DIW BERLIN

2019

Discussion Papers

Deutsches Institut für Wirtschaftsforschung 2022

Green Bonds' Reputation Effect and Its Impact on the Financing Costs of the Real Estate Sector

Aleksandar Petreski, Dorothea Schäfer and Andreas Stephan

IMPRESSUM

DIW Berlin, 2022

DIW Berlin
German Institute for Economic Research
Mohrenstr. 58
10117 Berlin

Tel. +49 (30) 897 89-0
Fax +49 (30) 897 89-200
https://www.diw.de

ISSN electronic edition 1619-4535

Papers can be downloaded free of charge from the DIW Berlin website:
https://www.diw.de/discussionpapers

Discussion Papers of DIW Berlin are indexed in RePEc and SSRN:
https://ideas.repec.org/s/diw/diwwpp.html
https://www.ssrn.com/link/DIW-Berlin-German-Inst-Econ-Res.html

Green bonds' reputation effect and its impact on the financing costs of the real estate sector

Aleksandar Petreski [*] Dorothea Schäfer [†] Andreas Stephan [‡] [§]

Abstract

This paper explores the effect of a firm's reputation of being a green bond issuer on its financing costs. Using a sample of 73 listed Swedish real estate companies issuing in total about 1500 bonds over the period from 2011 till 2021, difference-in-difference analyses and instrumental variable estimations are applied to identify the causal impact of frequent green vis-à-vis frequent non-green bond issuing on a firm's cost of capital and credit rating. The paper argues that it is repetitive issuance which lowers a firm's cost of capital, while the effects from first or one-time green bond issuance is the opposite. In line with the reputation capital hypothesis, issuing green bonds even lowers the firm's cost of equity capital, while issuing non-green bonds has no effect on the cost of equity capital.

Keywords: bond issuance, green debt, reputation capital, sustainability, ESG
JEL codes: G32, R30, R32

[*] Aleksandar.Petreski@ju.se, Jönköping International Business School
[†] dschaefer@diw.de, DIW Berlin &, Jönköping International Business School, Jönköping University
[‡] Andreas.Stephan@lnu.se, Linnaeus University, Sweden

[§] Schäfer and Stephan acknowledge: This work is part of the XPRESS project. The project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No. 857831, https://www.xpress-h2020.eu/. Disclaimer: The information and views set out in this work are those of the author(s) and do not necessarily reflect the official opinion of the European Union. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained herein.

1 Introduction

The building and construction sector accounts for 38 per cent of total global energy-related CO2 emissions.[1] Thus, there is a significant potential for reducing CO2 emissions in the real estate sector. Large investments in improving energy efficiency of existing buildings or construction of new energy-efficient buildings are required to exploit this potential. Consequently, the real estate sector issued 11.9% of all green bonds (GBs) in the period 2007-2019 (Löffler et al., 2021) or 7.3% of the total issued amount in the period 2013-2018 (Flammer, 2021). Strong supply and demand forces are driving the building sector to be one of the largest issuers of green bonds.

The recent surge in demand for energy-efficient housing by environmentally aware households (Kahn and Kok, 2014; Pommeranz and Steininger, 2021) and for "green offices" by companies (Eichholtz et al., 2010) as well as an increased interest in the acquisition of "green assets" by investors (Baker et al., 2018) supports the financing of the required green investments in the real estate sector. As one example, the Swedish real estate company Castellum, active in commercial real estate, succeeded to be included as the first Nordic company of the property and construction sector in the Dow Jones Sustainability Index (DJSI). This index covers the best performers in the field of sustainability from all of the world's industries. To be included in the DJSI created a strong reputation effect for Castellum, which might be relevant for both debtors and shareholders of the firm.

On the other hand, the risk of "green washing", meaning that green bond proceeds are used for non-green projects, is a concern to both investors and regulators (ESMA, 2020). In this paper, we argue that firms are using repetitive green bond issuance to obtain the recognition of being a sustainable firm and to mitigate the risk of being perceived as a "green-washing" firm. We also hypothesize that reputation effects may be the main driver of the observed lower premium for green bonds, which has been labelled as "greenium" in the literature (Löffler et al., 2021; Zerbib, 2019). Economic theory postulates that reputation "capital" provides incentives for firms to mitigate conflicts of interest between borrowers and lenders and to increase payoffs at a later stage (Diamond, 1989). This reduces default risk and, consequently, the firm's cost of debt.

Empirical research on the financing choices of real estate firms is scarce, despite its importance and heavy reliance on debt financing. In addition, to the best of our knowledge, there are no studies on the relationship between "green" reputation and the cost of capital for real estate firms. Tang and Zhang (2020) find positive stock reaction

[1] UN Environment Programme (UNEP) press release, 16/12/2020, https://www.unep.org/news-and-stories/press-release/building-sector-emissions-hit-record-high-low-carbon-pandemic, accessed 09/04/2022.

to green bond issuance announcements with larger announcement returns for first-time issuers then for repeating issuers. However, they also show that positive stock returns are not driven by lower cost of debt from green bonds. Fatica et al. (2021) find a premium for green bonds issued by corporations in the primary market. Similar to our study they find that repetitive issuance leads to a higher offering premium compared to one-time issuance which the authors assume can be explained by reputation effects.

Our study focuses on the question of whether the benefits from green bond issuance come from obtaining a green reputation. The main question is: are the financing costs of real estate firms with repeated green bond issuing lower than those of other real estate firms? Rather than focusing on bond yields as indicator of cost of debt capital, we consider how reputation influences the entity of a firm's cost and risk measures. In the empirical analysis we apply a difference-in-difference approach to estimate the causal impact from repeated green bond issuance on a firm's capital cost and default risk. To capture the direct reputation effect, we examine how repetitive green bond issuance affects the overall environmental, social, governance (ESG) score and its individual pillars. Finally, we use a Poisson regression model to estimate the relative importance of firm characteristics, including a history of past bond issuance, for a firm's current green bond issuing.

The econometric results reveal that repeated real estate bond issuers face lower financing costs in general. However, this effect is particularly strong for repeated issuers of green bonds. The findings confirm a positive association between green bond issuance and a firm's ESG scores, supporting the hypothesized reputation effect of green debt issuance. Finally, we find a strong path dependency of GB issuing. Past GB issuance is positively related to present GB issuance, while with traditional bonds the opposite effect emerges. It is worth noting that our study addresses potential endogeneity issues by employing instrumental variables and testing for endogeneity. In general, the test results imply that endogeneity is no concern for the estimated models.

