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Corporate Green Bonds in Emerging Markets

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Resumo/Abstract

The financial sector is working on instruments to allocate private capital into sustainable investments to help countries address environmental issues, such as those targeted by the United Nations' Sustainable Development Goals (SDGs). One of the most recent instruments is the green bond, which corresponds to debt instruments that incorporate environmental projects. According to the signaling argument, companies could use green bond issuance as a credible signal to market players about their commitment toward environmental issues, which would cause a positive outcome from these players, improving their financial performance. And, assuming that it is a trustworthy commitment firm's environmental performance is also likely to improve. Some previous studies have already brought some insights into this argument, but this study aims to analyze the relationship between green bond issuance and financial and ESG performance in emerging markets, verifying this phenomenon in undeveloped economies. By using a two-level hierarchical linear model (HLM2) we show a positive and statistically significant relation between green bond issuance and financial performance, and similar results for ESG performance, even when the three dimensions are investigated separately. These results indicate that green bonds contribute to better environmental, governance, and financial performance. And from the theoretical perspective, these findings are consonant with the signaling theory.

Modalidade/Type

Artigo Científico / Scientific Paper

Área Temática/Research Area

Contabilidade Financeira e Finanças (CFF) / Financial Accounting and Finance

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ABSTRACT

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Keywords: Green bond. Sustainable finance. Sustainable investments. ESG initiatives. Emerging markets.

1. INTRODUCTION

There are several initiatives in sustainable finance and investment that were designed to integrate environmental and social factors into investment decisions, the most recent development is the corporate green bonds. The proceeds of this debt instrument are committed to financing environmental projects, such as renewable energy, pollution prevention, affordable basic infrastructure, and sustainable food systems (ICMA, 2021a, 2021b). So, this initiative may help to address some beneficial changes, channelling available assets toward sustainable investments, while pursuing to achieve the 17 Sustainable Development Goals of the United Nations. Green bonds highlight the three important components of sustainable finance and investment, the environmental dimension, the social dimension, and the governance dimension (Daugaard, 2019; Cunha et al., 2019).

Likely corporate green bonds, social bonds have become very popular in recent years, and these ESG initiatives has skyrocketed in 2021 when the market saw the highest issuance of 481.8 billion dollars for an environmental project and 177.2 billion for social bonds (Reuter, 2021). While these debt instruments became more prevalent in the financial markets, the knowledge about them did not follow.

There are still few research studies about this phenomenon. Some studies focus on the effectiveness of green bonds in impacting corporate financial and environmental performance, suggesting that there is a positive relationship between them (Jo, Kim & Park, 2015, Flammer 2020, 2021), others find that there is only a positive effect in

environmental performance (Deng & Lu, 2017, Yeow & Ng, 2021), and other arguing that there is no relationship at all (Maltais & Nykvist, 2020, Nguyen et al., 2021).

The field has much more to explore, for example, studies should investigate the issuance in other markets besides North America and Europe. Studies about green bond issuance in emerging markets or undeveloped economies are scarce, and these regions face much greater social and environmental challenges, suggesting that ESG debt instruments could lead to a more substantial change (Cunha, Meira & Orsato, 2021). Besides that, researchers did not explore each of the ESG (environmental, social and corporate governance) dimension individually in their studies, and commonly uses only one proxy to measure ESG performance.

Therefore, in this study, we aim to analyse the relationship between green bond issuance and ESG and financial performance in public companies in emerging markets, considering the three dimensions of ESG performance, separately.

So, it aims to shed light on the effectiveness of green bonds in supporting the development of green projects by answering the following questions:

(1) Can green bond issuance improve firms' environmental, social and governance performance of emerging markets companies?

(2) Do green bond issuance have a positive impact on the corporate financial performance of emerging markets companies?

According to the signaling argument, companies could use green bond issuance as a credibly signal to market players about their commitment toward environmental issues, which would cause a positive outcome for these players, improving their financial performance. And, assuming that it is a trustworthy commitment firm's environmental and social performance are also likely to improve (Flammer 2020, 2021, Yeow & Ng, 2021).

