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DO RESPONSIBLE REAL ESTATE COMPANIES OUTPERFORM THEIR PEERS?

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ABSTRACT. This paper investigates the relationship between corporate social and environmental performance and financial performance for a sample of publicly traded US real estate companies. Using the MSCI ESG (formerly KLD) database on seven Environmental, Social & Governance dimensions in the 2003–2010 period, and weighting the dimensions according to prominence in the real estate sector, we model Tobin's Q and annual total return in a panel data framework. The results indicate a positive relationship between ESG rating and Tobin's Q but this effect is driven by ESG concerns rather than strengths. Consistently across all model specifications, overall ESG ratings are associated with lower returns. Negative scores appear to result in higher returns, at least in the short run, but positive scores have no significant impact on returns.

KEYWORDS: Corporate social responsibility; Real estate; Panel data

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1. INTRODUCTION

Environmentally responsible and sustainable business practices have become more prominent for corporations' strategic and operational activities in step with growing concerns about climate change and investment ethics. For investors, the scope of responsible investment can cover not only environmental issues and climate change mitigation but also the effects of businesses on a broad range of social and ethical concerns. The real estate sector has been engaging increasingly with concepts such as Environmental, Social and Governance (ESG), Corporate Social Responsibility (CSR) and Responsible Property Investment (RPI). While there has been a longstanding and substantial body of work on the relationship between corporate ESG performance (CESGP) and corporate financial performance (CFP), this paper presents the first quantitative empirical study of the real estate sector.

The motivation for focusing this study on the real estate sector instead of following the common practice of analyzing the entire universe of monitored companies is threefold. Firstly, focusing on the real estate sector allows us to investigate whether ESG performance has a weak impact on asset-based industries as might be expected from the low brand recognition of real estate companies and, indeed, most asset-based industries. Secondly, the long-term nature of most real estate investments potentially aligns better with the long-term sustainability objectives of ESG policies. This would imply a stronger effect. Thirdly, and most importantly, previous studies of the relationship between CESGP and CFP have identified economic sector as a key variable (see Waddock, Graves

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1997; Chand 2006; Porter, Kramer 2006). Exposure to social, environmental and governance issues varies widely across industries. Consequently, multi-sector studies can conceal or average out sector-specific effects (Griffin, Mahon 1997). Indeed, Chand (2006) suggests that research on the link between ESG performance and financial performance should focus on a single industry.

Thus, the present study investigates the implications of this strategic shift in the allocation of resources towards such ethical concerns for the performance of commercial real estate companies. Specifically, it aims to assess whether there is a link between the Environmental, Social and Governance (ESG) ratings of large real estate companies and their financial performance. We have organized the study as follows. The next section situates this paper within the existing literature. In the third section, we describe our data and present the summary statistics. The research strategy is outlined in the fourth section and the results from the empirical analysis are discussed. Finally, the implications of our findings are discussed.

2. EFFECTS OF CORPORATE RESPONSBILITY: THE EMPIRICAL EVIDENCE

Implying that resources allocated to ESG constitute a deadweight loss and a negative relationship between CESGP and CFP, Milton Friedman (1970) controversially stated that "*the social responsibility of business is to increase its profits*". The counter-argument has been that narrow neo-classical theories of the firm neglect the contribution of human and social capital to corporate financial performance. In particular, in the last two decades, a plethora of acronyms such as ESG, CSR, RPI and SRI (Socially Responsible Investment) have become increasingly mainstream. While the scope of these labels has been mutating and contested, there is some common ground. At their core is the incorporation of non-financial issues in investment and business decision-making.

In a study of motives to 'go green', Bansal and Roth (2000) propose three types of motive profiles that can individually or together stimulate a higher level of ESG commitment – the caring profile, the competitive profile and the concerned profile. In the caring profile, it is the organizational leadership that is the key driver of a firm's ESG commitment. In the competitive profile, a firm is motivated by business advantage. For instance, many REITs highlight the savings in energy costs attributable to implementing more sustainable practices. Finally, although this type of motive may rarely be stated publicly, the concerned profile is characterized in terms of a pre-emptive, collective response by a group of market participants in an industry that introduces improvements in ESG performance in order to obtain reputational and regulatory benefits. Both the competitive and concerned profiles imply that the primary aim of ESG activities is to improve CFP.

Nevertheless, improvements in financial performance can be directly linked to rationales for allocating resources to ESG activities. In terms of *a priori* expectations, ESG has been analyzed through a number of theoretical lenses which generate contrasting expected relationships between CESGP and CFP. For instance, instrumental stakeholder theory stresses the contribution of relationships with key stakeholders (other than shareholders) such as employees, suppliers, customers and the local community to financial performance. Closely related stakeholder–agency theory emphasizes how ESG activities can reduce the agency costs within corporate structures by improving interest alignment and monitoring of the actions of employers, managers and employees. Similarly, firm-as-contract theory also highlights the significance of, often implied, contracts with stakeholders as drivers of firms' financial performance. Hence, the expected causal relationship is that CESGP should determine CFP. In contrast, slack resources theory implies the opposite relationship – that CFP determines CESGP. It proposes that surpluses generated by prior financial performance release resources for ESG activities. While theories are often presented as mutually exclusive, it is possible that, similar to issue of motivation, the relative importance of resource availability and the salience of relationships with stakeholders may vary between sectors or firms and/or over time. Russo and Perrini (2010) report that firm size is a decisive factor and argue that the social capital approach is relevant for understanding ESG commitments of SMEs whereas stakeholder theory is more apt for explaining the actions of large firms. Roberts and Dowling (2002) find that high corporate reputation is linked to sustained financial performance over relatively long periods.

Recent reviews of this topic also generally suggest that the balance of the evidence is supportive of a positive relationship between ESG performance and financial performance. Van Beurden and Gössling (2008) find that earlier reviews included too many papers from the period 1970–1990

when the issue of ESG had low socio-political prominence. Their review of studies from 1990 onwards concluded that the vast majority of studies had found a positive relationship between ESG performance and financial performance. However, Orlitzky's (2011) large-scale meta-analysis reveals a somewhat troubling finding, i.e. that the direction and strength of the reported relationship between CESGP and CFP appears to depend on the disciplinary affiliation of the authors and journals reporting it. Publications in economics, finance and accounting have tended to find significantly lower average correlations than findings published in management, business ethics or business and society journals.

In the literature on the performance of socially responsible investments, it has been found that clientele effects can lead to different effects on prices, returns and risk. The key transmission mechanism is that a decrease in the size of the investor base produces a neglect effect associated with exclusionary screening, lower demand for 'sin' securities, a negative effect on prices and a positive effect on returns. The body of work on the performance of securitized SRI funds is broadly consistent with underperformance in terms of returns (see Bauer *et al*. 2005; Geczy *et al*. 2003; Renneboog *et al*. 2008; Lee, Faff 2009; Manescu 2010). For so-called 'sin' stocks, most studies find a higher cost of capital, lower security prices and higher returns.

