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# Explaining Green Bond Issuance using Survey Evidence: Beyond the Greenium\*

Ivan Sangiorgi  
ICMA Centre, Henley Business School  
University of Reading  
Reading  
United Kingdom  
[ivan.sangiorgi@icmacentre.ac.uk](mailto:ivan.sangiorgi@icmacentre.ac.uk)

Lisa Schopohl  
ICMA Centre, Henley Business School  
University of Reading  
Reading  
United Kingdom  
[l.schopohl@icmacentre.ac.uk](mailto:l.schopohl@icmacentre.ac.uk)

## Abstract

The paper examines the drivers and challenges of issuing green bonds from the perspective of green bond issuers. Using survey evidence of global issuers representing 29% of total green bond issuances, the research shows that reputational benefits, the market signalling power of green bonds and a desire to curb climate change are the main motives for green bond issuance. In contrast, insufficient market evolvment, and a lack of awareness and suitable green projects represent the biggest barriers for entry to the green bond market. Most respondents consider green bond issuance costs to be higher than those of comparable plain vanilla bonds, but acceptable due to the benefits they derive from green bond issuances. Among these benefits, respondents report higher levels of demand for green bonds, higher levels of investor engagement, diversification of their investor base and a strengthened internal commitment to sustainability. Issuers' experiences vary regarding the pricing of green bonds – with 48% of respondents stating that their green bond funding costs are the same as for their plain vanilla bonds and 42% reporting lower green bond funding costs. Most issuers favour a standardisation of the definition of 'green' for determining which projects can be funded via green bonds.

Keywords: Green bonds; Greenium; Bond Issuance; Survey; Climate finance

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## 1. Introduction

Green bonds finance projects which deliver environmental benefits (OECD, 2016). The Organisation for Economic Co-operation (OECD) regards green bonds as one of the most promising financial debt instruments to finance the transition to a low-carbon economy and to combat climate change (OECD, 2016, 2017). Research supports this view and demonstrates the usefulness of green bonds for climate change mitigation and adaptation, while at the same time enabling a redistribution of the associated costs across generations (e.g. Flaherty, Gevorkyan, Radpour, & Semmler, 2017; Monasterolo & Raberto, 2019; Sachs, 2014).

The green bond market has seen rapid growth since its debut in 2007. In 2019, new global green bond issuance amounted to USD 258.9bn resulting in USD 754bn of cumulative green bonds issued,<sup>1</sup> while 2020 and 2021 have seen further record volumes of new issuances.<sup>2</sup> However, green bonds still only account for less than 1% of the global bond market (SIFMA, 2019).<sup>3</sup> Hence, the green bond market has considerable potential for scaling, especially relative to the large investment needs of transitioning to a low carbon economy (see Table 2, OECD, 2015). A lack of adequate supply of green bonds is one of the key impediments to the growth of the green bond market (Cochu, Glenting, Hogg, Georgiev, Skolina, Eisinger, Jespersen, Agster, Fawkes, & Chowdhury, 2016). A recent survey of European green bond investors found that they have large unmet demand for green bonds from all types of issuers, but especially from non-financial corporates in the industrials, automotive and utilities sectors and from sovereign issuers (Sangiorgi & Schopohl, 2021).<sup>4</sup> The lack of supply is also stated as one of the main reasons for green bonds to be issued at a premium – a so called ‘greenium’ (Tang & Zhang, 2020; Hodgins, 2021).<sup>5</sup>

To grow the green bond market, we need to better understand what motivates organisations to issue green bonds and what prevents them from entering the market. As outlined by Flammer (2021), green bonds are restricted to financing a limited set of green projects while requiring additional documentation and oftentimes costly ‘green’ certification. Hence, it is not clear why issuers would choose to issue green bonds instead of conventional bonds and allocating the proceeds towards green projects. Thus a better understanding of the drivers and obstacles of green bond issuance is a prerequisite to designing market mechanisms and policies to scale the green bond market. A deeper insight into the impact of green bonds and issuers’ views on green bond policy measures can further inform policies that enable green bond growth. This study aims to address these topics. Answering these questions is particularly

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<sup>1</sup> The volume of cumulative green bonds issued since 2007 represent authors’ calculations based on figures provided in Climate Bonds Initiative (2019; 2020a; 2020c).

<sup>2</sup> Latest market statistics can be obtained via: <https://www.climatebonds.net/> (accessed: 17<sup>th</sup> December 2021).

<sup>3</sup> The Securities Industry and Financial Markets Association (SIFMA) estimates the global bond market outstanding to be around USD 102.8tn at the end of 2018 (SIFMA, 2019).

<sup>4</sup> See also Climate Bonds Initiative (2020d).

<sup>5</sup> Larcker and Watts (2020) define the greenium as the ‘premium that green assets trade to otherwise identical non-green securities’.

relevant considering media and academic discussions whether green bonds can fulfil their promise of generating positive environmental impact or rather serve as ‘greenwashing’ channels for issuers who want to profit from preferential pricing of green bonds without considerably changing their environmental performance.<sup>6</sup>

We use a survey instrument to explore experiences and views of green bond issuers. Our sample of respondents comprises 86 issuers, representing 34 countries and 29 industries. Participants jointly account for 29% of all green bonds issued since 2007 and span a wide variety of market experience, with some having been active in market for over twelve years and others having issued their first green bond less than a year from the survey date. The survey addresses five key areas: (1) respondents’ green bond market activity; (2) the green bond issuing process; (3) the costs and pricing of green bonds; (4) the non-financial impact of issuing green bonds; and (5) issuers’ views on green bond policies and future issuances.

We find that, on average, green bonds account for 21% of issuers’ total bonds outstanding. This share is considerably higher than the green bond market weight of 1%. Respondents report that the three main drivers to enter the green bond market were reputational benefits, the signalling effect of green bonds and issuers’ desire to curb climate change. In addition, more recent entrants to the green bond market increasingly view green bonds as an enabler for changing their business model. Surprisingly, cheaper pricing seems to be a secondary consideration and respondents rate increasing the stock price through green bond issuance as being the least important factor for their decision to issue green bonds. Hence, our results limit concerns of green bonds being primarily used for greenwashing purposes. Respondents identify insufficient market involvement and lack of awareness as the main reasons why they have not issued green bonds earlier, while more recent entrants to the green bond market are increasingly constrained by a lack of suitable projects that qualify for green bond inclusion.

Respondents state that internal stakeholders are the main drivers of issuing green bonds, in particular the organisation’s board and staff. In contrast, regulators are identified as least influential in the decision to enter the green bond market. Overall, we find that respondents rely strongly on external parties, with only 16% of issuers stating that they managed the green bond issuance entirely internally. However, this share is higher among early entrants, possibly as a result of their experience as green bond treasurers and the lack of external support in the initial stages of the green bond market.

Regarding the costs of green bond issuance, most respondents consider green bond issuance costs to be higher than those of plain vanilla bonds but acceptable due to the additional benefits that they derive from green bonds. Issuers are split regarding the relative funding costs of green bonds, with 48% stating that funding costs are the same as those of plain vanilla bonds and 42% reporting them as lower. Issuers

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<sup>6</sup> See Flammer (2021) for a discussion of the greenwashing argument.

who have entered the green bond market earlier are more likely to report lower funding costs for green bonds, implying that any preferential pricing of green bonds may have started to vanish as the market grew. Overall, our findings reflect the results in the empirical literature that the relative pricing of green bonds is not uniform and depends on issuer and market characteristics and that several green bond issuers have been profiting from lower green bond funding costs.<sup>7</sup>

Most respondents experience higher levels of investor demand for their green issues than their plain vanilla bonds, implying that there is strong – unmet – investor interest for these instruments. In addition, most issuers report stronger investor engagement when issuing green bonds, with investors seeking information on the use of proceeds, post-issuance transparency and the green bond framework. Almost all issuers state that the green bond issuance attracts new investors, with respondents allocating, on average, half of their issue to dedicated ‘green’ investors. We also document that for three quarters of respondents the green bond issuance has strengthened their internal commitments to sustainability.

Finally, we focus on respondents’ views on green bond policy measures. We find that most respondents (58%) favour a lenient approach towards the selection of suitable projects with no restrictions regarding the age of projects. In terms of standardising the green bond market, two thirds of respondents prefer a standardisation of the definition of ‘green’, while around one quarter support a less strict definition to allow a greater variety of projects to be financed. These differences in issuers’ opinions reflect the views held among green bond issuers (Sangiorgi & Schopohl, 2021) and the range of opinions in the public debate on measures to grow the green bond market and mobilise green capital (see Deschryver & de Mariz (2020) and the discussion therein).

We make several contributions to the literature. First, we contribute to the growing literature on green bonds. This literature has mainly focused on two aspects: the pricing of green bonds (e.g. Bachelet, Becchetti, & Manfredonia, 2019; Baker, Bergstresser, Serafeim, & Wurgler, 2018; Fatica, Panzica, & Rancan, 2021; Karpf & Mandel, 2017; Larcker & Watts, 2020; Zerbib, 2019) and the impact of issuing green bonds on the issuer (Fatica et al., 2021; Flammer, 2021; Tang & Zhang, 2020). We contribute to this body of work by showing that preferential pricing and other financial benefits are secondary considerations for green bond issuance and are outweighed by green bonds’ non-financial benefits. We further enhance prior evidence about a positive association between green bond issuances and investor interest (see Baker et al., 2018; Flammer, 2021; Tang & Zhang, 2020) as well as issuers’ environmental and social policies (Fatica et al., 2021; Flammer, 2021) by directly linking these impacts to green bond issuances. Furthermore, our study has direct policy implications by offering insights into issuers’ views on green bond policies and regulations.

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<sup>7</sup> We provide a more detailed discussion of this stream of the literature in Section 2.

Contrary to the existing green bond literature which relies on archival data, our paper is the first academic study that uses survey evidence based on a representative sample of green bond issuers. Not only does our survey data allow us to evaluate the research questions from a new perspective and to test many of the prior findings. It also offers insights into issuers' internal processes and drivers of their decision-making which are not directly measurable based on archival market data. As such, our study contributes to the broader literature in finance that uses survey evidence to analyse policies and decisions of financial actors, including investors and corporate managers (Amel-Zadeh & Serafeim, 2018; Dichev, Graham, Harvey, & Rajgopal, 2013; Graham & Harvey, 2001; Krueger, Sautner, & Starks, 2020; McCahery, Sautner, & Starks, 2016).

The rest of the paper proceeds as follows. Section 2 discusses the related literature, while Section 3 introduces the survey design and an overview of the respondents' characteristics. Section 4 presents our results. Section 5 concludes and discusses policy implications of our findings.

## **2. Literature Review**

One of the most debated questions around green bonds are the costs of issuing these instruments and their potential for cheaper pricing via a green pricing premium, the so-called greenium (Larcker & Watts, 2020; Chiang, 2017; Climate Bonds Initiative, 2017a). To assess any pricing differences between green bonds and plain vanilla bonds, the existing literature has mainly focused on the analysis of market data where the prices of green bonds are compared to those of matched plain vanilla bonds. This approach relies heavily on finding suitable close matches (Larcker & Watts, 2020), and has led to mixed results. Focusing on the pricing of municipal green bonds, Karpf and Mandel's (2017) findings suggest that green bonds are priced at a discount of around eight basis points, whereas studies by Zerbib (2019), Baker et al. (2018) and Bachelet et al. (2019), relying on different bond samples, all find a price premium for green bonds. Their estimates for the yield differential between green bonds and matched conventional bonds range between negative two to negative eight basis points. In comparison, Larcker and Watts (2020) find no difference in the pricing of green bonds and their matched plain vanilla counterparts, when applying a strict matching procedure. In line with Larcker and Watts (2020), Flammer (2021) and Tang and Zhang (2020) also document no significant premium for their samples of corporate green bonds. Fatica et al. (2021) study pricing differentials of green bonds at issuance by different issuer types and show that a premium exists for supranational institutions and non-financial corporates but not for issuances by financial institutions. They further document that non-financial corporates who are repeat issuers, i.e. issued green bonds more than once, benefit from an additional premium, which the authors interpret as evidence of a reputational effect on the green bond market. In addition, several studies find that green bonds with an externally certified green label generate an additional premium up to two to three times higher than self-labelled green bonds (Baker et al., 2018;

see also Fatica et al., 2021). Findings presented in Bachelet et al. (2019) further suggest that the size of green bond premia and discounts differs based on issuers' characteristics. Hence, the question whether green bonds offer preferential pricing remains an open one, but the existing body of research suggests that a potential 'greenium' is not uniform across markets and issuers, but rather depends on issuer and issue characteristics as well as the identification of a suitable non-green comparison bond. In our study, we contribute to these existing studies by asking issuers directly how the costs of funding for their green bonds compare to those of their comparable plain vanilla bonds. Not only does this remove the need to find a 'suitable' matched bond, but it also accounts for other non-measurable factors that are difficult to explicitly control for in archival studies that rely on market data.

Beyond the pricing of green bonds, the green bond literature also investigates the wider effects of green bond issuance, including the impact on the issuers' other securities (Flammer, 2021; Tang & Zhang, 2020), their appeal to investors (Baker et al., 2018; Flammer, 2021; Tang & Zhang, 2020) and the effect on issuers' environmental performance (Fatica et al., 2021; Flammer, 2021). Flammer (2021) and Tang and Zhang (2020) show that corporate issuers' stock price reacts positively to the announcement of a green bond issuance suggesting that equity investors consider green bond issuances to be value enhancing. In addition, green bonds also seem to help attract new investors as well as broaden and diversify issuers' investor base: evidence presented in Baker et al. (2018), Flammer (2021) and Tang and Zhang (2020) shows that after the issuance of green bonds, corporate issuers experience an increase in institutional ownership of their stocks, especially by long-term and green investors as well as domestically located institutional investors. Finally, there is suggestive evidence that green bond issuances also positively affect issuers' environmental policies and performance. In her study of corporate green bond issuers, Flammer (2021) documents an improvement in firms' environmental performance after the issuance of green bonds and argues that this finding suggests that issuers use green bond issuances as a signal for their green credentials and commitment towards the environment. Looking at the impact of green bond issuance on the lending activities by financial institutions, Fatica et al. (2021) find that green bond issuing banks lower lending towards carbon-intensive sectors after the green bond issuance, but only if they serve as lead bank in the lending deal. However, one shortcoming of these archival studies is that they cannot establish a causal link between green bond issuances on the one hand and changes in investor interest and environmental policies and actions on the other hand. Our survey evidence can help address this gap by directly asking respondents regarding the impact of green bond issuances on investor reactions and their environmental commitment.

