What are the key drivers of positive abnormal stock returns following a firm's issuance of green bonds?

Bachelor Thesis – Literature Review

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1. Introduction

Sustainable development, and more specifically green financing, is considered to be the driving force behind modern economic advancements (Zhou and Cui, 2019) and is often seen as a way of overcoming the low-carbon investment challenge (Shishlov et al., 2016). Progressions such as green financing are deemed to be necessary to ensure economic growth in a sustainable manner over a long-term horizon (Cochu et al., 2016). For organizations, one such way of financing green is by issuing green bonds.

Since the issuance of the world's first green bond by the European Investment Bank in 2007, issuance volume of this financial instrument has grown to USD 257.7bn in 2019 (see Chart 1) (Climate Bonds Initiative, 2020). Even though the amount of green bonds issued has increased tremendously over the course of the past decade, there still exist large discrepancies in academic findings and implications about *how* the issuance of green bonds can influence firm value and benefit shareholders. Across various studies, researchers have found a causal relationship between the issuance of green bonds and a short-term abnormal positive return in stock prices (Flammer 2020; Tang and Zhang, 2018; Glavas, 2018; Binti Ibrahim et al., 2017). These findings are consistent with a prior literature stream documenting how the stock market positively rewards proactive Corporate Social Responsibility engagement (Krüger, 2014; Flammer, 2013). This suggests a general consensus about perceived shareholder reaction to environmental-friendly practices conducted by companies. However, to this day, modern green bond studies are made up of contradictory findings on the underlying key drivers and causes of this positive stock-market reaction.

In an academic context, it is therefore valuable to harmonize findings and reach a common understanding of these determinants. This thesis develops a general framework categorizing key determinants identified in prior literature and moreover aims at synthesizing opposing academic findings. Furthermore, this paper contributes to society by providing explicitly stated policy recommendations to overseeing bodies which can be capitalized on by potential issuers of green bonds. Likewise, these recommendations aid in providing an evident degree of transparency and certainty to outside stakeholders. This paper will be guided by the following research question:

What are the key drivers of positive abnormal stock returns following a firm's issuance of green bonds?

Thereby, this paper firstly provides a theoretical framework comprising findings on key drivers from prior academia, which will help as a guideline for a review on existing literature. Simultaneously, for each driver a proposition which summarizes suggested findings from previous studies is developed. Afterwards, a discussion will review the plausibility of these developed propositions. A synthetical approach aims at finding a common ground for differences in findings and, furthermore, identifies strengths and weaknesses of existing literature. Lastly, policy recommendations and academic limitations are developed through the analytical review on findings.

2. Background

2.1 Definition of Green Bonds

Green bonds are debt instruments that allow issuers to mobilize funds for green projects and investments (Cochu et al., 2016). Most of these green bonds are "use-of proceeds" bonds, implying that collected funds are used to finance environmentally friendly projects. More specifically, the International Capital Markets Association states that proceeds from green bond issuance are to be used exclusively to finance or re-finance green, that is climate-friendly, projects (International Capital Markets Association, 2018). Essentially, the crucial difference to traditional bonds is the specific disclosure of green utilization of funds. Moreover, when companies issue green bonds whose proceeds are intended for climate-friendly projects, these financial instruments will nonetheless be backed by the entire issuer's balance sheet. Theoretically speaking, this allows for identical ratings across common and green bonds (Tang & Zhang, 2018).

2.2 Scope of the literature review

Utilized articles were primarily found through keyword-searching on SSRN's database and Google Scholar. Given the short history of green bonds and their limited amount of academic studies, it was decided to not bound this literature review to a geographical scope. A total amount of 33 papers has been reviewed, while 23 sources have proven useful in development of the framework. In addition to academic papers, reports by the Climate Bonds Initiative and International Capital Markets Association have been chosen due to their provision of quantitative data.

