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Which are the factors influencing green bonds issuance? Evidence from the European bonds market

Antonella Francesca Cicchiello[*], Matteo Cotugno[†], Stefano Monferrà [‡], Salvatore Perdichizzi[§]

Abstract

Based on a European sample, this paper examines the determinants affecting firms' choice between green or conventional bond issuance during 2015–2020. Our logit model results reveal that different issuer and corporate governance characteristics (i.e., current ratio, long debt, independent director) might significantly affect the issuer's decision between green and conventional bonds. Additionally, we show that the combined effect of board gender diversity and the issuer's debt maturity structure is positively related to green bond issuance. Our results suggest several key points relevant at both managerial and policy levels to promote the growth of the green bond market.

JEL Classification: G10, G34, G41, M14, O16

Keywords: Green bonds, Sustainable investment, Financial structure, Corporate Governance

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1 Introduction

The worsening of climate change, with climate-related disasters piling up season after season, has led to a greater awareness of environmental risks and, at the same time, to a growing focus on the transition from a capitalist and closed economy - focused on maximizing short-term profits - to a circular and sharing economy - focused on resource preservation, respect for the environment, and consumer safety. In this changing context, green bonds - a growing subset of the ESG investing universe - have become increasingly popular among companies and investors looking to reorient capital flows towards more sustainable investments. Green financing can play an essential role in tackling climate risks, raising funds for a low-carbon economy, and encouraging investors and issuers to incorporate climate issues in their investment, lending and underwriting decisions.

Since the European Investment Bank (EIB) pioneered the green bonds market by issuing the world's first Climate Awareness Bond (CAB) in late 2007, the European market has tremendously grown, with an average of 50% per year in the period 2015-2020. Currently, the EU is a global leader in green bonds, with 51% of the worldwide volume of green bonds being issued (Figure 1 - Panel A). The recently EU Taxonomy Regulation (Regulation 2020/852 of the European Parliament and of the Council of 18 June 2020) and the related EU Green Bond Standard (EUGBS) have played a critical role in bolstering the European sustainable finance market. In 2021, the global volume came from financial institutions and non-financial corporates, representing 26% and 25.7%, respectively (Figure 1 - Panel B).

Given their potential to mobilize financial sources towards sustainable investments, green bonds have become a crucial research topic among financial scholars. Despite the growing interest in green bond offers and investments, there is, however, a lack of understanding of their issuance drivers. The literature on firms' rationales to issue those securities remains limited, as only a few studies directly investigate the related issues (Lin and Su, 2022). The purpose of this paper is to fill this gap by providing a better understanding of the factors affecting a firm's choice to issue green bonds instead of conventional bonds and how these factors jointly play out. In particular, relying on the theoretical perspectives of firms' financing needs, conditions and preferences for environmental responsibility, we investigate the potential determinants divided into three main components: (i) issue characteristics; (ii) issuer-specific characteristics; and (iii)

issuer corporate governance characteristics. We also control for country-level characteristics (i.e., GDP growth, inflation and government interest rates).

As discussed in detail below, our results show that different issuer and corporate governance characteristics (i.e., current ratio, long-term debt, the board size, independent director) affect the probability of issuing a green bond. In addition, we evidence that the combined effect of board gender diversity and the issuer's debt structure is associated with a higher probability of issuing a green bond. Considering the behavioural and psychological differences in risk tolerance, overconfidence and ethical sensitivities (Datta et al., 2021; Atif et al., 2020), the green bond seems to be a more desirable choice for a firm with a high percentage of females on the board and a long-term debt structure.