As we rely on a survey instrument to investigate green bond issuers' motivations and attitudes towards their green bond issuances, our study also contributes to the growing body of survey-based finance research. Surveys are increasingly used in finance research to gain insights into the decision-making processes of investors and corporate managers as they offer a tool to analyse the intent behind the actions and inactions of financial actors and to ascertain their views on challenges and opportunities in



different market settings. Notable examples of surveys used in the finance literature are Brown et al.'s (2019) study on the role that institutional investors play in corporate capital structure decisions, McCahery et al. (2016) who investigate investors' governance preferences, Dichev et al.'s (2013) survey of CFOs on earnings quality and management and the survey by Graham and Harvey (2001) exploring CFOs' corporate finance practice. A few relevant studies in the field of corporate capital structure make use of questionnaires: Gompers, Kaplan, & Mukharlyamov's (2016) study of private equity investors' practices in firm valuation, capital structure and governance, Brounen, De Jong, & Koedijk's (2004) work on cost of capital and corporate governance, and Bancel and Mitto's (2004) investigation of the determinants of capital structure of European firms. In the sustainable finance and accounting literature, Amel-Zadeh and Serafeim (2018) employ a survey instrument to study how asset managers use environmental, social and governance (ESG) data in their investment decisions, Krueger et al. (2020) survey institutional investors' views on climate change risk, and the study by Hummel, Laun and Krauss (2021) investigates how environmental and social risks and topics are integrated in the banking sector. We contribute to this literature by examining survey evidence on green bond issuers. As the factors that motivate organisations' decision to issue green bonds and their effects on internal firm dynamics are predominantly not observable and as such not directly testable using traditional data analysis based on market data (Dichev et al., 2013; Krueger et al., 2020), the survey of green bond issuers enables us to gain a deeper understanding of the drivers and broader impact of green bond issuances and to re-examine findings in the prior literature that used archival green bond market data. To the best of our knowledge, only one further academic study employs a survey instrument in the context of green bond research (Sangiorgi & Schopohl, 2021), but their study focuses on gathering green bond investors' attitudes towards investment in green bonds, whereas our study is concerned with investigating the views of green bond issuers and hence complements the results in the prior literature.

### **3. Methodology**

#### *3.1. Survey design*

Our sample of respondents comprises 86 treasurers from organisations that have issued green bonds in the past. Proprietary access to the survey data was provided to us by the Climate Bonds Initiative (Climate Bonds). Climate Bonds is a not-for-profit organisation based in London whose aim is to promote the growth of the green bond market through advocacy on green bond issuances and provision of market data and analysis.<sup>8</sup> They also administer the international Climate Bonds Standard & Certification Scheme, a labelling scheme for green bonds. Climate Bonds invited 143 green bond issuers to participate in the survey and received responses from 86 treasurers, resulting in a response rate of

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<sup>8</sup> Further information on Climate Bonds Initiative is available via their website: <https://www.climatebonds.net/about>

60%.<sup>9</sup> The 86 respondents collectively issued 686 green bonds and jointly account for USD 7.4tn in bonds outstanding of which USD 222bn represent green bond issuances.<sup>10</sup> Based on estimated cumulative global green bond issuances, the sample accounts for 29% of all green bonds issued between 2007 and 2019 (Climate Bonds Initiative, 2019, 2020c).<sup>11, 12</sup> Invited respondents were chosen to ensure proportional representation of emerging and developed market issuers, countries, industries and credit ratings as well as a balanced and unbiased assessment of issuers' views on the green bond market issuance process. However, we acknowledge a potential bias to the extent to which treasurers that issue more green bonds might be more likely to respond to the survey and report more positive attitudes towards green bond issuance. We note that survey data comes with its own limitations such as sampling and response bias, as we must rely on the assumption that the responses reflect the respondents' true motivations and views. The issues of sampling and response bias will be discussed in further detail when we present the respondent characteristics in Section 3.2.

The survey, provided in Appendix 1, comprises 32 questions of which 26 represent closed-ended questions and six are open-ended questions. The questionnaire was shared with respondents in advance, and for most participants (71 out of 86) responses were collected via a telephone interview, while the remaining 15 respondents returned written responses. The data collection took place between May and November 2019.<sup>13</sup> The collected responses are statistically reliable with a Cronbach's alpha equal to 0.67 when including all the survey items.<sup>14,15</sup>

### 3.2. Respondent characteristics

Table 1 provides an overview of the 86 respondents by region (Panel A), issuer type (Panel B), market development (Panel C), credit rating (Panel D), issuance of sustainability reporting (Panel E) and

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<sup>9</sup> This percentage is considerably higher than the response rates reported in finance studies that make use of surveys. For instance, the response rates obtained in Brown, Dutordoir, Veld, and Veld-Merkoulova (2019), Graham and Harvey (2001), McCahery et al. (2016), Gompers et al. (2016), Brounen et al. (2004) and Bancel and Mitto (2004) are 16.1%, 9%, 4.3%, 50%, 5% and 12%, respectively.

<sup>10</sup> These numbers represent green bond issuances as of beginning of December 2019.

<sup>11</sup> Cumulative global green bond issuance since 2007 amounts to USD 521bn (Climate Bonds Initiative, 2019) and total green bond issuances in 2019 are USD 257.7bn (Climate Bonds Initiative, 2020c).

<sup>12</sup> Key market statistics from other sources refer to 2019, in line with the period of survey data collection.

<sup>13</sup> All interviews were concluded by 29<sup>th</sup> November 2019.

<sup>14</sup> Cronbach's alpha is a standard measure of the 'reliability' of survey items and internal consistency. It indicates how closely related the questions are. The overall reliability is determined by the number of questions, the sample size, and the way the respondents answer the questions (see Forman, Money, & Page, 1998). A Cronbach's alpha greater than or equal to 0.6-0.7 indicates acceptable reliability of the responses (Ursachi, Horodnic, & Zait, 2015).

<sup>15</sup> The design of the questionnaire was carried out and reviewed by Climate Bonds' experts who regularly develop questionnaires in the green bond market. Given Climate Bonds' expertise and their assessment of the content of the questions, face and (subjective) content validities were accounted for during the design of the questionnaire. However, the items in the survey questionnaire are not part of higher order constructs or scales. They are rather a series of questions designed to capture issuers' views on general areas of interests. For this reason, several tests usually employed to assess the validity of scales cannot be used.

certification of issued bonds (Panel F). The sample covers issuers from 34 countries, with the majority (62%) of issuers being based in Europe, followed by North America (13%) and Asia Pacific (12%). Green bond issuers from Latin America and the Middle East/Africa represent 8% and 2% of the sample, respectively. In addition, the survey comprises several supranational institutions, which are major issuers of green bonds.

We are not able to fully assess the potential response bias in our survey sample – i.e. how a random set of issuers would respond in comparison to our sample. However, following the methodology in Krueger et al. (2020) and Karolyi and Liao (2017), we partially assess the non-response bias by comparing the respondents’ characteristics with those of the population of green bond issuers. Based on Climate Bond’s internal green bond database (Climate Bonds Initiative, 2020d), 51% of green bond issuers are from Europe, 19% from North America, 13% are Supranational issuers, 13% are from Asia Pacific, 2% from Latin America and the Caribbean, and 0.5% from Africa. While the wide-ranging regional coverage of the our sample is broadly representative of the distribution of the green bond market, it suffers from a slight overrepresentation of European and African/Middle Eastern issuers, and an underrepresentation of US and Asian Pacific issuers.<sup>16</sup> Chinese issuers were not included in the survey due to a different institutional environment around green bond issuances, which would impair comparability between issuers.<sup>17</sup> As the institutional and regional environment around green finance and green bonds is fragmented and differs across regions (Park, 2018; Deschryver & de Mariz, 2020), we need to account for this geographical sample bias when interpreting the findings of the survey, especially with respect to respondents’ views on policy mechanisms.

We also acknowledge a potential bias to the extent to which organisations issuing more green bonds might be more likely to respond to the survey and report more positive attitudes towards green bonds. This is a consequence of the fact that Climate Bonds selected issuers from its green bond issuer database and predominantly carried out the survey data collection via telephone interviews. Green bond issues in our sample account for 21% of issuers’ total bonds outstanding, higher than the 1% market weight. This potential sample bias is also reflected in the average number of green bonds issued by our respondents (7.98) which is higher than the average number of green bond deals observed in the population of green bond issuers (6.40) reported by Climate Bonds Initiative (2020c). Furthermore, the average and median outstanding amount of green bonds issued by our respondents (USD 2.59bn and USD 0.82bn, respectively) is higher than the average amount of issued green bonds in the market (USD 0.81bn). Despite the potential sampling bias, it is important to understand the views of large issuers given their pivotal role in guiding the green bond issuance process. We evaluate the differences in

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<sup>16</sup> One cause for the underrepresentation of US issuers is the absence of the US agency Fannie Mae in the sample, which is the single largest issuer of green bonds in the US market. This explanation is also supported by discussions with a Climate Bonds’ expert and information drawn from their internal green bond records.

<sup>17</sup> Park (2018) offers a discussion of governance and regulatory structures in the green bond markets of different countries. Climate Bonds focused on Chinese issuers in a separate survey (Climate Bonds Initiative, 2020b).

responses between large and small issuers throughout the paper by computing average scores for item responses weighted by outstanding bond size. We also use the outstanding bond amount and the share of green bond debt as control variables in the model specifications, together with market types, issuer types and region with results discussed in Section 4.

[Insert Table 1 about here]

The green bond market has grown considerably since the first bond was issued in 2007 and now comprises a wide range of different issuer types. This diversity of issuers is also represented in our sample (Panel B), which comprises financial corporate issuers (42%), non-financial corporate issuers (30%), supranational, sub-sovereign and agency issuers, such as municipalities or development banks (20%), and sovereign issuers (8%). Comparing the number of issuers in our sample to the universe of issuers, we find that financial corporates and sovereigns are somewhat overrepresented in our sample, while supranational, sub-sovereign and agency issuers are underrepresented.<sup>18</sup> Overall, our sample contains issuers from 29 different industries, with financial institutions and utility firms accounting for the highest share among corporate issuers.

As shown in Panel C, around three quarters of respondents represent developed market issuers. However, our sample also comprises a sizable representation of issuers from emerging markets (19%), while the remaining share represents supranational institutions (5%).<sup>19</sup> Compared to the population of green bond issuers, emerging markets are slightly underrepresented in our sample while developed markets are overrepresented.<sup>20</sup> Developed market issuers are mainly from Europe (50 respondents), with the remainder comprising five respondents from Asia Pacific and eleven from North America. Emerging market issuers consist of five Asian Pacific issuers, one European respondent, seven Latin American issuers and three issuers from Middle East and Africa. This distribution enables us to gather the views and experiences of issuers in different market environments.

A relevant aspect of bond issuances is their credit rating. Panel D presents the sample distribution by credit ratings, where the rating of the last green bond issue has been used to classify issuers into different rating categories. Most respondents have investment grade ratings, except for one issuer with a BB+

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<sup>18</sup> The figures used to assess sample bias are computed by the authors and are approximations. The approximate proportion for the number of issuers in the green bond universe are: 19% financial corporates; 28% non-financial corporates; 39% supranational, sub-sovereign and agency issuers; 1.4 sovereigns; 8% asset backed securities; 4% green loans. Our data on key summary statistics of the green bond market is from: <https://www.climatebonds.net/market/data/>.

<sup>19</sup> Due to supranationals' heterogeneity in responses and unique characteristics, we include categorical variables in our model specifications for both markets and issuers. In all regression results either one or both variables have statistically significant coefficients.

<sup>20</sup> The approximate share of green bond issuers in the green bond universe are: 69% developed markets; 27% emerging markets; 3.4% supranationals. The figures are computed by the authors and are approximated values, based on market data available at the Climate Bonds website.

rating. Within the investment grade category, our sample's rating classes range from prime (18%) to lower premium grade (29%).

Most issuers in our sample provide some form of green reporting, with 42% of respondents engaging in sustainability reporting (Panel E). Only 8% have no publicly available reports. Finally, Panel F shows that 31% of respondents have at least one certified green bond issue, indicating that green bond certification is a common practice but not obtained by most issuers.

## 4. Results

### 4.1. Green Bond Market Activity

Our first focus of the survey is to understand respondents' green bond issuance activity. As shown in Table 2, our sample represents a broad spectrum of bond issuers involving large organisation with almost USD 2tn in total bonds outstanding to small issuers with a total bond volume of USD 30m. The average (median) amount of green bonds outstanding is USD 2.59bn (USD 0.82bn) and the average (median) proportion of green bonds to their total bonds is 21% (9%).<sup>21</sup> The relative green bond issuance ranges from 0.01% to 100%, highlighting the variety of green bond issuers featured in our sample.

[Insert Table 2 about here]

Next, we focus on the length of time that respondents have been active in the green bond market to explore their experience in the green bond market as well as potentially changing attitudes depending on the time of green bond market entry.<sup>22</sup> We find that the average respondent has issued their first green bond 2.62 years from the survey date. However, our sample also covers respondents whose first green bond issue dates back 12.5 years, thus representing the pioneers in green bond issuances. In addition, new green bond issuers who have issued their first green bond in the second half of 2019 are also featured in the survey. The average (median) respondent has issued around 8 (2) green bonds, with the most prolific green bond issuers having issued 128 green bonds.

Panels B to E of Table 2 show how the different characteristics of issuers interrelate. There appears to be a negative relationship between the size of the issuer and the proportion of their relative green bond issuance (Panel B). The average share of green bonds relative to total bonds is 40% among small issuers. However, this figure drops to 20% for medium-sized issuers and to only 3% for our largest issuer tercile.

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<sup>21</sup> In unreported results, we compare the distribution of amounts of green bonds outstanding in our sample to the universe of green bonds by issuer type. We find that sovereign issuers are overrepresented in our sample, leading to a high market coverage (greater than 90%). However, data were provided to us anonymously by Climate Bonds, so we cannot comment on the identity of the issuers.

<sup>22</sup> The reference point for the years from first green bond issuance is 31 December 2019.

In Panel C, we observe a positive link between relative green bond issuance and experience in the market. Issuers with the longest experience of issuing green bonds exhibit the highest relative share of green bonds of 25%, whereas respondents who have entered the green bond market less than one year from the survey date, allocate, on average, 18% of their total bond issuances to green bonds. This finding is intuitive and shows that the longer issuers are active in the green bond market, the more they shift their fixed income funding towards green bonds. A possible explanation is that issuers become more familiar with the green bond issuing process and have established systems to identify green projects that could be financed or re-financed via green bonds. This aligns with findings presented in Panel D showing that issuers who have issued their first green bond more than three years ago have overall issued a larger number of green bonds (on average 22.44) compared to issuers who have been issuing green bonds for a shorter period of time.

Finally, Panel E compares issuers' size to the time when issuers entered the green bond market. We find a clear positive link between the two parameters, suggesting that larger issuers have entered the green bond market earlier and have taken up a pioneering role in green bond issuances.

Table 3 overviews the use of proceeds that the respondents' green bonds are earmarked for and hence helps us to understand what type of projects these bonds finance.<sup>23,24</sup> The most popular use of proceeds categories are energy projects (34%), buildings (29%), and transport (15%), together accounting for 77% of all green bond issuances. Hence, the types of projects financed via green bonds are still relatively concentrated and there is scope for expanding green bond issuances to fund projects in other areas.

