IMPACT OF GREEN BOND POLICIES ON INSURERS: EVIDENCE FROM THE EUROPEAN EQUITY MARKET

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ABSTRACT

This article empirically investigates whether the introduction of green bond policies by insurance companies have a positive impact on their equity prices. To this aim, the sample of listed (re)insurers in Europe using monthly data for years 2012 – 2019 is employed. Announcements, press releases and semi-annual or annual reports are used to determine when the insurance companies committed to a green investment, issuance of green bonds or launching a green fund. Our results suggest that market investors positively price introducing such a policies for the issuance of green bonds or launching a green fund. However, the same results were not confirmed for initial investments in green bonds.

1. INTRODUCTION

Green Bonds are fixed-income instruments that finance green projects with an environmental objective. In the past decade, green bonds have gained increasing attention as a tool to accelerate the support for climate-related investments and the transition into an energy-efficient society by channelling capital flows towards more sustainable finance. The transition into a greener economy concerns - by definition – present and future generations and hence poses an intergenerational issue (Sachs, 2014). Historically, debt financing has been effective in realizing large scale and long-term projects (e.g. infrastructure). Green bonds serve as a suitable vehicle in spreading the costs of climate changes whereas benefits of a low carbon economy are generated in long-term.

The numerous international actions to reflect on climate change related impact have led to an increased demand for socially and environmentally responsible investment instruments. By issuing green bonds corporations and government institutions are able to support environmental projects that help the transition into a more energy-sustainable future. The green bond can be regarded as a promise between its issuer and the investor. Like a normal bond, the investor provides funds for a long-term with the issuer prom-

42 European Insurance and Occupational Pensions Authority (EIOPA).

ising to repay it with interest. However, green bonds are specifically tailored for green projects.

The first Green Bond was called into live in 2007 when the European Investment Bank (EIB) issued the first climate Awareness Bond. Labeling bonds as 'green' aims to flag that funds are exclusively used to finance climate and environmentally relevant projects. However, there is yet no official taxonomy outlining a framework for green bond labeling. Green Bonds are currently defined by a number of guidelines that have been established by numerous institutions in the course of the growing market, however the lack of a regulatory framework for those instruments has been questioned increasingly. Therefore this study aims to investigate whether investors respond positively to green bond policies implemented by the European insurers by paying positive premiums.

To address this research question, the study analyses the effect of green bond policies on equity prices of EU-based insurers. The following section 2 elaborates on the available research on green bond pricing as well as the economic significance of a harmonized framework. Section 3 provides a description of the sample used and the section 4 applied methodology. The results of empirical analysis conducted are presented in section 5, followed by the conclusion.

2. LITERATURE REVIEW

Climate change as a global issue has increased the awareness for the integration of sustainable principles in capital markets. With the rising pressure on environmental topics, investors are increasingly demanding the adaption of environmental, social or governance (ESG) criteria into financial services. Especially for critical sectors which contribute to a significant amount of the world-wide greenhouse gas emissions – i.e. energy and transport - channelling large amounts of funds effectively would be merely impossible via bank lending or private investors. Hence, the pivotal role of the green bond market in financing green projects with large up-front costs that only recover over the long-term becomes evident (Sartzetakis, 2019).

Sachs et al. (2019) pronounce the importance of green bonds as a tool to finance climate-relevant projects but also denote that – in order to meet internationally set of standards[43] for climate change – more measures have to be taken. As the demand for green investments has seen a tremendous rise from the investor's side, corporate environmental principles are now considered a significant driver for financial performance. Clark et al. (2015) find that 88% of their reviewed cases confirm a strong correlation between sound sustainable practices and enhanced operational performance which ultimately translates into cashflows. Furthermore, they show that in 80% of the sources, sustainable practices have a positive influence on investment performance.

Policy makers on the other hand have realized the need for a unified green taxonomy and recently there has been considerable effort to establish such a framework (PRI, 2018). Despite the prosperous outlook for the European- and international green bond market there are yet no harmonized, uniform standards for green bond labeling. This current situation triggers several obstacles and challenges for the green bond market to overcome. Introducing the green bond label would create a favourable environment for long-

43 United Nations' Sustainable Development Goals (SDGs) and the Paris Climate agreement (2015)

term investors as such a framework would ensure the compliance with general principles of sustainability when placing the funds. At the same time it imposes higher disclosure and transparency requirements and could possibly introduce another layer of regulatory reporting requirements on financial institutions engaging in Green Bond investments.