2.3 Theoretical framework of existing literature

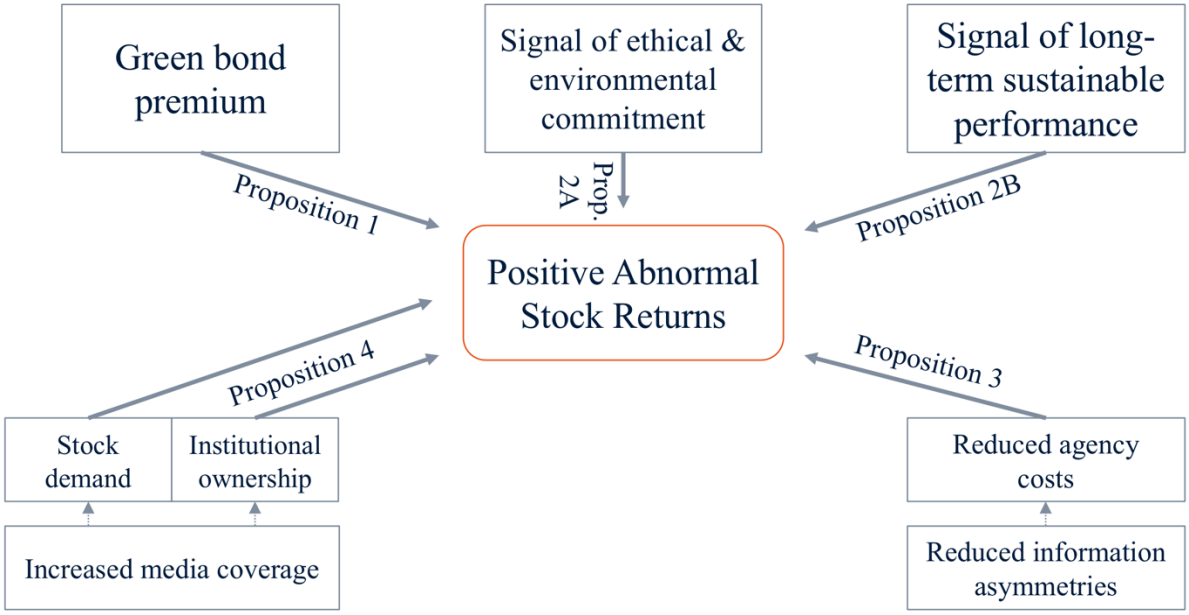

Figure 1: Framework – Illustration of stock return drivers originating in a green bond issuance

3. *Key drivers identified in prior literature*

3.1 Bond Premium

One of the most frequently analyzed possible drivers of positive stock returns as a response to green bond issuance is the green bond premium. In general, a bond premium is the extent to which the bond is trading above its face value. With regards to green bond premia, existing literature typically treats a green bond premium as the extent to which the green bond's yield is trading below the benchmark of a highly comparable, conventional bond's yield. The rationale behind an increased firm value as a consequence of a green bond premium is a rather straight-forward one; since green bond premia are characterized of a lower yield-to-maturity, this ultimately drives down the issuer's cost of capital. Hence, one can reasonably expect a reduction in financing expenses which influences firm value. Research has found that investors are willing to forgo superior financial performance to some extent in the case of simultaneous pursuit of ethical objectives (Renneboog et al., 2008). A comparable logic can be applied to green bonds; Investors might be willing to accept a lower yield-to-maturity if in turn their provided funds are used for climate-friendly purposes.

Past academic estimates of green bond premia have been very heterogenous. Ehlers and Packer (2017) find a green bond premium of 18 basis points. Similarly, Zerbib (2019) finds a yield difference of 2 basis points between green and conventional bonds from a dataset of sovereign, municipal and corporate bonds. Baker et al. (2019) report a premium of 6 basis points on green bonds issued by municipalities, which rises by up to 200% in case of external certification. Recently, Deng et al. (2020) have also reported green bond premia. At the same time, there is research that documents opposing findings. For instance, Larcker and Watts (2019) investigate the municipal green bond market and do not find a significant premium. Similarly, Flammer (2020) replicates the Larcker and Watts (2019) study for corporate issuers and, once again, does not find a green bond premium. Moreover, Tang and Zhang (2018) do not find a green bond premium to be a significant driver of increased stock returns. Most notably, Karpf and Mandel (2017) find green bonds to trade at a discount of 8 basis points and argue that these instruments are penalized by the market in the form of requiring a higher yield than expected based on their conventional counterparts. Given the large differences in findings, it is crucial to mention the two most prominent limitations that are necessary to be assigned to existing studies. First, the technicalities that go along with the calculation of green bond premia are found to be dissimilar across the existing literature, and second, there do exist significant differences in benchmarks that are chosen by researchers.

Proposition 1: A lower yield-to-maturity on issued green bonds is a driver for abnormal stock return.

3.2.1 Signaling of environmental commitment

Flammer (2013) reports that companies which have reportedly been engaging in corporate social responsibility incur significant increases in its share price, which can be seen as a way of rewarding ethically reflective practices by investors in the market. More generally, Krüger (2014) finds that beneficial news about company's corporate social responsibility bring positive valuation effects. Applying this underlying logic to the issuance of green bonds, it might be an attempt of the issuer to credibly communicate its commitment towards environmentally friendly projects. Consequently, investors will value this commitment which will be reflected in an increased share price.