Within the real estate literature, empirical estimation of the relationship between CESGP and CFP has received rather limited attention. There is a body of essentially descriptive and/or qualitative work that has largely focused on the investigating the increasing importance of SRI and ESG issues for real estate investors (for example, see Hebb *et al*. 2010; Newell 2008, 2009; Rapson *et al*. 2007). Focusing largely on governance *per se*, there is a body of work looking at US REITS on the relationship between governance ratings and other agency costs with financial performance (for examples, see Bauer *et al*. 2010; Bianco *et al*. 2007; Eichholtz *et al*. 2012; Hartzell *et al*. 2008). Results have been mixed. Hartzell *et al*. (2008) find that firms with stronger governance structures have higher initial IPO valuations and have better long-term operating performance than their peers. In contrast, Bauer *et al*. (2010) find that their index of governance strength is related neither to REITs' Tobin's Q nor to Return on Assets, Return on Equity and Funds from Operation and attribute this to the requirement for US REITs to distribute at least 90% of operational earnings. By contrast, Eichholtz *et al*. (2012) show in their empirical analysis that the proportion of 'green' buildings in a REIT portfolio is positively related with its operating performance.

The mechanism by which a strong ESG commitment is value adding in terms of improved CFP can be difficult to disentangle. In Friedmanian terms, the direct costs of allocating capital to ESG activities are relatively straightforward to measure. As Fig. 1 indicates, the direct costs are

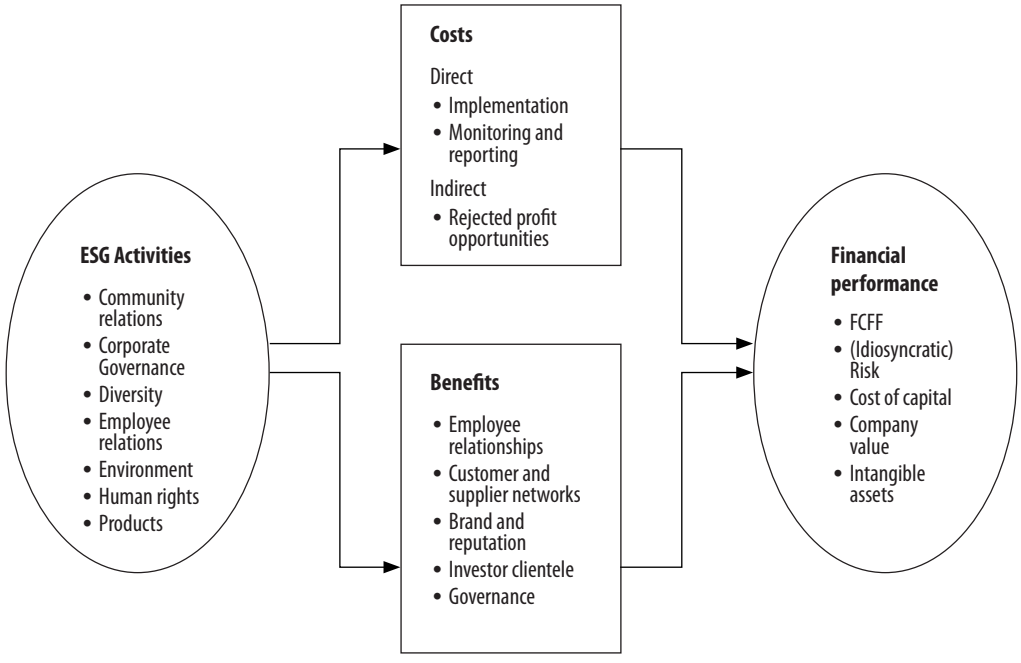

Fig. 1. Costs and benefits of an active ESG strategy

associated with the implementation, monitoring and reporting of an active ESG strategy. Indirect costs are also produced by the rejection of potential profitable business opportunities that may conflict with ESG-related objectives. Linking back to stakeholder and firm-as-contract theories, the arguments for a positive effect on financial performance tend to emphasize increases in relational wealth (see Luo, Bhattacharya 2009). Factors broadly related to trust, such as increased transparency and reduced information asymmetry, may create reputational and branding benefits that improve key relationships with employees, shareholders, customers, suppliers and the community (see Surroca *et al*. 2010). A strong ESG commitment implies more information about the expected cash flow distribution, reduced principal-agent costs and lower investors' risk premium. More directly, the cost of capital may be reduced as socially responsible investors may be prepared to accept a lower return from socially responsible businesses (Cajias *et al*. 2012).

As a result, it is argued that companies with strong ESG commitments are more operationally and financially stable and resilient. These potential positive effects of ESG activities on CFP are then, mediated through a range of variables such as governance structures and reputation benefits *inter alia*. Both costs and benefits are mediated through the capital markets where intangible assets are priced and returns generated. However, assuming efficient market pricing of investment in ESG, the returns from ESG are expected to be contingent upon the nature of the firm, the specific business sector and conditions in the broader business environment (see Campbell 2007). Further, at the firm level, it has been argued that there may be an optimal level of investment in ESG producing a curvilinear relationship between CESGP and CFP. The empirical analysis presented in the following sections takes into account these sector and firm-specific effects but is unable to test the theoretical arguments relating to transmission mechanisms. The empirical researcher is limited to observing the financial outcomes of these processes but cannot test them directly, at least not with the data employed in this study.

3. DATA AND SUMMARY STATISTICS

Largely in response to demand from market participants, metrics have emerged that benchmark corporate ESG performance (CESGP). Although by no means providing perfect measures of CESGP, the emergence of such metrics has facilitated a substantial body of research on the causes and effects of variations in CESGP. Similar to credit rating agencies, social and environmental rating agencies ostensibly aim to provide independent measures of corporations' ESG performance, increase transparency and reduce the search costs associated with socially responsible investment strategies. Ratings may be based on firms' past performance and/or they can also incorporate a firm's future potential relative position by evaluating their plans to improve future ESG performance (see Chatterji *et al*. 2009). It should be acknowledged that the quality of ESG ratings have been subject to some criticisms concerning their own lack of transparency and have been subject to little robust evaluation themselves (see Chatterji *et al*. 2009; Semenova 2010). McWilliams and Siegel (2000) report that inclusion of company R&D expenditure as a predictor of financial performance renders CSR metrics neutral or insignificant. Hawken's (2004) scathing report on the SRI mutual fund sector highlighted the arbitrariness and inconsistencies in criteria used to assess firms' suitability for inclusion in responsibly invested portfolios.

As stated above, this study draws upon the MSCI ESG database. Its social and environmental ratings are one of the most long established and have been widely used by academic researchers. Created by Kinder, Lydenberg and Domini and Co., the ESG (formerly KLD) index uses a proprietary system to assess companies on seven aspects of their ESG performance. They are community relations, corporate governance, diversity, employee relations, environment, human rights and products. Various scales are used to assess the performance in terms of major strength, minor strength, major weakness etc. The number of indicators has varied from year to year with an upward trend. The index is constructed from a combination of publicly available sources, other data organizations, direct communication with companies themselves and government information. Typically, the annual data is published several months after the end of the calendar year. This means that the 'contemporaneous' MSCI ESG score refers to a company's ESG performance in the previous calendar year. This point is further complicated by the fact that ESG MSCI ratings incorporate some information that is already public knowledge and hence priced accordingly in the market while part of the information set may be new, particularly the new information on a company's overall ESG performance compared to a benchmark group.