[Insert Table 3 about here]

Our results further suggest that smaller issuers use green bonds more frequently to finance waste-related projects, while larger investors allocate less green bond proceeds towards buildings but more towards water-related projects. Green bond market experience also plays a role in explaining the use of proceeds patterns of green bonds. Issuers who have issued their first green bond more than three years from the survey date have a more concentrated set of projects for their green bond funding, while more recent entrants have a considerably higher allocation to information, communication and technology projects and the industrial sector. Looking at the distribution of use of proceeds by issuer type, finance corporates mainly fund buildings (46%), non-financial corporates use the proceeds primarily for energy-related

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<sup>23</sup> Typical examples of uses of proceeds by category are (Climate Bonds Initiative, 2017b): projects aimed at improving industrial energy efficiency (industry); technology substitution such as smart grid application, low carbon infrastructure and data-centres using renewable energy (Information, Communication, Technology); nature-based assets for forestry, agriculture and fisheries (Land Use); waste management related to disposal, pollution control technology, recycling, reuse and prevention (Waste); water-saving technology or infrastructure (Water); low carbon transport, fuel-efficient vehicles, electric vehicles or transport infrastructures, alternative fuel vehicles (Transport); Low carbon buildings (Building); and renewable energy such as solar, wind, geothermal, hydropower and bioenergy (Energy).

<sup>24</sup> Climate Bonds provided us with information about use of proceeds using its green bond database.

projects (53%), whereas supranational, sub-sovereign and agency issuers and sovereign issuers show a less concentrated use of proceeds distribution with the most popular category being transport-related projects.

Next, we focus on issuers' motivation for issuing green bonds (Table 4). Among all respondents, reputational benefits and market signal are the top motivations, followed by a desire to curb climate change. These factors achieve average ratings of 4.33/5, 4.08/5 and 3.83/5, respectively, which are significantly higher than respondents' average responses across the different drivers.

[Insert Table 4 about here]

Another interesting finding is the comparatively low score of 2.34/5 for cheaper pricing as a motivation for issuing green bonds. Cheaper pricing seems to be less relevant for larger issuers. Hence, pricing considerations do not seem to be the main driver why respondents issue green bonds but are rather regarded as an ancillary factor. We will explore the question of green bond pricing and issuance costs in more detail in Section 4.3. The factor with the lowest rating from respondents is increasing the stock price through green bond issuance (1.44/5). Again, this is an interesting finding considering the evidence in the academic literature which suggests that the issuance of green bonds has a positive effect on the stock prices of corporate green bond issuers (Flammer, 2021; Tang & Zhang, 2020).<sup>25</sup> Another noteworthy result is the relatively low score that public policy and regulation receive (2.17/5). There are multiple ways to interpret this finding. On the one hand, the lower impact of policy makers and regulators indicates that green bond issuances are motivated by a different set of stakeholders and represent an internal motivation by issuers to generate positive environmental impact (see also Section 4.2 and Table 6, Panel B). On the other hand, the finding suggests that there is a greater role to play for policy makers and regulators in encouraging issuers to enter the green bond market.

Looking at how these motivations have changed over time, the most notable finding is the growing relevance of a changing business model as driver of green bond issuance for later entrants to the green bond market. While this factor seems to be of low importance to issuers with more market experience (1.88/5), for recent entrants it is regarded as the third most relevant driver of green bond issuance achieving a score of 3.09/5. The difference in average scores between these two issuer groups is highly statistically significant.

To account for the effects of respondents' characteristics on issuers' responses, we estimate multivariate regressions using ordered probit models.<sup>26</sup> We include regional dummies in all of our subsequent

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<sup>25</sup> Some respondents are not listed corporations and hence do not publicly issue stocks / equity, which partially explains the low support for this factor as a driver for green bond issuance.

<sup>26</sup> We use ordered probit models since dependent variables are questionnaire responses measured as scores (usually integer from 1 to 5) or binary variables. We estimate parsimonious models with key institutional investor characteristics used as explanatory variables to avoid over-identification issues due to the small sample size. Results are qualitatively similar under different model specifications and available upon request.

regression results, and cluster standard errors by region. We also use proxies for the issuers' total bonds outstanding, the number of years since the first green bond issuance of each respondent, the relative green bonds outstanding, and a set of dummy variables corresponding to the issuer category. Regression results reported in Table 4, Panel B show that a changing business model is a more important driver for larger issuers (column 2), while curbing climate change is the preferred motivation by more experienced issuers (column 8) in line with the univariate results.

Finally, we ask why respondents have not issued green bonds earlier. This question allows us to understand potential constraints and barriers for issuers to enter the green bond market. As shown in Table 5, among the six issuing constraints, 'markets not being sufficiently evolved' and 'lack of awareness' are identified as the main reasons why issuers did not issue green bonds earlier. The two factors achieved average scores of 3.79/5 and 3.22/5, respectively. Comparing the simple mean scores to the corresponding scores weighted by issuer size, the lack of market evolvment and awareness seem more pressing for larger issuers, with the differences being statistically significant at the 1% level. In addition, insufficient market evolvment also appears to be a more relevant constraint for issuers who have been active in the green bond market for longer, while the lack of suitable projects for green bonds is a more pressing concern for issuers that have entered the market less than a year from the survey date. These results are also observed when using regression models as shown in Panel B (columns 1 and 2). The latter findings are both encouraging and discouraging for the potential to grow the green bond market. While the decrease in relevance of insufficient market evolvment shows that the green bond market has considerably matured in issuers' view over the last decade, the lack of suitable projects is a more difficult issue to address and might be one explanation why we do not see more issuers entering the green bond market.

[Insert Table 5 about here]

#### 4.2. *Green Bond Issuance Process*

Next, we highlight issuers' experiences of the green bond issuance process. First, we focus on the length of the process to understand whether issuing green bonds is a considerably more time-consuming undertaking than issuing plain vanilla bonds (Table 6, Panel A). Most issuers took less than one year from the decision to issue a green bond to pricing, with 47% taking less than six months. Only 12% of respondents said that the issuance process took longer than one year. While the issuance time of six months might seem long when compared to standard plain vanilla bonds, this extra time for green bond issuances is usually necessary for preparing the issue, including additional documentation - e.g. the green bond framework and second party opinions - and for educating internal stakeholders.<sup>27</sup>

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<sup>27</sup> This explanation has been confirmed in discussions with an expert from Climate Bonds.



Issuers with more than three years of green bond market experience are more likely to report a longer issuance process relative to more recent entrants.<sup>28</sup> This is an encouraging finding and suggests that the issuance process becomes less lengthy as the green bond market matures. Issuer size seems to be a less relevant factor when it comes to the length of the process as there are no marked differences in responses for larger versus smaller issuers.

[Insert Table 6 about here]

The most influential stakeholder in the decision to issue green bonds is the board achieving an average score of 4.01/5, followed by the issuing organisations' staff (3.99/5) (Table 6, Panel B).<sup>29</sup> Investors are also regarded as influential (3.59/4), while respondents view regulators as least influential achieving the lowest score of 1.82/5. When comparing the simple mean with the weighted average scores by total bonds outstanding, syndicates appear to have greater influence for smaller issuers than larger ones. In addition, the impact of organisations' staff on the initial issuing decision has somewhat diminished over time and was replaced by the board as the most influential stakeholder group.

A potentially important institution for organisations who issue green bonds is a sustainability committee. Sustainability committees are board-level committees in the organisation which advise on and oversee the sustainability strategy and performance of the organisation (Burke, Hoitash, & Hoitash, 2019; Liao, Luo, & Tang, 2015; Velte & Stawinoga, 2020).<sup>30</sup> Of our 86 respondents, around 78% report that they have a sustainability committee. In unreported results, we find that sustainability committees seem to be more frequently present in larger issuers and issuers that have entered the green bond market earlier. Regarding the role that the sustainability committee played in the decision to issue green bonds, the picture is mixed across the respondents (Panel C). 30% of respondents indicate that the sustainability committee played no role in the decision, while 24% state that the sustainability committee had a moderate influence and 34% responded that the sustainability committee collaborated with other stakeholders on the green bond issuance decision. For only 19% of respondents was the sustainability committee the driving force behind the initiative to issue green bonds. While there is a vast literature with mixed findings on the relationship between the structure of various board-level committees and corporate policies and performance (e.g. Baxter, Bedard, Hoitash, & Yezegel, 2013; Beasley, Carcello, Hermanson, & Lapides, 2000; Conyon & Peck, 1998; Klein, 1998; Uzun, Szweczyk, & Varma, 2004),

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<sup>28</sup> In Table 6, Panel A two issuers selected two responses, reflecting different lengths of the process. Hence the total sum of responses (88) does not equal the overall number of issuers (86).

<sup>29</sup> The 'staff' category includes the treasurer, i.e. the main respondent group to the survey. Staff members refer to employees working in Treasury, Finance and Sustainability teams. Treasurers could be either CFOs or equivalent roles. Climate Bonds did not collect the job title of the respondent so we cannot distinguish between the different roles (CFOs vs treasurers). This explanation is supported by discussions with a Climate Bonds' expert.

<sup>30</sup> Burke et al. (2019, p. 1163) define the duties of sustainability committees to "span from a general focus on overall sustainability policies and procedures to specific foci on stakeholder groups such as employees or the environment". They further elaborate that these committees are voluntary and boards can define which stakeholder groups they focus on.

only few academic studies investigate the impact of sustainability committees on the sustainability performance of the organisation (e.g. Bui, Houque & Zaman, 2020; Burke et al., 2019; Helfaya & Moussa, 2017; Liao et al., 2015; Velte & Stawinoga, 2020). To the best of our knowledge, there is no academic work which specifically studies the relationship between sustainability committees and green bond issuance. Hence, our results provide evidence of the role that sustainability committees have in one aspect of capital structure and sustainability decisions, i.e. influencing the issuance process in the green bond market.

The issuance of green bonds involves additional documentation such as the green bond framework. To ensure that the green bond issuance and all related documentation are in line with market expectation, some issuers rely on third party guidance during the issuance process. Issuers usually appoint external review providers to assess the alignment of their green bonds to the Green Bond Principles and can provide their input on the issuance process using different forms: i) second party opinions, ii) verification, iii) certification, and iv) green scoring/rating (ICMA, 2020). A second party opinion is an assessment of the alignment of the green bond (or green bond programme/framework) to the core Green Bond Principles, and includes an evaluation of the overall sustainability strategy, policy, processes and the use of proceeds. A verification is instead more general and could relate to a designated set of criteria – not necessarily the Green Bond Principles – and apply to specific business processes or environmental criteria. Third parties can also certify the use of proceeds and the green bond framework against a recognised external green standard (or label), or assess them using a scoring/rating methodology. However, these external parties and their impact on the green bond issuing process have so far received relatively little attention by both regulators and academia.

To gain an understanding of the extent to which green bond issuers rely on these parties, we asked respondents whether they used external parties when issuing green bonds (Table 7). Only a minority of 16% stated that they did not rely on any third party but managed the issuance process completely internally. Especially issuers that entered the green bond market in the earlier years of its existence are more likely to internally manage the process (36%), while less than 5% of the respondents that issued their first green bond less than one year from the survey date did so without third party guidance. Looking at the type of third parties that issuers consulted, the two most frequently stated third parties are the second party opinion provider and the syndicate desk, both being consulted by 57% of respondents. In addition, consultants seem to play an important guiding role, especially for smaller issuers. The increasing reliance on third party guidance in the green bond issuing process is an interesting finding, especially on the backdrop of current policy and market developments which will likely see a greater role for external parties and external review providers. We will discuss the implications of our findings against these developments in the concluding section.

[Insert Table 7 about here]

### 4.3. *Costs and Pricing of Green Bonds*

The costs associated with green bond issuance and the pricing of the bonds in the primary market are important considerations. For a small share of respondents (14%), issuance costs are perceived as negligible indicating that additional costs of green bond issuance are not a major concern for several issuers (Table 8, Panel A). Among the respondents indicating that green bond issuance does involve higher costs compared to plain vanilla bonds, the majority (62%) regard these higher costs as acceptable since green bond issuance generates other benefits. Only 4% of respondents anticipate that the higher issue costs are offset by cheaper funding for green bonds. These perceptions do not vary considerably by issuer size and length of activity in the green bond market.

[Insert Table 8 about here]

Next, we turn our attention to the costs of funding for green bonds and hence the pricing of green bonds in the primary market.<sup>31</sup> Only a minority of issuers (7%) perceive the costs of funding for green bonds to be greater than for their plain vanilla bonds (Table 8, Panel B). However, the respondents are split whether they consider green bond funding costs to be the same as those of plain vanilla bonds (48%) or less (42%). Furthermore, we find that larger issuers and issuers with more years of experience in the green bond market are more likely to perceive green bond funding costs to be relatively less, while the share of respondents reporting greater green bond funding costs is highest among more recent market entrants. These results suggest that there might be differences in the primary market pricing for different types of issuers, and that the pricing of green bonds – or additional costs related to IT adaptation and documentation – might have changed over time as the green bond market has expanded and matured.

We also run regressions to better understand what might be driving the different perceptions of issuance costs and funding costs. The results are reported in Panel C of Table 8. Interestingly, issuer size does not seem to drive respondents' perception of green bond funding costs as evidenced by the insignificant coefficients on the log of total bonds outstanding. In line with the results from the univariate comparison, issuers with more experience in the green bond market are more likely to perceive green bond costs of funding as lower (columns 5, 6 and 7). Interestingly, issuers with a higher share of their bonds issued as green bonds are less prone to perceive green bond funding costs as greater (column 4). Turning to issuer types, we find that non-financial corporates are more likely to experience green bond funding costs as greater, compared to the base category of financial corporates (columns 4 and 7). A similar pattern is observed for sovereign issuers, although the finding is only marginally significant at the 10% level. Finally, we find that the perceived funding costs of green bonds seem to significantly

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<sup>31</sup> In the context of the survey, funding costs not only refer to bond yields, but also include costs such as IT adaptation, documentation such as the green bond frameworks, and legal paperwork. This explanation is supported by discussions with Climate Bonds' experts who collected survey responses.

differ by issuer region. Compared to European issuers (the base category), North American, supranational and Asian Pacific issuers are less likely to perceive green bond funding costs as greater than those of plain vanilla bonds, while Middle Eastern and African issuers are more likely to report greater costs of funding for their green bond issuances. In addition, issuers from Latin America are more likely to regard their green bond funding costs to be lower, compared to European issuers.

Investor demand for new bond issuances is another important consideration for issuers. Anecdotal evidence suggests that green bond issues generate a high investor demand and are frequently oversubscribed (e.g., Cochu et al., 2016; Tang and Zhang, 2020). This is confirmed by our results presented in Table 9, Panel A. 70% of issuers state that the level of demand for green bonds is higher than the demand for previously issued plain vanilla bonds, while 25% report it to be the same for both classes of bonds. Interestingly, none of the respondents experience lower investor demand for green bonds. Especially issuers, who have been in the market for less than one year, report that investor demand for their green bonds is higher.

[Insert Table 9 about here]

Table 9, Panel C shows that larger issuers are more likely to receive higher investor demand for their green bonds, while investors with more market experience and sovereign issuers tend to report the same levels of demand as for their plain vanilla bonds. Looking at regional differences, we find supranational issuers and issuers from Latin America and the Middle East and Africa to be prone to higher demand for their green bond issues, compared to European issuers.

While the previous questions have focused on primary market aspects of green bond issuances, another area of interest is the performance of green bonds in the secondary market. Especially the market liquidity of their securities is a relevant consideration for issuers as it can affect investor interest, the market perception of their issuances and pricing (Febi, Schaefer, Stephan, & Sun, 2018; Baker et al., 2018; Zerbib, 2019). This is confirmed by our findings. For around 70% of respondents, secondary market liquidity of green bonds is an important consideration, with larger and medium-sized investors having greater concern for green bonds' market liquidity than smaller investors (83%/82% vs 42%). Table 9, Panel C, column 2 presents regression results explaining the likelihood of respondents to state that they care about the secondary market liquidity of green bonds. Issuers who have been in the market for longer are less likely to care about secondary market liquidity, while sovereign, North American and supranational issuers are more likely to show concern for green bonds' market liquidity. In comparison, Middle Eastern and African issuers seem to see green bond secondary market liquidity as less of a concern.

