Fee Structure, Financing, and Investment Decisions: The Case of REITs

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Abstract

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1. Introduction

This paper focuses on the relation between REIT fee structure and two key Management Company decisions, namely debt issuance and investment. REITs management company compensation takes typically the form of management fees and performance fees. Management fees are generally paid once a year (sometimes twice) as a fixed percentage of NAV (net asset value under management) or GAV (gross asset value under management or, equivalently, the property-level cash-flows of the asset). Performance fees are generally composed of periodic fees (usually paid once a year) and final fees (paid at the end of the fund life), and they are based on agreed measures of performance, generally expressed as a function of the fund internal rate of return or market value. In this paper, our aim is to establish whether debt issuance and investment depend on the relative importance of these two types of fees in the overall key Management Company compensation scheme and the

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1 To be more precise, REITs pay other types of expenses to maintain their operations (e.g., depositary fees, publication fees and legal fees). However, we do not consider these fees in our model.

2 REIT prospectuses often indicate an explicit target hurdle rate.
effect this has on shareholders’ value. It should be noticed that, in practice, in some cases performance fees are paid on NAV or GAV. In this circumstance, there is not a significant difference between management and performance fees. For this reason, in this paper we restrict the definition of performance fees only to fees paid on the fund market value.

REITs fund market value should be in line with their NAV (net asset value) as the latter represents the fundamental value of the fund. But it is well known that, empirically, this is often not the case in that REITs typically trade at a discount on their NAV. In the extant literature, REIT performance is explained by momentum, size, turnover and analyst coverage (Chui et al. 2003), diversification and liquidity effects (Capozza and Seguin 1999) and governance factors such as external advisory contracts (Capozza and Seguin 2000), insider ownership (Capozza and Seguin 2003; Han 2006), institutional ownership (Wang et al. 1995), and independent boards (Ghosh and Sirmans 2003; Feng et al. 2005). The closely related theme of REIT discount to NAV is often linked to size, leverage, concentration (both in terms of sector and location), overhead expenses (Capozza and Lee 1995), presence of outside directors (Friday and Sirmans 1998), ownership structure (Friday and Sirmans 1998; Capozza and Seguin 2003), entrepreneurial ability of the fund management (Adams and Venmore-Rowland 1990), and investor overreaction (Barkham and Ward 1999). Another line of attach in explaining REIT discount is to consider agency costs, which occur when managers have an incentive to pursue their own interests instead of shareholder interests (Berle and Means 1932; Jensen and Meckling 1976). The separation of ownership (REIT shareholders) and control (Management Company) leads to agency problems. Sagalyn (1996) argues that a misalignment of incentives exists for REITs and, in particular, for REITs that are managed externally (i.e., managed by advisors).
We can divide research on agency problems into two broad classes. On the one hand, there are studies that investigate the optimal compensation scheme (Cannon and Vogt 1995; Sun 2010). Solt and Miller (1985) show that fees and financial performance are positively related and therefore financial performance is at least partially endogenous with respect to managerial action, implying that the increasing fee structure the authors observe over time is consistent with the best interest of shareholders. A positive relationship between fees and performance is confirmed by Feng et al. (2007). On the other hand, a number of studies examine the effect of fee structure on the strategies implemented by the Management Company. Jenkins (1980) finds that more than one half of the REITs in their sample used some form of incentive compensation and incentive fees make leverage and risk-taking more advantageous to the managers and advisors than to shareholders. Finnerty and Park (1991) and Fletcher and Diskin (1994) also study the interrelations between fee structure and debt policy. These authors show that compensating Management Companies on total asset value is an incentive for them to expand the fund asset base through the use of leverage. In particular, Finnerty and Park (1991) show that REITs with this type of incentive fees are larger than other REITs, pay higher dividends, and have greater leverage, more liquidity, more convertible debt, higher asset growth rates, and larger betas. Capozza and Seguin (2000) underline that externally managed REITs dramatically underperform their internally managed competitors and underperformance derives primarily from their use (or abuse) of leverage and debt, in that the former issue debt with promised rates that exceed both the yield paid by the latter and the current yield on projects undertaken with the loaned funds. The authors argue that such suboptimal behavior by managers can be explained by examining the base of their compensation.
In this paper, we propose and test a model of REIT investment decisions that takes into account how the fee structure affects the Management Company incentives. This way, we contribute to the literature which examines the effect of REITs fee structure on the strategies implemented by Management Companies. The key intuition is that, in order to increase their compensation, Management Companies that receive management fees paid on GAV have an incentive to issue debt and to use the proceeds to purchase more real assets, as neither interest nor the impact of leverage on the investors’ cost of capital affect the base upon which their compensation is calculated. To test our model, we use data on the Italian REITs during the period between 2006 and 2009. Focusing on Italian funds provides us with an ideal setting for the analysis of the interrelation between REIT fee structure and management decisions. Italian families are characterized by a high propensity for real estate investments. According to a Bank of Italy survey (2009), 61% of an Italian family’s total assets are represented by real estate investments. In Italy, the ratio of real estate investments to disposable income is 4. In France and Germany this ratio is equal to 2.5 and 3.1 respectively. Despite the importance of the real estate sector in Italy, empirical research on REITs is still sparse (a few exceptions are Benedetto and Morri 2009; Biasin et al. 2010; Biasin and Quaranta 2010; Lee and Morri 2009). On the one hand, several studies denounce low protection and a high exposure to expropriation risk for Italian minority shareholders (La Porta et al. 1998; Melis 2000; Bigelli and Mengoli 2004), implying that REIT shareholder interests in Italy may not be effectively safeguarded. On the other hand, the regulatory framework in place for Italian REITs restricts the ways in which the discount may be generated through the channel of managerial opportunistic behavior. In fact, to maintain tax-exempt status, REITs must pay out 95 percent of net taxable earnings. This limits REIT manager’s access to free cash flow and reduces agency costs. Also, as it is often the case, REIT managers’ investment options are restricted,