To create a summary measure of overall ESG performance, we first combine the information on sets of strength and concerns using the following formula:

$$ESG_{it} = \left(\frac{\sum_{S=1}^{n} S_{it} * 100}{S_t} * 100 - \frac{\sum_{C=1}^{n} C_{it} * 100)}{C_t} * 100 + 100 \right) / 2 , \quad (1)$$

where: S_{it} and C_{it} are individual binary strength and concern ratings for real estate company i at time t and the denominators S_t and C_t represent the total number of rating criteria respectively in a given year. Although the number of strengths and concerns changes over the years, this calculation method ensures comparability over time. A score of 50 always implies a neutral position, relative to strength and concerns; a score greater than 50 implies more 'strengths' than 'concerns'. The farther the score is from 50 (towards 100), the stronger is the relative 'strength'; a score less than 50 implies more 'concerns' than 'strengths' and farther the score is from 50 (towards 0), the stronger is the relative 'concerns'. This index formulation combines the number of strengths and concerns on a continuous scale and facilitates comparison across companies.

Previous studies have argued that the above method of creating a combined ESG score is problematic as all ESG criteria are treated as equally meaningful or important in the calculation of the score (see Griffin, Mahon 1997; Simpson, Kohers 2002). This problem is likely to be even more pronounced in the present study of listed US real estate companies where it can be assumed that some of the general ESG criteria are largely irrelevant or inapplicable (e.g. investments in tobacco, firearms, nuclear power as well as most human rights issues) while other criteria may be crucial for an ESG assessment of this sector (e.g. environmental criteria or governance issues).

Therefore, we devise a weighted ESG score in the following manner:

$$ESG_{it} = \sum_{j=1}^{n} S_{it} w_{jt} - \sum_{j=1}^{n} C_{it} w_{jt} + 1 , \quad (2)$$

where: S_{it} and C_{it} are individual binary strength and concern ratings for real estate company i at time t multiplied by the criterion weights w_{jt}. In this index, a score of 1 represents a neutral position where strengths and concerns balance each other out whereas score below 1 indicate more concerns than strengths and vice versa for scores above 1.

The weights in Equation 2 are derived by:

$$w_{jt} = \frac{\sum_{j=1}^{n} S_{it} + \sum_{j=1}^{n} C_{it}}{\sum_{i=1}^{n} \sum_{j=1}^{n} S_{it} + \sum_{i=1}^{n} \sum_{j=1}^{n} C_{it}} . \quad (3)$$

The weight of an ESG criterion in year t is based on the sum of individual binary counts for all real estate companies for this criterion over the sum of all criteria and real estate companies in that year. Put simply, the weight of a criterion is determined by the number of non-zero weightings for real estate companies in a particular year. In contrast to the un-weighted calculation, strengths and concerns are allowed to be asymmetric to the extent that the sum of weights of strengths does not necessarily equal the sum of weights of concerns. This weighting scheme is in principle equivalent to a Paasche current-weighted-index in that the individual weights of the criteria vary from year to year.

The comprehensive database required to conduct our analysis was assembled as follows. Based on the CUSIP codes of the companies contained in the MSCI ESG database, financial data for these companies was extracted from Thomson Reuters Datastream. Since the CUSIP codes do not match in all cases, for example due to spelling variations or after a company is restructured or renamed, we developed an algorithm that compares the full company names and respective CUSIPs in both MSCI and Datastream. Next, we identify real estate companies using ICB industry classification codes. Following the ICB definition as used by FTSE and Dow Jones and Thomson Reuters Datastream, the real estate sector includes real estate services (brokers and real estate agents), development companies, investment companies and REITs, but excludes pure construction companies. Table 1 gives a detailed overview of variable definitions and sources. The sample used in the panel regression consists of 341 real estate companies in the unbalanced sample from 2003 to 2010. The ESG ratings were published by KLD for listed US companies as early as the 1990s but the sample is considerably smaller pre-2003 which is a particular problem for an in-depth sectoral study such as this one. Besides sample size, there is also a possibility that 2003 was a watershed year regarding definitions and measurement standards although we were unable to confirm this. Our choice of using an unbalanced sample versus a balanced sample was guided by sample size considerations and concerns about

selection bias if we were to exclude all companies that were founded or formed (for example through mergers and acquisitions) post-2002.

Of the total 341 real estate companies in our sample, 148 companies or 43% are REITS specializing in office, retail, residential, diversified, etc. are identified. Although all companies in our dataset have considerable exposure to real estate markets, a subset of them are classified in wider areas such as financial services and construction. The sample also includes 89 financial services companies as well as 56 firms defined as hotels and travel/leisure. Further, 17 companies are classified as residential real estate developers, 22 as Real Estate Holding, Services and Investment companies and nine as other real estate companies. Table 2 provides summary statistics and a correlation matrix of the variables used in the panel data analysis.

At first glance, the ESG variables of interest do not appear to be highly correlated with either Tobin's Q or Total Returns. To examine within-sector variation in the key variables (Tobin's Q, Total Return and ESG weighted score), Table 3 shows the development of these variables over the 2003–2010 study period broken down by real estate subsector. Throughout this period, Tobin's Q is lowest for the home construction sector and highest for real estate companies in the financial service sector. There is a general marked decline in Tobin's Qs across all industries during the years of the financial crisis from 2007 onwards. This pattern is even more pronounced in the total return figures which turn sharply negative across real estate sub-sectors in 2007–2008. Interestingly, the home construction industry appears to have been affected by this negative trend earlier than other real estate companies. Regarding the ESG scores, it is remarkable that the scores of all industries except hotels have dropped considerably in the most recent year (2010). It is not clear whether this is due to the introduction of new criteria and definitions into the MSCI ESG scores or a lagged effect of the recession and financial crisis. While the analysis of sectoral trends provides interesting clues about the overall development of the variables of interest, a more fine-grained analysis of firm-level effects is required.

Table 1. Variable description and source

Variable	Definition	Source
Tobin's Q	Long term firm value measured as market capitalization plus debt (long and short) term debt and preferred stock divided by total assets as defined by Han (2006).	Datastream
Total Returns	Annual change in the Stock Prices.	
Volatility	Stock return volatility (standard deviation) calculated with weekly returns for the present year.	
Sector adjusted Return/Volatility	Return and Volatility adjusted following the sector composition of the sample for each cross section.	
ESG Score	Environmental, social and governance performance index for the corresponding dimension. Calculated as: $ESG_{it} = \sum_{j=1}^{n} S_{it} w_{jt} - \sum_{j=1}^{n} C_{it} w_{jt} + 1.$	KLD-Database
ESG Strengths	Total score of strengths in the corresponding areas for the firm in year *t*. Calculated as: $\left(\frac{\text{Sum of strengths}}{\text{Number of strengths}} * 100 \right).$	
ESG Concerns	Total score of concerns in the corresponding for the firm in year *t*. Calculated as: $\left(\frac{\text{Sum of concerns}}{\text{Number of concerns}} * 100 \right).$	
Leverage	Ratio, calculated as short term debt and current proportion of long term debt divided by total assets.	Data stream
Net Sales	Represents gross sales and other operating revenue less discounts, returns and allowances.	
Market Capitalization	Calculated as Market Price-Year End * Common Shares Outstanding.	
NAREIT Return	Total annual return of the NAREIT index.	

