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Green bond issuance and value creation for stockholders: evidence from Italy

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Abstract: This paper investigates the value creation for the stockholders through the analysis of the stock Italian market reaction when green bonds are issued in the market. Announcement data for issued green bonds have been hand-collected and the empirical analysis has been conducted with the aim of evaluating the difference in stock returns between green bond issuers and not issuers. Stocks have first been filtered for the market returns by capital asset pricing model (CAPM). Then, a nearest neighbours' approach has been used for matching purposes. Results show that the issuance of green bonds did not affect significantly the remuneration required by stockholders. Our research is directed to academics, practitioners and companies.

Keywords: corporate value creation; green bond; capital asset pricing model; CAPM; matching; sustainability; Italy.

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1 Introduction

The role of sustainability has begun to play an increasingly central role within the corporate organisational asset. Climate change that is plaguing the Earth led the member states of the United Nations to draft 2030 Agenda in 2015, setting 17 Sustainable Development Goals (SDGs).

Ever-increasing climate pressures have prompted more and more investors to shift their preferences to green finance instruments, which depending on the type – use of proceeds or general purpose-based – allow issuers to contribute to climate improvement and the implementation of projects whose common thread is the building of a national ecological civilisation (Xi and Jing, 2021). This type of investment is defined as socially responsible (SRI) as after carrying out an accurate financial analysis, it considers both its social and environmental consequences, whether positive or negative, making possible real steps towards achieving the SDGs (Broadstock et al., 2022).

According to Sládková et al. (2022), there are three factors that contribute to the growth of SRI, i.e., access to information, the ever-increasing presence of female investors who have shown themselves inclined towards social and environmental aspects and finally the willingness of investors to diversify their financial portfolio. There is still no single definition of green finance. Among the others, Lee and Lee (2022) argue that the concept finds a definition from the consideration of some aspects such as environmental protection and financial innovation (Salazar, 1998; Labatt and White, 2002; Tao et al., 2022) and investments aimed at the development of a low carbon economy (He et al., 2019a, 2019b).

The use of debt, by shareholders, in the financing structure can have several financial implications. In the case where debt is positively valued, the direct consequence is an improvement in the organisational efficiency of the funds (Lin et al., 2011; Zwiebel, 1996; Jensen and Zimmerman, 1985). In the case where there are different decisions by bondholders, who opt for strong governance, there may be less selection of risky investments to the detriment of shareholders (King and Wen, 2011). When less risky investments are chosen, the choice may come from the fact that too risky investments had been made previously and as a result one cannot risk a second investment that has a very high probability of default (Smith, 2015).

Through a quantitative methodology, we analysed a case study examining the stock market reaction when it faces the green bonds issue in Italy. Announcement data for issued green bonds have been hand-collected and the empirical analysis has been conducted with the aim of evaluating the difference in stock returns between green bond issuers and not issuers.

Thus, our study aims at evaluating if the issuance of green bonds generated a statistically significant difference in stock returns fluctuations of the issuing company, not explainable by common financial factors. In order to control for market factors, stocks have first been filtered for the market returns by the capital asset pricing model (CAPM). In such a way, we are able to isolate the idiosyncratic stock returns fluctuations. Then, a nearest neighbours' approach has been used for one-by-one matching. The matched stock not issuing green bonds is used as counterfactual. Results show that the issuance of green bonds did not affect significantly the remuneration required by stockholders, so that shareholders are not remunerated by the choice of financing with green instruments.

The rest of the paper is organised as follows. Section 2 reviews the relevant literature, while Section 3 discusses the methodological procedures employed. Section 4 presents the main results and discussion. Finally, in the last Section 5, we summarise conclusions and limitations of the present paper.

2 Literature review

2.1 Corporate governance, stockholders and environmental issues

In the last decade, corporate governance was often investigated in relation to the stockholder's perspectives and environmental issues (Li et al., 2018; Cucari et al., 2018). Particularly, corporate governance and decision-making processes are often directed towards sustainable issues and principles in the light of the environmental, social and governance (ESG) factors (Ziolo et al., 2019). In this scenario, the stockholders'

perspective assumed relevance especially in their remunerations under the corporate value creation for all stakeholders (Adams, 2017). The relationships between ESG factors and corporate value creation allow understanding the contributions that firms make both to society and to stakeholders in general (Signori et al., 2021). Companies taking their financial decisions start to consider if those decisions are in accordance with the environment principles. An investment is considered sustainable, indeed, when – integrating the ESG factors and through a mid-long-term vision – it aims to generate value not for the investor only, but for the whole company too. A specific ‘sustainable investment’ definition has been provided by the Eurosif in 2018: “Sustainable and responsible investment is a long-term oriented investment approach which integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio. It combines fundamental analysis and engagement with an evaluation of ESG factors to better capture long-term returns for investors, and to benefit society by influencing the behaviour of companies.”

