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Too transparent for signalling? A global analysis of bond issues by property companies

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Abstract
Bond issues often result in negative revaluations of the market value of equity. These market reactions are usually explained by negative signals and asymmetric information about the use of the proceeds. In industries with rather transparent investment opportunities these arguments are not applicable and we expect to find no negative revaluations. Consequently, analysing the stock price reactions to 2299 bond issues by real estate companies between 1996 and 2019, we observe none to positive reactions on the announcement of an upcoming bond issue. The findings underpin the necessity for controlling of industry effects in empirical studies on capital structure decisions.

KEYWORDS
bond issue, capital structure, property companies, REITs, signalling

JEL CLASSIFICATION
G32, G14, R42

1 | INTRODUCTION

The arguments cited most often in order to explain the influence of a bond issue on a company's market value are based on the pecking order theory, the trade-off-theory, the agency theory and the signalling theory. They may disagree in how to interpret a bond issue, but they all agree that in a situation of asymmetric information, the announcement of a bond issue offers information. In an environment of only low asymmetric information, the theories suggest that bond issuances show the existence of attractive investment opportunities with positive net present values. These projects should induce positive stock price reactions for the project owners.

We concentrate on the stock price reactions and shareholder wealth effects generated by a corporate bond issue in the real estate sector, as the use of the proceeds in this sector is less confronted with problems of asymmetric information compared to other industries. Real estate firms usually take

the proceeds to finance property investments. This asset class allows a transparent evaluation of the purchase price and the expected cash flows in the future. Therefore, the real estate industry seems to be especially suitable for testing the wealth effect of corporate bond issues in a low asymmetric information environment.

Besides the fundamental considerations of Modigliani and Miller (1963, 1958), empirical evidence about the value effects of bond issues on the stock market value of the issuing company are in general mixed. Early studies by Eckbo (1986) and Miller and Puthenpurackal (2005) report insignificant abnormal stock returns which indicate a balanced overall effect from positive investment opportunities and risk effects from asymmetric information. In most cases, however, the provided evidence is clearly negative. Howton et al. (1998) examine the market reaction to 937 straight debt issues in the United States between 1983 and 1993 and show average abnormal returns between −0.24% and −0.56%. Davydov et al. (2014), as well as Godlewski et al. (2011) document negative abnormal stock price reactions following straight bond issues in Russia. All this evidence usually includes issuances from different industries and a wide variety of geographic regions.

In order to eliminate confounding influences from industries with a high level of information asymmetry, focusing on the real estate sector offers a promising approach to investigate how debt issuance affects shareholder wealth when issuing companies already exhibit a comparably high level of transparency. The real estate sector has always been of general importance and interest since it offers a certain safety. Real estate offers predictable cash flows, it can be leveraged, it is improvable and there are several facilitating tax regulations concerning real estate. The high level of transparency in the real estate sector is empirically documented, for example, by Devos et al. (2007) who study analyst forecasts and find that Real Estate Investment Trusts (REITs) have smaller forecast errors compared to industrial stocks and Dolvin and Pyles (2009) who examine initial public offerings of REITs and find lower offer price revisions which is also consistent with relatively low information asymmetry.

Given that the real estate business model already has a long history, there should be a vast set of experience in adequately interpreting new information coming to the market. Therefore, this industry is suitable for this observation on the wealth effect of corporate bond issues in a certain industry. Previous studies like Howton and Howton (2001) and Higgins et al. (2004) have already investigated wealth effects of corporate bond issues in the real estate industry. However, their sample is comparably small and focuses on REITs that are listed on an US stock exchange. As pointed out by Dogan et al. (2019), country-specific differences of REITs greatly impact these analyses. Therefore, our sample is composed of observations from many different countries to put focus on REIT specific behaviour and dilute local country-specific variations, namely, in regulations. By using a comprehensive sample which covers different types of real estate companies from multiple geographic regions over a time horizon of 23 years, we avoid the potential distorting effect of the previous studies' narrow samples.

The remainder of this paper is structured as follows: In Section 2, we review the corresponding empirical and theoretical literature and derive our research hypotheses, Section 3 illustrates our research methodology and describes the sample selection procedure of our unique dataset consisting of more than 2000 corporate bond issues. In Section 4, our empirical results are presented and Section 5 concludes on our findings and discusses their implications.

2 | HYPOTHESES DEVELOPMENT

Based on our previous assumptions regarding the value effects of bond issues on the stock market value of the issuing company in general, the high level of transparency in the real estate sector and the preceding results of Howton and Howton (2001) and Higgins et al. (2004), we state our first hypothesis:

H1 *Real estate companies will show a significant positive price response to the issuance of corporate bonds.*

We note that there are several influencing factors on the country-level, which might also affect debt issues of local real-estate companies (Dogan et al., 2019; Ghosh & Petrova, 2021). We therefore perform several additional robustness checks to ensure the generalisability of the findings as stated (see Section 4 for details).

Our next hypothesis is based on the efficient-market hypothesis (EMH) by Fama (1976, 1970). According to the EMH, in efficient markets (stock) prices always correctly reflect all available information. Considering only the date of the primary announcement of the issues and therefore, the 'bonds pipeline' subgroup of our dataset, the announcement of an issue should provide new information which has to be incorporated into the company's stock price. Furthermore, the positive effect which we expect for bond issues in general should be most visible here, since it represents the moment when the value relevant information reaches the market and triggers the re-valuation effect proposed by the EMH. Consequently, we formulate the following:

H2 *Following an event of the bonds pipeline category, we will find a more significant positive price response than for other issue deals.*

Furthermore, we want to examine overall differences between the issuance of different types of bonds. The general differences between different deal types are analysed by Fields and Mais (1991). The authors find a significant abnormal return following the announcement of a private placement of convertible debt. On the other hand, the public sale of convertible debt is associated with a negative abnormal return. The authors conclude that private placement may be interpreted as a positive signal, as it increases the external supervision of the company actions, and therefore, leads to a positive price response. In the same way, firms with high credit quality tend to issue unsecured debt and equity, while lower credit quality firms spread their capital structure between unsecured issues, asset-backed issues and convertible bonds (Rauh & Sufi, 2010). Specifically for REITs, Higgins et al. (2004) examine the short-run and long-run shareholder wealth effects of private placements of debt. For this case, the authors report no significant market reaction to the placements. Due to these mixed preceding results, we want to further examine the different responses between different types of debt and state:

H3 *Different deal types will lead to different price responses following their issuance.*

In the same line, we want to analyse the impact of the size of an issue on the price response. Large issues of debt create big obligations for companies and could therefore serve as a major signal. In general, a 'good' company with 'good' future projects can afford a large issue size. Following Flannery (1986), the issue volume could consequently imply information about the availability of profitable investment opportunities for the company. This would lead to a more positive reaction for larger issues.