Table 2. Summary statistics and correlation matrix

Descriptive statistics					Correlation matrix														
Variable		139 Firms 2003–2010			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		N	Mean	SD															
Tobin's Q	(1)	2216	1.456	1.125	1														
Total Returns (%)	(2)	2298	0.193	0.794	0.112	1													
Volatility	(3)	2296	0.065	0.094	(0.124)	(0.187)	1												
Sector Adjusted Return	(4)	2285	0.000	0.527	0.112	0.775	(0.008)	1											
ESG Index un-weighted	(5)	1978	48.864	2.582	0.016	(0.005)	(0.072)	(0.026)	1										
ESG Strength un-weighted	(6)	1978	2.114	4.348	(0.043)	(0.023)	(0.032)	(0.033)	0.613	1									
ESG Concern un-weighted	(7)	1978	4.387	4.276	(0.063)	(0.017)	0.055	(0.003)	(0.584)	0.283	1								
ESG Index weighted	(8)	1978	0.845	0.183	0.023	(0.042)	0.010	(0.031)	0.663	0.294	(0.503)	1							
ESG Strength weighted	(9)	1978	0.026	0.041	0.027	0.002	(0.062)	(0.034)	0.521	0.633	0.019	0.466	1						
ESG Concern weighted	(10)	1978	0.181	0.168	(0.018)	0.046	(0.026)	0.025	(0.595)	(0.163)	0.554	(0.976)	(0.261)	1					
Leverage (%)	(11)	2430	40.254	25.661	(0.126)	(0.052)	0.083	(0.008)	(0.033)	(0.118)	(0.082)	(0.005)	(0.082)	(0.015)	1				
Net Sales ($ billion)	(12)	2465	1.618	5.351	(0.122)	(0.018)	(0.014)	(0.012)	(0.027)	0.393	0.436	0.055	0.221	(0.005)	(0.052)	1			
Market Cap ($ billion)	(13)	2346	2.834	6.541	(0.000)	(0.006)	(0.087)	0.009	0.061	0.416	0.354	0.127	0.245	(0.078)	(0.076)	0.809	1		
Total Assets ($ billion)	(14)	2482	11.795	73.868	(0.114)	(0.021)	0.004	(0.022)	0.005	0.322	0.324	0.046	0.190	(0.003)	0.003	0.872	0.784	1	
NAREIT Return (%)	(15)	8	0.077	0.317	0.101	(0.013)	(0.508)	0.003	(0.040)	0.049	0.098	(0.262)	0.000	0.286	(0.007)	0.015	0.027	(0.005)	1

Table 3. Summary statistics of key variables across sub-sectors

Sectors		2003	2004	2005	2006	2007	2008	2009	2010	2003	2004	2005	2006	2007	2008	2009	2010
		Mean Tobin's Q								Mean Total Returns							
Home construction		1.053	1.173	1.580	0.862	0.784	0.846	1.018	0.989	0.633	0.381	0.142	-0.255	-0.949	-0.458	0.301	0.083
Hotels and others		1.258	1.507	1.816	1.750	1.885	1.026	1.128	1.468	0.287	0.403	0.143	0.191	-0.175	-1.096	0.251	0.383
Real estate investments trusts		1.298	1.357	1.434	1.474	1.290	1.191	1.076	1.301	0.348	0.231	0.111	0.241	-0.184	-0.592	0.268	0.248
Financial services		1.731	1.683	2.093	2.284	1.916	1.390	1.356	1.571	0.503	0.117	0.216	0.251	-0.022	-0.846	0.228	0.084
		Mean ESG weighted overall score								Mean Market Value ($mill.)							
Sector decomposition	Obs.	2003	2004	2005	2006	2007	2008	2009	2010	2003	2004	2005	2006	2007	2008	2009	2010
Home construction	176	0.950	0.852	0.824	0.788	0.782	0.759	0.752	0.633	514.4	711.4	1148.2	1374.0	1522.2	1082.5	1034.0	1231.7
Hotels and others	648	0.880	0.809	0.833	0.843	0.886	0.875	0.847	0.827	1769.8	2387.6	3455.9	2800.2	3231.7	2098.0	1659.1	2175.4
REIT-sample																	
REITs – all	1184	0.923	0.881	0.874	0.888	0.905	0.899	0.895	0.572	1421.3	1721.1	2146.4	2390.4	2462.0	2204.2	1527.0	2326.2
REITs Hotel & lodging	88	0.960	0.933	0.898	0.930	0.933	0.923	0.920	0.575	1107.5	1295.9	1620.4	2466.1	2719.0	1474.8	1098.1	1810.1
REITs Mortgage	248	0.941	0.902	0.885	0.929	0.958	0.959	0.944	0.511	785.0	893.8	954.5	837.6	808.5	713.4	699.6	821.9
REITs Specialty	176	0.891	0.889	0.886	0.890	0.903	0.897	0.890	0.575	2193.0	2850.8	2908.2	2747.5	3121.2	3567.6	2749.2	3799.4
REITs Diversified	56	0.939	0.907	0.890	0.854	0.883	0.862	0.857	0.776	797.3	890.5	1115.7	1175.4	1057.0	1016.7	648.1	1068.5
REITs Residential	128	0.940	0.802	0.818	0.818	0.876	0.881	0.878	0.523	1814.6	2021.5	2485.1	3039.9	2759.8	2632.4	1557.8	2984.7
REITs Retail	232	0.901	0.885	0.843	0.865	0.892	0.887	0.883	0.564	1388.6	1899.3	2749.0	2926.0	3059.1	2604.2	1606.3	2772.6
REITs Industrial & office	256	0.937	0.882	0.913	0.921	0.898	0.889	0.886	0.645	1335.3	1601.6	2030.7	2555.9	2653.1	2405.2	1674.4	2535.6
Financial services																	
Financial services – all	712	0.939	0.875	0.858	0.888	0.916	0.903	0.892	0.671	4476.5	4534.8	4941.5	5975.2	6953.5	5593.3	4770.0	4505.6
FIN Asset managers	232	0.985	0.867	0.869	0.874	0.906	0.897	0.897	0.697	4717.2	4610.0	5244.4	5819.8	8354.8	7536.5	6174.7	5749.0
FIN Specialty finance	168	0.878	0.898	0.860	0.882	0.906	0.916	0.879	0.604	1199.1	1354.1	1754.8	1686.5	1697.1	1162.2	669.7	1056.5
FIN Investment services	312	0.947	0.868	0.847	0.904	0.930	0.904	0.894	0.675	5830.8	5993.8	6140.2	7958.3	8213.5	6024.3	5628.8	5349.8

4. EMPIRICAL FRAMEWORK

The research strategy of our empirical analysis involved two stages. Before estimating empirical relationships in a panel data framework, we examine the direction of causality through a standard Granger causality test using Vector Auto-Regression (VAR) which treats all variables symmetrically without imposing any *a priori* assumption about causality.

Earlier studies on the link between ESG and financial performance were criticized for not paying sufficient attention to the problem of causality. To wit, companies with superior CFP may have slack resources to spend on ESG which may in turn enhance their subsequent CFP. A related argument is that a third factor, typically firm size, drives both CESGP and CFP but there is some empirical evidence that this may not be the case. Orlitzky's (2001) meta-analysis does not confirm the relevance of firm size as a confounding factor. To address these standard criticisms emerging from the extant literature, we include a control for firm size (market capitalization) and also investigate first whether CESGP predicts CFP or vice-versa. The dependent variables tested for Granger causality were Tobin's Q, total return and ESG score. In the panel framework, the VAR model can be specified as follows (see Holtz-Eakin *et al.* 1988):

$$p_{it} = \alpha_{0t} + \sum_{i=1}^{m} \alpha_{1t} p_{it-1} + \sum_{i=1}^{m} \delta_{1t} K_{it-1} + \tau_t X_i + \varepsilon_{it}, \quad (4)$$

where: p_{it} is the performance measure for the firm i in year t. K_{it} is the ESG score for the firm i in year t. α_{0t},..., α_{mt}, δ_{1t}, ..., δ_{mt}, τ_t are the coefficient of the linear projections of intercept, past values of p_{it}, K_{it} and the individual effects (X_i). In this Granger causality test, first differences are taken to eliminate the individual effects and one period lags are included in the model.