#### 4.4. *Impact of Issuing Green Bonds*

Next, we explore the broader impact that issuing green bonds can have on issuers. We concentrate on the aspects of issuers' operations and processes that are not observable as they happen behind the scenes, such as engagement with investors and impact on issuers' sustainability commitment.

We find that 91% of respondents experience more investor engagement for their green bond issuances, independent of investor size and market experience (Table 10, Panel A).

[Insert Table 10 about here]

Regarding the type of information investors requested for green bond issuances, Table 10, Panel B, shows that investors ask for information on the classification of the use of proceeds (78%), followed by post issuance transparency (66%) and the green bond framework (64%). The former two are relatively more important for the investor base of large issuers, while post issuance transparency seems less of a concern for investors in green bond issuers with more than three years of market experience.

Next, we analyse whether green bonds help to attract new investors and hence diversify issuers' investor base.<sup>32</sup> As reported in Table 10, Panel C, respondents predominantly confirmed that their green bond issuance attracts new investors with only two respondents, or 2%, stating that the green bond issue does not attract new investors.

Respondents are also asked about the proportion of their green bond issues that are allocated to 'green' investors, i.e. investors with a stated focus on environmental considerations in their investment decisions and processes.<sup>33</sup> Table 10, Panel D, reports that, on average, our respondents allocate just above half of their green bond issues to green investors, with larger issuers reporting a particularly high allocation to this investor clientele. However, the range and standard deviation of responses indicate that the allocation of green bonds to green investors differs widely between respondents suggesting that investor interest varies by issuer. One of the determining factors of the proportion of green bonds being allocated to green investors appears to be the regional location of the issuer. Middle Eastern and African issuers report particularly high allocations to green investors, while North American and sovereign issuers allocate a smaller share of their green bonds to investors with an environmental focus.<sup>34</sup>

Next, we explore the impact of green bond issuance on issuers' sustainability efforts. We find that for more than three quarters of respondents issuing green bonds has affected their commitment to sustainability (Table 11, Panel A). The proportion reporting a strengthening of their internal

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<sup>32</sup> The survey question refers to new bond investors in the specific green bond issues, rather than new equity investors.

<sup>33</sup> The definition of green investors is not limited to Principles for Responsible Investments pledged investors. The classification of green investors may differ by issuer, e.g. some issuers look for investors with a dedicated research team or for explicit policy guidelines, some rely on investors' self-classification as green or dedicated green mandates. Hence, there might be some heterogeneity in the way that issuers identify investors as green. This information was confirmed via discussions with an expert from Climate Bonds.

<sup>34</sup> Unreported regression results are available upon request.

sustainability commitment due to the green bond issuance is particularly high among small issuers (96%). Table 11, Panel B further illustrates that the impact on issuers' internal commitment to sustainability is stronger, the higher the share of green bond funding relative to issuers' total bonds outstanding. Hence, as issuers shift more of their debt financing towards green bonds, their sustainability commitments strengthen. Furthermore, regional differences seem to be present in green bonds' impact on issuers' sustainability commitments. Compared to European issuers, issuers from all other regions report a strengthening of their commitment towards sustainability as a result of their green bond issuance. Perhaps surprisingly, non-financial corporates are less likely than financial corporates to report an effect on their sustainability commitment. One explanation for this finding is that the green bond issue may be a result of their sustainability commitment, and less a catalyst. However, future research could focus on exploring the dynamic relation between green bond issuance and issuers' sustainability commitment to develop a clearer understanding about the cause-and-effect relations between both phenomena.

[Insert Table 11 about here]

Next, we asked respondents whether they are planning to issue more green bonds in the future. The answers to this question offer us several insights into respondents' experience with the green bond issuance process and their environmental agenda going forward. Our results show that the vast majority (88%) of respondents plan to issue more green bonds, while 15% of issuers state that they will reopen existing green bonds (Table 12, Panel A). Only two respondents indicate that they are not planning further green bond deals. The intention to issue future green bonds does not seem to strongly depend on issuers' length of experience in the green bond market or their size. Overall, these results suggest that respondents overwhelmingly had positive experiences with their green bond issuances and envisage to engage in further green projects in the future.

[Insert Table 12 about here]

Finally, respondents were asked about the benefits they associate with repeat green bond issuance (Table 12, Panel B). The most frequently mentioned benefit is the establishment of an investor base (82%) and the greater visibility that repeat issuance entails (71%), followed by higher demand for issuances (58%). Almost half of the issuers also state economies of scale and cheaper funding. This result complements findings in the prior literature that repeat issuers can demand a higher premium for their green bond issuances (Fatica et al., 2021). The benefits of an established investor base as a result of repeat issuance seems to carry very high importance for larger investors with 93% stating it as a benefit, as well as for investors that entered the market less than one year from the survey date (88%). In addition, investors with long experience of issuing green bonds particularly value the greater visibility that comes with repeat issues. Unreported regression results confirm these findings and highlight regional differences in the perceived benefits of issuing more green bonds. Economies of scale

are more frequently chosen by sovereign and supranational issuers. North American respondents seem to observe more visibility as benefits of their repeat issues but are less likely to state economies of scale and higher demand. Cheaper funding is a less frequently selected option by respondents from Asia Pacific and Middle East and Africa with respect to the responses of European issuers.

#### 4.5. *Issuers' Views on Green Bond Policies and Future Issuances*

Table 13 offers insights into issuers' perspectives on different policy initiatives in the green bond space. First, we focus on issuers' views on the types of projects that should be eligible for financing via green bonds. The EU Technical Expert Group's guidance (2020) specifies that green assets should qualify for green bonds without a specific look-back period as long as they meet stringent criteria. An alternative position is that only new projects should be included in green bonds to ensure that these bonds generate sizable net green impact.<sup>35</sup> Table 13, Panel A, shows that the majority, 58%, of respondents favour the most lenient approach that allows all projects to be eligible for green bond funding, while they show little support for the strictest approach that only permits green bonds to be used for new projects – 8% support this position. Around one third of respondents favour an approach which restricts green bond financing to new projects and those initiated within the previous two years. In unreported regression results, we explore differences in responses based on issuer characteristics. Issuers who have longer experience in the green bond market and who have a larger share of their bonds issued as green bonds show higher support for the strictest definition restricting green bonds to financing only new projects. In addition, supranational, sub-sovereign and agency issuers and sovereigns are also more likely to favour the strict definition, compared to financial corporates, while issuers from Asia Pacific, Latin America and the Middle East and Africa show relatively lower support for this approach.

[Insert Table 13 about here]

Another topic of debate among policy makers and green bond market participants is the definition of what projects and assets classify as 'green'. Again, there is a divide between those favouring a standardisation of 'green' definitions, likely resulting in a more constrained pool of green projects and assets, to ensure the integrity of the 'green' label and avoid green washing, and those that support a less strict definition of 'green' to enhance diversity in issuance and to scale up the market. Results presented in Table 13, Panel B suggest that two thirds of respondents favour a greater standardisation of the definitions, taxonomies and reporting in the green bond market, while around one quarter of issuers support a less strict application of definitions. The remainder respond that they have no preferences in the debate about standardising definitions. Interestingly, issuers that have entered the green bond market

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<sup>35</sup> The different views on the use of green bond proceeds to finance / refinance projects were collected by Climate Bonds' experts through their discussions with issuers.

in the year prior to the survey date are more likely to favour the stricter standardisation of green bonds. This is perhaps surprising considering that one of the concerns about standardising the definition of ‘green’ is that it might prevent the entrance of new issuers to the green bond market.

The final aspect that we investigate involves the expansion of bond labels to other ESG categories. Green bonds are arguably the largest and most well-known market segment in the ESG bond market. However, there are other environmental and social aspects that could be stimulated and financed via dedicated bond issuances. Especially considering the Covid-19 pandemic, the spotlight has been on social and employment aspects of corporate business activities and governmental efforts, and questions have been raised to what extent social bonds could be used to finance efforts to combat the crisis and to improve social and employee-oriented practices in firms and public institutions. While the responses to this survey predate the outbreak of the Covid-19 pandemic, it is nevertheless interesting to examine issuers’ prior plans on whether they consider issuing bonds with alternative social or environmental labels. Table 13, Panel C lists different labels that are either being used for bond issuances or that have been proposed, together with issuers’ responses whether they are likely to consider issuing such bonds in the future. The preferred label for future issuances is sustainability bonds which receive 40% of respondents’ support. In addition, Social Development Goals bonds garner 33% of issuer support, ESG bonds 30% and social bonds 29%, respectively. Sustainability bonds rank as the top label for future bond issuance among issuers with the least experience in the bond market as well as smaller issuers, whereas large and the most experienced issuers favour social bonds for future bond issuances.

## **5. Conclusion**

This study explores the drivers and challenges of issuing green bonds, from the perspective of green bond issuers. We examine survey evidence of 86 global green bond issuers which account for around 29% of overall green bond issuances until the end of 2019. Our results show that, on average, respondents have 21% (median 9%) of their total bonds outstanding issued as green bonds. The main drivers of green bond issuances include reputational benefits, the market signal of green bond issuance and the desire to curb climate change, while more recent entrants to the green bond market increasingly view green bonds as an enabler for changing their business model. In contrast, insufficient market evolution and lack of awareness are identified as the main reasons why respondents have not issued green bonds earlier. Respondents who have recently issued their first green bond state that they were constrained by a lack of suitable green projects.

The main stakeholders behind the decision to issue green bonds are issuers’ board and staff. When issuing green bonds, most respondents also rely on external guidance such as external parties and consultants. Most respondents consider green bond issuance costs to be higher than those of plain vanilla bonds but regard these costs as acceptable due to other benefits they derive from issuing green



bonds. For just below half of the respondents green bond funding costs are the same as those of plain vanilla instruments, while 42% respond that they are lower. Issuers with longer experience of issuing green bonds report relatively lower costs of funding for green issuances.

One of the main benefits of green bond issuance is higher investor demand for these bonds, with 70% of respondents saying that their green issuances generated higher levels of investor demand and almost all respondents reported that green bonds attracted new investors. On average, around half of the respondents' green bond issuances were allocated to green investors, suggesting that green bonds help issuers to diversify their investor base. Issuers also experience more investor engagement for their green issuances and stronger internal sustainability commitments.

In terms of the issuers' views on green bond policy initiatives, most respondents favour a more lenient approach towards the eligibility of projects for green bonds which should cover new and 'old' projects initiated more than two years from the survey date. Two thirds of issuers prefer a standardisation of the definition of 'green' to clearly define what environmental projects can be financed using green bonds.

Our findings have important implications for green bond issuers, investors and policy makers. Issuers that want to issue green bonds for the first time or that want to revisit the green bond market for additional funding need to ensure that they mobilise the support from the board and staff as they have been identified as the key drivers of the decision to issue green bonds. Hence, treasurers who intend to enter the green bond market need to ensure that they engage and educate their boards on the benefits of issuing green bonds. In addition, the lack of suitable green projects as a main obstacle for green bond issuance among the more recent entrants suggests that more can be done among issuers to establish appropriate reporting and IT systems to identify suitable projects for inclusion in green bonds. These results also point to a restrictiveness or lack of clarity about the types of projects that qualify as 'green' which offers scope for policymakers and regulators to intervene and more clearly set out which projects qualify for green bond funding. We will discuss this aspect in further detail below under the topic of standardisation of definitions of 'green'.

Moreover, our findings have implications for investors. Since we find that green bond issuance is motivated by issuers' desire to curb climate change and green bonds reportedly strengthen institutions' commitment to sustainability, our results may provide confidence to investors that green bonds can play a valuable role in impact investment strategies. Impact investing has become increasingly popular among specific investor groups (see Barber, Morse, & Yasuda, 2021; Geczy, Jeffers, Musto, & Tucker, 2021) but the difficulty to measure and evaluate the environmental and social 'impact' of investments provides obstacles for these strategies and further raises concerns that the 'green' investments do not offer the environmental benefits that they promise. Our results should help to limit these 'greenwashing' concerns and hence increase the appeal of green bonds for investors with a clear 'green' mandate.

Finally, our results have several implications for policymakers and regulators. Based on our survey evidence, regulators and policy makers have so far only played a minor role in driving green bond market growth, suggesting that there is scope for a greater impact of regulation and policy incentives to encourage green bond issuance. Among European and North American investors, public policy initiatives to stimulate green bond issuances have been limited, especially when compared to the green bond subsidies and incentive schemes seen in several Asian countries.<sup>36</sup>

Current developments such as the guideline of the EU Technical Expert Group on Sustainable Finance (2020) seem to align with our respondents' strong preference for a broad eligibility of projects suitable for green bond finance as they recommend that green assets should qualify for green bonds without a specific look-back period. However, these considerations need to be carefully balanced against concerns that by allowing issuers to use green bonds for refinancing existing projects no additional environmental benefits are generated and existing projects are instead 'repackaged' as green.

Issuers' differences in opinions as to the standardisation of the definition of 'green' reflect the challenges for policymakers in defining appropriate green bond standards. At least at the EU level where policymakers are currently developing a EU Green Bond Standard (see Technical Expert Group on Sustainable Finance, 2019) there is a movement towards more standardisation as the EU Green Bond Standard advocates that funds raised by the green bond should be allocated fully to projects aligned with the EU Taxonomy (see EU Commission, 2021).<sup>37</sup> These developments should be welcomed by the majority of the issuers as the aim of the EU Green Bond Standard is to "address concerns on greenwashing and protecting market integrity to ensure that legitimate environmental projects are financed" via green bonds (EU Commission, 2021). However, the Green Bond Standard is currently proposed to be implemented on a voluntary, non-legislative basis, which could reassure those respondents that favour a less stringent definition of 'green' projects.<sup>38</sup>

Finally, second party opinion providers and other external parties deserve additional attention by policymakers and academia as they are key facilitators in the green bond issuance process – especially newer entrants to the green bond market rely heavily on these external parties during green bond issuance. The green bond certification and third-party guidance market is only sparsely regulated and relies mainly on self-regulatory market practice (Park, 2018). Hence, this is an area for policy makers to ensure transparency and reliability for investors and issuers, especially as the current proposal for the

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<sup>36</sup> For instance, subsidy schemes aimed at reducing issuance costs or external review costs have been provided in different forms to issuers in China, Malaysia, Japan, Hong Kong and Singapore, while a direct tax reduction scheme was introduced in Malaysia (Sustainable Banking Network, 2018).

<sup>37</sup> As a classification system, the EU Taxonomy defines and lists environmentally sustainable economic activities: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852>

<sup>38</sup> The current leading green bond market standards, Green Bond Principles, are voluntary guidelines for the issuance of green bonds and do not require the issuer to apply a specific taxonomy to assess how green or sustainable its project is. The Green Bond Principles specify that proceeds should finance only green project with clear and potentially measurable environmental benefits (ICMA, 2018; Deschryver and de Mariz, 2020).