This paper contributes to the existing literature in several ways. First, this is one of the very rare studies that explores the effect of repeated green bond issuance on financing costs and a firm's credit rating in a systematic empirical analysis. Second, we confirm the reputation building nature of repeated GB issuance and provide evidence of a strong path dependency of green bond issuing activity. Third, in contrast to the existing research, we use instrumental variables to account for the potential endogeneity of green bond issuance and, thus, are able to establish causality.

The paper proceeds as follows. Section 2 provides some background fact about the financing of Swedish real estate firms. Section 3 reviews the literature and presents the hypotheses. Section 4 describes the method and approach to estimate effects from repet-

itive issuance. Section 5 describes the data. Section 6 presents the results and discusses the findings. Section 7 concludes.

2 Background

In Sweden, real estate activities account for 2.7% of the total employment[2] showing the relative importance of the real estate sector for the Swedish economy. Residential buildings have a more than 40% share of the total market value of Swedish real estate assets while office buildings accounts for more than 25%, and industrial, retail (restaurants and shopping malls), logistics, hotel, public and other premises have lower shares (Finansinspektionen, 2019). With regard to geographical location, Stockholm accounts for 36% of the total real estate values, Gothenburg's share is 18% and the third largest market is Malmö with 12%.

One fifth of the Swedish climate impact (approximately 12 million tonnes of CO2 per year) is due to the construction and real estate and construction sector activities (Boverket, 2020). At the proposal of Swedish National Board of Housing Building and Planning (Boverket), in order to reduce the building emissions a new regulation was brought that all new construction of buildings should be accompanied by a report on the climate impact of the building.

Swedish commercial real estate companies finance their operations with 35% equity and 65% debt. Real estate firms have been relying for a long time on the traditional banking finance. Half of banks' exposure to non-financial corporations was to the property sector. Recent data shows a shift in the debt financing of real estate firms, from bank loans towards bond markets. Two-third of debt of the real estate sector is provided by banks, and one-third is obtained from issuing bonds and certificates, with an increasing share (Riksbank, 2021).

The push toward debt financing was initiated by the restrictive measures of the financial authority towards bank supply of credit to CRE, low interest rates, possibility to widen investor base and strong demand for real estate assets. Due to the high exposure of banking sector to commercial property sector and the perceived spill over risk to the whole financial system, the Swedish Financial Supervisory Authority in 2020 decided to increase the risk weights (35% for corporate exposures in commercial real estate and 25% for commercial residential properties) and raise the capital requirements for lending to commercial real estate firms.

The Swedish corporate bond market is characterised as a relatively small market with relatively few issuers and limited liquidity. Furthermore due to a lack of transparency

[2]For the entire EU-27, real estate activities account for 1.9% of the employment.

and a large share of issuers without credit ratings pricing is more difficult compared to more developed corporate bond markets (Wollert, 2020). It is worth noting that large real estate firms are over-represented as issuers on the Swedish corporate bond market.[3] Constrained by the small size of the domestic market, Swedish real estate firms often issue bonds in external markets, in other currencies, especially in euro and having a green label.

Little is known about the factors that motivate real estate companies to commit to issue green bonds. Anecdotal evidence tells that there are synergies between the required documentation for energy-efficient buildings and the certification procedure for green bonds. The real estate sector's premium over government bonds attracted in particular investment funds, insurance and pension companies and foreign investors (Finansinspektionen, 2019). Demand for real estate bonds was further fuelled by investors looking for investments with positive environmental effects. Also, while real estate firms have traditionally heavily relied on bank loans, they see the bond market as a more flexible and cost efficient instrument to obtain the required funds. Real estate firms value green bonds as an instrument that combines two important features: the reduction of bank dependence and the enhancement in reputation of being a sustainable firm. However, for the latter, firms need to revert to repetitive issuance, while for the first the advantage from participation in the bond market also occurs with a one-time issuance.

Sustainability measures established in the building sector are simultaneously accompanied by environmental initiatives within financial infrastructure. Issuers of bonds, beside following mandatory EU "Prospectus Directive" and sustainability reporting practices prescribed by the Non-Financial Report-ing Directive (NFRD), voluntary follow ICMA Green Bond Principles (GBP). Issuers should confirm the alignment of their green bond program with the four core GBP components: use of proceeds, process for project evaluation and selection, management of proceeds and reporting, and should engage in independent external review of pre-issuance and post-issuance activities. Real estate is among the eligible Green Projects categories emphasized in the ICMA Voluntary Process Guidelines for Issuing Green Bonds. Green buildings that meet national/internationally recognised standards or environmental performance certificates are among the most frequent types of projects financed by the Green Bond market (ICMA, 2021).

Still, limited harmonisation in sustainability reporting practices by the NFRD Directive, evident in its different national transpositions, create difficulties for investor rational decision-making. Lack of a sound corporate disclosure basis is the main reason for emergence of green-washing risk as issuer's disclosure often misrepresent the

[3]Real estate companies issued 47 per cent of the outstanding value of corporate bonds issued in SEK in 2020.

real sustainability profile of a listed entity. Low transparency in the Swedish corporate bond market, characterized by large share of issuers without a credit rating (30%) and weak data on pricing and trading (Wollert, 2020), amplify the problem of asymmetric information and add to the weight of potential green-washing risk.

3 Literature review and hypotheses

Seminal papers by Milgrom and Roberts (1982) and Diamond (1989) argue that reputation decreases the cost of financing because of a reduction in asymmetric information. Cao et al. (2015) provides evidence that acquired reputation lowers the cost of equity, while Anginer et al. (2011) confirm similar effects on the cost of debt. Other related literature has investigated the effects of corporate social responsibility (CSR) and corporate social performance (CSP) on corporate financial performance (CFP) and on asset prices. Empirical studies support that firms with better CSR scores face lower cost of capital (El Ghoul et al., 2011) and obtain a better credit risk assessment, measured by credit ratings (Oikonomou et al., 2014) and zero-volatility spreads (z-spreads) (Stellner et al., 2015). According to other studies, environmental strengths affect a firm's bond spread, bond and issuer rating (Bauer and Hann, 2010; Cubas-Díaz and Martínez, 2018), and reduce the cost of equity and debt (Chava, 2014). In addition, Baker et al. (2018), Zerbib (2019) and Löffler et al. (2021) provide evidence that green bonds experience lower yields ("greenium") than conventional bonds, thus lower the issuer's cost of debt capital.

Research on how repetitive green bond issuance affects a firm's financing cost is scarce. Only the study by Fatica et al. (2021) explores whether repeated issuers earn a premium. Similarly, our study investigates whether repeated issuers earn a premium that is not available to one-time GB issuers. However, we additionally highlight the link between a firm's reputational capital from repetitive GB issuance and the degree of perceived sustainability.