This study, therefore, hopes to investigate if this argument can be beheld in emerging markets. To achieve this aim, we compile a data set of public companies headed in emerging markets from the Refinitv database, considering their ESG performance, financial performance, information about the green bond issuance, and other accounting information, from 2016 to 2021. Next, we examine how ESG, and financial performance are influenced by green bond issuance using a two-level hierarchical linear model (HLM2).

The results show a positive and statistically significant relationship between green bond issuance and ESG performance. Likewise, for green bond issuance and environmental performance, and governance performance, individually. For the influence of green bonds on social performance, there is a positive relationship, but it is not statistically significant, if we consider a significance of 10%. And, finally, for financial performance, results present a positively and statistically significant relation with green bond issuance and ROA.

These results indicate that green bonds contribute to better environmental, social, governance, and financial performance. And from the theoretical perspective, these findings are consonant with the signaling theory (Flammer, 2020, 2021).

This research contributes to the efforts to the continual commitment between financial systems and sustainability. The study's insights shows that in undeveloped economies the issuance of green bonds can help companies improve their ESG and financial performance, encouraging more issuance in these economies, which greatly need projects focused on environmental issues.

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29 de Novembro a 01 de Dezembro de 2023
São Paulo-SP

Research's evidence could be valuable for scholars, business managers, investors, financial analysts, and policymakers because demonstrate the importance of considering sustainable aspects in financial decision-making. Finally, this study also contributes to the pursuit of the 17 Sustainable Development Goals from the United Nations, while stimulating sustainable finance and investment.

2. THEORETICAL CONTEXT

The first green bond was issued in 2008 by the World Bank in cooperation with the Swedish bank SEB (World Bank, 2019). Since then, the global green bond market has grown from 11 billion USD issued in 2013 to 522.7 billion USD in 2021, while the social bond market reached 200.2 billion USD in the same year (Climate Initiative Bond, 2021).

Green bonds, social bonds, sustainable bonds, and responsible bonds are initiatives from a phenomenon known as impact investing. These initiatives seek a positive environmental and social impact withal financial return (Liang & Renneboog, 2020). The green bond market has become increasingly popular in recent years, but the literature is still crawling trying to understand the rationales for issuing green bonds and their implications. As proposed by Flammer (2021), one of these rationales can be explained through the lens of signaling theory.

The signaling theory proposed by Spence (1973) is concerned with reducing the information asymmetry between two parties. In his seminal work, the author discusses labour markets, demonstrating how a job applicant might engage in behaviours to reduce information asymmetry. Spence illustrated how high-quality prospective employees distinguish themselves from low-quality prospects via the costly signal of rigorous higher education. Management and financial scholars have also applied signaling theory to help explain the influence of information asymmetry in a wide array of research contexts, including firms and investors (Connelly et al., 2010).

So, to reduce transaction costs, companies need to reduce the information asymmetry between what they know about themselves and what investors know, through costly actions that will underlie their intentions (Lyon & Montgomery, 2015). One way to do this is by taking actions that could send a signal to investors.

As presented by Spense (1973) and Riley (1979) in signaling theory, a signal is effective if firms with less desirable characteristics could not imitate it. In this regard, green bonds may allow companies to credible signal that they are environmentally responsible and committed to undertaking investments in green projects (Flammer, 2021).

Previous studies (e.g., Klassen & McLaughlin, 1996; Flammer, 2013; Krueger, 2015) has shown that the response of the stock market is positive when companies engage in environmental and socially responsible behaviour. So, it is expected that corporate green bonds provide a credible signal of companies' commitment to sustainable practices, allowing a positive stock market reaction and a positive financial return.

Ararat and Suel (2011) aim that from investors' point of view, sustainable investments, such as green bonds, can contribute to global sustainability and also improve long-term risk management and therefore increase expected investment returns.

In the finance literature, there has been some work examining if the green label makes a difference in bond yields/pricing of green bonds (Ehlers and Packer 2017; Baker et al. 2018; Zerbib, 2019). Other studies investigate green bonds as an innovation that could help the liquidity of infrastructure assets (Merk et al., 2012; Della Croce & Yermo, 2013; Bhattacharya, Oppenheim & Stern, 2015).