EU Green Bond Standard states that “EU green bonds must be checked by an external reviewer to ensure compliance with regulation and that funded projects are aligned with the Taxonomy” (EU Commission, 2021). These developments imply that these external parties will further increase in importance in the future. Not only would a more in-depth analysis of the role and impact of these external parties offer an interesting avenue for future research but our finding of issuers’ current reliance on these external parties highlights the practical relevance of understanding the role and importance of these market players.

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**Table 1: Sample Overview**

This table reports summary statistics on the characteristics of the 86 respondents that participated in the survey. Panel A reports the number of respondents by region; Panel B shows responses by issuer category; Panel C reports the sample distribution based on the market development of the issued green bonds; Panel D presents responses by credit rating; Panel E shows the number of respondents by type of sustainability reporting; Panel F reports the number of respondents with at least one certified green bond issue.

| <b>Panel A: Region</b>                            |                     |                 | N  | %      |
|---|---------------------|-----------------|----|--------|
| Asia Pacific                                      |                     |                 | 10 | 11.63  |
| Europe  |                     |                 | 51 | 59.3   |
| Latin America & the Caribbean                     |                     |                 | 7  | 8.14   |
| Middle East & Africa                              |                     |                 | 3  | 3.49   |
| North America                                     |                     |                 | 11 | 12.79  |
| Supranational                                     |                     |                 | 4  | 4.65   |
| <b>Panel B: Issuer Category</b>                   |                     |                 | N  | %      |
| Financial Corporate                               |                     |                 | 36 | 41.86  |
| Non-Financial Corporate                           |                     |                 | 26 | 30.23  |
| Supranational, Sub-sovereign & Agency             |                     |                 | 17 | 19.77  |
| Sovereign   |                     |                 | 7  | 8.14   |
| <b>Panel C: Market Development</b>                |                     |                 | N  | %      |
| Developed Markets                                 |                     |                 | 66 | 76.74  |
| Emerging Markets                                  |                     |                 | 16 | 18.6   |
| Supranational Markets                             |                     |                 | 4  | 4.65   |
| <b>Panel D: Rating Description</b>                |                     |                 | N  | %      |
| Investment Grade                                  | Prime               | AAA             | 12 | 18.18  |
|   | High Grade          | AA+, AA, AA-    | 9  | 13.64  |
|   | Upper Medium Grade  | A+, A, A-       | 25 | 37.88  |
|   | Lower Premium Grade | BBB+, BBB, BBB- | 19 | 28.79  |
| Non-Investment Grade                              | Speculative         | BB+, BB, BB-    | 1  | 1.52   |
| Not Available                                     |                     |                 | 20 |        |
| <b>Panel E: Issuance of Sustainability Report</b> |                     |                 | N  | %      |
| Sustainability Report                             |                     |                 | 36 | 41.86% |
| Integrated Report                                 |                     |                 | 7  | 8.14%  |
| Section in Annual Report                          |                     |                 | 11 | 12.79% |
| Other environment related publication/ disclosure |                     |                 | 14 | 16.28% |
| No publication                                    |                     |                 | 7  | 8.14%  |
| Not Available                                     |                     |                 | 11 | 12.79% |
| <b>Panel F: Bond Certification</b>                |                     |                 | N  | %      |
| Issuers with at least one certified green bond    |                     |                 | 27 | 31.40% |
| <b>Total</b>                                      |                     |                 | 86 |        |



**Table 2 – Green Bond Issuers’ Market Activity**

This table presents summary statistics on green bond market activity of respondents. Panel A shows summary statistics of: i) issuers’ total bonds outstanding measured in USD billions; ii) the issuers’ total green bonds outstanding measured in USD billions; iii) the relative green bonds outstanding measured as the ratio between issuers’ green bonds outstanding and the total bonds outstanding; iv) the number of years since the first green bond issue by the respondent measured as the ratio between the number of days from 31 December 2019 to the pricing date of the first green bond issue of the respondent over 365 days; and v) the number of green bonds issued by the respondent. Panel B presents summary statistics of Relative Green Bonds Outstanding by terciles of Total Bonds Outstanding (Small if Total Bonds Outstanding is below or equal USD 4.75bn, Medium if Total Bonds Outstanding is greater than USD 4.75bn and below or equal to USD 37.19bn, and Large if Total Bonds Outstanding is greater than USD 37.19bn). Panel C reports summary statistics of Relative Green Bonds by Years since 1<sup>st</sup> Green Bond Issue (less than 1 year (< 1), from 1 to 3 years (1-3), and more than 3 years (> 3y)). Panel D shows summary statistics of the number of Green Bond issues by Years since 1<sup>st</sup> Green Bond Issue; Panel E presents summary statistics of Years since 1<sup>st</sup> Green Bond Issue by Total Bonds Outstanding.

| <b>Panel A: Overall Sample</b>  | N  | Mean  | Median | SD     | Min    | Max     | 10%  | 25%   | 75%   | 90%    |
|---|----|-------|--------|--------|--------|---------|------|-------|-------|--------|
| Total Bonds Outstanding (in USDbn)  | 86 | 85.74 | 10.92  | 243.29 | 0.03   | 1985.04 | 0.28 | 2.36  | 52.31 | 207.17 |
| Green Bonds Outstanding (in USDbn)  | 86 | 2.59  | 0.82   | 4.55   | 0.01   | 25.07   | 0.07 | 0.42  | 3.61  | 5.89   |
| Relative Green Bonds Outstanding  | 86 | 0.21  | 0.09   | 0.28   | 0      | 1       | 0.01 | 0.04  | 0.24  | 0.66   |
| Years since 1st Green Bond Issue  | 86 | 2.62  | 1.9    | 2.37   | 0.18   | 12.52   | 0.61 | 0.9   | 3.56  | 5.62   |
| Number of Issued Green Bonds  | 86 | 7.98  | 2      | 19.89  | 1      | 128     | 1    | 1     | 5     | 11     |
| <b>Panel B: Relative Green Bonds by Outstanding Bonds</b>                       |    |       | N      | Mean   | Median | SD      | Min  | Max   |       |        |
| Small   |    |       | 29     | 40%    | 25%    | 34%     | 3%   | 100%  |       |        |
| Medium  |    |       | 29     | 20%    | 11%    | 24%     | 2%   | 100%  |       |        |
| Large   |    |       | 28     | 3%     | 2%     | 3%      | 0%   | 10%   |       |        |
| <b>Panel C: Relative Green Bonds by Years since 1st Green Bond Issue</b>        |    |       | N      | Mean   | Median | SD      | Min  | Max   |       |        |
| < 1   |    |       | 24     | 18%    | 6%     | 28%     | 0%   | 100%  |       |        |
| 1 – 3   |    |       | 37     | 21%    | 11%    | 27%     | 0%   | 100%  |       |        |
| > 3   |    |       | 25     | 25%    | 8%     | 31%     | 1%   | 100%  |       |        |
| <b>Panel D: Number of Green Bond Issues by Years since 1st Green Bond Issue</b> |    |       | N      | Mean   | Median | SD      | Min  | Max   |       |        |
| < 1   |    |       | 24     | 1.29   | 1      | 0.69    | 1    | 3     |       |        |
| 1 – 3   |    |       | 37     | 2.54   | 2      | 2.13    | 1    | 8     |       |        |
| > 3   |    |       | 25     | 22.44  | 8      | 32.95   | 2    | 128   |       |        |
| <b>Panel E: Years Since First Issuance by Tercile of Outstanding Bonds</b>      |    |       | N      | Mean   | Median | SD      | Min  | Max   |       |        |
| Small   |    |       | 29     | 1.79   | 1.44   | 1.37    | 0.18 | 6.6   |       |        |
| Medium  |    |       | 29     | 2.71   | 2.09   | 2.26    | 0.23 | 9.92  |       |        |
| Large   |    |       | 28     | 3.38   | 2.48   | 3.01    | 0.52 | 12.52 |       |        |

**Table 3: Use of Proceeds**

This table presents the percentage allocation of proceeds of the respondents' green bonds by category. Percentages are reported for all the sample, by terciles of Total Bonds Outstanding, by Years since 1st Green Bond Issue, and by issuer category. Variable definitions and measurements are explained in the description to Table 2.

|  | All    | Total Bonds Outstanding |        |        | Years since 1 <sup>st</sup> Green Bond Issue |        |        | Issuer Category     |                    |   |           |
|--|--------|-------------------------|--------|--------|--|--------|--------|---------------------|--------------------|---|-----------|
|  |        | Small                   | Medium | Large  | < 1  | 1 - 3  | > 3    | Financial Corporate | Non-Fin. Corporate | Supranational, Sub-sovereign and Agency | Sovereign |
| Industry                               | 0.45%  | 0.92%                   | 0.43%  | 0.00%  | 1.35%  | 0.18%  | 0.00%  | 0.00%               | 1.02%              | 0.74%                                   | 0.00%     |
| Information, Communication, Technology | 1.26%  | 0.23%                   | 0.51%  | 3.10%  | 4.13%  | 0.18%  | 0.09%  | 0.06%               | 3.59%              | 0.74%                                   | 0.00%     |
| Land Use                               | 5.27%  | 7.72%                   | 2.35%  | 5.76%  | 5.04%  | 7.27%  | 2.54%  | 4.11%               | 6.33%              | 2.57%                                   | 13.92%    |
| Waste                                  | 5.96%  | 11.19%                  | 2.86%  | 3.75%  | 4.28%  | 6.43%  | 6.87%  | 7.34%               | 5.47%              | 4.88%                                   | 3.27%     |
| Water                                  | 7.29%  | 5.86%                   | 4.49%  | 11.66% | 10.96%                                       | 4.12%  | 8.45%  | 6.82%               | 4.48%              | 13.12%                                  | 5.98%     |
| Transport                              | 15.05% | 9.62%                   | 16.98% | 18.69% | 14.73%                                       | 20.05% | 7.97%  | 7.54%               | 9.99%              | 29.39%                                  | 37.68%    |
| Buildings                              | 28.81% | 31.53%                  | 34.23% | 20.38% | 35.98%                                       | 24.77% | 27.90% | 45.81%              | 15.65%             | 18.17%                                  | 16.13%    |
| Energy                                 | 33.70% | 31.56%                  | 36.72% | 32.79% | 22.33%                                       | 34.53% | 43.38% | 27.29%              | 52.70%             | 25.61%                                  | 15.74%    |
| Unallocated                            | 2.21%  | 1.38%                   | 1.43%  | 3.86%  | 1.19%  | 2.46%  | 2.80%  | 1.03%               | 0.77%              | 4.79%                                   | 7.29%     |

**Table 4: Motivations for Issuing Green Bonds**

This table presents summary statistics and regression results of motivations for issuing green bonds (Question 5 of the survey in the Appendix). For each consideration, respondents expressed their rating on a Likert scale according to the intensity of their preferences from 1 (the lowest) to 5 (the highest). Panel A shows summary statistics. ‘Mean Across All Question Items’ refers to the average score of each respondent across all question items; ‘Weighted Average by Tot. Bond Outstanding’ represents the average score of each question item weighted by Total Bonds Outstanding; ‘< 1’, ‘1-3’ and ‘> 3’ show average scores by Years since 1<sup>st</sup> Green Bond Issue. A positive value for ‘Diff. Mean and Mean Across All Question Items’ indicates a mean score for a single question item (‘Mean’) that is greater than the respondents’ average score across all items (‘Mean Across All Question Items’) and suggests a higher rating for that item. The mean across all question items can vary according to the number of observations available by item. A positive value for ‘Diff. Mean and Weighted Average’ indicates a mean score for a single question item (‘Mean’) that is greater than the respondents’ average score weighted by Total Bond Outstanding; ‘Diff. < 1 and > 3’ refers to the difference between the average scores for a single question item for issuers that issued their first green bond in the last year and more than 3 years, respectively. Panel B reports results of ordered probit regressions estimated using standard errors clustered by region. The dependent variables are scores for each motivation. Non-Financial Corporate, Supranational, Sub-sovereign and Agency, and Sovereign are categorical variables corresponding to the Issuer Category, where Financial Corporate is the base category. Asia Pacific, Latin America & the Caribbean, Middle East & Africa, North America and Supranational are categorical variables indicating the region of the issuer, where Europe is the base category. Other variable definitions and measurements are explained in the description to Table 2. z-statistics are reported in parentheses. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

| <b>Panel A: Rank the considerations that played a part in your decision to issue a green bond</b> | <b>N</b> | <b>Mean</b> | <b>Mean Across All Question Items</b> | <b>Diff. Mean and Mean Across All Question Items</b> | <b>Weighted Average by Tot. Bond Outstanding</b> | <b>Diff. Mean and Weighted Average</b> | <b>Median</b> | <b>SD</b> | <b>Min</b> | <b>Max</b> | <b>&lt; 1</b> | <b>1 - 3</b> | <b>&gt; 3</b> | <b>Diff. &lt; 1 and &gt; 3</b> |
|---|----------|-------------|---------------------------------------|--|--|--|---------------|-----------|------------|------------|---------------|--------------|---------------|--------------------------------|
| Reputational benefits   | 81       | 4.37        | 2.91                                  | 1.46***  | 4.26   | 0.11                                   | 5             | 0.99      | 1          | 5          | 4.33          | 4.42         | 4.33          | 0.00                           |
| Changing business model   | 81       | 2.52        | 2.90                                  | -0.38**  | 2.72   | -0.20                                  | 2             | 1.51      | 1          | 5          | 3.09          | 2.61         | 1.88          | 1.21***                        |
| Cheaper pricing   | 80       | 2.34        | 2.89                                  | -0.56***   | 1.90   | 0.44***                                | 2             | 1.14      | 1          | 5          | 2.22          | 2.42         | 2.33          | -0.12                          |
| Investor pressure   | 81       | 2.69        | 2.91                                  | -0.22  | 2.35   | 0.34**                                 | 3             | 1.32      | 1          | 5          | 3.00          | 2.47         | 2.70          | 0.30                           |
| Market signal   | 84       | 4.20        | 2.95                                  | 1.26***  | 4.51   | -0.30***                               | 4             | 1.00      | 1          | 5          | 4.08          | 4.23         | 4.28          | -0.20                          |
| Public policy / regulation  | 81       | 2.17        | 2.90                                  | -0.73***   | 2.48   | -0.31*                                 | 2             | 1.39      | 1          | 5          | 2.09          | 2.45         | 1.88          | 0.21                           |
| Financial flexibility   | 83       | 2.70        | 2.92                                  | -0.22*   | 2.30   | 0.39**                                 | 3             | 1.38      | 1          | 5          | 3.08          | 2.59         | 2.48          | 0.60                           |
| To curb climate change  | 83       | 3.80        | 2.94                                  | 0.86***  | 4.19   | -0.40***                               | 4             | 1.32      | 1          | 5          | 3.83          | 3.49         | 4.21          | -0.38                          |
| Response to shareholder expectations  | 77       | 2.86        | 2.91                                  | -0.06  | 2.52   | 0.33*                                  | 3             | 1.50      | 1          | 5          | 2.96          | 2.97         | 2.59          | 0.37                           |
| To increase the stock price   | 61       | 1.44        | 2.81                                  | -1.36***   | 1.39   | 0.05                                   | 1             | 0.85      | 1          | 4          | 1.45          | 1.44         | 1.43          | 0.02                           |
| The operation was successful for peers  | 78       | 2.41        | 2.88                                  | -0.47***   | 2.57   | -0.16                                  | 2             | 1.31      | 1          | 5          | 2.50          | 2.55         | 2.13          | 0.37                           |

