163
2020	168.5
2021	338.5
2022 (till 1st Quarter)	263.1
Total	**1193.7**

(Source: Climate Bonds Initiative (CBI) database)

Further, Table 1.2 describes the breakdown of corporate green bonds into financial and industrial sectors over time.

Table 3.2 : Sector-Wise Corporate Green Bond Issuance

Year	Financial Corporation	Non-financial Corporations
2013	1.4	3.6
2014	6	10.8
2015	13.8	8.6
2016	33.3	17.6
2017	39.7	32.9
2018	61.4	36.5
2019	82.5	80.5
2020	77.2	91.3
2021	162.3	176.2
2022	139.9	123.2
Total	**616.1**	**577.6**

(Source: Climate Bonds Initiative database)

As of 31st December 2022, this study obtained 853 corporate green bond issuers. These green bond issuers have publicly disclosed their external review report following green bond principles. This analysis has eliminated corporate issuers not listed in the stock market and focused solely on publicly listed stocks. Before getting the publicly listed issuers, this study verifies whether the green bond issuer is publicly listed. If it is not listed, this study verifies whether the bond issuer's parent firm is publicly listed.

This study examines a final sample of 230 publicly listed green bond issuers, representing a subset of the overall population of 853 corporate green bond issuers, as presented in Table 3.3. Out of 853 corporate green bond issuers, 780 corporate green bond issuers are from the corporate sector, and 73 are from the financial sector. For this study, the stock price data is necessary to capture the stocks' response to corporate green bonds' issuance announcements. Therefore, this study considers only those corporate green bond issuers listed on the stock exchange. Corporate green bond issuers listed on the stock exchange are publicly listed issuers. So, out of 853 corporate green bond issuers, this study finds 256 corporate green bond issuers listed on the stock exchange. This study additionally eliminated 17 publicly listed corporate green

bonds' issuers out of 256 with a market capitalization below $5 million, as they were affected by the penny stock or tiny firm impact.

Further, this study excluded 09 more publicly listed corporate green bonds issuers from the sample due to a lack of necessary information, i.e., the green bonds' issuance announcement dates. Hence, the study's final sample comprised 230 firms listed on the stock exchange that issue green bonds, as indicated in Table 3.3. Out of the final 230 publicly listed corporate green bonds issuers, 154 issuers are from the corporate sector, and 76 are from the financial sector.

This study considered issuers' first-time issuance announcement of green bond and ignored the subsequent issuance because all previous studies have conclusively proved that stocks do not Respond to subsequent issuance (Flammer, 2021; Tang & Zhang, 2020; Lebelle et al., 2020). This study shows that each issuer of the sample's green bond has only one issuance. Moreover, because of database constraints, the dataset utilized in this study encompasses specific information about green bonds, including bond ID, issuing entity, bond type, issuer's domicile, jurisdiction, external review report, issued amount, currency, issuance date, and maturity date. Table 3.3 provides a detailed breakdown of the study sample across countries. Green bonds are particularly widespread in China, Europe (France, Germany and Sweden have the higher number of issuers), and United States of America.

Table 3.3 : Corporate Green Bond Issuers Across Countries

Country	Total green bond issuers	Financial sector issuer	Corporate sector issuer	Publicly listed issuer	Final sample of publicly listed issuers
Argentina	1	1	0	0	0
Australia	8	1	7	5	5
Austria	6	0	6	4	4
Belgium	19	1	18	6	6
Benin	1	1	0	0	0
Brazil	9	0	9	3	3
Canada	25	8	17	11	9
Chile	2	1	1	1	1
China	136	0	136	27	22
China (Hong Kong)	1	0	1	0	0
Colombia	6	0	6	2	2
Czech Republic	2	0	2	0	0
Denmark	8	1	7	3	3
Egypt	1	1	0	0	0
Estonia	1	0	1	0	0
Fiji	1	1	0	0	0
Finland	11	1	10	6	6
France	87	8	79	23	20
Georgia	1	0	1	0	0
Germany	62	4	58	15	12
Greece	2	0	2	2	2
Guernsey	1	0	1	0	0
Honduras	1	0	1	0	0
Hong Kong	9	1	8	8	8
Hungary	5	1	4	1	1

Table 3.3 : Continued

Iceland	**6**	**1**	**5**	**0**	**0**
India	7	0	7	7	7
Indonesia	3	1	2	0	0
Ireland	3	1	2	0	0
Israel	2	1	1	0	0
Italy	22	1	21	9	9
Japan	47	0	47	21	17
Kazakhstan	1	0	1	0	0
Korea	6	0	6	3	3
Latvia	2	0	2	0	0
Lithuania	2	1	1	1	1
Luxembourg	5	0	5	0	0
Malaysia	3	0	3	0	0
Mexico	6	0	6	0	0
New Zealand	1	1	0	0	0
Nigeria	3	1	2	1	1
Norway	20	1	19	7	7
Pakistan	1	1	0	0	0
Peru	1	0	1	0	0
Philippines	5	0	5	5	5
Poland	5	1	4	2	2
Portugal	4	0	4	1	1
Romania	1	0	1	0	0
Saudi Arabia	1	0	1	1	1
Serbia	1	1	0	0	0
Singapore	4	0	4	3	3
Slovakia	1	0	1	0	0

Table 3.3 : Continued

Slovenia	**1**	**0**	**1**	**0**	**0**
South Africa	4	1	3	2	2
Spain	21	0	20	8	8
Sweden	68	2	66	18	16
Switzerland	17	1	16	6	6
Taiwan	1	0	1	1	1
Thailand	4	0	4	2	2
Netherland	26	1	25	3	3
Turkey	2	0	2	2	2
UAE	3	0	3	1	1
UK	20	1	19	9	9
USA	117	23	94	26	19
Total	**853**	**73**	**780**	**256**	**230**

(Source: International Capital Market Association (ICMA) and Climate Bonds Initiative (CBI) databases)

3.3 Event Selection of Corporate Green Bonds

This study needs the event date for analysis. For this, the event day is when firms announce the corporate green bond issuance. This study considers the corporate green bond issuance announcement date as an event date. That denotes the day when new information is disclosed to the market, which is necessary to assess how stocks respond to the news (Flammer, 2021). This event date is used in the event window to calculate firms issuing green bonds' cumulative abnormal return (CAR). Cumulative average abnormal returns (CAARs) for the entire sample are calculated by taking the average for cumulative abnormal return (CAR) of all firms issuing green bonds. Similarly, cumulative average abnormal returns (CAAR) for each country are calculated independently by taking the mean of cumulative abnormal return (CAR) of all firms operating in that country, as some countries have more than one firm issuing green bonds.

For this study, the green bond issuance announcement date is gathered from the green bond databases (Climate Bond Initiative/International Capital Market Association) or any reliable news report, for example, an official press release. Corporate green bonds whose issuance announcement date is unavailable on the database are searched from the firm's official website, media release, newspaper and press conferences, or the latest. Tang and Zhang (2020) employed a similar event selection methodology in their study.

3.4 Security Data

Obtaining the daily stock prices for firms that have announced that they will issue green bonds publicly is essential for this study. This pertinent data is obtained from the datastream platform. To conduct the analysis, Every firm in the sample must have access to daily stock price information before and after the event day. Such information is essential for the establishment of event and estimation windows. Each firm in the sample possesses the available returns to compute the expected returns during the estimation window. Similarly, each included in the sample possesses the available returns to calculate the cumulative abnormal return during the event window. In addition to firms' stock price information, this study collected stock market index data for the relevant countries from the data stream.

3.5 Variables of the study and Data collection

This section highlights the variables of the study in detail. Table 3.4 highlights the variables of the study. The detail of all variables described in Table 3.4 is as follows.

Table 3.4 : Variables of the Study

Sr. No	Variable	Nature of variable	Source
01	Cumulative Average Abnormal Return (CAAR)	Dependent variable	Calculated from stock prices through event-study
02	National culture	Independent variable	Hofstede insight website
03	National Environmental Performance.	Independent variable	Environmental Performance Index (EPI) Website
04	GDP Per Capita as a proxy of economic wealth	Country-level control variable	World Bank
05	GDP annual growth as a proxy of economic growth	Country-level control variable	World bank
06	Country Investment Freedom	Country-level control variable	World Bank/ The Global Economy website
07	COVID-19	Country-level control variable	World Health Organization

3.5.1 Dependent Variables

The dependent variable in this study is the cumulative abnormal return (CAAR), which measures how the stocks react to announcements of corporate green bond issuance. The stock price effect is how stocks respond to news of a corporate green bond issuance, which is examined using an event research technique. An event study is a statistical method for determining how a particular event influences a company's stock price. This methodology uses abnormal returns (AR) to quantify the stock response. Abnormal returns (AR) are crucial metrics in event studies that reveal information about the impact of a particular occurrence on a company's stock price. They show the discrepancy between the actual and projected returns on an investment. Equations 3 and 4 demonstrate how the abnormal returns (AR) are utilized to compute the cumulative abnormal return (CAR) and cumulative average abnormal return (CAAR). In addition, the following information pertains to the cumulative average abnormal return (CAAR).

3.5.1.1 Cumulative Average Abnormal Returns (CAAR)

To understand the CAAR, first, there is a need to understand the stock returns, which refers to the amount of money made or lost on specific stock investments over a period. It is calculated as $R = P_n\text{-}P_0 / P_0$. These stock returns are used to calculate the abnormal return (AR), cumulative abnormal return (CAR), and cumulative average abnormal return (CAAR). To calculate the CAAR, the issuance announcement date of the corporate green bonds is required.

CAAR represents the stocks' response to corporate green bond issuance announcements in this study. AR and CAAR for this study are calculated by

conducting the event study analysis around the green bond issuance announcement date. Cumulative average abnormal returns (CAAR) for each country independently are calculated by taking the mean of cumulative abnormal return (CAR) of all firms operating in that country. This study uses CAAR as a dependent variable to investigate the Impact of national culture and environmental performance on stock market responses to corporate green bonds' issuance announcements.

3.5.2 Independent Variables

The main independent variables in this study are the national culture and national environmental performance. The details of the variables are as follows.

3.5.2.1 National culture

It refers to the set of shared norms, beliefs, behaviours, customs, and values that differentiate the members of one country from others. National culture has six further dimensions: Uncertainty Avoidance, Power Distance, Indulgence vs Restraint, Individualism vs Collectivism, Long-Term vs. Short-Term Orientation, and Masculinity vs. Femininity, as defined by Hofstede in 1980. National culture is measured through the six-dimensional score gathered from the Hofstede insight data site. Out of six dimensions of national culture, three dimensions, i.e., Individualism (IND), Uncertainty Avoidance (UA), and Long-Term Orientation (LTO), are considered for this study based on previous literature.

National culture data is one-time data for all countries rather than yearly because cultural values, such as people's habits, values, norms, etc., do not change over time. For instance, researchers observed that societal values, beliefs, norms, traditions, and

preferences are enduring / stable over a period of time (Guiso et al., 2006). Similarly, Tang and Koveos (2008) argued that societal cultural values reflect institutional traits. Language, ethnic homogeneity, religion, traditions, legal origin, norms, and customs are examples of societal traits irrelevant to cultural updates because they don't change much over time. Thus, Tang and Koveos (2008) propose a framework in which the stability of institutional traits serves as the basis for cultural stability.

In addition, Tang and Koveos (2008) observed a correlation between cultures and national wealth. They suggest that cultural dimensions may change throughout time in response to fluctuations in national income. Consequently, cultural dimensions can be attributed to the influence of evolving economic circumstances. For this, Tang and Koveos (2008) advised using GDP per capita as control variables in studies that use Hofstede's dimensions as independent variables. Therefore, the Hofstede model is still valid and applicable if researchers adjust the country's economic conditions. Therefore, if researchers adjust the country's economic conditions in their research, the Hofstede model is still valid and applicable. So in the light of above discussion, this study uses the Hofstede cultural dimensions dataset as applied by Tang (2021) in his recent research.

3.5.2.2 National Environmental Performance

National environmental performance is defined by the Yale Center for Environmental Law and Policy as the country's performance about ecosystem vitality, environmental health, and climate change. This variable is measured through the Environmental Performance Index (EPI) developed by the Yale Center for Environmental Law and Policy. According to EPI, countries are ranked based on environmental performance

by assigning scores. The Environmental Performance Index (EPI) measures national environmental performance, as demonstrated by earlier scholars like (Dangelico et al., 2020). The EPI data for this study is gathered from the Environmental Performance Index (EPI) website. The EPI ranks 180 countries based on climate change performance, ecosystem vitality, and environmental health. This EPI ranking shows which country is better, focusing on every country's environmental challenges.

3.5.3 Control Variables

This study used some control variables at the country level. The purpose of the control variables is to capture the real-time effect of the main variables of the study. This study uses some macroeconomic variables as control variables to show the actual impact of the main variables of the study. These variables represent the economy of a country. This study uses the macroeconomic variables primarily used in economic and finance literature, such as gross domestic product growth (GDPG) and gross domestic product per capita (GDPPC). The data on macroeconomic indicators is collected from the World Bank website.

Further, this study also used the control variables related to country governance and financial liberalization. The data for each relevant control variable is collected yearly. The description of the variables is as follows.

3.5.3.1 Gross Domestic Product Per Capita (GDPPC)

GDP is defined as the total monetary worth of all goods and services produced in a nation in a given year, and it symbolizes the nation's economic richness. This study

uses Tang and Koveos (2008) research to examine straight GDP per capita. The statistics used by the GDPPC are from the World Bank website.

3.5.3.2 Economic growth (GDPGRW)

Economic growth is also used as a control variable in this study. There is a notable difference in the issuance of corporate green bonds across various countries, and the impact of announcing such issuances will vary throughout these countries. Therefore, we postulate that collective impact at the stock market level will align with the country's economic growth. This study uses GDP annual growth (GDPG) as a proxy of economic growth. The data on annual GDP growth is gathered from the World Bank website.

3.5.3.3 Investment Freedom of the Countries

It is used as a country-level control variable for financial liberalization. As Investment Freedom provides economic freedom to the country, there is no restriction on the flow of capital inside and outside the country; individuals and firms are allowed to move their capital inside and outside the country. Investment Freedom significantly affects investor efficiency (Chen & Huang, 2009).

The Uncertainty Avoidance, Long-Term Orientation, and Individualism scores of national culture dimensions tell the respective cultural dimensions score of national investors of the country, but stock markets also allowed the foreign investors to participate in trading. Calculating the cultural dimension score of these foreign investors is challenging, if not impossible, because they have different cultural values as they belong to various countries (Aggarwal et al., 2012s; Lucey & Zhang, 2010).

Consequently, to directly measure foreign investors' relevant cultural dimensions score, this study adds the Investment Freedom index from “The Global Economy” as a control variable. The Investment Freedom index quantifies the stock market's liberalization, comprising the degree of participation of foreign investors in the local equity markets. It is used as an ex-ante proxy to control the participation of foreign investors in the local equity markets (Ashraf, 2021).

For this reason, this study added it as a control variable to capture the real-time effect of the national culture variable. The same justification is used for Investment Freedom as a control variable to capture the impact of the national Environmental Performance Index. The country-level Investment Freedom index data is gathered from The Global Economy website. The data is collected yearly for each country.

3.5.3.4 COVID-19

The COVID-19 dummy variable is used to control for the COVID-19 pandemic for the study period of 2013-2022. A dummy variable for COVID-19 is created for the pre and post-COVID-19 period. The countries where corporate green bond issuance occurs before the COVID-19 pandemic announcement are assigned “0”, and countries where corporate green bond issuance announcements occur after the COVID-19 pandemic announcement are assigned “1” for creating the COVID-19 dummy variable. The COVID-19 pandemic announcement is the day the country's first COVID-19 case was reported (Fernandez-Perez et al., 2021). This study created the dummy variable of COVID-19 based on the previously created COVID-19 dummy variable by Travergård and Pettersson (2023) and Wan and Tian (2022) in their

studies. This study gathered data regarding the announcement of COVID-19 cases to create a dummy variable from the World Health Organization (WHO) website.

3.6 Data Analysis Technique

This section highlights the techniques required to fulfill the study objective of analyzing the stocks' response to the announcements of green bond issuance across countries.

3.6.1 Event Study

This study's analysis uses the event study methodology. The choice of event is crucial before using this technique. The methodology is employed to assess the stock's responses to the announcements of the green bond issue. In this case, the event is announcing the green bond issue. The choice of the event window requires knowledge of the event day. In the days preceding and following the event, the event window is created. The post-event window is the period that follows the event window, while the estimation window is the period utilized to estimate the expected return. This study aimed to examine investor responses to the issue of green bonds using the various event windows. For example, [-10+10] is one of the event windows used in this study, which describes the 10 days before and 10 days after the event day. Similarly, following are the other event windows: [-2+5], [-2+10], [-1+1], [0+1], [-2+20], [-2+40], [-2+60], [-5+10], [-10+20] [-10+40], [-10+100], [-2+100], [-1+100] used in this study.

The selection of these multiple event windows has been made based on previous studies, e.g., Flammer (2021), Tang and Zhang (2020), Lebelle et al. (2020), and

Baulkaran (2019) used multiple event windows in their studies. The reason for choosing so many event windows is to capture different market response phases. For example, short event windows (e.g., [-1+1] days around the event) capture the immediate response to the event (MacKinlay, 1997), intermediate event windows (e.g., [-5+5] days around the event) capture the gradual adjustment (Fama, 1998), and longer event windows (e.g., [-20+20] days around the event) capture the long-term effect (Kothari & Warner, 2007). Multiple event windows are also used for comprehensive analysis in which researchers can determine whether an impact is temporary or lasting by comparing results across multiple event windows; that helps to minimize the possibility of misinterpreting short-term variations as long-term effects (Oler et al., 2011).

Additionally, multiple event windows are employed to increase robustness because consistent results across multiple windows increase the validity of the results (Campbell et al., 1997). The results from numerous event windows may also show how the event effect varies in different market settings, boosting the findings' generalizability (Kothari & Warner, 2007). The summary of the event study analysis can be shown in Figure 3.1.