In the next stage of the analysis, we test the influence of ESG rating on firm value by regressing firm-level performance variable (Tobin's Q or total return) on the contemporaneous and lagged ESG score (measured at t and t–1). The standard OLS model in a panel setting (pooled OLS) is:

$$p_{it} = \alpha + \beta K_{it} + \gamma X_{it} + Z_t + \varepsilon_{it}, \quad (5)$$

where: X_{it} is the vector of firm-level financial attributes (e.g. leverage, volatility, net sales and market cap) of firm i in year t; Z_t is the industry-level return (e.g. NAREIT index) in year t.

In Equation 5, strict exogeneity is assumed between the regressors and the error term. However, more often than not, economic and financial relationships in aggregate and disaggregate data suffer from unobserved heterogeneity. This simply implies that the OLS assumption of orthogonality or exogeneity or non-correlation among dependent variables and the residual is not tenable. The unobserved effects may stem from cross-sectional or temporal variation (or both) as follows:

$$\varepsilon_{it} = \delta_i + \theta_t + \omega_{it}, \quad (6)$$

where: δ_i is the firm-specific effect; θ_t is the time effect; and ω_{it} is the idiosyncratic error. As a result of two-way error component structure specified in Equation 6, the intercept in Equation 5 may vary across the firms or the time periods. Consequently, these effects may bias the estimates. The panel data framework applied in the next stage of the analysis is a more appropriate tool for isolating the effect of ESG performance on financial performance. To this end, we employ two standard methods to eliminate the unobserved heterogeneity: first-differencing (FD) and fixed effects (FE) or Least Squares Dummy Variable (LSDV) models which are similar in structure.

In a simple way, we can 'difference out' the fixed effect by subtracting (t-1) values from t as follows:

$$(p_{it} - p_{it-1}) \equiv \Delta p_{it} = \beta \Delta K_{it} + \gamma \Delta X_{it} + \Delta Z_t + \Delta \varepsilon_{it}. \quad (7)$$

Time-invariant unobserved heterogeneity is canceled out in Equation 7. The FD estimation in Equation 7 is also efficient when ε_{it} follows a random walk. However, it is likely that the assumption of no autocorrelation is violated in multiple panels. As a result, the standard errors will be biased. The GLS or Huber-White sandwich estimators address this problem effectively. Hence, Equation 7 uses the robust standard error specification following Arellano (1987) which is valid in the presence of heteroscedasticity and/or serial correlation, especially in a panel with a small number of time periods compared to the number of cross-sections as is the case here (see Wooldridge 2002 for a discussion).

An alternative way of eliminating unobserved heterogeneity is the FE or LSDV specification which is equivalent to 'de-meaning' or 'mean-differencing' the variables across cross-sections and time-periods respectively:

$$p_{it} = \alpha + \beta K_{it} + \gamma X_{it} + Z_t + \delta_i + \theta_t + \omega_{it}, \quad (8)$$

where: δ_i are the firm-specific dummies; θ_t are the time dummies; and ω_{it} is the idiosyncratic error.

The key distinction between Equations 7 and 8 is how 'within cross-section' and 'between cross-section' variations are dealt with. In multiple panels (T >2), the nature of the idiosyncratic error, and ω_{it}, should guide the choice between an FD and an FE estimator. The FE estimator is more efficient when and ω_{it} contains no serial correlation, which is rarely the case in economic and financial data. Conversely, the FD estimator is more efficient when and ω_{it} follows a random walk (see Wooldridge 2002 for a discussion). To provide robust estimations, we employ both approaches in our analysis and compare the results.

5. FINDINGS

The first step of the analysis tests for Granger causality to rule out that ESG performance is merely a function of previous financial performance. Table 4 shows the results of the empirical estimation of causality from both directions with total returns and Tobin's Q and weighted and unweighted ESG scores. Overall, we do not detect Granger causality (indicated by insignificant p-values) neither from Tobin's Q to ESG score nor from total returns to ESG score and hence find no empirical support for the hypothesis of circular causality in our dataset. Having passed this test, we proceed on the assumption that ESG scores are not or only weakly endogenous with returns in our dataset. However, additional tests will be required to rule out endogeneity.

Next, we estimate the effect of ESG scores on the market valuation represented by the Tobin's Q of a company. Table 5 presents the model estimates applying a panel regression with company fixed effects as well as an estimation using first differences. The baseline model contains control variables for leverage, intra-year volatility, volume of net sales, the size effect reflected in the market cap as well as the NAREIT index as a proxy for real estate market conditions. Next, ESG scores are included both as contemporaneous and lagged predictors. The final two model variations use a weighted estimation using the average market capitalization of a company in each year. The reasoning behind the weighting is that larger companies should have greater influence on parameter estimates in line with their greater economic, social and environmental weight 'on the ground'.

In total, eight model variations are estimated for aggregate ESG indices as well as for separate ESG strengths and concerns. Except for Model 2, which is a first-differenced equation and robustness check on our level specifications, all models include firm-level fixed effects and are estimated with robust standard error specification to address any potential heteroscedasticity problems. The variance inflation factors are below 2.95. Explanatory power, as reflected by the Adj. R^2, is about 30 percent across all models. The coefficients of the control variables are generally consistent across all eight model specifications. While leverage exhibits the expected positive effect, volatility has a highly significant negative relationship effect on Tobin's Q. All model variations show a significant positive impact of company size and a negative impact of both intra-year volatility of a company's stock price and net sales. The NAREIT index is a significant and positive predictor of company-level Tobin's Q except in the second estimation.

Turning to the variable of interest, we find an overall positive impact of contemporaneous ESG performance on the market valuation of a company (Models 2 and 3). The first difference specification (Model 2) is broadly in line with the firm fixed effects level specification (Model 3). ESG scores for the previous year were not significant in explaining contemporaneous Tobin's Q in Model 4. An important consideration for time lags is the fact that the 'contemporaneous' ESG is in fact lagged by at least several months as it refers to ESG performance exhibited and measured in the *previous* year. This occurs because it takes time to construct, process and release the ESG ratings. Hence, what we refer to as the 'contemporaneous' measure is effectively a partially lagging indicator of ESG performance.

Next, we estimate the impact of ESG concerns and strengths separately in order to detect any differential impact that a positive or negative rating may have. The results suggest that ESG performance affects market valuation asymmetrically. We find that contemporaneous ESG concerns affect market valuation negatively. However, no significant positive link is confirmed for ESG strengths. Similarly, no delayed effects are found for either ESG strengths or concerns. Finally, the weighted estimations (Models 7 and 8) do not reveal any marked departure from the broad results obtained for the unweighted models.