| Panel B                               | Reputational benefits | Changing business model | Cheaper pricing       | Investor pressure     | Market signal        | Public policy / regulation | Financial flexibility | To curb climate change | Response to shareholder expectations | To increase the stock price | The operation was successful for peers |
|---------------------------------------|-----------------------|-------------------------|-----------------------|-----------------------|----------------------|----------------------------|-----------------------|------------------------|--------------------------------------|-----------------------------|--|
|                                       | (1)                   | (2)                     | (3)                   | (4)                   | (5)                  | (6)                        | (7)                   | (8)                    | (9)                                  | (10)                        | (11)                                   |
| Log Total Bonds Outstanding           | 0.001<br>(0.01)       | 0.163**<br>(2.52)       | -0.092**<br>(-2.04)   | -0.065*<br>(-1.81)    | 0.120<br>(0.99)      | -0.072<br>(-0.88)          | -0.036<br>(-0.21)     | -0.159*<br>(-1.76)     | 0.075<br>(1.54)                      | 0.143<br>(0.95)             | 0.260***<br>(3.22)                     |
| Log Years since 1st Green Bond Issue  | -0.034<br>(-0.18)     | -0.290***<br>(-2.85)    | 0.043<br>(0.28)       | -0.133<br>(-1.05)     | 0.054<br>(0.86)      | -0.003<br>(-0.02)          | -0.145<br>(-0.72)     | 0.340**<br>(2.51)      | -0.162*<br>(-1.76)                   | -0.026<br>(-0.09)           | -0.217*<br>(-1.82)                     |
| Relative Green Bonds Outstanding      | -0.087<br>(-0.19)     | -0.147<br>(-0.31)       | -0.115<br>(-0.22)     | -0.496*<br>(-1.75)    | 0.371<br>(0.58)      | -1.257**<br>(-2.45)        | -0.305<br>(-0.48)     | -1.658***<br>(-5.81)   | 0.768**<br>(2.37)                    | 1.098***<br>(4.57)          | 0.753<br>(1.31)                        |
| Non-Financial Corporate               | 0.333***<br>(3.35)    | 0.668**<br>(2.10)       | -0.563<br>(-1.47)     | 0.204<br>(1.18)       | -0.269<br>(-1.27)    | -0.101<br>(-0.61)          | -0.303<br>(-0.83)     | 0.137<br>(0.53)        | -0.274*<br>(-1.67)                   | -0.052<br>(-0.16)           | -0.031<br>(-0.15)                      |
| Supranational, Sub-sovereign & Agency | -0.256<br>(-1.07)     | 0.056<br>(0.23)         | -0.015<br>(-0.04)     | 1.354***<br>(19.63)   | -0.507***<br>(-3.43) | 0.552**<br>(2.16)          | 0.119<br>(0.25)       | 0.448***<br>(2.77)     | 0.042<br>(0.30)                      | 0.345<br>(0.72)             | 0.339*<br>(1.70)                       |
| Sovereign                             | -1.070*<br>(-1.89)    | -1.122<br>(-1.14)       | 0.077<br>(0.53)       | 0.976***<br>(3.15)    | 0.025<br>(0.07)      | 0.704***<br>(2.77)         | -0.431<br>(-1.18)     | 0.191<br>(0.98)        | -2.195***<br>(-4.67)                 | -0.399<br>(-0.72)           | 0.130<br>(0.35)                        |
| North America                         | 0.148***<br>(2.78)    | -0.614***<br>(-5.13)    | -0.107<br>(-1.28)     | -0.996***<br>(-24.83) | -0.606***<br>(-6.67) | 0.416***<br>(5.10)         | -0.188***<br>(-3.85)  | -0.332***<br>(-8.78)   | -0.024<br>(-0.58)                    | 0.037<br>(0.19)             | -0.086<br>(-0.96)                      |
| Supranational                         | 0.713*<br>(1.86)      | -0.031<br>(-0.07)       | -0.431**<br>(-2.39)   | -0.656***<br>(-3.12)  | 0.069<br>(0.93)      | -0.087<br>(-0.25)          | -0.612**<br>(-2.28)   | -0.533*<br>(-1.85)     | -1.038***<br>(-4.26)                 | -4.584***<br>(-7.27)        | -0.608*<br>(-1.70)                     |
| Asia Pacific                          | 0.592**<br>(2.54)     | 0.539***<br>(4.75)      | 0.352**<br>(2.29)     | -0.057<br>(-0.46)     | 0.239<br>(0.83)      | -0.023<br>(-0.20)          | -0.284<br>(-0.76)     | -0.204<br>(-0.79)      | -0.383***<br>(-2.73)                 | 0.679*<br>(1.79)            | -0.171<br>(-0.85)                      |
| Latin America & the Caribbean         | 1.310***<br>(6.68)    | 1.295***<br>(5.77)      | 0.564***<br>(6.01)    | -0.713***<br>(-10.59) | 1.533***<br>(4.02)   | 0.165<br>(1.02)            | 0.042<br>(0.11)       | -0.047<br>(-0.24)      | 1.304***<br>(13.60)                  | 1.335***<br>(4.07)          | 2.047***<br>(10.63)                    |
| Middle East & Africa                  | 0.627***<br>(6.87)    | 1.847***<br>(9.94)      | -1.522***<br>(-19.45) | -1.454***<br>(-5.68)  | -0.194<br>(-1.20)    | 0.120**<br>(2.26)          | 0.462***<br>(4.11)    | -0.035<br>(-0.35)      | -0.492***<br>(-3.25)                 | 0.283<br>(0.52)             | -6.250***<br>(-15.62)                  |
| Observations                          | 81                    | 81                      | 80                    | 81                    | 84                   | 81                         | 83                    | 83                     | 77                                   | 61                          | 78                                     |
| Pseudo R2                             | 0.0649                | 0.0894                  | 0.0518                | 0.0944                | 0.0749               | 0.0495                     | 0.0272                | 0.0510                 | 0.0692                               | 0.0863                      | 0.133                                  |

**Table 5: Issuing Constraints Prior to First Green Bond Issuance**

This table presents summary statistics and regression results of issuing constraints for green bonds (Question 6 of the survey in the Appendix). For each constraint, respondents expressed their rating on a Likert scale according to the intensity of their importance from 1 (the lowest) to 5 (the highest). Panel A shows summary statistics. Panel B reports results of ordered probit regressions estimated using standard errors clustered by region. The dependent variables are scores for each constraint.

| <b>Panel A: Prior to issuing a green bond, why had you not done so?</b> | <b>N</b> | <b>Mean</b> | <b>Mean Across All Question Items</b> | <b>Diff. Mean and Mean Across All Question Items</b> | <b>Weighted Average by Tot. Bond Outstanding</b> | <b>Diff. Mean and Weighted Average</b> | <b>Median</b> | <b>SD</b> | <b>&lt; 1</b> | <b>1 - 3</b> | <b>&gt; 3</b> | <b>Diff. &lt; 1 and &gt; 3</b> |
|---|----------|-------------|---------------------------------------|--|--|--|---------------|-----------|---------------|--------------|---------------|--------------------------------|
| Awareness   | 82       | 3.22        | 2.49                                  | 0.73***  | 3.72   | -0.50***                               | 3.5           | 1.53      | 2.96          | 3.44         | 3.14          | -0.18                          |
| Lack of suitable projects   | 82       | 2.10        | 2.49                                  | -0.39***   | 1.79   | 0.31*                                  | 1             | 1.42      | 2.83          | 1.97         | 1.50          | 1.33***                        |
| Lack of buy in from stakeholders  | 83       | 2.05        | 2.52                                  | -0.47***   | 2.09   | -0.04                                  | 2             | 1.27      | 2.04          | 2.08         | 2.00          | 0.04                           |
| Market not sufficiently evolved   | 84       | 3.79        | 2.55                                  | 1.23***  | 4.33   | -0.55***                               | 4             | 1.51      | 3.13          | 3.78         | 4.46          | -1.33***                       |
| Investor appetite   | 76       | 2.30        | 2.48                                  | -0.18  | 1.95   | 0.36**                                 | 2             | 1.37      | 2.17          | 2.25         | 2.55          | -0.38                          |
| Balance sheet limitations   | 81       | 1.52        | 2.49                                  | -0.97***   | 1.25   | 0.26**                                 | 1             | 1.09      | 1.75          | 1.57         | 1.18          | 0.57*                          |

| Panel B                               | Awareness           | Lack of suitable projects | Lack of buy in from stakeholders | Market not sufficiently evolved | Investor appetite    | Balance sheet limitations |
|---------------------------------------|---------------------|---------------------------|----------------------------------|---------------------------------|----------------------|---------------------------|
|                                       | (1)                 | (2)                       | (3)                              | (4)                             | (5)                  | (6)                       |
| Log Total Bonds Outstanding           | -0.038<br>(-1.11)   | 0.005<br>(0.05)           | 0.020<br>(0.20)                  | 0.161***<br>(6.39)              | 0.088<br>(1.23)      | -0.124*<br>(-1.65)        |
| Log Years since 1st Green Bond Issue  | 0.244**<br>(2.12)   | -0.403***<br>(-3.59)      | 0.018<br>(0.16)                  | 0.428***<br>(12.30)             | -0.021<br>(-0.27)    | -0.254***<br>(-3.75)      |
| Relative Green Bonds Outstanding      | 0.106<br>(0.22)     | 0.442<br>(0.77)           | 0.145<br>(0.33)                  | 0.789*<br>(1.91)                | -0.281<br>(-0.83)    | -0.261<br>(-0.32)         |
| Non-Financial Corporate               | -0.031<br>(-0.11)   | -0.399<br>(-0.92)         | -0.003<br>(-0.01)                | -0.212<br>(-0.47)               | 0.349<br>(1.25)      | -0.711**<br>(-2.11)       |
| Supranational, Sub-sovereign & Agency | -0.201<br>(-0.39)   | -0.111<br>(-0.39)         | 0.492*<br>(1.89)                 | 0.220<br>(1.64)                 | -0.188<br>(-0.48)    | 0.585<br>(1.37)           |
| Sovereign                             | 0.284<br>(0.63)     | 0.233<br>(0.94)           | 0.301<br>(0.44)                  | -0.342***<br>(-2.87)            | -0.660<br>(-1.47)    | 0.309<br>(0.95)           |
| North America                         | 0.001<br>(0.02)     | 0.777***<br>(5.75)        | -0.303***<br>(-3.58)             | -0.171***<br>(-2.59)            | -0.235***<br>(-4.66) | 0.265<br>(1.23)           |
| Supranational                         | -0.896*<br>(-1.90)  | 0.166<br>(0.70)           | -5.715***<br>(-16.69)            | 4.349***<br>(19.73)             | 1.153***<br>(3.78)   | -4.694***<br>(-13.16)     |
| Asia Pacific                          | 0.288*<br>(1.90)    | -0.070<br>(-0.41)         | -0.190<br>(-0.88)                | 0.897***<br>(6.83)              | 0.533***<br>(3.83)   | 0.341<br>(1.41)           |
| Latin America & the Caribbean         | 0.586***<br>(10.99) | 0.345<br>(1.26)           | -0.011<br>(-0.05)                | 0.405***<br>(5.15)              | -0.223<br>(-1.48)    | -4.931***<br>(-22.70)     |
| Middle East & Africa                  | 1.016***<br>(3.65)  | 0.990***<br>(31.34)       | 0.073<br>(0.52)                  | 6.369***<br>(16.48)             | 0.903***<br>(6.75)   | -0.713***<br>(-3.36)      |
| Observations                          | 82                  | 82                        | 83                               | 84                              | 76                   | 81                        |
| Pseudo R2                             | 0.0403              | 0.0673                    | 0.0440                           | 0.141                           | 0.0428               | 0.107                     |

**Table 6: Characteristics of the Issuing Process**

This table presents summary statistics on the characteristics of the issuing process (Questions 7, 2 and 4 of the survey in the Appendix). Panel A reports frequency and percentages of responses of the average length of the issuing process from green light to pricing by ‘Years since 1<sup>st</sup> Green Bond Issue’ and by ‘Tot. Bonds Outstanding’; Panel B presents summary statistics and rankings of the stakeholders who contributed to the decision to issue a green bond. For each stakeholder, respondents expressed their rating on a Likert scale according to the intensity of their importance from 1 (the lowest) to 5 (the highest). Panel C shows frequency and percentages of responses on the role played by the sustainability committee in the decision to issue a green bond by ‘Years Since 1<sup>st</sup> Green Bond Issue’ and by ‘Tot. Bonds Outstanding’.

| Panel A: How long did the process take from green light to pricing? | N  | Yes | % Yes  | % of 'Yes' by Years since 1 <sup>st</sup> Green Bond Issue |        |        | % of 'Yes' by Tot. Bonds Outstanding |        |        |
|---|----|-----|--------|--|--------|--------|--------------------------------------|--------|--------|
|   |    |     |        | < 1  | 1 - 3  | > 3    | Small                                | Medium | Large  |
|   |    |     |        | Less than 6 months   | 86     | 40     | 46.51%                               | 55.20% | 58.60% |
| 6 months to a year  | 86 | 38  | 44.19% | 41.40%   | 31.00% | 60.70% | 50.00%                               | 43.20% | 40.00% |
| More than 1 year  | 86 | 10  | 11.63% | 6.90%  | 10.30% | 17.90% | 12.50%                               | 8.10%  | 16.00% |

  

| Panel B: Rank the stakeholders who contributed to the decision to issue a green bond | N  | Mean | Mean Across All Question Items | Diff. Mean and Mean Across All Question Items | Weighted Average by Tot. Bond Outstanding | Diff. Mean and Weighted Average | Median | Diff. < 1 and > 3 |       |      |         |
|--|----|------|--------------------------------|---|---|---------------------------------|--------|-------------------|-------|------|---------|
|  |    |      |                                |   |   |                                 |        | < 1               | 1 - 3 | > 3  |         |
| Investors  | 85 | 3.59 | 3.15                           | 0.44***                                       | 3.33                                      | 0.26*                           | 4      | 3.63              | 3.25  | 4.04 | -0.42   |
| Staff  | 85 | 3.99 | 3.15                           | 0.84***                                       | 3.74                                      | 0.25*                           | 4      | 3.96              | 3.58  | 4.60 | -0.64** |
| Board  | 84 | 4.01 | 3.14                           | 0.87***                                       | 4.12                                      | -0.11                           | 4      | 4.29              | 4.03  | 3.72 | 0.57    |
| Syndicate  | 85 | 2.31 | 3.15                           | -0.84***                                      | 1.68                                      | 0.63***                         | 2      | 2.21              | 2.19  | 2.56 | -0.35   |
| Regulators   | 84 | 1.82 | 3.14                           | -1.32***                                      | 1.57                                      | 0.25*                           | 1      | 1.88              | 1.89  | 1.67 | 0.21    |

