The effects of the global financial crisis on the capital structure of EPRA/NAREIT Europe index companies

Giacomo Morri

*Accounting, Control, Finance & Real Estate Department,
SDA Bocconi School of Management, Milan, Italy, and*

Andrea Artegiani

Bocconi University, Milan, Italy

Abstract

Purpose – The purpose of this paper is to test whether the financial crisis has affected the capital structure of real estate companies in Europe and whether these impacts can be studied utilizing the variables traditionally used by the trade-off and pecking-order theories to explain the capital structure of companies.

Design/methodology/approach – The study uses a fixed-effect panel regression analysis and a sample composed of companies included in the EPRA/NAREIT Europe Index. The effect of the financial crisis has been accounted for within the model by means of a dummy variable.

Findings – The global financial crisis did have an impact on the capital structure of companies and the main variables traditionally used by the trade-off and pecking order theories proved to be suitable in explaining the capital structure of real estate companies. Real estate investment trusts are, on average, more leveraged than traditional real estate companies due to their special regulatory status.

Research limitations/implications – The study is limited to the European market and UK companies in particular account for a large part of the sample. In addition, major regulatory differences between the various European countries are not taken into account in the model.

Originality/value – Similar studies have been performed for the US and Australian market. However, the impact of the global financial crisis has not been traditionally considered in these studies.

Keywords Capital structure, Listed companies, Global financial crisis, Property companies, REITs

Paper type Research paper

1. Introduction[1]

During the past decade, the role and the importance of capital structure within real estate markets have been central for those markets. Initially, excess liquidity caused by easily available debt pushed up property values, whilst later the "credit crunch", combined with the economic crisis, contributed to reducing them suddenly. Thus, choices relating to capital structure, i.e. as to whether debt was to be preferred over equity or vice versa, along with their determinants in the real estate sector, appear to have played a central role in managers' decisions.

This issue is touched upon by copious literature, starting with the study by Modigliani and Miller (1958), which also constituted the foundation for modern thinking regarding corporate capital structure. However, the study by Rajan and Zingales (1995)

represents a fundamental reference point for the types of model this study will use. In any case, that study focused on public companies from several different industries in the major industrialized economies. Since then, much research has focused either on a particular country or on a particular industry. Whilst some studies have also focused on the determinants of the capital structure of real estate companies, most have focused on the more developed US market.

This study focuses on the determinants of the capital structure of publicly listed real estate firms in Europe comprising the EPRA/NAREIT Europe Index. Due to developments over the past 20 years, various European economies are becoming more integrated into a single market.

The purpose of this article is to test whether the financial crisis affected the capital structure of real estate companies in Europe and whether these impacts can be studied utilizing the variables traditionally employed by the trade-off and the pecking order theories (TOT and POT, respectively) to explain the capital structure of companies. In particular, it investigates the most significant variable relating to the debt/equity ratio. Moreover, a key aim is to determine how the same factors affecting the capital structure of such companies acted differently before and after the global financial crisis (GFC) broke out in 2007. Finally, this study aims to understand whether those determinants of the capital structure affected real estate investment trusts (REITs) or traditional real estate firms differently. Four main conclusions can be inferred from the analysis.

This article is divided into the following three parts. First, it will review the literature on the topic (Section 2); the central part of the study will focus on a description of the methodology and the data used (Sections 3 and 4); finally, an explanation and interpretation of the empirical results will be presented (Section 5).

2. Literature review and previous findings

The *optimization theories*, first introduced by Kraus and Litzenberger (1973), state that company managers make trade-off evaluations between the benefits of a more leveraged firm and the costs thereby caused. Donaldson (1961), on the other hand, was the first author of the *behavioral* theories with the POT: management's decisions regarding capital structure are influenced, on the one hand, by the market's perception of the availability of superior information to management and, on the other hand, by the overall market conditions, which may or may not offer the firm the opportunity to sell financial securities at a premium over their real value. The real estate investment industry is characterized by some specific features. First, there is a parallel market for the assets held in the portfolio of property companies, which means that it should be easier to borrow since these real assets can be easily used as collateral. REITs are companies regulated by a very specific set of rules, which differ from country to country, which can strongly influence their capital structure in a way that traditional property companies (RECs) cannot. Any tax shield effect and its related benefits are nearly eliminated in the REIT sector due to the tax-exempt status of such companies. The agency cost associated with the availability to management of free cash flows is mitigated by the requirement for REITs to distribute almost all of their earnings to shareholders. As no benefit is apparently associated with the issuance of new debt, and given the remaining potential bankruptcy costs, there is little incentive to use a high level of leverage. The presence of a high proportion of debt in the capital structure of REITs is thus inconsistent with the TOT. According to the POT, company managers

should prefer debt over external financing and internal financial resources over debt. However, the earning distribution requirement of REITs heavily limits management discretion in major financing decisions. Consequently, it may be the case that there is no overvaluation mispricing behind a management decision to issue new shares. If investors were all well aware of this, information asymmetry would be less of a problem for this type of company. This should apply even more so to real estate companies, as these are generally easier to value because there is usually low or no value to be derived from human capital or growth opportunities: RECs are simply a collection of properties also traded on a parallel market. However, some RECs still prefer to borrow rather than issuing new equity. In their analysis of the *SNL Database REITs Component*, Ghosh *et al.* (2007) found that there seems to be no long-term target capital structure for these companies. Barclay *et al.* (2013) concluded in their 1984-2010 regression analysis of more than 470 taxable and nontaxable RECs that tax deductibility plays only a secondary role in a firm's leverage decisions. According to their view, for firms investing in the same type of asset, non-tax-exempt companies should generally be more levered, although in actual fact take on an average of just 5 per cent more debt. In their analysis of the determinants of the capital structure of Australian REITs, Dimovski and Zarebski (2012) found that the same variables (size, profitability, tangibility of assets, operating risk and growth opportunities) had a similar impact on the leverage of those firms before and after the GFC, even though their impact appears to be somewhat distorted. The intuition is that for REITs it has been more about finding how to survive than how to exploit opportunities. This has translated into the creation of a more simple financial structure, which appeals to more risk-adverse investors. Their analysis also provides mixed support for both the POT and TOT. For Dimovski and Zarebski (2012), the two theories are not mutually exclusive, but can rather help to understand capital structure from different perspectives and at different times. Harrison *et al.* (2011) claim that the regulations requiring REITs to invest only in real estate represent an obstacle to diversification and, hence, increase the probability of financial distress, making debt more expensive and less preferred. However, Dimovski and Zarebski (2012) are not of the same view because the use of properties by businesses in different industries should represent an indirect way of diversification. Li *et al.* (2007a, 2007b) found that REITs act differently from other corporate entities. The TOT and the POT mostly agree on the set of variables that are considered to affect the capital structure of companies, even though the way in which those variables are predicted to affect the capital structure of companies may differ.