This study makes several contributions to the literature. First, we contribute to the growing literature on the green bond market (Zerbib, 2019; Rannou et al., 2021; Simeth, 2022).. This literature focuses mainly on the pricing of green bonds in the market for corporate and sovereign green bonds (Flammer, 2021, 2013; Gianfrate and Peri, 2019; Fatica et al., 2021; Hyun et al., 2021). However, there is a lack of studies examining the rationales behind green bond issuance, which is crucial to promoting the development of the green bonds market. The sole exception is the recent study by Lin and Su (2022), providing an initial discussion based on China. Our study complements this literature by adding new insights into the European context. Second, we contribute to the literature on firms' financing decisions by examining the determinants affecting firms' choices between green or conventional bond issuance. Third, we contribute to the strand of the literature investigating how corporate governance affects bond issuance (Dutordoir et al., 2014). A growing subset of this literature examines the link between board gender diversity and firm sustainable investment, arguing that female directors generally demonstrate greater moral and ethical sensitivities than their male counterparts (Atif et al., 2020). We combine these two strands of literature to develop predictions on the relation between corporate governance characteristics and firms' likelihood to issue green bonds. Finally, this study extends the literature on firms' debt maturity structure by examining the effect of top-executives gender on green debt choice in the presence of a more extended debt maturity structure.

2 Theoretical deduction

According to recent studies, companies prefer to issue green bonds to obtain cheaper financing (Zerbib, 2019; Gianfrate and Peri, 2019). However, firms' decision between green and conventional bonds may be drive also by their preference for green and environmental responsibility. For example, companies may use green bonds to signal to investors their commitment to the environment and mitigate the economic and reputational risk (Flammer, 2013). Companies may also benefit from green bonds' tendency to improve firm-level environmental footprints and financial performance (Flammer, 2021).

Based on the above theoretical perspectives, we investigate the potential determinants of the green bond issuance. In particular, we include specific issuance and issuer characteristics as firms' financing needs and conditions drivers. Regarding issuance characteristics, empirical studies on green bonds reveal that the lower financing cost attracts corporate issuers by making green bonds more financially convenient than other bonds with similar characteristics. However, if issuance costs rise, green bonds are no longer the preferred (Gianfrate and Peri, 2019). Green bonds proceeds are exclusively used to finance new and existing eligible projects that contribute to environmental sustainability. This constraint on the proceeds use makes green bonds less convenient to satisfy more extensive financing needs (Barua and Chiesa, 2019). Furthermore, green bonds are not the main options of financing and firms prefer to issue them to satisfy a lower debt demand while taking advantage of enhance their green reputation. Recent studies also show that a longer bond maturity would require a larger issue size and affect the financing cost, making conventional bond preferable (Lin and Su, 2022).

Beside issuance characteristics, we investigate issuer-specific factors affecting the choice between green and conventional bonds. According to the literature, larger firms face lower information costs and have greater access to funding through the conventional ways (Frank and Goyal, 2009). We can then expect smaller firms to tap on the emerging green bond market to solve funding difficulties. The current ratio - used as a short-term solvency proxy - can have two potential opposite effects on the choice between green or conventional bonds issuance. Firms with a larger current ratio may be more likely to issue conventional bonds as they are characterized by fewer information asymmetries. Similarly, firms with a lower current ratio may prefer conventional bonds as they are more flexible and do not set limits on the

use of financing proceeds. A higher return on assets (ROA) - used as a proxy of the issuer's profitability - is expected to have a negative effect on the choice of green bonds. Firms with higher profitability will probably prefer to issue conventional bonds which are less subject to information asymmetries (Myers, 1977). We also consider the leverage of the firm, defined as the ratio of total debt to total assets. According to Denis and Mihov (2003), higher leverage can be interpreted as a positive signal as it indicates better access to the debt market and a better reputation. This variable is expected to be negatively linked with the probability to issue green bonds. According to Diamond (1991), firms choose long-term debt because they are not sure to be able to keep borrowing in the future and also to avoid market monitoring from bondholders after the issue. We can expect a long debt maturity to be positively correlated with green bond issuance. On the contrary, firms tend to borrow in the short run whether they expect to have better borrowing conditions in the future. These firms might not want to be tied by long-term debt conditions, thereby they will prefer conventional bonds.

Furthermore, we include issuer corporate governance characteristics. Relying on the gender socialisation theory (Dawson, 1997), recent studies reveal that a higher number of female directors promotes the implementation of sustainable investment strategies (Atif et al., 2020). Accordingly, in debt structure decisions, female executives and female CFO (who are responsible for financial planning and proposing strategic directions) are expected to prefer greener debt compared to their male counterparts. Similarly, a large board, as well as a board with more independent directors, are expected to be more environmentally responsive and more prone to make environmental decisions (Liao et al., 2015).