But most research studies focus on the role of green bonds in a portfolio, by investigating the relationship between green bonds and traditional bonds (Reboredo, 2018; Reboredo & Ugolini, 2020; Reboredo et al., 2020; Nguyen et al., 2021). Even the most of them show that green bonds performed better than traditional bonds, some studies bring evidence that the performance of a green investment is not significantly different from traditional ones (Friede et al., 2015; Revelli & Viviani, 2015).

As well as the early US literature (Hamilton, Jo & Statman, 1993; Statman, 2000; Schroder, 2003) shows that the performance of sustainable investment is not significantly different from that of non-sustainable investment. Besides that, it was found that ESG considerations could lower expected returns because high ESG may lower risk which then leads to lower expected returns (Hong & Kacperczyk, 2009; Albuquerque, Koskinen & Zhang, 2019; Bolton & Kacperczyk, 2020).

Between this and that, there is still no consensus about whether green investing helps or hurts corporate performance. And, despite the undeniable contributions made by previous research, only a few studies focus on the effectiveness of green bonds in impacting corporate ESG performance, and financial performance. And even fewer studies discuss this impact in emerging markets, prevailing in the literature research only in developed economies. In this study, we aim to fill this gap by examining the issuance of green bonds by companies in emerging markets and their financial and ESG performance, considering each dimension individually.

3. LITERATURE REVIEW

Green bonds are any type of fixed income instrument whose proceeds or an equivalent amount will be exclusively applied to finance or refinance, entirely or partially, projects with clear environmental benefits. The ICMA presents that eligible green project categories may include renewable energy, energy efficiency, pollution prevention and control, environmentally sustainable management of living natural resources and land use, terrestrial and aquatic biodiversity conservation, clean transportation, sustainable water and wastewater management, climate change adaptation, circular economy adapted products, production technologies and process and/or certified eco-efficient products, and green buildings. Liberati and Marinelli (2021, p.5) presented green bonds as "debt securities whose proceeds are invested by the issuer to pursue environmental sustainability purposes such as the reduction of CO_2 emissions, and the increase of energy efficiency".

As market participants increase their awareness of and interest in ESG strategies and projects, the use of these instruments should continue to grow. The financial market can play an important role in redirecting capital toward sustainable activities, including the transition to a low-carbon economy and a more equal society (Núñez, Velloso, & Da Silva, 2022). As a result, investors are placing greater scrutiny on green instruments, increasingly seeking better risk information, return and impact, and demanding actions to mitigate ESG risk exposure.

In emerging markets, green debt instruments are becoming an increasingly reliable strategy for sovereign and corporate issuers, showing the potential of green bonds as a source of financing for sustainable investments (GSI, 2020). According to Bloomberg's analyst Sydney Maki (2022) even with a lower starting point, the growth rate of green debt issuance in emerging markets is whopping, sending a sign that the

financial world is adopting the sustainable trend. The 2021's boom was led by China, followed by Latin American nations such as Chile, Mexico, and Brazil, and India, Indonesia, and Malaysia.

Despite this distinguished growth, studies about green bond issuance in emerging markets or undeveloped economies are scarce. These regions face much greater social and environmental challenges, suggesting that ESG debt instruments could lead to a more substantial change (Cunha, Meira & Orsato, 2021). Therefore, this study focuses on corporate green bond issuance in emerging markets.

Regarding green bond issuance, several studies have highlighted the positive outcome of green bonds on firms' environmental and corporate social responsibility (CSR) performance (Deng and Lu, 2017; Sebastiani, 2019; Zhou and Cui, 2019, Flammer, 2020, 2021, Yeow & Ng, 2021).

Deng and Lu (2017) conclude that green debt instruments have a significant impact on CSR improvement. They propose that establishing green financing policies is an effective way to improve environmental performance and CSR since it strengthens the regulation of firm-level environmental commitment. Similarly, Sebastiani (2019) discovers that energy and utility companies seem to lower CO2 emissions regarding the issuance of their first green bond.