Opposed to the argument of credible signaling is greenwashing. Trompeter (2017) states that the general weak transparency and reporting requirements towards external stakeholders when issuing green bonds might cause what is known as greenwashing. For instance, companies might not exclusively use the collected funds from green bonds for actual environmentally friendly projects, but instead utilize them for financing separate developments. Here Bachelet et al. (2019) argue that companies might be incentivized to take advantage of greenwashing in order to reap gains in reputation and the willingness to fund by environmentally sensitive investors, while at the same time not dealing with the costs of establishing green projects. In fact, in a survey interviewing treasurers from green bond issuing organizations, Climate Bonds Initiative (2020) finds that reputational benefits are the top motivation for the initial issuance of green bonds.

Proposition 2a: The signal of an ethical, environmental commitment as a consequence of a green bond issuance is a driver for abnormal stock return.

3.2.2 Fundamental long-term performance

In contrast to the environmental commitment driver, the roots of this determinant lie not in the sheer ethicalities of Corporate Social Responsibility[1], but rather in the increased long-term performance of companies. Existing academia has been investigating the association between a company's CSR practices and long-term performance, and various studies find a positive relationship (Kao et al., 2018; Barnett and Salomon, 2012). Specifically, Fatemi et al. (2015) argue that the upfront costs of CSR engagement are eventually offset by increased future cash flows. Moreover, Amiraslani et al. (2017) find that firms with dedication to CSR are positioned superiorly in times of financial crises. Similarly, Kim et al. (2014) find that the engagement in CSR mitigates a company's stock crash risk, due to a commitment to higher transparency in stakeholder relations. The relationship between a company's CSR activity and financial performance is also studied by Eccles et al. (2014) who find a positive link across the variables.

With regard to green bonds, Zhou and Cui (2019) argue that green bond issuance enhances CSR inside companies. Similarly, issuing green bonds aimed at raising capital for climate-friendly projects can be linked to companies' pursuit of CSR engagement. Hence, it can be

[1] Hereafter CSR; Refers a company's attempt in achieving advances in fields of environment, society and governance (ESG)

suggested that investors evaluate a company's issuance of green bonds as a possible determinant for superior long-term performance. This increased perception of future performance might be a prime reason for the observed improvement in short-term abnormal stock returns.

Proposition 2b: The signal of dedicated, long-term sustainable performance as a consequence of a green bond issuance is a driver for abnormal stock return.

3.3 Media coverage, investor attention and higher stock demand

Tang and Zhang (2018) document that media coverage increases following the issuance of green bonds as the issuing companies will be filing press releases. This increased public attention is illustrated by a significant increase in Google search volume of Apple Inc. as a consequence of a green bond issuance, and results in an increase of the issuer's perceived reputation. The article argues that this increased media attention and reputation enlarges the stock demand and the scope of the investor base, which ultimately results in an increased institutional ownership of 7.9%. Furthermore, Shaydurova et al. (2018) and Bachelet et al. (2019) identify that investments in sustainably proactive organizations are appealing to younger people, specifically Millennials (i.e. people born towards the end of the 20th century). These findings of increased stock demand and institutional ownership suggest that a stock's liquidity, typically measured by its bid-ask spread (Chen et al., 2007; Beber et al., 2009), is also likely to increase as a consequence of green bond issuance. Tang and Zhang (2018) find a significant improvement in stock turnover and liquidity following the issuance of green bonds. Essentially, in companies where green bonds have recently been issued, basic economic laws explain the relationship among an increased media coverage and a higher stock demand being a prime driver of short-term abnormal stock returns.

Proposition 3: Through increased stock demand and institutional ownership, media coverage as a consequence of a green bond issuance is a driver for abnormal stock return.

3.4 Reduced information asymmetries and agency costs

In general, common modern green bond standards as proposed by the Climate Bond Initiative (2020) or the voluntary International Capital Market Association (2018) demand the disclosure of information to some extent by the issuing body. This, for instance, includes a disclosure of

what the funded proceeds will be used for and how projects will be managed and reported back to shareholders. Informational disclosure, not only about the environmental commitment but furthermore about chosen projects, and periodic reporting towards shareholders can reduce information asymmetries among the green bond's issuer and its owners. Taken a step further, the reduction in information asymmetries, theoretically, goes hand in hand with a reduced need for monitoring and oversight costs. The interplay between aligning informational knowledge and falling agency costs has been extensively studied by prior literature (see for example: Morris, 1987). It can be suggested that this reduction in agency costs will be positively valued by equity holders.

Proposition 4: Reduced information asymmetries and agency costs as a consequence of a green bond issuance are drivers for abnormal stock return.

4. Discussion on the plausibility of propositions

The following discussion about the implications of prior research built up in the following manner. Firstly, a synthesis of existing academic positions with regards to the above-developed propositions will be given. Secondly, this paper provides policy recommendations which originate in the prior discussion.