As mentioned above, there are several theories that predict a negative relationship between reputational capital and cost of debt. Diamond (1989) argues that the borrowing interest rate of an issuer decreases over time. The lowering indicates the value of having a good reputation. Anginer et al. (2011) argue that a firm's reputation affects its debt financing and capital financing costs. Furthermore, the risk-mitigation view implies that a good reputation reduces perceived firm risk. Accordingly, a firm with repetitive green bond issuance should benefit from the reduced risk of green washing perception.

A good reputation of following environmental, social, and governmental criteria is often spread via increased media attention. Grullon et al. (2004) provide empirical evidence that more visible firms, with higher degree of familiarity attract a larger number

of both individual and institutional investors. In line with this evidence, Tang and Zhang (2020) find increased institutional ownership after green bond issuance. Usually, more attention from institutional investors increases liquidity and improves financing conditions. In sum, via the channel "visibility" a firm's reputation as green bond issuer may affect its credit rating and capital cost. Thus, we propose

Hypothesis 1 *Firms that repeatedly issue green bonds benefit from reputation effects by receiving favorable credit ratings and lower cost of debt.*

Cao et al. (2015) document a negative association between firm reputation and the cost of equity. They also show that the reputation effect on the equity financing cost is higher when information asymmetry is more severe. The weighted average cost of capital (WACC) is determined by a firm's cost of debt and equity financing and its capital structure. Assuming the findings of Cao et al. (2015) apply to green bonds as well, we get to

Hypothesis 2 *A firm's reputation as credible green bonds issuer lowers its cost of equity and its Weighted Average Cost of Capital (WACC).*

ESG data are not able to convincingly provide the same information (Gyönyörová et al., 2021). External ESG ratings include too much "noise" as they intend to cover the multidimensional profile of firm governance. In addition, ESG from third-party certification agencies is both costly and only updated yearly. Fragmentation of standards and labeling as well as the heterogeneity of the ESG rating vendors and methodologies (Douglas et al., 2017) make it difficult to learn about the environmental impact of green bonds. Various definitions and methodologies used to measure ESG/CSR affect the disparity in the results of empirical studies (Gillan et al., 2021). In contrast, the reputation of a firm as credible green bond issuer does not suffer from such weaknesses, which are common to ESG/CSR ratings. It arises from their persistence in issuance of green bonds instead of non-green bonds. Having a clear record of timely repayments and re-newed confidence at each debt issuance reduce the perceived risk of green washing. One can expect that continuous efforts to increase and keep the green debt reputation influence the overall ESG score of the firm. Therefore,

Hypothesis 3 *Firms benefit from reputation effects and obtain better ESG ratings after repeatedly issuing green bonds.*

Using the argument of Gorton (1996), new green firm debt will be more heavily discounted by investors, compared to the firms with established (green bond) histories. In that sense, one could expect excess discount to decrease over time as lenders observe

and learn about non-occurrence of green-wash incidents. Subsequent issuances of green debt are to be monitored less intensively, with fewer costs. Decreased discounted rates and costs from repeated issuance motivate even more future green debt issuances. Repeated issuing of green bonds reinforces firm reputation. Therefore, we propose that the propensity to issue green bonds depends, in particular, on the previous history of bond issuance and arrive at

Hypothesis 4 *Learning effects and reputation lower bond issuance costs over time. Therefore, the likelihood of bond issuance in general is higher if firms have previously issued bonds, either conventional or green ones.*

Studies exploring the role of other firm characteristics in determining the propensity to issue green bonds are scarce. Only Chiesa and Barua (2019) study how firm characteristics affect the size of borrowing via green bonds. They find that issuers with a better business performance (i.e., higher annual revenue growth rate) and with an already higher leverage in their capital structure, have lower demand for external borrowing, either due to higher availability of internal funds or due to less flexibility in raising further funds by issuing debt.

Cantillo and Wright (2000) formulate a theoretical model that identifies high and stable cash flows, high profitability, low real interest rates, firm size, ample collateral, and low entrenchment as crucial factors for a borrower's selection of lenders. Denis and Mihov (2003) identify high profits as determinant for issuing bonds. Following the arguments of the literature above leads to

Hypothesis 5 *Firm size, capital structure, profitability, and liquidity can explain the likelihood of bond issuance in general, and of green bonds in particular.*

4 Econometric Methodology

To test the hypotheses formulated above, we apply difference-in-differences (DiD) analyses[4] in combination with instrumental variable (IV) estimation to test for potential endogeneity of green bond issuance. In the first part, the analyses focus on the questions how a firm's capital cost and credit rating are affected by the repetitive issuance of conventional or green bonds, which corresponds to Hypotheses 1 and 2. In the first specification the dependent variable is cost of capital as the outcome of interest, and the treatment is

[4]DiD is a non-experimental technique to estimate the average treatment effect on the treated (ATET) by comparing the difference across time in the differences between outcome means in the control (no issuance) and treatment (issuance) groups. DiD controls for unobservable time and group characteristics that may confound the effect of the treatment on the outcome.

cumulative frequency of bond issuances. Formally, the DiD estimation equation can be written as

$$y_{it} = \mu_i + \lambda_t + \beta x_{it} + \theta^k CI_{it}^k + \varepsilon_{it} \tag{1}$$

where y_{it} denotes the outcome variable of interest for firm *i* in period *t*, μ_i a firm-specific fixed effect, λ_t a period-specific effect, x_{it} designates control variables, β denotes their influence on the outcome variable, CI_{it}^k describes cumulative bond issuance defined as $\left(\sum_{t_0}^{t} I_{it}^k\right)$ from period t_0 to t, where k denotes either conventional or green bonds. Finally, ε_{it} denotes the iid error term, while θ^k denotes the effect of main interest, i.e., the treatment effect from repetitive bond issuance on the outcome variable. Note that Equation 1 specifies two distinct treatment variables, cumulative green and non-green bond issuance. While our hypotheses are formulated in terms of the expected effects from green bond issuance, we cannot exclude the possibility that also issuance of non-green bonds might have the same impact. Having both types of bonds in the same equation allows us to distinguish whether a particular effect is specific for green bonds or can be also observed for issuance of non-green bonds.

Identification of the effect of main interest requires the assumption of common trend (CT): that both groups would have developed equally over time in absence of the treatment (issuance). CT assumption holds potentially only after conditioning on observed covariates. DiD approaches, which compare two or more treatments, similar to Fricke (2017), require the stricter identifying assumption of ordered treatment effects. While our hypotheses are formulated with respect to green bond issuance, we expect that both treatments (issuance of bonds) lower a firm's financing costs. However, given the reputation mechanism, which we conjecture being the main driving force for the expected effects on credit ratings and cost of capital, we expect green bond issuance to have a stronger effect than the other treatment (non-green bond issuance). Having treatments in the same direction with one being stronger is conform with the assumption of ordered treatment effects.