The lack of clearly defined Green Bond Principles creates reputational risks for both investors and issuers as it is difficult to control compliance. A number of academic papers question the effectiveness of the recent growth in green bond investments. More than a decade into the development of the green bond market, a standard of green bond certification is yet to be established in order to ensure that investments serve a beneficial environmental impact. The set-up of a sound certification program would moreover exclude reputational risks of merely labeling investments as green ("green-washed") whereby they do not serve any climate-relevant purpose. This would guarantee an appropriate use of proceeds and consecutively funds are channeled where they are effective (Bachelet et al, 2019).

A key factor in the success of green bonds is the measurability of the positive effect that green bonds aim to achieve from an environmental point of view. Asset managers increasingly rely on external certification to verify that the respective proceeds are used effectively. However, it seems that market players mainly focuses on the ex-ante review of a green instrument's credentials by agencies rather than taking the ex-post measurements as well as reporting and continuous verification standards into account (Shishlov et al, 2016).

A number of guidelines of green bond certification has emerged in the course of the growing market. These aim to ensure that the use of funds and proceeds is exclusively tied to green projects. However, measuring the environmental impact as well as ensuring an ongoing monitoring- and verification process is not guaranteed. So far the same bond metrics which are used for conventional bonds - such as yield to maturity, spread and duration - are employed for green bonds whereas those indicators solely assess the bond's financial performance. Clapp et al (2016) recognize that while reporting standards are yet to be addressed in a harmonized manner, best practises start to emerge. Issuers of renewable energy bonds are incorporating life-cycle analysis to reflect on the projects' environmental impact and the construction sector has established building certifications and energy-efficiency targets. In the meanwhile the World Bank has taken up a leading role in the international environment for reporting.

The International Capital Market Association (ICMA) has set up Green Bond Principles - "voluntary process guidelines" – which outline the general certification criteria that most schemes apply. Assembled by the leading private financial institutions in the sustainable sector in 2015, those principles guide prospective issuers. ICMA classifies a range of key components of green bond issuance which are: (i) the use of proceeds for environmentally sustainable activities; (ii) a process for determining project eligibility; (iii) management of the proceeds in a transparent fashion that can be tracked and verified; and (iv) annual reporting on the use of proceeds (ICAM, 2017).

Focusing purely on the acceleration for a low-carbon economy, the Climate Bond Initiative (CBI) has also contributed to the establishment of certification standards for green bonds (CBI, 2019). While the Green Bond Principles remain general, the organization has outlined sector-specific eligibility criteria to assess an asset's low carbon value and suitability at issuance. If assets meet the CBI standard, they are then eligible for Climate Bond Certification, following an external verification on the bond's environmental standards and continuous monitoring.

From an economic point of view, aligning the short-term target function of the average investor with the long-term investment horizon of social and environmental projects is another key issue addressed by a number of publications. According to Demary and Neligan (2018) most investors prefer optimizing their returns over a short-term horizon. This is a counter-productive feature when considering that most green projects (i.e. infrastructure and building sector) are designed to become profitable only long-term. Reflecting on this problem, the study emphasizes the key role that supranational institutions, government institutions and central banks have to take up. These institutions are not only under less pressure of short-term profitability but their creditability also enables them to benefit from long-term outlooks.

Discussing the counter productiveness of short-termism on sustainable finance, Schoenmaker (2018) argues that – by nature – environmental factors are not included in the decision-making process of an economic player. Externalities emerge in the medium-term whereas sustainable investments only pay out long-term. This makes the transition towards greener capital markets increasingly difficult as investors optimize based on a short-term horizon but climate-relevant activities reveal their impact only long-term. In this respect, the supervisory treatment of illiquid investments is proposed as one of possible solutions. While liquid (short-term) investments enjoy low supervisory surcharge, illiquid investments as they are placed in long-term environmental projects cannot be measures on a frequent basis (market-to-market) and hence are treated with greater regulatory rigorousness.