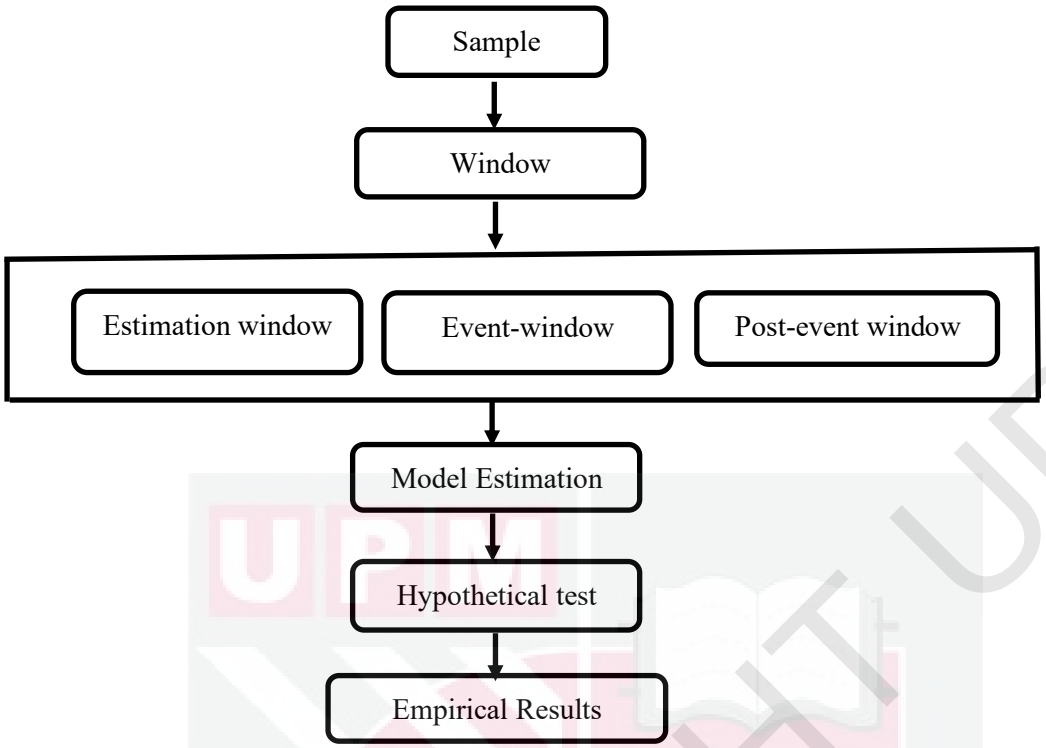

Figure 3.1: Event-Study Analysis Steps

This method captures the response by measuring abnormal returns, generally the difference between actual and expected returns. The abnormal returns (AR) estimation is based on MacKinlay (1997).

$$AR_{it} = R_{it} - E(R_{it}) \qquad \text{Eq. 1}$$

Where

R_{it} = Actual returns of security *i* at time *t*

$E(R_{it})$ = Expected returns of security *i* at time *t*

The expected returns are estimated based on Sharpe (1964) market model:

$$\mathbf{E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}} \ \ldots \qquad \text{Eq. 2}$$

Where

α_i = intercept

β_i = beta, or slope of security *i* and market

R_{mt} = actual returns of the market at time *t*

ε_{it} = error term

The market model is measured using OLS based on the estimation window's 272 days (working days in a year). Following the abnormal return (AR) calculation, each firm's cumulative abnormal return (CAR) is estimated as described in Equation 3.

$$CAR_t = \sum AR_{t-1} + AR_t \quad \text{Eq. 3}$$

Following the cumulative abnormal return (CAR) calculation, Equation 4 calculates firms' cumulative average abnormal return (CAAR).

$$CAAR = \frac{\sum_{i=1}^{N} CAR_i}{N} \quad \text{Eq. 4}$$

3.6.2 Panel Estimation Model

This section highlights the method used to examine the impact of national culture and national environmental performance on stocks' responses to corporate green bond issuance announcements. This study used the panel estimation model as the data of this study is panel data. Therefore, this study uses the panel estimation model to evaluate the impact of national culture and national environmental performance on stocks' response to corporate green bonds' issuance announcements.

Equation 5 describes the basic panel data for this study.

$$CAAR_{it} = \alpha + \beta_1 IND_i + \beta_2 LTO_i + \beta_3 UA_i + \beta_4 NEP_{it} + \beta_5 Ln(GDPPC)_{it} + \beta_6 GDPG_{it} + \beta_7 IF_{it} + \beta_8 Covid\text{-}19_{it} + \varepsilon_{it} \quad \text{Eq. 5}$$

CAAR = Stocks' response to corporate green bonds' issuance announcements

IND = Individualism dimension of national culture

LTO = Long-Term Orientation dimension of national culture

UA = Uncertainty Avoidance dimension of national culture

NEP = National environmental performance

Ln(GDPPC) = Gross Domestic Product Per Capita in the natural log as a proxy for the country's economic wealth.

GDPG = GDP annual growth as a proxy for a country's economic growth

IF = Investment Freedom as a proxy for country's financial liberalization

COVID-19 = Control variable to control for the COVID-19 Pandemic

In Equation 5, the "i" represents the cross-sections (number of countries), "t" represents the time period, and "it" represents the panel data. The panel data consists of both cross-sectional and time series data. The data set of this study is panel data because it includes both cross-sectional (38 countries) and time-series (2013-22) data. Further, in Equation 5, IND, LTO, and UA only have "i" because these are national cultural dimensions, and their data do not vary over time. The data on national cultural dimensions is different for different countries, but within a country, it does not change over time. For panel data, the presentation of this study's equation regarding the national culture is consistent with the study of Fernandez-Perez et al. (2021). In contrast, NEP, GDPPC, GDPG, IF, and COVID-19 have "it" because data on these

variables is different for different countries, and also, within a country, the data vary over time.

Stocks' response to corporate green bonds' issuance announcement is measured through cumulative average abnormal returns (CAAR), and it serves as a dependent variable for this study. Three dimensions of national culture, i.e., Uncertainty Avoidance (UA), Long-Term Orientation (LTO), and Individualism (IND) are taken as independent variables for this study. National environmental performance measured through the Environmental Performance Index (EPI) was also used as an independent variable for this study. The country's economic wealth is measured through Gross domestic product per capita (GDPPC), the country's economic growth is measured through the country's annual growth (GDPG), and the country's financial liberalization is measured through Investment Freedom (IF) are the Country-level control variables in this study. There are three competing panel estimation models:

a. Pooled Ordinary Least Square (OLS) Model
b. Random Effect Model
c. Fixed Effect Model

The pooled OLS model disregarded the panel character of the data, which interprets ε as equally and independently distributed (i.i.d) disturbances uncorrelated with χ, or Cor(εi, χi) = 0. In this instance, the model may be estimated using OLS and the pooled data (no further method is needed). That is known as the Pooled Model and represents the slope estimator by βols. The slope and intercept are assumed to be constant across time and units for the pooled model. However, these presumptions may be limited.

Heterogeneity bias could arise from the pooled regression. The impact of X on Y, also known as the intercept or slope, frequently varies with time and unit. Heterogeneity refers to distinct units differing in unmeasurable ways. Panel data indicates heterogeneity among firms or countries. The Random Effect Model restricts the coefficients or slope to be homogenous while assuming that each unit (e.g., household, firms, or countries) has its intercepts to address the heterogeneity bias. To consider this variability, ε is split into two components or composite error terms:

$$\varepsilon_{it} = \lambda_i + \mu_{it} \quad \text{Eq. 6}$$

The hypothesis is that μit has a mean of zero, and variance is identically and independently distributed (i.i.d). λi is the individual-specific effect, or unobserved heterogeneity, and is time-invariant, meaning that a time subscript or index is not required. Based on this, the notion of the Random Effect Model for this study is described in equation 7.

$$CAAR_{it} = \alpha + \beta_1 IND_i + \beta_2 LTO_i + \beta_3 UA_i + \beta_4 NEP_{it} + \beta_5 Ln(GDPPC)_{it} + \beta_6 GDPG_{it} + \beta_7 IF_{it} + \beta_8 Covid\text{-}19_{it} + \lambda_i + \mu_{it} \quad \text{Eq. 7}$$

$\varepsilon_{it} = \lambda_i + \mu_{it}$ is now part of the Random Effect Model's error term.

In the Random Effect, it is assumed that λ_i are part of the composite error term ε_{it}. The error λ_i and μ_{it} in the composite error term have variance σ^2_λ and σ^2_μ respectively. In the Random Effect Model, the error term ε is serially correlated within a unit. That is because all observations within a unit have a common component, viz λ_i.

It is pertinent to mention that the Fixed Effect Model is unsuitable for this study because of the nature of the data. This study has scores for national cultural dimensions, which do not change over time. The Fixed Effect Model depends on within-variation (or time series variations) to identify the influence of variables that do not change over time. Thus, it is impossible to estimate the time-invariant variables. Thus, this study analysis uses the Random Effect Model. Further, to verify which model is most appropriate out of Pooled OLS and Random Effect, the Breusch-Pagan, Lagrange Multiplier (LM) test is used.

3.6.2.1 Breusch-Pagan, Lagrange Multiplier (LM) Test

Breusch-Pagan, Lagrange Multiplier (LM) test is used to identify the appropriate model from Pooled OLS and Random Effect. The first test is the Breusch-Pagan LM test, which differentiates Pooled OLS and Random Effect Models. Remember from the previous section that the Random Effect and Pooled OLS Models are distinguished by the individual-specific term (λ). Since there wouldn't be any autocorrelation, it is clear that the OLS model would be the best linear unbiased estimator (BLUE) if σ2λ=0. If not, the Random Effect Model makes the most sense. The following are the Breusch-Pagan LM test hypotheses:

H_0: $\sigma_i^2 = 0$ (Pooled OLS-Homogeneity)

H_A: $\sigma_i^2 > 0$ (Random Effects-Heterogeneity)

The Breusch-Pagan, Lagrange Multiplier (LM) test rejects the null hypothesis and accepts the alternative hypothesis if the p-value is less than 0.05.

3.6.3 Diagnostic Checks

Once the Random Effect Model has been determined to be the best fit for this study, several diagnostic tests must be carried out to ensure that the data are free of outliers, serial correlation, heteroscedasticity, and multicollinearity. The following are each diagnostic's specifics.

3.6.3.1 Multicollinearity

A significant correlation between two or more independent variables is known as multicollinearity. The OLS model must be performed first, followed by the variance inflation factor (VIF) test to conduct the multicollinearity test. If the VIF mean exceeds 10, multicollinearity is an issue (Law, 2018). One way to lessen the Multicollinearity issue is to eliminate the most significant VIF variable. However, which variable should stay and which should be removed from the estimation depends on the theory.

3.6.3.2 Heteroscedasticity

When the variance for each observation in a data collection differs, it is known as Heteroscedasticity. On the other hand, Homoscedasticity refers to the situation when the variance for every observation is the same. A simple method of identifying Heteroscedasticity is to make a residual plot, in which the explanatory variable is plotted against the least squares residuals. A more rigorous mathematical technique for determining heteroscedasticity is the Breusch-Pagan test. Utilizing a variance function, the alternative hypothesis that heteroscedasticity exists is tested against the

null hypothesis that heteroscedasticity does not exist using a $\chi 2$-test. For the diagnostic check, the null and alternative hypotheses are:

H_0: Homoscedasticity (or constant variance)

H_A: Heteroscedasticity (variance is not constant)

Following the test, the alternative hypothesis, which is heteroscedasticity in the data, can be accepted, and the null hypothesis, which is homoscedasticity in the data, can be rejected if the p-value is less than 0.05. It is important to note that a "robust" option can be used to correct for heteroscedasticity in both Fixed and Random Effects.

3.6.3.3 Serial correlation

If the panel data is long-term series panel data, the serial correlation is more severe. It is not an issue in micro panels (with just a few years of observations). The serial correlation is found using the Lagrange-Multiplier (LM) test. The alternative and null hypotheses to facilitate the diagnostic process are:

H_0: No serial correlation

H_A: Serial correlation

If the p-value of LM is less than 0.05, the alternative hypothesis is accepted, and the null hypothesis is rejected. It is important to note that panel standard error or AR (1) can be used to solve the serial correlation problem.

3.7 Summary of the Chapter

This chapter describes the variables of the study. All variables are correctly defined with their data sources. In the next section of this chapter, sample construction and data collection are discussed, and details about the green bond issuance events and event selection criteria are highlighted. The data analysis methods are then highlighted, including regression analysis to explore the impact of national culture and environmental performance on the stock market response to corporate green bond issuance announcements and the event-study method to explore the stock market response to green bond issuance. The results are reported and explained in the next chapter using panel estimate models, event studies, and descriptive statistics.

CHAPTER 4

RESULTS AND ANALYSIS

4.1 Introduction

A thorough review of the investigation's findings is given in this chapter. This study examines the impact of national culture and environmental performance on stocks' response to corporate green bonds' issuance announcements. This chapter presents a comprehensive analysis of various aspects related to corporate green bonds' issuance announcements. This study initially examines the stocks' response to corporate green bonds' issuance announcements through event study methodology across various event windows. Additionally, the analysis is performed to investigate the impact of national culture and environmental performance on stocks' response to corporate green bonds' issuance announcement through a panel estimation model.

The results are categorized into four distinct parts. The initial segment encompasses the descriptive analysis and highlights the major variables in the subsequent panel estimation analysis. The event study technique is covered in detail in the following section, explaining how announcements affect share prices based on the cumulative abnormal return (CAR) and cumulative average abnormal return (CAAR). The final section elucidates the outcomes derived from the panel estimation model. This chapter finishes with a discussion of the findings derived from the investigation.

4.2 Event study analysis

Table 4.1 highlights the event study findings for various event windows. This Table shows the stocks' response to the announcements of green bond issuance for the following event windows: 08 days [-2+5],13 days [-2+10], 03 days [-1+1], 02 days [0+1], 23 days [-2+20], 43 days [-2+40], 16 days [-5+10], 21 days [-10+10], 31 days [-10+20] and 51 days [-10+40]. The results revealed that cumulative average abnormal returns (CAAR) of the 08 days [-2+5], 13 days [-2+10], 16 days [-5+10], and 21 days [-10+10] event windows are significantly positive at 5% level.

These positive and significant CAARs mean that investors attain abnormal returns that are 7.30%, 13.59%, 14.36%, and 15.69% higher than the expected return for 08 days [-2+5], 13 days [-2+10], 16 days [-5+10] and 21 days [-10+10] event windows respectively. This positive and significant result mainly designates that stocks respond positively to the announcements of green bond issuance. This positive stock response shows investors are taking advantage of green bond issuance. However, CAAR of 03 days event window [-1+1], 02 days event window [0+1], 23 days event window [-2+20], 43 days event window [-2+40], 31 days event window [-10+20], 51 days event window [-10+40] are positive but insignificant.

Table 4.1 : Green Bond Issuance Announcement and Stock Market Response

Event Time	CAAR	T-statistics	No. of Events
[-2+5]	0.0730***	2.065755	230
[-2+10]	0.1359***	2.301769	230
[-1+1]	0.0200	0.636174	230
[0+1]	0.0159	0.538982	230
[-2+20]	0.2115	1.53537	230
[-2+40]	0.3630	1.460589	230
[-2+60]	0.5069	1.518176	230
[-5+10]	0.1436***	2.39013	230
[-10+10]	0.1569***	2.460176	230
[-10+20]	0.2324	1.693777	230
[-10+40]	0.3840	1.618996	230
[-10+100]	0.7463	1.255993	230
[-2+100]	0.7254	1.097586	230
[-1+100]	0.7217	0.689754	230

This table reports all sample firms' cumulative average abnormal return (CAAR) for various event windows. T-statistics highlights the significance of CAAR.

*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

To further illustrate the positive stock market response, Figure 4.1 gives cumulative average abnormal returns around the green bonds' issuance announcements.

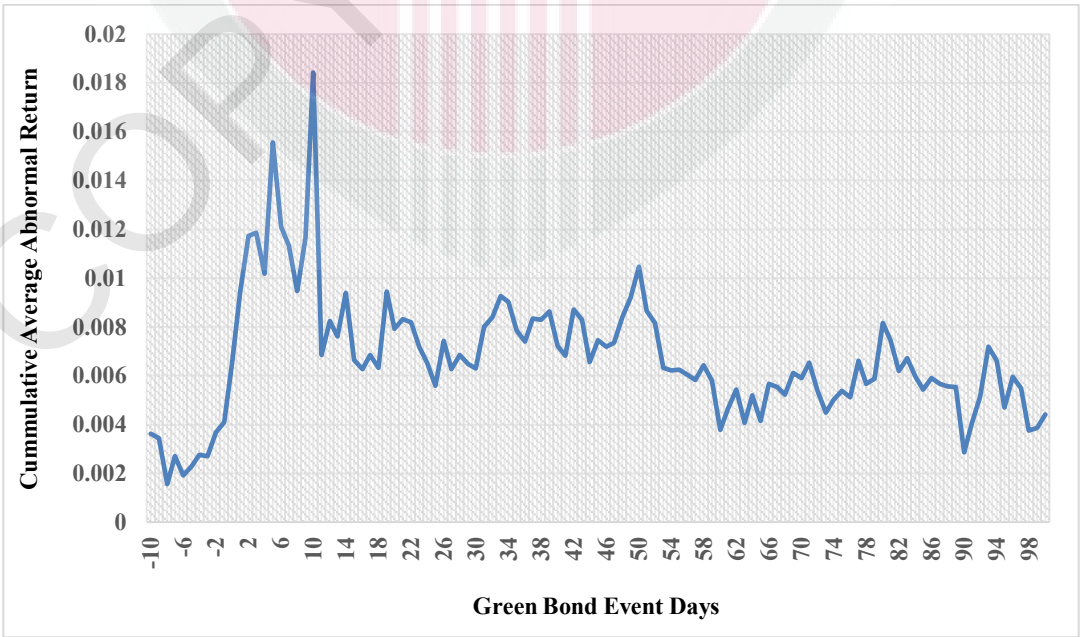

Figure 4.1 : CAAR for the entire sample

Furthermore, this study examined which green bond issuers are more likely to receive rewards from the stock market by splitting into their business sectors. There are two different reasons behind conducting this analysis. First, the two primary groups of issuers of green bonds have different procedures. The corporate sector directly offers green bonds to finance their green projects, one of their core competencies. However, the financial sector provides green bonds to fund green projects by other companies or offers its clients loans that benefit the environment. Second, it is believed that studies involving ESG and CSR are necessary to examine the impact of cross-industry further. For example, businesses involved in renewable energy may be more susceptible to environmental challenges and gain more advantages from them than financial institutions.

Table 4.2 demonstrates how the response of stocks to announcements of green bond issuance differs for issuers belonging to the corporate sector or financial sector. Notably, this study emphasized the cumulative average abnormal return (CAAR) calculated for the 08 days [-2+5], 13 days [-2+10], 16 days [-5+10], and 21 days [-10+10] event windows across industries. This study focuses exclusively on these four event windows for additional analysis because, as Table 4.1 demonstrates, the cumulative average abnormal return (CAAR) for these four event windows is only significant out of ten. The result showed that cumulative average abnormal return (CAAR) for the corporate sector issuers of green bonds are significant at 5% significance level around 08 days [-2+5], 13 days [-2+10], 16 days [-5+10] and 21 days [-10+10] event windows whereas, for financial sector issuers the cumulative average abnormal return (CAAR) is insignificant for all event windows except 08 days [-2+5] event window. So, the cumulative average abnormal returns (CAAR) around

08 days [-2+5] event window are commonly significant both in corporate sector and financial sector issuers of the green bonds; however, the cumulative average abnormal returns are higher in the corporate sector with 8.2914% as compared to 7.79% in the financial sector, this difference's size is still relatively small.

Table 4.2 : Sector Wise Stocks' Response

Corporate sector			
Event Time	**CAAR**	**T-statistics**	**Observations**
[-2+5]	0.082914***	2.006405	154
[-2+10]	0.157458***	2.294821	154
[-5+10]	0.160503***	2.362712	154
[-10+10]	0.162607***	2.328708	154
Financial sector			
Event Time	**CAAR**	**T-statistics**	**Observations**
[-2+5]	0.077933***	2.1577	76
[-2+10]	0.1409365	1.6796	76
[-5+10]	0.1624300	-0.08687	76
[-10+10]	0.2090833	-0.09141	76

This table reports corporate and financial sector firms' cumulative average abnormal return (CAAR) for various event windows. T-statistics highlights the significance of CAAR.

*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Further, Figure 4.2 highlights the visual effect of the stocks' response for the corporate and financial sectors, respectively. It shows that after the announcement of green bond issuance, the cumulative average abnormal return (CAAR) of corporate sector firms is higher than that of financial sector firms.