On the other hand, it seems reasonable to also assume a relation between the company size and the volume of the bond issue. In this case, the signalling effect would only be limited. But even in this case, a large issue would lead to higher attention by investors, possibly increasing the awareness for the company in general. Thus, for all companies, a positive price response is to be expected following a large issue. We hypothesise:

H4 *Issuing larger volumes will have a significant positive price response.*

Considering the real estate sector, the group of real estate investment trusts, so-called REITs, qualifies as a highly interesting subgroup of our analysis. In most countries, REITs are legally obliged to pay out a certain quota of income (e.g. 90% in the US) to the investors in order to obtain tax

exemptions. Consequently, REIT companies are often dependent on capital acquisition through the capital market. As publicly listed companies already offer a high level of transparency by disclosure of financial information to investors, the frequent interactions with the capital market grant an additional gain in transparency. Deng et al. (2017) argue that transparency is critical in the evaluation of REITs as more transparent REITs (external REITs) receive better loan contract terms and have a more favourable loan syndicate structure. In the literature, a positive price response to straight bond announcements concerning real estate corporations is documented in general. It is to be noted that REITs with their special tax treatment have, of course, a different approach in managing debt and leverage compared to other companies which can, for example, increase their leverage to gain a tax shield. Considering REITs, Feng et al. (2007) argue that, contrary to the financing decisions of firms not facing these regulations, REITs with high growth opportunity and high market valuation raise funds through debt issues. As an explanation for this effect concerning short-term debt, Howe and Shilling (1988) describe signalling as the main driving factor for the positive significant debt-issuance effect. This source finds a positive stock price reaction to debt offerings for REITs but mainly driven through significant positive reactions to short-term-debt. In contrast, Howton and Howton (2001) and Higgins et al. (2004) have found no significant market reaction to straight or private debt issuance following an analysis of REIT data from 1991 to 1997 and from 1993 to 2001, respectively. However, Tan (2017) points out that in a study of US REITs in the years 1992–2014 the overconfidence of REITs' CEOs has led many of them to accumulate debt justifiable only by their personal strong belief in future financial gain of their company. The capital market has punished these CEOs accordingly as their perceived advantage of positive information was not shared by investors.

A similar explanation is given by Morri and Beretta (2008): the authors suggest that REITs follow a pecking order theory. This means that they prefer internal over external financing and debt over equity, when external financing is required. They find that firms that are more profitable are less leveraged and REITs with more growth opportunities have higher leverage ratios. Tangibility of assets turns out to be positively correlated with leverage, while REITs, whose operating risk is higher, prefer a lower financial risk and lower gearing. Therefore, the issuing of debt may indicate that the company can allow itself to increase leverage because of expected future positive development.

Other sources like Harrison et al. (2011) have tried to determine the factors driving REIT capital structure decisions. Their results support predictions derived from market timing and trade-off-theories but fail to support pecking order theory predictions. Contrary to the pecking order theory, the trade-off theory assumes that there is an optimal debt-equity ratio, which maximises firm value. In moving towards the target leverage ratio, firms continuously trade-off the advantages and disadvantages of borrowing. According to this theory, more profitable firms have a higher debt to equity ratio because they have more income to shelter and are less in danger of bankruptcy. Of course, the applicability here is to be questioned, since REITs have a different approach to the tax shield because of their tax regulations. The market timing theory states that managers have private information about the value of their firm and utilise this to strategically time their offering in order to maximise shareholder wealth. All three theories offer different explanations for the positive reaction to debt offerings. Nevertheless, they all agree that a positive reaction should be observed. Therefore, we will also suggest for REITs:

H5 *REITs will show a higher positive price response to the issuance of corporate bonds than Non-REITs.*

3 | DATA AND METHODOLOGY

3.1 | Event study methodology

Our goal is to determine and estimate the influence of a certain event on a company. For this purpose, Fama et al. (1969) have introduced the event study methodology.

The fundamental idea of an event study is to analyse the impact of the respective events (announcements of issue related information) on the companies' stock prices by comparing the expected (theoretical) return in the absence of the event with the actual return on the event-day. The difference leads to the event induced *abnormal return* (AR). Therefore, as a first step, the *expected returns* (ER) in the absence of the event have to be calculated by using a suitable estimator. We follow the previous literature and apply the market model, which is defined by the following equation:

$$ER_{it} = \alpha_i + \beta_i R_{mt} + u_i. \tag{1}$$

Considering a day t in the estimation window, ER_{it} describes the expected return of company i on that day. The variable R_{mt} stands for the return of a benchmark index on the day t. We use region-specific MSCI real estate indices as our benchmarks.[1] The parameter α_i stands for a general over- or under-performance of the company compared to the benchmark and β_i measures the influence of index movements on the return for the company. u_i defines a white noise disturbance term. The parameters α_i and β_i are obtained by an OLS-estimator on historical market data. We consider an estimation window of a full year (252 trading days) beginning 262 days prior to the event date. Following this estimation window there is an event window containing the day of the event date and a certain range of days surrounding the event. Since the incorporation of new information into the stock price could take several days, there are multiple event windows of different sizes accounting for those effects.

The expected return is then compared to the observed return on the days in the event window by defining an abnormal return (AR) as the difference between the observed return R_{it} and the expected return ER_{it}:

$$AR_{it} = R_{it} - ER_{it}. \tag{2}$$

Now, we want to consider certain time windows $[\tau_1; \tau_2]$ in our event window and determine the summed up abnormal returns as the cumulative abnormal return (CAR):

$$CAR_{i,[\tau_1;\tau_2]} = \sum_{t=\tau_1}^{\tau_2} AR_{it}. \tag{3}$$

We take the arithmetic mean of all CARs for a certain time window and obtain the average cumulative abnormal return (ACAR):

$$ACAR_{[\tau_1;\tau_2]} = \frac{1}{n} \sum_{i=1}^{n} CAR_{i,[\tau_1;\tau_2]}. \tag{4}$$

In order to test the ACARs for statistical significance, we will apply the classical cross-sectional t-test, the BMP-test as a parametric test and the CZ-test as a non-parametric test. We refer to Boehmer et al. (1991), Corrado and Zivney (1992) and Corrado (1989) for the test statistics of the BMP-test and the CZ-test.