Since we have more than two time periods we implement DiD with multiple time periods with staggered adoption, such that once units are treated, they remain treated in the following periods, as described in Callaway and Sant'Anna (2021). Once the firm becomes treated, which means the firm has issued bonds of a specific label (either non-green or green) this increases its cumulative number of issuances for that bond label. This treatment level is kept the same until the next issuance of the same bond label (next treatment level). We use the average treatment effect where the parameter of interest is θ^k, which is typically portrayed as an overall effect of participating in the treatment *k* across all time periods, similar to the static treatment effect specification in Callaway and Sant'Anna (2021).

Bonds issuers might have lower financing costs for a variety of reasons. Omitted variables related to firm risks and investor preferences might induce correlation between cumulative issuance and financing costs. To address the problem of potential endogeneity we use an instrumental approach to isolate the effect of repetitive issuance on financing costs. Ideal instruments for firm repetitive issuance are predictors of it without being related to omitted factors affecting firm financing costs.

We employ two instruments: the sum of cumulative green bond issuance of all other real estate firms and the sum of cumulative non-green bond issuance of all other real estate firms: $CIO^k_{it} = \sum_{j \neq i} \sum_{t_0}^{t} IO^k_{jt}$. We investigate the validity of instruments used in the endogeneity test with Hansen (1982)'s test of overidentifying restrictions.[5]

Disregarding potential correlation of regression disturbances over time and across firms may result in inconsistent standard errors. Note that conventional cluster robust standard errors do not capture the issue of cross-sectional dependence, but assume cross-sectional independence. For the case of auto-correlation in single time-series, standard errors can be adjusted for possible dependence in the residuals, and those autocorrelation robust standard errors are consistent even in the presence of autocorrelation (Newey and West, 1987). In the same fashion, in the context of panel data and fixed effects (within) regression models, robust standard errors can be used, which are consistent both if autocorrelation and cross-sectional correlation are present (Driscoll and Kraay, 1998a).[6]

To estimate the determinants of firm *i*'s bond issuance B^k_{it} of bond type *k* in year *t*, the following equation is specified

$$B^k_{it} = cons + \lambda_t + \beta x_{it} + \gamma^k CI^k_{i,t-1} + \delta^k CIO^k_{it} + \epsilon_{it}, \tag{2}$$

where B^k_{it} denotes the number of issuances in year *t*, λ_t is a period-specific effect, $I^k_{i,t-1} = \sum_{t_0}^{t-1} I^k_{it}$ denotes the cumulative firm's past issuance of bond type $k \in \{GB, NGB\}$ until previous period *t-1*, γ^k denotes the effect of having previously issued green and/or non green bonds on issuing *k* type of bonds, x_{it} are control variables (e.g., firm characteristics), CIO^k_{it} is the cumulative issuance of bond type *k* by all other real estate firms except firm *i*, δ^k denotes the effect of cumulative sum of all issued bonds by all other real estate firms except firm *i* on issuing *k* type of bonds, and ε_{it} denotes the iid error term.[7]

[5] This is implemented by using the STATA program *xtivreg2* provided by Schaffer (2005a).

[6] Those estimations are performed using the STATA program *xtscc* provided by Hoechle (2007).

[7] This model is estimated using the STATA command *poisson*. Note that there is not sufficient time-variation to specify a Poisson model with fixed effects.

5 Data and variables

The data for this study has been obtained from Thomson Reuters Refinitiv database. The total sample comprises about 1550 bonds of 92 real estate firms, among which 73 are listed. The observed time period ranges from 2011 till the second quarter of 2022. Table 1 presents the description of variables.

[Table 1 here]

For the DiD analysis, we measure financing cost using several dependent variables: cost of debt (distinguishing short and long-term), cost of equity, and WACC. For these variables which we have 82160 daily (business days) observations. We measure credit rating using Starmine combined credit score, for which we have 64344 daily observations at disposal. Table 2 summarizes the variables used in the DiD regressions.

[Table 2 here]

For each bond we have issuance information: issuance date, maturity date, maturity, label of the issuance (green/non-green), coupon rate, foreign currency, seniority, and coupon class (fixed/floating). The summary of bond issuance characteristics is presented in Table 3.

The sample of bonds was merged with the sample of RE firms and the independent and instrumental variables were compiled. To measure reputation, we use cumulative past and current issuance (issuances) of green bonds. As instrumental variables we use cumulative past and current issuance of green bonds by all other real estate firms and cumulative past and current issuance of non-green bonds by all other real estate firms.

For the purpose of analysis of the relationship between reputation and ESG, we employ ESG as dependent variable and use a sample of 27 firms having ESG information giving 92 firm-year observations.

In the Poisson regression describing the dependence of a firm's bond issuance on its past issuance, as confounders we use four variables (each lagged by one month): log of total assets, return on assets (ROA), current ratio (cash and equivalents/total assets), and debt share. We also use cumulative issuance of green bonds by all other real estate firms, cumulative issuance of non-green bonds by all other real estate firms, and year effects are specified. The final matched sample used in the Poisson regression encompasses 71 RE firms with 550 firm-year observations in total.

6 Results

6.1 Descriptive results

In this section, we provide some stylized facts on the bond issuances: bond characteristics, issuance frequency, and issue amount.

Table 3 shows the distinction of bond characteristics by green/non-green label for the period 2011-2021. In comparison to non-green bonds, green bonds have statistically significant smaller issuance volume, coupon rate, and share of bonds issued in foreign currency. Smaller volumes of green bond issuance amount (0.515 billions of SEK against 0.671 billions of SEK) coincide with higher frequency of issuance, see Table 4. This combination might be indicative for a possible attempt by real estate firms to build a reputation as green bond issuer by being more present on the green bond market. The significantly smaller coupon rates offered on green bonds when issued on the primary market (difference of -0.482%) correspond with the empirical finding on green bond premium. The smaller share of green bonds issued in foreign currency (11.2% against 16.6%) might be indicative of a strong domestic demand for green bonds. There is no significant difference regarding maturity, seniority, and coupon class (floating vs fixed).

[Table 3 here]

In Table 4 the number of issuing firms and issued bonds over the sample period is shown, both for private and listed real estate firms. Overall, listed firms are more active in issuing bonds. For instance, in year 2021 14 listed firms issued bonds (either GB or NGB or both) while only 7 private firms issued bonds. This fact can be explained by transaction costs of bond issuance where listed firms might have an advantage facing lower costs. However, while fewer private firms issue bonds if they do so they are very active and perform more issuances than listed firms. This holds in particular for GB issuance. Another take-away from Table 4 is that the number of issuers is increasing, in particular among listed firms, and there is a strong increasing trend of GB issuance over time.