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3 In 2008, the real estate division represented 19.5% of the Italian GDP.
primarily to real estate assets (Demsetz and Lehn 1985; Smith and Watts 1992). These two provisions severely limit REIT managers’ ability to increase firm size, thereby boosting compensation, by retaining earnings or through acquisitions. The only way to enlarge the compensation base is to borrow and expand the portfolio of properties under management. From an econometric point of view, this is advantageous as it identifies leveraging up and expanding the property investment portfolio as the only possible managerial response to incentives to increase firm size.

In our model, we demonstrate that only performance fees, i.e. fees paid on the fund market value, as opposed to management or performance fees paid on GAV or NAV, fully align the interest of the Management Company and shareholders. Unfortunately, we are unable to directly test this implication because, in our database of REITs, only in one case the Management Company is paid performance fees on the fund market value. This reflects the fact that, surprisingly, this form of remuneration of Management Companies is not widespread in the REIT sector. We are, however, able to test it indirectly by breaking up the differential effect on managerial incentives of performance fees and fees paid on GAV as the sum of, on the one hand, the differential effect of performance fees and management fees paid on NAV and, on the other hand, the differential effect of management fees paid on NAV and management fees paid on GAV. The first component is not observable since performance fees are rarely used, but its strength should be inversely proportional to the residual life of the fund and proportional to its age, since NAV will tend to come closer to the market value as the fund unwinding approaches and experts in charge of assessing NAV develop more familiarity with the fund investments. We exploit this fact to identify its impact on financing and investment decisions.
We find that (management) fees paid on GAV create an incentive for the Management Company to expand their asset base by taking on proportionally more debt than fees paid on NAV. This suggests that fees paid on GAV lead Management Companies to suboptimal (from a shareholder’s perspective) financing and investment decisions, bent on maximizing fees rather than on generating shareholders’ value. To the extent that NAV overestimates market value, which tends to happen especially when the fund redemption is far ahead in the future and the fund is relatively young, the effect of incentives created by fees paid on GAV is even more sub-optimal when compared to those generated by fees paid on market value. This is borne out in our data in that Management Companies in receipt of fees paid on GAV not only take on proportionally more debt than those compensated with fees paid on NAV but tend to do so to a greater extent when the fund redemption date is far ahead and the fund is younger. On balance, our results demonstrate that REITs fee structure influences Management Company financial decisions and trading policy.

The rest of this paper is organized as follows. Section 2 presents a theoretical model describing the impact of fee structure REIT managerial choices. Section 3 and 4 describe the dataset and empirical setup used to test the theoretical model. Section 5 states a set of testable hypotheses and presents the results of our empirical analysis. Section 6 draws the conclusions.
2. The model

We assume the REIT fund market value to be a function, \( v \), of Management Company investments, \( I \in R^+ \), and debt, \( D \in R^+ \), policies. Let \( v(I, D) \) be twice continuously differentiable strictly concave on the non-negative orthant with an interior maximum. For simplicity, we can specify \( v \) as an additively separable function,

\[
v(I, D) = v^1(I) + v^2(D).
\]