According to Zhou and Cui (2019), green bonds produce significant environmental and economic benefits; additionally, green bond issuance increases companies' CSR participation. In the same way, Flammer (2020) in her study demonstrates that the environmental scores, as well as the CO2 emissions of green bond issuers, subsequently outperform those of non-green bond issuers.

Then, Flammer (2021) concludes that corporate green bonds are effective in improving companies' environmental ratings and lowering their CO2 emission levels, both in the short term and long term, suggesting that green bonds are a powerful tool in climate financing.

As presented before, green bonds may serve as a credible signal of the company's commitment toward the environment, since they could represent a real commitment to environmental, social and governance issues. And, if it is a credible signal, it could lead to positive financial performance.

Yeow and Ng (2021) claim that green bonds can impact corporate environmental performance positively. In addition, the authors state that green bonds could impact corporate financial performance indirectly, with better profitability and higher financial valuation. Weber (2017) shows that companies which incorporate ESG issues into their financial practice manage to increase financial performance. He also suggests that green credit policies adopted by financial institutions, such as banks, could promote a successful financial sector. And Al-Mheiri and Nobanee (2020) discover that companies could be lowering their costs by using green bonds. This strategy is another way to pursue an improvement in financial performance.

So, it is expected that companies with ESG bond issuance have superior environmental, social, governance and financial performance since they are committed to investing in ESG issues. Environmental, social and governance performance can be defined as the relationship between the organisation and the environment, the society, and its corporate governance, which measures the company's ability to engage in ESG practices (such as reducing GHG emissions, providing vocational training, and promote reduction of waste). To correctly evaluate the ESG corporate performance it is necessary

to adopt non-financial metrics, as proposed by Yeow and Ng (2021). The authors highlight Refinitiv's ESG score as a usual proxy for ESG performance.

Therefore, according to previous studies and supported by signalling theory, we propose the following hypotheses:

H1: the issuance of green bonds by companies in emerging markets can positively influence environmental, social and governance performance.

H2: the issuance of green bonds by companies in emerging markets can positively influence financial performance.

4. METHODOLOGY

To analyse the relationship between the issue of green bonds, ESG performance and financial performance in emerging markets, the initial sample comprises public companies from 2016 to 2021. We consider these six years because companies hardly disclosed ESG data before this period in the Refinitiv database.

The International Monetary Fund classifies as emerging markets 20 economies from 2010 to 2020, based on income, sustainable and strong growth and stability that can provide participation in global trade and financial market integration (IMF, 2021). These economies are Argentina, Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Iran, Malaysia, Mexico, the Philippines, Poland, Russia, Saudi Arabia, South Africa, Thailand, Turkey, and the United Arab Emirates (IMF, 2021).

Countries classified as emerging markets that did not present any corporate green bond issuance for the analysed period were excluded. Therefore, in this study, we analyse publicly traded companies from only 10 emerging economies: Brazil, Chile, China, Colombia, India, Indonesia, the Philippines, Poland, South Africa, and Thailand.

We limited the sample to firms with available ESG data, collected from the Refinitiv database. The final sample comprises 1,503 public companies from 2016 to 2021, in an unbalanced panel data with 5,478 firm-year observations.

As there are many corporate ESG bonds issued by financial institutions, we chose not to exclude the financial sector from our sample. Consistent with prior literature about sustainable finance, studies have sought to include this sector in their analyses (Zhou & Cui, 2019; Flammer, 2021). Table 1 reports the number of companies by country and by industry.