One of the main tools used to back sustainable investments are the so-called green bonds. The name itself suggests their purpose: green bonds are a financial tool used to finance ‘green’ projects; they are conventional bonds and the proceeds destination is different. The issuing one will have to commit a percentage of the whole profit in projects which can produce at least one of the environment benefits that the International Capital Market Association (ICMA) expects. Usually, it’s the issuing one itself to define whether a project is considered green or not and then there’s an independent third-party, the so-called second party opinion, which will review the selection projects’ criteria or will check if they are ICMA projects compliant or not. One of the most important third parties is CICERO, the Center for International Climate Environment Research. They established three ranges of colours (dark green, medium green and light green) that offer to the investors a better view on the environmental quality of the green bond.

Under the ‘ESG’ label, it is possible to retrieve the green bonds – the standard ones – as well as a wide range of bonds such as social ones and the sustainability linked ones. Since 2018, the sustainability linked bonds represent the 34% of the whole ESG stock market. The ‘linked’ in their name is used to point out that their performance is linked to key sustainability indicators (the so-called key performances indicator, KPI). There are the sustainability-linked bond principles that identify in four steps the key elements which are necessary for the sustainability linked-bond:

- KPI selection
- sustainability performance target (SPT)
- bond features definition
- reporting.

Additionally, a big range of risks about the ‘environmental sustainability’ thematic are detected in the capital market activities. Companies which are considered as non-virtuous companies in the environmental and social fields are heading for a credit crunch: they may receive funding at a larger steak or – in the worst scenario – they may not receive one at all. The standardisation, transparency and supervision of external reviewers are also not sufficient to assure investors of the green nature of their investment (Han and Li, 2022). In these cases, the risk goes under the name ‘greenwashing’; a financial product is described as ‘green’ to let it appear desirable for the investors, but the truth is that it will

not respect the minimum required standards. On the other hand, the virtuous companies will be considered 'best performers', they will be able to distinguish themselves from the competitors and they will be able to attract a higher number of investors.

During the first phase, green bonds were exclusively issued from supranational financial institution such as the European Bank for investments and the Global Bank which have issued respectively in 2007 and 2008 the first green bonds. These financial tools faced a slow development due to the global economic crisis until 2013. Since then, their issue doubled, mostly because of private companies.

Due to the increasing popularity of green bonds, a recent strand of literature investigated the effect of issuance on stock returns. To the best of our knowledge, there is no study focused on the Italian case. Italy has a first-string role in the green European debt scenario: of all the green bonds UE subscribers about the 10% is located in Italy, and until now no case histories are related to this market. Furthermore, we adopted an alternative methodological approach to get insight about this research question, based on counterfactual analysis.

From a previous Baulkaran (2019) case history emerges that the green bonds issuing is a plus value, mostly used to finance development opportunities and to mitigate risks; hence, stockholders react positively when green bonds are issued. Zerbib (2019) carries on the theory that stockholders do not promote the green bonds development just because they're 'green' branded though. Flammer (2021) using an event study methodology demonstrates that green bonds issue increases the company's financial performances. Zhou and Cui (2019) identify a result which is halfway compared to the Zerbib and Flammer theories: focusing on the green bonds issued in China they conclude that they surely are a sort of greenwashing, but they can also generate positive economic benefits. According to Puopolo et al. (2015), the responsible management policy towards environment does not affect remuneration required by investors.

2.2 The green bond market in the sustainable investments

During the last years, it has been registered an exponential growth about the green finance literature.

Green bonds represent a new source of investment characterised by the absence of particular and strict requirements for the monitoring of proceeds: this does not avoid the problem of speculative trading among investors (Roslen et al., 2017).