3.2 | Sample selection and control variables

In order to identify the influence of a bond issue on a company's stock price and its drivers, it is crucial to collect a comprehensive dataset of issue events and control variables. Therefore, we start with all bond issues in the real estate sector documented in the Thomson Reuters Datastream

[1]The benchmark indices are matched by using the bond issue's issuer sub region property.

database from January 1996 to April 2019. Since there are many cases in which the bond issuer is a financial subsidiary of the actual issuing real estate company, the bond issues are filtered by companies having an ultimate parent in the real estate macro industry. This approach will overcome difficulties arising from complexity in company structure when issuing subsidiaries are not publicly listed or, if publicly listed, display a stock market reaction biased compared to the ultimate parent's stock market reaction. In general, there are mainly two distinct dates on which important bond issue related information were released: First, the primary announcement of the issue and subsequently the issue itself. We analyse both associated events and denominate the first as 'bonds pipeline' events and the latter ones 'issue dates' (in a narrow sense) in the following sections. This leads us to an initial sample of 17,420 events. The subsequently necessary exclusion of some events illustrates Figure 1.

In particular, confounding events during the event windows can cause biased results for the event study. This is why the sample is further restricted manually by limiting the possible number of events per company to one per quarter. If a company has more than one issue per quarter, only the first issue in this quarter is considered, while the others are removed from the sample. An additional exclusion of, for example, penny stocks and duplicates restricts the final event study dataset to a number of 2299 events. The Thomson Reuters Datastream database is also used to collect company- and issue-specific (financial) data. Missing data for several events restricts the final regression dataset to 1994 events.

3.2.1 | Analysed subsets

The event study dataset is further divided into three subsamples in order to control for different drivers and effects of the bond issues: the *REIT*s samples distinguish between REIT-companies and non-REIT-companies, the *principal amount* samples are generated by splitting the full dataset into five quantile subsamples according to the principal amount of the issue. The *issue type* samples are defined according to the following specific deal types:

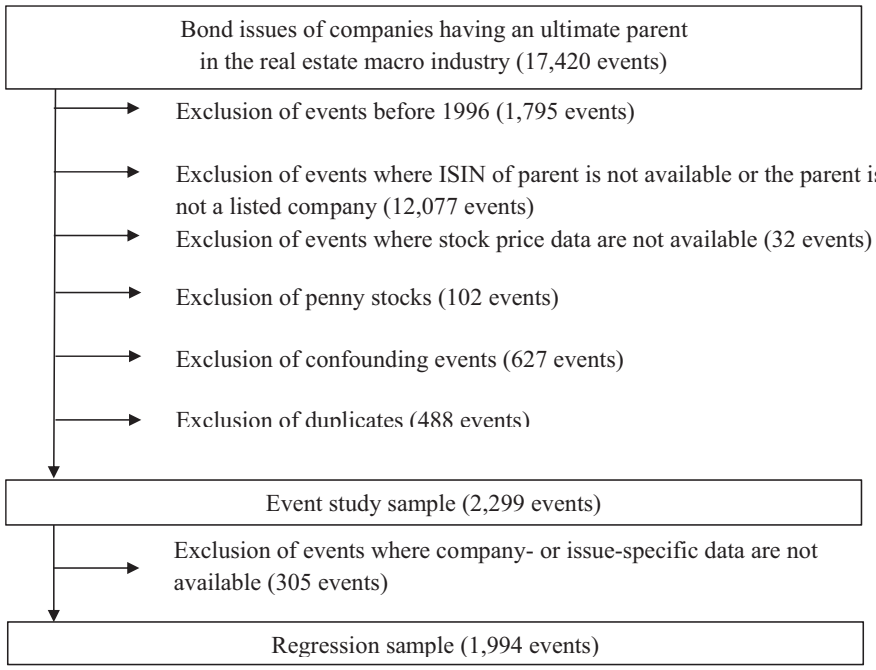

FIGURE 1 Overview of the data collection process.

- *Convertible bonds*: a bond may be equipped with an option to convert the debt in company equity or stock. The interest rate for non-convertible bonds is usually higher since it does not offer the profitable option to convert. For this issue type Kleidt and Schiereck (2009) find that the systematic equity risk increases after the issuance of a convertible bond, whereas Zeidler et al. (2012) provide evidence that the systematic risk increases prior to the issuance of a convertible bond and drops right after the issuance.
- *Preferred stock*: in its essence, preferred stock is equity but it combines features of debt and shall therefore be considered here. Preferred stock does not contain a voting right concerning company decisions but pays higher dividends and has a stronger claim on assets compared to common stock. Dividends are usually fixed or set in terms of a benchmark index and are paid before common stock dividends. Nevertheless, the payment of these dividends is a decision of the company's board of directors.
- *Asset-backed securities*: in an asset-backed security, other assets create a pool of assets from which the security derives its payments. The payments are generated by the underlying assets and passed on to the asset-backed security. A common type of asset-backed security concerning real estate is a mortgage-backed security, in which the pool of assets is made of a collection of mortgages.
- *Debt private placemen*: in a private placement, securities are sold to a small number of selected investors. It differs from a public issue for that the securities are not made available for sale on the open market to any type of investor. A big appeal of private placements is the minimal regulatory requirements and standards that the offering must comply with. Even though it is a raise of capital which involves the sale of securities, it is not necessary to be registered with the U.S. Securities and Exchange Commission (SEC) in America for example.
- *MTN programs*: mid-term debts, which should not be explained in detail since the dataset only contains a very small number of such events.

3.2.2 | Issue-specific variables

We include several company and issue specific control variables in the cross sectional regression analyses:

- *Recent equity deal*: this dummy variable is equal to one if there has been an equity deal for the respective company in the same year like the issue event and zero if not. This variable could be an indicator for the company's level of profitable projects if the raise of capital through bonds and equity deals indicates numerous investments possibilities with a positive net present value. On the other hand, an equity deal which is quickly followed by a bond issue could indicate that the equity deal has not been as successful as expected, making it necessary to raise additional capital through bond issues. The first column of Table 1 consequently describes the percentage of events in which the regarded issue event is preceded by an equity deal of the same company.
- *Principal amount* describes the issue's volume in million US dollars (US$). Foreign currencies have been converted to US$.
- *Offer price* is the price per share at which the security is offered to the public.
- *Coupon* is the interest rate on a debt security the issuer promises to pay to the holder until maturity.

Since there are several issues where the coupon or the offer price is not available, Table 1 reports the number of observations for which the respective data is available. It is notable that REITs offer their bonds for a significantly lower price per share.