Carney (2015) emphasizes the importance putting incentives in favour of a long-term investment horizon rather than short-term projects. As the global community faces profound environmental challenges, the focus has to be put on overcoming this short-termism. Hence, the preference of investors and managers to play short-term depicts yet another obstacle for sustainable finance to be effective.

Besides the measurements that have been taken by the ICAM and CIB, the European Commission has called in a High-Level Expert Group on Sustainable Finance (HLEG) to support the establishment of clear guidelines and an official EU Green Bond Standard and to facilitate the development of sustainable finance. The HLEG advices the Commission concerning mandatory requirements for disclosure as well as the allocation of proceeds, reporting and external reviews. The Sustainable Finance Taxonomy would then lay out the criteria for identifying the eligibility of green projects and on accreditation criteria for providers of external review. An EU Green Bond label would hence allow an alignment of all green projects with the standard and increase clarity for investors and issuers. Moreover, the European Commission (EC) announced tax incentives for European Green Bonds in order to further support the growth of the market. As taxation remains in the competence of the Member States, the EC advices to assess the support for green bonds by implementing tax incentives as well as accelerated depreciation for assets financed by green bonds and green loans. On a regulatory basis it would provide a favourable stimulus for green investments towards a climate-efficient economy (EC, 2019).

Examining the price effect of a green label Ehlers and Packer (2017) query whether investors are willing to pay a premium for investments linked to environmental topics. In order to analyze this effect, they compare the credit spreads at issuance of 21 green bonds issued between 2014 and 2017 to the credit spreads at issuance of conventional bonds of the same issuers at the closest possible issue date.[44] As most green bonds issuers also emit conventional bonds, the data sample rules out issuer-specific idiosyncratic factors

44 Matched bond pairs are restricted to US dollar- and euro-denominated green bonds.

such as credit risk. Their study concludes that – at issuance - green bonds are priced at a premium compared to conventional bonds with similar characteristics, with a mean difference in spreads of around 18 basis points. Several recent studies suggest similar results, e.g. (Barclays, 2015). Likewise, Nanayakkara and Colombage (2019) find out that green bonds are traded at a premium of 63 basis points compared to corporate bond issue with analogous characteristics. The model, using panel data regression with data over the period from 2016 to 2017, concludes that a green label indeed offers a significant incentive for investors to raise funds through issuing green bonds. Moreover, it displays an opportunity to diversify a portfolio's investments returns. The study hence emphasizes the numerous incentives that Green Bonds offer for investors as well as supports of capital flows towards a more sustainable development of security markets. Overall, these findings validate the assumption that a significant share of investors have a preference to hold green bonds which has an impact on the price at issuance. In other words, there is currently a higher demand for green bonds relative to the current supply (OECD, 2016).

3. DATA SAMPLE

As data on insurers investing in green bonds are not available, insurers' engagement has been identified by using available market data only. The aim is to include as many listed companies as possible. There are 109 listed (re)insurers in Europe, but those investing in or issuing green bonds are yet limited. Therefore, the sample has to be narrowed to 17 EU insurers of which 15 are currently listed covering the years 2012 - 2019.[45] Furthermore, monthly time series are employed in our sample.

By examining EU-based insurers which engage in green finance activities, a first list of companies which hold green bond investments, issue green bonds or have launched a green bond fund has been set up. In order to measure the impact of green bond policy of EU insurers on their share prices, a green dummy variable is introduced. This indicates whether an announcement of observed insurance company on investment in green bonds, issuance of green bonds or launch of green bond funds was made at the specific month. The value '1' of green dummy variable corresponds to an announcement on introduction one of the mentioned green element into an insurance company's strategy. Since we employ publicly available market data, the specific month in which the insurer engages in green bonds were derived from official announcements on the company website, its annual- or semi-annual reports, sustainability reports or its press releases. In all other months the employed dummy variable is set to value '0'. To further break down the type of companies' introduced green policy, we use three further dummy variables. These indicate the actual type of engagement from the three categories we have listed earlier - green bond investment, green bond issuance and green bond fund. The sample was further complemented with data on companies' equity price developments and the benchmark market development represented by STOXX Europe 600 index extracted on a monthly basis from Bloomberg.

