

A pair of hands is shown from a top-down perspective, gently cupping a glowing green globe. The globe features a white grid of latitude and longitude lines and a faint world map. The background is a soft, out-of-focus light gray.

EUROPEAN REAL ESTATE SOCIETY

24th Annual Conference

June 28 - July 1, 2017, Delft, The Netherlands

Is it worth to be Green?
A Performance analysis on European Green REITs

Mariani Massimo, Caragnano Alessandra, Amoruso Paola, Patruno Pierluigi Maria

LUM Jean Monnet University, Italy

AGeNDA



General framework



Literature review



Data and methodology



Results



Conclusion

General framework

Sustainability represents an innovative component of profitability for Real Estate finance, in line with the dynamics characterizing the current different sectors in the global landscape.



Among other instruments, real estate funds aiming at ensuring sustainability as an essential component of their investment strategy choose to diversify their investment portfolios, including a “green” component represented by certified buildings.

General framework

This paper wants to investigate **the impact of the “green” component on the financial performance of European REITs.**

The adopted selection criteria refer to the two most popular European certifications:

LEED and BREEAM

(standards to evaluate sustainable buildings from an environmental point of view).

The **objective** is to demonstrate the degree of correlation between the adoption of implemented sustainable policies and financial performance

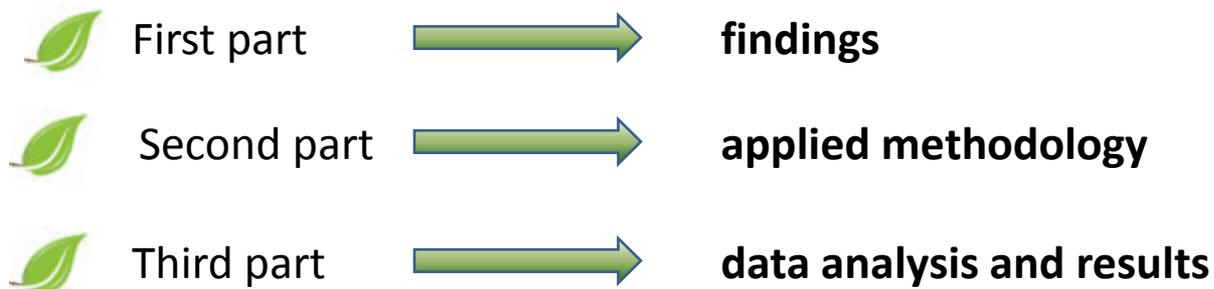
General framework

The rationale of this research arises from the results of previous studies investigating green investment funds and comparable traditional funds performances, questioning whether pursuing green investment goals, would improve return performance (Eichholtz, Kok, and Yonder 2012).

This work is oriented in validating the hypothesis, which states that sustainable and environmentally friendly components, **positively affect investment portfolios**, focusing on the European property management industry.

Investors' consideration led to the need of combining profit oriented and social purposes in the last few years.

General framework



Finally the work findings invalidated our hypothesis on improvement of financial performances generated by green components. In the selected sample and during the selected time period, the percentage of certified building in the REITs portfolio have a negative impact on these performances while also improving the stocks' beta.

Literature review

There has been an intense growth in “green” private equity and infrastructure, with a particular focus on renewable energy. Green investment refers to a sub-set of wider investment themes or can be related to investment approaches, for instance, environmental, social and governance investing (ESG), socially responsible investing (SRI), and long-term sustainable.

-  **Porter and der Linde (1995)** sustained that improving a company environmental performance can enhance financial or economic performance, without necessarily increasing costs.
-  **King and Lenox (2001)** analysed 652 U.S. firms over the decade 1986–1996. The authors found evidence of a relationship between higher financial valuation and lower pollution.
-  **Stefan and Paul (2008)** provided empirical evidence of enhancement in environmental and financial performance demonstrating the “win-win” situation with potential revenue increase and cost reduction of environment-committed practices.

Literature review

 **Eichholtz, Kok, and Yonder (2012)** were the first scholars to investigate the relationship between return performance of REITs and their green component.