Table 1 - Sample by country and by industry

Industry	Brazil	Chile	China	Col.	India	Indon.	Philip.	Pol.	S. Africa	Thail.	Total
Academic and educational service	4	0	9	0	2	0	0	2	0	1	18
Basic materials	12	2	81	3	22	5	3	5	14	18	165
Consumer cyclicals	15	0	101	4	9	4	3	7	22	13	178
Consumer non-cyclicals	11	0	87	1	12	5	4	3	17	8	148
Energy	3	2	32	1	16	0	2	2	4	4	66
Financials	20	32	112	3	31	3	5	2	9	6	223
Healthcare	10	2	66	1	6	7	1	2	6	12	113
Industrials	20	3	102	2	23	9	5	6	10	16	196
Real estate	7	0	58	4	21	3	2	4	4	6	109
Technology	15	1	96	2	16	8	1	6	34	20	199
Utilities	8	1	60	0	9	2	0	3	4	1	88
Total	**125**	**43**	**804**	**21**	**167**	**46**	**26**	**42**	**124**	**105**	**1503**

Note: Col. = Colombia, Indon. = Indonesia, Philip. = the Philippines, Pol. = Poland, S. Africa = South Africa, Thail. = Thailand.

ESG data, financial data, and information about the issuance of corporate green bonds are obtained from the Refinitiv database. Refinitiv (previous Thomson Reuters database) is specialized in providing objective, relevant, auditable, and systematic ESG information (Flammer, 2021). To mitigate the impact of outliers, all ratios are winsorized at the 1st and 99th percentiles of their empirical distribution.

To meet the study hypotheses, we selected five dependent variables. To measure the ESG performance we choose the ESG score from Refinitiv which measures the company's ESG performance based on verifiable reported data, adding 630 company-level ESG measures, of three pillars: environmental, social and governance (Refinitiv, 2022). In addition, we used the Environmental pillar score, Social pillar score and Governance pillar score, to investigate the impact of green bond issuance on each pillar score of ESG performance separately.

The Environmental pillar score aggregates measures from three categories, resource use, emissions, and innovation. While the Social pillar score aggregates from categories, workforce, human rights, community, and product responsibility. And the Governance pillar from other three categories, management, shareholders, and CSR (Corporate Social Responsibility) strategy. The pillar weights are normalised to percentages ranging between 0 and 100 (for further information, refer to Refinitiv, 2022).

These metrics are often used in the literature as an indicator of a firm's performance on environmental, social and governance dimensions (Ioannou & Serafeim, 2012; Cheng et al., 2014; Hartmann & Uhlenbruck, 2015; Rees & Rodionova, 2015; Del Bosco & Misani, 2016; Zhou & Cui, 2019; Yu, Luu & Chen, 2020; Flammer, 2021).

The last dependent variable, which represents the financial performance we choose to use is the return on assets (ROA) metric. ROA is the ratio of net profit before taxes to total assets. This metric is also often used in the literature to represent financial performance and applied more recently by Zhou and Cui (2019) and Flammer (2021).

To measure the issuance of green bonds by companies we create a dummy using the Refinitiv database which contains all the issuance of green bonds made in the world. So, if the dummy assumes value 1 there was an issuance of green bond, and 0 otherwise.

Finally, we include control variables to control for other possible influences on ESG and financial performance: firm size, equity multiplier, asset turnover, and a dummy for regulated countries.

There are two variables for firm size, called Size1 and Size2. The first one is the natural logarithm of the company's market capitalization, and the second is the natural logarithm of the total assets. Firm size is relevant because of the existence of economies of scale, which according to Elsayed and Paton (2005) is more prominent in investments related to environmental issues.

The debt capacity, measured by the equity multiplier, controls for the possibility that some treated firms have better access to funds (Flammer, 2021). The equity multiplier (EM) is the ratio of total assets to total equity.

Asset turnover is the ratio of total sales to total assets, and it is used as an indicator of a company's efficiency. So, asset turnover (AT) is used as a control variable because the AT ratio could influence financial and ESG performance.

We also include a dummy variable, called Regulated, which assumes a value of 1 if the company is from countries which have defined regulations for green bond issuance, and 0 otherwise. Green bonds issued in China and India have a specification about what makes a bond green (Maltais & Nykvist, 2020).

AT ratio and EM ratio was used by Yeow and Ng (2021), the authors affirm that these variables are included as they are sufficiently correlated with omitted causal factors. Table 2 presents the expected the expected signals between the variables.