[Table 4 here]

Table 5 shows the evolution of issued amount of GB and NGBs of Swedish real estate firms over the period 2011-2021. As can be seen, the green issuance amounts have more dynamic growth than non-green bonds, almost tripling their volume in 4 years, from 14 billions SEK in 2017 to 53 billions SEK in 2021. Non-green bonds increased with some reversals as well, amounting to 87.9 billions of SEK in 2021. As a consequence, the share of issued green debt in total issued debt increased, reaching 37% of the total issued debt by the real estate sector.

[Table 5 here]

6.2 Estimation Results

This section presents and discusses the estimation results of reputation effects on financing costs using DiD analysis and results from Poisson regression analysis on the dependence of current bond issuance on past issuance.

Table 6 reports the results from the DiD analysis on the reputation effects of green bonds. We find that one additional green bond issuance reduces the cost of debt by 0.0571%. This result is in line with Wulandari et al. (2018) who report that green bonds' liquidity risk decreases over time. Downward adjustment of cost of debt is stronger for green bond issuance then for non-green bond issuance. As can be seen, both coefficients of lagged cumulative bond issuance are negative and significant, but the coefficient for lagged count of green bond issuances is higher in magnitude (demonstrated by the negative difference of 0.0145%). Differentiating the debt cost of capital into short-term and long-term, we also find significant and negative reputation effects, with higher effect for green bond issuers. Green bonds issuances decrease the short-term cost of debt by 0.102%, while for non-green bonds the reduction is 0.076% (the difference is 0.026%). Issuance of green bonds reduce long-term cost of debt by 0.0763%, which is 0.026% more than compared to non-green bonds (0.0503%). Within R2 is the highest for the model of the long-term debt's cost of capital (0.275), indicating that the relationship between bond issuance and financing costs is best captured with this model.

[Table 6 here]

The findings also confirm that firms with more frequent bond issuances improve their credit rating (Column (4)). The estimations reveal that the positive result is stronger for the firms with more frequent green bond issuances (improvement by 0.0857 points) compared to more frequent non-green bond issuers (improvement by 0.0136 points). Overall the estimation outcomes in Column (1)-(4) clearly confirm Hypothesis 1. A firm with a more frequent issuing of green bonds enjoys lower debt costs and a better rating. Those advantages of more frequent green issuing may result from a higher investor attention. Investors perceive a lower information asymmetry and, thus, expect lower monitoring cost. Both render investments less risky and decrease the risk premium.

A difference in the reputation effect with regard to the bond label is particularly visible for the cost of equity in Column (5). Reputation effects of increasing the number of green bond issuances are negative and significant (-0.129%), while the result for non-green issuance remains insignificant. Correspondingly, Column (6) shows that firms with a long history of financing environmental projects via the bond market show a significant negative effect on the weighted average cost of capital (decrease in WACC of 0.0857%). Costs of financing of non-environmental projects also decrease for firms

with a longer track record of bond issuance (decrease in WACC of 0.0321%). These findings confirm Hypothesis 2. A good track record of subsequent green bond issuances decreases the cost of equity and the WACC by attracting more investors with stronger green preferences and by decreasing the systematic and litigation risk of the firm. This evidence also corresponds to the findings that a firm's ESG/CSR performance can lower the equity cost of capital (El Ghoul et al., 2011; Hong and Kacperczyk, 2009) and the debt cost of capital (Chava, 2014; Goss and Roberts, 2011; Löffler et al., 2021; Zerbib, 2019).

[Table 7 here]

Table 7 shows the effects of first (or one-time) issuance on financing costs. The results show that when firms issue green bonds, one-time issuance produces opposite effects for the outcomes in comparison to repeated issuance: firms face higher debt costs, both in the short-term and in the long-term. This is an important robustness test for Hypothesis 5 that it is repetitive GB issuance which lowers financing costs, there are even opposite effects for first or one-time GB issuance. Those also lead to a lower credit rating. Table 7 also shows that companies do not benefit in terms of cost of equity capital from one-time issuance, while their WACC rises due to the increase in the cost of debt capital. First or one-time issuance of NGBs have different effects which again makes Hypothesis 5 plausible. On average, one-time issuance increases firm debt cost, but decreases short-term or long-term cost of debt capital. It is worth noting that we consider the first bond issuance as the one we observe during the sample period. This definition might be better suited for green bonds than for conventional bonds, since the green bond issuance phenomenon is recent and overlaps with the sample period we cover. Furthermore, the results show that in contrast to GB one-time issuance of NGBs decreases firms' WACC. Firm credit rating and cost of equity are not significantly affected by one-time issuance of conventional bonds.

[Table 8 here]

Table 8 reports the reputation effects of GB issuance on ESG scores and sub-scores. The results are in line with Hypothesis 3. Having a longer track of green bond issuance improves a firm's ESG scores. The coefficient of GB issuance is significantly positive. One additional GB issuance improves the ESG composite score by 3.29 points in total (Column (1)). It also significantly enhances each of its components—environmental, social, and governmental. A history of green bond issuances has the strongest positive effect on the environmental score (improvement of 3.689 score points in Column (2)). In contrast, a long track of non-green issuances improves the government sub-score (by 1.45 points), but the effect is still lower than for one more green bond issuance (3.35). The

estimation outcomes prove our assertion that although reputation and the ESG score do not overlap perfectly, repeated green bond issuance and the ESG score are deeply connected. According to Feng and Wu (2021) the close connection may also contribute to lower cost of debt.

[Table 9 here]

Table 9 presents the findings on Hypothesis 4 and 5. Clearly, past own bond issuances matters for the present number of bond issuance differentiated by bond type. Current numbers of bond issuances of both GB and NGBs dependent stronger on the previous own issuance of same type than on past issuance of the other type, where the effect is often even negative (Columns (1)-(4) in Table 9). These results confirm Hypothesis 4. The coefficient on issuing the same type of bond earlier is stronger for green bonds (second row, column (2): 0.0683), than for the non-green bonds (first row of column (1): 0.0197). The result about being inclined to issue more green bonds emerges most likely from a positive experience in the past. This "addiction" may be caused by lower coupon rates and lower monitoring costs for subsequent green bond issuance. Interestingly, external issuances, be they green or non-green, have no such effect. The coefficients of the variables $\sum$NGB all other REs$_t$ and $\sum$GB all other REs$_t$ show that the issuing activity of other real estate firms has no impact on the own current issuing propensity, thus there are no spillover effects. In sum, Table 9 confirms again that reputation effects work in favor of issuing green bonds.