Flammer (2021) even mentioned in his case history a so-called 'green bond boom'. The green finance publications are referred to the 2001–2022 period, even if their production grows up mostly from 2017. Literature focused mostly on the green bonds study even if other financial tools that would deserve to be studied from researchers exist. One of them are the green credit financing (GCF), a type of financial service provided by banks to encourage borrowers to commit green investment and achieve sustainable development (An et al., 2020). Green bonds are nowadays the climate finance 'thermometer' though (Gallucci, 2021).

The first issued green bond was called Climate Awareness Bond and was promoted by the European Investment Bank (EIB) in 2007, followed, then, the Global Bank in 2008. Only from 2013 on, due to the global economic crisis, companies started to issue their first green bonds as the European Bank and Global Bank did. In Italy, the first green bond was issued in 2014 from the Hera Group, it has a due date in 2024 and a €500

million value. What accelerated the whole process in the international community was the Paris Climate Agreement which, signed in 2015, became law on the 4th of November 2016. Since then, 190 countries have signed their first legally binding global climate deal which pointed out, in this way, their responsibility in protecting the future of the world.

Green bonds received a major attention compared to the other financial tools mostly because it is the only tool in which international standards are required. ICMA has listed the so-called Green Bonds Principles (GBP):

- 1 use of proceeds
- 2 process for project evaluation and selection
- 3 management of proceeds
- 4 reporting.

One of the most recent news in the green bonds market is related to the banks. The European Banking Authority answering the committee to provide consulting on the KPIs, the key performances indicators, has pointed out how important is to have a green asset ratio (GAR), supported by other KPIs, as tool to understand how institutions are financing activities valued as sustainable and how/if they are reaching the Paris Agreement targets. To estimate the GAR a fraction is needed: to the denominator there are the total activities of the bank and to the numerator all the 'green' activities, basically the ones which agree with the sustainability law. The new green asset ratio will be introduced in Europe from 2022 and data will have to be provided starting from 2023, there the risk of a credit crunch for companies if they will not provide the requested data to the banks or will not agree with the UE taxonomy.

Considering the main research experiences, the aspects that researchers have been exanimate the most are the effect of green investments on corporate cost of capital (Zhang et al., 2021), the impact given from green bonds on the different fundamental performance measures of the firms (Bhutta et al., 2022), the possibility that governments can de-risk green bonds in order to increase innovative green investments (Braga et al., 2021), the comparison of the economic values between green bonds and conventional bonds from an asset allocation perspective (Han and Li, 2022; Wang et al., 2020), the existence or non-existence of the 'greenium' (Agliardi and Agliardi, 2021; Nanayakkara and Colombage, 2019; Larcker and Watts, 2020; Löffler et al., 2021; Mesthrige et al., 2020; Alessi et al., 2021; MacAskill et al., 2021; Naqvi et al., 2021; Koziol et al., 2022; Lau et al., 2022), if green bonds also offer an interesting risk-profit profile compared to the traditional (non-green) bonds (Hachenberg and Schiereck, 2018). Roslen et al. (2017) use multinational samples for the first time by adopting the event study method so as to avert the problem of the small number of green bond announcements referring to a single country. Pham (2016) shows that stocks issuing green bonds experience large volatility compared with non-green segment. Azhgaliyeva et al. (2020) shows that green bond policies are effective in promoting green bond issuance although there is not assessment of the impact of such policies on shareholders.

Many case histories show that investors are willing to lose any financial advantage giving priority to the social benefits investing in socially responsible businesses which respect the environment (Martin and Moser, 2016). Particularly, Martin and Moser (2016) demonstrate that investors have a positive mindset when they get the opportunity to invest in a green project, even if it is not related to the future cash flow. Maltais and

Nyckvist (2020) during an interview tried to understand the reasons why the green bonds are so popular; no one of the interviewed ones declared investing in green bonds as motivated by legitimacy seeking or institutional pressures; actually, the three most widely held incentives to issue green bonds among their issuer interviewees were: broadening the investor base, lower capital costs, and meeting investor demand for sustainable investment products. For the reasons above have been used the corporate social responsibility (CSR) and sustainable and responsible investment (SRI) literature too, useful to understand why organisations commit themselves in socially responsible activities without being really obliged in doing it. CSR activities can be seen as a way for a business to demonstrate its commitment to society and the environment (Verma and Bansal, 2021). Amiraslani et al. (2017) showed that firms with high-CSR scores better resist financial crisis probably because they are trusted more by financial investors. A study by Goss and Roberts (2011) shows that the firms with higher levels of environmental, social or governance concerns will face higher costs of borrowing. Also, analysing China's green bond market, Zhou and Cui (2019) tried to investigate on the relationships between green bonds, corporate performance and social responsibility. They found out that environmental issues plus social responsibility affects in a positive way the green bonds market expansion.