4.1 Proposition 1

As one can observe from prior literature streams, there seems to be a large misunderstanding about the existence of premia on issued green bonds. The green bond discount of 8 basis points found by Karpf and Mandel (2017) has found resistance in recent studies (Larcker and Watts, 2019; Flammer, 2020), in which the authors argue that the research methodology employed by Karpf and Mandel (2017) biases the result towards a positive yield-to-maturity excess of green bonds over conventional bonds. Moreover, not only Larcker and Watts (2019) but also Baker et al. (2019) argue that the reason for this discount bias lies in the study's research methodology, which incorporates a comparison between taxable and non-taxable securities and thereby ignores the role of taxation in the pricing of municipal bonds. Furthermore, Larcker and Watts (2019) criticize the matching method of Baker et al. (2019), by arguing that the pooled regression approach used by Baker et al. (2019) is inadequate for estimating a possible green bond premium. The main intuition behind this is that the matching method of allocating

a green bond to a comparable conventional bond is not accurate and includes biases towards a green bond premium[2]. Instead, the authors develop a matching method that allows for the matching of quasi-identical green and conventional bonds that have been issued by the same entity. Using this precise matching method, the authors do not find a significantly positive or negative premium on municipality green bonds. Flammer (2020) replicates this finding of an effective green bond premium of zero, also making use of an exact-matching method, for corporate green bonds.

When comparing the different findings, it seems as though the methodology of matching a green bond to a conventional bond in order to calculate the adjusted yield-to-maturity differential plays a pivotal role. In fact, prior conducted research on green bond premia largely shares methodical limitations. More specifically, utilized matching methods among green and traditional bonds have not only been largely different across academia, but, as illustrated above, have also been academically faulty. Literature shows that, prior to the development of Larcker and Watts' (2019) matching method, green bond premia estimates have been largely different. Essentially, the methodology of Larcker and Watts (2019) is crucial since it allows for an exact match, as it compares green and conventional bonds issued on the same day, maturing at the same point in time and characterized by the same underlying bond rating. This thought is also developed by Fatica et al. (2019). Furthermore, the large sample size of 640 matched pairs enhances its significance. The quality of this matching method and the replicative corporate green bond study of Flammer (2020) indicate that the best estimate of premia on green bonds issued by municipalities and corporations is close to zero.

In contrast to this argument of methodical accuracy in favor of a zero green bond premium, one can find an existing stream of literature that identifies theoretical reasons for this premium to exist. For instance, it is believed that green bonds enjoy diversification benefits[3] (Inderst et al., 2012), that there is a general shortage in supply, and that green bonds are more liquid when being compared to conventional bonds (Febi et al., 2018). Moreover, Renneboog, Ter Horst and Zhang (2008) argue that, in the pursuit of ethical objectives, investors are willing to forgo some superior financial performance. These underlying aspects have typically been used as

[2] The authors argue that comparing non-green securities without call options and green bonds with call options results in a bias towards a green bond premium

[3] That is their return is believed to be uncorrelated to the return of other fixed income securities

explanations for a theoretical existence of green bond premia. Consequently, the arising question is why this premium apparently does not exist in practice.

Here, one can argue that superior company performance following green bond issuance actually allows for the issuance of green bonds at competitive yields. In connection to literature finding evidence for a positive correlation between CSR and performance, even though the non-existence of a green bond premium causes more costly funding, issuers are able to compensate for this additional cost of capital by a superior financial performance. This thought is also supported by Flammer (2020). Furthermore, market participant surveys, for instance conducted by Larcker and Watts (2019), reveal that investors are not incentivized to substitute higher yields, that is higher returns on their investment, for increases in morality. Additionally, Cochu et al. (2016) state that there is a lack of transparency in the green bond market. This is because issuers of green bonds are on its own not required to periodically report on how raised funds are actually being used to create a positive environmental impact. Thus, a certain risk of greenwashing might prevent investors from settling with a lower yield-to-maturity, which is another explanation for a non-existence of green bonds in practice.
Ultimately, while there are theoretical arguments that try to explain the existence of a green bond premium, the combination of the results from the exact matching method developed by Larcker and Watts (2019) paired with the rationale behind these findings is convincing and thereby leaves one to reject *proposition 1*.