3 Data and estimation strategy

3.1 Data

To compile our dataset, we combine information from various sources. First, we collected 2875 corporate plain vanilla fixed coupon bond issuance records for 1098 "*Non-Financial*" firms in Europe[1] denominated in euro from the Thomson Reuter's Refinitiv fixed-income database

[1]The countries included are: Austria, Belgium, Bulgaria, Czech, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

issued from January 1, 2015, to December 31, 2020, as the initial sample. The database contains information on the total amount, maturity, coupon, credit rating, issuer, and ECB collateral eligibility. Second, we obtain annual firm-level balance sheet data from the Bureau Van Dijk Amadeus database for 2014 2020. We filter out firms for which information on total assets or total equity is unavailable. This step leads to reducing our sample to 794 firms. Then, we extract board information data from BoardEx. Board information data (number of directors, female participation rate on the board of directors and number of independent directors) are available for 282 listed firms. Finally, we obtain macroeconomic data on per GDP growth, inflation and government interest rates from Eurostat. The sample size varies across regression specifications because not all variables are available for all bond firm-year observations.

3.2 Summary statistics

Table 1 show the definition and descriptive statistics of the variables. The *Green* variable shows that, on average, 6.3% of firms issued a green bond. In terms of bonds structure, the average cost of the bond is equal to 2.0%; the amount issued averages 361.6 million Euros; the average bond maturity is 7.44, and the 48.9% of bond issued is ECB eligible with a rating equal to 14.23 (BBB for Fitch rating). Considering the issuer characteristics, the *Current ratio* equals 1.3%, *ROA* equals 5.5%, *Size* is equal to 23.02), *Long Debt* equals 26.02%, and *Leverage* equals 5.4%. The governance variables display that the female participation rate averages 30.8%; the mean number of directors is 12.81, and the board's portion of independent directors equals 53.3%. Finally, the GDP growth, the inflation, and interest rate averages respectively 0.0%, 1.3%; 0.6%.

3.3 Empirical design

To identify the determinants of firms' issuance of the green bond, we estimate the following logit model:

$$Green_{i,t} = \beta_0 + \beta_i X_{i,t-1} + \epsilon \tag{1}$$

where *Green* is a dummy variable that equals one if a firm issued a green bond and zero otherwise. $X_{i,t-1}$ are our set of potential determinants and ϵ represents an error term. Following Lin and Su (2022) and Altunbaş et al. (2010), the variables of issuer characteristics are lagged at time *t-1*. This step is essential since issuance choices are related to firms' accounts in the previous year, and this choice could prevent endogeneity issues. Finally, we account for the risk of serial correlation and heteroskedasticity using robust standard errors.

4 Results

Table 2 shows the main results for equation 1 (marginal effects are reported in table). In columns 1 and 2, we consider all the set of potential determinants classified in the three key categories.

Among the issuance characteristics variables, as expected, a longer bond maturity (*Tenor*) has a negatively significant effect on the issuer's likelihood to choose green bonds over conventional bonds. We also find that the *ECB Collateral Eligible* dummy shows a positive and statistically significant effect on the probability of green bond issuance. Regarding the issuer's characteristics, results reveal that *Long-term debt* and *Current ratio* positively affect the issuance choice between green and conventional bonds. According to the sign of the coefficients, firms with a more extended debt maturity structure and better solvency (larger current ratio) are those firms that have a positive probability of issuing a green bond, 33.6% and 10% respectively. Considering the issuer's corporate governance characteristics, we find that only *Board size* and *Independent Directors* are positively related to the issuance of green bonds. Moreover, it seems that board gender diversity does not affect the probability to issue a green bond.