  

| Panel C: What role did the sustainability committee play in the decision to issue a green bond? | N  | Yes | % Yes  | % of 'Yes' by Years since 1 <sup>st</sup> Green Bond Issue |        |        | % of 'Yes' by Tot. Bonds Outstanding |        |        |
|---|----|-----|--------|--|--------|--------|--------------------------------------|--------|--------|
|   |    |     |        | < 1  | 1 - 3  | > 3    | Small                                | Medium | Large  |
|   |    |     |        | Zero   | 80     | 24     | 30.00%                               | 27.30% | 26.50% |
| Moderate influence  | 80 | 19  | 23.75% | 22.70%   | 23.50% | 25.00% | 29.20%                               | 28.60% | 14.30% |
| Collaborated with other stakeholders  | 79 | 27  | 34.18% | 36.40%   | 35.30% | 30.40% | 37.50%                               | 29.60% | 35.70% |
| Drove the initiative  | 80 | 15  | 18.75% | 13.60%   | 23.50% | 16.70% | 25.00%                               | 10.70% | 21.40% |

**Table 7: Third Party Guidance during Issuance Process**

This table presents summary statistics on third party guidance during the issuing process (Question 8 of the survey in the Appendix). This table reports frequency and percentages of responses on whether respondents had third party guidance on the issuance process by ‘Years since 1<sup>st</sup> Green Bond Issue’ and by ‘Tot. Bonds Outstanding’.

| Did you get third party guidance on the issuance process including your framework? If so, from whom? | N  | Yes | % Yes  | % of ‘Yes’ by Years since 1 <sup>st</sup> Green Bond Issue |        |        | % of ‘Yes’ by Tot. Bonds Outstanding |        |        |
|--|----|-----|--------|--|--------|--------|--------------------------------------|--------|--------|
|  |    |     |        | < 1  | 1 - 3  | > 3    | Small                                | Medium | Large  |
|  |    |     |        | No, internally managed                                     | 86     | 14     | 16.28%                               | 4.17%  | 10.81% |
| Development Bank   | 86 | 7   | 8.14%  | 16.67%   | 8.11%  | 0.00%  | 13.79%                               | 3.45%  | 7.14%  |
| Climate Bonds Initiative   | 86 | 20  | 23.26% | 16.67%   | 32.43% | 16.00% | 27.59%                               | 17.24% | 25.00% |
| Consultant   | 86 | 22  | 25.58% | 20.83%   | 37.84% | 12.00% | 37.93%                               | 17.24% | 21.43% |
| Second party opinions provider   | 86 | 49  | 56.98% | 58.33%   | 56.76% | 56.00% | 51.72%                               | 62.07% | 57.14% |
| Stock exchange   | 86 | 1   | 1.16%  | 0.00%  | 2.70%  | 0.00%  | 3.45%                                | 0.00%  | 0.00%  |
| Syndicate desk   | 86 | 49  | 56.98% | 58.33%   | 56.76% | 56.00% | 44.83%                               | 68.97% | 57.14% |
| Other  | 86 | 17  | 19.77% | 16.67%   | 18.92% | 24.00% | 17.24%                               | 20.69% | 21.43% |



**Table 8: Perception of Issuance and Funding Costs for Green Bonds**

This table presents summary statistics and regression results on perceptions of issuance and funding costs for green bonds (Questions 10 and 13 of the survey in the Appendix). Panel A reports frequency and percentages of responses on the perception of the additional issuance costs; Panel B shows frequency and percentages of responses on how the cost of funding compared to vanilla bonds and / or loans issued by the respondents. Panel C presents results of ordered probit regressions estimated using standard errors clustered by region. Items to questions in Panel A and Panel B (columns 1 to 6) are used as binary dependent variables (Yes = 1, No = 0) in columns 1 to 3 and 1 to 6, respectively. The dependent variable in column 7 is a score from 0 to 2 which indicates whether the cost of funding of green bonds was greater (score equal to 2), the same (score equal to 1) or less (score equal to 0) when compared to vanilla bonds and / or loans issued by each respondent.

| Panel A: How do you perceive the additional issuance costs? | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond<br>Issue |        |        | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|---|----|-----|--------|--|--------|--------|---|--------|--------|
|   |    |     |        | < 1  | 1 - 3  | > 3    | Small                                   | Medium | Large  |
|   |    |     |        | Acceptable because cheaper funding expected                      | 85     | 3      | 3.53%                                   | 4.17%  | 5.56%  |
| Acceptable because of other benefits                        | 85 | 53  | 62.35% | 58.33%   | 66.67% | 60.00% | 64.29%                                  | 55.17% | 67.86% |
| Negligible  | 85 | 35  | 41.18% | 41.67%   | 36.11% | 48.00% | 39.29%                                  | 44.83% | 39.29% |
| Not Available   | 85 | 0   | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%                                   | 0.00%  | 0.00%  |

  

| Panel B: How did the cost of funding compare to your vanilla bonds and /or loans? | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond<br>Issue |        |        | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|---|----|-----|--------|--|--------|--------|---|--------|--------|
|   |    |     |        | < 1  | 1 - 3  | > 3    | Small                                   | Medium | Large  |
|   |    |     |        | Greater  | 86     | 6      | 6.98%                                   | 12.50% | 5.41%  |
| Less  | 86 | 36  | 41.86% | 37.50%   | 35.14% | 56.00% | 37.93%                                  | 27.59% | 60.71% |
| Same  | 86 | 41  | 47.67% | 50.00%   | 51.35% | 40.00% | 51.72%                                  | 58.62% | 32.14% |
| Not Available   | 86 | 3   | 3.49%  | 0.00%  | 8.11%  | 0.00%  | 3.45%                                   | 6.90%  | 0.00%  |

| Panel C                               | How do you perceive the additional issuance costs? |                                 |                       | How did the cost of funding compare to your vanilla bonds and /or loans? |                      |                      |                                 |
|---------------------------------------|--|---------------------------------|-----------------------|--|----------------------|----------------------|---------------------------------|
|                                       | Valid because cheaper funding expected             | Valid because of other benefits | Negligible            | Greater  | Less                 | Same                 | Greater = 2, Same = 1, Less = 0 |
|                                       | (1)  | (2)                             | (3)                   | (4)  | (5)                  | (6)                  | (7)                             |
| Log Total Bonds Outstanding           | 0.119<br>(0.41)                                    | -0.024<br>(-0.18)               | -0.080<br>(-0.69)     | -0.118<br>(-0.41)  | 0.065<br>(0.75)      | -0.017<br>(-0.14)    | -0.053<br>(-0.46)               |
| Log Years since 1st Green Bond Issue  | -0.516***<br>(-2.58)                               | 0.065<br>(0.31)                 | 0.265<br>(1.54)       | -0.197<br>(-0.54)  | 0.377***<br>(2.61)   | -0.380***<br>(-3.38) | -0.281**<br>(-2.29)             |
| Relative Green Bonds Outstanding      | 1.878<br>(0.59)                                    | 0.001<br>(0.00)                 | -0.747<br>(-1.18)     | -6.247***<br>(-2.81)   | 0.657<br>(1.12)      | 0.323<br>(0.88)      | -1.003*<br>(-1.70)              |
| Non-Financial Corporate               | -5.466***<br>(-39.32)                              | -0.140<br>(-0.45)               | 0.334<br>(1.59)       | 2.000***<br>(7.67)   | -0.658<br>(-1.51)    | 0.198<br>(0.63)      | 0.787**<br>(2.23)               |
| Supranational, Sub-sovereign & Agency | -5.438**<br>(-2.32)                                | 0.574***<br>(2.76)              | -0.398<br>(-1.54)     | 0.667<br>(1.37)  | 0.574<br>(1.14)      | -0.713**<br>(-2.00)  | -0.401<br>(-0.66)               |
| Sovereign                             | -6.234***<br>(-9.86)                               | 0.922**<br>(2.30)               | -0.177<br>(-0.40)     | 1.426*<br>(1.69)   | 0.168<br>(0.60)      | -0.598*<br>(-1.92)   | 0.093<br>(0.18)                 |
| North America                         | -4.057***<br>(-13.07)                              | -0.368***<br>(-3.37)            | 0.355***<br>(4.75)    | -5.768***<br>(-12.94)  | -0.263***<br>(-3.26) | 0.571***<br>(8.60)   | -0.056<br>(-0.67)               |
| Supranational                         | 1.726<br>(0.73)                                    | -0.179<br>(-0.93)               | -0.528***<br>(-4.27)  | -3.806***<br>(-6.32)   | -2.089***<br>(-4.42) | 2.273***<br>(5.56)   | 1.451***<br>(3.21)              |
| Asia Pacific                          | -4.664***<br>(-3.66)                               | -0.367<br>(-1.24)               | 0.025<br>(0.09)       | -4.782***<br>(-8.41)   | -1.188***<br>(-4.96) | 1.341***<br>(3.79)   | 0.672***<br>(3.98)              |
| Latin America & the Caribbean         | 1.625***<br>(7.60)                                 | 0.667**<br>(2.04)               | -5.662***<br>(-11.70) | -0.567<br>(-1.19)  | 0.640***<br>(2.69)   | -0.569*<br>(-1.69)   | -0.429<br>(-1.48)               |
| Middle East & Africa                  | -6.096***<br>(-4.44)                               | 4.947***<br>(11.65)             | -5.036***<br>(-11.71) | 1.768***<br>(17.36)  | -0.492***<br>(-4.26) | -0.623**<br>(-2.50)  | 1.036***<br>(10.40)             |
| Observations                          | 85   | 85                              | 85                    | 83   | 83                   | 83                   | 83                              |
| Pseudo R2                             | 0.442  | 0.0943                          | 0.145                 | 0.352  | 0.171                | 0.181                | 0.108                           |

**Table 9: Investor Demand and Liquidity for Green Bonds**

This table presents summary statistics and regression results on investor demand and liquidity for green bonds (Questions 22 and 19 of the survey in the Appendix). Panel A reports frequency and percentages of responses on the level of demand for green bonds compared to vanilla bonds previously issued; Panel B shows frequency and percentages of responses on whether issuers care about the level of liquidity of their issued green bonds in the secondary market. Panel C presents results of ordered probit regressions estimated using standard errors clustered by region. In column 1 the dependent variable is a dummy which takes value 1 if the level of green bond demand is higher compared to previously issued vanilla bonds, and 0 if the level is the same (there are no responses for lower). In column 2 the dependent variable is a binary variable which takes value 1 if issuers care about the level of liquidity of their green bonds in the secondary market, and 0 if they do not care.

| <b>Panel A: Was the level of demand different compared to vanilla bonds you have previously issued?</b> | <b>N</b> | <b>Yes</b> | <b>% Yes</b> | <b>% of 'Yes' by Years since 1<sup>st</sup> Green Bond Issue</b> |              |               | <b>% of 'Yes' by Tot. Bonds Outstanding</b> |               |              |
|---|----------|------------|--------------|--|--------------|---------------|---|---------------|--------------|
|   |          |            |              | <b>&lt; 1</b>  | <b>1 - 3</b> | <b>&gt; 3</b> | <b>Small</b>                                | <b>Medium</b> | <b>Large</b> |
|   |          |            |              | Higher   | 83           | 58            | 69.88%                                      | 87.50%        | 58.82%       |
| Lower   | 83       | 0          | 0.00%        | 0.00%  | 0.00%        | 0.00%         | 0.00%                                       | 0.00%         | 0.00%        |
| Same  | 83       | 21         | 25.30%       | 8.33%  | 38.24%       | 24.00%        | 25.00%                                      | 25.93%        | 25.00%       |
| Not Available   | 83       | 4          | 4.82%        | 4.17%  | 2.94%        | 8.00%         | 10.71%                                      | 3.70%         | 0.00%        |

  

| <b>Panel B: Do you care about the level of liquidity of your green bond in the secondary market?</b> | <b>N</b> | <b>Yes</b> | <b>% Yes</b> | <b>% of 'Yes' by Years since 1<sup>st</sup> Green Bond Issue</b> |              |               | <b>% of 'Yes' by Tot. Bonds Outstanding</b> |               |              |
|--|----------|------------|--------------|--|--------------|---------------|---|---------------|--------------|
|  |          |            |              | <b>&lt; 1</b>  | <b>1 - 3</b> | <b>&gt; 3</b> | <b>Small</b>                                | <b>Medium</b> | <b>Large</b> |
|  |          |            |              | Yes/No   | 83           | 58            | 69.88%                                      | 70.80%        | 65.70%       |

| Panel C                               | Was the level of demand different compared to vanilla bonds you have previously issued? | Do you care about the level of liquidity of your green bond in the secondary market? |
|---------------------------------------|---|--|
|                                       | Higher = 1, Same = 0  | Yes = 1, No = 0  |
|                                       | (1)   | (2)  |
| Log Total Bonds Outstanding           | 0.413***<br>(4.62)  | 0.256*<br>(1.75)   |
| Log Years since 1st Green Bond Issue  | -0.556***<br>(-2.99)  | -0.252**<br>(-2.34)  |
| Relative Green Bonds Outstanding      | 1.854***<br>(2.64)  | 1.232*<br>(1.69)   |
| Non-Financial Corporate               | 0.177<br>(0.61)   | -0.598<br>(-1.10)  |
| Supranational, Sub-sovereign & Agency | 0.155<br>(1.04)   | -0.320<br>(-0.84)  |
| Sovereign                             | -2.370***<br>(-10.64)   | 4.156***<br>(15.98)  |
| North America                         | -1.367***<br>(-12.12)   | 0.559***<br>(2.84)   |
| Supranational                         | -0.803**<br>(-2.14)   | -0.426<br>(-1.09)  |
| Asia Pacific                          | 0.302<br>(1.26)   | 0.207<br>(0.64)  |
| Latin America & the Caribbean         | 1.234***<br>(4.14)  | -0.038<br>(-0.09)  |
| Middle East & Africa                  | 5.490***<br>(13.47)   | -1.385***<br>(-3.02)   |
| Observations                          | 79  | 83   |
| Pseudo R2                             | 0.281   | 0.188  |

**Table 10: Engagement with Investors**

This table presents summary statistics and regression results on engagement with green bond investors (Questions 11, 12, 14 and 23 of the survey in the Appendix). Panel A reports frequency and percentages of responses on whether a green bond involves more engagement with investors than a vanilla one; Panel B shows frequency and percentages of responses on the green bond features on which investors want more information. Panel C reports frequency and percentages of responses on whether the green bond deal attracted new investors. Panel D presents frequency and percentages of the average proportion of the green bond deal allocated to investors with explicit green mandate.