4.2 Proposition 2a and 2b

The issuance of green bonds by organizations can be seen as a socially responsible act, since its proceeds are aimed at financing environmentally friendly projects. As developed earlier, CSR might cause a positive shareholder reaction through two major channels: 1) Signaling of the sheer increase in organizational ethical behavior through CSR and 2) Signaling of a fundamental increase in long-term enduring performance through CSR. The latter one has found significant support in a modern stream of literature (Barnett and Salomon, 2012; Eccles et al., 2013; Kim et al., 2014; Fatemi et al., 2015; Amiraslani et al., 2017; Kao et al., 2018)

One can argue that an improved organizational image enlarges stock demand by morally responsible investors, which, in turn, increases stock price. On the contrary, as developed above, a market interview found that debt investors are not willing to replace financial return

for an increase in CSR (Larcker and Watts, 2019). It might therefore also be unlikely that a company's shares will be demanded more by equity investors solely because of the company's improvement in ethical behavior without an eye on financial performance of that company. Instead, it is more likely that it is a combination of the two channels which is a prime driver for abnormal stock return. That is, an increased stock demand arises from investors that are keen on providing capital to a company active in environmentally friendly projects while at the same time demand and value a steady, crises-proof long-term financial performance from that very company.

On the other hand, the lack of transparency in the green bond market and the resulting risk of greenwashing (Trompeter, 2017; Cochu et al., 2016) might be a reason for investors to doubt a company's green commitment, and thus not impacting stock demand. It seems fair to assume that when companies are not able to provide certainty about the "greenness" of their practices, it will neither catch the interest of moral investors, nor will the companies capitalize on CSR principles that provide long-term performance enhancements. This assumption is consistent with Dimson et al. (2012) who find a positive market reaction for a successful engagement in CSR opposed to no market reaction when this engagement is unsuccessful. Consequently, it is noteworthy that investors will only value green bond issuance as described above, if there is a true belief in the credibility of the company's green projects, i.e. the risk of greenwashing is perceived as low. Ultimately, one can argue that as long as there is a credible belief by investors, engagement in CSR, especially due to a signal of increased long-term performance, is a prime driver of abnormal stock return.

4.3 Proposition 3

In 4.2 it is assumed that the increased demand for shares in companies that are active in CSR originates in the "greenness" and superior long-term performance that is valued by investors. In the following part, the causal relationship between a sole increased media coverage and a resulting higher stock demand and institutional ownership is under investigation. Tang and Zhang (2018) argue that through an increase in media attention, issuing green bonds can magnify the investor base and thus increase the scope of institutional holdings. To illustrate, Saleh et al. (2010) find a positive relationship between CSR disclosure and institutional ownership. The question at hand is how this increase in institutional ownership might translate to abnormal returns in stock. Sias et al. (2006) find a strong positive correlation between

quarterly changes in institutional holdings and stock returns, because of aggregate institutional trading.

Although one can assume that an increased media coverage will lead to attention across investors, it is up to future research to scientifically examine how this increase in attention translates to an increase in demand. For now, it seems fair to assume that increased attention on its own is not likely to increase stock demand, but that it is more likely that the content of the press releases (i.e. CSR disclosure) has a positive impact on investors, and that the credibility of media coverage plays a pivotal role. Consequently, I suggest that it is a combination of a supportive media coverage due to credible green bond press releases (i.e. a form of CSR engagement) paired with the investor's preference for stocks with environmentally friendly practices (as developed in 4.2) that leads to a higher stock demand and thus an increase in stock price. Support for this argument is found in Tang and Zhang (2018, page 9) who suggest a "green label effect" by which formal press releases, which incorporate the approval of internal green projects by external parties, increase investor attention and thereby enlarge the investor base. Possibly, one can even go a step further and argue that the impact of investor's green preferences on stock demand is mediated by media coverage. As a concluding remark, it is necessary to state that the impact of media coverage on stock returns through increased institutional holdings and an increased stock demand involves relationships that have not been extensively studied by academia, and, thus, is an interesting avenue for future research.

4.4 Proposition 4

In general, one can argue that organizational disclosure of operations/projects reduces information asymmetries between inside and outside stakeholders. This reduction in information asymmetries reduces the need for monitoring cost borne by shareholders (Morris, 1987). Additionally, with regards to CSR engagement there is a further risk that gets mitigated by green bond proceed disclosure, which is the risk of greenwashing. Reduction in risk generally tends to be valued positively by the market. Again, one has to state that this decrease in risk will only take place in case of a credible green bond announcement. Furthermore, it is debatable whether informational alignment immediately translates to significantly lower agency costs in practice, and it is more probable that this driver has a negligible impact on stock returns.

4.5 Synthesis of discussion and policy recommendations

Analyzing the discussion on the various drivers of positive abnormal stock pricing in prior literature, it seems as if the impact of almost all drivers stands and falls on the "green credibility" that companies are able to provide to various stakeholders. This "green credibility" refers to the extent to which outside stakeholders trust the actual environmental impact of projects that are indented to be funded with green bond capital. To revise, throughout the above discussion it was argued that investors will only believe green bond issuance yields ethical improvements, superior long-term performance, enlarged institutional holdings and reduction in information asymmetries as long as investors believe the "green credibility". As a consequence, only then will these drivers enlarge the respective company's stock demand and price. A further, significant support for this argument is found by Flammer (2020) who states that the stock market reaction is stronger for bonds whose "greenness" is certified by third parties. One can furthermore expect an impact caused by certification especially on the significance of the relationship between signaling environmental commitment and positive abnormal stock return, since external verification represents a costly dedication. Essentially, the degree of credibility and certainty that companies are able to provide reduces risk and therefore is valued positively by shareholders.