In contrast to the majority of existing studies:

 **Chang, Nelson and Doug Witte (2012) obtained a divergent result**

In their paper, the authors described the development of green mutual funds in US markets, indicating that while initially driven by environmentally friendly behaviour of investors, the future of these types of funds will depend on their ability to generate competitive returns.

With reference to social investment in real estate, several works on responsible property investing (RPI) have been developed (Pivo and McNamara, 2005; Pivo, 2009, 2010), showing that companies are oriented towards more sustainable real estate investments.

Data and methodology

Data have been collected from the Bloomberg terminal

The time period considered is **6 years** (July 2010- June 2016) according to the time period selection suggested by **Fama and French** for the application of their state-of-the-art model

REITs component of the FTSE EPRA/NAREIT Europe index have been shortlisted according to the availability of data such as age (at least founded in 2010), total and green certified square metres under management, and other variables successively described; 52 real estate investment trusts have been elected as “Green” according to the percentage of certified squares metres under management.

The minimum chosen threshold is 20% of sqm certified LEED or BREEAM as percentage of the whole property portfolio

Data and methodology

 The requirement for each fund in order to be included in the sample is the availability of fund daily shares last prices and historical yearly, ROE, ROA, Price to Book ratio, Debt Ratio and FundsTotal Assets, for the whole considered period (6 years);

 26 trusts have been added to the sample as non-green REITs characterized by less than 20% or complete absence of green certified sqm under management. The resulting sample contains 390 observations.

Data and methodology

The selected model for this study has been inspired by the work of Eichholtz, Kok, and Yonder (2012), as:

$$\text{Equation 1: } ROA_{it} = \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i$$

$$\text{Equation 2: } ROE_{it} = \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i$$

$$\text{Equation 3: } \text{Alpha}_{it} = \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i$$

$$\text{Equation 4: } \text{Beta}_{it} = \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i$$

Data and methodology

Dependent Variables

ROA_i is the historical Return on Assets

ROE_i is the historical Return on Equity

$Alpha_i$ is the intercept from the Fama-French Five Factors Model

$Beta_i$ is the market risk premium coefficient from the Fama-French Five Factor Model

Independent Variables

$Ln (Total Assets)_i$ is the natural logarithm of the REIT_i total assets at time t

$PriceBookRatio_i$ is the historical Price to Book Ratio of the REIT_i at time t

$Debt Ratio_i$ is the debt to asset ratio of the REIT_i at time t

Sqm_i is the total square metres under management of REIT_i at time t

Age_i is the years since the IPO of REIT_i at time t

$Greenness_i$ is a categorical dummy variable that assumes values of 1 if the REIT_i portfolio is characterized by a percentage of green certified square metres at least equal to 20%; 0 otherwise

The term ε_i is the error term

Results

Panel B: Financial Performances							
1 - ROA				2 - ROE			
	Coeff.	t-Stat	Prob.		Coeff.	t-Stat	Prob.
Ln(Total Assets)	0,069490	4,68122	0,0037 ***	Ln(Total Assets)	0,036329	3,957289	0,0099 ***
Price-Book Ratio	0,092184	2,23613	0,0129 **	Price-Book Ra	-0,092235	-5,82409	0,0001 ***
Debt Ratio	0,004660	1,84008	0,0811 *	Debt Ratio	-0,001500	-0,11494	0,2555
Age	0,017767	1,68519	0,0842 *	Age	0,020273	0,51382	0,8237
Sqm	-7,53E-10	-1,2903	0,6603	Sqm	2,13E-09	0,059884	0,8402
Greeness	-0,343360	-2,5437	0,0807 **	Greeness	0,382473	0,361693	0,5355
R ²	0,51075			R ²	0,80913		
Prob.	1,046E-07			Prob.	0,000013		