TABLE 1 Descriptive statistics for the issue-specific variables of the regression dataset

	Recent equity deal	*Principal amount* (million US$)			*Offer price*			*Coupon*		
	%	*n*	Mean	Med	*n*	Mean	Med	*n*	Mean	Med
Panel A: Total sample										
Total	24	1994	293.4	150.0	1567	93.40	100.0	1275	4.09	4.00
Panel B: REITs										
REITs	32***	816	306.8	200.7***	551	82.84***	99.54***	443	4.63***	4.48***
Panel C: Type of issue event										
Debt private placement	33	57	95.66***	79.62***	55	96.84	100.0	52	4.17	4.23
Mortgage/asset backed	9	11	234.5	101.3	8	100.4***	100.0	7	6.68***	6.38***
MTN programs	0***	3	4495	1133***	3	100.0***	100.0	0	NA	NA
Non-convertible bonds	22***	1390	222.3***	150.0	1349	99.86***	100.0	1216	4.07*	4.00
Preferred stock	31*	152	124.7***	100.0***	152	34.36***	25.00***	0	NA	NA
Bonds pipeline	29***	381	618.6***	390.8***	0	NA	NA	0	NA	NA
Panel D: Principal amount										
<US$10 million	31%	68	4.87	4.76	44	99.27**	100.0	32	3.60	2.86**
US$10–US$100 million	22%	674	46.85	44.30	558	92.15	100.0	396	3.29***	3.12***
US$100–US$250 million	24%	492	154.4	150.0	443	90.29***	100.0	355	4.35***	4.27**
US$250–US$500 million	24%	403	336.2	300.0	342	95.48***	99.69	319	4.88***	4.60***
≥US$500 million	27%	457	957.2	750.0	180	99.52***	99.57	173	4.02	4.00
Panel E: Region										
Africa	50%	8	26.19	15.82	8	100.0	100.0	0	NA	NA
Asia	18%	728	315.0	133.8	589	99.65	100.0	556	3.75	3.50
Europe	22%	352	239.1	114.7	352	101.7	100.0	236	2.89	2.38
North America	31%	868	307.3	225.0	586	81.67	99.45	466	5.02	4.65
South America	11%	38	124.2	58.56	32	100.1	100.0	17	6.40	6.60
Panel F: Time										
Before crisis	25%	1552	278.5	157.1	1278	95.08	100.0	1035	3.83	3.80
After crisis	22%	442	345.9	125.0	289	85.99	99.86	240	5.19	5.50

Note: Means and medians of the respective group in the Panels B–D are tested against the total sample excluding the observations of the group being compared. Means and medians are tested by using Welch's *t*-test and the Mann-Whitney *U*-Test, respectively. Principal amounts in Panel D are not tested statistically. Significant test results are highlighted underneath the respective mean or median. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

3.2.3 | Company-specific variables

Similar to the question if a company has recently raised equity, our following variables of interest are other proxies for the profitability of the issuing company's projects:

- *Total Assets*$_g$ measures the growth of the total assets in the year prior to the issue event. High growth rates indicate that the company has already invested comparably large amounts in their assets, which are real estate objects. Using growth rates enables comparability between different companies and ensures that all used company-specific variables are consistently expressed as ratios.
- *(High) dividends per share* could indicate that the company's projects are highly profitable generating high earnings that are distributed to the shareholders.

Furthermore, the variables *market-to-book-value*, *volatility*, *return on equity* and *leverage* are used to control for the firm's relative valuation, its risk, profitability and capital structure.

For the different groups of principal amounts, Table 2 Panel D shows that the median of the dividends per share tends to increase towards higher principal amounts. This is in line with the hypothesis that higher principal amounts signal large growth opportunities leading to high earnings which are spread to the shareholders. However, the large differences between the mean and median values are driven by few events with comparably high dividends per share. It is also remarkable that REITs exhibit a significant lower stock price volatility as Table 2 Panel B indicates, which is equal to a lower risk when investing in REITs.

3.2.4 | Dummy variables

Since real estate markets vary strongly across different countries and time periods, several additional dummy variables are included in order to control for these specifics:

- We consider five geographic regions in the dataset: *Africa*, *Asia*, *Europe*, *North America* or *South America*; each dummy variable equals 1 if the bond issue has taken place in the respective region and 0 otherwise. These variables aim to take into account different market conditions in these regions which also might affect debt issues. For example the maturity of the debt market has been proven to play a role for debt issues in related studies (e.g. Berninger et al., 2021) as well as local regulations regarding real estate companies (Dogan et al., 2019; Ghosh & Petrova, 2021) and the enforcement level for debt (Djankov et al., 2008).
- The world financial crisis marks an extraordinary structural interruption in the real estate market. This is why the dummy variable *BeforeCrisis* equals 1 if the bond issue has taken place before 2007 and 0 if the bonds have been issued in 2007 or later.

In Tables 1 and 2 the last two panels exhibit company- and issue-specific descriptive statistics according to these subgroups. Table 3 gives a brief overview of the number of bond issues divided by the geographic region and the different subsamples which are examined in the event study and regressions later on. It can be seen that our sample of bond issues covers a broad regional variety as well as different bond characteristics.

4 | EMPIRICAL RESULTS

In a first step, we provide results of our event studies. Figure 2 illustrates the low overall abnormal returns surrounding the day of issue with a negative tendency.

The statistical results in Table 4 underline the insignificant abnormal returns throughout every single event window, in contrast to our expectations. This leads to a rejection of H1 since there is no observable stock-market reaction to the issue of a corporate bond on average.

The total sample contains issues of a wide variety of different sizes and types. While very small issues could play a subordinate role for investors, large issues attract the investors' attention thor-

TABLE 2 Descriptive statistics for the company-specific variables of the regression dataset

	Observations		*Market-to-book-value*		*Volatility* (%)		*Return on equity* (%)		*Total Assets*$_g$ (%)		*Leverage* (%)		*Dividends per share* (%)	
	n	%	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med
Panel A: Total sample														
Total	1994	100	1.64	1.36	23.51	22.27	14.75	7.80	24.68	9.20	178.64	112.5	6.53	0.68
Panel B: REITs														
REITs	816	41	2.04***	1.84***	20.18***	19.32***	22.89	7.53***	20.14	7.30	143.87*	109.73	5.69	1.73***
Panel C: Type of issue event														
Debt private placement	57	3	1.47	1.12	19.35***	19.36***	7.55	6.01***	11.07**	10.50	82.32***	67.77***	1.29***	0.80
Mortgage/asset backed	11	1	1.17***	0.93*	24.12	19.92	12.22	12.79	32.75	29.60***	179.7	151.69	0.46***	0.54
MTN programs	3	0.2	0.56***	0.60***	20.59	17.80	8.84	4.98	8.40	16.00	47.65***	44.40**	0.95***	0.53
Non-convertible bonds	1390	70	1.64***	1.31***	23.92	22.98***	9.61	8.32	25.91	9.50	184.5	114.00*	4.97***	0.40***
Preferred stock	152	8	2.13	1.87***	20.73***	19.23***	8.42	7.10*	18.86	9.60	235.07	125.06	4.52	1.29***
Bonds pipeline	381	19	1.50	1.47	23.76	23.21	37.23	6.31***	24.43	7.10	150.19	110.02	14.05***	1.32***
Panel D: Principal amount														
<US$10 million	68	3	2.22***	1.80***	23.42	23.23	−3.74	7.60	20.55*	12.45	157.75	102.56***	17.03	0.57***
US$10–US$100 million	674	34	1.57	1.26***	23.51	22.27	8.87	8.09	14.74	9.60	182.48	106.41	7.46	0.32
US$100–US$250 million	492	25	1.46	1.25***	23.54	22.86	9.86	8.48*	16.27	10.20*	179.77	121.03	2.60***	0.53
US$250–US$500 million	403	20	1.71	1.62***	23.71	22.57	8.24	7.45**	53.94	7.90	188.70	119.20	1.99***	1.24***
≥US$500 million	357	18	1.86	1.43	23.28	21.56	43.47	7.44	22.78	7.70*	162.51	109.84	13.33***	1.54***
Panel E: Region														
Africa	8	0.4	3.28	0.99	16.36	15.92	8.26	10.78	18.13	19.30	430.0	60.59	0.11	0.11
Asia	728	37	1.37	1.14	28.49	28.80	8.63	7.32	33.72	10.00	161.0	116.6	13.24	0.10
Europe	352	18	1.17	1.04	19.96	19.38	12.44	12.14	15.36	10.60	135.4	101.5	1.69	0.45
North America	868	44	2.05	1.83	20.60	19.33	21.49	7.65	20.32	7.5	185.1	116.1	3.21	1.64
South America	38	2	1.66	0.88	29.06	30.56	0.74	5.08	38.44	2.10	716.1	75.01	0.15	0.05