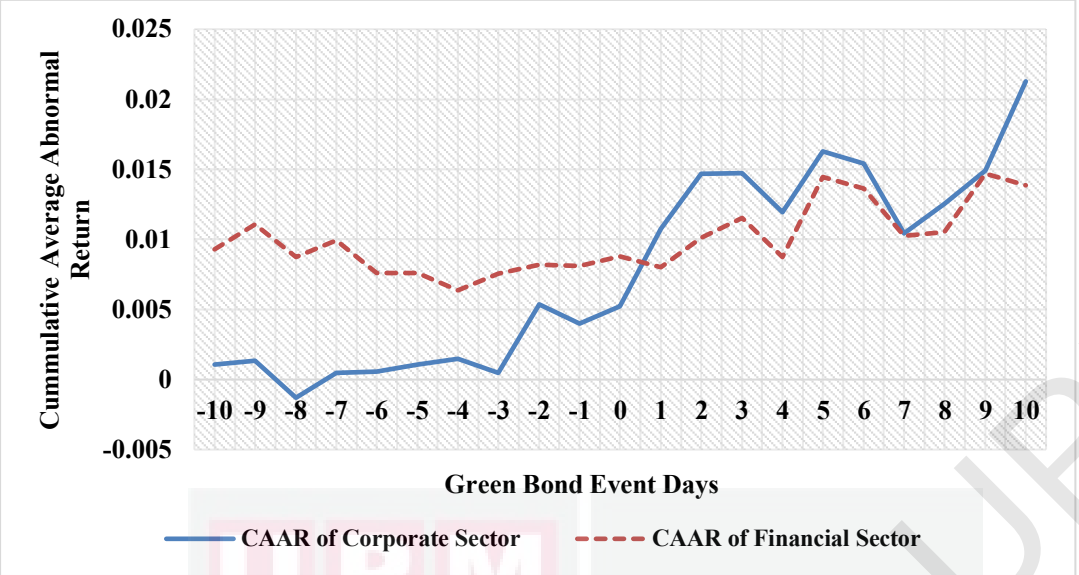

Figure 4.2 : CAAR for Corporate and Financial Sector

The findings of the sector-wise analysis suggest that the financial corporations that issue green bonds to invest in the green projects of other firms or to lend money to their clients in an environmentally friendly way are not as valued by the stock market as the corporate sector that offers green bonds to fund their green projects directly. Therefore, corporate investors gain more from green bond issuance than investors in the financial sector.

This study also carried out an analysis that took the issuers' domiciles into account to ascertain how investors profit from corporate green bond issuance announcements. This study is being done because the way the stock responds to news depends on the nature of the financial markets and other factors at the national level (Farooq et al., 2022). In this regard, investor's responses to green bond issuance may vary across countries. For instance, according to research by Lebelle et al. (2020), developed markets were more inclined than developing markets to respond negatively to news of green bond issuance. Investors of developed markets are rational compared to

developing markets, which is the possible reason for the difference in investors' responses to green bond issuance.

Similarly, Pedersen and Thun (2019) observed that Northern Europe experienced significantly higher stock market returns around announcements of green bond issuance. In contrast, no significant returns were seen for the rest of the European region (Pedersen & Thun, 2019). Therefore, it is essential to independently inspect the comparative effect of corporate green bond issuance announcements on a panel of developed vs. developing countries and on each country. Announcements of corporate green bond issuance generate different stock responses for issuers with different domiciles, as Table 4.3 demonstrates. Mainly, this study emphasized the cumulative average abnormal return (CAAR) calculated for the 08 days [-2+5], 13 days [-2+10], 16 days [-5+10], and 21 days [-10+10] event windows for a panel of developed vs. developing countries as well on each country independently.

The result showed that cumulative average abnormal return (CAAR) for green bond issuers belonging to developed countries is positive and significant at a 5% significance level around 08 days [-2+5], 13 days [-2+10], 16 days [-5+10] and 21 days [-10+10] event windows whereas, for green bond issuers belong to developing countries, the cumulative average abnormal return (CAAR) is insignificant for all event windows. This evidence implies that stock investors are more interested in developed country's green bond issuers than those of developing nations. One of the reasons for these significant positive cumulative average abnormal returns (CAAR) of developed countries' issuers may be due to rational investors. The markets of

developed countries are less volatile, and investors respond more rationally than markets of developing nations.

On the other hand, one of the possible reasons for the insignificant behaviour of most of the stock markets of developing countries might be due to the high volatility risk of these markets. As this risk generates the possibility of negative returns, these negative returns can combine with positive abnormal returns to produce insignificant outcomes. These findings are consistent with the study of Lebelle et al. (2020), who found an insignificant response of stocks to corporate green bond issuance for developing countries compared to developed countries. Thus, developed nations' investors can see green bond issuance rationally and appraise its positive consequences; so, investors in developed countries benefit from green bond issuance, whereas investors in developing countries do not bother as much.

Table 4.3 : Stocks' Response for Developed vs Developing Countries

Developed countries			
Event Time	**CAAR**	**T-statistics**	**Observations**
[-2+5]	0.076271***	2.0037	171
[-2+10]	0.140331***	2.142521	171
[-5+10]	0.145606***	2.222957	171
[-10+10]	0.155975***	2.279893	171
Developing countries			
Event Time	**CAAR**	**T-statistics**	**Observations**
[-2+5]	0.054384975	0.634179	59
[-2+10]	0.110921922	0.985957	59
[-5+10]	0.132536568	1.119537	59
[-10+10]	0.162029187	1.264389	59

This table reports the cumulative average abnormal return (CAAR) of developed and developing countries' firms for various event windows. T-statistics highlights the significance of CAAR.

*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Additionally, Figure 4.3 highlights the visual impact of stocks' responses for a panel of developed and developing countries. It demonstrates that following the news of the issuing of green bonds, developed country firms' cumulative average abnormal return (CAAR) outperformed that of developing country firms.

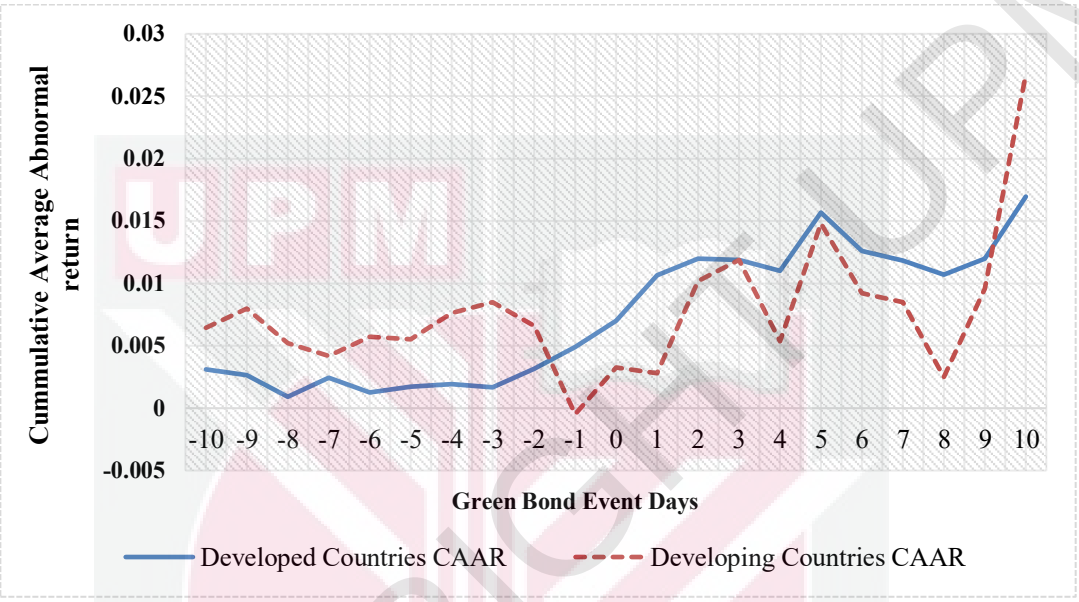

Figure 4.3 : CAAR for Developed and Developing Countries

Moreover, Table 4.4 emphasized the cumulative average abnormal return (CAAR) calculated for 08 days [-2+5], 13 days [-2+10], 16 days [-5+10], and 21 days [-10+10] event windows for each country independently. Cumulative average abnormal returns (CAAR) for each country independently are calculated by taking the mean of cumulative abnormal return (CAR) of all firms operating in that country. The results in Table 7 revealed that all developed countries except Greece, Spain, and the United Arab Emirates have positive and significant cumulative average abnormal returns for several analyzed event windows, which shows that stocks respond positively to the announcements of green bond issuance in these countries and investors are getting advantage from this issuance.

However, the magnitude of the cumulative average abnormal return (CAAR) is different for each country. Belgium, Canada, Chile, Denmark, Finland, Italy, Lithuania, the Netherlands, Sweden, and Switzerland have significant positive cumulative average abnormal return (CAAR) over 08 days [-2+5], 13 days [-2+10], 16 days [-5+10] and 21 days [-10+10] event windows. Only Spain has a negative and significant cumulative average abnormal return (CAAR) over 08 days [-2+5], 13 days [-2+10], 16 days [-5+10], and 21 days [-10+10] event windows. Australia, Hungry, Poland, Saudi Arabia, and Singapore have a positive and significant cumulative average abnormal return (CAAR) over 08 days [-2+5] and 13 days [-2+10] event windows. Austria, the United States of America, and the United Kingdom have positive and significant cumulative average abnormal return (CAAR) for 08 days [-2+5], 13 days [-2+10], and 16 days [-5+10] event windows.

Furthermore, France has positive and significant cumulative average abnormal (CAAR) returns over 13 days [-2+10] and 21 days [-10+10] event windows. Germany and Portugal have a significant positive cumulative average abnormal return (CAAR) over the 08 days [-2+5] event window, and the United Arab Emirates has a significant negative cumulative average abnormal return (CAAR) for the same event window. Hong Kong has a positive and significant cumulative average abnormal return (CAAR) for 13 days [-2+10] and 16 days [-5+10] event window. Japan has significant positive cumulative average abnormal return (CAAR) for 16 days [-5+10] and 21 days [-10+10] event windows. Norway has significant positive cumulative average abnormal return (CAAR) for 08 days [-2+05] and 21 days [-10+10] event windows. Taiwan has a significant positive cumulative average abnormal return (CAAR) for the 08-day [-2+05] event window. Greece has only insignificant cumulative average

abnormal return (CAAR) over all analyzed event windows out of all developed countries.

Conclusively, stocks respond positively to corporate green bond issuance in developed countries. These countries' green bond issuance has produced positive stock market movements due to the presence of rational investors, as developed markets tend to be less volatile than developing country markets, and investors tend to behave more rationally.

In addition, Table 4.4 reports that most developing countries have insignificant cumulative average abnormal returns (CAAR) for all analyzed event windows, such as Brazil, Colombia, Philippines, South Africa, South Korea, and Thailand have insignificant cumulative average abnormal returns (CAAR) over 08 days [-2+5], 13 days [-2+10], 16 days [-5+10] and 21 days [-10+10] event windows which indicates that stock exchange do not respond to announcement of green bonds issuance in these countries. Hence, investors neither get benefits nor bear losses due to announcements of green bond issuance in these countries.

However, a few developing countries like China, India, and Türkiye have significant positive cumulative abnormal returns (CAAR). The magnitudes of these returns are different from each other and lower than those of developed countries. China and India have significant positive cumulative average abnormal returns over 08 days event window [-2+5], 13 days event window [-2+10], and 16 days event window [-5+10], while Türkiye has a positive significant cumulative average abnormal return (CAAR) over 08 days [-2+5] and 13 days [-2+10] event windows.

Thus, it can be revealed that most developing countries' stock markets do not Respond to announcements of green bond issuance except in a few countries, which indicates that investors do not bother with green bond issuance in these countries. This insignificant behaviour of most of the stock markets of developing countries might be due to the high volatility risk of these markets. As this risk generates the possibility of negative returns, these negative returns can combine with positive abnormal returns to produce insignificant outcomes. Further, Figure A 1.2 in the Appendices highlights the visual effect of stocks' responses for each country separately.

Table 4.4 : Stock Market Response to the Announcements of Green Bond Issuance Across Countries

Country	Status	CAAR [-2+5]	CAAR [-2+10]	CAAR [-5+10]	CAAR [-10+10]
Australia	Developed	0.2072***	0.3217**	0.4015	0.5378***
Austria	Developed	0.016268***	0.130255***	0.11289***	0.149089
Belgium	Developed	0.130041***	0.269218***	0.244311***	0.215268***
Canada	Developed	0.01906***	0.162921***	0.148916***	0.174816***
Chile	Developed	0.175659***	0.279621***	0.185358***	0.160197***
Denmark	Developed	0.264976***	0.420557***	0.471348***	0.731687***
Finland	Developed	0.248887***	0.471979***	0.497387***	0.515211***
France	Developed	0.093857	0.153574***	0.173024	0.213863***
Germany	Developed	0.033941**	0.061337	0.065174	0.070913
Greece	Developed	-0.10914	-0.2284	-0.20366	-0.12976
Hungry	Developed	0.112819**	0.105493***	0.187873	0.202231
Hong Kong	Developed	-0.13002	-0.20536***	-0.23499***	-0.28884
Italy	Developed	0.042604***	0.088178***	0.086631***	0.094845***
Japan	Developed	0.075779	0.146737	0.159531***	0.158281***
Lithuania	Developed	0.043565***	0.106054***	0.112353***	0.101861***
Netherland	Developed	0.235918***	0.386813***	0.48566***	0.559715***
Norway	Developed	0.180904***	0.288611	0.311587	0.348203***
Poland	Developed	0.488578***	0.92279***	0.97952	0.993131***
Portugal	Developed	0.032057***	0.063962	0.073064	-0.02072
Saudi Arabia	Developed	0.341488***	0.502632***	0.617929	0.673925
Singapore	Developed	0.119008***	0.165049***	0.089858	-0.00226
Spain	Developed	-0.22959***	-0.51347***	-0.51709***	-0.46425***
Sweden	Developed	0.110157***	0.184423***	0.18467***	0.174427***
Switzerland	Developed	0.025409***	0.132423***	0.093341***	0.045878***
Taiwan	Developed	0.138814	0.161663***	0.238288	0.298851

Table 4.4 : Continued

UAE	**Developed**	**-0.40682*** **	**-0.67175**	**-0.89129**	**-0.97968**
UK	Developed	0.15223***	0.313374***	0.316246***	0.295239
USA	Developed	0.120141***	0.226125***	0.231305***	0.199713
Brazil	Developing	0.200187	0.166427	0.249397	0.428447
China	Developing	0.016982***	0.119856***	0.106513***	0.10356
Colombia	Developing	-0.04234	0.00593	0.077279	0.061505
India	Developing	0.093452***	0.220106***	0.296785***	0.324922
Nigeria	Developing	-0.18135	-0.35373***	-0.32304***	0.007294
Philippines	Developing	0.082239	0.101857	0.075224	0.12105
South Africa	Developing	0.097554	0.09	0.135524	0.136207
South Korea	Developing	-0.04135	-0.21521	-0.30585	-0.41337
Thailand	Developing	0.014883	0.009248	0.007965	0.02386
Turkiye	Developing	0.02165***	0.024299***	-0.05037	-0.17298

This table reports each country's cumulative average abnormal return (CAAR). CAAR of each country is calculated by taking the average cumulative abnormal return (CAR) of firms that announce corporate green bonds' issuance. T-statistics highlights the significance of CAAR.

*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

This study comes from initial studies investigating the stock response to corporate green bond issuance announcements at the country level. The results of the individual countries' analyses are based on the available limited sample size. Even a few countries in the sample have one or two green bond issuers. There isn't a single consolidated database regarding green bonds, and the many data sources used today are very different. This study analyzed a compiled inventory of green bonds issued on a global scale, covering the entire history of this market, to offer an accurate depiction of its present condition. This study covers the maximum number of countries even with fewer corporate green bond issuers in a single country because of new and emerging fields. Initial studies, even with small samples, can lay the groundwork for future research by investigating the indepth behaviour of the investors and markets. Initial studies with small samples can also uncover preliminary trends, providing a foundation for more extensive and comprehensive studies.

4.3 Panel estimation model results

The panel estimation model examines the impact of national culture and national environmental performance on stock responses to corporate green bonds' issuance announcements.

4.3.1 Nature of Dataset

Table 4.5 describes the type of dataset used for this study. It shows that the dataset used is unbalanced panel data ranging from 2013-2022. The dataset belongs to 38 countries with 133 observations.

Table 4.5 : Type of Dataset

Type of Data	Balance/Unbalanced	Time Span	Countries	Observations
Panel	Unbalanced	2013-22	38	133

This table describes the type of dataset, the total number of countries from where the sample was taken, the time span of data collected, and the total number of observations considered in the final sample for analysis.

4.3.2 Descriptive Statistics

The purpose of employing descriptive statistics is to facilitate comprehension of the attributes, quality, and patterns exhibited by the dataset utilized in this research. The primary objective is to ensure the reliability and validity of the data. Descriptive analysis involves the examination of sample data.

Table 4.6 shows the descriptive statistics of this study's independent, dependent, and control variables. It displays the total number of observations, the study's variable lowest and maximum values, and the mean and standard deviation. For different event windows, the cumulative average abnormal return (CAAR) is the dependent variable in this study.

Table 4.6 : Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum Value	Maximum Value
CAAR [-2+5]	133	0.0595	0.2612	-0.9800	0.6581
CAAR [-2+10]	133	0.1117	0.3868	-0.9430	0.9708
CAAR [-5+10]	133	0.1206	0.4110	-0.9183	0.9076
CAAR [-10+10]	133	0.1326	0.4121	-0.9796	0.9411
UA	133	59.725	23.513	08	100
LTO	133	53.748	21.974	13	100
IND	133	57.740	23.064	13	91
NEP	133	69.723	16.180	25	91.7
IF	133	72.480	17.914	20	90
GDPPC (natural log)	133	10.252	0.954	7.371	11.398
GDPG	133	1.903	3.931	-11.030	11.792
COVID-19	133	0.5190	0.5015	0	1

This Table describes the summary statistics of independent, dependent, and explanatory variables. CAAR is the cumulative average abnormal return for different event windows, which serves as a dependent variable. CAAR[-2+5] is cumulative average abnormal return for event window of [-2+5], CAAR [-2+10] is cumulative average abnormal returns for event window of [-2+10], CAAR [-5+10] is cumulative average abnormal return for event window of [-5+10], and CAAR [-10+10] is cumulative average abnormal return for event window of [-10+10]. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. GDPG, IF, GDPPC, and COVID-19 are control variables. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), GDPPC is the GDP per capita in a natural log, and COVID-19 is a dummy variable to capture the COVID-19 impact.

Table 4.6 reports that the mean values of CAAR [-2+5], CAAR [-2+10], CAAR [-5+10], and CAAR [-10+10] are 0.0595, 0.1117, 0.1206, and 0.1326 respectively. The mean values of CAAR for different event windows show that green bond issuance announcements produce positive abnormal returns for investors.

The standard deviation values of CAAR [-2+5], CAAR [-2+10], CAAR [-5+10], and CAAR [-10+10] are 0.2612, 3868, 0.4110, and 0.4121, respectively. The minimum values of CAAR [-2+5], CAAR [-2+10], CAAR [-5+10], and CAAR [-10+10] are -0.9800, -0.9430 -0.9183 and -0.9796 respectively. The maximum values of CAAR [-

2+5], CAAR [-2+10], CAAR [-5+10], and CAAR [-10+10] are 0.6581, 09708, 0.9076, and 0.9411, respectively.

Further, this study pondered the three dimensions of the national culture of Hofstede (1980), which are Individualism (IND), Long-Term Orientation (LTO), and Uncertainty Avoidance (UA) as independent variables for this research. The mean values of Individualism (IND), Long-Term Orientation (LTO), and Uncertainty Avoidance (UA) are 57.740, 53.748, and 59.725, respectively. These mean values show that most of the countries considered for the dataset of this study have Individualistic, higher Uncertainty Avoidance, and Long-Term Orientation cultures.

The standard deviation values of Individualism (IND), Long-Term Orientation (LTO), and Uncertainty Avoidance (UA) are 23.064, 21.974, and 23.513, respectively. The minimum values of Individualism (IND), Long-Term Orientation (LTO), and Uncertainty Avoidance (UA) are 13, 13, and 08, respectively. The maximum values of Individualism (IND), Long-Term Orientation (LTO), and Uncertainty Avoidance (UA) are 91, 100, and 100, respectively.