Our findings support the financing demand and green preference as two theoretical channels. In the determinants of issuer choice between green and conventional bonds, only some issuer and corporate governance characteristics are significant, indicating the issuance choice would be a complex decision-making process. There are four main determinants' effects statistically significant at the 5% level supported by our analysis regression: current ratio, long-term debt, independent director, and board size. Since the determinants are classified into different types, it would propose a natural question, how do financial and corporate governance factors combine to determine the choices of the issuer to issue green bonds. To provide a more in-

depth understanding of this question, we further analyse the possible relative mechanism. The literature on the importance of board gender diversity and firm financing decisions suggests that there might be several channels that affect the decision of a firm to become "greener" (Atif et al., 2020). For this reason, we try to explain the positive relationship between the *Long-term Debt* and *Green* bond issuance. We start with an examination of the board gender diversity of the firm. To test the combined effect of board gender diversity and the firm debt structure choice on the firm probability to issue a green bond, we run again our regressions with two additional variables: a dummy equal to one if the *% Female board* is above the sample median and zero otherwise (*High Female*), and its interaction with the *Long-term Debt*. The results reported in Table 2, columns 3 and 4, suggest that firm boards with a high female participation rate for firms with a high long-term debt have a positive probability of issuing a green bond. More specifically, it increases the likelihood to issue a green bond between 45.4% and 41.9%.

This result can be explained by gender behavioural and psychological differences in risk tolerance, overconfidence and ethical sensitivities (Datta et al., 2021; Atif et al., 2020). The gender ethics framework posits that women are more likely to exhibit greater risk-avoidance (Jianakoplos and Bernasek, 1998) and less overconfidence (Barber and Odean, 2001) than male. Since short-maturity debt is more costly to risk-averse executives (Brockman et al., 2010), but it is more beneficial to overconfident managers (Huang et al., 2016), female executives (more risk-averse and less overconfident) are expected to have a higher preference for longer maturity debt than their male counterparts (less risk-averse and more overconfident). According to the gender socialization theory a higher number of female directors promotes the implementation of sustainable investment strategies (Atif et al., 2020). The above arguments provide solid theoretical underpinnings for the combined effect of board gender diversity and debt maturity structure on green bond issuance preference.

We also test whether there is evidence of an independent directors on the board and firm financing decision channel on the firm choice to issue a green bond. Similar to what we do with the board gender diversity ratio, we construct a dummy variable equal to one for firms with an independent director ratio above the sample median and zero otherwise (*High Independent Director*). We interact it with *Long-term Debt* to understand if the probability to issue a green bond can be related to firms with higher independent director ratios and long-term debt. The

results in columns 5 and 6 in Table 2, however, do not seem to suggest that an independent director played a role in the analysis. Overall, the results in this section indicate that firms with a higher female on board and oriented to long-term debt are more likely to issue a green bond.

To confirm our empirical evidence, we conducted a series of robustness checks. In Table 3, we show the results for the same regressions as those in Table 2, augmented by year, country, sector, and rating fixed effects. Following, Boutabba and Rannou (2022), we also control the implied liquidity risks for investors in terms of the liquidity premium. We find a significant positive effect on the issuer's likelihood to choose green bonds over conventional bonds. We also check if the presence of a female CFO affects our main results. We do not find this evidence. Finally, the results reiterate our main findings.[2]

5 Conclusions

The need to expand the scale of green bonds to realise a successful transition to a sustainable and green economy makes it necessary to analyse the drivers of green bond issuance. This paper provides an initial discussion based on the European context, investigating the potential factors influencing issuance choices between green or conventional bonds. Our main findings show that a higher corporate short-term debt repayment capability, a more extended debt maturity structure and a more significant presence of independent directors positively affect the probability of issuing a green bond. Green bond also seems to be a more desirable choice for issuers with a high percentage of females on the board and a longer-term debt structure. This paper provides clear managerial and policy implications. An in-depth understanding of the reasons behind the issuance of green bonds based on the specific background of Europe is fundamental to designing effective political incentives to promote faster growth of a high-quality green bond market and to achieve the sustainability outcomes urged by the overarching Paris Agreement framework. Additionally, as investing in sustainable projects and businesses has become critical, understanding and gaining experience in green bond issuance can help companies reduce long-term funding costs.