Table 2 - Expected signals between variables

	ESG	ENV	SOC	GOV	ROA
Greenbond	+	+	+	+	+
Size1	+	+	+	+	+
Size2	+	+	+	+	+
EM	-	-	-	-	-
AT	+	+	+	+	+
Regulated	+	+	+	+	+

Note: ESG = ESG score; ENV = environmental pillar score; SOC = social pillar score; GOV = governance pillar score; ROA = return on assets ratio; Greenbond = dummy for green bond issuance; Size1 = firm size; Size2 = firm size; EM = equity multiplier; AT = asset turnover.

We analyse the relation between ESG and financial performance and the issuance of green bonds by applying a hierarchical linear model, or multilevel modelling. The hierarchical linear models for panel data are considered more robust and perform better than traditional panel models with fixed or random effects because they recognize the existence of clusters or hierarchy in the data (Raudenbush & Bryk, 2002).

In this study, we estimate all five models considering two levels in the specification of the hierarchical model, level 1 representing the firm (1,503 firms) and level 2 representing the country (10 emerging markets). We previously tested the suitability of the null models for country and sector clustering and concluded based on

the results that it would be best to use country clustering, for all five models. We also tested whether it would be better to use two-level or three-level modelling, considering the cluster by year, and according to the results, the best option is a two-level hierarchical linear model (HLM2).

5. RESULTS

5.1 Descriptive statistics and correlation

The descriptive statistics are shown in Table 3. For the first dependent variable, ESG performance score, on average the companies in the sample have an ESG performance of less than 45%. The same pattern occurs for environmental performance score (ENV), and social performance score (SOC). For governance (GOV) we have a better performance. However, the standard deviations for these metrics are high, which means that some companies have a high performance and others a very low performance.

For Latin American (Brazil, Chile, and Colombia) companies the average ESG performance is 47,4% (with a standard deviation of 22.96) during the six years, and the social dimension is the one with the highest average performance (51%). For Chinese companies, the average ESG performance is 37% (and standard deviation of 16.42), and the governance dimension has the better performance (49%).

Table 3 - Descriptive statistics

Variable	N	Mean	Min	p50	Max	SD
ESG	5478	44.61	4.75	44.57	85.36	18.91
ENV	5478	37.71	0	36.38	90.27	25.33
SOC	5478	43.80	2.63	42.97	92.30	24.04
GOV	5478	50.66	3.54	51.16	90.60	21.66
ROA	5478	0.21	0	0.06	4.52	0.67
Size1	5478	22.54	17.89	22.33	27.20	1.73
Size2	5478	19.25	11.50	21.31	25.32	3.89
EM	5478	3.70	0.00	2.34	20.69	3.59
AT	5478	0.10	0	0.07	1.06	0.15

Note: ESG = ESG score; ENV = environmental pillar score; SOC = social pillar score; GOV = governance pillar score; ROA = return on assets ratio; Size1 = firm size; Size2 = firm size; EM = equity multiplier; AT = asset turnover; Min = minimum; Max = maximum; Std. dev. = standard deviation; p50 = median.

The other Asian economies (India, Indonesia, Philippines, and Thailand) present an average ESG performance of 50% (and a standard deviation of 18), and the social performance (55%) is the best one. Finally, for South Africa and Poland, the average ESG performance is 50.5% (standard deviation of 17) and 44.5% (standard deviation of 17.6), respectively. The best performance for South African companies is from the social pillar (54%) and for Polish companies, it is from the governance pillar (47%). None of the countries has a noteworthy environmental performance.

The financial performance, measured by ROA, presents an average of 0.21 with a standard deviation of 0,67. If we consider that the higher the ROA, the more efficient the company – because it can generate more profits with fewer assets –, these companies are not efficient. There is a large variation between ROA's averages, when analyzing each

country separately (Brazil=0.68, Chile=0.85, China=0.06, Colombia=1.03, India=0.26, Indonesia=0.1, Philippines=0.06, Poland=0.02, South Africa=0.55, and Thailand=0.07).

The equity multiplier (EM) is a risk indicator, generally, a high EM indicates that a company is using a high amount of debt to finance assets, and a low EM means that the company has less reliance on debt. It is more appropriate to compare the EM ratio between peers, so we compared by country. Chile has the highest average EM ratio (7.75), followed by Colombia (5.31) and Poland (4.91). So, these companies may rely more on debt to finance their assets.