TABLE 2 (Continued)

	Observations		*Market-to-book-value*		*Volatility* (%)		*Return on equity* (%)		*Total Assets*$_g$ (%)		*Leverage* (%)		*Dividends per share* (%)	
	n	**%**	**Mean**	**Med**	**Mean**	**Med**	**Mean**	**Med**	**Mean**	**Med**	**Mean**	**Med**	**Mean**	**Med**
Panel F: Time														
Before crisis	1552	78	1.58	1.27	24.82	24.08	8.36	7.73	24.55	8.70	184.6	110.9	7.77	0.50
After crisis	442	22	1.87	1.67	18.92	16.80	37.21	8.48	25.12	10.60	157.9	115.9	2.19	1.25

Note: Means and medians of the respective group in the Panels B–D are tested against the total sample excluding the observations of the group being compared. Means and medians are tested by using Welch's *t*-test and the Mann-Whitney *U*-Test, respectively. Significant test results are highlighted underneath the respective mean or median. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

TABLE 3 Overview of the number of bond issues divided into different subgroups

	Total	REITs	Large principal amount
Africa	8	0	0
Asia	728	66	128
Europe	352	3	60
North America	868	747	168
South America	38	0	1

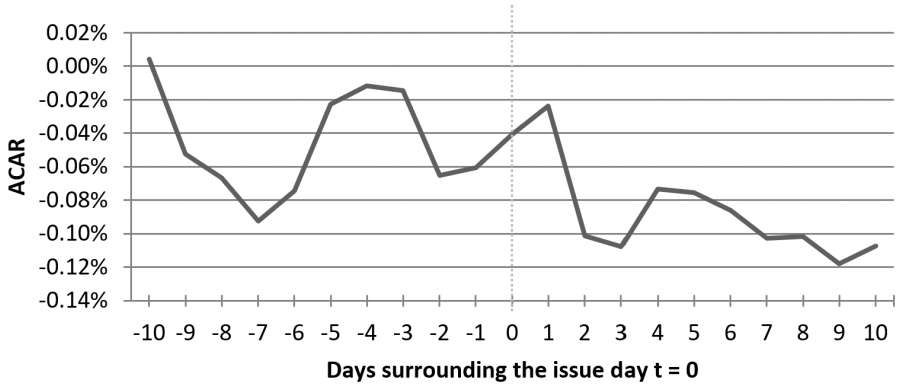

FIGURE 2 ACAR development around the day of issue for the total sample.

oughly. Furthermore, the announcement of a bond issue poses new information for the stock-market while the issue itself does not reveal any new information.[2]

Therefore, the following sections focus on the stock-market reactions to specific types and sizes of issues.

4.1 | REIT subsamples

Dividing the events into the two subgroups of issues by REIT companies and non-REIT companies, the event study results are ambiguous. Both subsamples show insignificant stock-market reactions. Nevertheless, the overall abnormal returns during the full 21-day event windows symmetrically surrounding the event date are negative for the non-REITs subsample (Table 5 Panel B) and positive for the REITs (Table 6 Panel A) subsample. This is also visualised by Figure 3. In untabulated results the statistical comparison of the mean values by using Welch's *t*-test does not show any significant difference. Hence, the expectation that REITs show a greater positive price response to the issuance of corporate bonds than Non-REITs (H5) cannot be supported. This leads to the assumption that the corporate type of the real estate company plays a subordinate role for investors when incorporating the bond issue event into the stock price. One possible reason could be that the legal structure of REITs differ between the analysed countries. There could be some countries where the information if the issuing company is a REIT is an important driver of the stock-market reaction. As this research question is not covered by this article, this could be subject of further research.

[2]To ensure that these results are not driven by country-specific factors that might affect the debt issues in general (e.g. Djankov et al., 2008; Hoepner et al., 2016) or by the legal environment regarding real estate companies (Dogan et al., 2019; Ghosh & Petrova, 2021), we additionally split our sample on the country-level and find comparable results. These results are untabulated for the sake of brevity and are available from the authors upon request.

TABLE 4 Detailed event study results for the issue event, using the total sample

	ACAR (%)	Median ACAR (%)	*t*-test (*t*-value)	BMP-test (*t*-value)	CZ-test (*z*-score)
Panel A: Total sample (n = 2299)					
[−10; +10]	−0.11	−0.31	−0.75	−0.59	−0.72
[−1; 0]	0.02	−0.06	0.53	0.41	0.39
[0; +1]	0.04	−0.07	0.79	0.07	−0.02
[0; 0]	0.02	−0.05	0.61	0.34	0.43
[+1; +10]	−0.07	−0.16	−0.71	−1.09	−1.30

Note: ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

TABLE 5 Detailed event study results for the issue day, divided into subsamples by the company's classification as REIT or non-REIT

	ACAR (%)	Median ACAR (%)	*t*-test (*t*-value)	BMP-test (*t*-value)	CZ-test (*z*-score)
Panel A: REITs (n = 943)					
[−10; +10]	0.12	−0.06	0.71	−0.06	0.30
[−1; 0]	0.03	−0.04	0.44	0.62	0.78
[0; +1]	−0.05	−0.10	−0.91	−1.26	−1.08
[0; 0]	0.00	−0.05	−0.05	−0.19	−0.12
[+1; +10]	0.02	0.08	0.18	−0.94	−0.87
Panel B: Non-REITs (n = 1356)					
[−10; +10]	−0.28	−0.45	−1.31	−0.76	−1.17
[−1; 0]	0.02	−0.10	0.33	−0.02	−0.16
[0; +1]	0.10	−0.07	1.39	1.17	0.86
[0; 0]	0.03	−0.05	0.75	0.61	0.64
[+1; +10]	−0.13	−0.24	−0.94	−0.65	−0.94

Note: ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

4.2 | Type of issue

As described in subsection 3.2 there are several different types of issue events, each with specific characteristics. Since the bonds pipeline subgroup stands out by only containing the (sometimes vague) announcements of upcoming bond issues, this new information should cause stronger reactions than the actual bond issue as hypothesised by H2. Figure 4 therefore shows the development of the abnormal returns for this subgroup during the event window.