Estimation results of the impact of ESG scores on annual total returns of a company's shares are detailed in Table 6. We apply the same estimation strategy as for the prediction of Tobin's Q. Eight model variations are estimated including the baseline model, the aggregate ESG indices and separate ESG strengths and concerns. Except for Model 2 which is first-differenced, all modules

Table 4. Granger causality tests

	DepVar: Total Returns				DepVar: Total Returns		
	Chi-sq	df	p-value		Chi-sq	df	p-value
ESG weighted	0.714	1	0.398	ESG unweighted	2.439	1	0.118
	DepVar: ESG weighted				DepVar: ESG unweighted		
	Chi-sq	df	p-value		Chi-sq	df	p-value
Total Returns	0.441	1	0.507	Total Returns	2.158	1	0.142
	DepVar: Log Tobin's Q				DepVar: Log Tobin's Q		
	Chi-sq	df	p-value		Chi-sq	df	p-value
ESG weighted	0.007	1	0.932	ESG unweighted	0.681	1	0.409
	DepVar: ESG weighted				DepVar: ESG unweighted		
	Chi-sq	df	p-value		Chi-sq	df	p-value
Log Tobin's Q	0.278	1	0.597	Log Tobin's Q	0.093	1	0.759

Notes: '***', '**', and '*' denote 1%, 5% and 10% significance levels respectively. 1-period lags are included in the models.

Table 5. Panel fixed effects regression results. Dependent variable: Log Tobin's Q

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG (*t*)		0.082* (1.684)	0.220*** (4.226)	0.186*** (3.343)			0.191*** (2.571)	
ESG (*t*-1)				0.026 (0.236)				
ESG Concern (*t*)					–0.210*** (–3.542)	–0.183*** (–2.971)		–0.155* (–1.812)
ESG Concern (*t*-1)						–0.067 (–0.623)		
ESG Strength (*t*)					0.344 (1.353)	0.356 (0.922)		0.585 (1.27)
ESG Strength (*t*-1)						–0.287 (–0.834)		
Leverage	0.664*** (5.464)	0.581*** (3.640)	0.548*** (4.140)	0.619*** (4.015)	0.548*** (4.132)	0.620*** (4.049)	0.953*** (4.267)	0.939*** (4.23)
Log(Volatility)	–0.112*** (–4.800)	–0.086*** (–4.028)	–0.075*** (–2.677)	–0.111*** (–3.619)	–0.075*** (–2.645)	–0.109*** (–3.599)	–0.139*** (–4.049	–0.137*** (–3.977)
Log (Net Sales)	–0.144*** (–4.217)	–0.179*** (–2.677)	–0.218*** (–3.049)	–0.196** (–2.434)	–0.217*** (–3.046)	–0.198** (–2.494)	–0.303*** (–3.14)	–0.307*** (–3.084)
Log(Market Cap)	0.311*** (10.177	0.362*** (10.383)	0.334*** (8.659)	0.303*** (6.754)	0.334*** (8.671)	0.304*** (6.873)	0.482*** (7.581)	0.480*** (7.55)
NAREIT	0.040* (1.761)	–0.008 (–0.440)	0.079*** (3.079)	0.046* (1.669)	0.078*** (3.051)	0.047* (1.693)	–0.027 (–0.387)	–0.031 (–0.444)
Fixed effects	Firm	First diff.	Firm	Firm	Firm	Firm	Firm	Firm
Weighted by market cap	No	No	No	No	No	No	Yes	Yes
Adj. R^2	26.85	32.30	27.91	26.75	27.91	26.77	20.35	24.13
N	2154	1490	1831	1541	1831	1541	1490	1831

Notes: Age variable is calculated as time-variant. T-statistics (with robust standard errors following Arellano (1987) due to N >T) are reported within the parentheses. '***', '**', and '*' denote 1%, 5% and 10% significance levels respectively. All Variance Inflation Factors are below 2.95. Models (7) and (8) estimated with panel WLS using market capitalization as weighting vector.

Table 6. Panel fixed effects regression results. Dependent variable: Total returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG (*t*)		–0.510*** (–4.532)	–0.487*** (–4.700)	–0.691*** (–6.562)			–0.452*** (–2.914)	
ESG (*t*–1)				0.380*** (2.911)				
ESG Concern (*t*)					0.503*** (4.635)	0.685*** (6.200)		0.501*** (3.194)
ESG Concern (*t*-1)						–0.504*** (–3.604)		
ESG Strength (*t*)					–0.301 (–0.744)	–0.388 (–0.917)		0.088 (0.147)
ESG Strength (*t*-1)						–0.540 (–1.245)		
Leverage	–0.005*** (–3.008)	–0.005* (–1.879)	–0.006*** (–3.133)	–0.005*** (–2.659)	–0.006*** (–3.138)	–0.005*** (–2.665)	0.000 (–0.018)	0.000 (–0.095)
Log(Volatility)	–0.261*** (–5.990)	–0.580*** (–13.133)	–0.385*** (–10.957)	–0.491*** (–16.509)	–0.383*** (–10.876)	–0.487*** (–16.274)	–0.592*** (–9.685)	–0.590*** (–9.726)
Log(Net Sales)	–0.104** (–2.366)	–0.206*** (–3.326)	–0.085** (–2.476)	–0.055* (–1.708)	–0.085** (–2.451)	–0.062* (–1.823)	–0.090** (–1.979)	–0.095** (–2.187)
Log(Market Cap)	–0.206*** (–5.012)	–0.075 (–1.547)	–0.197*** (–5.337)	–0.226*** (–5.697)	–0.197*** (–5.331)	–0.220*** (–5.622)	–0.097 (–1.628)	–0.100* (–1.656)
NAREIT	–0.217*** (–4.305)	–0.627*** (–13.666)	–0.355*** (–7.408)	–0.453*** (–9.841)	–0.356*** (–7.422)	–0.448*** (–9.724)	–0.560*** (–5.658)	–0.566*** (–5.758)
Fixed effects	Firm	First diff.	Firm	Firm	Firm	Firm	Firm	Firm
Weighted by market cap	No	No	No	No	No	No	Yes	Yes
Adj. R^2	8.90	23.46	13.59	18.15	13.59	18.35	25.25	24.11
N	2163	1495	1837	1546	1837	1546	1495	1837

Notes: Age variable is calculated as time-variant. T-statistics (with robust standard errors following Arellano (1987) due to N >T) are reported within the parentheses. '***', '**', and '*' denote 1%, 5% and 10% significance levels respectively. All Variance Inflation Factors are below 3.38. Models (7) and (8) estimated via panel WLS with market capitalization as weighting vector.