Thus, in the light of the previous analysis our research question is the following: *does green bond issue affect stockholder premium towards the value creation?*

3 Data and methodology

We apply a quantitative approach to answer our research question. Particularly, we establish the protocol of research as follow. We first collect data using secondary sources basing our research on journals' articles or press releases to identify all the announcements regarding green bonds issue. Monthly stock prices are obtained from Yahoo! Finance in the 2010–2022 time frame for all the available stocks traded in the FTSEMIB Index.

On the initial sample of selected stocks, only few issued green bonds before 2019, thus ensuring an enough large temporal observations for an accurate testing. In particular, the stocks are the following:

- ENEL
- Intesa San Paolo (ISP)
- HERA (HER).

ENEL and ISP issued green bonds in the beginning of 2017, while HER in the 2014 thus being one of the first company in Italy issuing green-bonds. Because of data constraints, we provided three case studies on these selected stocks. Indeed, for the selected stocks we have enough data for testing properly our research question. The main descriptive statistics associated with the selected stocks are shown in Table 1.

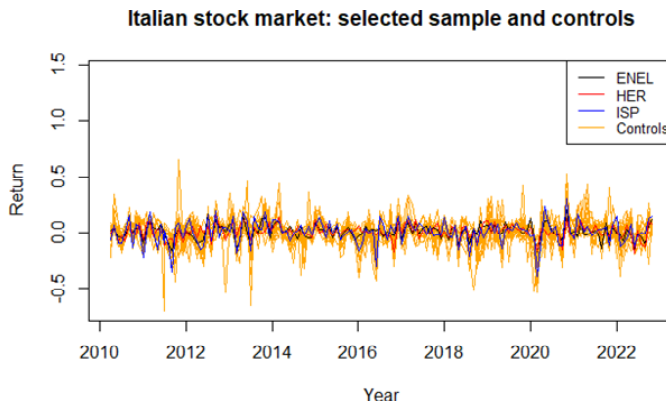
ENEL is the stock characterised by the highest average return compared to HER and ISP, but it is also the most risky. All the stocks in the sample show platykurtic distribution and positive skewness, confirming the stylised facts of financial returns. The

stock returns of both the three green bonds issuing and the not bond issuing companies are shown in Figure 1.

Table 1 Main descriptive statistics associated with sample of stocks

	<i>ENEL</i>	<i>HER</i>	<i>ISP</i>
Mean	4.199961474	2.433330084	1.568499442
Median	3.681441	2.336881	1.558209
St. dev.	1.577317688	0.634010602	0.295643309
Kurtosis	-1.116104206	-1.093904184	-0.375347741
Skewness	0.644891047	0.30617089	0.418321145
Min	2.427389	1.47806	0.9918
Max	7.318932	3.695567	2.431527

Figure 1 Selected sample of green bond issuing companies and possible controls (not issuing companies) (see online version for colours)



The yellow lines in Figure 1 are all the possible controls, i.e., the stocks that did not issue green bonds until 2019. We therefore consider the green bond issuance as the treatment and evaluate the effect of the treatment on the outcome, that is stock returns. Therefore, our aim is to evaluate if the issuance of green bonds generated a statistically significant difference in stock returns fluctuations of the issuing company. Clearly, there are many financial factors explaining stock returns fluctuations. Not pre-filtering the returns for such factors would bias the results. To estimate the returns fluctuations that are not explained by common financial factors, we assumed that the CAPM holds and we estimate the following equation for each i^{th} stock in the sample:

$$r_{i,t} = \alpha + \beta r_m + \varepsilon_{i,t} \quad (1)$$

Then, we filtered all stock returns in the sample by retaining the residuals, i.e.,

$$\hat{\varepsilon}_{i,t} = r_{i,t} - \hat{\alpha} - \hat{\beta} r_m \quad (2)$$

As a result, by filtering operation we isolate the i^{th} stock idiosyncratic fluctuations, which do not depend by the factorial structure. In particular, we consider the market factor

because it is acknowledged as the most relevant in explaining stock market fluctuations (e.g., see Molero-Gonzalez et al., 2023).