The diagram shows a positive peak symmetrically surrounding the day of the bond issue announcement. The respective abnormal returns of 0.15% are weakly statistically significant. However, the overall abnormal returns during the [−10; +10] event window do not differ significantly from zero.

The little and statistically weak market reaction for only the primary issue announcements can be explained by noise-driven trading due to raised attention for the company's stock around these events (Black, 1986). This exceptional attention results in a short-term buying behaviour which is declining again soon. These so called 'availability heuristics'[3] have previously been described for individual investors by Barber and Odean (2007). Paired with the noise-traders-hypothesis, this could explain the significant positive short-term reaction. Nevertheless, the noise in the days following the announcement could be reduced by the subsequent revelation of further information concerning the proposed

[3]For further reading concerning availability heuristics refer to, for example, Kliger and Kudryavtsev (2010).

TABLE 6 Event study results for the different issue event types

	ACAR (%)	Median ACAR (%)	*t*-test (*t*-value)	BMP-test (*t*-value)	CZ-test (*z*-score)
Panel A: Debt private placements (n = 64)					
[−10; +10]	−0.02	−0.50	−0.04	−0.72	−0.78
[−1; 0]	0.15	0.00	0.88	0.85	1.11
[0; +1]	0.08	−0.08	0.45	−0.14	0.05
[0; 0]	0.00	0.07	0.02	0.33	0.66
[+1; +10]	−0.14	−0.14	−0.34	−1.31	−1.50
Panel B: Mortgage/asset backed (n = 13)					
[−10; +10]	1.07	2.06	0.63	0.88	−0.07
[−1; 0]	−0.29	−0.50	−0.82	−0.81	−0.89
[0; +1]	0.06	−0.18	0.16	0.30	0.80
[0; 0]	0.15	0.44	0.53	0.45	0.46
[+1; +10]	−0.13	0.29	−0.15	−0.45	−0.70
Panel C: MTN programs (n = 3)					
[−10; +10]	2.34	−0.91	0.64	0.29	0.20
[−1; 0]	−0.36	−0.14	−0.88	−1.09	−0.64
[0; +1]	−1.35	−0.45	−1.13	−1.18	−0.54
[0; 0]	−0.15	0.07	−0.50	−0.62	−0.29
[+1; +10]	−0.19	1.03	−0.09	0.46	0.83
Panel D: Non-convertible bonds (n = 1553)					
[−10; +10]	−0.21	−0.35	−1.23	−1.08	−1.12
[−1; 0]	−0.02	−0.10	−0.31	−0.43	−0.55
[0; +1]	0.07	−0.07	1.10	0.81	0.48
[0; 0]	−0.01	−0.06	−0.31	−0.44	−0.34
[+1; +10]	−0.06	−0.21	−0.51	−0.86	−1.18
Panel E: Preferred stock (n = 180)					
[−10; +10]	0.33	0.21	0.71	0.67	1.12
[−1; 0]	−0.09	−0.03	−0.62	−0.36	−0.19
[0; +1]	−0.06	0.00	−0.49	−1.53	−0.97
[0; 0]	−0.06	−0.07	−0.62	−1.39	−1.26
[+1; +10]	0.07	0.21	0.22	0.28	0.75
Panel F: Bonds pipeline (n = 486)					
[−10; +10]	0.01	−0.30	0.03	0.24	0.04
[−1; 0]	0.19	0.06	1.65*	1.76*	1.71*
[0; +1]	−0.02	−0.11	−0.15	−0.45	−0.42
[0; 0]	0.15	0.04	1.71*	1.93*	1.98**
[+1; +10]	−0.13	−0.28	−0.63	−0.53	−0.54

Note: ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

issue. This could trigger investors to adjust their attention-driven behaviour to a rational behaviour and thus explain the ACAR's drop in the days after the announcement event.

Comparable effects have also been documented by Karniouchina et al. (2009), who analyse the impact of stock recommendations shown on a TV show. They attribute the positive abnormal returns to primacy and recency effects. Compared to the results of the total sample, events of the bonds pipe-

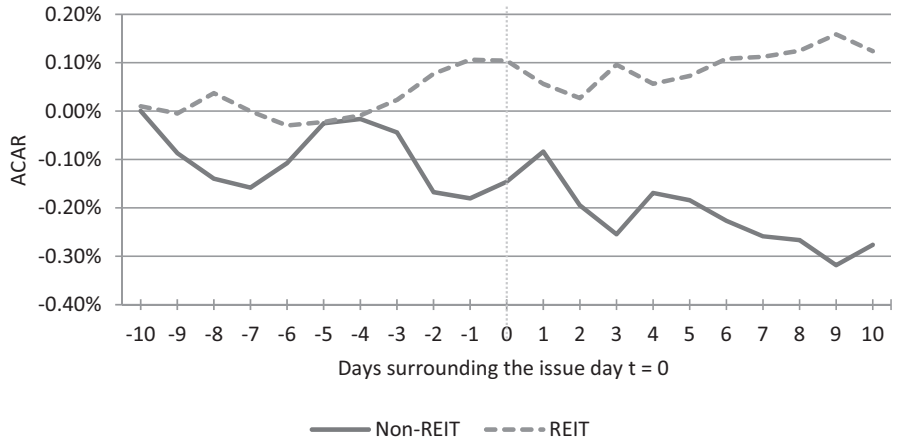

FIGURE 3 ACAR development surrounding the issue day, divided into subsamples by the company's classification as REIT or non-REIT.