Table 7. Panel fixed effects regression with sub-sector interaction terms

Interaction term	Dependent variable							
	Tobin's Q				Total Return			
ESG-Variable /Sector	Home construction	Hotel & others	REITs	Financial services	Home construction	Hotel & others	REITs	Financial services
ESG (*t*)	0.009 (0.947)	0.011 (0.842)	**0.169**** (0.020)	0.173* (0.092)	0.009 (0.947)	**–0.636***** (0.009)	**–0.718***** (0.000)	**–0.344**** (0.024)
ESG (*t*-1)	–0.038 (0.769)	0.004 (0.954)	–0.15 (0.184)	–0.077 (0.508)	**–0.038***** (0.000)	**0.580**** (0.011)	**0.416***** (0.005)	**0.358*** (0.051)
Adj. R^2	26.20	26.20	26.40	26.40	26.20	15.60	16.70	15.10
	Tobin's Q				Total Return			
ESG Strength (*t*)	1.427 (0.352)	–0.206 (0.591)	0.071 (0.913)	0.853 (0.290)	1.427 (0.352)	0.599 (0.417)	–0.254 (0.658)	–1.12 (0.128)
ESG Strength (*t*-1)	–0.437 (0.163)	–0.029 (0.920)	0.059 (0.921)	–0.944 (0.215)	–0.437 (0.163)	–0.220 (0.756)	–0.909 (0.170)	–0.29 (0.723)
ESG Concern (*t*)	0.023 (0.871)	–0.060 (0.259)	**–0.189**** (0.016)	–0.171 (0.111)	0.023 (0.871)	**0.668**** (0.017)	**0.731***** (0.000)	**0.328**** (0.049)
ESG Concern (t-1)	–0.379 (0.189)	–0.097 (0.503)	0.108 (0.604)	–0.155 (0.302)	**–0.379***** (0.000)	**–0.774***** (0.008)	**–0.468***** (0.006)	–0.352 (0.158)
Adj. R^2	26.20	26.20	26.40	26.60	26.20	15.70	16.80	15.20

Notes: T-statistics with robust standard errors following Arellano (1987) due to N >T. P-values are reported within the brackets ( ). '***', '**', and '*' denote 1%, 5% and 10% significance.

include firm-level fixed effects. All models are estimated with robust standard error specification to address any potential heteroscedasticity problems. The variance inflation factors are below 3.38. The explanatory power as reflected by Adj. R^2 of the return models is generally lower than it is for Tobin's Q (in Table 5). The control variables leverage, price volatility, net sales, market capitalization and NAREIT index returns all have a negative effect on total returns. For ESG scores, we find a consistent and strongly significant negative impact on total returns for both contemporaneous scores (Models 2 and 3). This finding is consistent with the 'sin stock' expectation that lower market prices are associated with higher returns. However, it is notable that when a lagged ESG score is included in the estimation (Model 4), the coefficient turns positive. It is difficult to determine whether this indicates a partial reversion to the mean after an initial drop in returns or whether it is caused by unobservable factors.

To model the impact of negative and positive scores, we again include ESG strengths and concerns as separate variables (Models 5 and 6) and find that concerns exhibit a positive contemporaneous association with a company's returns which then appears to revert, at least partially, in the following year. This significant relationship is confirmed in the weighted estimation (Model 8). As with the Tobin's Q estimation, no significant impact is found for ESG strengths on total returns. Overall, we find a larger number of concerns tend to achieve higher returns possibly reflecting the increased 'sin stock' attributes of these companies.

An obvious concern in our estimation of real estate companies is that the industries that are classified as real estate-related show considerable variation regarding market dynamics and financial performance. Moreover, the summary statistics in Table 3 confirm that these industries also differ regarding their average overall ESG scores. In our sample of real estate companies, four sub-sectors are represented: Home Construction, Hotel & Others, REITs, and Financial Services. Therefore, to differentiate the impact of ESG performance on Tobin-s Q and total returns by real estate subsectors, we introduce interaction terms of ESG scores and sub-sector into the regression model. The results are reported in Table 7. Both contemporaneous and lagged values of overall ESG score and concerns and strengths are tested for each of the four major sub-sectors. A significant positive impact on market valuation (i.e. Tobin's Q) is only confirmed for REITs. However, when strengths and concerns are examined separately, we find that it is ESG concerns that have the negative effect on market valuation of REITs. For total returns, a significant negative impact is confirmed for contemporaneous ESG score in the hotel, REIT and financial service industries and lagged ESG score for home construction. Again, we observe a pattern where returns increase with concerns and the decrease in contemporaneous returns is partially offset in the following year. A separate estimation of the panel regressions by sub-sector presented in the appendix (Tables A1 and A2) largely confirms the results derived from the interaction term estimation.

6. CONCLUSIONS

This analysis has set out to investigate the link between social/environmental responsibility and financial performance for real estate companies. Our motivation for doing so was as follows: Industries that are heavily dependent on their marketing efforts and brand reputation have an innate incentive to care about ESG issues (which is well documented in the literature) but what about companies that are largely hidden from the public gaze because consumers do not ordinarily interact with them and are hence not familiar with their names and identities? By restricting our analysis to the real estate sector, we were able to study the effects of ESG ratings on companies that depend on investing in and managing assets rather than being primarily driven by brand reputation and interactions with consumers.

Neither the existing empirical evidence nor the current conceptual frameworks provide strong *a priori* expectations for this research. Previous empirical work has not produced consistent findings on whether companies that 'do good' also 'do well'. In addition, there are plausible arguments to justify almost every possible empirical finding. Our conceptual framework proposes a link between ESG performance and its implications for listed real estate companies that is dependent upon the balance of costs and benefits created by the allocation of resources to ESG activities. While most analyses have stressed the growing importance of trust, stakeholders and relationships to business performance, the opportunity cost of ESG investment also need to be acknowledged.

The findings of the study are consistent with the literature in that high overall ESG ratings positively affect a company's market value. When

distinguishing between strengths and concerns, we find that negative ratings (concerns) have the strongest effects on company value. Companies with a relatively high number of ESG concerns tend to have significantly lower market values while there does not appear to be a significant effect of ESG strengths. Consistent with findings on the performance of SRI funds, a relatively high overall ESG rating affects total returns negatively. This result is consistent across numerous model specifications. The level of ESG concerns has a significant positive effect on returns while ESG strengths are only weakly linked to lower returns. A sub-sector analysis confirms that even asset-based sub-sectors such as REITs exhibit the same association of negative ESG ratings (concerns) with higher returns.

It is clear that the transmission of changes in resources allocated to ESG issues to changes in share prices and corporate profitability (and vice versa) raises difficult timing issues with implications for further work. There are both costs and benefits and long and short-term effects associated with investment in ESG. Any ESG changes can be priced instantaneously in the capital markets while real effects on business operations are likely to be lagged. Further, from a real estate investment portfolio perspective, there is scope for further work on the relationship between ESG ratings and asset acquisition strategies. Research on whether real estate investment firms with high ESG ratings also have distinctive asset acquisition criteria, for example a strong preference for eco-certified buildings will help to distinguish the relative contributions of increased relational capital and image benefits compared to investment strategy.