Finally, Hypothesis 5 is only partly confirmed. Large firms show a slightly higher propensity to issue green than non-green bonds. The coefficient for the log of total assets is 0.908 for green vis-à-vis 0.861 for non-green bonds. In addition, firms with higher profitability, measured via the lagged ROA, have a stronger preference for green (coefficient: 0.0819) than for non-green bond issuing (0.0287). Surprisingly, the lagged share of debt in total assets has a positive effect on the propensity to issue non-green bonds, but the coefficients are statistically and economically only weakly significant (0.0137 and 0.0139). The current ratio is insignificant which suggests that liquidity of the firm is not significantly influenced by the choice of the bond type.

In sum, the main results are obtained from the DiD analyses of reputation effects for Swedish real estate companies using a novel and comprehensive reputation measure: cumulative past green bond issuance.

Having a better reputation as credible long-term issuer of green bonds enables firms to have easier access to capital markets at relatively lower cost of debt capital. Reduced information asymmetry, increased public scrutiny over firm financial reporting, minimized litigation risks, and reduced green washing risks, which emerge from imperfect

contracting regarding the use of green bond proceeds, improve the credit rating of the firm.

The results also show that the likelihood of green bond issuance is higher if real estate firms have previously issued green bonds and if issuers are larger and more profitable firms. The transition from being issuer of non-green bonds to being issuer of green-bonds is more likely than the transition green to non-green.

7 Conclusions

This paper provides a deeper understanding of the mechanism behind the established negative relationship between green bond issuing and financing costs. The paper hypothesizes that this negative relationship can be explained by reputation effects from repeated green bond issuances, which signal credibility and quality of the firm to investors. In addition, the paper sheds light on factors that determine how companies build their reputations through the repetitive action of issuance of green bonds.

The econometric results of the DiD approach using 73 Swedish real estate firms confirm that repeated green bond issuance reduces the firm's cost of capital. This even holds for the cost of equity. We conjecture from this finding that credible prescription for green bonds and green projects reduces the firm's idiosyncratic risk and, thereby, increases their attractiveness for large institutional investors. Additional econometric results confirm the effect of green bond issuance on reputation by using ESG scores as a reputation proxy variable. We find that all aspects of the ESG composite score—environmental, social, and governance pillars—are positively affected by having a long track record of green bond issuance, while only the governance pillar of ESG is positively affected by having a long track record of non-green issuance.

The theoretical explanation regarding the reputation effects from green bond issuance is that monitoring of green projects is costly and there is information asymmetry between investors and firms. Having a good reputation and pursuing credible green projects might be important for investors to mitigate the risk of "green-washing" practices.

These findings are not only important for corporate managers and investors, but also for financial markets supervisory agencies. Repeated issuance of green bonds reduces a firm's financing costs in the long-term. This supports the view that firms' risk management considering environmental reputation effects does create corporate value. Financial market regulators should be aware of the importance of the multiple issuance of bonds for building a firm's reputation capital when monitoring green instruments.

References

Anginer, D., Mansi, S., Warburton, A. J., and Yildizhan, C. (2011). Firm reputation and cost of debt capital.

Baker, M., Bergstresser, D., Serafeim, G., and Wurgler, J. (2018). Financing the response to climate change: The pricing and ownership of us green bonds. Technical report, National Bureau of Economic Research.

Bauer, R. and Hann, D. (2010). Corporate environmental management and credit risk. *Available at SSRN 1660470*.

Boverket (2020). Regulation on climate declarations for buildings. Technical report, Swedish National Board of Housing Building and Planning.

Callaway, B. and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230.

Cantillo, M. and Wright, J. (2000). How do firms choose their lenders? an empirical investigation. *The Review of Financial Studies*, 13(1):155–189.

Cao, Y., Myers, J. N., Myers, L. A., and Omer, T. C. (2015). Company reputation and the cost of equity capital. *Review of Accounting Studies*, 20(1):42–81.

Chava, S. (2014). Environmental externalities and cost of capital. *Management science*, 60(9):2223–2247.

Chiesa, M. and Barua, S. (2019). The surge of impact borrowing: The magnitude and determinants of green bond supply and its heterogeneity across markets. *Journal of Sustainable Finance & Investment*, 9(2):138–161.

Cubas-Díaz, M. and Martínez, S. M. Á. (2018). Do credit ratings take into account the sustainability performance of companies? *Sustainability*, 10(11):4272.

Denis, D. J. and Mihov, V. T. (2003). The choice among bank debt, non-bank private debt, and public debt: evidence from new corporate borrowings. *Journal of financial Economics*, 70(1):3–28.

Diamond, D. W. (1989). Reputation acquisition in debt markets. *Journal of political Economy*, 97(4):828–862.

Douglas, E., Van Holt, T., and Whelan, T. (2017). Responsible investing: Guide to esg data providers and relevant trends. *Journal of Environmental Investing*, 8(1):91–114.

Driscoll, J. C. and Kraay, A. C. (1998a). Consistent covariance matrix estimation with spatially dependent panel data. *Review of economics and statistics*, 80(4):549–560.

Driscoll, J. C. and Kraay, A. C. (1998b). Consistent Covariance Matrix Estimation With Spatially Dependent Panel Data. *The Review of Economics and Statistics*, 80(4):549–560.

Eichholtz, P., Kok, N., and Quigley, J. M. (2010). Doing well by doing good? green office buildings. *American Economic Review*, 100(5):2492–2509.

El Ghoul, S., Guedhami, O., Kwok, C. C., and Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance*, 35(9):2388–2406.

ESMA (2020). Sustainable finance roadmap 2022-2024. Technical report, European Securities and Markets Authority.

Fatica, S., Panzica, R., and Rancan, M. (2021). The pricing of green bonds: are financial institutions special? *Journal of Financial Stability*, 54:100873.

Feng, Z. and Wu, Z. (2021). Esg disclosure, reit debt financing and firm value. *The Journal of Real Estate Finance and Economics*.

Finansinspektionen (2019). The commercial real estate market and financial stability. Technical report, Finansinspektionen.

Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics*, 142(2):499–516.

Fricke, H. (2017). Identification based on difference-in-differences approaches with multiple treatments. *Oxford Bulletin of Economics and Statistics*, 79(3):426–433.

Gillan, S. L., Koch, A., and Starks, L. T. (2021). Firms and social responsibility: A review of esg and csr research in corporate finance. *Journal of Corporate Finance*, 66:101889.

Gorton, G. (1996). Reputation formation in early bank note markets. *Journal of political Economy*, 104(2):346–397.

Goss, A. and Roberts, G. S. (2011). The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking & Finance*, 35(7):1794–1810.

Grullon, G., Kanatas, G., and Weston, J. P. (2004). Advertising, breadth of ownership, and liquidity. *The Review of Financial Studies*, 17(2):439–461.