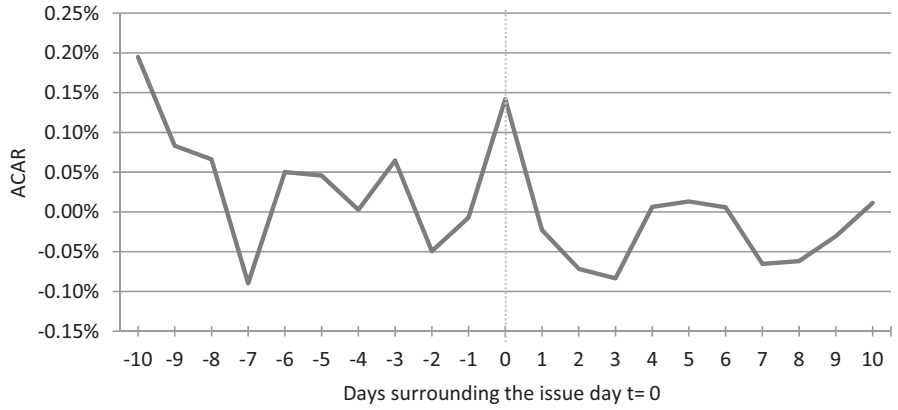

FIGURE 4 ACAR development surrounding the bonds pipeline events.

line subgroup show stronger significant price responses, which is in line with H2. However, the differences between the price responses are not statistically significant following Welch's *t*-test and the Wilcoxon test. Nevertheless, the stock price reactions to issues of all the other issue type subgroups are predominantly insignificant as Table 6 Panels A–E show. This supports H2 and lets us reject H3, since the results suggest that in general bond issues in the real estate sector are not value relevant for the company's investors.

4.3 | Principal amount

Since H4 states multiple reasons to assume that issuing larger volumes leads to a significant, more positive stock-market reaction, our next subsamples focus on the principal amount of the issue. Exemplarily, Figure 5 illustrates the development of the abnormal returns for very large issues with a principal amount of more than US$500 million.

Around the issue date, again small positive market reactions of 0.14% in this case can be observed. Table 7 Panel E shows that those abnormal returns are statistical significant.

When looking at all other subsamples with smaller principal amounts in Table 7, it can be seen that only those large issues cause a significant positive stock-market reaction at all. In addition, when normalising the principal amount with the company's market value, Welch's *t*-test reveals that the issues in the large principal amounts subsample are significantly larger in relation to the company's market value than for the other issues: Very large issues raise 40% of the company's market value on average, while other issues raise only 11% on average. Those findings support H4. The explanation for the peak reaction could be the same effect of noise-driven trading as previously described.

4.4 | Cross-sectional regression results

To study the joint effect of the previously analysed factor, finally several regression analyses were conducted. In each of the following regression models the CARs of company *i* are used as dependent variable. Equation (5) exhibits the fully specified regression model, in which the index $[\tau_1; \tau_2]$ denotes the beginning and the end of the used event window.

$$\begin{aligned} CAR_{i,[\tau_1;\tau_2]} = {} & \beta_0 + \beta_1 Market-to-book-value_i + \beta_2 Volatility_i + \beta_3 Return\ on\ equity_i + \beta_4 Total\ assets_{g,i} \\ & + \beta_5 Leverage_i^2 + \beta_6 Dividends\ per\ share_i + \beta_7 Recent\ equity\ deal_i + \beta_8 Principal\ amount_i \\ & + \beta_9 Offer\ price_i + \beta_{10} Coupon_i + \beta_{11} Asia_i + \beta_{12} NorthAmerica_i + \beta_{13} Before\ Crisis_i + u_i. \end{aligned} \tag{5}$$

The model is divided into four sub-models: model I only includes company-specific variables, whereas model II only includes issue-specific variables. Model IV is consequently a combination of model I and model II, including all variables. Since there are several events for which the offer price and the coupon data are not available, Model III excludes these two variables in order to fully use the unrestricted regression dataset.

Due to brevity reasons, regressions on the large amounts and the REITs subsamples are omitted in the main part of the paper but are available on request.

Even though the event study results of the full sample remained insignificant, it is remarkable that the regression for the total sample, which is shown in Table 8, exhibits two significant company-specific variables. First, the growth indicator *Total Assets*$_g$ is positively associated with the capital market reaction. This indicates that expected future growth prospects of the issuing company play a role in assessing the current financing decision also in the real estate sector. The significant negative coefficient of the variable *Leverage* might be interpreted in a comparable way, where an

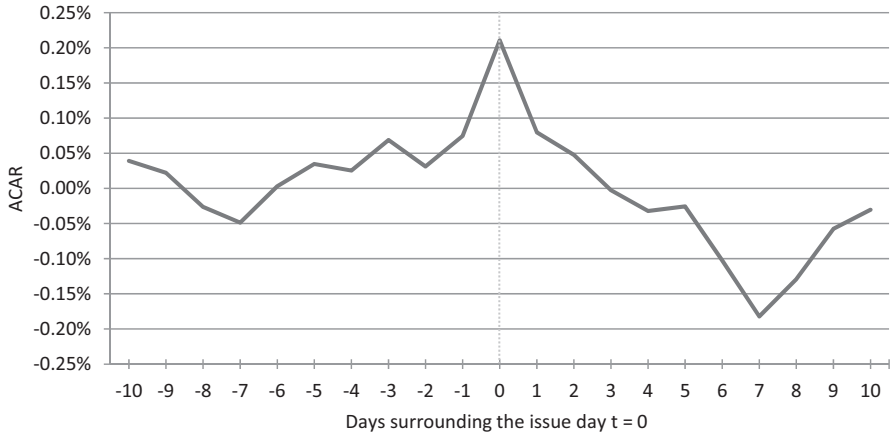

FIGURE 5 ACAR development surrounding the issue day, using the subsample of issues with a principal amount of more than US$500 million.

TABLE 7 Event study results for the issue day, divided into subsamples by principal amounts