Finally, the asset turnover ratio (AT) which shows how efficiently a company can use its assets to generate revenue, demonstrates that these analyzed companies are not much efficient, on average. The best average AT ratio is presented by Indian companies (0.16), followed by Brazilian companies (0.12).

The correlation between the chosen metrics was also analyzed. Table 4 presents Spearman's correlation coefficients.

Table 4 - Spearman's correlation coefficients

	ESG	ENV	SOC	GOV	ROA	Green	Size1	Size2	EM	AT	Reg.
ESG	1										
ENV	0.82*	1									
SOC	0.89*	0.69*	1								
GOV	0.60*	0.29*	0.28*	1							
ROA	0.08*	0.06*	0.10*	0.00	1						
Green	0.05*	0.06*	0.04*	0.04*	-0.01	1					
Size1	0.22*	0.25*	0.18*	0.09*	-0.28*	0.13*	1				
Size2	-0.16*	-0.05*	-0.29*	0.05*	-0.22*	0.06*	0.40*	1			
EM	0.11*	0.07*	0.12*	0.01	-0.19*	0.11*	0.61*	0.06*	1		
AT	0.04*	0.02	0.07*	-0.01	0.62*	-0.06*	-0.46*	-0.19*	-0.32*	1	
Reg.	-0.25*	-0.16*	-0.37*	0.01	-0.19*	0.02	0.21*	0.76*	-0.01	-0.1*	1

Note: ESG = ESG score; ENV = environmental pillar score; SOC = social pillar score; GOV = governance pillar score; ROA = return on assets ratio; Green = dummy for green bond issuance; Size1 = firm size; Size2 = firm size; EM = equity multiplier; AT = asset turnover; Reg = dummy for regulated firms.

The environmental and social are strongly correlated (0.69), which was expected. While the dependent variables for ESG performance (ESG, ENV, SOC, GOV) are weakly but positively correlated with the independent variable (Green). And the dependent variable for financial performance (ROA) seems to be negatively correlated with green bonds, contrary to the expected by previous studies.

5.2 Regression results and analyses

Table 5 presents the estimation for models 1, 2, 3 and 4 to test the first hypothesis (H$_1$), which refers to the positive influence of green bond issuance on ESG performance, and also the estimation for model 5, to test the second hypothesis (H$_2$), verifying if the issuance of green bonds is positively related to the financial performance.

Model 1, as expected, shows a positive and statistically significant relationship between green bond issuance and ESG performance. Likewise, Models 2 and 4, show a positive and statistically significant relation between green bond issuance and

environmental performance (Model 2), and governance performance (Model 3), individually. For the influence of green bonds on social performance, Model 3 shows a positive relationship, but not statistically significant if we consider a significance of 10%. And, finally, for financial performance, Model 5, presents a positively and statistically significant relation with green bond issuance.

These results indicate that green bonds issuance contribute to better environmental, governance, and financial performance. And from the theoretical perspective, these findings are consonant with the signaling theory (Flammer, 2020, 2021). The issuance of green bonds seems to be a trustworthy commitment to environmental issues, due to the positive relationship presented.

Yeow and Ng (2021) presented similar findings, for environmental performance when considering the issuance of green bonds. They used as a proxy for environmental performance the amount of GHG emissions, and include companies from North America, Asia, and Europe. The authors also investigated the relationship between green bonds and financial performance, using as a proxy the ROA ratio, but did not find a statistically significant relation.