Gyönyörová, L., Stachoň, M., and Stašek, D. (2021). Esg ratings: relevant information or misleading clue? evidence from the s&p global 1200. *Journal of Sustainable Finance & Investment*, pages 1–35.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the econometric society*, pages 1029–1054.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal*, 7(3):281–312.

Hong, H. and Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, 93(1):15–36.

ICMA (2021). Green bond principles. Technical report, International Capital Market Association.

Kahn, M. E. and Kok, N. (2014). The capitalization of green labels in the california housing market. *Regional Science and Urban Economics*, 47:25–34.

Löffler, K. U., Petreski, A., and Stephan, A. (2021). Drivers of green bond issuance and

new evidence on the "greenium". *Eurasian Economic Review*, 11(1):1–24.

Milgrom, P. and Roberts, J. (1982). Predation, reputation, and entry deterrence. *Journal of economic theory*, 27(2):280–312.

Newey, W. K. and West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, 55(3):703–708.

Oikonomou, I., Brooks, C., and Pavelin, S. (2014). The effects of corporate social performance on the cost of corporate debt and credit ratings. *Financial Review*, 49(1):49–75.

Pommeranz, C. and Steininger, B. I. (2021). What drives the premium for energy-efficient apartments – green awareness or purchasing power? *The Journal of Real Estate Finance and Economics*.

Riksbank (2021). Financial stability report 2021-2. Technical report, Sveriges Riksbank.

Schaffer, M. E. (2005a). XTIVREG2: Stata module to perform extended IV/2SLS, GMM and AC/HAC, LIML and k-class regression for panel data models. Statistical Software Components, Boston College Department of Economics.

Schaffer, M. E. (2005b). XTIVREG2: Stata module to perform extended IV/2SLS, GMM and AC/HAC, LIML and k-class regression for panel data models. Statistical Software Components, Boston College Department of Economics.

Stellner, C., Klein, C., and Zwergel, B. (2015). Corporate social responsibility and eurozone corporate bonds: The moderating role of country sustainability. *Journal of Banking & Finance*, 59:538–549.

Tang, D. Y. and Zhang, Y. (2020). Do shareholders benefit from green bonds? *Journal of Corporate Finance*, 61:101427.

Wollert, S. (2020). Staff memo: Swedish corporate bonds during the coronavirus pandemic. Technical report, Sveriges Riksbank.

Wulandari, F., Schäfer, D., Stephan, A., and Sun, C. (2018). The impact of liquidity risk on the yield spread of green bonds. *Finance Research Letters*, 27(C):53–59.

Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance*, 98:39–60.

8 Appendices

8.1 Tables

Table 1: Variable definitions

Variable	Description
Dependent variables:	
Cost of debt capital (%)	Represents the marginal cost of issuing new debt.
Short-term cost of debt capital (%)	The marginal cost of issuing short-term debt with a horizon of 1 year.
Long-term cost of debt capital (%)	The marginal cost of issuing long-term debt with a horizon of 10 years.
Credit rating	Combined credit rating score for a firm, estimated by Starmine.
Cost of equity capital (%)	The beta of the firm's stock multiplied with inflation-adjusted market excess return.
WACC (%)	Weighted average cost of capital.
Independent variables:	
GB issuance	Cumulative issuance of green bonds
NGB issuance	Cumulative issuance of conventional bonds
Total Assets (TA)	Represents the total assets of a firm reported for the year t.
Return On Assets (ROA)	Ratio of income for the fiscal year t divided by the average total assets for the same year t.
Debt share	Share of green debt in total firm debt for the year t.
Current ratio	Ratio of cash and equivalents divided by total assets reported for the same year t.

Source: Eikon Refinitiv, GB= green bond, NGB= non-green bond

Table 2: Summary statistics of variables used in DiD regressions

Variable	N	Mean	SD	Min	Max
Dependent variables					
Cost of debt	82161	2.41	2.96	-20.0	354.4
Short-term	82160	2.16	6.21	-42.3	476.8
Long-term	82160	3.35	2.16	-25.7	47.7
Cost of equity	82161	5.64	2.77	-6.07	22.8
WACC	82161	4.16	2.59	-5.32	210.3
Rating	64344	11.91	3.19	1	20
Independent variables					
GB cumulative issuance	82161	0.87	3.19	0	33
NGB cumulative issuance	82161	4.39	8.80	0	71
Instruments					
GB cumulative issuance by all other REs	82161	162.5	112.4	16	379
NGB cumulative issuance by all other REs	82161	935.5	165.6	617	1171

Table 3: Characteristics of real estate bonds issued during the period 2011-2021, sample size (n=1074)

Bond characteristic	GB	NGB	% diff	t-statistic	p-value
Issue volume (bill SEK)	0.515	0.671	-21.7	-3.06	0.002
Coupon rate (%)	1.274	1.756	-32.5	-4.73	0.000
Yield spread (%)	1.090	1.598	-38.8	-3.36	0.000
Bid-ask spread	0.479	0.573	-17.8	-3.50	0.000
Foreign currency	0.112	0.166	-15.5	-2.36	0.019
Maturity (in years)	4.937	5.238	-5.7	-0.82	0.411
Senior rank secured debt	0.045	0.046	-0.1	-0.02	0.985
Coupon class floating	0.604	0.586	3.8	0.59	0.556

Source: Eikon Refinitiv, authors' calculations. GB=green bond, NGB=conventional bond. Yield spread is the first year yield-to-maturity after issuance relative to 10 yrs governmental bond. Bid-ask spread in the difference in bid and ask price of bonds with face value 100 during the first year after issuance.

Table 4: Number of bond issuance of Swedish real estate sector firms

	Real estate firms issuing bonds		Issuance GB		Issuance NGB		Issuance all bonds	
year	private	listed	private	listed	private	listed	private	listed
2011	0	3	0	0	20	2	20	2
2012	0	3	0	0	33	12	33	12
2013	1	6	2	0	28	18	30	18
2014	3	8	7	0	47	22	54	22
2015	2	8	7	1	45	27	52	28
2016	4	11	10	5	50	23	60	28
2017	4	10	18	10	40	54	58	64
2018	2	9	27	20	32	56	59	76
2019	3	10	44	25	42	64	86	89
2020	5	13	54	27	43	54	97	81
2021	7	14	54	48	21	49	75	97
2022	4	7	19	1	6	1	25	2
Total	35	102	242	137	407	382	649	519

Source: Eikon Refinitiv, authors' calculations. 2022 refers to the first quarter only.