Company size is considered to have great explanatory power under both the POT and TOT. According to the TOT, larger firms are better able to diversify, which means that they have cash flows that are less susceptible to change and, hence, reduce the potential for the rise of bankruptcy costs. Fama and French (2002) agree with this conclusion. This should help large companies to access financing under more favorable terms. Arguing against this theory, the POT postulates that because larger firms are more likely to be monitored by external actors, the level of information asymmetry should be lower and, hence, the company should be able to issue more equity than debt. Generally speaking, a company size positively affects the capacity of a firm to issue both new shares and new bonds because a larger size implies that, due to economies of scale, the firm is able to sustain the costs associated with these operations. In their study of US REITs, Harrison *et al.* (2011) found an evident and substantial positive correlation

between company size and leverage. A positive correlation was also found by Rajan and Zingales (1995), Wiwattanakantang (1999), Booth *et al.* (2002), Pandey (2001) and Green *et al.* (2001). Arif and Hassan (2008), focusing on the impact of the GFC on Asian companies, reached the same conclusion, as did Chikolwa (2009), who carried out an analysis of REITs in Australia just before the GFC.

Profitability is widely considered to influence the amount of debt a company can take on. However, most studies do not agree on the direction in which the correlation between the two variables operates. For the POT, the direction is certainly negative: if a firm is profitable, it simply means that there are more internal cash resources to use for positive investment opportunities. To avoid the costs associated with information asymmetry, a company with such resources will certainly use its retained earnings first. Barclay *et al.* (2006) and MacKay and Phillips (2002) found that the relationship between profitability and leverage to be positive, thus supporting the TOT. According to this theory, a more profitable firm has more earnings, which may be used as a shield, and hence, debt comes with this additional benefit. Considering debt either at market or book value can help considerably to resolve in which sense profitability influences leverage. According to the TOT, book values tend to create the conditions for a positive relationship between the two. In the case of market values, however, firm value is expected to vary – and increase – as a consequence of an increase in profitability, so that leverage measured as the ratio of debt over equity should be reduced. The POT is consistent with the latter position that there is a negative relationship for market values. However, it must be stressed that, in the case of REITs, the requirement that most earnings must be distributed to shareholders implies that, despite the absence of the tax shield effect, whenever a REITs is faced with a positive NPV opportunity, it may prefer to finance it with debt.

As for profitability, both theories expect growth opportunities to have a major explanatory role in determining the level of leverage of a company. According to the TOT, firms with growth opportunities are less levered because positive investment opportunities imply that management is less likely to invest money in risky or unrelated business activities. In other words, debt has a smaller disciplining role and thus offers less benefit for a firm. In particular, Harrison *et al.* (2011) found a negative correlation in REITs between growth opportunities and the level of leverage. Bradley *et al.* (1984), Kim and Sorensen (1986), Titman and Wessels (1988), Barclay *et al.* (2006), Arif and Hassan (2008) and Chikolwa (2009) also argued that growth opportunities and leverage follow the TOT, and thus there is a negative relationship between them. On the other hand, based on their analysis of the SNL database of REITs initial public offerings (IPOs) during the 1991-2003 period, Feng *et al.* (2007) state that REITs with high growth opportunities prefer to raise funds through debt. They claim that this result runs contrary to what generally happens with other types of firm and attribute it to the special regulatory requirements of REITs regarding the distribution of earnings, which reduces internally available cash resources. Deesomsak *et al.* (2004), Morri and Beretta (2008) and Giambona *et al.* (2008) also found a positive correlation and, hence, support the POT in explaining the impact of growth opportunities on the capital structure of REITs. The general reasoning followed by this theory is that high-growth firms retain fewer earnings than the amount of money required to make any positive investment project they may face. Under these conditions, they prefer to use debt, which is only a second best choice after internal cash resources, according to the TOT. However, by the

same token, the theory also postulates that if firms are sufficiently optimistic that the future will bring even more promising opportunities, they may not wish to use debt now to avoid issuing new equity in future as a last resort. Generally speaking, the POT offers mixed interpretations of the impact that growth opportunities have on the capital structure of companies. Nevertheless, the real estate industry is characterized by few growth opportunities and, if there are any, these need to be regarded as just temporary windows. Whilst this may generally be the case for property companies not frequently faced with positive growth opportunities, for REITs, by contrast, due to the high level of regulation requiring these companies to hold the majority of assets as passive investment, it is seldom the case that there are any positive investment opportunities to exploit.

The prevailing interest rates affect the leverage of a company, as they represent the direct cost of debt financing for such firm. Traditionally, cost of debt has not been taken into consideration by either the POT or the TOT. This is because it is easy to predict the impact on the level of debt used by a company using classical economic theory: when the price (interest rates) for a commodity (debt) rises, demand for that commodity should fall.

The effect that the ownership structure of a company can have on its capital structure was not originally considered by either the TOT or the POT. However, a negative correlation between the presence of block holders and the amount of leverage of a firm may be hypothesized using the reasoning underlying the POT: company management is inclined to act opportunistically, but if there are few block holders, they will be able to organize and exert the same monitoring that lenders generally use – thus, there is less need for debt and its disciplining role. Short et al. (2002) and Bathala et al. (1994) draw on UK and US samples, respectively, finding similar evidence: companies with large institutional block holders were less leveraged than companies with a greater number of free-floating shares. The same result was highlighted by Capozza and Seguin (2003) for the REIT subsector. On the other hand, Firth (1995) found opposite results, while Omet (2004) found no direct correlation between the presence of block holders and the level of debt in a company. The general conclusion could be that even if the POT can help make predictions regarding capital structure, empirical evidence is mixed.

Both the TOT and the POT predict a negative correlation between risk and leverage. According to the TOT, as risk increases, so does the likelihood of bankruptcy and, consequently, the interest rates demanded by lenders. Under the POT, a higher risk will be associated with an increase in the information requirements imposed by lenders to reduce information asymmetry with company insiders, thus making management reluctant to issue new debt. Generally speaking, firms working in the same industry – which thus have the same level of operating risk – have been found to have the same capital structure. Ooi (1999), Newell (2006), Giambona et al. (2008) and Chikolwa (2009) show that low risk, in the form of geographically diversified asset investment by Australian REITs, provides these companies with cheaper debt and, hence, creates the conditions for a negative correlation between risk and debt levels. Kale et al. (1991) found that leverage and risk have a U-shaped structure: leverage decreases for low levels of risk, but increases for high levels. Booth et al. (2002), Morri and Beretta (2008) and Chikolwa (2009) found that when risk is high, REITs generally choose lower debt levels. For Wiwattanakantang (1999), the results vary and there is not necessarily any negative correlation between risk and debt. A positive association between operating risk and

leverage has been found even by Barkham (1997) in his study on the UK market: companies that were generally involved in development projects, and thus traditionally considered to be risky, were usually more highly leveraged than RECs that traditionally invested in existing properties. According to research by Maris and Elayan (1990), mortgage REITs are positively correlated with risk.