Since \( v \) is strictly concave, the first-order necessary and sufficient conditions (FOCs) for its maximization are,

\[
\begin{align*}
v_I &= \frac{\partial v^1(I^*)}{\partial I} = 0, \\
v_D &= \frac{\partial v^2(D^*)}{\partial D} = 0,
\end{align*}
\]

where \( v_I \) and \( v_D \) indicate partial derivatives evaluated at the point where \( v \) reaches its maximum value, \((I^*, D^*)\). The fund NAV is the net fair value of the fund determined periodically (usually every six months) by independent experts. It is reasonable to believe that independent experts evaluate the fund on the basis of the investments made by the Management Company. As long as the experts deem that the Management Company chooses investments which have an incremental rate of return above the capital market rate, their valuation of NAV increases, otherwise their valuation of NAV decreases\(^5\). Thus, we assume the NAV to be a concave function of \( I \), that \( n(I) \) with \( n(.) \) concave in its argument. Finally, GAV can be obtained as an accounting identity by summing NAV and debt, that is

\[
g(I, D) = n(I) + D.
\]

\(^4\) The model can also be expressed in terms of net investments. In that case, \( I \in R \).
\(^5\) Obviously, if we considered the time effect in a dynamic model, which we do not do, the valuation of NAV could change because of changing economic conditions.
The Management Company should, in principle, choose the level of $I$ and $D$ that maximizes shareholder wealth, i.e., $I^*$ and $D^*$. However, if the REIT fee structure does not align the Management Company and shareholder interests, the former may be tempted to choose $I$ and $D$ so that their own wealth is maximized, i.e., $I^M$ and $D^M$. Since the fee structure differs across funds, there are at least three possible cases to consider in defining the Management Company objective function. In the first case, the Management Company receives only a performance fee paid on the fund market value (case 1). In the second and third case, the Management Company receives both a performance fee and a management fee either on NAV (case 2) or GAV (case 3).

**Case 1 – The Management Company receives only a performance fee, $\pi \in (0,1)$**

The Management Company objective function is

$$m(I, D; \pi) = \pi \left[ v^1(I) + v^2(D) \right].$$  \[3\]

Since $m$ is strictly concave, the first-order conditions for its maximization are necessary and sufficient,

$$m_I = \pi \frac{\partial v^1(I^M)}{\partial I} = 0,$$

$$m_D = \pi \frac{\partial v^2(D^M)}{\partial D} = 0.$$  \[4\]

As both members of the previous two expressions can be divided by $\pi$ without affecting the results, the FOCs of this problem are identical to those in system [2] and the following observation is straightforward.

**Proposition 1 –** If the Management Company receives only a performance fee on the fund market value, the Management Company and shareholder interests are aligned, and the Management Company chooses the optimal level of investment and debt.

Thus, in case 1, $I^M = I^*$ and $D^M = D^*$.  


Case 2 – The Management Company receives a performance fee, \( \pi \in (0,1) \), and a management fee on NAV, \( \phi \in (0,1) \)

The Management Company objective function is

\[
m(I, D; \pi, \phi) = \pi \left[ v^1(I) + v^2(D) \right] + \phi n(I). \tag{5}\]

Since \( m \) is a sum of a strictly concave function and a concave function, it is strictly concave. Thus, the first-order conditions for its maximization are necessary and sufficient,

\[
m_I = \pi \frac{\partial v^1(I^M)}{\partial I} + \phi \frac{\partial n(I^M)}{\partial I} = 0, \\
m_D = \pi \frac{\partial v^2(D^M)}{\partial D} = 0. \tag{6}\]

The optimal choice of \( I^M \) and \( D^M \) depends on the value of the parameter \( \phi \). To determine how \( I^M \) and \( D^M \) respond to changes in \( \phi \), we differentiate the FOCs with respect to \( \phi \),

\[
m_{II} \frac{dI^M(\phi)}{d\phi} + m_{I\phi} = \left( \pi \frac{\partial^2 v^1(I^M)}{\partial I^2} + \phi \frac{\partial^2 n(I^M)}{\partial I^2} \right) \frac{dI^M(\phi)}{d\phi} + \frac{\partial n(I^M)}{\partial I} = 0, \\
m_{DD} \frac{dD^M(\phi)}{d\phi} + m_{D\phi} = \left( \pi \frac{\partial^2 v^2(D^M)}{\partial D^2} \right) \frac{dD^M(\phi)}{d\phi} = 0, \tag{7}\]

where all partial derivatives are evaluated at the point \((I^M, D^M)\). Solving the previous system for \( \frac{dI^M(\phi)}{d\phi} \) and \( \frac{dD^M(\phi)}{d\phi} \), we have

\[
\frac{dI^M(\phi)}{d\phi} = -\frac{m_{I\phi}}{m_{II}} = -\frac{\partial n(I^M)}{\partial I} \left( \pi \frac{\partial^2 v^1(I^M)}{\partial I^2} + \phi \frac{\partial^2 n(I^M)}{\partial I^2} \right), \tag{8}\]