[2]Finally, we implement an instrumental-variable (IV) regressions to allow for the potential endogeneity of gender participation on the board of directors using as an instrument variable the Female Participation Rate at the NUTS 2 region where the firms headquarter is located. The results not reported in the manuscript confirm our main results.

Declarations of interest

None.

References

Altunbaş, Y., Kara, A., and Marques-Ibanez, D. (2010). Large debt financing: syndicated loans versus corporate bonds. The European Journal of Finance, 16(5):437 458.

Atif, M., Alam, M. S., and Hossain, M. (2020). Firm sustainable investment: Are female directors greener? Business Strategy and the Environment, 29(8):3449 3469.

Barber, B. M. and Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. The Quarterly Journal of Economics, 116(1):261 292.

Barua, S. and Chiesa, M. (2019). Sustainable financing practices through green bonds: What affects the funding size? Business Strategy and the Environment, 28(6):1131 1147.

Boutabba, M. A. and Rannou, Y. (2022). Investor strategies in the green bond market: The influence of liquidity risks, economic factors and clientele effects. International Review of Financial Analysis, 81:102071.

Brockman, P., Martin, X., and Unlu, E. (2010). Executive compensation and the maturity structure of corporate debt. The Journal of Finance, 65(3):1123 1161.

Datta, S., Doan, T., and Toscano, F. (2021). Top executive gender, board gender diversity, and financing decisions: Evidence from debt structure choice. Journal of Banking & Finance, 125:106070.

Dawson, L. M. (1997). Ethical differences between men and women in the sales profession. Journal of Business Ethics, 16(11):1143 1152.

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. (1991). Debt maturity structure and liquidity risk. The Quarterly Journal of Economics, 106(3):709 737.

Dutordoir, M., Strong, N., and Ziegan, M. C. (2014). Does corporate governance influence convertible bond issuance? Journal of Corporate Finance, 24:80 100.

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

Flammer, C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. Academy of Management Journal, 56(3):758 781.

Flammer, C. (2021). Corporate green bonds. Journal of Financial Economics.

Frank, M. Z. and Goyal, V. K. (2009). Capital structure decisions: which factors are reliably important? Financial management, 38(1):1 37.

Gianfrate, G. and Peri, M. (2019). The green advantage: Exploring the convenience of issuing green bonds. Journal of Cleaner Production, 219:127 135.

Huang, R., Tan, K. J. K., and Faff, R. W. (2016). Ceo overconfidence and corporate debt maturity. Journal of Corporate Finance, 36:93 110.

Hyun, S., Park, D., and Tian, S. (2021). Pricing of green labeling: A comparison of labeled and unlabeled green bonds. Finance Research Letters, 41:101816.

Jianakoplos, N. A. and Bernasek, A. (1998). Are women more risk averse? Economic Inquiry, 36(4):620 630.

Liao, L., Luo, L., and Tang, Q. (2015). Gender diversity, board independence, environmental committee and greenhouse gas disclosure. The British Accounting Review, 47(4):409 424.

Lin, B. and Su, T. (2022). Green bond vs conventional bond: Outline the rationale behind issuance choices in china. International Review of Financial Analysis, 81:102063.

Myers, S. C. (1977). Determinants of corporate borrowing. Journal of Financial Economics, 5(2):147 175.

Rannou, Y., Boutabba, M. A., and Barneto, P. (2021). Are green bond and carbon markets in europe complements or substitutes? insights from the activity of power firms. Energy Economics, 104:105651.

Simeth, N. (2022). The value of external reviews in the secondary green bond market. Finance Research Letters, 46:102306.

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

Table 1: Variable Definitions and Summary Statistics for the Full Sample (2015-2020).
Table 1 reports the summary statistics of the variables for the full sample. Sources: yearly firm-specific and board-firm-specific data, are respectively from Bureau Van Dijk Orbis Bank Focus and Boardex. Bond information and characteristics are from Thompson Reuters. Yearly macroeconomic data at the country level are from Eurostat.