Table 5: Issued amount in billion SEK of green and non-green bonds, Swedish real state sector over period 2011-2021

year	GB	NGB	Total	GB (%)
2011	–	7.6	7.6	–
2012	–	17.2	17.2	–
2013	1.3	19.7	21.0	6.2
2014	3.3	26.9	30.2	10.9
2015	3.8	38.3	42.1	9.1
2016	7.6	43.5	51.1	14.9
2017	14.0	88.5	102.5	13.7
2018	27.5	64.1	91.7	30.0
2019	37.5	94.9	132.4	28.3
2020	38.6	82.0	120.6	32.0
2021	53.0	87.9	140.9	37.6
Total	186.7	570.6	757.3	24.7

Source: Eikon Refinitiv, authors' calculations. GB=proceeds from green bond issuance, NGB=proceeds from conventional bond issuance.

Table 6: Difference-in-Difference fixed effects regression results on repetitive issuance, sample period 2015-2021

	(1) Cost of debt capital	(2) Short-term cost debt capital	(3) Long-term cost debt capital	(4) Credit rating	(5) Cost of equity capital	(6) WACC
GB issuance	-0.0571***	-0.102***	-0.0763***	0.0857***	-0.129***	-0.0857***
	(-7.47)	(-7.31)	(-10.86)	(18.39)	(-29.53)	(-15.58)
NGB issuance	-0.0426***	-0.0760***	-0.0503***	0.0136***	-0.00355	-0.0321***
	(-8.63)	(-8.06)	(-13.04)	(4.85)	(-1.49)	(-8.93)
Cons	3.229***	2.015***	3.193***	12.55***	6.011***	4.608***
	(121.96)	(17.42)	(72.88)	(546.42)	(187.17)	(236.29)
N	82161	82160	82160	82161	82161	88489
# firms	73	73	73	63	73	73
R2 (Within)	0.0913	0.0964	0.221	0.275	0.0737	
Endogeneity test:						
Endog. GB issuance	0.500	0.0426	1.610	0.0159	1.014	0.911
p-value (df=1)	0.479	0.837	0.205	0.900	0.314	0.340
Validity of instruments test:						
Hansen J statistic	1.502	1.500	1.053	0.0745	0.0638	0.630
p-value (df=1)	0.220	0.221	0.305	0.785	0.801	0.427

Notes: Driscoll-Kraay (Driscoll and Kraay, 1998b) robust t statistics in parentheses (max lag=7), * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, period (month) fixed effects included. GB= green bond, NGB= non-green bond, WACC=weighted average cost of capital. Issuances are cumulative, see Equation (1). Credit rating refers to Starmine model implied credit risk, transformed to an integer scale from 1 to 20, where 1 is highest and 20 is lowest credit risk (AAA). IV estimations performed with xtivreg2's Schaffer (2005b) GMM estimation with HAC robust standard errors using NGB issuance and GB issuance of other REs as instruments.

Table 7: Difference-in-Difference fixed effects regression results for first or one-time GB issuance, sample period 2015-2021

	(1) Cost of debt capital	(2) Short-term cost debt capital	(3) Long-term cost debt capital	(4) Credit rating	(5) Cost of equity capital	(6) WACC
First or one-time GB issuance	0.709***	0.560***	0.414***	-0.385***	-0.0310	0.297***
	(7.37)	(4.97)	(4.75)	(-3.53)	(-0.28)	(3.96)
NGB issuance	0.0394***	-0.0742***	-0.0204**	-0.00459	0.00624	-0.0374***
	(-3.38)	(-3.59)	(-2.49)	(-0.69)	(0.73)	(-3.89)
Cons	2.243***	2.710***	4.282***	12.70***	6.737***	4.848***
	(35.61)	(23.08)	(72.54)	(546.56)	(186.34)	(107.72)
N	71099	71098	71098	79777	71099	71099
# firms	72	72	72	63	72	72
R2 (Within)	0.106	0.0998	0.228	0.218	0.118	0.0839

Notes: See Table 6.

Table 8: Reputation effects of GB issuance, impact on ESG scores and its pillars

	(1) ESG	(2) Env score	(3) Soc score	(4) Gov score
GB issuance	3.289***	3.689***	2.885**	3.347**
	(2.93)	(2.67)	(2.39)	(2.60)
NGB issuance	0.758	0.644	0.227	1.453**
	(1.24)	(0.85)	(0.34)	(2.07)
Cons	50.49***	39.94*	56.34***	54.25**
	(2.76)	(1.78)	(2.86)	(2.60)
N (firm-year)	92	92	92	92
# firms	27	27	27	27

Notes: t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Env=Environmental, Soc=Social, Gov=Governance.

Table 9: Dependence of bond issuance on past issuances, Poisson model estimations, sample period 2011-2021

	(1) # GB issue	(2) # NGB issue	(3) # GB issue	(4) # NGB issue
$\sum$ own past GB issuances$_{t-1}$	0.0683***	-0.102***	0.0697***	-0.0959**
	(2.66)	(-2.73)	(2.69)	(-2.25)
$\sum$ own past NGB issuances$_{t-1}$	-0.0466***	0.0197***	-0.0441**	0.0217***
	(-3.12)	(3.11)	(-2.46)	(2.79)
$\sum$ GB issuances by all other REs$_t$			-0.00772	-0.00245
			(1.14)	(1.02)
$\sum$ NGB issuances by all other REs$_t$			0.00863	0.00355
			(-0.89)	(-0.23)
Other firm characteristics				
log(TA)$_{t-1}$	0.908***	0.861***	0.900***	0.856***
	(4.55)	(7.65)	(4.83)	(6.93)
ROA$_{t-1}$	0.0819*	0.0287*	0.0786*	0.0230
	(1.80)	(1.70)	(1.68)	(1.11)
Debt share$_{t-1}$	-0.00537	0.0137*	-0.00480	0.0139*
	(-0.51)	(1.78)	(-0.44)	(1.76)
Current ratio$_{t-1}$	-0.0141	-0.000791	-0.0114	-0.000622
	(-0.09)	(-1.33)	(-0.07)	(-1.22)
Year	0.435***	0.0496	0.557***	0.0563
	(4.40)	(1.57)	(5.05)	(0.69)
Cons	-901.0***	-121.4*	-1146.4***	-135.1
	(-4.49)	(-1.90)	(-5.10)	(-0.82)
N	559	559	559	559
# firms	71	71	71	71
chi2	403.0	597.8	465.3	620.9
df_m	7	7	9	9
p-value	<0.01	<0.01	<0.01	<0.01
R2 (pseudo)	0.498	0.453	0.501	0.454

Notes: Robust t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Firm-year observations, only listed firms. $\sum$ own past bond issuances of type k is variable $I^k_{i,t-1}$ in Equation (2). $\sum$ bond issuances all other REs$_t$: total cumulative count of all other REs' bond issuances.