Table I summarizes the effect which, according to the TOT and the POT, each of the variables considered in the model has on leverage.

3. Data and sample description

The data used are taken from the 68 companies comprising the EPRA/NAREIT Europe Index on December 31, 2012, that have been continuously included in the index since 2003. These include 36 RECs, while the remaining 32 are REITs. The companies in the sample may be characterized according to their business model. REITs are limited as regards the types of business activity they can perform: they have to focus on income investments, and the amount of sellable assets within a year must be very low as a percentage of the total portfolio. RECs have been analyzed in terms of their asset composition. Whenever at least 15 per cent of a company's assets are related to the riskier activity of property development and trading, the company was considered to be involved in such activities. As a result, 31 per cent of RECs were involved in "Development and trading", while the remaining 69 per cent in "Income, management and services".

Financial data from DATASTREAM refer to the period 2003-2012. The overall number of observations that was possible to be used was 528 of a potential 680. This is due to the fact that some data are missing, in particular historical data, such as that relating to market beta observations used to express a company's level of risk. The overall sample has been broken down into two subsamples, RECs and REITs, as a consequence of the differing specific features of the legal framework governing them and the differing purposes of the businesses. Data have been examined separately for each year to check for consistency over time. LEVERAGE has been calculated dividing debt by the sum of debt and the market value of equity.

4. Methodology

As the sample data refer to more *cross-sectional units*, namely, the 68 companies belonging to the EPRA/NAREIT Europe Index, and these units are observed *over time*, specifically the 10-year period 2003-2012, the model is based on a panel regression analysis. In particular, the model used in this study is a *fixed effect* panel regression model where the *individual* effect component is captured by the dummy variable TYPE, which is allocated either a value of 0 for RECs or 1 for REITs. This dummy variable is

Variable	TOT	POT
Size	+	−
Profitability	+	−
Growth	−	+ (−)
Cost of debt		
Ownership		−
Risk	−	−

Table I.
The expected effect of the determinants of leverage according to the TOT and POT

included because the business activities of these two groups of companies are influenced by a different set of regulatory requirements. The *time* effect component in the model is captured, on the other hand, by the dummy variable CRISIS, which is equal to "0" where an observation is registered for the period 2003-2007 and to "1" if it is obtained from the 2008-2012 period.

The validity and explanatory power of the model will be checked by running a set of statistical tests to factor out the possibility of autocorrelation, multicollinearity, and heteroskedasticity and to ensure that there is a normal distribution of residuals.

The general approach will be to prefer market values over book values whenever possible. In fact, market values provide a more realistic picture of the true conditions of a company. The following independent variables are used in the model.

The denominator in the formula is defined as total capital, and this version of LEVERAGE is also known as the loan-to-value ratio (LTV).

The level of total assets probably provides the best indication of the size of a company. However, considering the significant differences between assets levels for the companies in the sample, this measure has been further refined by using the natural logarithm of the total value of assets. Many studies from the relevant literature use the same proxy for SIZE, including: Homaifar *et al.* (1994); Fama and French (2002); Feng *et al.* (2007) in their study of REITs' IPO over the 1991-2003 period; Isil and Dogan (2011) in their study of Turkish REITs.

The use of earnings before interest and taxes (EBIT) has been preferred to other forms of profitability such as net income as it is presumed to be independent from the capital structure of a company. Without the EBIT correction, it is expected that there will be a negative correlation between leverage and profitability: when the debt to equity ratio is higher, interest rates are expected to be higher, thus decreasing the level of net income over the same amount of assets. This is the same measure of PROFITABILITY that Titman and Wessels (1988) utilized in their study on the determinants of the capital structure of US manufacturing firms over the 1974-1982 period.

The market-to-book value ratio of equity is the proxy which will be used in the model to represent the growth opportunities a company is facing. The decision to opt for a market value measure has the advantage of being an ex-ante and forward-looking prediction. Indeed, the future growth opportunities of a company may be thought of as being reflected in the stock price as investors apply their future predictions regarding the firm's potential for growth by using the dividend discount model. In their study on the determinants of capital structure of Australian REITs during the GFC, Dimovski and Zarebski (2012) utilized the same measure for GROWTH.

This is a typical measure which is used also by Morri and Cristanziani (2009) in their analysis of the determinants of the capital structure of RECs over the years 2002-2006.

A similar measure of ownership has been used by Driffield *et al.* (2007) and Brailsforda *et al.* (2002). The general assumption is that when there are block holders in a company, they are likely to have the common interest of directing the company's policies to maximize their wealth and, in general, if the majority of shares are held by a few individuals, it should be easier for them to exercise actual control over management behavior:

$$RISK = \beta_u$$

β_u is the beta unlevered of the company calculated as derived from capital asset pricing model formula. As the aim of this study is to determine what influences the leverage of a company, the beta utilized in the model will be an unlevered beta, i.e. a beta that is independent of the amount of debt a company has taken on, which is thus the only measure of the true operating risk of that company. Ooi (1999) used unlevered beta as a proxy for RISK in his study on the determinants of the capital structure of UK property companies.

TYPE and CRISIS are simply two dummy variables which take the following two values:

$$TYPE = 0 \; for \; RECs$$
$$TYPE = 1 \; for \; REIT$$
$$CRISIS = 0 \; for \; 2003 - 2007 \; observations$$
$$CRISIS = 1 \; for \; 2008 - 2012 \; observations$$

It is important to note that the dummy variable TYPE took on a different value for observations taken from the same company where that company changed its status from REC to REIT during the observation period, as occurred for many UK or French firms in 2007.

The existence of multicollinearity has been checked by calculating the Pearson correlation coefficients. The Klein's test has been used in relation to the main regression only. Auxiliary regressions have run each time with one of the independent variables acting as the dependent variable; if the R^2 of the main regression is higher than the total R^2 of these auxiliary regressions, then the existence of multicollinearity can be excluded. The existence of heteroskedasticity has been checked by running White's test. In cases in which the model appeared to be affected by heteroskedasticity, two further auxiliary regressions were run to establish whether heteroskedasticity affected the empirical results obtained by using the model. These auxiliary tests were the White heteroskedasticity-consistent variances standard errors and the Newey-West HAC standard errors and covariance. Finally, the hypothesis of normal distribution of residuals has been checked using the Jarque-Bera test to plot the residuals on a graph; the independence of residuals has been, in turn, checked by graphing their spatial distribution.

5. Results
This section will be divided into three parts. The first part will present the results obtained by running the main model. The second part will show the results of some eight additional models run to study the impact of the GFC and REC or REIT status on capital structure. Finally, one last model will be presented in the third part to establish whether the country of origin of a company is an influencing factor on the capital structure of the companies in the sample.