Variable	Variable Definition	N	Mean	S.D.	Min	Max
Green	The dummy variable equals one if a firm issues a green bond, zero otherwise (more precisely, if the bond in the Thomson Reuters Refinitiv database is labelled as "green bonds").	591	0.063	0.242	0.000	1.000
Cost of bond	The average % rate of coupon interest per annum.	591	0.020	0.015	0.000	0.120
Amount Issued	The natural logarithm of the average amount of bond issuance.	591	19.701	1.133	13.943	21.724
Tenor	The average of number of years for bond maturity.	591	7.442	2.631	1.000	24.000
ECB Eligibility	The dummy variable equals one if the bond issued is ECB eligible as collateral, zero otherwise. The ratings are from S&P, Moodys, Fitch, and DBRS historical databases. According to the Guideline on implementing the Eurosystem monetary policy framework (ECB/2014/60).	591	0.489	0.500	0.000	1.000
Rating	We select the first-best rating from the four different rating agencies. The rating system securities are assigned a rating from 15 (e. g., AAA) to 1 (e. g., D), with 15 being the highest quality and one the lowest quality.	280	14.239	2.050	6.000	18.000
Leverage	Total capital to total assets.	591	0.054	0.082	0.000	0.911
Current ratio	Current assets (Cash and cash equivalents + Marketable securities + Accounts receivable + Prepaid expenses + Inventory) over Current liabilities (Short-term debt + Current portion of long-term debt + Accounts payable + Accrued liabilities like dividend, income tax, and payroll)	591	1.300	0.800	1.000	9.200
ROA	The EBIT to total assets (%), representing the profitability of the issuer.	591	0.055	0.054	-0.336	0.235
Size	The natural logarithm of total assets.	591	23.021	1.545	17.650	25.434
Long-term Debt	Total long debt to total assets.	591	0.262	0.145	0.000	0.868
% Female Board	The fraction of female on the board.	591	0.308	0.127	0.000	0.600
Board Size	The natural logarithm of the number of board members.	591	2.555	0.363	1.386	3.401
Independent Directors	The fraction of total independent directors on the board.	591	0.533	0.226	0.000	1.000
CFO Female	The dummy variable equals one if the CFO is a female, zero otherwise.	591	0.047	0.213	0.000	1.000
Liquidity Risk	In line with Boutabba and Rannou (2022), we proxied the Liquidity risk as to the annual standard deviation of the Bid-Ask Spread.	576	0.001	0.004	0.000	0.029
GDP growth	Gross domestic product annual growth rate.	591	0.000	0.038	-0.115	0.086
Inflation	Gross domestic product deflator.	591	0.013	0.010	-0.038	0.053
Interest rate	The 10-year government bond yield.	591	0.006	0.007	-0.005	0.034

Figure 1: This Figure evidences the Total amount of Green Bonds issuance by Region and Issuer type around the world

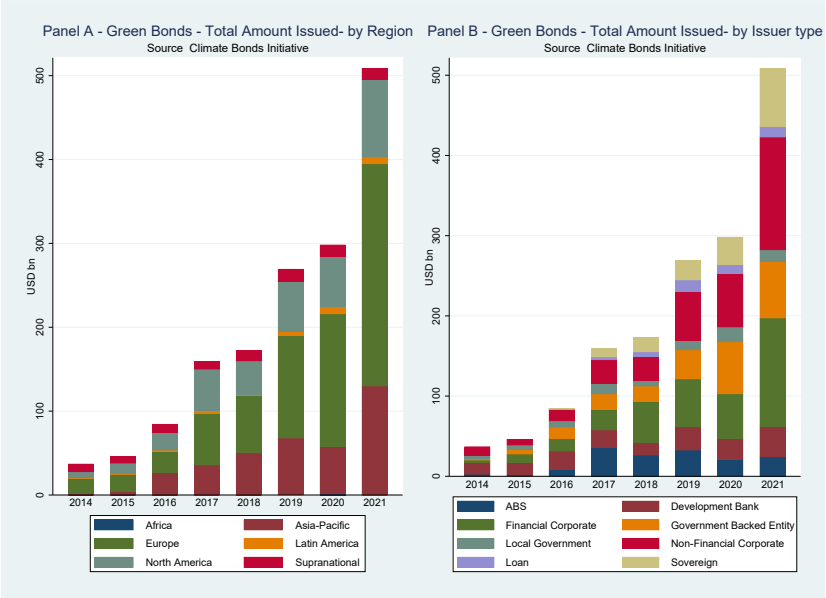

Table 2: Baseline results.