\[
\frac{dD^M(\phi)}{d\phi} = 0.\]
Since \( m \) is strictly concave, \( m'' < 0 \). Thus, the sign of \( \frac{dI_M(\phi)}{d\phi} \) agrees with the sign of \( \frac{\partial n(I^M)}{\partial I} \). Furthermore, \( \frac{dD_M(\phi)}{d\phi} \) is always null since \( \nu^2 \) is strictly concave in \( D \) and therefore \( \frac{\partial^2 \nu^2(D^M)}{\partial D^2} > 0 \). The following observation is then straightforward.

**Proposition 2** – If the Management Company receives a both performance fee on the fund market value and a management fee on NAV, the Management Company and shareholder interests are, in general, not aligned. The Management Company chooses a suboptimal level of investment either too high – if \( \frac{\partial n(I^M)}{\partial I} > 0 \) – or too low – if \( \frac{\partial n(I^M)}{\partial I} < 0 \). The Management Company chooses the optimal level of investment only if \( \frac{\partial n(I^M)}{\partial I} = 0 \).

The condition \( \frac{\partial n(I^M)}{\partial I} = 0 \) means that, if the fund market value and NAV are maximized at the same point\(^6\), the management fee is irrelevant for the investment policy. Moreover, the second equation in [8] implies that the level of debt is at its optimal value. It is important to note that this conclusion hinges on the assumption that \( \nu(I,D) \) is separable and strictly concave in both its arguments, so that it can be strictly concave in \( D \). This requires that any over-investment can be financed using internally generated funds without hitting the budget constraint. While not fully realistic, this is an assumption we maintain as it considerably simplifies the analytical derivation of managerial response to the fee structure.

\(^6\) This is because the objective function is additive.
Case 3 – The Management Company receives a performance fee, $\pi \in (0,1)$, and a management fee on GAV, $\phi \in (0,1)$

The Management Company objective function is

$$m(I,D;\pi,\phi) = \pi\left[v^1(I) + v^2(D)\right] + \phi\left[n(I)+D\right].$$

Also in this case $m$ is strictly concave. Thus, the first-order necessary and sufficient conditions for maximizing $m$ are

$$m_I = \pi \frac{\partial v^1(I^M)}{\partial I} \, \phi \frac{\partial n(I^M)}{\partial I} = 0$$
$$m_D = \pi \frac{\partial v^2(D^M)}{\partial D} \, + \phi = 0.$$

The optimal choice of $I^M$ and $D^M$ depends on the value of the parameter $\phi$. To determine how $I^M$ and $D^M$ respond to changes in $\phi$, we differentiate the FOCs with respect to $\phi$,

$$m_I \frac{dI^M(\phi)}{d\phi} + m_{I\phi} = \frac{\partial^2 v^1(I^M)}{\partial I^2} \, + \phi \frac{\partial^2 n(I^M)}{\partial I^2} + \frac{\partial n(I^M)}{\partial I} = 0$$
$$m_D \frac{dD^M(\phi)}{d\phi} + m_{D\phi} = \frac{\partial^2 v^2(D^M)}{\partial D^2} \, + \frac{\partial D^M(\phi)}{d\phi} + 1 = 0.$$

Solving the previous system for $\frac{dI^M(\phi)}{d\phi}$ and $\frac{dD^M(\phi)}{d\phi}$, we have

$$\frac{dI^M(\phi)}{d\phi} = -\frac{m_{I\phi}}{m_I} = -\pi \frac{\partial^2 v^1(I^M)}{\partial I^2} \, + \phi \frac{\partial^2 n(I^M)}{\partial I^2} \right)$$
$$\frac{dD^M(\phi)}{d\phi} = -\frac{m_{D\phi}}{m_D} = -\frac{1}{\pi \frac{\partial^2 v^2(D^M)}{\partial D^2}}.$$

As in the previous case, the sign of $\frac{dI^M(\phi)}{d\phi}$ agrees with the sign of $\frac{\partial n(I^M)}{\partial I}$. Since $m$ is strictly concave, $m_{DD} < 0$. Thus, in this case the level of debt is suboptimal and always
increases in $\phi$. It is thus straightforward to summarize these observations in the following proposition.

**Proposition 3** – If the Management Company receives both a performance fee (on the fund market value) and a management fee on GAV, the Management Company and shareholder interests are not aligned. The Management Company chooses a suboptimal level of investment which is too high, since presumably $\frac{\partial n(t^u)}{\partial I} > 0$, and therefore the REIT debt that it chooses increases in the (percentage level of the) management fee.