5.1 Empirical results for the comprehensive sample of RECs and REITs over the 2003-2012 period
Table II reports the empirical findings obtained by running the model. RECs present a mean leverage value of 0.549, while the figure for REITs is 0.464. The average size of REITs is larger than that of RECs: measured in terms of total assets, REITs average is

4,924.9 vs 3,424.9 (€ million) for RECs. The average PROFITABILITY was 0.035 with a standard deviation of 0.033. REITs showed a significantly higher figure for the price-to-book value of equity used as a proxy for growth opportunities, amounting to 1.008 as against 0.768 for RECs. RECs are riskier than REITs as their average value for unlevered beta was 1.904 (compared to 1.674). This can be explained by the higher proportion of pure income-generating properties in which REITs generally invest as compared to the possibility for RECs to invest in value-added properties or development schemes.

Focusing on the significance of the regressors used in the model, 6 of 9 of these can be significantly used to explain the behavior of leverage. SIZE, PROFITABILITY, GROWTH, COST and TYPE all present p-values close to zero, and, hence, are highly significant.

The independent variable with the greatest influence on leverage is COST, with a coefficient of -1.4321. This result is certainly in line with what could be expected from empirical data, as the greater the cost of debt, the less it is used. Ooi (1999) found substantial empirical backing for the claim that firms try to forecast future interest rates and then set a target leverage ratio. McCue and Kling (1994) studied the impact of major macroeconomic variables on real estate return and found that the level of nominal interest rates had the greatest impact.

PROFITABILITY is the independent variable with the second highest level of influence in the model with a coefficient of -0.5262. This evidence is in line with the predictions of the POT: companies prefer to use internal cash resources, and as long as they have more available cash (in the sense that they are more profitable), they are less leveraged. The study carried out by Rajan and Zingales (1995) clearly shows that the correlation between LEVERAGE and PROFITABILITY is negative, even though the value of the coefficient differed widely on country-to-country analyses. Studies that agree with the hypothesis that internal funding is preferred over debt include Myers (1977), Fama and French (2002) and Hovakimian *et al.* (2004).

The variable TYPE, with a coefficient of -0.1296 and a p-value very close to 0, is clearly another critical variable which may be used to explain the leverage of a firm. Having set the value of this dummy variable as 1 for REITs and 0 for RECs, the results of the analysis seem to comply with the TOT. Indeed, REITs are almost tax-exempt

Variable	Coefficient	Standard error	t-statistic	Probability
C	0.0966	0.1413	0.6836	0.4946
Size	0.0291	0.0064	4.5085	0.0000
Profitability	−0.5262	0.1038	−5.0695	0.0000
Growth	−0.0836	0.0149	−5.6235	0.0000
Cost_of_debt	−1.4321	0.3570	−4.0111	0.0001
Ownership	−0.0242	0.0299	−0.8084	0.4192
Risk	−0.0023	0.0068	−0.3422	0.7323
Type	−0.1296	0.0139	−9.3385	0.0000
Crisis	0.0444	0.0165	2.6878	0.0074
R-squared	0.2954	Adjusted R-squared		0.2846
F-statistic	27.2046	Prob (F-statistic)		0.0000

Table II.
Empirical results for the comprehensive sample of RECs and REITs over the 2003-2012 period

institutions and gain little advantage from a higher degree of LEVERAGE due to the almost complete absence of any tax shield effect.

CRISIS is another relevant variable that helps to account for the LEVERAGE level of real estate companies. As can be expected from reality, this variable has a positive effect, meaning that firms have generally turned out to be more leveraged since the start of the GFC. This may be due to the fact that the value of their property assets has fallen dramatically and the equity measured at book value has dropped significantly. Theoretically, it could be dependent on a greater recourse to debt, though it is a known fact that the banks have reined in lending to the real estate sector since the start of the GFC.

SIZE has a positive effect under the TOT: if a company is larger in terms of total asset value, or similarly, if the company has greater collateral available, it is perceived by lenders to be safer. At the same time, the concept of economies of scale can also help to explain this effect: larger firms are better able to sustain the fixed costs associated with debt issuing such as going to the debt market, fulfilling information requirements of lenders and servicing their debt. Thus, larger companies can make greater use of debt, especially public debt, and are consequently more leveraged.

The impact of GROWTH is negative and in line with the TOT. As previously explained, when there are major positive investment opportunities, managers are less likely to invest in suboptimal ventures and there is hence less of a need for the disciplining effect of debt. Many studies have claimed that there is a negative correlation between LEVERAGE and market-to-book value of equity, including Barclay and Smith (2006), Long and Malitz (1985), Smith and Watts (1992) and Bradley *et al.* (1984). Generally speaking, in periods of "hot equity", i.e. when the market-to-book value of a firm is higher, managers should be willing to exploit these conditions and, hence, prefer equity over debt, thus dramatically reducing the level of leverage of their firms.

RISK has a very low level of significance within the model. However, the negative effect of the coefficient is in keeping with the predictions of both the TOT and the POT that when a company is perceived as riskier by the market, debt proves to be a more expensive choice of financing and companies, consequently, tend to be less leveraged. Similar results were found in the real estate sector by Booth *et al.* (2002), Ooi (1999), Newell (2006), Giambona *et al.* (2008) and Chikolwa (2009).

OWNERSHIP does not play a significant role within the model. This may either indicate that OWNERSHIP does not play a critical role in determining the capital structure of real estate companies or even that this variable cannot be used in general to predict the leverage of companies in any sector. However, the negative effect of the correlation could be important because it demonstrates that the presence of block holders may reduce the amount of leverage a firm uses. This situation can be explained by the fact that large shareholders exert sufficient control to monitor their company's management to ensure they do not act opportunistically by taking on too much risk and embarking on dangerous debt-financed projects.

5.2 Analysis before and after the GCF and within the subsample of companies
Part of the research question for this study is to establish whether or not the determinants of the capital structure of real estate companies have differed before and after the start of the GFC. This objective seems to be even more important in view of the fact that the dummy variable CRISIS showed up significantly in the main model at the

1 per cent level. Two further main regressions have been run considering data from, respectively:

(1) 2003-2007, to study the behavior of LEVERAGE in the BGFC (before GFC) period.

(2) 2008-2012, to study the behavior of LEVERAGE in the PGFC (post-GFC) period.

The inclusion of TYPE in all such models with a level of significance of 0.1 per cent made the case for some six additional regressions: two regressions based, respectively, on observations taken only from RECs and REITs, and the same operation for observations taken during the BGFC and PGFC periods. This has contributed to obtaining a more complete analysis of the behavior of LEVERAGE in the two subgroups of companies. Indeed, it was shown above that, due to the special regulatory requirements of REITs, the explanatory variables of LEVERAGE may operate differently in the two subsamples of companies.

Table III reports the findings based on these additional regressions.

With an R^2 ranging from 0.10 to 0.34 and the F-statistic generally significant at the 2 per cent level, with one exception, these additional regressions can be regarded as good models with a fairly valid ability to describe the variation of LEVERAGE in the sample of companies.

Both PROFITABILITY and SIZE significantly affect the behavior of leverage since they are significant at the 5 per cent level in six and eight of the nine regressions, respectively.

