How to evaluate risk for Italian real estate funds

Claudio Giannotti
University of Lum Casamassima, Bari, Italy, and

Gianluca Mattarocci
Faculty of Economics, University of Rome "Tor Vergata", Rome, Italy

Abstract

Purpose – The purpose of this paper is to define an approach useful to evaluate real estate funds on the specific characteristics of the Italian market and on the basis of international best practices.

Design/methodology/approach – The first step is to identify specific factors and portfolio construction choices that could impact directly on the variability of inflows and outflows related to real estate fund. The analysis is realised constructing standard measures of financial and downside risk and identifying a panel model that allows to explain risk measure dynamics on the basis of some investments and portfolio characteristics. Results obtained are tested with an out of sample procedure in order to evaluate the type of misclassification risk related to each model. The second step is to evaluate the impact of debt policy on the risk assumed by a real estate funds. After an analysis of debt sustainability for each real estate unit on the basis of deadlines and amount of flows related to each investment, the study proposed looks directly at the debt policy of listed real estate funds: the analysis is aimed to evaluate the relationship between leverage choice and inflows/outflows variability and the coherence between declared results and expected results for high-leveraged funds respect to the others.

Findings – The results stemming from the use of a real estate database supplied by Beni Stabili Gestioni Società di Gestione del Risparmio showed that the portfolio's construction choice impacts strongly on the variability of results of a real estate fund. The strict linkage between characteristics of debt and type of property makes difficult to evaluate the additional risk related to debt choice but on the basis of Italian market data are possible to point out the higher difficulties for high-leveraged funds to achieve the result communicated to the market (the so-called target IRR).

Originality/value – The value added of the paper is to study the relevance of specific risk factors respect to portfolio's ones in the evaluation of risk exposure for a real estate portfolio and the impact of the leverage choices on the variability of inflows and outflows related to the real estate investments.

Keywords Real estate, Investment funds, Financial risk, Risk assessment, Debts, Italy

Paper type Research paper

1. Introduction
Mutual funds' investors generally delegate investment decisions and strategies to the investment management company which generally have full decision-making autonomy (Grinblatt and Titman, 1989). The fund managers' performance is monitored on the basis of the public documents issued by the operator (Ge and Zheng, 2006), as well as by comparing the achievements of the competitors (Davis, 2001). In real estate sector, estimates of the fair value of the asset are very complex (Pellat, 1972), as well as assessments of the real estate management and administration processes (Gualtieri, 2003), as a result of which investors generally have problems in evaluating the quality of a property fund.

As regards the governance of real estate funds, in order to safeguard the interests of quotaholders and the transparency of transactions, the Italian law lays down specific rules limiting the actions of the investment fund managers (Giannotti and Mattarocci, 2008a).

The risk assessment of property portfolios must:

- take into account the actual cash flows of the single investments, as opposed to the expected cash flows (Geltner, 1990); and

- assess the significance of the expected and unexpected risks to which potential investors are exposed (Liu and Mei, 1994).

The surveys conducted to date show an interest by investors in summary measurements (ratings or scorings), which allow a quality assessment of the direct and indirect real estate investments (Hutchison *et al.*, 2005), and several rating agencies have proposed models for assessing the exposure to risk of property vehicles (Standard and Poor's, 2004; Fitch, 2007; Moody's, 2006).

This paper provides an overview of the Italian real estate market, which features investment vehicles (property funds) different from those available in the other international markets assessed by the rating agencies. Using the data supplied by Beni Stabili Gestioni Società di Gestione del Risparmio (SGR), the paper defines a risk estimation model for property portfolios based on an assessment of the weight of the single risk drivers, considering the data relating to 2006, and analyses the model's forecasting capacity with an estimate of the 2007 data. The results highlight several peculiarities of real estate investments in Italy, in recent years, which justify the greater focus that needs to be placed on portfolio composition decisions, compared to the models for selecting the best investment opportunities.

The following paragraphs review the relevant literature about the risk profiles related to the single property and to the portfolio's composition (Section 2) and provide an empirical analysis of a sample of Italian properties to assess the weight these factors may have on the Italian market (Section 3). The last section features several short conclusions.

2. Literature review
Italian real estate funds are closed-end investment funds that collect assets from the generic quotaholders (retail funds) or from a select group of investors (reserved funds), for the main purpose of financing investments in property, property related interests or property companies (Giannotti, 2005)[1]. The assets collected by the funds are managed by an investment management company (in Italy, the so-called, SGR, in accordance

with the fund's statement (Biasin, 2005) and single investors are unable to interfere on the fund manager's structure or organization, except by replacing the current manager with another market operator during the quotaholders' meeting (Cammarano, 2007).

The instruments placed on the Italian market differ from the products placed on foreign markets (such as real-estate investment trust and real estate operating company), not just with respect to fiscal or regulatory matters, but also with regard to the overall organization (Biasin, 2003).

Such differences determine the need to consider differently and/or to exclude altogether certain profiles examined in the relevant international literature, with respect to the risk assessment of Italian property funds, in accordance with their specific characteristics.

2.1 Single investment perspective

The evaluation of a single property investment is based on the cash flows scheduled, with a view to determine the economic and financial convenience of the investment and, above all, to assess the variability of the single investment flows (Riggs *et al.*, 2000).