To evaluate if green bond issuance affects filtered returns, we adopt a counterfactual analysis based on matching. Thus, given an i^{th} green bond issuing company (ENEL, ISP and HER in Figure 1), we aim at finding the most similar j^{th} not green bond issuing company (labelled as ‘controls’ in Figure 1) considering the pre-issuing (filtered) returns characteristics.

We evaluated the similarity between the i^{th} green bond issuing company and the j^{th} possible controls according to their structural similarity, i.e., by means of the Euclidean distance:

$$d_{i,j} = \sqrt{\sum_{t=1}^T (\hat{\varepsilon}_{i,t} - \hat{\varepsilon}_{j,t})^2} \quad (3)$$

where T represents the last time point before the i^{th} stock announced the green bond issuance. Then, using a nearest neighbours’ approach, we matched the i^{th} stock with the j^{th} company according to the following condition:

$$\min_j d_{i,j} \quad (4)$$

For fixed i^{th} stock and all $j = 1, \dots, N$. In the end, considering the post-issuance time period, we used the selected j^{th} stock as counterfactual for the i^{th} stock. Indeed, we estimated the effect of green bond issuance by testing the equality of average (filtered) returns between the issuing and not-issuing (counterfactual) companies. To account for auto-correlation in returns, we established the following linear regression:

$$\Delta \varepsilon_t = \delta_i + \eta_t \quad (5)$$

With $\Delta \varepsilon_t = (\varepsilon_1, \varepsilon_2, \dots, \varepsilon_T)'$ being the difference between the i^{th} and j^{th} filtered returns at time t (post-green bond issuance), $i = (1, 1, \dots, 1)'$ be a vector of ones and η_t a regression error term. We investigated the inference on the parameter δ , which represents the average difference between the time series i and j , that is the filtered return of the i^{th} stock and its counterfactual (the j^{th} stock). To account for auto-correlation, inference is conducted considering HAC standard errors.

4 Primary results and discussion

This section is directed to present results of our analysis answering the research question. First of all, the results of the CAPM for all the stocks are reported in Table 2.

From Table 1, we observe that CAPM holds for all the stocks included in the sample, since the intercept is statistically equal to zero and the beta coefficients are statistically significant. From the residuals of the estimated regressions with parameters shown in Table 1, we extrapolate the filtered returns used for the analysis. We first analyse the results associated with HER stock, which issued the first green bond in the 2014. According to the pre-issuing time periods, the stock SFL has been recognised as the best matching unit according to our greedy search. The results of the computed distances with other possible controls time series (i.e., not green bond issuing) are reported in Table 3.

SRG represents the best matching-based control as its distance is equal to 0.38 and is the lowest compared with the others (see third column of Table 2). Figure 2 shows the filtered returns pre- and post-green-bond issuance for the HER company and its matching-based counterfactual (i.e., SRG).

Table 2 CAPM estimates

<i>Stock</i>	<i>Alpha</i>	<i>Beta</i>
ACE.MI	0.006206	0.752495***
AGL.MI	0.004346	0.960824***
AMP.MI	0.013777	0.520022***
ATL.MI	0.003662	0.773006***
BAMI.MI	-0.011647	1.56399***
BPE.MI	-0.011036	1.433437***
CE.MI	0.00266	1.052475***
DAN.MI	0.001229	0.850642***
ENEL.MI	0.005368	0.724409***
ERG.MI	0.010284	0.576598***
GEO.MI	-0.010787	1.188543***
HER.MI	0.005933	0.66719***
ISP.MI	0.002514	1.353753***
MB.MI	0.002363	1.396975***
MT.MI	-0.004262	1.538361***
SFL.MI	-0.008614	1.014476***
SO.MI	-0.005852	1.392932***
SRG.MI	0.006703	0.426133***
TIT.MI	-0.009672	0.991358***
TOD.MI	-0.000672	0.570093***
TRN.MI	0.009969	0.347638***
UCG.MI	-0.010115	1.609913***
UNI.MI	-0.005742	1.337269***
WBD.MI	0.003387	0.957466***

Note: ***, **, * means significance at 99%, 95%, 90% level of confidence.