The significance of SIZE is always around the 3 per cent level in all the cases except for the REC subsample in the pre-crisis period. In the significant regressions, the SIZE coefficients range from 0.02 to 0.05 and are always positive, basically confirming the reasoning of the TOT that larger companies are always more leveraged because they are perceived to be less risky because the scale of their assets can help them to diversify their investments. At the same time, larger companies can achieve economies of scale that can significantly reduce the costs associated with debt issuance. It is particularly interesting that the coefficient is higher during the PGFC period. This may be interpreted as evidence that, during periods of financial distress, only the largest companies can obtain significantly more debt. Indeed, considering the variables that most heavily influence LEVERAGE, namely, PROFITABILITY and COST, it can easily be seen that, in passing from the BGFC to the PGFC regression, their coefficients tend to 0, while SIZE increases from 0.0208 to 0.0361. Therefore, during a period when debt is probably more expensive and firms are less profitable, a larger asset size is used as a strong basis for obtaining more debt.

PROFITABILITY is also significant at the 5 per cent level in six cases and is constantly negative, ranging from -0.97 to -0.27, thus certainly substantiating the POT: if companies have internally generated cash resources, they are less likely to issue new debt. Moving from the BGFC to the PGFC, it is possible to see that the value of the coefficients differs significantly and is closer to 0, moving from a pre-crisis value of -0.9491 to a post-crisis value of -0.2669. This is extremely important evidence: if in the BGFC period a more profitable firm could "afford" not to use debt by exploiting its available internal cash resources, during the PGFC, a drop in profitability may have caused the same firm to use more debt, whilst even trying to save some cash, given the gloomy outlook regarding the uncertain future.

COST is significant in four of the nine regressions. The COST variable certainly deserves to be considered in greater depth. It is most interesting to note that the trend

| | 2003-2012 | | | | | | Before GFC 2003-2007 | | | | | |
| | Comprehensive | | REC Subsample | | REIT Subsample | | Comprehensive | | REC Subsample | | REIT Subsample | |
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	0.0966	0.4946	0.3283	0.1128	-0.1659	0.3981	0.3124	0.0765	2.1406	0.1462	-0.1562	0.6065
Size	0.0291	0.0000	0.0203	0.0323	0.0321	0.0005	0.0208	0.0099	-0.0672	0.3428	0.0375	0.0088
Profitability	-0.5262	0.0000	-0.7615	0.0000	-0.4022	0.0029	-0.9491	0.0000	0.4003	0.6764	-0.9720	0.0045
Growth	-0.0836	0.0000	-0.0953	0.0000	-0.0606	0.0161	-0.0692	0.0002	-0.0853	0.4922	-0.1052	0.0083
Cost_of_debt	-1.4321	0.0001	-1.7131	0.0000	-0.4532	0.5517	-2.4086	0.0000	-4.5376	0.0197	-1.1851	0.3282
Ownership	-0.0242	0.4192	-0.0697	0.0905	0.0216	0.6305	0.0077	0.8399	0.0585	0.6994	0.0517	0.4272
Risk	-0.0023	0.7323	0.0062	0.4740	-0.0095	0.3830	0.0113	0.1741	-0.0217	0.6217	0.0098	0.4928
Type	-0.1296	0.0000	N/A	N/A	N/A	N/A	-0.0904	0.0000	N/A	N/A	N/A	N/A
Crisis	0.0444	0.0074	0.0543	0.0111	0.0260	0.3260	N/A	N/A	N/A	N/A	N/A	N/A

(continued)

Table III.
Empirical results for
the nine regressions
run in the study

	Comprehensive		Post GFC 2008-2012 REC subsample		REIT subsample	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	−0.0808	0.7032	−0.4606	0.2517	−0.1491	0.5570
Size	0.0361	0.0002	0.0549	0.0026	0.0310	0.0104
Profitability	−0.2753	0.0346	−0.2669	0.2886	−0.2873	0.0653
Growth	−0.0902	0.0001	−0.1538	0.0000	−0.0418	0.2079
Cost_of_debt	0.6719	0.3080	1.6263	0.0695	0.1727	0.8637
Ownership	−0.0258	0.5560	−0.0949	0.1551	0.0009	0.9886
Risk	−0.0133	0.2064	−0.0035	0.7949	−0.0216	0.1787
Type	−0.1459	0.0000	N/A	N/A	N/A	N/A
Crisis	N/A	N/A	N/A	N/A	N/A	N/A

Table III.

changes from negative to positive in the run-up to the GFC. During the BGFC period, the variable operated as can be expected: when debt is more expensive, there is less leverage. However, the position may have changed during the PGFC period: asset values plummeted while debt soared, particularly for riskier companies, i.e. those with higher interest rates. In other words, before the GFC, it was more a case of companies *deciding* whether or not to issue new debt, depending on the prevailing level of interest rates applied to them; during the GFC, companies have seen the market value of their assets reduced, which has caused their level of leverage to increase. In this sense, it is of interest to note the findings by Bredin and Stevenson (2006): after interest rates rise, stock values are expected to fall and, as a result, leverage is expected to rise.

OWNERSHIP does not feature significantly in any of the regressions. This may be an indication of the fact that it may be difficult to make predictions regarding the level of leverage in a company based on whether or not there are large shareholders. If anything, this may be the case for the real estate industry. The position may be even more complicated for REITs due to the existence of special regulatory requirements that, leaving aside any difference resulting from the country, generally prohibit the creation of large block holders. This may be the reason why OWNERSHIP is not significant in all of the REIT subsample regressions. Indeed, if the REITs regulatory requirements of the different European countries impose roughly the same rules concerning ownership, this may greatly reduce the variability of the sample, with the result that OWNERSHIP turns out not to be significant in the model.

GROWTH is significant at the 1 per cent level except for two models. The coefficient is constantly negative, thus confirming that when there are positive, NPV opportunities management is less likely to commit to suboptimal investments and, hence, there is less need for the disciplining effect of debt.

The variable RISK never plays a significant role in the model. However, it may be interesting to make some observations over whether it is positive or negative. During a period of relative economic stability (BGFC period), the correlation is positive both for the comprehensive sample and the REITs subsample, while in a period of financial crisis, investors become more conservative in their attitude towards real estate, with the result that the traditional negative correlation prevalent in other industries emerges.

TYPE is always significant, with a level very close to 0. The positive or negative value of the coefficients is consistent across the three regressions: the comprehensive sample for 2003-2012, BGFC and PGFC. The negative value of the coefficient means that REITs are generally less leveraged than RECs due to the lower tax-shield effect mentioned above.