The description of all variables employed in this study is provided in the table below.

45 The sample was reduced to 2016 in a second stage, since some figures for 2017 of the sample countries were not available at the time of conducting this study.

Table 1: List of variables employed

Variable name	Abbreviation	Description
Return on a specific insurance company	ldprice	Logarithmic differences of the equity price of specific insurance company.
Market return	ldmarket	Logarithmic differences of the market index, which is based on the STOXX European 600 Market Index.
Green dummy	green	The green dummy variable indicates when an insurance company has engaged in any type of green bond strategy. The value '1' is assigned in the first occurrence of an announced green bond framework.
Green bond investments dummy	investment	The investment dummy variable indicates that the insurer's type of engagement in green bonds is a direct investment according to the announcement by the insurance company.
Green bond issuance dummy	issuance	The issuance dummy variable indicates that the insurer's type of engagement in green bonds consist of own green bond issuance according to the announcement.
Green bond fund launch dummy	fund	The fund dummy variable indicates that insurance company has launched an own green fund in a respective month according to the announcement.
Bond issuance dummy	debt	This dummy variable indicates the announcement on own bond issuance by the insurance company.
Volume of bond issuance	debt_volume	Natural logarithm of the announced volume of issued bonds by the insurance companies. The variables is assigned to 0 in case of no any issuance in the particular time t.

Note: All variables are employed with monthly frequency.

4. RESEARCH HYPOTHESES AND METHODOLOGY

This study empirically investigates whether the ongoing trend of insurance companies moving towards green policy is positively priced by market investors. This hypothesis is tested using equity prices of the listed European insurance companies that implemented green policy during the investigated period. To this aim, we specify the following model.

$$ldprice_{i,t} = \alpha + \theta\beta_i ldmarket_t + \gamma green_{i,t} + \varepsilon_{i,t} \quad (1)$$

The variable $ldprice_{i,t}$ represents a logarithmic market return of insurance company i at time t. The variable $ldmarket_t$ corresponds to a logarithmic market return at time t and the variable $green_{i,t}$ denotes dummy variable for green policy of insurance company i and time t. Effects of unobservable company-specific and cross section variables are represented by the variable $\varepsilon_{i,t}$. The equation (1) assumes that a logarithmic market return of each insurance company is given by its sensitivity to the overall market move corresponding to its beta (β_i). Furthermore, the equation (1) assumes that an insurer's return could increase at the period of announcement on implementing a green policy.

In the first step, we estimate beta for each insurance company *i* in the sample. In the second step, we create a new variable:

$$bldmarket_{t,i} = \widehat{ldmarket}_{i,t} = \beta_i ldmarket_t$$

The equation (1) could be then rewritten as follows:

$$ldprice_{i,t} = \alpha + \theta bldmarket_{i,t} + \gamma green_{i,t} + \varepsilon_{i,t} \quad (2)$$

We can further assume that market return could also contain some seasonality effects. Hence, we add the monthly dummies.[46]

$$ldprice_{i,t} = \alpha + \theta bldmarket_{i,t} + \gamma green_{i,t} + \sum_{j=2}^{12} \delta_j month_{j,t} + \varepsilon_{i,t} \quad (3)$$

$$month_{j,t} = \begin{cases} 1, & \text{for all time period } t \text{ that that corresponds to a month } j \\ 0, & otherwise. \end{cases}$$

$$j \in \{2, 3, \dots, 12)$$

Three different green bond policies announcements are considered, i.e. investment into green bonds, issuance of green bonds and raising green funds. We could assume that market investors are not reacting to those three types of announcements in the same way. Hence, we can introduce three separate dummy variables to capture the different market sensitivities to the three green bond policies considered.

$$ldprice_{i\,t} = \alpha + \theta bldmarket_{i\,t} + \gamma_1 investment_{i\,t} + \gamma_2 issuance_{i\,t} + \gamma_3 funds_{i\,t} + \sum_{j=2}^{12} \delta_j month_{j,t} + \varepsilon_{i,t} \quad (4)$$

Finally, $bldmarket_{i,t}$ as represents market return of insurance company *i* at time t multiplied by company's beta, therefore the coefficient θ should be theoretically equal to 1. Hence, we can impose this restriction to models (3) and (4).