Table 2 reports estimates from equation 1. *Green* is a dummy variable that equals one for a bond classified as "Green Bond" in the Thomson Reuter's Refinitiv fixed-income database and zero otherwise. *High Female* is a dummy equal to one if the % Female board is above the sample median and zero otherwise. *High Independent Director* is a dummy variable equal to one for firms with an independent director ratio above the sample median and zero otherwise. In column 1, we jointly consider the bond, firm, and corporate governance characteristics. In column 2, we control for Rating fixed effects. In columns 3-6, we report estimate for the mechanism. All variables are defined in Table 1. Marginal effects are reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Green	Green	Green	Green	Green	Green
High female*Long-term Debt			0.454***	0.419*		
			(2.938)	(1.728)		
High female			-0.134***	-0.121		
			(-2.892)	(-1.353)		
High independent*Long-term Debt					0.236	-0.586
					(1.049)	(-0.923)
High independent					-0.036	0.257
					(-0.564)	(1.370)
Board size	0.080**	0.151**	0.068	0.137*	0.072*	0.141*
	(1.982)	(1.978)	(1.585)	(1.684)	(1.765)	(1.876)
Independent Directors	0.079	0.196**	0.078	0.198**		
	(1.400)	(1.975)	(1.287)	(1.965)		
% Female Board	-0.059	0.011			-0.069	-0.003
	(-0.629)	(0.057)			(-0.694)	(-0.015)
Long-term Debt	0.190**	0.336**	-0.132	0.053	0.008	0.815
	(2.191)	(2.214)	(-1.038)	(0.260)	(0.037)	(1.370)
Current ratio	0.173	0.100***	0.190*	0.994***	0.186*	0.101***
	(1.641)	(2.851)	(1.911)	(2.761)	(1.923)	(2.634)
ROA	-0.140	0.065	-0.125	0.292	-0.151	0.123
	(-0.961)	(0.167)	(-0.938)	(0.795)	(-1.047)	(0.307)
Size	-0.003	0.031	0.001	0.038	-0.000	0.039
	(-0.225)	(1.109)	(0.074)	(1.455)	(-0.025)	(1.419)
Leverage	-0.084	0.248	-0.034	0.372	-0.083	0.366
	(-0.577)	(0.709)	(-0.316)	(0.953)	(-0.622)	(0.842)
Cost of bonds	-0.449	-0.486	-0.410	-0.451	-0.258	-0.545*
	(-0.377)	(-1.605)	(-0.369)	(-1.514)	(-0.216)	(-1.659)
Amount Issued	0.012	-0.012	0.007	-0.021	0.009	-0.009
	(0.902)	(-0.206)	(0.499)	(-0.348)	(0.763)	(-0.149)
Tenor	-0.001	-0.016*	-0.001	-0.015*	-0.000	-0.019*
	(-0.254)	(-1.923)	(-0.231)	(-1.770)	(-0.060)	(-1.942)
ECB Collateral Eligible	0.052**	0.059	0.047*	0.053	0.052**	0.046
	(2.013)	(0.742)	(1.952)	(0.719)	(2.057)	(0.663)
GDP growth	-0.672***	-0.838**	-0.610***	-0.812**	-0.650***	-0.747**
	(-2.694)	(-2.222)	(-2.596)	(-2.179)	(-2.595)	(-2.194)
Inflation	0.317	0.216	0.286	0.218	0.119	-0.004
	(0.297)	(0.081)	(0.277)	(0.089)	(0.118)	(-0.002)
Government Bond interest rate	0.300**	0.674**	0.250**	0.601**	0.281**	0.579**
	(2.411)	(2.337)	(2.046)	(2.073)	(2.277)	(2.085)
Observations	591	243	591	243	591	243
Rating FE	NO	YES	NO	YES	NO	YES
Pseudo R2	0.130	0.263	0.160	0.276	0.137	0.274

Table 3: Robustness check.