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APPENDIX

Table A1. Panel fixed effects regression results

Sector	Home construction								REITs							
Dependent variable	Tobins Q				Total Return				Tobins Q				Total Return			
ESG (t)	–0.081	–0.036			–0.104	–0.343			0.004	0.000			–0.060	–0.070		
	(–0.574)	(–0.336)			(–0.360)	(–0.942)			(0.629)	(–0.008)			(–4.028)***	(–3.994)***		
ESG (t–1)		0.460				0.622				–0.010				0.024		
		(2.296)**				(0.844)				(–1.444)				(1.487)		
ESG Concern (t)			0.027	–0.013			–0.045	0.235			–0.002	0.000			0.047	0.052
			(0.192)	(–0.154)			(–0.127)	(0.577)			(–0.659)	(–0.164)			(5.559)***	(5.440)***
ESG Concern (t–1)				–0.684				–1.005				0.002				–0.008
				(–3.090)***				(–1.046)				(0.527)				(–0.874)
ESG Strength (t)			–1.040	–0.685			–2.699	–1.862			0.001	0.000			–0.003	–0.007
			(–1.080)	(–0.558)			(–1.616)	(–0.495)			(0.192)	(0.091)			(–0.396)	(–0.628)
ESG Strength (t–1)				–0.838				–1.664				–0.010				0.012
				(–1.332)				(–0.824)				(–1.697)*				(1.183)
Leverage	1.450	1.538	1.478	1.530	0.001	0.000	0.002	0.000	0.717	0.780	0.718	0.798	–0.009	–0.009	–0.009	–0.010
	(2.373)***	(2.497)**	(2.410)**	(2.410)**	(0.392)***	(0.003)	(0.587)	(0.017)	(5.250) ***	(5.382)***	(5.313)***	(5.549)***	(–3.376)***	(–3.110)***	(–3.521)***	(–3.349)***
Log(Volatility)	–0.207	–0.199	–0.212	–0.196	–0.175	–0.266	–0.186	–0.261	–0.072	–0.092	–0.071	–0.089	–0.338	–0.394	–0.370	–0.423
	(–3.525)***	(–4.182)***	(–3.114)***	(–3.817)***	(–1.759)*	(–2.890)***	(–1.995)*	(–2.999)***	(–4.470) ***	(–5.936)***	(–4.258)***	(–5.259)***	(–9.259)***	(–8.999)***	(–10.263)***	(–9.502)***
Log(Net Sales)	–0.482	–0.527	–0.504	–0.554	–0.334	–0.277	–0.393	–0.330	–0.320	–0.347	–0.321	–0.354	0.001	0.000	0.036	0.032
	(–3.209)***	(–2.902)***	(–3.101)***	(–3.011)***	(–3.472)***	(–3.096)***	(–3.347)***	(–2.494)**	(–6.360) ***	(–5.943) ***	(–6.552)***	(–6.059)***	(0.022)	(–0.001)	(0.595)	(0.466)
Log(Market Cap)	0.643	0.681	0.669	0.725	–0.016	–0.119	0.054	–0.032	0.267	0.237	0.268	0.241	–0.276	–0.307	–0.297	–0.325
	(13.413)***	(15.907)***	(10.168)***	(12.740)***	(–0.182)	(–1.179)	(0.583)	(–0.223)	(5.988) ***	(4.675) ***	(6.059)***	(4.775) ***	(–5.337)***	(–4.827)***	(–5.548)***	(–4.998)***
NAREIT	–0.094	–0.124	–0.111	–0.137	–0.036	–0.050	–0.082	–0.078	0.041	0.018	0.043	0.019	–0.240***	–0.273	–0.285	–0.319
	(–2.451)**	(–3.815)***	(–2.023)**	(–3.250)***	(–0.243)	(–0.278)	(–0.614)	(–0.498)	(1.639)	(0.793)	(1.557)	(0.780)	(–3.477)	(–3.699)***	(–4.115)***	(–4.363)***
Adj. R^2	54.99	5345	54.32	51.66	17.52	21.01	19.68	22.57	44.14	46.29	44.08	46.22	24.17	23.21	21.44	20.32
N	87	73	87	73	87	73	87	73	876	744	876	744	877	745	877	745

Notes: T-statistics (with robust standard errors following Arellano (1987) due to N > T) are reported within the parentheses. '***', '**', and '*' denote 1%, 5% and 10% significance levels respectively.

Table A2. Panel fixed effects regression results

Sector	Financial services								Hotel and others							
Dependent variable	Tobins Q				Total Return				Tobins Q				Total Return			
ESG (t)	0.392	0.237			–0.298	–0.430			0.091	0.090			–0.399	–0.825		
	(3.452)***	(1.909)*			(–1.797)*	(–2.346)**			(1.384)	(1.539)			(–1.252)	(–2.864)***		
ESG (t–1)		0.085				0.168				0.103				0.895		
		(0.534)				(0.661)				(0.774)				(3.160)***		
ESG Concern (t)			–0.384	–0.214			0.233	0.363			–0.078	–0.096			0.574	0.956
			(–2.902)***	(–1.615)			(1.312)	(1.966)**			(–1.083)	(–1.552)			(1.915)*	(3.199)***
ESG Concern (t–1)				–0.162				–0.291				–0.117				–0.970
				(–0.880)				(–1.033)				(–0.793)				(–3.157)***
ESG Strength (t)			0.487	0.820			–1.100	–1.264			0.242	0.047			1.571	1.063
			(1.030)	(0.994)			(–1.798)*	(–1.640)			(0.623)	(0.092)			(1.596)	(1.133)
ESG Strength (t–1)				–0.64				–0.541				–0.033				0.699
				(–0.882)				(–0.614)				(–0.090)				(1.035)
Leverage	0.336	0.716	0.333	0.729	–0.009	–0.008	–0.009	–0.008	0.455	0.416	0.455	0.418	–0.002	0.003	–0.002	0.003
	(1.928)*	(2.458)**	(1.877)*	(2.484)**	(–4.305)	(–3.214)***	(–4.234)	(–3.137)***	(1.688)*	(1.266)	(1.674)*	(1.284)	(–0.443)***	(0.718)	(–0.425)	(0.629)
Log(Volatility)	–0.092	–0.138	–0.091	–0.129	–0.416	–0.423	–0.424	–0.425	–0.061	–0.078	–0.061	–0.078	–0.480	–0.571	–0.477	–0.566
	(–1.872)*	(–2.442)**	(–1.876)*	(–2.380)**	(–6.796)	(–6.924)	(–7.128)	(–7.354)	(–2.038)**	(–2.422)**	(–2.014)**	(–2.406)**	(–7.817)***	(–8.392)***	(–7.633)***	(–8.007)***
Log(Net Sales)	–0.142	–0.112	–0.142	–0.121	–0.071	–0.073	–0.074	–0.083	–0.231	–0.199	–0.232	–0.197	–0.085	–0.073	–0.101	–0.088
	(–1.707)*	(–1.349)	(–1.706)*	(–1.462)	(–3.676)	(–2.662)***	(–3.850)	(–2.668)***	(–3.851)***	(–3.355)***	(–3.824)***	(–3.246)***	(–0.755)	(–0.602)	(–0.879)***	(–0.708)
Log(Market Cap)	0.272	0.255	0.272	0.260	–0.180	–0.140	–0.180	–0.136	0.368	0.334	0.368	0.334	–0.192	–0.238	–0.192	–0.239
	(4.281)	(3.570)	(4.272)	(3.704)	(–3.158)***	(–2.390)**	(–3.201)***	(–2.367)**	(6.457)***	(6.970)***	(6.456)***	(6.993)***	(–2.790)***	(–3.410)***	(–2.785)***	(–3.477)***
NAREIT	0.105	0.058	0.105	0.064	–0.313	–0.350	–0.315	–0.348	0.060	0.019	0.058	0.020	–0.502	–0.564	–0.529	–0.583
	(2.286)**	(1.199)	(2.300)**	(1.311)	(–3.330)***	(–3.661)	(–3.380)***	(–3.691)	(1.784)*	(0.631)	(1.738)*	(0.697)	(–4.345)***	(–4.965)***	(–4.538)***	(–5.094)***
Adj. R^2	25.91	26.55	25.85	26.74	17.98	15.52	18.14	15.88	38.67	36.98	38.57	36.72	12.49	15.87	13.31	16.23
N	513	434	513	434	513	434	513	434	402	340	402	340	403	341	403	341

Notes: T-statistics (with robust standard errors following Arellano (1987) due to N > T) are reported within the parentheses. '***', '**', and '*' denote 1%, 5% and 10% significance levels respectively.