However, it follows from the first equations in the systems described by [8] and [12] that the level of investment is not affected by the choice of the base for the management fee (GAV or NAV), as long as the performance fee (on the fund market value) is sufficiently large compared to the management fee.

To sum up, the previous analysis shows that only performance fees optimally reduce agency conflicts, by ensuring that maximizing shareholder wealth by means of optimal investment and financing decisions is the only way for the Management Company to maximize the fee amount it receives. In contrast, management fees may lead Management Companies to opportunistic behavior. The model suggests that the Management Company assumes more debts when management fees are paid on GAV (rather than NAV), and tends to choose the same suboptimal level of investment in case of a management fee paid either on GAV or NAV.

3. Empirical setup
To test our theoretical model empirically, we use a panel dataset of Italian REITs and a regression model of the following general form:

\[ y_{it} = \alpha + \mathbf{x}_{it}' \beta + u_{it}, \quad i = 1, \ldots, N; \quad t = 1, \ldots, T, \]

where \( y_{it} \) is the response variable for the unit \( i \) at time \( t \), \( \alpha \) is a scalar, \( \beta \) is a \( 1 \times k \) vector of partial effects, \( \mathbf{x}_{it} \) is a \( 1 \times k \) vector of covariates and \( u_{it} \) is given by the following one-way error component model for the disturbances:

\[ u_{it} = \mu_i + \nu_{it}, \]

where \( \mu_i \) denotes an unobservable time-constant unit effect and \( \nu_{it} \) indicates an idiosyncratic error term. The response variable is either the natural logarithm of the total debt of the fund \( i \) at time \( t \), the value of net investments (in millions) of the fund \( i \), defined as the difference between asset investments and disposals realized at time \( t \), or a measure of leverage, i.e. the ratio of total debt to GAV at time \( t \). We estimate [13] using several classes of panel models, including the Between Estimator (BE), the Fixed Effects (FE), the OLS and the Random Effects (RE) model. The BE estimator exploits the between dimension of the data (differences between individuals). The BE estimator is consistent if the covariates are strictly exogenous and uncorrelated with the unobservable time-constant unit effects. The FE estimator uses the within dimension of the data (differences within individuals). The FE estimator requires the covariates to be strictly exogenous, but does not impose any restriction on the correlation between explanatory variables and unobservable time-constant unit effects. The FE model has the attraction of needing weaker assumptions than those required by other estimators. The OLS estimator exploits both the within and the between dimensions of the data, but not efficiently. Consistency of this estimator requires the explanatory variables to be uncorrelated with the unobservable time-constant unit effects and the idiosyncratic error term. The RE estimator uses both the within and the between dimensions of the data efficiently.
Consistency requires all the covariates to be strictly exogenous and independent of the unobserved time-constant unit effects, a condition that rarely holds in economic applications.

4. Data and variables description

We base our empirical analysis on a sample composed of all the 22 Italian listed REITs. We collected all the data from the compulsory half-year reports that the funds published in the 4-year interval 2006-2009. Starting from the second half of 2006, the total number of observations is 154. In what follows, we propose a short description of the variables we use in the subsequent regression analysis.

\[ time_{it} \]

is time \( t \) in years.

\[ \ln(\text{debt}_{it}) \]

is the natural logarithm of the total debt of the fund \( i \) at time \( t \). The average value of the total debt (in levels) for all REITs is 128.59 million Euros; the standard deviation is 133.06 million Euros.

\[ \text{inv}_{it} \]

is the value of net investments (in millions) of the fund \( i \), defined as the difference between asset investments and disposals realized at time \( t \). The average value of net investments for all REITs is -7.96 million Euros; the standard deviation is 42.77 million Euros.

\[ \text{gavfees}_{i} \]

is a dummy variable equal to 1 if management fees are paid on GAV and 0 otherwise (i.e., paid on NAV). 45.45% of REITs have a management fee paid on GAV.

\[ \ln(\text{nav}_{it}) \]

is the natural logarithm of the NAV of the fund \( i \) at time \( t \). The

\[ ^7 \text{In the theoretical model, investments were supposed to take only non-negative values. Investments as defined here, however, can take both positive and negative values. This difference, however, is irrelevant, because the theoretical model can be easily generalized considering investments that can assume any real values, } I \in \mathbb{R}, \text{ leaving all the implications of the model unchanged.} \]
average value of the NAV (in levels) for all REITs is 270.87 million Euros; the standard deviation is 118.14 million Euros.

\( \text{leverage}_{it} \) is the leverage of the fund \( i \), defined as the ratio between the total debt of the fund and its GAV at time \( t \).