Our models (3) and (4) are used to test impact of introducing green bond policies on companies' equity prices. The significant dummy variables with positive coefficients would suggest that market participants positively price the introduction of the particular green policy. In other words, the companies implementing those policies would be traded with premiums at the time of the specific announcement.

As our data sample contains 15 companies and 87 time periods, we start with the pooled estimate of the models with cluster-robust standard errors. Furthermore, we employ panel techniques and Breusch and Pagan Lagrange multiplier test for random effects. Finally, we employ Hausman test to find out whether the estimate for panel data model fixed effects should be used instead.

Additionally, the potential positive effect for the green bond issuance (a significant dummy variable for green bond issuance) could also be driven by increasing debt financing itself implying an advantage of using a tax shield. Hence, we need to further investigate the impact for both green and standard bonds issuance on equity prices of those companies that issue green bonds. Hence, we additionally test the following equation (5) for the companies that issued green bonds as a robustness check.

$$ldprice_{i,t} = \alpha + \theta bldmarket_{i,t} + \gamma_1 investment_{i,t} + \gamma_2 issuance_{i,t} + \gamma_3 funds_{i,t} + \gamma_4 debt_{i,t} * debt\_volume_{i,t}^{12} + \sum_{j=2} \delta_j month_{j,t} + \varepsilon_{i,t} \quad (4)$$

46 Please note that only 11 dummy variables need to be added to capture monthly seasonality.

5. EMPIRICAL RESULTS

In the first step, we verify whether both time series employed in our analysis – dependent variable corresponding to return on a specific insurance company as well as independent variable representing market return – are stationary. In both cases, Levin-Lin-Chu unit-root test strongly reject the null hypothesis that the panel contains unit roots. Hence, we employ the models (2), (3) and (4) using pooled estimate model with cluster-robust standard errors. The results are provided in Table 2 – see models pool1, pool2 and pool3 (columns 1,2,3). Using the equation 2, the green policy does not seems to significantly affect equity prices of insurance company (model pool1). We further control for seasonality as there might be some specific monthly effects regularly appearing every year. The results show that seasonality indeed plays a role as some of the introduced dummies are statistically significant. However, including monthly dummies does not change our result (model pool2). Hence, we test all three types of green bond policies considered in this study separately (model pool3). In this case, our empirical analysis suggests that while insurers' prices do not significantly react to announcement to investments in green bonds, they do react to the announcement on issuance of green bonds or launching a green bond fund. In this respect, the results might imply that introducing a certain type of green policy by insurers is positively priced by investors. In order to make a conclusion on the green bond issuance we further test whether the positive effect for the green bond issuance is not driven by increasing debt financing itself implying an advantage of using a tax shield by controlling for debt issuance - see equation (5). However, based on the model estimated for companies issued green bond, the significance of the dummy on green bond issuance has not been changed. Hence, we can imply that the conclusion on green bond issuance is relevant.

In the next step, we re-estimate equation (3) and (4) imposing restriction on the coefficient.The resulting models (restr_p1 and restr_p2) confirm the previously obtained results with both dummies for introducing issuance of green bonds and launching a green bond fund significant at 5% confidence level.