Arising from this synthesis, a suggestion for green bond issuers to engage in a cost-benefit analysis about receiving external certification is proposed, as external certification seems to enhance almost all of the developed key drivers' impact on stock returns. However, Cochu et al. (2016) mention issues regarding the independence of external certifying bodies which are therefore prone to conflicts of interest. Thus, with the aim of providing consensus and certainty to the green bond market, it is up to independent overseeing organizations to precisely define the matter and certification process of green bonds. For instance, in the United States, the Security & Exchange Commission could play the role of an objective entity. This thought not only finds support in Shishlov et al. (2016), but also in Trompeter (2017) who precisely argues that requirements for subsequentially disclosing how green bond proceeds are utilized and allowing green bondholders to file lawsuits against issuers in case of proceed misuse will reduce greenwashing incentives. Ultimately, these policy recommendations entail benefits to various stakeholders through alignment of information and thus cause the aforementioned drivers to become significant in positively influencing stock returns.

5. *Limitations and areas for future research*

Larcker and Watts (2019) show that green bond premia estimates are drastically influenced by matching techniques. *Future research should therefore focus on the development of a representative, standardized and widely accepted method for matching green bonds with their conventional counterparts as precisely as possible*. Advances in this regard will likely harmonize findings about the existence of green bond premia, influencing stock return.

Results about the significance of drivers on stock return are additionally dependent on the nature of the issuer, the nature of the project which the bond is seeking to finance, the degree of greenwashing risk that investors face, which can be mitigated by external certification, and also whether it is a first-time issuance or not. Past research has often not accounted sufficiently for these variables and it is critical to mention that studies are thus limited in their comparability and implications. To illustrate, of particular interest is the study of Bachelet et al. (2019) since it documents a possible shift in a green bond discount to a green bond premium when issuers of green bonds receive external verification. While the matching methodology has been chosen sub-optimally, it is very much worth noting that this study indicates that different findings in prior studies might have arisen, because, across samples and times, investors are differently exposed to the risk of greenwashing. Moreover, comparability across samples is hampered by differences in bond ratings of sample bonds; a limitation that originates in studies by Ehlers and Packer (2017) and Zerbib (2019) who find lower yields for worse bonds. The degree of expressive force provided by future studies will therefore crucially depend on the extent to which *academia is able to control for individual differences in bond characteristics and greenwashing risk*. Additionally, limitations in conclusive outcomes of research about the impact of media coverage on stock prices are recognized. Therefore, this paper proposes the *need for future research on causal relationships among variables in this field*.

6. *Concluding remarks*

This paper develops a framework which illustrates drivers of abnormal stock return following a firm's issuance of green bonds, that have been proposed by previous academic studies and consequently evaluates the feasibility of these drivers. It also recognizes the degree of "green credibility" that companies are able to provide when issuing green bonds as a key variable for determining the impact of developed drivers on stock returns. Making use of this finding, it

recommends explicit policies on which corporate and overseeing organizations can capitalize on, and thus provides value to society. It proposes an explanation underlying the long-lasting debate about an existence of a green bond premium. Additionally, by identifying methodical differences and their implications, this paper is able to synchronize opposing findings from prior literature streams. It is therefore a valuable piece in an academic context, since it synthesizes results towards a common denominator. It also suggests that future research should concentrate on the elimination of identified methodical limitations and furthermore consider heterogenous characteristics of bond issuers to a greater extent.

7. References

Amiraslani, H., Lins, K., Servaes, H., & Tamayo, A. (2017). A Matter of Trust? The Bond Market Benefits of Corporate Social Capital during the Financial Crisis. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2978794

Bachelet, M., Becchetti, L., & Manfredonia, S. (2019). The Green Bonds Premium Puzzle: The Role of Issuer Characteristics and Third-Party Verification. *Sustainability*, *11*(4), 1098. https://doi.org/10.3390/su11041098

Baker, M., Bergstresser, D., Serafeim, G., & Wurgler, J. (2019). Financing the Response to Climate Change: The Pricing and Ownership of U.S. Green Bonds. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3275327

Barnett, M., & Salomon, R. (2012). Does it pay to be really good? addressing the shape of the relationship between social and financial performance. *Strategic Management Journal*, *33*(11), 1304-1320. https://doi.org/10.1002/smj.1980