Similarly, national environmental performance (NEP) was likewise used as an independent variable, with a mean of 69.723, a standard deviation of 16.180, a minimum value of 25, and a maximum of 91.7. The average national environmental performance number indicates that most of the nations included in the dataset for this study have superior national environmental performance. This study also included a few control variables at the country level. For instance, Investment Freedom, GDP per capita, GDP growth, and COVID-19 with their mean values of 72.480, 10.252, 1.903,

and 0.5190, respectively, standard deviation values are 17.914, 0.954, 3.931, and 0.5015, minimum values are 20, 7.371. -11.030 and 0, respectively, and maximum values are 90, 11.398, 11.792, and 1, respectively.

4.3.3 Correlation Metrics and VIF

The correlation matrix describes the link between the variables. The correlation matrix in this study is used to monitor the multicollinearity problem among the explanatory factors. The coefficient of correlation has a value between -1 and +1. A perfect negative or positive correlation is shown if the correlation coefficient is valued at -1 or +1. If this value ranges between 0 and 0.30 (0 and -0.30), in this case, it is a weak positive or negative correlation, respectively. If this value ranges between 0.30 and 0.70 (0.30 and -0.7), it is a moderate positive or negative correlation, respectively. If this value ranges between 0.70 and 1 (-0.7 and 1), it is considered a strong positive or negative correlation, respectively (Ratner, 2009).

Table 4.7 shows the correlation matrix among and VIF of explanatory variables. Table 4.7 reports weak/low degree correlation between Individualism (IND) and Uncertainty Avoidance (UA) with coefficient value of 0.1325, Long-Term Orientation (LTO) and Individualism with coefficient value of -0.1198, Long-Term Orientation (LTO) and Investment Freedom (IF) with coefficient value of -15.38, Long-Term Orientation and GDP per capita (GDPPC) with coefficient value of 0.1474, Uncertainty Avoidance (UA) and Investment Freedom (IF) with coefficient value of 0.1478, Uncertainty Avoidance and national environmental performance (NEP) with coefficient value of 0.1737.

Table 4.7 : Correlation Matrix and VIF of Explanatory Variables

Variables	IND	LTO	UAI	NEP	IF	GDPPC	GDPG	Covid-19	VIF
IND	1								2.89
LTO	-0.1198	1							1.22
UAI	0.1325	0.0477	1						1.17
NEP	0.5103	-0.0157	0.1737	1					2.25
IF	0.5137	-0.1538	0.1478	0.6133	1				2.26
GDPPC	0.5123	0.1474	-0.0329	0.6853	0.6544	1			2.89
GDPG	0.0134	0.0656	-0.0944	-0.0714	-0.0629	-0.0169	1		1.03
Covid-19	0.0082	-0.0382	0.0599	0.2384	0.0478	0.0483	0.2516	1	1.21
VIF (Mean)									**1.75**

This Table describes all explanatory variables' pairwise Pearson correlation and variance inflation factor (VIF).

Additionally, Table 4.7 shows a correlation of 0.5137 between Individualism (IND) and Investment Freedom (IF), 0.5123 between Individualism (IND) and GDP per Capita (GDPPC), 0.5103 between Individualism (IND) and national environmental performance (NEP), 0.6544 between Investment Freedom (IF) and GDP per capita (GDPPC), 0.613 between national environmental performance (NEP) and Investment Freedom (IF), and 0.685 between national environmental performance (NEP) and GDP per capita (GDPPC). Likewise, Table 4.7 indicates no correlation between COVID-19 and any explanatory or control factors.

Gujarati (2003) discovered that if the coefficient of correlation among two explanatory variables is more than 0.8, then Multicollinearity is considered a problem; otherwise, it is not. Table 4.7 shows that multicollinearity among the explanatory variables is not an issue because the value of the coefficient of correlation is less than 0.8. A few previous studies have used a correlation coefficient value of 0.7 as a cut-off point for the problem of multicollinearity (Ashraf, 2021; Chang & Mastrangelo, 2011).

Furthermore, through the Variance Inflation Factor (VIF), the Multicollinearity problem is tested. If the VIF's mean value is higher than 10, Multicollinearity is an issue (Law, 2018). Kim (2019) also discovered that the multicollinearity issue exists if the mean value of VIF is higher than 5 to 10. As far as this study is concerned, the mean value of VIF in Table 4.7 indicates that there is no Multicollinearity in the dataset because the mean value of the VIF is 1.75 (which is less than both 5 and 10). It is also observed that the VIF value of each explanatory variable is also in the range.

4.3.4 Impact of National Culture and Environmental Performance on Stocks' Response to Corporate Green Bonds' Issuance Announcements

This study uses the panel data estimation model to estimate the impact of national culture and environmental performance on stocks' response to corporate green bonds' issuance announcements. This study analyzed four panels based on stocks' responses (CAAR). Panel A has a CAAR of [-2+5] event window, panel B has a CAAR of [-2+10] event window, panel C has a CAAR of [-5+10] event window, and panel D has a CAAR of [-10+10]. This study considered only four panels because of the significance of the event windows. Table 4.1 reports that only four out of 10 analyzed event windows have shown positive significant cumulative average abnormal returns. Therefore, this study selects four significant event windows for further analysis.

Table 4.8 shows the paned data estimation model results with panel A. Panel A describes the panel data estimation results using CAAR [-2+5] as a dependent variable. First, pooled OLS and Random Effect Models are applied to the panel estimation model. To determine whether the Random Effect Model or pooled OLS is appropriate for this dataset, the Breusch Pagan LM test is employed. Table 4.8 shows a significant Breusch Pagan LM test result, suggesting that the Random Effect Model is a better fit than a straightforward pooled OLS analysis.

Furthermore, the Hausman test is typically used to evaluate the acceptability of a Random or Fixed Effect Model. However, since the dataset used in this study might not be appropriate for the Fixed Effect Model, the Hausman test has not been run in this investigation. The variables that do not change over time, also known as time-invariant variables, cannot be estimated through the Fixed Effect Model because the

Fixed Effect estimator depends on the inside (or time series) variations (Law, 2018). As far as the dataset of this study is concerned, it consisted of cultural dimensions scores that do not vary over time and remain unchanged for each country. Consequently, the Fixed Effect Model is not an appropriate panel estimation model for this study. For this reason, the best panel data estimate model for this study is the Random Effect Model.

Hence, the Random Effect Model is applied, and further diagnostic checks are performed on the dataset. Multicollinearity, Heteroscedasticity, and serial correlation tests are performed in diagnostic checks. Variance Inflation Factor (VIF) is used for the Multicollinearity diagnostic. The result indicates that the mean value of VIF for all panels is 1.75 (also displayed in Table 4.7). This mean value of VIF shows no Multicollinearity issue in the dataset because it is less than the standard value of 10. As the literature describes, if the mean value of VIF is greater than 10, then there is a multicollinearity problem (Law, 2018). Kim (2019) also discovered that the multicollinearity issue exists if the mean value of VIF is higher than 5 to 10.

For Heteroscedasticity, the Breusch-Pagan test for Heteroscedasticity is applied, and its result in Table 4.8 shows that the p-value is significant for all panels that highlight the existence of Heteroscedasticity in the dataset. Further, the Wooldridge test is applied to check the serial correlation in the panel dataset. Its result shows that the p-value is significant for all panels, indicating serial correlation in the dataset. Consequently, after the necessary diagnostic check, the Random Effect Model with Heteroscedasticity and Serial correlation is finally applied, and its results are finally interpreted.

In general, the results of panel A in Table 4.8 show that national culture and environmental performance positively influence the stocks' response (CAAR -2+5) to corporate green bond issuance announcements. The Individualism (IND) dimension of Hofstede national culture has a positive significant effect on CAAR [-2+5] for Random Effect with Heteroscedasticity & serial correlation models as the coefficient value (0.7133**) is positive and significant at a 5% significance level. This positive significant effect shows that the cumulative average abnormal returns are higher in Individualistic than in Collectivist cultures.

The positive coefficient of the Individualism dimension indicates that stock markets perform better in an Individualistic culture around the corporate green bonds' issuance announcements. So, investors from Individualistic cultures get more advantages from corporate green issuance announcements than countries with collectivist cultures. Investors with an Individualistic culture are more overconfident and overoptimistic, and they have more willingness to take risks (Cheon & Lee, 2018; Chui et al., 2010), and this behaviour could result in higher volatility and increased trading to a salient event (Odean, 1998). Boubakri et al. (2016) also described that an increased willingness to take risks is correlated with Individualism.

The association between high Individualism and increased trading is also observed in the literature (Chui et al., 2010; Statman et al., 2006). Furthermore, Connelly (2017) also claimed that an increase in socially responsible investment (SRI) is associated with high Individualism. Broadstock et al. (2022) documented that investing in green bonds is a socially responsible investment (SRI). Therefore, investors in Individualistic cultures are more confident and willing to invest more in green bonds,

considered socially responsible investments. In return, they get more advantages through higher abnormal returns. The results of this study are also consistent with those of Fernandez-Perez et al. (2021), who reported a positive association between Individualism and market abnormal returns (CAR).

In panel A analysis, the Uncertainty Avoidance (UA) dimension of Hofstede's national culture has an overall insignificant effect on CAAR[-2+5], as the coefficient value (0.0514) is not significant. This insignificant coefficient reports no relationship between Uncertainty Avoidance and stocks' response (CAAR -2+5) around the green bonds' issuance announcements. Stocks do not respond significantly to the green bonds' issuance announcements in Uncertainty Avoidance culture. Hence, investors cannot get any benefit/loss from green bond issuance in countries with Uncertainty Avoidance. It is observed that people from a high Uncertainty Avoidance culture consume more life insurance (Chui & Kwok, 2008). In contrast, firms belonging to a high Uncertainty Avoidance culture take fewer corporate risks (Li et al., 2013), adhere to conservative cash-holding strategies (Chen et al., 2015), and tend not to invest in international financial markets (Anderson et al., 2011).

Moreover, investors from countries with high levels of Uncertainty Avoidance tend to limit their investments to markets with higher levels of risk (Inklaar & Yang, 2012). Mihet (2013) also noted that inventive and risk-taking attitudes are lower in societies with high levels of Uncertainty Avoidance. According to Keswani et al. (2016), investors in countries with greater Uncertainty Avoidance tend to prefer traditional investments over alternative investments. While green bonds as an alternative investment are considered a source of firms higher innovative performance (Khurram

et al., 2023), as well as a source of improvement in green innovation (Wang et al., 2022). According to Labidi et al. (2021), investors from countries with high levels of Uncertainty Avoidance may find it challenging to abandon conventional investment methods and incorporate ESG considerations into their choices.

Researchers further demonstrate that the flow of capital with socially responsible investment (SRI) is less in countries with higher Uncertainty Avoidance. Broadstock et al. (2022) documented that investing in green bonds is a socially responsible investment (SRI), and investment in green bonds increases ESG practices (Wang & Wang, 2022). Therefore, investors from Uncertainty Avoidance cultures are reluctant to take additional risks and are happy to stay with the traditional investment. They even hesitated to invest in innovative and socially responsible investments like green bonds due to their Uncertainty Avoidance behaviour. So, they do not bother with green bond issuance announcements and cannot get any benefit or loss; consequently, stock markets do not respond to green bond issuance announcements in an Uncertainty Avoidance culture.

Further, in panel A analysis, Table 4.8 shows that the Long-Term Orientation dimension of Hofstede national culture dimension has a significant positive effect on stocks' response (CAAR-2+5), as the value of co-efficient (0.6062**) is positive and significant at 5% significance level. This positive significant effect shows that the cumulative average abnormal returns are higher in a Long-Term-Oriented culture than in a short-term-oriented culture. The positive coefficient of the Long-Term Orientation dimension indicates that stock markets perform better in long-term oriented societies

around the corporate green bonds' issuance announcements. Long-term investors prefer to invest more in green bonds than short-term-oriented investors.

So, investors from countries with Long-Term Orientation cultures get more advantages from corporate green issuance announcements than those from Short-Term-Orientation cultures. Long-Term Orientation cultures have better environmental performance, and investors from long-term oriented societies are more inclined to invest in environmental safety than short-term societies (Dangelico et al., 2020).

Additionally, it has been noted that after the issuing of corporate green bonds, the ownership of long-term and environmentally conscious (green) investors increased, as well as the firm's environmental performance (Flammer, 2021). As far as the green bond is concerned, the proceeds from the green bonds are also used to protect the environment by investing in long-term green projects (Climate Bond Initiative, 2022) and also used to mitigate the risks that arise due to climate change (Fatica & Panzica, 2021). Connelly (2017) also demonstrates a positive correlation between Long-Term orientation culture and socially responsible investment (SRI) capital flow. According to research by Broadstock et al. (2022), purchasing green bonds is a socially responsible investment (SRI), and investors who value socially conscious funds and the environment are attracted to the issuing of green bonds (Tang & Zhang, 2020).

Green bonds send a reliable signal of environmental commitment; firms are more likely to fascinate investors with a long-term mindset and are concerned with the natural environment. Therefore, it can be justified that stock markets in long-term societies respond positively to corporate green bonds' issuance announcements;

consequently, investors benefit from it in the form of significantly higher positive abnormal returns. This study's results align with Flammer (2021), who finds that ownership of long-term oriented investors increased after the green bonds' issuance.

Moving toward the relationship between national environmental performance and abnormal returns, Table 4.8 for panel A shows that national environmental performance measured through the Environmental Performance Index has a positive significant effect on stocks' response (CAAR -2+5), as the value of co-efficient (0.0543**) is positive and significant at 5% significance level. The beta coefficient of national environmental performance (NEP) is less than Hofstede's national cultural dimensions but is still positive and significant. The positive significant coefficient of national environmental performance with stocks' response (CAAR-2+5) indicates that the cumulative average abnormal returns are higher in nations having better environmental performance, as the environmental performance at the nation level will increase the cumulative average abnormal returns around the corporate green bonds' issuance announcements in these nations will also increase.

The positive coefficient also indicates that stock markets perform higher in nations having better environmental performance around the corporate green bonds' issuance announcements. Investors from countries with better environmental performance prefer to invest more in green bonds than nations with lower environmental performance. So, investors of nations with better environmental performance get more advantages from corporate green issuance announcements than those with lower environmental performance. Investors from better environmental performance nations respond positively to green bond issuance announcements because the country that

provides better policies on environmental issues may help the firms enhance their environmental performance (Yu et al., 2021), and better firm environmental performance leads to an increase in firm's stock prices (Castro et al., 2021).

It is also observed that countries with better environmental performance issue more green bonds (Mertzanis & Tebourbi, 2023), as well as more socially responsible investment (SRI) decisions, are linked to higher national environmental performance rankings (Diouf et al., 2016). Further, the green bond is considered an important financial instrument for enhancing environmental performance (Flammer, 2021; Tang & Zhang, 2020) and a tool against climate risk mitigation by reducing the carbon footprint (Fatica & Panzica, 2021). Broadstock et al. (2022) documented that investing in green bonds is a socially responsible investment (SRI), and the issuance of green bonds fascinates investors having a green agenda and socially responsible funds (Tang & Zhang, 2020).

Therefore, it can be said that nations with better environmental performance also have more environmentally dedicated firms that issue maximum green bonds, and investors respond positively to this issuance because they consider investing in green bonds as environmentally and socially responsible investing. Stock markets also perform better around corporate green bond issuance if the issuer belongs to nations with better environmental performance than issuers from lower environmental performance nations. This strong investor response can be seen in the form of higher positive abnormal returns. These results are consistent with the study of Castro et al. (2021), who reported a positive relationship between environmental performance and stock prices. It is also in line with the study of Mertzanis and Tebourbi (2023), who

discovered that countries with better environmental performance issue more green bonds, and investors respond to this issuance positively due to environmentally dedicated investment (Flammer, 2021).

As far as the control variables are concerned, results of panel A in Table 4.8 show that Investment Freedom (LNIF) has no significant relation with the stock market response (CAAR-2+5) around green bonds issuance announcements, as the value of coefficient (-0.0609) is insignificant. Investment Freedom is a proxy of financial liberalization used to control foreign investors' influence in domestic stock markets. The insignificant result of Investment Freedom shows that foreign investors are not concerned about the green bond issuance announcements in domestic countries.

The results of the Investment Freedom are consistent with the study of Ashraf (2021), who reported the insignificant relation of Investment Freedom as a control variable with stock market returns. The results on Investment Freedom as a control variable are also in line with the study of Tang and Zhang (2020), who demonstrated that the ownership of only domestic shareholders increased rather than foreign shareholders, indicating that domestic shareholders are only interested in investing in green bonds rather than foreign shareholders.

Furthermore, GDP per capita and GDP growth have an insignificant impact on CAAR-2+5. COVID-19 significantly impacted CAAR [-2+5], as the coefficient value (0.0222) is positive and significant. The positive coefficient of COVID-19 highlights that stocks respond positively to corporate green bond issuance announcements during COVID-19, and these results are consistent with the study of Jin and Zhang (2023).

Table 4.8 : Panel A with CAAR [-2+5]

Variables	Pooled OLS	Random Effect	Random Effect with Hetero & Serial Correlation
LNIND	0.6576 (0.000)***	0.7133 (0.021)**	0.7133 (0.022)**
LNLTO	0.5324 (0.001)***	0.6062 (0.065)*	0.6062 (0.044)**
LNUA	0.1669 (0.253)	0.0514 (0.880)	0.0514 (0.866)
LNNEP	-0.2658 (0.456)	0.0543 (0.024)**	0.0543 (0.058)**
LNGDPG	0.1163 (0.489)	0.0121 (0.219)	0.0121 (0.158)
LNIF	-0.7703 (0.007)***	0.0609 (0.332)	-0.0609 (0.570)
LNGDPPC	0.1734 (0.135)	0.1171 (0.016)**	0.1171 (0.056)**
COVID-19	-0.0129 (0.927)	0.0222 (0.002)***	0.0222 (0.001)***
Constant	1.6292 (0.228)	0.2065 (0.925)	0.2065 (0.919)
Breusch-Pagan LM Test	62.23 (0.0000)***		
Multicollinearity (VIF)	1.75	1.75	
Heteroscedasticity (χ^2 - stat)	6.94 (0.0085)***	6.94 (0.0085)***	
Serial Correlation (F-stat)	52.207 (0.0000)***	52.207 (0.0000)***	
R-square (%)	27.38	20.86	20.86
F-statistics	5.75 (0.000)***	43.56 (0.000)***	56.79 (0.000)***
Observations	133	133	133
Number of ID	38	38	38

This table describes the results of pooled OLS, Random Effect Model, and Random Effect Model with heteroscedasticity and serial correlation for panel A. CAAR is the cumulative average abnormal return that serves as a dependent variable. Panel A uses CAAR for the event window of [-2+5] as a dependent variable. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. The control variables are GDPG, IF, GDPPC in a natural log, and COVID-19. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), and GDPPC is the GDP per capita in the natural log. COVID-19 is a dummy variable that captures the Covid-19 effect.

P-vale in parentheses
*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Table 4.9 shows the results of panel B using the CAAR-2+10 (stocks' response) as a dependent variable. The results are almost consistent with the results of panel A. Individualism and Long-Term Orientation dimensions of Hofstede culture have a positive and significant relationship with CAAR -2+10 (stocks' response) around the corporate green bonds issuance announcements as their coefficient are positive and significant with values of 0.7524** and 0.6226** respectively but compared to panel A their coefficient values are higher. The Uncertainty Avoidance dimension of Hofstede culture has no relationship with CAAR-2+10 as the coefficient value (0.0417) is insignificant, which is also in line with the result of panel A.

Similarly, the national environmental performance has a significant and positive impact on CAAR-2+10 (market response), as the coefficient value (0.0528*). The results of NEP for panel B are consistent with panel A, but the coefficient value is slightly lower in panel B than in panel A. Regarding the control variables, the GDP per capita, GDP Growth, and Investment Freedom have insignificant effects on CAAR-2+10. COVID-19 significantly impacted CAAR -2+5, as the coefficient value (0.0192***) is positive and significant.