5.3 Empirical results taking account of country differences

As the sample on which the analysis was based is composed of companies from 13 different countries, with different regulations applicable to capital structure, it was necessary to run a further analysis to establish whether the country of origin of a company was an influencing factor for the model. This was done by incorporating dummy variables into the model. If the results in Table IV are considered, it appears that companies generally do not have a different capital structure simply because of different country regulations: indeed, only 2 (Germany and Greece) of the 12 dummy variables enter the model with a level of significance at the 5 per cent level. This may be explained by the fact that laws and regulations governing

Variable	Coefficient	Standard error	t-statistic	Probability
C	0.3230	0.1540	2.0978	0.0364
Size	0.0135	0.0064	2.1054	0.0357
Profitability	−0.6142	0.0943	−6.5147	0.0000
Growth	−0.0074	0.0009	−8.1732	0.0000
Cost_of_debt	−0.3536	0.3880	−0.9115	0.3624
Ownership	−0.1022	0.0319	−3.2087	0.0014
Risk	0.0003	0.0010	0.3528	0.7244
Type	−0.0942	0.0210	−4.4873	0.0000
Crisis	0.0355	0.0141	2.5230	0.0119
AUS	−0.0054	0.0611	−0.0883	0.9297
BEL	−0.0315	0.0641	−0.4906	0.6239
FIN	0.1004	0.0616	1.6316	0.1034
FRA	0.0632	0.0613	1.0310	0.3030
GER	0.1764	0.0509	3.4657	0.0006
GRE	−0.2665	0.0868	−3.0717	0.0022
ITA	0.0855	0.0708	1.2075	0.2278
NDL	−0.0313	0.0622	−0.5025	0.6155
NOR	0.1415	0.0830	1.7045	0.0889
POL	−0.0790	0.0773	−1.0221	0.3072
SWE	−0.0083	0.0516	−0.1617	0.8716
SWI	−0.0547	0.0616	−0.8877	0.3751
UK	−0.0798	0.0575	−1.3883	0.1656
R-squared	0.4660	Adjusted R-squared	0.4450	
F-statistic	22.1877	Prob (F-statistic)	0.0000	

Table IV.
Empirical results
from the model
considering the
country of origin of
companies in the
sample

REITs are rather similar across the different European countries. Moreover, the only countries with significant results (Germany and Greece) have very different economies and different real estate market structures.

6. Conclusions
Four main conclusions can be inferred from the analysis carried out of the capital structure of companies in the EPRA/NAREIT Europe Index.

First, one group of variables is able to explain leverage choices, and some are consistent with either the TOT or POT. SIZE has a positive effect in accordance with the TOT, as larger companies are perceived by lenders as being safer and because of economies of scale in debt issuance. GROWTH is negative, in line with the TOT, as when there are major positive investment opportunities, managers are less likely to invest in suboptimal ventures, which means that there is less need for the disciplining effect of debt; moreover, in periods of "hot equity", managers should be willing to exploit these conditions and hence prefer equity over debt, thus reducing dramatically the level of leverage of their firms. PROFITABILITY is consistent with the predictions of the POT, as companies prefer to use internal cash resources, and as long as they have more available cash (i.e. they are more profitable), they are less leveraged. COST influences leverage most significantly and is consistent with what could be expected from empirical data: the greater the cost of debt, the less it is used. RISK and OWNERSHIP do not enter the model on a significant scale. The fact that RISK is not significant, as traditionally considered by both the TOT and the POT, may be due to the

construction of the sample and the lack of a significant number of values, as measured by the value of unlevered beta. OWNERSHIP, which has not traditionally been considered by either the POT or the TOT to have any particular explanatory power on LEVERAGE, was confirmed as not significant.

Second, TYPE was the other variable in the model which has not traditionally been considered by theories on capital structure. Findings confirm the predictions that because of special regulatory requirements, it is less convenient for REITs to use debt because, as practically tax-exempt institutions, they have little benefit due to almost complete absence of any tax shield effect.

Third, the GFC has affected the capital structure of companies in the EPRA/NAREIT Europe Index over time, whilst have become more levered since the start of the GFC. Generally speaking, firms have been more leveraged since the start of the GFC because the value of their property assets has fallen dramatically and the equity measured at book value has dropped significantly. In particular, COST affected LEVERAGE differently in the BGFC and PGFC periods, respectively. COST was negatively correlated to LEVERAGE in the BGFC period, meaning that companies for which debt was more expensive were less leveraged; the opposite correlation has obtained in the PGFC period because, for companies paying higher interest rates, the LTV has increased more significantly as a consequence of the fall in property portfolio values or due to the refinancing of their debts under more costly conditions. Passing from the BGFC to the PGFC regression, PROFITABILITY and SIZE coefficients tend to 0, while SIZE increases. Therefore, in a period when debt is probably more expensive and firms are less profitable, a larger asset size is used as a strong basis for securing more debt. If a more profitable firm could afford not to use debt in the BGFC period by exploiting its available internal cash resources, during the PGFC period, a drop in profitability may have caused the same firm to use more debt, whilst even trying to save some cash given the gloomy outlook regarding the uncertain future. RISK and OWNERSHIP do not play any significant part in any of the regressions run, while GROWTH is not always significant and is constantly negative, confirming that when there are positive, NPV opportunities management is less likely to make suboptimal investments and, hence, there is less need for the disciplining effect of debt. TYPE is significant in all periods, confirming that REITs are generally less leveraged than RECs due to the reduced tax-shield effect.

Finally, the country of origin of a company was found not to be a decisive factor for leverage, as it seems that companies do not generally have a different capital structure simply due to different country regulations, perhaps because laws and regulations governing REITs are rather similar across the different European countries.

Some improvements to the study could be made with the addition of further variables, or the removal of existing variables. It would be interesting to replicate the study in a few years' time, once the current financial turmoil has passed, to establish whether or not the determinants of LEVERAGE have returned to their previous position to explain the behavior of LEVERAGE as during the BGFC period. For the time being, it would be interesting also to replicate this BGFC and PGFC study utilizing samples from other major economies such as Australia, Japan and the USA, thus allowing a wider geographical comparison.

Note

1. The article has been presented as a working paper at the 21st Annual European Real Estate Society Conference in Bucharest (Romania), 25th-28th June 2014.

References

Arif, M. and Hassan, T. (2008), "How capital structure adjusts dynamically during financial crises", *Corporate Finance Review*, Vol. 13 No. 3, pp. 11-24.

Barclay, M.J., Heitzman, S.M. and Smith, C.W. (2013), "Debt and taxes: evidence from the real estate industry", *Journal of Corporate Finance*, Vol. 20 No. 1, pp. 74-93.

Barclay, M.J., Morellec, E. and Smith, C.W.J. (2006), "On the debt capacity of growth options", *Journal of Business*, Vol. 79 No. 1, pp. 37-59.

Barkham, R.J. (1997), "The financial structure and ethos of property companies: an empirical analysis", *Construction Management and Economics*, Vol. 15 No. 1, pp. 441-456.

Bathala, C.T., Moon, K.P. and Rao, R.P. (1994), "Managerial ownership, debt policy, and the impact of institutional holdings: an agency perspective", *Financial Management*, Vol. 23 No. 3, pp. 38-50.