	ACAR (%)	Median ACAR (%)	*t*-test (*t*-value)	BMP-test (*t*-value)	CZ-test (*z*-score)
Panel A: Principal amount <US$10 million (*n* = 85)					
[−10; +10]	−0.84	−0.59	−0.96	−1.18	−0.52
[−1; 0]	−0.05%	−0.18	−0.18	−0.08	0.43
[0; +1]	0.13	0.14	0.42	0.75	0.51
[0; 0]	0.04	0.09	0.19	0.70	0.77
[+1; +10]	0.12	−0.13	0.21	−0.14	0.26
Panel B: Principal amount US$10–US$100 million (*n* = 770)					
[−10; +10]	−0.53	−0.86	−2.00**	−2.17**	−2.08**
[−1; 0]	−0.10	−0.14	−1.21	−0.85	−1.17
[0; +1]	0.04	−0.16	0.43	0.15	−0.45
[0; 0]	−0.01	−0.08	−0.12	0.03	−0.48
[+1; +10]	−0.26	−0.38	−1.53	−1.64	−1.79*
Panel C: Principal amount US$100–US$250 million (*n* = 561)					
[−10; +10]	0.37	−0.14	1.31	1.09	0.80
[−1; 0]	0.11	−0.03	1.15	0.54	0.51
[0; +1]	0.15	0.02	1.65*	1.18	1.28
[0; 0]	0.04	−0.03	0.68	0.10	0.51
[+1; +10]	0.16	−0.03	0.82	0.06	0.42
Panel D: Principal amount US$250–US$500 million (*n* = 445)					
[−10; +10]	0.08	−0.25	0.27	0.36	0.66
[−1; 0]	0.02	−0.03	0.19	−0.24	0.07
[0; +1]	−0.0	−0.14	−0.77	−1.83*	−1.50
[0; 0]	−0.06	−0.08	−0.87	−1.46	−1.38
[+1; +10]	0.14	−0.05	0.68	−0.02	−0.17
Panel E: Principal amount ≥US$500 million (*n* = 410)					
[−10; +10]	−0.03	0.05%	−0.10	0.17	−0.58
[−1; 0]	0.18	0.00	1.75*	2.04**	1.53
[0; +1]	0.01	−0.03	0.05	0.28	0.22
[0; 0]	0.14	0.02	1.88*	2.13**	2.02**
[+1; +10]	−0.24	−0.30	−1.26	−0.41	−1.26
Panel F: No principal amount available (*n* = 28)					
[−10; +10]	−0.11	1.47	−0.10	1.51	1.22
[−1; 0]	−0.36	−0.07	−0.73	−0.31	−0.07
[0; +1]	−0.20	0.23	−0.39	−0.08	0.09
[0; 0]	−0.18	0.06	−0.62	−0.75	−0.15
[+1; +10]	−0.38	−0.06	−0.50	0.77	1.05

Note: ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

already high level of leverage in the company could indicate that the current issue should be used for refinancing but not growth.

The remaining control variables show almost no significant effect at all while the overall explanatory power of the models in general is comparably low. This is quite surprising since many of the applied control variables have proven explanatory value in samples compiled of broader industries

(Ammann et al., 2006; de Roon & Chris, 1998; Davydov et al., 2014). In contrast, the short term capital market reactions on bond issues in the real-estate sector appear to be more erratic which supports our conclusion that they can mostly be attributed to noise driven trading. The dummy variables controlling for differences between geographic regions and time periods remain insignificant. Thus, they seem to play a subordinate role in the shareholders' valuation process.

TABLE 8 Regression results, using the CARs in the event window [0; +1] as dependent variable

	$CAR_{[0;+1]}$			
	I	**II**	**III**	**IV**
Company-specific				
Market-to-book-value	0.020		0.023	0.025
	(0.758)		(0.846)	(0.456)
Volatility	0.015		0.002	0.012
	(0.504)		(0.056)	(0.250)
Return on equity	0.009		0.011	0.066*
	(0.013)		(0.016)	(1.678)
Total Assets$_g$	0.084**		0.084**	0.100
	(1.987)		(2.007)	(0.174)
Leverage^2	−0.066**		−0.066**	−0.036
	(−2.268)		(−2.224)	(−0.181)
Dividends per share	0.002		0.0004	0.016
	(0.088)		(0.014)	(0.523)
Issue-specific				
Recent equity deal		−0.035	−0.030	−0.040
		(−1.370)	(−1.503)	(−1.454)
Principal amount		−0.005	−0.007	−0.021
		(−0.195)	(−0.379)	(−0.634)
Offer price		−0.012		−0.014
		(−0.811)		(−0.850)
Coupon		0.026		0.021
		(0.675)		(0.464)
Asia		0.001	0.004	−0.016
		(0.017)	(0.110)	(−0.307)
North America		−0.026	−0.025	−0.027
		(−0.736)	(−0.813)	(−0.626)
Before crisis		0.014	0.006	0.012
		(0.437)	(0.217)	(0.361)
Regression details				
Constant	−0.0007	0.030	0.001	0.031
	(−0.364)	(0.808)	(0.327)	(0.798)
Observations	1994	1239	1994	1239
Adjusted R^2	0.008	−0.003	0.007	0.011
F-value	1.525	0.503	1.203	0.478

Note: Indices *g* denote growth rates, measured during the year prior to the issue event. The robust *t*-statistics are given in parentheses. For the OLS-coefficients and the *F*-value ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively.

However, it is important to keep in mind that the adjusted *R* squared remains comparably small, which implies that there could be many other diffuse drivers. Those, possibly diffuse, drivers align with the noise traders hypothesis since many small drivers lead to a significant stock market reaction when they coincide.

5 | CONCLUSION

Raising capital through bond issues is an important way of funding especially in the real estate sector with its high demand for capital. In general it seems reasonable to assume that a bond issue is valuated positively by shareholders since it can serve as a signal about the availability of promising new projects for the firm. Nevertheless, different theories imply different interpretations for this event and market reaction is hardly foreseen. For example, Allen and Rutherford (1992) find negative reactions to the announcement of convertible bonds, while they are able to provide evidence that there is a positive reaction to straight bond announcements. Unlike conventional industry companies, real estate companies face highly illiquid markets but in general have a very steady cash-flow structure. Furthermore, specific corporate structures like REITs make it necessary to consider these differences while evaluating the market reaction. While previous literature has mainly focused on differences of stock-market reactions to bond issues in specific countries, especially the USA (Allen & Rutherford, 1992; Howe & Shilling, 1988), leading to ambiguous results, our study focuses on different issue types, sizes and differences between REITs and Non-REIT companies.

For the total subsample and the subsample of bond issues by REITs we cannot find any significant stock-market reaction to the issue of a bond. This could be caused by the heterogeneity of the total sample and the heterogeneous REIT structures in different countries. Hence, the sample is further divided into different subsamples. Analysing the subsample of primary issue announcements, a significant, slightly positive abnormal capital market reaction of 0.15% can be observed, which quickly declines in the following days. This pattern is attributed to the attention-driven buying behaviour of noise traders, which is followed by the slow incorporation of information into the stock price by rational investors, leading to the stock price decline. The other issue types, however, do not show any significant reaction to the issue itself. For very large issues, the observed reactions are comparable, indicating that large issues attract more attention and therefore lead to a stronger attention-driven buying behaviour. A subsequent regression analysis reveals that both abnormal returns are predominantly driven by the company's growth prospects and its leverage. Both findings could be interpreted as individual attempts of investors to differentiate between issues aiming growth financing or refinancing purposes.

In summary, some types of corporate bond issues in the real estate sector have significant information effects for the capital market. However, even these significant abnormal returns are very small in an absolute scale. This stands in stark contrast to the results for several other industries. While these results are usually attributed to the signalling function of a bond issue, this could indicate that signalling is in contrast not predominate in the real estate sector. Due to its comparably low information asymmetry towards the investors, bond issues are not a key factor for investors when evaluating a real estate company.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Refinitiv Datastream. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the authors with the permission of Refinitiv.

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