Table 4.9 : Panel B with CAAR [-2+10]

Variables	Pooled OLS	Random Effect	Random Effect with Hetero & Serial Correlation
LNIND	0.6606 (0.000)***	0.7524 (0.016)**	0.7524 (0.020)**
LNLTO	0.5155 (0.000)***	0.6226 (0.061)*	0.6226 (0.036)**
LNUA	0.1700 (0.250)	0.0417 (0.903)	0.0417 (0.890)
LNNEP	-0.2631 (0.466)	0.0528 (0.070)*	0.0528 (0.070)*
LNGDPG	0.1212 (0.476)	0.0158 (0.191)	0.0158 (0.121)
LNIF	-0.7800 (0.007)***	-0.0876 (0.259)	-0.0876 (0.415)
LNGDPPC	0.1797 (0.126)	-0.1522 (0.010)***	-0.1522 (0.020)**
COVID-19	-0.0151 (0.916)	0.0192 (0.031)**	0.0192 (0.010)***
Constant	1.6301 (0.233)	0.4992 (0.823)	0.4992 (0.807)
Breusch-Pagan LM Test	65.02 (0.0000)***		
Multicollinearity (VIF)	1.75	1.75	
Heteroscedasticity (χ^2 - stat)	6.47 (0.010)***	6.47 (0.010)***	
Serial Correlation (F-stat)	23.002 (0.000)***	23.002 (0.000)***	
R-square (%)	26.83	20.14	20.14
F-statistics	5.59 (0.000)***	33.06 (0.000)***	56.29 (0.000)***
Observations	133	133	133
Number of ID	38	38	38

This table describes the results of the pooled OLS, Random Effect Model, and Random Effect Model with heteroscedasticity and serial correlation for panel B. CAAR is cumulative average abnormal returns that serve as a dependent variable. Panel B uses CAAR for the event window of [-2+10] as the dependent variable. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. The control variables are GDPG, IF, GDPPC in a natural log, and COVID-19. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), and GDPPC is the GDP per capita in the natural log. COVID-19 is a dummy variable that captures the Covid-19 effect.

P-vale in parentheses
*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Furthermore, Table 4.10 shows the results of panel C by using the stock CAAR-5+10 (stocks' response) as a dependent variable. The results are almost consistent with the results of panel A. Individualism and Long-Term Orientation dimensions of Hofstede culture have a positive and significant relationship with CAAR -5+10 (stocks' response) around the corporate green bonds issuance announcements as their coefficient are positive and significant with values of 0.7203** and 0.6109** respectively.

However, the Uncertainty Avoidance dimension of Hofstede culture has no relationship with CAAR-5+10 as the coefficient value (0.0495) is insignificant, which is also in line with the result of panels A and B. Similarly, the national environmental performance has a significant and positive impact on CAAR-5+10 (market response), as the coefficient value (0.0540**). The results of National environmental performance for panel C are consistent with panels A and B. Regarding the control variables, GDP per capita has a significant negative impact, and COVID-19 has a significant positive impact on CAAR -5+10. In contrast, Investment Freedom and GDP growth have insignificant effects on CAAR -5+10.

Table 4.10 : Panel C with CAAR [-5+10]

Variables	Pooled OLS	Random Effect	Random Effect with Hetero & Serial Correlation
LNIND	0.6575 (0.000)***	0.7203 (0.022)**	0.7203 (0.022)**
LNLTO	0.5323 (0.001)***	0.6109 (0.063)*	0.6109 (0.041)**
LNUA	0.1670 (0.253)	0.0495 (0.884)	0.0495 (0.871)
LNNEP	-0.2650 (0.457)	0.0540 (0.033)**	0.0540 (0.050)**
LNGDPG	0.1167 (0.487)	0.0132 (0.202)	0.0132 (0.138)
LNIF	-0.7707 (0.007)***	-0.0694 (0.294)	-0.0694 (0.516)
LNGDPPC	0.1734 (0.135)	-0.1245 (0.015)***	-0.1245 (0.041)**
COVID-19	-0.0147 (0.917)	0.0223 (0.008)***	0.0203 (0.011)***
Constant	2.5128 (0.064)*	1.1640 (0.597)	1.1640 (0.566)
Breusch-Pagan LM Test	63.50 (0.000)***		
Multicollinearity (VIF)	1.75	1.75	
Heteroscedasticity (χ^2-stat)	6.92 (0.008)***	6.92 (0.008)***	
Serial Correlation (F-stat)	25.945 (0.000)***	25.945 (0.000)***	
R-square (%)	27.38	20.89	20.89
F-statistics	5.75 (0.000)***	38.89 (0.000)***	56.29 (0.000)***
Observations	133	133	133
Number of ID	38	38	38

This table describes the results of the pooled OLS, Random Effect Model, and Random Effect Model with Heteroscedasticity and serial correlation for panel C. CAAR is cumulative average abnormal returns that serve as a dependent variable. Panel C uses CAAR for the event window of [-5+10] as the dependent variable. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. The control variables are GDPG, IF, GDPPC in a natural log, and COVID-19. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), and GDPPC is the GDP per capita in the natural log. COVID-19 is a dummy variable that captures the Covid-19 effect.

P-vale in parentheses
*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Furthermore, Table 4.11 shows the results of panel D using the CAAR-10+10 (stocks' response) as a dependent variable. Individualism and Long-Term Orientation dimensions of Hofstede culture have a positive and significant relationship with CAAR -10+10 (stocks' response) around the corporate green bonds issuance announcements as their coefficient are positive and significant with values of 0.7313** and 0.6140**, respectively. Whereas the Uncertainty Avoidance dimension of Hofstede culture has no relationship with CAAR-5+10 as the coefficient value (0.0461) is insignificant, which is also in line with the result of panels A, B, and C. Similarly, the national environmental performance has a significant and positive impact on CAAR-5+10 (market response), as the coefficient value (0.0580**). The results of NEP for panel C are consistent with those of panels A, B, and C. Regarding the control variables, GDP growth, GDP per capita, and Investment Freedom have insignificant effects on CAAR-2+5, whereas COVID-19 has a significant positive impact on CAAR -5+10.

Table 4.11 : Panel D with CAAR [-10+10]

Variables	Pooled OLS	Random Effect	Random Effect with Hetero & Serial Correlation
LNIND	0.6590 (0.000)***	0.7313 (0.019)**	0.7313 (0.021)**
LNLTO	0.5257 (0.001)***	0.6140 (0.063)*	0.6140 (0.039)**
LNUA	0.1673 (0.254)	0.0461 (0.892)	0.0461 (0.879)
LNNEP	-0.2623 (0.463)	0.0580 (0.039)**	0.0580 (0.050)**
LNGDPG	0.1181 (0.483)	0.0141 (0.218)	0.0141 (0.127)
LNIF	-0.7761 (0.007)***	-0.0809 (0.269)	-0.0809 (0.449)
LNGDPPC	0.1752 (0.133)	-0.1340 (0.017)**	-0.1340 (0.030)**
COVID-19	-0.0157 (0.912)	0.0192 (0.023)***	0.0192 (0.029)**
Constant	2.5274 (0.063)*	1.2556 (0.571)	1.2556 (0.536)
Breusch-Pagan LM Test	64.01 (0.000)***		
Multicollinearity (VIF)	1.75	1.75	
Heteroscedasticity (χ^2-stat)	6.83 (0.009)***	6.83 (0.009)***	-
Serial Correlation (F-stat)	19.815 (0.000)***	19.815 (0.000)***	-
R-square (%)	27.21	20.70	20.70
F-statistics	5.70 (0.000)***	34.56 (0.000)***	52.39 (0.000)***
Observations	133	133	133
Number of ID	38	38	38

This table describes the results of the pooled OLS, Random Effect, and Random Effect Models with Heteroscedasticity and serial correlation for panel D. CAAR is cumulative average abnormal returns that serve as a dependent variable. Panel D uses CAAR for the event window of [-10+10] as the dependent variable. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. The control variables are GDPG, IF, GDPPC in the natural log, and COVID-19. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), and GDPPC is the GDP per capita in the natural log. COVID-19 is a dummy variable that captures the Covid-19 effect.

*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Table 4.12 summarizes the results of all panels (panel A -2+5, panel B -2+10, panel C -5+10, and panel D -10+10) in a single Table. Table 4.12 shows that the Individualism and Long-Term Orientation dimensions of Hofstede national culture positively and significantly impact cumulative average abnormal returns (CAAR) for all panels. In contrast, the Uncertainty Avoidance dimension is insignificant to CAAR for all panels. These results highlight that overall national culture has an impact on stocks' response (CAAR) around corporate green bonds' issuance announcements for all panels, which demonstrates that national culture is an essential factor in describing the investor response to the corporate green bonds issuance announcements and investors gain/loss from these issuances can be influenced because of their cultural traits. For example, investors respond positively in Individualistic and long-term-oriented societies and benefit from green bond issuance announcements.

In contrast, investors from Uncertainty Avoidance societies do not bother with corporate green bond issuance announcements because of their risk-averse attitude, and they cannot get any benefit/loss from green bond issuance. Furthermore, the results of Table 4.12 show that the national environmental performance (NEP) has a positive and significant impact on the stocks' response (CAAR) for all panels, which indicates that stock markets perform better in better environmental performance societies; hence, investors respond positively and get benefit from corporate green bonds issuance in these countries. Regarding the control variables, COVID-19 positively impacts stock response overall, whereas GDP per capita has a negative effect. The GDP's growth and investment freedom have an insignificant impact on stock response.

Table 4.12 : Final Panel Random Effect with Heteroscedasticity and Serial Correlation

Variables	Panel A CAAR [-2+5]	Panel B CAAR [-2+10]	Panel C CAAR [-5+10]	Panel D CAAR [-10+10]
LNIND	0.7133 (0.022)**	0.7524 (0.020)**	0.7203 (0.022)**	0.7313 (0.021)**
LNLTO	0.6062 (0.044)**	0.6226 (0.036)**	0.6109 (0.041)**	0.6140 (0.039)**
LNUA	0.0514 (0.866)	0.0417 (0.890)	0.0495 (0.871)	0.0461 (0.879)
LNNEP	0.0543 (0.058)**	0.0528 (0.071)*	0.0540 (0.050)**	0.0580 (0.050) **
LNGDPG	0.0121 (0.158)	0.0158 (1.211)	0.0132 (0.138)	0.0141 (0.127)
LNIF	-0.0609 (0.570)	-0.0867 (0.415)	-0.0694 (0.516)	-0.0809 (0.449)
LNGDPPC	-0.1171 (0.056)**	-0.1522 (0.020)**	-0.1245 (0.041)**	-0.1340 (0.030)**
COVID-19	0.0222 (0.001)***	0.0192 (0.010)***	0.0203 (0.011)***	0.0192 (0.029)**
Constant	0.2065 (0.919)	0.4992 (0.807)	1.1640 (0.566)	1.2556 (0.536)
R-square (%)	20.86	20.14	20.89	20.70
F-statistics	56.79 (0.000)***	56.29 (0.000)***	53.52 (0.000)***	52.39 (0.000)***
Observations	133	133	133	133
Number of ID	38	38	38	38

This Table describes the Random Effect Model with Heteroscedasticity and serial correlation for all panels. CAAR is the cumulative average abnormal return that serves as a dependent variable. Panel A uses CAAR for the event window of [-2+5] as a dependent variable, Panel B uses CAAR for the event window of [-2+10] as a dependent variable, Panel C uses CAAR for the event window of [-5+10] as a dependent variable, Panel D use CAAR for event window of [-10+10] as a dependent variable. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. GDPG, IF, and GDPPC are control variables. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), and GDPPC is the GDP per capita in the natural log.

P-vale in parentheses
*** p<0.01, statistically significant at 1%
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

Additionally, sixteen-panel Random Effect Models are run to look at the effect of each Hofstede national cultural dimension and national environmental performance on stocks' response (CAAR) separately, as shown in Table 4.13. This study has four panels: in panel A, the dependent variable is CAAR-2+5; in panel B, it is CAAR-2+10; in panel C, it is CAAR-5+10; in panel D, it is CAAR-10+10. Each panel consists of four independent variables: three Hofstede national cultural dimensions (Individualism, Long-Term Orientation, and Uncertainty Avoidance) and one national environmental performance variable. Besides the independent variables, each estimation model uses GDP growth, Investment Freedom, and GDP per capita as control variables. So, each independent variable is tested with CAAR -2+5, CAAR -2+10, CAAR -5+10, and CAAR -10+10 separately in the presence of control variables, and the results are reported in Table 4.13.

The results of Table 4.13 report that the Individualism dimension of Hofstede national culture has a significant positive effect on CAAR-2+5, CAAR-5+10, and CAAR -10+10, as the coefficient values (0.793**, 0.942**, 0.821**, and 0.763** respectively) are positive and significant. Similarly, the Long-Term Orientation dimension of Hofstede national culture has a significant positive effect on CAAR-2+5, CAAR-5+10, and CAAR -10+10, as the coefficient values (0.691**, 0.823**, 0.718**, and 0.699** respectively) are positive and significant. In contrast, the Uncertainty Avoidance dimension of Hofstede national culture has an insignificant effect on CAAR-2+5, CAAR-5+10, and CAAR -10+10, as the coefficient values (0.032, 0.029, 0.024, and 0.049 respectively) are insignificant. Moreover, the results of Table 4.13 also show that national environmental performance has a positive and significant impact on CAAR-2+5, CAAR -2+10, CAAR-5+10, and CAAR -10+10 as

the coefficient values (0.077**, 0.118**, 0.069**, and 0.105** respectively) are positive and significant.

The results of individually tested independent and dependent variables in separate estimation models are consistent with those of jointly tested independent and independent variables in a single estimation model bond issuance. Overall, the findings in Table 4.13 highlight that stocks respond positively to corporate green bond issuance announcements for Individualistic, long-Term Orientation, and better environmental performance nations.

In contrast, stocks do not respond to corporate green bond issuance for Uncertainty Avoidance countries. Consequently, investors from Individualistic, Long-Term Orientaion, and better environmental performance nations benefit from corporate green bond issuance announcements. In contrast, investors from Uncertainty Avoidance countries do not bother with green bond issuance announcements and cannot get any benefit/loss from these issuance announcements. Thus, it can be concluded that overall national culture and environmental performance significantly influence investor response to corporate green bond issuance, and they can play an essential role in shaping the investors' sentiment and making investment decisions.

Table 4.13 : Panel Random Effect Model for Each Explanatory Variable Separately

	Panel A: CAAR [-2+5]				Panel B: CAAR [-2+10]				Panel C: CAAR [-5+10]				Panel D: CAAR [-10+10]			
	(1) IND	(2) LTo	(3) UA	(4) NEP	(1) IND	(2) LTo	(3) UA	(4) NEP	(1) IND	(2) LTo	(3) UA	(4) NEP	(1) IND	(2) LTo	(3) UA	(4) NEP
IND	0.792**				0.827**				0.798*				0.810**			
	(0.016)				(0.014)				(0.015)				(0.015)			
LTO		0.689*				0.704*				0.693*				0.697		
		(0.068)				(0.063)				(0.065)				(0.063)		
UA			0.032				0.026				0.030				0.028	
			(0.931)				(0.944)				(0.934)				(0.938)	
NEP				0.058**				0.058				0.058				0.063**
				(0.048)				(0.054)**				(0.048)				(0.045)
GDPG	0.013	0.012	0.012	0.010	0.0164*	0.015	0.014	0.013	0.014	0.013	0.013**	0.011*	0.015	0.014	0.013**	0.0121*
	(0.147)	(0.151)	(0.169)	(0.201)	(0.100)	(0.100)	(0.119)	(0.136)	(0.131)	(0.133)	(0.152)	(0.178)	(0.125)	(0.125)	(0.147)	(0.172)
IF	-0.050	-0.044	-0.041	-0.049	-0.074	-0.065	-0.060	-0.069	-0.058	-0.052	-0.048	-0.056	-0.068	-0.060	-0.055	-0.065
	(0.645)	(0.687)	(0.714)	(0.646)	(0.495)	(0.547)	(0.586)	(0.514)	(0.592)	(0.637)	(0.066)	(0.598)	(0.532)	(0.583)	(0.619)	(0.543)
GDPPC	-0.141**	-0.137**	-0.128**	-0.949	-0.171**	-0.164*	-0.151	0.119	-0.147***	-0.142	-0.132***	-0.099**	-0.157*	-0.151	-0.139	-0.104
	(0.019)	(0.022)	(0.040)	(0.146)	(0.010)	(0.008)	(0.024)	(0.010)	(0.015)	(0.016)	(0.034)	(0.126)	(0.013)	(0.013)	(0.033)	(0.120)
COVID-19	0.026**	0.067**	0.026****	0.022	0.023**	0.023	0.023	0.019	0.022***	0.024***	0.021***	0.020**	0.023*	0.024	0.021	0.019
	(0.000)	(0.000)	(0.000)	(0.001)	(0.005)	(0.004)	(0.004)	(0.010)	(0.004)	(0.004)	(0.002)	(0.000)	(0.008)	(0.000)	(0.008)	(0.028)
Constant	2.848*	3.177*	5.565	5.158***	3.108	3.480	5.904	5.487***	3.802***	4.131***	6.529***	6.121***	3.899***	4.241**	6.638	6186
	(0.078)	(0.074)	(0.002)	(0.000)	(0.049)	(0.066)	(0.001)	(0.000)	(0.018)	(0.022)	(0.018)	(0.000)	(0.014)	(0.022)	(0.000)	(0.000)
Obs.	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133
F-Statistics	59.04	46.61	50.08	40.50	53.94	50.44	51.64	39.20	53.93	40.86	43.30	37.82	55.18	43.71	46.00	36.57
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
No. of ID	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38

This Table describes the results of the Random Effect Model after all diagnostic checks. CAAR is the cumulative average abnormal return that serves as a dependent variable. Panel A uses CAAR for the event window of [-2+5] as a dependent variable, Panel B uses CAAR for the event window of [-2+10] as a dependent variable, Panel C uses CAAR for the event window of [-5+10] as a dependent variable, Panel D use CAAR for event window of [-10+10] as a dependent variable. IND, LTO, UA, and NEP are the independent variables. IND is the Individualism dimension score of Hofstede's national culture, LTO is the Long-Term Orientation dimension score of Hofstede's national culture, UA is the Uncertainty Avoidance dimension of Hofstede's national culture, and NEP is the national Environmental Performance Index score. GDPG, IF, GDPPC, and COVID-19 are control variables. GDPG is the annual GDP growth, IF is the Investment Freedom score (used as a proxy of financial liberalization), and GDPPC is the GDP per capita in the natural log.

P-vale in parentheses
*** p<0.01, statistically significant at 1%,
** p<0.05, statistically significant at 5%
* p<0.1, statistically significant at 10%

4.4 Additional Possible Explanations

Additionally, this study calculates the cumulative average abnormal return (CAAR) of 21 days for the national culture dimensions. Table 4.14 highlights the 21-day cumulative average abnormal return for cultural dimensions.