Beber, A., Brandt, M., & Kavajecz, K. (2009). Flight-to-Quality or Flight-to-Liquidity? Evidence from the Euro-Area Bond Market. *Review Of Financial Studies*, *22*(3), 925-957. https://doi.org/10.1093/rfs/hhm088

Binti Ibrahim, S., Mohd Roslen, S., & Sin Yee, L. (2017). Green Bond and shareholders' wealth: a multi-country event study. *International Journal Of Globalisation And Small Business*, *9*(1), 61. https://doi.org/10.1504/ijgsb.2017.10005758

Chen, L., Lesmond, D., & Wei, J. (2007). Corporate Yield Spreads and Bond Liquidity. *The Journal Of Finance*, *62*(1), 119-149. https://doi.org/10.1111/j.1540-6261.2007.01203.x

Climate Bonds Initiative. (2020). *2019 Green Bond Market Summary*. Retrieved from https://www.climatebonds.net/files/reports/2019_annual_highlights-final.pdf

Cochu, A., Glenting, C., Hogg, D., Georgiev, I., Skolina, J., & Eisinger, F. et al. (2016). *Study on the potential of green bond finance for resource-efficient investments*. Brussels: European Commission.

Deng, Z., Tang, D., & Zhang, Y. (2020). Is “Greenness” Priced in the Market? Evidence from Green Bond Issuance in China. *The Journal Of Alternative Investments*, jai.2020.1.097. https://doi.org/10.3905/jai.2020.1.097

Dimson, E., Karakas, O., & Li, X. (2012). Activism on Corporate Social Responsibility. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2024189

Eccles, R., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, *60*(11), 2835-2857. https://doi.org/10.1287/mnsc.2014.1984

Ehlers, T., & Packer, F. (2017). Green Bond Finance and Certification. *BIS Quarterly Review September 2017*. Retrieved 17 May 2020.

Fatemi, A., Fooladi, I., & Tehranian, H. (2015). Valuation effects of corporate social responsibility. *Journal Of Banking & Finance*, *59*, 182-192. https://doi.org/10.1016/j.jbankfin.2015.04.028

Fatica, S., Panzica, R., & Rancan, M. (2019). The pricing of green bonds: are financial institutions special?. *JRC Working Papers In Economics And Finance*, *2019*(7). Retrieved 17 May 2020, from http://hdl.handle.net/10419/202313.

Fatin, L. (2020). Record 2019 GB Issuance $255bn! EU largest market: US, China, France lead Top 20 national rankings: Sovereign GBs & Certified Bonds gain momentum [Blog]. Retrieved from https://www.climatebonds.net/2020/01/record-2019-gb-issuance-255bn-eu-largest-market-us-china-france-lead-top-20-national

Febi, W., Schäfer, D., Stephan, A., & Sun, C. (2018). The impact of liquidity risk on the yield spread of green bonds. *Finance Research Letters*, *27*, 53-59. https://doi.org/10.1016/j.frl.2018.02.025

Flammer, C. (2013). Does Corporate Social Responsibility Lead to Superior Financial Performance? A Regression Discontinuity Approach. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2146282

Flammer, C. (2020). Corporate Green Bonds. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3125518

Glavas, D. (2018). How Do Stock Prices React to Green Bond Issuance Announcements?. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3279069

Inderst, G., Kaminker, C., & Stewart, F. (2012). Defining and Measuring Green Investments. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2742085

International Capital Market Association. (2018). *Green Bond Principles*. Retrieved from https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf

Karpf, A., & Mandel, A. (2017). Does it Pay to Be Green?. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2923484

Kao, E., Yeh, C., Wang, L., & Fung, H. (2018). The relationship between CSR and performance: Evidence in China. *Pacific-Basin Finance Journal*, *51*, 155-170. https://doi.org/10.1016/j.pacfin.2018.04.006

Kim, Y., Li, H., & Li, S. (2014). Corporate social responsibility and stock price crash risk. *Journal Of Banking & Finance*, *43*, 1-13. https://doi.org/10.1016/j.jbankfin.2014.02.013

Krüger, P. (2014). Corporate goodness and shareholder wealth. *Journal Of Financial Economics*, *115*(2), 304-329. https://doi.org/10.1016/j.jfineco.2014.09.008

Larcker, D., & Watts, E. (2019). Where's the Greenium?. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3333847

Morris, R. (1987). Signalling, Agency Theory and Accounting Policy Choice. *Accounting And Business Research*, *18*(69), 47-56. https://doi.org/10.1080/00014788.1987.9729347

Renneboog, L., ter Horst, J., & Zhang, C. (2008). The Price of Ethics and Stakeholder Governance: The Performance of Socially Responsible Mutual Funds. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1102706