Booth, P., Matysiak, G. and Ormerod, P. (2002), "Risk measurement and management for real estate portfolios, investment property forum (IPF)", London.

Bradley, M., Jarrel, G.A. and Han Kim, E. (1984), "On the existence of an optimal capital structure: theory and evidence", *Journal of Finance*, Vol. 39 No. 3, pp. 857-878.

Brailsforda, T.J., Oliver, B.R. and Puaa, S.L.H. (2002), "On the relation between ownership structure and capital structure", *Accounting and Finance*, Vol. 42 No. 1, pp. 1-26.

Bredin, D. and Stevenson, S. (2006), "The response of REITs to monetary policy transmission", paper presented at the American Real Estate Society Annual Meeting, Key West, FL.

Capozza, D.R. and Seguin, P.J. (2003), "Inside ownership, risk sharing and Tobin's q-ratios: evidence from REITs", *Real Estate Economics*, Vol. 31 No. 3, pp. 367-404.

Chikolwa, B. (2009), "Determinants of capital structure for A-REITs", *15th Annual Conference of Pacific Rim Real Estate Society*.

Deesomsak, R., Paudyal, K. and Pescetto, G. (2004), "The determinants of capital structure: evidence from the Asia Pacific region", *Journal of Multinational Financial Management*, Vol. 14 Nos 4/5, pp. 387-405.

Dimovski, B. and Zarebski, P. (2012), "Determinants of capital structure of a-REITS and the global financial crisis", *Pacific Rim Property Research Journal*, Vol. 18 No. 1, pp. 3-19.

Donaldson, G. (1961), *Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity*, Division of Research, Harvard School of Business Administration, Boston.

Driffield, N., Mahambare, V. and Pal, S. (2007), "How does ownership structure affect capital structure and firm value?", *Economics of Transition*, Vol. 15 No. 3, pp. 535-573.

Fama, E. and French, K. (2002), "Testing tradeoff and pecking order predictions about dividends and debt", *Review of Financial Studies*, Vol. 15 No. 1, pp. 1-37.

Feng, Z., Ghosh, C. and Sirmans, C.F. (2007), "CEO involvement in director selection: implications for REIT dividend policy", *The Journal of Real Estate Finance and Economics*, Vol. 35 No. 4, pp. 385-410.

Firth, M. (1995), "The impact of institutional stockholders and managerial interest on the capital structure of firms", *Managerial and Decision Economics*, Vol. 16 No. 2, pp. 167-175.

Giambona, E., Harding, J.P. and Sirmans, C.F. (2008), "Explaining the variation in REIT capital structure: the role of asset liquidation value", *Real Estate Economics*, Vol. 36 No. 1, pp. 111-137.

Green, C., Murinde, V. and Prasad, S. (2001), "Company financial structures in developing economies: evidence from a comparative analysis of Thai and Malay companies", Working Paper, University of Birmingham.

Harrison, D.M., Panasian, C.A. and Seiler, M.J. (2011), "Further evidence on the capital structure of REITS", *Real Estate Economics*, Vol. 39 No. 1, pp. 133-166.

Homaifar, G., Zietz, J. and Benkato, O. (1994), "An empirical model of capital structure: some new evidence", *Journal of Business Finance & Accounting*, Vol. 24 No. 1, pp. 1-15.

Hovakimian, A., Hovakimian, G. and Tehranian, H. (2004), "Determinants of target capital structure: the case of dual debt and equity issues", *Journal of Financial Economics*, Vol. 71 No. 3, pp. 517-540.

Isil, E. and Dogan, T. (2011), "Concentrated ownership, no dividend payout requirement and capital structure of REITs: evidence from Turkey", *Journal of Real Estate Finance and Economics*, Vol. 43 No. 1, pp. 174-204.

Kale, J.R., Noe, T.H. and Ramirez, G.G. (1991), "The effect of business risk on corporate capital structure: theory and evidence", *Journal of Finance*, Vol. 46 No. 5, pp. 1693-1715.

Kim, W.S. and Sorensen, E.H. (1986), "Evidence on the impact of agency costs of debt in corporate debt policy", *Journal of Financial and Quantitative Analysis*, Vol. 21 No. 2, pp. 131-144.

Kraus, A. and Litzenberger, R.H. (1973), "A state-preference model of optimal capital structure", *The Journal of Finance*, Vol. 28 No. 4, pp. 911-922.

Li, L., Ooi, J.T.L. and Ong, S.E. (2007a), "An analysis of the financing decisions of REITs: from a capital market perspective", *National University of Singapore*, Vol. 1 No. 1, pp. 1-36.

Li, Y., Ibrahim, M.F., Ong, S.E. and Ooi, J.T.L. (2007b), "Market timing and REIT capital structure changes", Working Paper Series, Institute of Real Estate Studies, Vol. 1 No. 1, pp. 1-33.

Long, M.S. and Malitz, E.B. (1985), "Investment patterns and financial leverage", in Press, I.O.C. (Ed.), *Corporate Capital Structures in the United States*, 1st ed., Chicago.

McCue, T.E. and Kling, J.L. (1994), "Real estate returns and the macroeconomy: some empirical evidence from real estate investment trust data, 1972-1991", *Journal of Real Estate Research*, Vol. 9 No. 3, p. 277.

MacKay, P. and Phillips, G.M. (2002), "Is there an optimal industry financial structure?", Working Paper AFA 2002 Atlanta, R.H. Smith School of Business, University of Maryland, College Park, MD.

Maris, B.A. and Elayan, F.A. (1990), "Capital structure and the cost of capital for untaxed firms: the case of REITs", *AREUEA Journal*, Vol. 18 No. 1, pp. 22-39.

Barclay, M. and Smith, C.W. (2006), "On the debt capacity of growth options", *Journal of Business*, Vol. 79 No. 1, pp. 37-59.

Modigliani, F. and Miller, M. (1958), "The cost of capital, corporation finance and the theory of investment", *American Economic Review*, Vol. 48 No. 3, pp. 261-297.

Morri, G. and Beretta, C. (2008), "The capital structure determinants of REITs: is it a peculiar industry?", *Journal of European Real Estate Research*, Vol. 1 No. 1, pp. 6-57.

Morri, G. and Cristanziani, F. (2009), "What determines the capital structure of real estate companies? An analysis of the EPRA/NAREIT Europe Index", *Journal of Property Investment & Finance*, Vol. 27 No. 4, pp. 318-272.

Myers, S.C. (1977), "Determinants of corporate borrowing", *Journal of Financial Economics*, Vol. 5 No. 2, pp. 147-175.

Newell, G. (2006), "The changing risk profile of listed property trusts", *Australian Property Journal*, Vol. 39 No. 3, pp. 172-180.

Omet, G.S. (2004), "Dividend policy behaviour in the Jordanian capital market", *International Journal of Business*, Vol. 9 No. 3.

Ooi, J.T.L. (1999), "The debt maturity structure of UK property companies", *Journal of Property Research*, Vol. 16 No. 4, pp. 293-307.