Table 4.14 : 21 days CAAR for National Culture Dimensions

Days	High IND CAAR	Low IND CAAR	High LTO CAAR	Low LTO CAAR	High UA CAAR	Low UA CAAR
-10	0.003941	0.001475	0.0000127	0.000116	0.001918	0.001638
-9	0.003261	0.004686	-0.0020226	0.000559	0.003148	-0.00012
-8	0.001039	0.001351	0.001549568	-0.00211	0.00178	-0.00176
-7	-0.00314	0.000122	-0.00088184	-0.00026	0.002489	-0.00118
-6	0.003117	-0.00328	0.004007143	-0.0007	0.002111	-0.0021
-5	-0.00272	-0.00472	0.00375003	-0.0003	0.001811	0.00007
-4	0.003355	-0.00357	0.005068162	0.000674	0.002218	0.002142
-3	-0.00343	-0.00767	0.004370554	-0.00022	0.00262	-0.00158
-2	-0.00558	0.00571	-0.00430524	0.001606	0.003459	0.002894
-1	0.00636	0.005107	0.00737249	-0.00258	0.004094	-0.00309
ED	0.009346	0.007676	0.010686667	0.005309	0.006407	0.005058
1	0.013732	0.009351	0.012373503	0.011179	0.009041	0.009676
2	0.015732	0.008117	0.017097693	0.00921	0.008859	0.014093
3	0.019679	0.009344	0.020717185	0.008092	0.009861	0.014577
4	0.018069	-0.00404	0.009082401	0.005391	0.006555	0.014886
5	0.022654	0.012813	0.015035991	0.011121	0.010651	0.021554
6	0.01982	0.011028	0.012097358	0.01028	0.008148	0.014876
7	0.018045	0.006378	0.011750724	0.010846	0.006934	0.022852
8	0.017467	-0.00931	0.015728587	0.008901	0.007952	0.015353
9	0.023623	-0.00462	0.020994051	0.012249	0.008518	0.026323
10	0.024967	0.008059	0.018018643	0.012762	0.014228	0.029054
21 days CAAR	0.209335 (20.93%)	0.054019 (5.40%)	0.182503791 (18.25%)	0.102125 (10.21%)	0.122802 (12.28%)	0.18521793 (18.52%)

This Table reports the results of cumulative average abnormal return (CAAR) of 21 days (10 days before and 10 days after the event day) for high Individualism (Individualistic), low Individualism (Collectivism), low (Normative), high (Pragmatic) LTO culture, low UA (Risk-taker), and high Uncertainty Avoidance (Risk-averse) culture.

Table 4.14 describes firms' cumulative average abnormal returns in countries with Individualistic cultures (high IND), which are 15.53%[1] higher than the CAARs of firms with collectivist (low IND) cultures. Moreover, the CAARs of firms with high

[1] High IND CAAR – Low IND CAAR (20.93%-5.40%) = 15.53%

Long-Term Orientation cultures are 8.04%[2] higher than the CAARs of countries with low Long-Term Orientation. Similarly, the CAARs of firms with low Uncertainty Avoidance culture are 6.24%[3] higher than the CAARs of countries with low Uncertainty Avoidance culture.

Figure 4.4 highlights the trend of cumulative average abnormal returns (CAARs) of firms belonging to Individualistic (high IND) and Collectivism (low IND). The figure shows that the CAARs of Individualistic countries' firms are higher than the CAARs of Collectivist countries' firms.

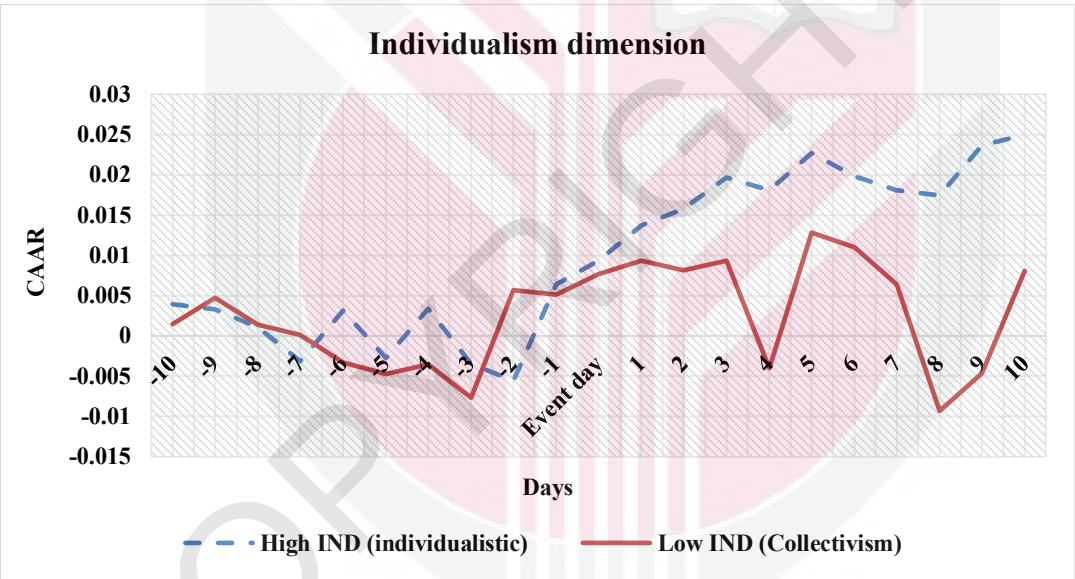

Figure 4.4 : 21 days CAAR for Individualism (IND) dimension of national culture

Similarly, Figure 4.5 highlights the trend of cumulative average abnormal returns (CAARs) of firms belonging to high LTO (Pragmatic) and low LTO (Normative)

[2] High LTO CAAR – Low LTO CAAR (18.25%-10.21%) = 8.04%
[3] Low UA CAAR – High UA CAAR (18.52% - 12.28%) = 6.24%

cultures. The figure shows that the CAARs of Pragmatic countries' firms are higher than the CAARs of Normative countries' firms.

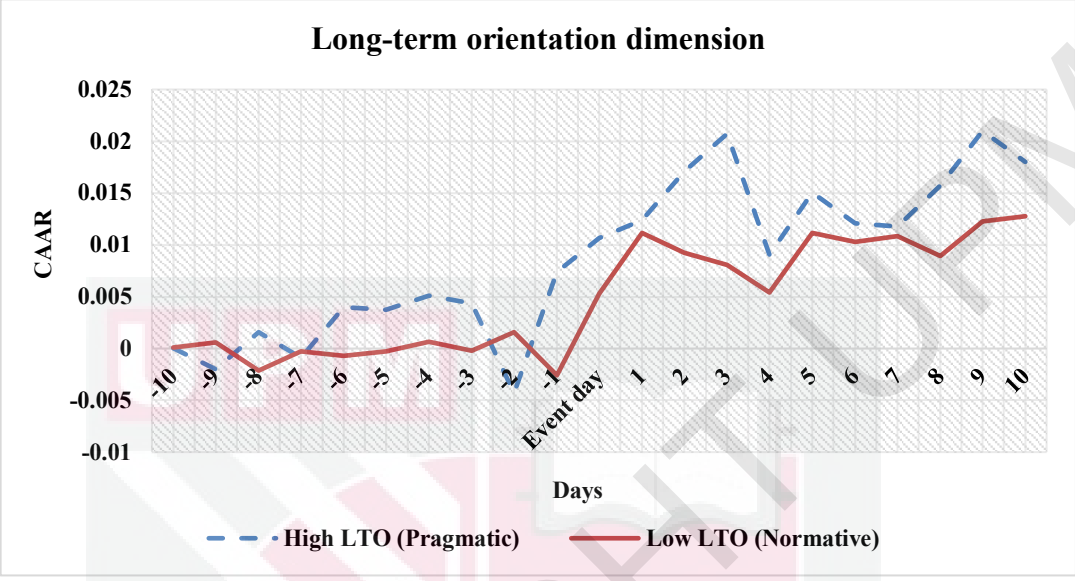

Figure 4.5 : 21 days CAAR for Long-Term Orientation (LTO) dimension of national culture

Moreover, Figure 4.6 highlights the trend of cumulative average abnormal returns (CAARs) of firms belonging to high Uncertainty Avoidance (risk averse) and low Uncertainty Avoidance (risk taker) cultures.

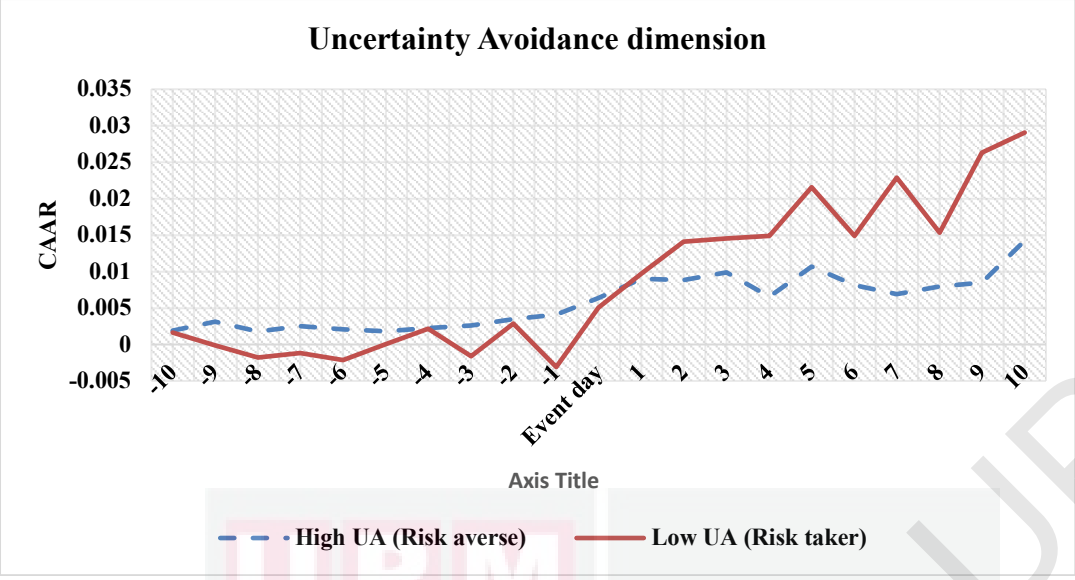

Figure 4.6 : 21 days CAAR for Uncertainty Avoidance (UA) dimension of national culture

Figure 4.6 shows that the CAARs of low- Uncertainty Avoidance countries' firms are higher than the CAARs of low- Uncertainty Avoidance countries' firms. Further, this study also calculates cumulative average abnormal return (CAAR) of 21 days for countries leading and lagging in national environmental performance (NEP). Table 4.15 highlights the 21-day cumulative average abnormal return for countries based on their national environmental performance. The Environmental Performance Index (EPI) measures national environmental performance. Based on their EPI score, countries are divided into leaders (those with the highest EPI score) and laggards (those with the lowest EPI score). The Yale Center for Environmental Law and Policy ranked 180 countries based on their EPI scores ranging from 1 to 100. This research categorizes the countries into four quartiles. Leaders in national environmental performance are countries that are in the 1st quartile.

In contrast, the countries in the 2nd, 3rd, and 4th quartile are considered laggards in national environmental performance. Table 4.15 reports that the 21 days cumulative

average abnormal returns of firms belonging to countries that are leaders in national environmental performance are 9.39% higher compared to CAARs of firms belonging to laggards in national environmental performance. These results highlight that investors of countries that are leaders in national environmental performance respond more to the corporate green bonds issuance than investors of countries that are laggards in national environmental performance. Hence, investors in countries with better national environmental performance are getting more benefits from issuing corporate green bonds.

Table 4.15 : CAAR Based on National Environmental Performance (NEP)

Days	CAAR of Leaders in NEP	CAAR of Laggards in NEP
-10	0.002622	0.002548
-9	0.002354	0.004894
-8	0.001038	0.003062
-7	0.001832	0.001451
-6	0.002	0.001172
-5	0.001904	0.002229
-4	0.003013	0.004175
-3	0.003214	0.005163
-2	0.004978	0.002985
-1	0.006415	-0.00303
Event day	0.0115	0.001225
1	0.011828	0.000406
2	0.01365	0.008528
3	0.016196	0.007959
4	0.014907	0.002952
5	0.016469	0.010834
6	0.015512	0.009334
7	0.014835	0.010271
8	0.015446	0.003733
9	0.018298	0.012451
10	0.020644	0.012385
21 days CAAR	0.198654 (19.86%)	0.104724 (10.47%)

This Table reports the results of cumulative average abnormal return (CAAR) of 21 days (10 days before and 10 days after the event day) for countries based on their country / national environmental performance (NEP).

Further, Figure 4.7 highlights the trend of CAARs of firms leading and lagging in national environmental performance. CAARs of firms belonging to the leader of national environmental performance are higher than the CAARs of firms belonging to laggards of national environmental performance.

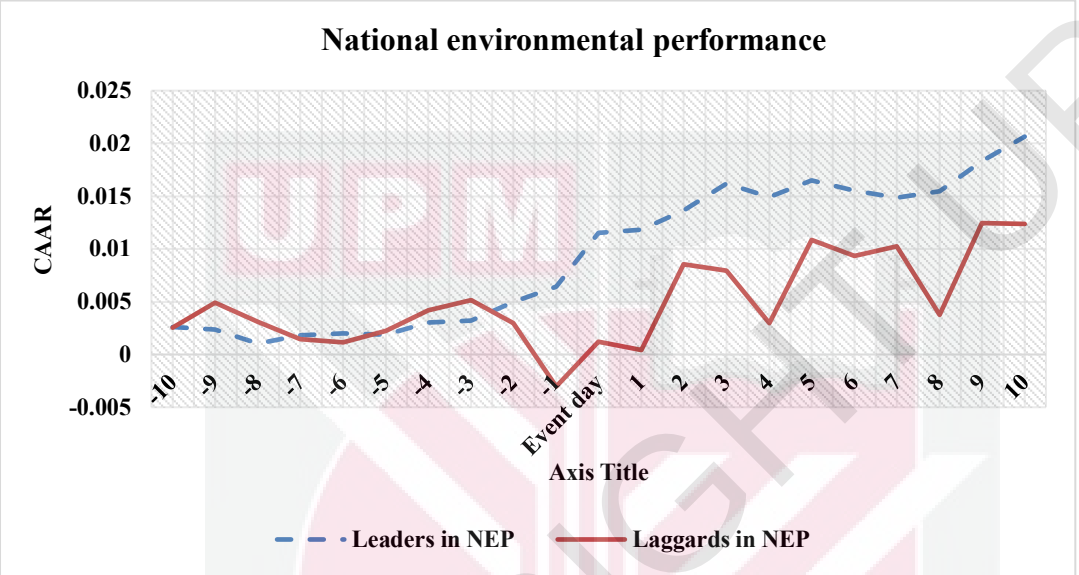

Figure 4.7 : 21 days CAAR for countries based on national environmental performance

4.5 Chapter Summary

This chapter is devoted to presenting and analyzing data collected for this study. This chapter presents the results of the impact of national culture and environmental performance on stocks' response to corporate green bonds' issuance. The presentation of this chapter is in line with the study's objectives. The first focus of the chapter is on the descriptive properties of the study's variables. That is followed by the inferential statistical analysis, which presents results for each research hypothesis.

The general result is that corporate green bonds' issuance announcements positively impact stock returns regardless of the type. However, stock response is significant for

developed countries compared to developing countries. Similarly, stock response is higher for the corporate than for the financial sector. These findings have substantial implications for the government, business managers, investors, international organizations, and regulatory bodies looking for funds to manage the climate change risk. For example, it is anticipated that Europe alone will need to invest 180 billion euros extra annually to fulfill the 2030 climate change targets established in the 2015 Paris Climate Agreement; this also involves cutting greenhouse gas (GHG) emissions by 40%. These findings suggest governments should attract long-term foreign investment through green bond issuance. By doing this, governments may boost their foreign reserves, improving energy security and minimizing the adverse effects of climate change.

The results also indicate that stocks' response to corporate green bond issuance differs for all countries. The panel estimate model confirms that the leading causes of the difference are national culture and environmental performance. The results of the panel estimation model highlight that national culture and environmental performance significantly impact stocks' response to corporate green bond issuance announcements.

These results are based on available limited sample sizes. Even a few countries in the sample have one or two green bond issuers. This study covers the maximum number of countries even with fewer corporate green bond issuers in a single country because the interaction of green bond research with the national culture is a new field. Initial studies, even with small samples, can lay the groundwork for future research by investigating the in-depth behaviour of the investors and markets. Initial studies with

small samples can also uncover preliminary trends, providing a foundation for more extensive and comprehensive studies. Further, countries with smaller sample sizes are also considered because unique characteristics such as Individualism, Uncertainty Avoidance, Long-Term Orientation, and environmental performance may significantly impact how stocks respond to the corporate green bonds issuance announcements.

These findings have implications for various policymakers to understand the investors' preferences for green bond investments due to environmental performance and cultural differences at the national level, which ultimately helps them formulate strategies to reduce the climate effect. The next chapter concludes the findings, explains the limitations, and suggests future studies in this area of research.

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter provides a concise overview of the study's findings. It describes the results following the stated objectives. This final chapter elaborates on how these results contribute to the body of knowledge. Furthermore, this chapter addresses limitations that were encountered during this study. The chapter culminates with recommendations for further investigations in the field of study.

5.2 Summary of Major Findings

This study evaluates stocks' response to corporate green bonds' issuance announcements. Determining the role of national culture and environmental performance in stock response to the corporate green bonds' issuance announcements is also essential. There are numerous findings in this study; however, because of limitations in both time and space, this chapter supplies solely a synopsis of the significant conclusions following the study's objectives.

The first objective of this study is to examine stocks' responses to corporate green bonds' issuance announcements. The results indicate positive and statistically significant Cumulative Average Abnormal Returns (CAARs) during the 08 days [-2+5], 13 days [-2+10], 16 days [-5+10], and 21 days [-10+10] event windows. These positive and significant CAARs mean that investors attain an abnormal return higher than expected. These findings suggest a positive stock price response to corporate green bond issuance announcements, showing that investors can benefit from

corporate green bond issuance announcements (Tang & Zhang, 2020). In addition, this research independently calculates cumulative average abnormal returns (CAARs) for green bond issuers in both the corporate and financial sectors. Their results indicate that the Cumulative average abnormal returns (CAARs) of green bond issuers in the corporate sector are statistically significant and positive.

In contrast, CAARs of green bond issuers in the financial sector are statistically insignificant, which shows that investors exhibit more significant interest in the corporate sector that issues green bonds to finance their own environmentally sustainable initiatives directly, compared to the financial sector that issues green bonds to provide eco-friendly loans to their clients or invest in green projects of other firms. Consequently, investors within the corporate sector derive more benefits from the corporate green bonds' issuance announcements than those within the financial sector (Tang & Zhang, 2020).

Similarly, this study separately calculates cumulative average abnormal returns (CAARs) for green bond issuers in developed and developing countries. The results indicate that the Cumulative average abnormal returns (CAARs) of green bond issuers in developed countries are statistically significant and positive. In contrast, CAARs of green bond issuers in developing countries are statistically insignificant. Further, independent analysis of green bond issuers at the country level also shows consistency in results that stocks of green bond issuers of most of the developed nations (e.g., Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Hungry, Italy, Japan, Lithuania, Netherland, Norway, Poland, Portugal, Saudi Arabia, Singapore, Sweden, Switzerland, UK, USA) Respond significantly positive. On the

other hand, stocks of green bond issuers in most developing countries (Brazil, Colombia, Nigeria, Philippines, South Africa, South Korea, and Thailand) show statistically insignificant responses to corporate green bond issuance announcements.

These results indicate that investors in most developed nations get an advantage from corporate green bonds' issuance announcements, whereas investors in most developing countries do not respond to this issuance. So, it may be concluded that most developed countries' stock markets Respond significantly positively to green bond issuance, and investors are taking advantage of it in these countries. These countries' positive stock market behaviour on green bond issuance announcements might be due to the presence of rational investors; compared to markets in developing countries, developed country markets tend to be less volatile, and investors behave more rationally. However, most stock markets in developing nations may have demonstrated insignificant behaviour because of their high volatility risk. As this risk generates the possibility of negative returns, these negative returns can combine with positive abnormal returns to produce insignificant outcomes.