Figure 2 shows a similar pattern between the two series post-treatment, thus suggesting an absence of effect. The results of the HAC robust t-test reported in Table 4 shows that the filtered returns are not statistically different pre- and post-green bond issuance, suggesting that this policy did not affect stock returns.

We then consider the case of stocks issuing green bond in the 2017, i.e., ENEL and Intesa San Paolo (ISP). According to Table 2, the matching unit for both the stocks is TRN with a distance equal to 0.42 and 0.6 for ENEL and ISP respectively. This can be probably explained by the high correlation between ENEL and ISP (filtered) returns, which is close to 0.7. In Figures 3 and 4 it shows the pre- and post-evaluation for the two stocks.

Table 3 Estimated distances

<i>Stocks</i>	<i>ENEL</i>	<i>ISP</i>	<i>HER</i>
ACE.MI	0.651246	0.830934	0.576439
AGL.MI	0.738561	0.855601	0.651394
AMP.MI	0.709368	0.809033	0.528248
ATL.MI	0.520328	0.653376	0.484139
BAMI.MI	1.007597	0.950083	0.762862
BPE.MI	0.890946	0.906223	0.7664
CE.MI	0.616112	0.667354	0.538177
DAN.MI	0.828529	0.891812	0.65164
ERG.MI	0.709703	0.595606	0.457097
GEO.MI	0.765255	0.893241	0.717356
HER.MI	0.539534	0.870329	0.631396
ISP.MI	0.595606	0.788034	0.631587
MB.MI	0.610357	0.684731	0.556766
MT.MI	1.517274	1.629954	1.356042
SFL.MI	1.169802	1.29331	0.774948
SO.MI	0.990289	1.040775	0.765571
SRG.MI	0.473378	0.693583	0.385337
TIT.MI	0.592096	0.751572	0.54883
TOD.MI	0.901515	0.976546	0.612215
TRN.MI	0.427834	0.603404	0.498909
UCG.MI	0.694287	0.647184	0.57329
UNI.MI	1.128599	1.136758	0.8481
WBD.MI	1.012321	0.990834	0.685151

Note: Lowest distances are highlighted with italic font.

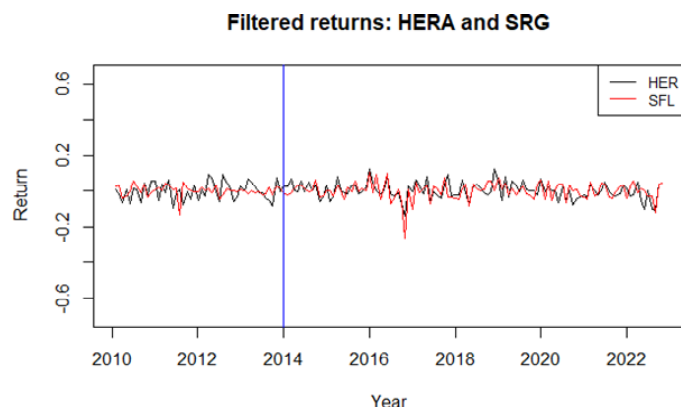
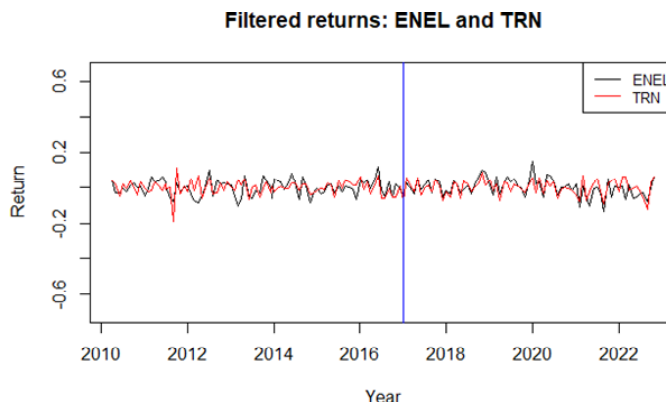
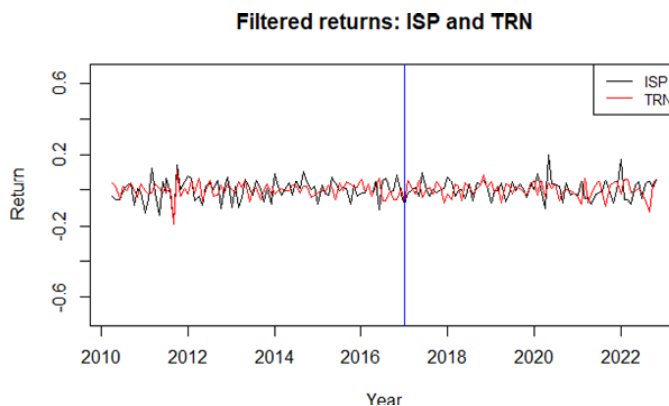
Figure 2 Pre- and post-bond issuing, HERA vs. SRG (see online version for colours)