Table 2: Results of the pooled estimates

	pool1	pool2	pool3	restr_p1	restr_p2
			Dependent variable: ldprice		
bldmarket	0.9979***	1.0051***	1.0063***	1.0000	1.0000
	(0.0006)	(0.0145)	(0.0139)	(0.0000)	(0.0000)
Green	0.0008	0.0030		0.0030	
	(0.0084)	(0.0078)		(0.0077)	
investment			-0.0037		-0.0037
			(0.0099)		(0.0099)
issuance			0.0154**		0.0153**
			(0.0071)		(0.0071)
fund			0.0228*		0.0227**
			(0.0111)		(0.0110)
month, j = 2		-0.0018	-0.0018	-0.0017	-0.0017
		(0.0053)	(0.0054)	(0.0053)	(0.0053)
month, j = 3		-0.0097	-0.0097	-0.0098	-0.0098
		(0.0101)	(0.0101)	(0.0101)	(0.0101)
month, j = 4		-0.0030	-0.0029	-0.0030	-0.0030
		(0.0067)	(0.0067)	(0.0067)	(0.0067)
month, j = 5		-0.0244***	-0.0243***	-0.0245***	-0.0244***
		(0.0061)	(0.0061)	(0.0060)	(0.0059)
month, j = 6		0.0059	0.0057	0.0057	0.0054
		(0.0083)	(0.0085)	(0.0080)	(0.0082)
month, j = 7		0.0067	0.0067	0.0068	0.0068
		(0.0059)	(0.0059)	(0.0059)	(0.0060)
month, j = 8		0.0158**	0.0157**	0.0156**	0.0155**
		(0.0071)	(0.0071)	(0.0068)	(0.0068)
month, j = 9		0.0084	0.0082	0.0084	0.0082
		(0.0069)	(0.0069)	(0.0069)	(0.0069)
month, j = 10		0.0181*	0.0181*	0.0180*	0.0180*
		(0.0094)	(0.0094)	(0.0094)	(0.0094)
month, j = 11		0.0070	0.0068	0.0070	0.0068
		(0.0070)	(0.0070)	(0.0070)	(0.0070)
month, j = 12		0.0021	0.0019	0.0020	0.0018
		(0.0046)	(0.0046)	(0.0044)	(0.0044)
Observations	1,290	1,290	1,290	1,290	1,290
R-squared	0.3667	0.3929	0.3933		

Note: Robust standard errors are reported in parentheses. The significance is reported as following *** p<0.01, ** p<0.05, * p<0.10.
Source: Own calculations.

We further use Breusch-Pagan Lagrange multiplier (LM) test to verify whether a random effect model needs to be applied instead of a pool model. The both models with aggregate green dummy (equation 3) and with three separate green dummies (equation 4) were tested. In both cases, the null hypothesis of homoskedasticity cannot be rejected. Hence, random effects are not present in our models and pool regression is sufficient. We also test whether fixed effect would be preferable using Hausman test. However, the null hypothesis that there is no difference in coefficient of models with fixed and random effects was not rejected. Hence, it further confirms that the used pooled estimates are appropriate and robust.

6. CONCLUSION

This study contributes to the contemporaneous literature by investigating impact of green bond policies specifically for European insurers. It empirically test whether introduction of such policies is positively priced by market investors. To this aim, we employ publicly available data of listed European insurance companies to find out the specific month in which the insurer engaged in green bond policies. In this respect, we use official announcements on companies' websites, their annual or semi-annual reports, sustainability reports or their press releases. We further model equity prices of the companies that introduced green bond policies using market index and the estimated betas of the companies. To verify the impact of green bond policies, we introduce a dummy variable for the time when the specific green bond announcement was made. Furthermore, we split the introduced dummy into three categories - investment into green bonds, issuance of green bonds or launching green bond funds – to empirically test those three categories separately. Moreover, we included dummy variables for months to control for seasonality. Finally, the pool regression estimates with cluster-robust standard errors are employed to test a significance of the introduced dummies.

Our results suggest that announcements of European insurance companies on introducing green bond policies by issuance of green bonds or launching green bond funds are positively priced by market investors. However, the same effect of announcements on investments into green bonds could not be empirically confirmed. This conclusion shed a light on one of the instruments suitable to deal with the costs of climate changes and transition towards a low carbon economy. It reveals the way how insurers could transform climate related risks into a positive value for companies contributing to the overall financial stability of the European insurance sector.

As green bonds are one of the important tools that can help to support a transition into an energy-efficient society by channeling capital flows towards more sustainable finance, both theoretical and empirical research that help to understand their role in financial markets and broader economy could contribute to make the transition faster, more smooth and efficient. Since, insurers as long-term investors naturally play a crucial role in the green bond markets, further research in this area is needed.