This study's findings of the first objective (i.e., the impact of corporate green bonds' issuance announcements on stock prices) are consistent with the Signalling theory. By issuing corporate green bonds, firms send a credible signal about their environmental commitment to the market, and stocks respond positively to this gesture. These findings also match the previous work that shows the positive response of stocks to the announcements of green bonds' issuance (Flammer, 2021; Tang & Zhang, 2020; Baulkaran, 2019). In contrast, these results contradict a few previous researches showing a negative response of stocks to corporate green bonds' issuance because of

the greenwashing concept (Wu, 2022; Lebelle et al., 2020). This study negates the idea that green bonds are essentially greenwashing instruments; if that were the case, investors would punish such practices through their negative stock response.

The second objective of this study is to examine the role of national culture on stock price response to corporate green bond issuance announcements. Cumulative average abnormal return (CAAR) represents the stock price response to corporate green bonds' issuance. Based on the literature, the three dimensions of national culture (i.e., Individualism, Uncertainty Avoidance, and Long-Term Orientation) are considered for this study. Panel Random Effect Model is applied, and findings show that Individualism and Long-Term Orientation have a significant positive relationship, while Uncertainty Avoidance has an insignificant relationship with CAAR. Further, it is observed that firms from countries with high Individualism (Individualistic) cultures have higher CAAR than firms with low Individualism (Collectivism) cultures. Investors from Individualistic culture are more overconfident and overoptimistic, and they have more willingness to take risks (Cheon & Lee, 2018; Chui et al., 2010), and this behaviour could result in higher volatility and increased trading to a salient event (Odean, 1998).

Investors in Individualistic cultures exhibit an optimistic and overconfident mindset, resulting in increased engagement in socially responsible investment (SRI) within these cultures (Connelly, 2017). So, investors in an Individualistic culture (high Individualism) are more confident and willing to invest more in green bonds that are considered socially responsible investments. In return, they get more advantages through higher abnormal returns. These results are consistent with those of Fernandez-Perez et al.

(2021), who reported a positive association between the Individualism dimension and cumulative abnormal returns (CAR). Firms in countries with Long-Term Orientation have higher CAAR than those in Short-Term Orientation cultures.

Further, this study finds an insignificant relationship between the Uncertainty Avoidance dimension of national culture and CAAR (stocks response). Additional findings also highlight that countries with lower Uncertainty Avoidance cultures have higher CAAR than those with higher Uncertainty Avoidance cultures. In countries with higher Uncertainty Avoidance, investors prefer to stay with conventional investments and ignore alternative investments (Keswani et al., 2016). While investment in green bonds is considered an alternative investment, and it's a source of firms' higher innovative performance (Khurram et al., 2023), as well as a source of improvement in green innovation (Wang et al., 2022). Investors from high Uncertainty Avoidance countries could find it hard to move away from traditional investment strategies and include ESG (environmental, social, and governance) considerations in their investment decisions (Labidi et al., 2021).

Therefore, investors from Uncertainty Avoidance cultures are reluctant to take additional risks and are happy to stay with the traditional investment. They are even hesitant to invest in innovative and socially responsible investments like green bonds due to their Uncertainty Avoidance behaviour. So, they do not bother with green bond issuance announcements and cannot get any benefit or loss from them; consequently, stock markets do not respond to green bond issuance announcements in an Uncertainty Avoidance culture. These results are consistent with the study of Mihet (2013) and Keswani et al. (2016).

Further, this study finds a significant positive relationship between the Long-Term Orientation dimension of national culture and CAAR (stocks response). Additional findings also highlight that firms belonging to countries with Long-Term Orientation cultures have higher CAAR compared to firms belonging to countries with Short-Term Orientation cultures. Long-Term Orientation culture has better environmental performance, and investors from Long-Term Orientation societies are more inclined to invest in environmental safety than short-term societies (Dangelico et al., 2020). So, long-term investors invest more in green bonds as after the issuance of corporate green bonds, the ownership of Long-term oriented and environmentally conscious (green) investors increased (Tang & Zhang, 2020), as well as the business environmental performance (Flammer, 2021).

Therefore, stocks in Long-Term Orientation societies respond positively to corporate green bonds' issuance announcements; consequently, investors benefit from it. This study's results align with those of Tang and Zhang (2020), who found that ownership of long-term investors increased after the issuance of green bonds. Comprehensively, the results of the second objective (i.e., the role of national culture in stocks response to corporate green bonds' issuance) are consistent with Hofstede's cultural dimensions theory, which states that national culture influences investors' sentiment, ultimately affecting their financial decision-making.

The third objective of this study is to examine the role of national environmental performance on stock price response to corporate green bond issuance announcements. Cumulative average abnormal return (CAAR) represents the stocks' response to corporate green bonds' issuance, whereas the Environmental Performance

Index (EPI) measures national environmental performance. Panel Random Effect Model is applied to examine this, and findings show that national environmental performance has a significant positive relationship with CAAR (stock response to corporate green bonds' issuance announcements). The positive considerable relationship of national environmental performance with the stock response (CAAR) indicates that the cumulative average abnormal returns (CAARs) are higher in nations having better environmental performance, as the environmental performance at the nation level will increase the cumulative average abnormal returns (CAARs) around the corporate green bonds' issuance announcements in these nations will also increase.

The findings suggest that investors of nations with better environmental performance prefer investing more in green bonds than those with lower environmental performance. Investors from better environmental performance nations respond positively to green bond issuance announcements because a country that provides better policies on environmental issues may help the firms enhance their environmental performance (Yu et al., 2021). Better environmental performance increases the firm's stock prices (Castro et al., 2021). Countries with better environmental performance issue more green bonds (Mertzanis & Tebourbi, 2023), as well as invest more in socially responsible investment (SRI), which leads to higher national environmental performance rankings (Diouf et al., 2016).

These results are consistent with the study of Castro et al. (2021), who reported a positive relationship between environmental performance and stock prices. It is also in line with the study of Mertzanis and Tebourbi (2023), who discovered that countries with better environmental performance issue more green bonds, and investors respond

to this issuance positively due to environmentally dedicated investment (Flammer, 2021). Comprehensively, the findings of the third objective of this study are consistent with the Resource-Based theory, which states that the external environment in which the organizations operate has a significant influence on managers' decision-making and, in turn, firms' financial outcomes (Dess & Beard, 1984; García-Sánchez & Martínez-Ferrero, 2019; Yildiz & Karan, 2020).

According to the results of the stock's response to corporate green bond issuance announcements, investors view announcements of green bond issuance as environmentally beneficial signals from firms and respond positively to them. Further, this response may be different due to multiple factors. Literature highlights that firm and bond-specific factors may influence the stocks' response to corporate green bond issuance announcements (Flammer, 2021; Tang & Zhang, 2020; Baulkaran, 2019). Some other macro-level factors may also influence the stock response to corporate green bond issuance announcements, such as national culture and environmental performance, addressed in this study.

The findings of this study draw investors' attention to portfolio construction; for example, Tang and Zhang (2020) suggested that the issuance of a green bond is advantageous for firms' current investors in terms of their resource allocation. Krueger et al. (2020) proposed that investors can protect themselves from climate change risk through portfolio construction. Findings are also essential regarding management perspective for shaping their corporate financing strategies. These findings also benefit policymakers in formulating and reviewing green bonds and climate risk mitigation strategies. As the impact of climate change may differ from nation to

nation, these findings provide policymakers with insights into the variations in investors' interest in green bonds across nations, considering climate change, environmental performance, and cultural differences.

These findings are also valuable for the government, business managers, investors, international organizations, and regulatory bodies looking for funds to manage the climate change risk. For example, to reach the 2030 climate change targets outlined in the 2015 Paris Climate Agreement. It is estimated that Europe alone will need to invest 180 billion euros more annually; this also involves cutting greenhouse gas (GHG) emissions by 40%. Governments may apply the findings of this study to appeal to long-term foreign investment in green bonds, boosting their foreign reserves, improving energy security, and minimizing the adverse effects of climate change.

5.3 Limitations of the Study

One of the primary limitations of this study is the relatively small sample size of green bond issuers. This study needs only publicly listed corporations that issue green bonds. Globally, the number of listed firms that issue green bonds is limited. This study found 872 corporate green bond issuers (firms) globally, out of which only 256 green bond issuers (firms) are listed. Further, in across-country analysis, the sample size from various countries is also limited, such as in Hungary, where only one listed firm has issued green bonds.

One additional limitation found for this study is the limited accessibility of data. The Data Stream provides conveniently accessible information regarding the stock price. However, the corporate green bond issuance announcement data is obtained through

the firm website, firm reports, newspapers, press releases, and different green bond databases. Annual reports and press releases have only been published recently by the firm. Furthermore, it should be noted that certain firms' websites may be inactive or inaccessible due to various reasons such as mergers, cessation of operations, or delisting. Certain firms have no interest in media or newspaper coverage of the announcement of the issuance of green bonds.

Additionally, there is no centralized database about green bonds, and the numerous data sources used today are dissimilar. In addition, there is no centralized database about green bonds, and the multiple data sources used today are dissimilar. Many data sources don't show the green bond issuance announcement dates. Moreover, this study also imposes the limitation of market capitalization. It considers only those corporations having a market capitalization of more than $ 5 million due to penny stock or small firm effect. Adjusting all the limitations reduced the sample size from 256 to 230.

In addition to the limitation posed by limited data availability, an uneven variation exists in the frequency of the available data. The stock price calculation is derived from daily changes, but assessments of country-environmental performance are based on annual data. For instance, the stock’s response to corporate green bond issuance announcements is measured using the daily stock price data. In contrast, national country-environmental performance is an annual measurement, and national culture dimensions score is a one-time (unchanged) measurement. This variation can introduce a discrepancy in the numerical data, which may affect the study outcomes.

5.4 Future Research

The study on national culture and environmental performance's role in stock responses to corporate green bonds' issuance announcements is unique due to its multidisciplinary nature, encompassing green, environmental, and behavioural finance domains. Most of the academic research on green bonds has concentrated on examining the interaction between green bonds and various financial markets, as well as exploring the relationship between green bonds and corporate performance and the impact of green bonds on the financial market. However, there has been comparatively less emphasis on investigating the behaviour of issuers and market participants in the context of green bonds. Although this study examines the role of national culture and environmental performance on stock performance to green bonds' issuance, still further investigation could be investigated in this area by conducting a more comprehensive analysis of the behaviours of market participants, particularly investors, regarding their distinct interpretations of green bond issuances, the impact this has on their investment strategy, and the subsequent portfolio management actions.

A fascinating field of research in the future would involve examining the impact of the issuer's transparency and quality of information disclosure on the market. Additionally, it's necessary to assess this study's possible moderating and mediating effects from a future perspective. One potential application in studying national culture and stocks' response to green bond issuance announcements is using financial liberalization, investor sentiment, and macroeconomic factors as moderating variables. In the same way, socio-economic variables can be employed as mediating variables for future research.

Further, it is essential to note that due to the novelty of corporate green bonds as a financial instrument, the findings presented in this study are derived from a limited number of observations. As additional data becomes accessible, further investigations have the potential to offer a broader scope of information and a more precise delineation of the enduring consequences associated with corporate green bonds.

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APPENDICES

Table A1-7.1: Effect of rise in global temperature level on world and regional GDP

	Well-below 2C increase	2 C increase	2.6 C increase	3.2 C increase
	Paris target	The likely range of global temperature gains		Severe case
Simulating for economic loss impacts from rising temperature in % GDP, relative to the world without climate change (0 C)				
World	-4.20%	-11.00%	-13.90%	-18.10%
OECD	-3.10%	-7.60%	-8.10%	-10.60%
North America	-3.10%	-6.90%	-7.40%	-9.50%
South America	-4.10%	-10.80%	-13.00%	-17.00%
Europe	-2.80%	-7.70%	-8.00%	-10.50%
Middle East & Africa	-4.70%	-14.00%	-21.50%	-27.60%
Asia	-5.50%	-14.90%	-20.40%	-26.50%
Advanced Asia	-3.30%	-9.50%	-11.70%	-15.40%
ASEAN	-4.20%	-17.00%	-29.00%	-37.40%
Oceania	-4.30%	-11.20%	-12.30%	-16.30%

(Source: World Economic Forum)

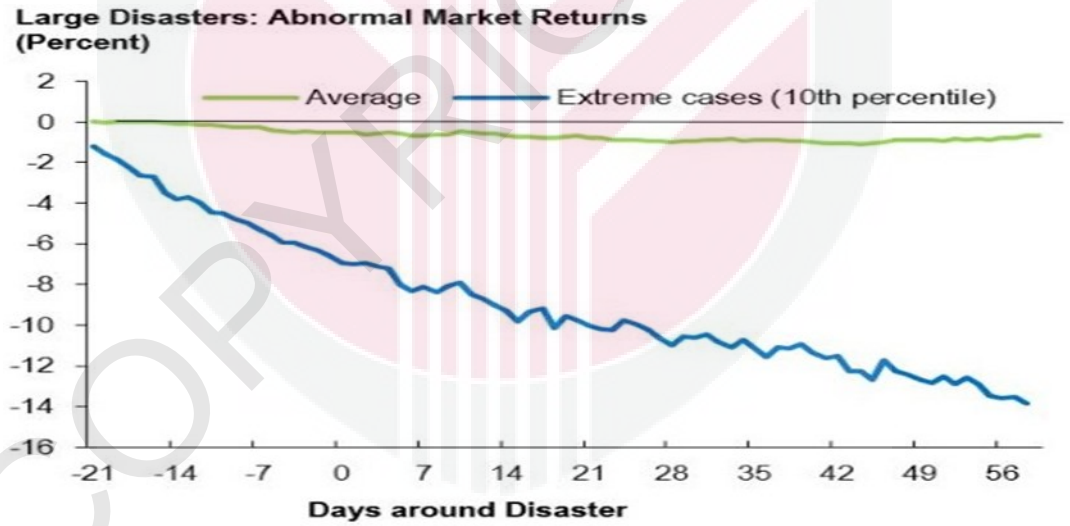
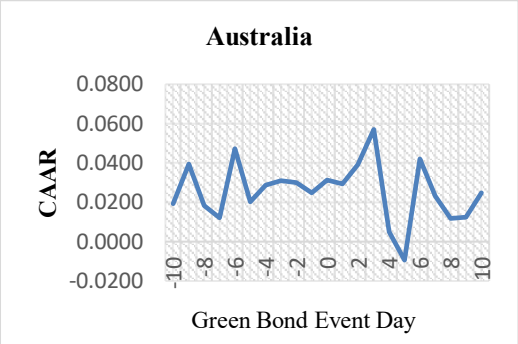
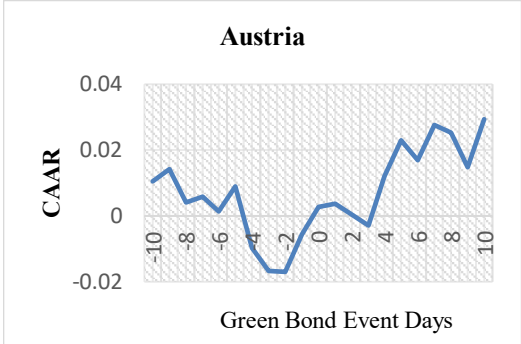
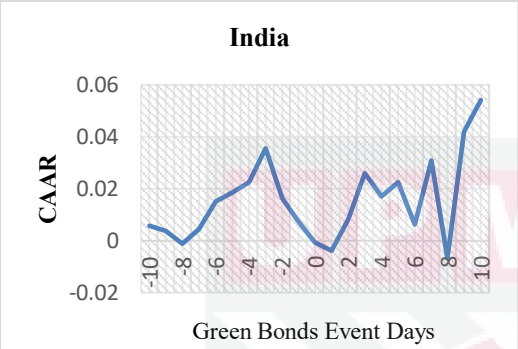
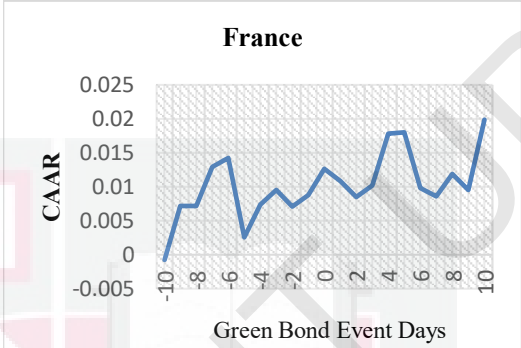


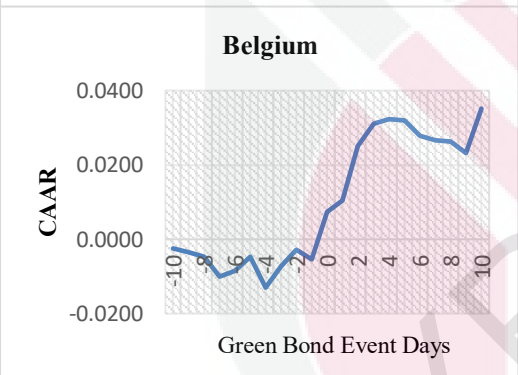
Figure A1-7.1: Impact of Climate Disasters on Stock Market
(Source: Emergency Event Database (EM-DAT), Refinitiv Datastream and IMF staff calculations)