Table 5 - Results from HLM2 regression

	Model 1	Model 2	Model 3	Model 4	Model 5
Fixed effects	**ESG**	**ENV**	**SOC**	**GOV**	**ROA**
GreenBond	3.340441	4.871495	2.516935	4.233659	0.095054
	(0.013)	(0.009)	(0.109)	(0.016)	(0.021)
Size1	5.374336	7.70751	6.329857	2.154101	
	(0.000)	(0.000)	(0.000)	(0.000)	
Size2					-0.01356
					(0.000)
EM	-0.8417822	-1.53434	-0.79141	-0.55529	0.000478
	(0.000)	(0.000)	(0.000)	(0.000)	(0.814)
AT	14.81653	21.11751	19.35433	4.590266	2.702074
	(0.000)	(0.000)	(0.000)	(0.036)	(0.000)
Regulated	2.125022	-1.39984	2.186694	0.073566	-0.05517
	(0.251)	(0.568)	(0.325)	(0.958)	(0.339)
Cons.	-70.04929	-127.232	-88.965	3.643695	0.242086
	(0.000)	(0.000)	(0.000)	(0.484)	(0.007)
Random effects					
Country	44.2455	42.92707	108.1223	3.274476	0.046478
ICC	0.1424638	0.076703	0.228515	0.007055	0.1559
N	5478	5478	5478	5478	5478
Groups	10	10	10	10	10
Wald chi2	974.08	979.49	1025.82	92.45	3417.14
Prob > chi2	0.000	0.000	0.000	0.000	0.000
LR test vs. linear model:	537.39	235.97	1010.69	8.56	307.24
Prob >= chibar2	0.000	0.000	0.000	0.0017	0.000

The findings in this study shed light on how the green bond issuance can beneficiate companies' performance. For the first control variable, Regulated, the coefficients are not statistically significant. Such result suggests that does not matter if a country has specific and defined rules for green bond issuance, when we are analyzing ESG and financial performance.

As for the other control variables, size is found to be positively and statistically significant. So, the larger the company, the higher its ESG performance, and the opposite result for financial performance. As proposed by previous studies which argue that larger firms tend to perform better from an environmental standpoint (Deng & Lu, 2017, Yeow & Ng, 2021). And in this study, a larger firm seems to have a better social and governance performance.

The asset turnover ratio (AT) is positive and significant with all dependent variables, so the more efficient the firm is at generating revenue from sales, the higher its ESG and financial performance (Yeow & Ng, 2021). Finally, the equity multiplier ratio (EM) is negatively and significantly associated with ESG performance at all dimensions. That means the higher its debt reliance the lower its ESG performance.

6. CONCLUSIONS

This study discussed the green bond issuance as an opportunity, as a new financing tool in sustainable finance, to improve ESG and financial performance in companies from emerging economies, which is rarely approached by the literature. Analysing ESG and financial data from companies headed in ten emerging markets from 2016 to 2021, and using a hierarchical linear model (HLM2), we present some evidence that this could be true.

Considering ESG performance improvement by green bond issuance, some previous studies presented similar results (Flammer 2020, 2021; Yeow & Ng, 2021). However, in this study, we present evidence that the issuance of green bonds helps to improve environmental and governance dimensions, since the results for the social dimension are not statistically significant.

We find that different from other research studies, the green bond issuance seems to positively influence the financial performance as well. Wherefore, our results are consistent with the signaling argument and demonstrate that green bond issuance helps companies to send credible signals about their commitment toward environmental issues, which bring positive financial outcomes (Flammer, 2013, 2021; Klassen & McLauglin, 1996; Krueger, 2015). And when this commitment materializes, the environmental and governance performance improves.

This research contributes to the efforts to the continual commitment between financial systems and sustainability. This study's insights show that in undeveloped economies the issuance of green bonds can help companies improve their ESG and financial performance, encouraging more issuance in these economies, which greatly need projects focused on environmental and social issues.

Research's evidence could be valuable for scholars, business managers, investors, financial analysts, and policymakers because demonstrate the importance of considering

sustainable aspects in financial decision-making. Finally, this study also contributes to the pursuit of the 17 Sustainable Development Goals from the United Nations, while stimulating sustainable finance and investment.

This study calls for future research, since ESG debt instruments are still crawling, and the results are based on a small number of observations. Another aspect that needs attention is the social and cultural features of market players in such different countries, which this study did not consider.

As the sustainable finance research area is still new, and fragmented, integrating theories for generating new research hypotheses could help in its development, and bring interesting findings.

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