\( \text{residual lifetime}_{it} \) is the residual time to maturity expressed in years of the fund \( i \) at time \( t \). The average residual time to maturity in 2009 for all REITs is 11.05 years; the standard deviation is 3.33 years.

\( \text{duration}_{it} \) is the number of years that, at inception, the fund is set to last.

5. Empirical results

It is worth emphasizing that not all the Propositions presented in section 2 can be tested directly using our sample of REITs. Especially Proposition 1 and 2 cannot be directly tested because all the REITs in our sample exhibit a compensation structure largely based on management fees only. We can however indirectly identify the managerial incentive distortion brought about by the absence of performance fees set as a proportion of the fund market value by noting that the latter differs from NAV the most for young funds, in that the expert assessors of NAV have had less time to get to know the fund and its portfolio of properties, and for funds that have a long residual life, since at redemption market value and NAV must converge, and therefore NAV assessors will try harder to align their valuation to the market as the time to unwind the fund approaches. We thus consider the following regression model

\[
\text{leverage}_{it} = \beta_0 + \beta_1 \text{time}_i + \beta_2 \text{gav fees}_i + \beta_3 \text{residual lifetime}_i + \beta_4 \text{duration}_i + u_i. \quad [15]
\]
Here, all variables are denoted as explained in the previous Section. Table 1 shows the results applying four estimators: BE, FE, OLS, RE. The BE and the FE estimators are given in the first two columns of table. Since the FE estimator eliminates any time-invariant variables from the model, the effects of fees on GAV and of duration are removed. As expected, the FE estimator has the largest within R-squared, while the BE and the OLS estimators maximize the between and the overall R-squared respectively. Wald test statistics (not reported) are calculated for all models to test for the hypothesis that all coefficients in the model except the intercept are equal to zero. All tests lead to rejecting the hypothesis that the conditional mean of the response variable is constant and independent of covariates. The coefficients on $time_i$, $gavfees_i$, $residuallifetime_i$, and $duration_i$ are positive in all models. That is, apart from an upward determinist trend over time, Management Companies tend to increase their leverage when management fees are paid on GAV instead of NAV, when the redemption date of the fund is distant and when the duration of the fund, at its inception, is short. The positive effect of fees paid on GAV is coherent with Proposition 3. The positive influence of $residuallifetime_i$ and the negative effect of $duration_i$ are in accord with Propositions 1 and 2. If the intuition that discrepancies between NAV and market value are more pronounced when the redemption date of the fund is distant is correct, the positive coefficient of $residuallifetime_i$ is in agreement with the prediction that performance fees (paid on the market value rather than GAV or NAV) mitigate managerial incentives to undertake suboptimal investment policies, resulting in higher leverage. The fact that the coefficient of $duration_i$ takes a positive sign, while the coefficient of $residuallifetime_i$ takes a positive sign, implies a negative effect of the fund age, i.e. the difference $duration_i - residuallifetime_i$, on leverage. If the intuition that the discrepancy between NAV and market value is more pronounced when the age of the fund is low, this is consistent with
the view that performance fees mitigate managerial incentives to adopt sub-optimally high leverage. Reassuringly, the sign of the coefficient estimates are the same for all estimators, though their statistical significance varies considerably. If the individual effects are uncorrelated with the explanatory variables, all estimators are consistent and the RE estimator is the most efficient. If the individual effects are correlated with some covariates, the FE estimator is the only one that is consistent. Given the high explanatory power of the model estimated using RE, we believe that we can rule out that omitted variables exert a large influence. Therefore, while we cannot rule out correlation between individual effects and some of the covariates, it seems reasonable to deem such possible influences not strong enough to invalidate inferences based on the RE estimates. According to the latter, all effects are statistically very significant.

The third Proposition, taken in isolation, may be tested more easily. It implies two more specific hypotheses that can be directly tested. The first of such hypothesis is the following:

**Hypothesis 1 (H1) –** If management fees are paid on GAV rather than on NAV, the REIT is more indebted.

As a first naïve check of whether H1 holds, figure 1 plots the debt-to-GAV ratio (Peng 2008). The figure is divided in three panels. In the central panel, the time series observations of each REIT are discretized and assigned to distinct color categories: light colors indicate low values, dark colors indicate high values. The black horizontal line divides the funds in two groups: GAV-fee-based funds are on the top, NAV-fee-based funds are on the bottom. REITs on the top present a higher level of debt, i.e. a result in line with H1. The right hand side panel shows box-plots of the time series data of each fund. Again, GAV-fee-based funds exhibit a higher level of debt than NAV-fee-based funds. The bottom panel illustrates mean

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8 All our inference is based on robust standard errors and results are double-checked with both bootstrap and jackknife standard errors. For brevity, we omit these results.
values of debt-to-GAV ratio across all REITs for each time point and shows an upward trend in the level of debt. This upward trend can be explained in terms of asset disposals: as REITs approach their maturity, asset disposals increase, GAV reduces and the debt-to-GAV ratio increases. An alternative story is that since REITs are characterized by a high debt capacity, they benefited from the cut in interest rates as part of the expansive monetary policy pursued by the European Central Bank to counteract the financial crisis.