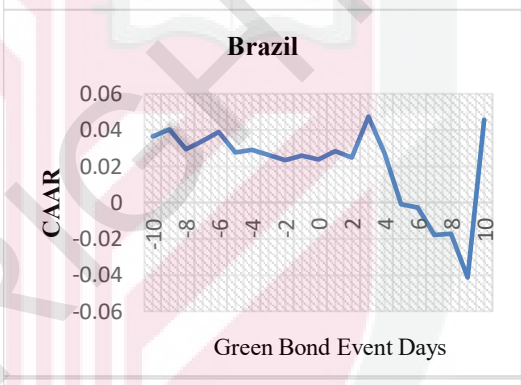


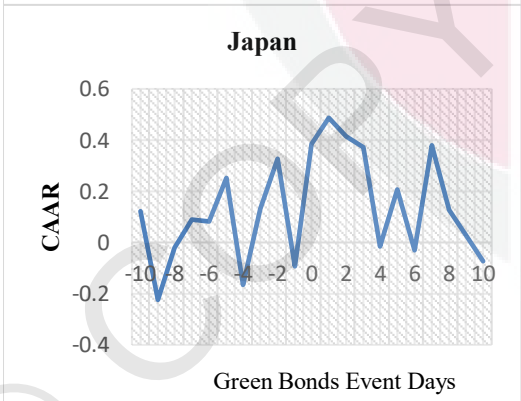


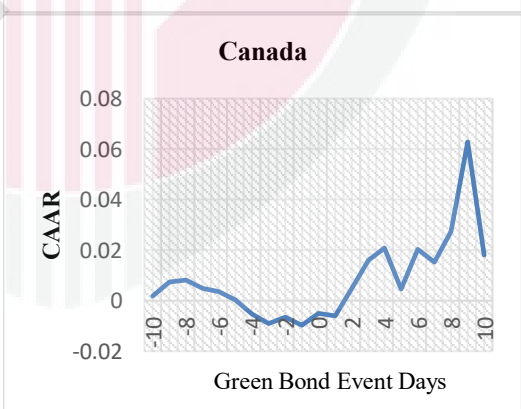


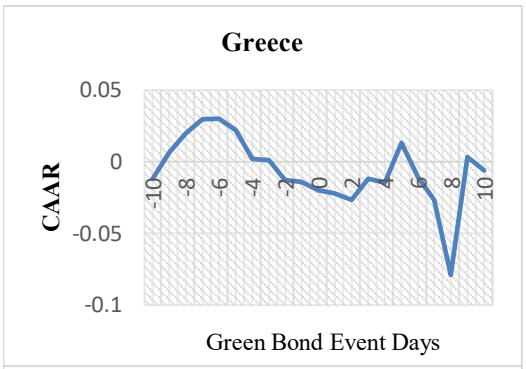


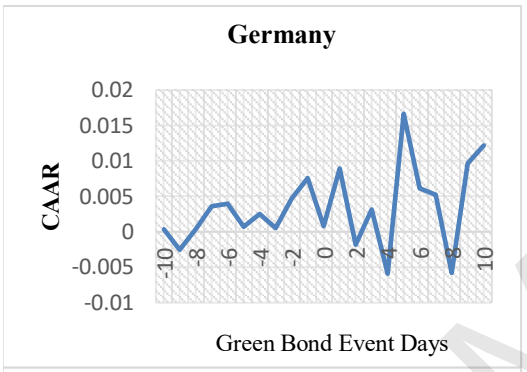


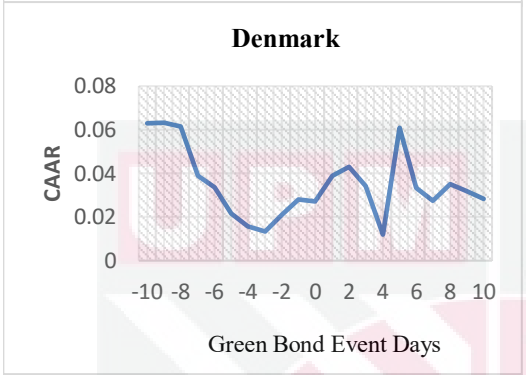


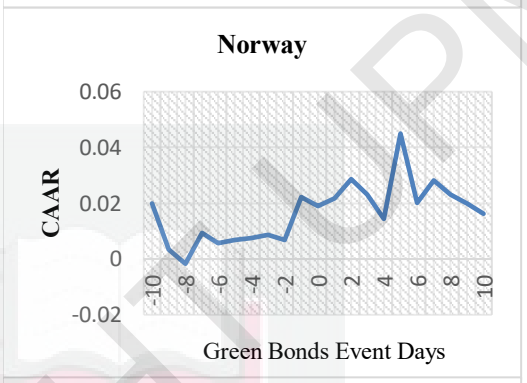


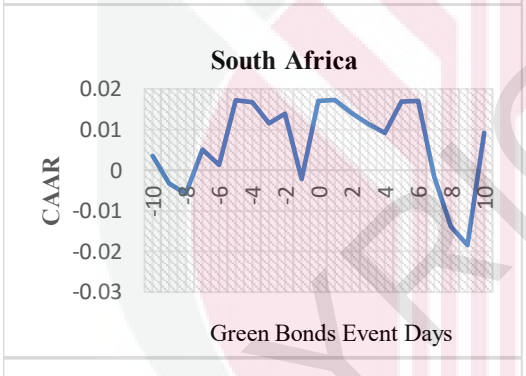


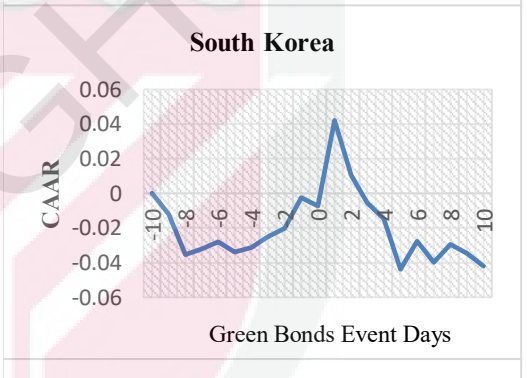


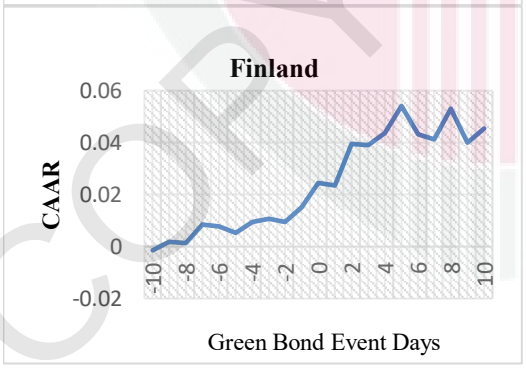


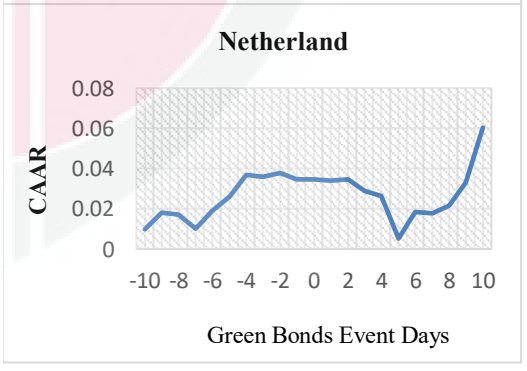


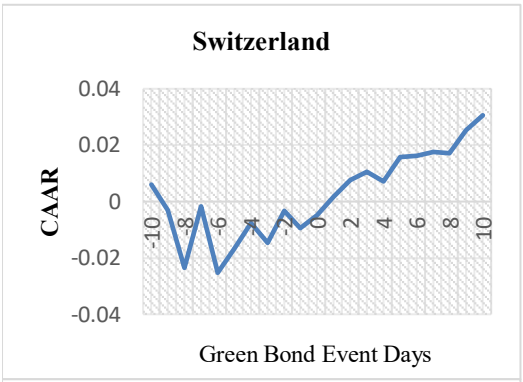


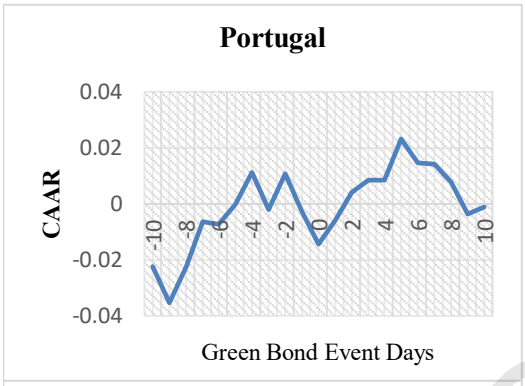


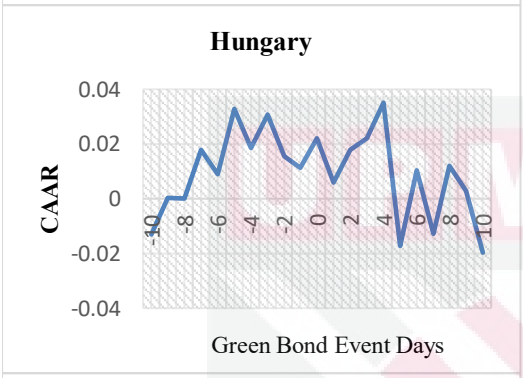


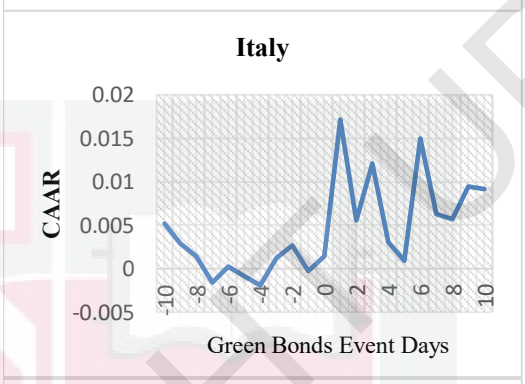


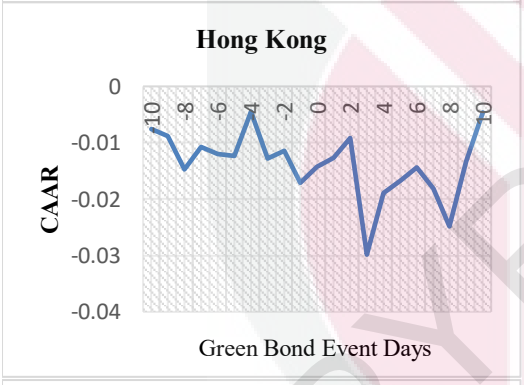


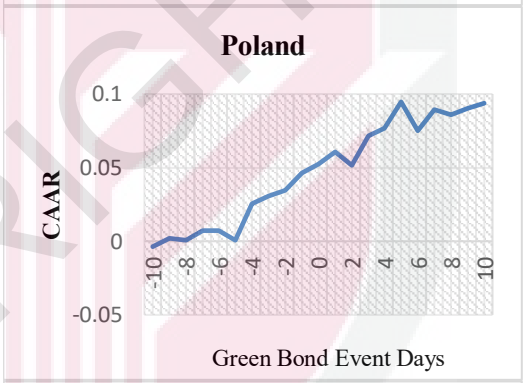


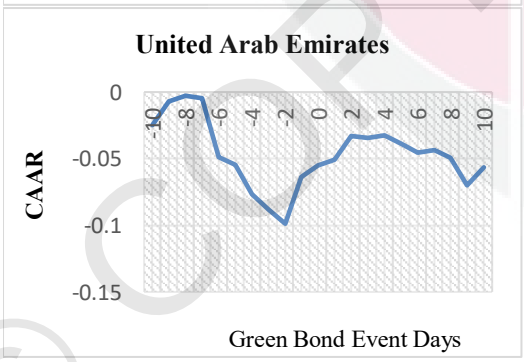


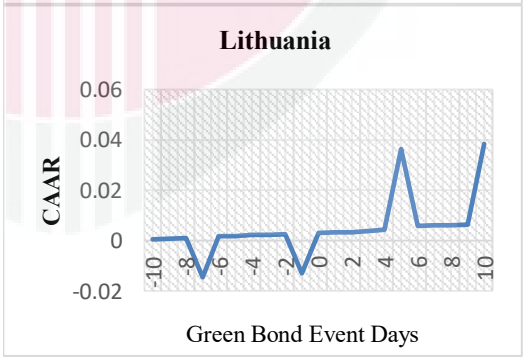


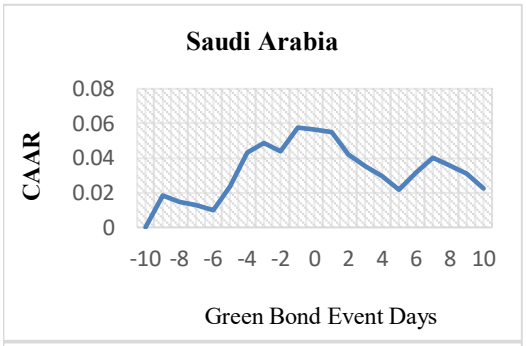


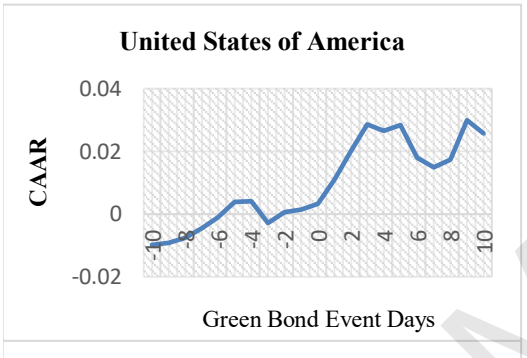


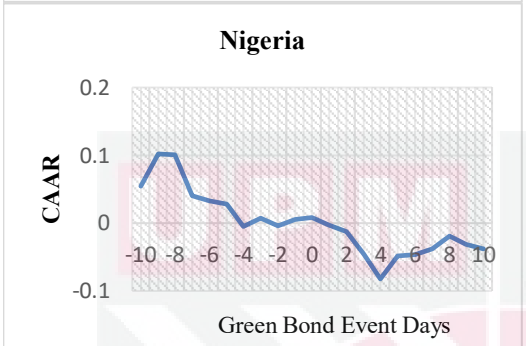


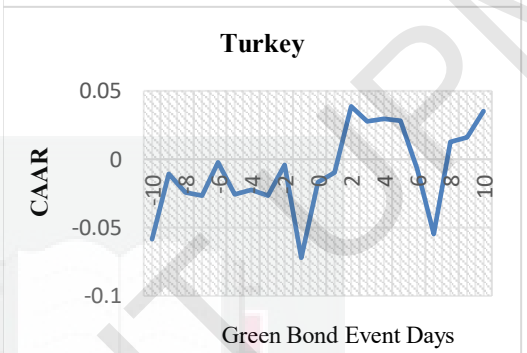


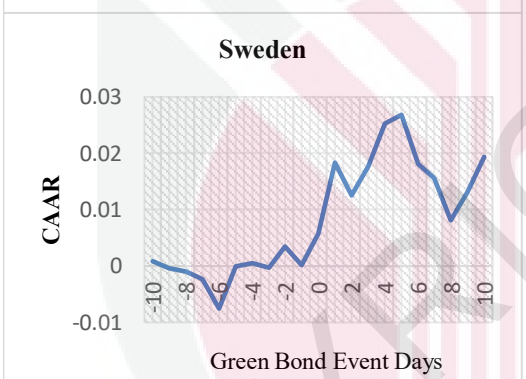


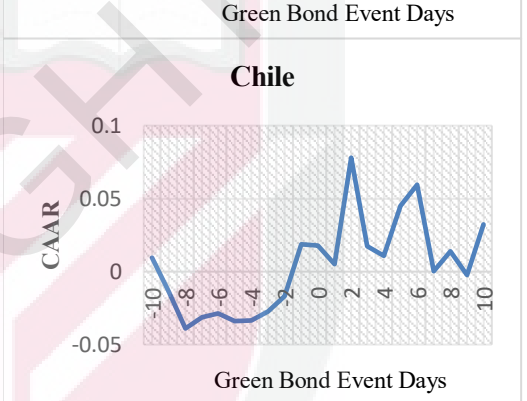


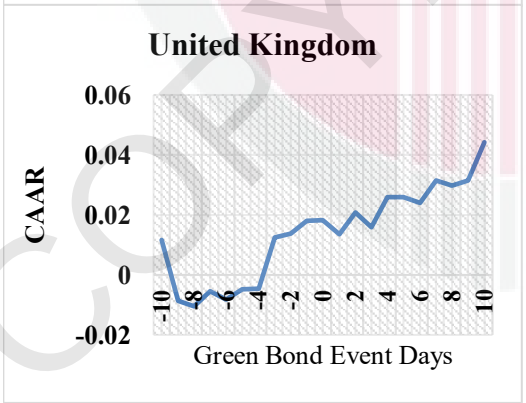


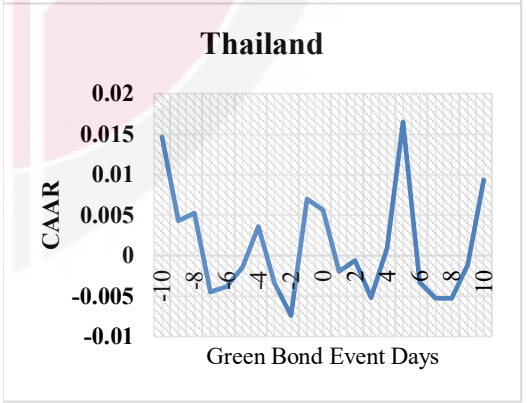












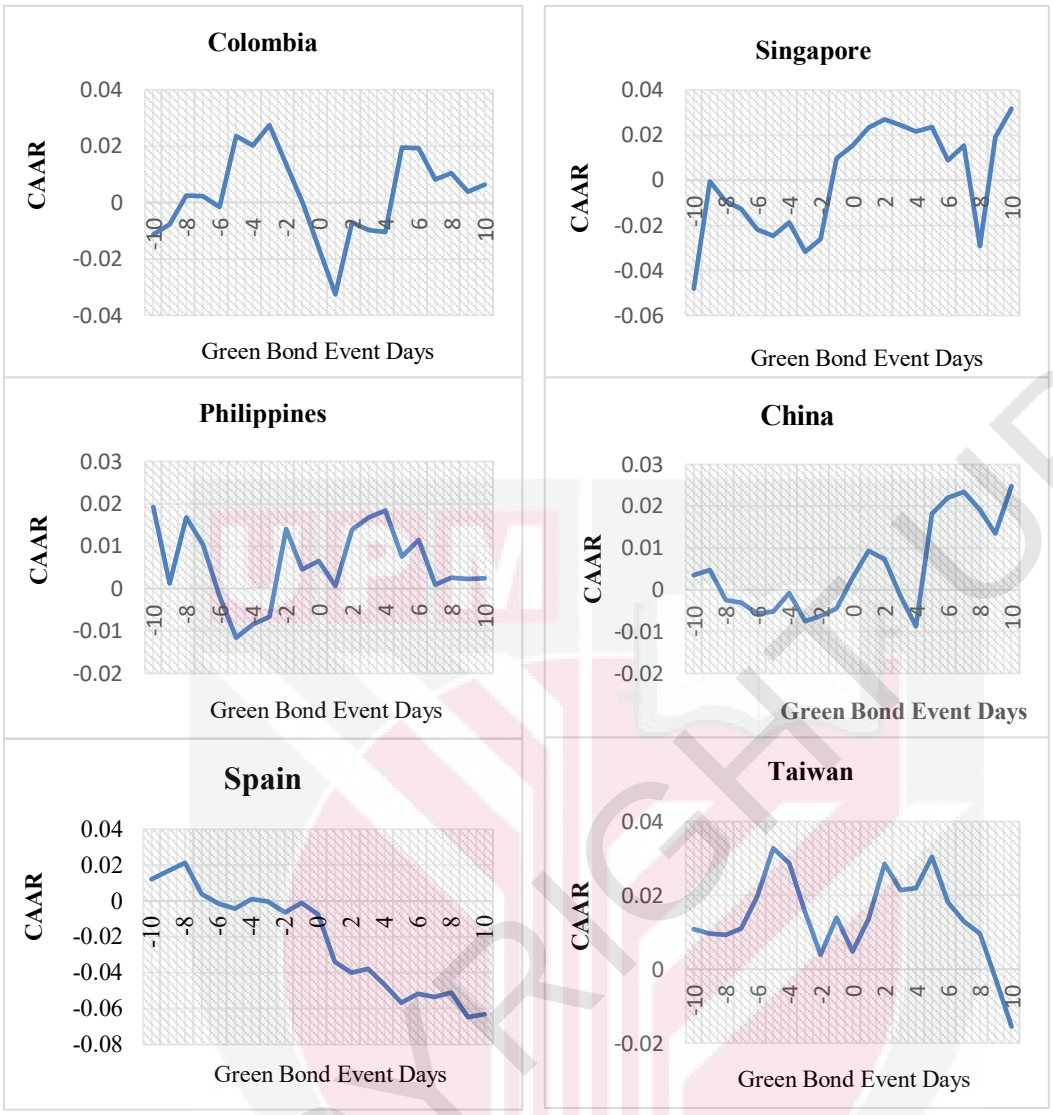


Figure A1-2: 21 Days CAAR for individual Countries

LIST OF PUBLICATIONS

Riaz, T., Selamat, A. I., Nor, N. M., & Hassan, A. F. S. (2024). Meaningful Review of Existing Trends, Expansion, and Future Directions of Green Bond Research: A Bibliometric Approach. *Studia Universitatis „Vasile Goldis" Arad–Economics Series*, *34*(1), 1-36.

Riaz, T., Selamat, A. I., Nor, N. M., & Hassan, A. F. S. (2024). Do Investors Get Benefits from Corporate Green Sukuk Issuance. *Journal of Islamic Monetary Economics and Finance*, *10* (3), 445-470.

List of Accepted Papers

Riaz, T., Selamat, A. I., Nor, N. M., & Hassan, A. F. S. (2025). Do investors get an advantage from corporate green bond issuance? A cross-country study [Paper accepted]. Studia Universitatis „Vasile Goldis" Arad–Economics *35*(2).

Presentations

Riaz, T., Selamat, A. I., Nor, N. M., & Hassan, A. F. S. (2023, October 25-26). Do Investors Get Benefits from Corporate Green Sukuk Issuance? [Paper presentation]. 9th International Islamic Monetary Economics and Finance Conference (IIMEFC), Jakarta, Indonesia