3 - Alpha				4 - Beta			
	Coeff.	t-Stat	Prob.		Coeff.	t-Stat	Prob.
Ln(Total Assets)	4,91E-05	0,60193	0,6183	Ln(Total Assets)	0,001509	0,410863	0,5924
Price-Book Ratio	0,000415	1,89085	0,0683 *	Price-Book Ra	0,007917	0,541429	0,2239
Debt Ratio	-8,51E-07	-0,1801	0,5157	Debt Ratio	-6,30E-05	-2,51649	0,0953 *
Age	4,26E-06	0,98167	0,2491	Age	0,000130	0,566782	0,2171
Sqm	1,42E-12	1,9881	0,0174 **	Sqm	4,26E-11	0,608454	0,1551
Greeness	-8,05E-04	-6,9964	0,0016 ***	Greeness	0,002500	2,575625	0,0786 *
R ²	0,8108			R ²	0,6833		
Prob.	1,22E-08			Prob.	1,13E-06		

*indicates significance at the 10 percent level

**indicates significance at the 5 percent level

***indicates significance at the 1 percent level

Results

Equation 1

$$ROA_{it} = \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i \\ + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i$$

All the considered variables have different but significant effects on the ROA, except for variable Sqm, as shown by the p-values. The variable Greenness has a negative impact on the ROA at 5% significance level (p-value < 0.05).

The R^2 of the performed regressions can be considered as efficient statistics to describe the goodness of a model fit.

In this case R^2 indicates that the model has a 51% explanatory power at 1% significance level, due to the significantly low p-value (p-value < 0.001).

Results

Equation 2

$$ROE_{it} = \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i \\ + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i$$

Only the Ln(Total Assets) variable and the Price to Book Ratio one have a significant impact on the ROE value at 1% significance level.

The variable Greenness is not significant in affecting the ROE of the REITs.

The R^2 value indicates a 80.9% explanatory power of the model, at 1% significance level.

Results

....Equation 3 and Equation 4

$$\begin{aligned} \text{Alpha}_{it} = & \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i \\ & + \beta_5 \text{Age}_i + \beta_6 \text{Greenness}_i + \varepsilon_i \end{aligned}$$

$$\begin{aligned} \text{Beta}_{it} = & \alpha + \beta_1 \ln(\text{Total Assets})_i + \beta_2 \text{PriceBook Ratio}_i + \beta_3 \text{Debt Ratio}_i + \beta_4 \text{Sqm}_i + \beta_5 \text{Age}_i \\ & + \beta_6 \text{Greenness}_i + \varepsilon_i \end{aligned}$$

Equation3 shows that the REITs *Alphas* are positively affected by *Price to Book Ratio* at 10% significance level, and by the total square metres in portfolio (*Sqm*) at 5% significance level.

The *Greenness* component has a relatively small, but negative impact on the REITs performances.

The applied model presents goodness of fit statistic value of 81.08% at 1% significance level (p-value of 1.22E-08).

Equation4 shows the impact of these variables on *REITs Stock's Betas*. In this case, the *Debt Ratio* negatively affects the dependent variable at 10% significance level (p-value<0.1) while the *Greenness* component has a positive impact on the stocks' performance at a 10% significance level.

Conclusion

This work has been oriented in validating the hypothesis, which states that such green components can positively affect investment portfolios, focusing on the European framework.

The applied methodology is a fundamental component of the uniqueness of this study in addition to the fact that such a study has never been performed for the observed regions.

The performed analysis demonstrated that the percentage of certified building in the European REITs portfolios has a negative impact on ROA, ROE and stocks alphas while also improving the stocks beta.

Conclusion

The hope for green investors is that, aiming at sustainable goals, costs may be reduced and profits increased, and this would be reflected in stocks and financial performances

However, this work empirically validated the Chang et. al theory (2012), stating that, pursuing green investment goals could sacrifice return and financial performances, as in this case.

Considerations have to be made regarding the sample selection affected by the availability of historical data. Further studies could consider the historical changes in green certified squares metres under management, as this, which can be considered the main limitation of the whole study, could improve the reliability of the results and the model as a whole.

***Thank you for your
attention!***

*Alessandra Caragnano
Phd Student
LUM Jean Monnet University
Italy
alessandracaragnano@yahoo.it*