Saleh, M., Zulkifli, N., & Muhamad, R. (2010). Corporate social responsibility disclosure and its relation on institutional ownership. *Managerial Auditing Journal*, *25*(6), 591-613. https://doi.org/10.1108/02686901011054881

Shaydurova, A., Panova, S., Fedosova, R., & Zlotnikova, G. (2018). Investment Attractiveness of "Green" Financial Instruments. *Journal Of Reviews On Global Economics*, *7*, 710-715. https://doi.org/10.6000/1929-7092.2018.07.65

Shishlov, I., Morel, R., & Cochran, I. (2016). *Beyond transparency: Unlocking the full potential of green bonds*. Paris: I4CE. Retrieved from https://www.i4ce.org/download/unlocking-the-potential-of-green-bonds/

Sias, R., Starks, L., & Titman, S. (2006). Changes in Institutional Ownership and Stock Returns: Assessment and Methodology*. *The Journal Of Business*, *79*(6), 2869-2910. https://doi.org/10.1086/508002

Tang, D., & Zhang, Y. (2018). Do Shareholders Benefit from Green Bonds?. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3259555

Trompeter, L. (2017). Green is Good: How Green Bonds Cultivated into Wall Street's Environmental Paradox. *Sustainable Development Law And Policy Brief*, *17*(2). Retrieved 17 May 2020.

Zerbib, O. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal Of Banking & Finance*, *98*, 39-60. https://doi.org/10.1016/j.jbankfin.2018.10.012

Zhou, X., & Cui, Y. (2019). Green Bonds, Corporate Performance, and Corporate Social Responsibility. *Sustainability*, *11*(23), 6881. https://doi.org/10.3390/su11236881

8. *Appendix*

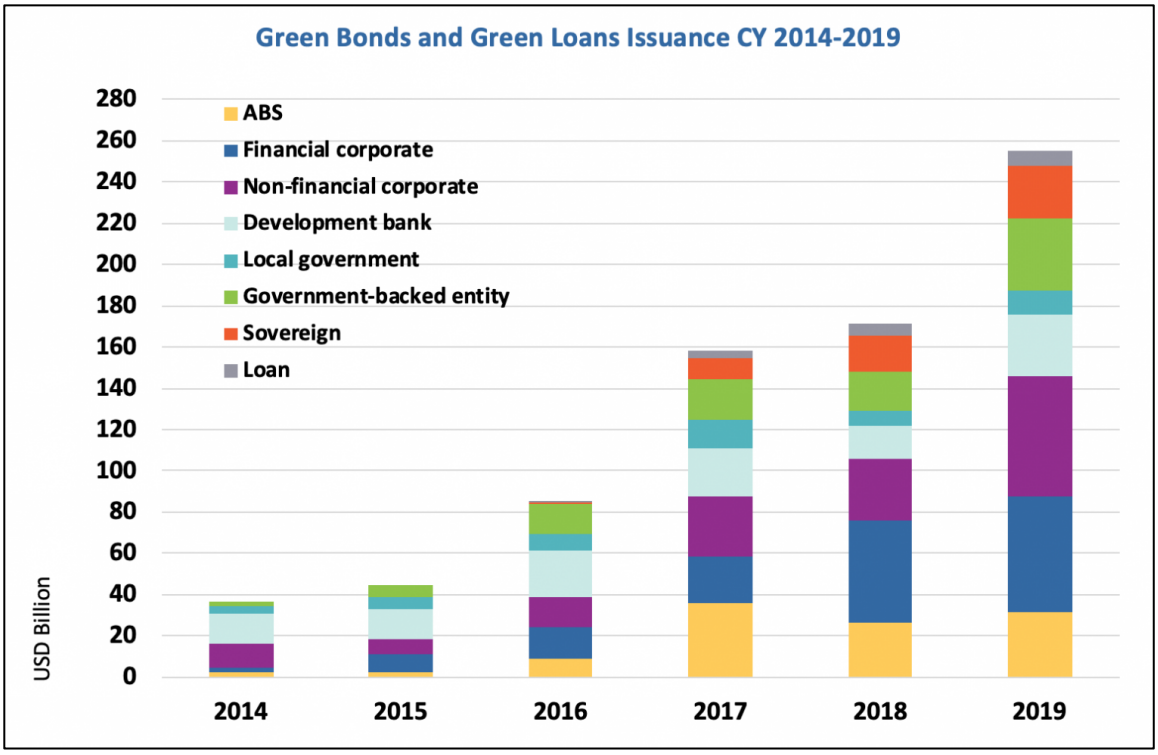

Chart 1: Development of Green Bond Issuance Volume 2014-2019 (Fatin, 2020)

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By signing this statement, I hereby acknowledge the submitted thesis (hereafter mentioned as "product"), titled:

What are the key drivers of positive abnormal stock returns following a firm's issuance of green bonds?

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