Table 4 Inference about difference in filtered returns means (bond issuer and matched unit)

<i>Stocks</i>	<i>Est.</i>	<i>St. error</i>	<i>t-stat</i>	<i>p-val</i>
ENEL	0.000309	0.005435	0.056769	0.954891
ISP	0.001023	0.005406	0.189295	0.85041
HER	0.001576	0.004002	0.393869	0.694469

Figure 3 Pre- and post-bond issuing, ENEL vs. TRN (see online version for colours)**Figure 4** Pre- and post-bond issuing, ISP vs. TRN (see online version for colours)

Considering the t-test with HAC standard errors, also in this case it seems that green bond issuance did not generate different fluctuations. Table 4 provides support to this evidence. Overall, it seems that the issuance of green bonds has no effect for shareholders, neither positive or negative. The practice of a green financing, therefore, should not be pursued by the firms with the goal of improving their returns on the stock market, rather to promote more sustainable activities that can reduce the negative impact that each company has with the environment.

5 Conclusions

This study was directed to analyse the stock market reaction when it faces the green bonds issue evaluating the difference in stock returns between green bond issuers and not issuers. Quantitative methodology, we proposed preliminary evidence using the case of some Italian companies. In the light of theoretical and practical implication, when institutional investors are taking decisions, they cannot avoid considering the environmental impact and projects' sustainability. Even though the 'sustainability' topic is pretty used, nowadays does not exist an accepted shared standard; hence, under the 'financial sustainability' topic are included all those investments strategies that beside the return on investment (ROI) – which is inevitably considered when investing money – have a positive effect on the environment or a socially accepted profit. Green bond market had rapidly grown, even if today green bond is perceived more as a way to communicate 'being good' externally instead of really understand economic benefits (Maltais and Nykvist, 2020).

Answering the research question “does green bond issue affect stockholder premium towards the value creation?”, the present paper investigates the difference in stock returns between green bond issuers and not issuers contributing to the literature (Goss and Roberts, 2011; Zerbib, 2019; Flammer, 2021). By analysing a sample of selected stocks (i.e., ENEL, ISP and HER) we investigate if the issuance of green bonds generates a statistically significant difference in stock returns fluctuations of the issuing company, not explainable by common financial factors. We point out that issuing green bond does not affect stockholders' remuneration contributing to enrich literature (Puopolo et al., 2015). Even if our results are tested on a single country and few Italian companies, our results can be extended to all stockholders' remuneration and companies.

These findings have important implications especially for investors. Indeed, it has been demonstrated that the issuance of green bonds does not affect shareholder remuneration. It is important for investors to consider that green bonds represent a diversification tool capable of improving their CSR for the commitment to projects that aim to reduce the overall impact on the environment, without however having the certainty to obtain a higher return than they would get from an investment in a conventional bond.

The main weakness of this study is that it focuses on three case studies, i.e., ENEL, ISP and HER. This choice is due to data availability, as these stocks have enough data for reliable statistical tests for monthly data. Therefore, future studies should be devoted to the analysis of a larger sample of stocks. Analyses at different frequencies could also be conducted. Furthermore, the results from alternative and well-established methodological approaches used for causal inference – such as synthetic control matching (Abadie et al., 2010) – can be shown. The selected stocks, however, are structurally different, as they belong to different industry sectors and have different dimension. Since the results are not driven by specific unobserved factors – we also filtered the returns for CAPM – the main findings could be however generalised, although timidly, to other Italian stocks.

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