[Figure 1]

As a more formal test of H1, we propose a panel regression analysis on the model

$$\ln(\text{debt}_t) = \beta_0 + \beta_1 \text{gavfees}_t + \beta_2 \ln(\text{nav}_t) + \beta_3 \text{residualftime}_t + u_t.$$  \[16\]

In this model, $\text{gavfees}_t$ is the explanatory variable of interest, while $\ln(\text{nav}_t)$ and $\text{residualftime}_t$ are control variables. Table 2 shows the results. Since the FE estimator eliminates any time-invariant variables from the model, the effects of fees on GAV are removed. The OLS and the RE estimators are given in the last two columns of the table. If the individual effects are uncorrelated with the explanatory variables, all estimators are consistent and the RE estimator is the most efficient. If the individual effects are correlated with some covariates, the FE estimator is the only one that is consistent. To choose between the RE and FE estimator, we perform the Hausman test. Under the null hypothesis, the test statistic follows a Chi-squared distribution with 2 degrees of freedom. Considering the value of the test statistic (2.11, $p$-value = 0.35), we propend for the RE estimator which is consistent and efficient. Coherently with H1, the coefficient on $gavfees_t$ is positive in all models. That is, Management Companies tend to assume more debts when management fees are paid on GAV than they do when these fees are paid on NAV. This effect is very statistically significant$^9$. As expected, the FE estimator has the largest within R-squared, while the BE and the OLS

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$^9$ All our inference is based on robust standard errors and results are double-checked with both bootstrap and jackknife standard errors. For brevity, we omit these results.
estimators maximize the between and the overall R-squared respectively. Wald test statistics (not reported) are calculated for all models to test for the hypothesis that all coefficients in the model except the intercept are equal to zero. All tests lead to rejecting the hypothesis that the conditional mean of the response variable is constant and independent of covariates.

[Table 2]

The second hypothesis we wish to test posits that:

**Hypothesis 2 (H2)** – The level of investments is not related to the base on which the management fee is paid (GAV or NAV).

In this case, figure 2 plots the net investment-to-NAV ratio. As expected, the distinction between GAV-fee-based funds and NAV-fee-based funds seems to play no role for Management Company investment choices: in the central panel, REITs appear to be randomly distributed between the top and the bottom group. In the right hand side panel, the overall level of investments and the within-fund ranges of variation are similar across the 22 funds. The bottom panel shows the trend in the level of investments: investments decrease in the period 2007-2008. This downward trend can be explained in terms of asset disposals: as REITs approach their maturity, asset disposals increase and the investment-to-NAV ratio decreases. An alternative story is that investments decrease as a consequence of the financial crisis.

[Figure 2]

The regression model to test H2 is

$$inv_{it} = \beta_0 + \beta_1 gavfee_{it} + \beta_2 \ln(NAV_{it}) + \beta_3 residuallifetime_{it} + u_{it}.$$ \[17\]

Table 3 presents the results. According to the Hausman test (0.51, p-value 0.77), we favor the RE estimator. Coherently to H2, the coefficient on $gavfee_{it}$ is now not statistically different from zero (in all models). We conclude that the base of management fees is not related to investment decisions.


6. Conclusions

REITs represent one of the most important instruments to convoy investor savings toward the real estate industry for several reasons. While direct real estate investments require a high fixed amount of capital to be undertaken and are usually a prerogative of specialized investors, listed REITs allow properties to be parceled out and, hence, to loosen the bound faced by potential retail and small institutional investors. Furthermore, listed REITs allow investors to diversify their portfolio and to select a product which combines the typical features of a financial instrument with the characteristics of real estate investments (e.g., stable dividend yields and protection against inflation). REITs are managed by Management Companies. Management Companies should make financing and investment decisions to maximize shareholder wealth. However, if the fund fee structure does not align the Management Company and shareholder interests, the former may be tempted to make suboptimal choices to maximize their own wealth. This agency conflict is a cost for investors who could be enticed to move toward other financial instruments. Thus, in order to make these instruments even more attractive for investors, the fee structure should be designed to direct management effort toward shareholder value maximization and, therefore, to reduce agency costs. This paper has focused on this problem, developing a theoretical model and then testing it.