Ooi, J. (1999), "The determinants of capital structure Evidence on UK property companies", *Journal of Property Investment & Finance*, Vol. 17 No. 5, pp. 464-480.

Pandey, I. (2001), "Capital structure and the firm characteristics: evidence from an emerging market", *IIMA Working Paper*, Vol. 1 No. 1, pp. 1-19.

Rajan, R.G. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", *Journal of Finance*, Vol. 50 No. 5, pp. 1421-1460.

Short, H., Zhang, H. and Keasey, K. (2002), "The link between dividend policy and institutional ownership", *Journal of Corporate Finance*, Vol. 8, pp. 105-122.

Smith, C. and Watts, R. (1992), "The investment opportunity set and corporate financing, dividend, and compensation policies", *Journal of Financial Economics*, Vol. 32 No. 3, pp. 263-292.

Titman, S. and Wessels, R. (1988), "The determinants of capital structure choice", *The Journal of Finance*, Vol. 43 No. 1, pp. 1-19.

Wiwattanakantang, Y. (1999), "An empirical study on the determinants of the capital structure of Thai firms", *Pacific-Basin Finance Journal*, Vol. 7 Nos 3/4, pp. 371-403.

Further reading

Aivazian, V., Booth, L., Demirguc-Kunt, A. and Maksimovic, V. (2001), "Capital structure in developing countries", *Journal of Finance*, Vol. 56 No. 1, pp. 87-130.

Bontempi, M.E. (2002), "The dynamic specification of the modified pecking order theory: its relevance to Italy", *Empirical Economics*, Vol. 27 No. 1, pp. 1-22.

Cai, F. and Ghosh, A. (1999), "Capital structure: new evidence of optimality and pecking order theory", *American Business Review*, Vol. 17 No. 1, pp. 32-38.

Capozza, D.R. and Seguin, P.J. (2001), "Debt without taxes: capital structure in REITs", *Real Estate Finance*, Vol. 18 No. 1, pp. 38-46.

Cassar, G. and Holmes, S. (2003), "Capital structure and financing of SMEs: Australian evidence", *Accounting and Finance*, Vol. 43 No. 1, pp. 123-147.

Fischer, E.O., Heinkel, R. and Zechner, J. (1989), "Dynamic capital structure choice: theory and tests", *Journal of Finance*, Vol. 44 No. 1, pp. 19-40.

Frank, M.Z. and Goyal, V.K. (2003), "Testing the pecking order theory of capital", *Journal of Financial Economics*, Vol. 67, pp. 217-248.

Hammes, K. and Chen, Y. (2004), "Performance of the Swedish real estate sector 1998-2002", *Working Papers Series No*. 1, pp. 1-27.

Hovakimian, A. (2004), "The role of target leverage in security issues and repurchases", *Journal of Business*, Vol. 77 No. 4, pp. 1041-1072.

McMahon, R. and Zoppa, A. (2002), "Pecking order theory and the financial structure of manufacturing SME's from Australia's business longitudinal survey", Research Paper Series, The Flinders University of South Australia, School of Commerce, Vol. 2 No. 1, pp. 1-29.

Molina, C.A. (2005), "Are firms underleveraged? An examination of the effect of leverage on default probabilities", *Journal of Finance*, Vol. 60 No. 3, pp. 1427-1459.

Myers, S.C. (1983), "The capital structure puzzle", *The Journal of Finance*, Vol. 39 No. 3, pp. 575-592.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions", *Journal of Financial Economics*, Vol. 13 No. 1, pp. 187-221.

Myers, S.C. and Shyam-Sunder, L. (1999), "Testing static tradeo against pecking order models", *Journal of Financial Economics*, Vol. 51, pp. 219-244.

Westgaard, S., Eidet, A., Frydenberg, S. and Grosas, T.C. (2008), "Investing the capital structure of UK real estate companies", *Journal of Property Research*, Vol. 25 No. 1, pp. 61-87.

Appendix

Company name	Nationality	Market CAP M (€)
Ca Immobilien	Austria	147.878
Conwert Immobilien Invest	Austria	762
Immofinanz AG	Austria	2.588
Citycon	Finland	1.507
Sponda Oyj	Finland	1.022
Technopolis	Finland	397
Icade	France	4.703
Colonia Real Estate	Germany	183
Deutsche Wohnen AG	Germany	4.843
DIC Asset AG	Germany	434
Gagfah	Germany	3.138
Ivg Immobilien	Germany	N.A.
Patrizia Immobilien	Germany	739
Beni Stabili	Italy	66
Igd - Immobiliare Grande Distribuzione	Italy	444
Norwegian Property ASA	Norway	643
Globe Trade Centre	Poland	112
Castellum	Sweden	2.023
FABEGE	Sweden	19
Hufvudstaden A	Sweden	2.071
Klovern AB	Sweden	954
Kungsleden	Sweden	849
Wihlborgs Fastigheter	Sweden	1.030
Allreal Hld N	Switzerland	1.677
PSP Swiss Property	Switzerland	3.109
Swiss Prime Site	Switzerland	3.609
Daejan Hdg	UK	1.267
Development Securities	UK	382
F&C Commercial Property Trust	UK	1.602
Grainger	UK	1.232
Helical Bar	UK	625
Quintain Estates and Development	UK	682
St.Modwen Properties PLC	UK	1.247
Standard Life Inv Prop Inc Trust	UK	259
UK Commercial Property Trust	UK	1.684
Unite Group	UK	141.765

Table AI.
List of RECs by
country of origin

Company name	Nationality	Market CAP M(€)
Befimmo (Sicafi)	Belgium	1.308
Cofinimmo	Belgium	1.609
Intervest Offices & Warehouses	Belgium	315
Leasinvest-Sicafi	Belgium	416
Warehouses De Pauw	Belgium	927
Wereldhave Belgium	Belgium	611
Affine	France	128
Fonciere Des Regions	France	4.445
Gecina	France	6.526
Klepierre	France	6.534
Mercialys	France	1.545
Silic	France	N.A.
Societe de la Tour Eiffel	France	287
Unibail - Rodamco	France	19.053
Alstria Office	Germany	759
Eurobank Properties Real Estate Investment	Greece	4.265
Corio	Netherlands	4.265
EuroCommercial Ppty	Netherlands	1.495
Nieuwe Steen Inv	Netherlands	565
Vastned Retail	Netherlands	675
Wereldhave	Netherlands	1.369
Big Yellow Group	UK	751
British Land Co	UK	7.181
Derwent London	UK	2.876
Great Portland Estates	UK	2.196
Hammerson	UK	4.549
Land Securities Group	UK	8.443
Mucklow (A.& J.) Group	UK	275
Primary Health Prop.	UK	2.190
Segro	UK	2.653
Shaftesbury	UK	1.885
Workspace Group	UK	910

Table AII.
List of REITs by
country of origin

Corresponding author
Giacomo Morri can be contacted at: giacomo.morri@sdabocconi.it