Table 3 reports estimates from equation 1 controlling for time, country, and sector fixed effects. *Green* is a dummy variable that equals one for a bond classified as "Green Bond" in the Thomson Reuter's Refinitiv fixed-income database and zero otherwise. *High Female* is a dummy equal to one if the % Female board is above the sample median and zero otherwise. *High Independent Director* is a dummy variable equal to one for firms with an independent director ratio above the sample median and zero otherwise. In column 1, we jointly consider the bond, firm, and corporate governance characteristics. In column 2, we control for Rating fixed effects. In columns 3-6, we report estimate for the mechanism. All variables are defined in Table 1. Marginal effects are reported. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Green	Green	Green	Green	Green	Green
High female*Long-term Debt			0.406**	2.693***		
			(2.224)	(4.031)		
High female			-0.144**	-0.757***		
			(-1.996)	(-4.084)		
High independent*Long-term Debt					0.154	-0.108
					(0.594)	(-0.171)
High independent					-0.014	0.260
					(-0.185)	(1.550)
Board size	0.097	0.359***	0.077	0.105***	0.092	0.682***
	(1.551)	(3.223)	(1.075)	(4.226)	(1.448)	(4.127)
Independent Directors	0.037	0.161	0.036	0.451***		
	(0.545)	(0.874)	(0.528)	(3.409)		
% Female Board	-0.242	-0.087			-0.253	-0.148
	(-1.206)	(-0.215)			(-1.230)	(-0.491)
CFO Female	-0.001	0.001	0.018	-0.234	-0.004	
	(-0.017)	(0.007)	(0.238)	(-1.439)	(-0.061)	
Liquidity Risk	-0.081	0.772*	0.206	0.134***	0.563	0.373
	(-0.021)	(1.663)	(0.606)	(2.907)	(0.150)	(0.563)
Long-term Debt	0.222**	0.101***	-0.078	-0.158***	0.109	0.907
	(1.967)	(2.788)	(-0.520)	(-2.696)	(0.424)	(1.510)
Current ratio	0.285**	0.239***	0.325**	0.160***	0.308**	0.176***
	(2.061)	(3.748)	(2.376)	(3.411)	(2.286)	(2.643)
ROA	-0.286	0.624	-0.292	-0.267	-0.279	0.127
	(-1.639)	(0.773)	(-1.642)	(-0.502)	(-1.578)	(0.148)
Size	-0.000	0.071	0.003	-0.061	0.002	0.010
	(-0.002)	(1.252)	(0.239)	(-0.921)	(0.171)	(0.230)
Leverage	-0.252	0.816	-0.211	-0.159**	-0.223	-0.591
	(-1.404)	(1.504)	(-1.535)	(-2.225)	(-1.383)	(-1.408)
Cost of bonds	0.128	-0.726	0.248	0.202	0.241	-0.551
	(0.093)	(-1.393)	(0.188)	(0.571)	(0.181)	(-0.149)
Amount Issued	0.010	-0.009	0.006	0.001	0.006	0.030
	(0.638)	(-0.124)	(0.378)	(0.006)	(0.393)	(0.448)
Tenor	-0.001	-0.025**	-0.001	-0.038**	-0.001	-0.031***
	(-0.286)	(-2.058)	(-0.136)	(-2.029)	(-0.235)	(-2.718)
ECB Collateral Eligible	0.076**	0.073	0.066**	0.224**	0.076**	0.109
	(2.295)	(0.662)	(2.201)	(2.539)	(2.289)	(1.054)
Observations	523	173	523	173	523	173
Year FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES	YES	YES
Rating FE	NO	YES	NO	YES	NO	YES
Pseudo R2	0.228	0.453	0.241	0.644	0.234	0.586

Highlights:

1. Firms with a higher portion of long-term debt have a higher probability to issue a green bond.
2. *Per se* a higher board diversity (portion of female in the board of directors) seems to not be beneficial to increase the probability to issue a green bond.
3. *However*, firms with higher female on board and oriented to long-term financing are more likely to issue green bond.