| Panel A: Does a green bond involve more engagement with investors than a vanilla one?    | N  | %      | % of 'Yes' by                                |  |  | % of 'Yes' by          |                        |                        |        |        |
|--|----|--------|--|--|--|------------------------|------------------------|------------------------|--------|--------|
|  |    |        | Years since 1 <sup>st</sup> Green Bond Issue |  |  | Tot. Bonds Outstanding |                        |                        |        |        |
|  |    |        | < 1  | 1 - 3  | > 3  | Small                  | Medium                 | Large                  |        |        |
| Yes  | 78 | 90.70% | 100.00%                                      | 83.78%                                       | 92.00%                                       | 89.66%                 | 89.66%                 | 92.86%                 |        |        |
| No   | 4  | 4.65%  | 0.00%  | 8.11%  | 4.00%  | 6.90%                  | 3.45%                  | 3.57%                  |        |        |
| Same   | 4  | 4.65%  | 0.00%  | 8.11%  | 4.00%  | 3.45%                  | 6.90%                  | 3.57%                  |        |        |
| Total  | 86 |        |  |  |  |                        |                        |                        |        |        |
| Panel B: Which green bond features did investors want more information on?               | N  | Yes    | % Yes  | % of 'Yes' by                                |  |                        | % of 'Yes' by          |                        |        |        |
|  |    |        |  | Years since 1 <sup>st</sup> Green Bond Issue |  |                        | Tot. Bonds Outstanding |                        |        |        |
|  |    |        |  | < 1  | 1 - 3  | > 3                    | Small                  | Medium                 | Large  |        |
| Framework  | 73 | 47     | 64.38%                                       | 66.67%                                       | 69.23%                                       | 56.52%                 | 61.90%                 | 61.54%                 | 69.23% |        |
| Second Party Opinions  | 73 | 19     | 26.03%                                       | 12.50%                                       | 34.62%                                       | 30.43%                 | 38.10%                 | 15.38%                 | 26.92% |        |
| Classification of use of proceeds  | 73 | 57     | 78.08%                                       | 87.50%                                       | 69.23%                                       | 78.26%                 | 76.19%                 | 61.54%                 | 96.15% |        |
| Post issuance transparency   | 73 | 48     | 65.75%                                       | 62.50%                                       | 84.62%                                       | 47.83%                 | 57.14%                 | 65.38%                 | 73.08% |        |
| Other  | 73 | 16     | 21.92%                                       | 20.83%                                       | 15.38%                                       | 30.43%                 | 9.52%                  | 26.92%                 | 26.92% |        |
| Panel C: Did the green bond deal attract new investors?                                  | N  | %      |  |  |  |                        |                        |                        |        |        |
| No   | 2  | 2.33%  |  |  |  |                        |                        |                        |        |        |
| Yes  | 84 | 97.67% |  |  |  |                        |                        |                        |        |        |
| Total  | 86 |        |  |  |  |                        |                        |                        |        |        |
| Panel D: How much of the deal was allocated to investors with an explicit green mandate? | N  | Mean   | Median                                       | SD   | % of 'Yes' by                                |                        |                        | % of 'Yes' by          |        |        |
|  |    |        |  |  | Years since 1 <sup>st</sup> Green Bond Issue |                        |                        | Tot. Bonds Outstanding |        |        |
|  |    |        |  |  | < 1  | 1 - 3                  | > 3                    | Small                  | Medium | Large  |
| Proportion of deal allocated to investors with explicit green mandates                   | 60 | 50.74% | 50.00%                                       | 25.13%                                       | 50.70%                                       | 46.70%                 | 56.40%                 | 44.10%                 | 47.50% | 58.70% |

**Table 11: Impact of Green Bonds on Internal Commitment to Sustainability**

This table presents summary statistics and regression results on the impact of green bonds on issuers' internal commitment to sustainability (Question 21 of the survey in the Appendix). Panel A reports frequency and percentages of responses on whether green bond deals have impacted the issuers' internal commitment to sustainability by 'Years Since 1<sup>st</sup> Green Bond Issue' and by 'Tot. Bonds Outstanding'; Panel B presents results of ordered probit regressions estimated using standard errors clustered by region. The dependent variable is a dummy which takes value 1 if green bond deals have impacted the issuers' internal commitment to sustainability, and 0 otherwise.

| Panel A: Has the deal impacted your internal commitment to sustainability? | N  | %      | % of 'Yes' by Years since 1 <sup>st</sup> Green Bond Issue |         |        | % of 'Yes' by Tot. Bonds Outstanding |        |        |
|--|----|--------|--|---------|--------|--------------------------------------|--------|--------|
|  |    |        | < 1y   | 1 - 3ys | > 3ys  | Small                                | Medium | Large  |
|  |    |        | Yes  | 62      | 76.54% | 79.20%                               | 78.10% | 72.00% |
| No   | 19 | 23.46% | 20.80%   | 21.90%  | 28.00% | 3.70%                                | 32.10% | 34.60% |
| Total  | 81 |        |  |         |        |                                      |        |        |

| Panel B                               | Yes = 1, No = 0      |
|---------------------------------------|----------------------|
| Log Total Bonds Outstanding           | -0.122**<br>(-2.11)  |
| Log Years since 1st Green Bond Issue  | -0.011<br>(-0.10)    |
| Relative Green Bonds Outstanding      | 1.877***<br>(10.38)  |
| Non-Financial Corporate               | -1.298***<br>(-8.40) |
| Supranational, Sub-sovereign & Agency | 0.110<br>(0.27)      |
| Sovereign                             | -0.372*<br>(-1.85)   |
| North America                         | 0.240***<br>(15.45)  |
| Supranational                         | -0.748***<br>(-7.97) |
| Asia Pacific                          | 5.025***<br>(20.35)  |
| Latin America & the Caribbean         | 5.698***<br>(26.86)  |
| Middle East & Africa                  | 5.143***<br>(17.47)  |
| Observations                          | 81                   |
| Pseudo R2                             | 0.247                |

**Table 12: Plans to Issue more Green Bonds**

This table presents summary statistics of respondents' plans to issue more green bonds and the benefits of being a repeat issuer (Questions 25 and 27 of the survey in the Appendix). Panel A reports frequency and percentages of responses on whether respondents are planning to issue more green bonds or reopen current bonds; Panel B shows frequency and percentages of responses on the perceived benefits of being a repeat green bond issuer.

| Panel A: Are you planning to issue more green bonds, or reopen the current bond?    | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond Issue |        |         | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|---|----|-----|--------|---|--------|---------|---|--------|--------|
|   |    |     |        | < 1   | 1 - 3  | > 3     | Small                                   | Medium | Large  |
|   |    |     |        | No  | 86     | 2       | 2.33%                                   | 0.00%  | 2.70%  |
| Issue more  | 85 | 75  | 88.24% | 87.50%  | 80.56% | 100.00% | 82.76%                                  | 92.86% | 89.29% |
| Reopen  | 84 | 13  | 15.48% | 16.67%  | 16.67% | 12.50%  | 10.34%                                  | 7.14%  | 29.63% |
| Unknown   | 84 | 4   | 4.76%  | 8.33%   | 5.56%  | 0.00%   | 10.34%                                  | 3.57%  | 0.00%  |
| Panel B: What do you envisage the benefits of being a repeat green bond issuer are? | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond Issue |        |         | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|   |    |     |        | < 1   | 1 - 3  | > 3     | Small                                   | Medium | Large  |
|   |    |     |        | Economies of scale  | 85     | 40      | 47.06%                                  | 45.83% | 41.67% |
| Established investor base   | 85 | 70  | 82.35% | 87.50%  | 77.78% | 84.00%  | 72.41%                                  | 82.14% | 92.86% |
| Higher demand   | 85 | 49  | 57.65% | 70.83%  | 47.22% | 60.00%  | 62.07%                                  | 53.57% | 57.14% |
| Cheaper funding (secondary market green curve)                                      | 85 | 40  | 47.06% | 54.17%  | 30.56% | 64.00%  | 37.93%                                  | 50.00% | 53.57% |
| More visibility   | 85 | 61  | 71.76% | 66.67%  | 66.67% | 84.00%  | 68.97%                                  | 75.00% | 71.43% |
| Not Available   | 86 | 4   | 4.65%  | 8.33%   | 2.70%  | 4.00%   | 3.45%                                   | 10.34% | 0.00%  |

**Table 13: Issuer Views on Policy Measures and Labels for Future Issuances**

This table presents summary statistics of respondents' views on projects' eligibility, standardisation of definitions for green bonds and preferences for labels for future issuances (Questions 1, 29 and 28 of the survey in the Appendix, respectively). Panel A reports frequency and percentages of responses on which projects should be eligible for green bonds; Panel B shows frequency and percentages of responses on issuers' preferences for standardisation of definitions. Panel C presents summary statistics on issuers' preferences for social and green bond labels for future issuances.

| Panel A: Green bonds should finance (Yes/No)  | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond<br>Issue                                     |        |        | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|---|----|-----|--------|--|--------|--------|---|--------|--------|
|   |    |     |        | < 1  | 1 – 3  | > 3    | Small                                   | Medium | Large  |
|   |    |     |        | Only new projects  | 86     | 7      | 8.14%                                   | 4.17%  | 2.70%  |
| New projects or those completed within the preceding two years                      | 86 | 28  | 32.56% | 41.67%   | 29.73% | 28.00% | 27.59%                                  | 34.48% | 35.71% |
| All of the above and projects initiated more than two years ago                     | 86 | 50  | 58.14% | 54.17%   | 64.86% | 52.00% | 72.41%                                  | 55.17% | 46.43% |
| Panel B: Would you prefer   | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond<br>Issue                                     |        |        | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|   |    |     |        | < 1  | 1 - 3  | > 3    | Small                                   | Medium | Large  |
|   |    |     |        | Standardisation of definitions, taxonomies, and reporting to ensure the integrity of the green label | 83     | 54     | 65.06%                                  | 78.26% | 61.11% |
| Less strict definitions to enhance diversity in issuance and to scale up the market | 83 | 19  | 22.89% | 17.39%   | 25.00% | 25.00% | 24.10%                                  | 18.50% | 25.90% |
| No preference   | 83 | 10  | 12.05% | 4.35%  | 13.89% | 16.67% | 13.80%                                  | 7.40%  | 14.80% |
| Panel C: Which labels are you considering for future environment related bonds?     | N  | Yes | % Yes  | % of 'Yes' by<br>Years since 1 <sup>st</sup> Green Bond<br>Issue                                     |        |        | % of 'Yes' by<br>Tot. Bonds Outstanding |        |        |
|   |    |     |        | < 1  | 1 - 3  | > 3    | Small                                   | Medium | Large  |
|   |    |     |        | Sustainable Development Goals  | 82     | 27     | 32.93%                                  | 26.09% | 37.14% |
| Environmental, Social and Governance  | 82 | 25  | 30.49% | 26.09%   | 40.00% | 20.83% | 44.44%                                  | 17.86% | 29.63% |
| Social  | 82 | 24  | 29.27% | 34.78%   | 17.14% | 41.67% | 7.41%                                   | 28.57% | 51.85% |
| Sustainability  | 82 | 33  | 40.24% | 52.17%   | 40.00% | 29.17% | 51.85%                                  | 35.71% | 33.33% |
| Hybrid Green Bond   | 82 | 6   | 7.32%  | 8.70%  | 2.86%  | 12.50% | 3.70%                                   | 10.71% | 7.41%  |
| Other (please name)   | 82 | 10  | 12.20% | 8.70%  | 11.43% | 16.67% | 14.81%                                  | 10.71% | 11.11% |



## Appendix 1 – Survey Questionnaire

**Note: Questions marked with an asterisk (\*) are featured and analysed in this study.**

\*1. Green bonds should finance (multiple options, select one)

- Only new projects
- New projects or those completed within the preceding two years
- All of the above and projects initiated more than two years ago

\*2. Rank the stakeholders who contributed to the decision to issue a green bond (multiple categories; ratings from 1-5 where 1 is not important, 5 is very important)

- Investors
- Staff
- Board
- Syndicate
- Regulators

3. Do you have a sustainability committee? (Y/N)

\*4. If yes, what role did it play in the decision to issue a green bond (multiple options, select one)

- Zero
- Moderate influence
- Collaborated with other stakeholders
- Drove the initiative

\*5. Rank the considerations that played a part in your decision to issue a green bond (multiple categories; ratings from 1-5 where 1 is not important, 5 is very important)

- Reputational benefits
- Changing business model
- Cheaper pricing
- Investor pressure
- Market signal
- Public policy / regulation
- Financial flexibility
- To curb climate change
- Response to shareholder expectations
- To increase the stock price
- The operation was successful for peers

\*6. Prior to issuing a green bond, why had you not done so? (multiple categories; ratings from 1-5 where 1 is not important, 5 is very important)

- Awareness
- Lack of suitable projects
- Lack of buy in from stakeholders
- Market not sufficiently evolved
- Investor appetite
- Balance sheet limitations

\*7. How long did the process take from green light to pricing? (multiple options, select one)

- Less than 6 months
- 6 months to a year
- 1 Year+

\*8. Did you get third party guidance on the issuance process including your framework? If so, from whom? (multiple options, select all that apply)

- No, internally managed
- Development Bank
- Climate Bonds Initiative

- Consultant
- Second Party Opinion provider
- Stock exchange
- Syndicate desk
- Other

9. Who did you commission for the external review? (Please name)

\*10. How do you perceive the additional issuance costs? (multiple options, select one)

- Valid because cheaper funding expected
- Valid because of other benefits
- Negligible
- Not Available

\*11. Does a green bond involve more engagement with investors than a vanilla one? (multiple options, select one)

- Yes
- No
- Same

\*12. Which green bond features did investors want more information on? (multiple options, select all that apply)

- Framework
- Second Party Opinions
- Classification of use of proceeds
- Post issuance transparency
- Other

\*13. How did the cost of funding compare to your vanilla bonds and /or loans? (multiple options, select one)

- Greater
- Less
- Same
- Not Available

\*14. Did the green bond deal attract new investors? (Y/N)

15. If yes, what are the perceived benefits of this? (Please name at least three)

16. What do you perceive as the benefits of listing green bonds? (multiple options, select all that apply)

- Tax
- Visibility
- Integrity
- Perception
- Secondary market liquidity

17. Did you actively decide on your listing venue, if yes, what were the criteria guiding your decision? (multiple options, select all that apply)

- Critical mass
- Local to head office
- Local to domicile of target investors
- Fiscal considerations
- Other

18. Would you consider changing listing venue, and if yes, what would trigger such a decision? (multiple options, select all that apply)

- Better visibility among target population
- Cost
- Other

\*19. Do you care about the level of liquidity of your green bond in the secondary market? (Y/N)

20. What is your perception of integrated sustainability?

\*21. Has the deal impacted your internal commitment to sustainability? (Y/N)

\*22. Was the level of demand (i.e. over-subscription) different compared to vanilla bonds you have previously issued? (multiple options, select one)

- Higher
- Lower
- Same
- Not Available

\*23. How much of the deal was allocated to investors with an explicit green mandate? (%)

24. Did you encounter any other benefits from issuing green bonds? If so, which? (Please name)

\*25. Are you planning to issue more green bonds, or reopen the current bond? (multiple options, select all that apply)

- Issue more
- Reopen
- Unknown

26. If you are a repeat issuer, with what frequency do you expect to issue green bonds? (multiple options, select one)

- More than once a year
- Once a year
- Less than once a year
- Ad hoc

\*27. What do you envisage the benefits of being a repeat green bond issuer are? (multiple options, select all that apply)

- Economies of scale
- Established investor base
- Higher demand
- Cheaper funding (secondary market green curve)
- More visibility

\*28. Which labels are you considering for future environment related bonds? (multiple options, select all that apply)

- Sustainable Development Goals
- Environmental, Social and Governance
- Social
- Sustainability
- Hybrid Green Bond
- Other (please name)

\*29. Regarding standardisation, would you prefer: (multiple options, select one)

- Standardisation of definitions, taxonomies, and reporting to ensure the integrity of the green label
- Less strict definitions to enhance diversity in issuance and to scale up the market
- No preference

30. What is the main factor that will enhance growth and scale? (Please name one)

31. What is the main obstacle? (Please name one)

32. One line of advice for other treasurers considering a green bond.