The main prediction of the theoretical model are that (a) performance fees on the fund market value align the Management Company and shareholder interests, (b) management fees on GAV lead Management Companies to assume too much debt and (c) management fees
(either on NAV or GAV) lead Management Companies to choose a suboptimal level of investment. We tested this model on the Italian REITs. Our findings show that the fund is more indebted when management fees are paid on GAV rather than on NAV, and that this effect is stronger when the fund is younger and time to redemption longer, i.e. when NAV is likely to diverge the most from market value, suggesting that performance fees paid on the latter would entail even less leverage. Furthermore, the level of investments does not seem to be related to the base (GAV or NAV) of management fees. With regards to these two aspects, the theoretical model is therefore supported by the data. Thus, expressing fees on market values (and not on NAV or GAV) appears to be a pursuable solution to align the Management Company and investor interests\(^{10}\). Further empirical studies are needed to test this model on other markets. In particular, while the Italian market for REITs can be considered an ideal setting for the empirical analysis of the interrelation between fund fee structure and management decisions, empirical analyses on other countries would make it possible, with richer datasets, to test implications of the model that are only weakly identified in our setting.

\(^{10}\) The misalignment of interests between Management Companies and investors is likely to be stronger during the fund life rather than at its listing or maturity date (when the difference between the fund MV and NAV is null by construction). Even if listed REITs should be more liquid than direct real estate investments, only shareholders who hold their quotes for the whole life of the fund do not suffer of agency costs. Hence, REIT greater liquidity is often more theoretical than real.
References


Table 1 – The table presents the results of the regression analysis. \( time_i \) is time \( t \) in years. \( leverage_i \) is the leverage of the fund \( i \), defined as the ratio between the total debt of the fund and its GAV at time \( t \). \( gavfees \) is a dummy variable equal to 1 if management fees are paid on GAV and 0 otherwise (i.e., paid on NAV). \( residual\text{if}etime_i \) is the residual time to maturity expressed in years of the fund \( i \) at time \( t \). \( duration_i \) is the number of years that, at inception, the fund is set to last. The total number of observations is 154. Robust standard errors (bootstrapped standard errors for the between estimator) are reported in parentheses. ***, **, * indicate statistical significance at the 1%, 5%, 10% level.

<table>
<thead>
<tr>
<th>Variables</th>
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Table 2 – The table presents the results of the regression analysis. \( \ln(d_{it}) \) is the natural logarithm of the total debt of the fund \( i \) at time \( t \). \( \text{gavfee}_i \) is a dummy variable equal to 1 if management fees are paid on GAV and 0 otherwise (i.e., paid on NAV). \( \ln(n_{it}) \) is the natural logarithm of the NAV of the fund \( i \) at time \( t \). \( \text{residualftime}_i \) is the residual time to maturity expressed in years of the fund \( i \) at time \( t \). The total number of observations is 154. Robust standard errors are reported in parentheses. ***, **, * indicate statistical significance at 1%, 5%, 10%.

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Table 3 – The table presents the results of the regression analysis. $inv_{it}$ is the value of net investments (in millions) of the fund $i$, defined as the difference between asset investments and disposals realized at time $t$. $gavfee_{it}$ is a dummy variable equal to 1 if management fees are paid on GAV and 0 otherwise (i.e., paid on NAV). $\ln(\text{nav}_{it})$ is the natural logarithm of the NAV of the fund $i$ at time $t$. $\text{residual lifetime}_{it}$ is the residual time to maturity expressed in years of the fund $i$ at time $t$. The total number of observations is 154. Robust standard errors are reported in parentheses. ***, **, * indicate statistical significance at 1%, 5%, 10%.

<table>
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**Figure 1** – This figure plots the debt-to-GAV ratio. The figure is divided in three panels. In the central panel, the time series observations of each fund are discretized and assigned to distinct color categories: light colors indicate low values, dark colors indicate high values. The black horizontal line divides funds in GAV-fee-based funds (on the top) and NAV-fee-based funds (on the bottom). On the right hand side panel are boxplots of the time series value of each REIT and on the bottom panel are mean values across all the time series for each time point.
Figure 2 – This figure plots the net investment-to-NAV ratio. The figure is divided in three panels. In the central panel, the time series observations of each fund are discretized and assigned to distinct color categories: light colors indicate low values, dark colors indicate high values. The black horizontal line divides funds in GAV-fee-based funds (on the top) and NAV-fee-based funds (on the bottom). On the right hand side panel are boxplots of the time series value of each REIT and on the bottom panel are mean values across all the time series for each time point.