The risk exposure of the single real estate investments is generally assessed by distinguishing between investments in trading properties held for sale and properties for income-producing purposes.

The objective of trading properties is to invest in real estate with a view to increasing its value and then ultimately selling it off at a profit (Hettenhouse and Dee, 1976). The risk in this case is related to the size of the outgoing flows generated by the investment, the time needed for the incoming flows to materialize and any external factors that can determine unexpected costs and/or delays, or unexpected variations to the sales price (Flanagan and Norman, 2003). Based on the characteristics of the assessed properties and of their life-cycle phase, it is possible to forecast different cost levels incurred by the buyer either to develop the property for sale or to keep the sales value of the property unaltered over the years (Porzio and Sampagnaro, 2007).

In the case of income-producing properties, the variables that need to be taken into account when assessing the related risks are numerous and heterogeneous. In the relevant literature, the risks related to this type of properties generally comprise the following:

- vacancy risks;
- tenants' default; and
- after the contract expiration, the different risks related to either renting the property out once again or selling it.

The vacancy rate depends on the rent asked by the lessor and the willingness to pay by the potential tenants (Gabriel and Nothaft, 1988). The vacancy rate balance in the medium-to-long-term primarily depends on the number of available properties on the market with similar characteristics, on the benefits for the single tenant from the availability of the property and on the cost incurred by the tenant to put together the required capital (McDonald, 2000). The significance of this risk and the likely duration of the vacancy depend on the type of property (Wincott, 1997) on the specific characteristics of the location (Gabriel and Nothaft, 2001) and on the characteristics of the process for searching the counterparty (Crockett, 1982).

The lessor allows the tenant to use a property in exchange for the promise of future cash flows, and the actual occurrence of the expected incoming flows depends on the tenant's future ability to comply with his obligations in accordance with the terms and conditions of the lease (Short *et al.*, 2003). In the case of households, the probability of default by a tenant generally takes into account the household's available income as the key variable (Sullivan and Fisher, 1988) and by assuming that the outlays for the house are a priority requirement compared to other planned outlays (Ling and Naranjo, 1997). In the case of firms the estimate is generally made using more complex models for assessing the firm's current and future creditworthiness (Caselli and Gatti, 1999).

The risks related to either renting out a property once again or selling it, as a result of a tenant default or contract expiration, depend on the time needed to vacate the premises and on the results that can be achieved as a function of the new market conditions. The analysis of the time to vacate the premises requires a survey of the legal process required in connection with the notice to quit and the actual eviction, in order to quantify the significance of the phenomenon in respect of the assessment of the single investment[2]. The result that can be achieved once the owner has got the property back depends – in the case of a new lease – on the characteristics of the property and its location (Ministero delle Infrastrutture and Nomisma, 2007), while in the case of a property sale, the result is affected by the costs and the time related to the sale process and to the market price trends (Capozza *et al.*, 2005), minus any property sales costs (Camagni and Martellato, 2007).

Especially, in the case of long-term investments, the investment risk assessment should also take account of the sustainability of:

- the maintenance costs, with respect to the relevant property investment (Standard and Poor's, 1995); and
- if they are provided for, the risk related to the failed inclusion of the costs incurred for the refurbishment/extraordinary redevelopment in the sales price of the property and/or the future rent (Moody's, 2004).

2.2 Portfolio perspective

The decision to diversify investments by acquiring a large number of properties results in the need to identify criteria allowing the evaluation of the decisions relating to the portfolio construction. The profiles identified in the relevant literature to consider the decisions made in terms of the portfolio composition are:

- portfolio concentration;
- portfolio allocation;
- active management; and
- borrowing policy.

Portfolio concentration can be viewed as a concentration of single tenants measured as ratio of the value of each exposure respect to overall portfolio (single name concentration) or as the ratio of the flows related to the single the ratio of rents related to total flows generated in the period (economic concentration) (Standard and Poor's, 2004).

The portfolio allocation considers the exposure to uniform categories of tenants in order to evaluate if dynamics of a particular sector or geographical area could impact significantly on the performance of the fund. This analysis presupposes the definition of criteria for distinguishing the properties based on the endogenous, exogenous and

tenant risks (Cacciamani, 2003; Giannotti and Mattarocci, 2008b): proxies selected are affected by the heterogeneity of the portfolio examined and by the level of detail of the available data.

Active management represents the set of portfolio rebalancing actions aimed to maximize the profits during the observed time period (Fitch, 2007). The study of the role of active management in respect of the portfolio, therefore, makes it possible to assess how the manager's decisions can affect the risk exposure of the property portfolio and to appreciate the manager's capacity to adjust the initial investment strategy to exploit the developments in the property market (Jacobs, 2005). Risk assessment related to these investment portfolio movement strategies should take into account the impact of these changes on performance (Lin and Young, 2004), by means of performance attribution techniques aimed to take the profits of the year apart to highlight the components associated solely with this activity (Gallo *et al.*, 2000) or, in the case of markets for which no reliable benchmarks are available, by comparing the *ex post* results with the estimated results of a buy-and-hold strategy (Rodriguez, 2007).

The choice to collect money through the credit market channel represent an opportunity in order to increase the number and the value of investment released that reduce the flexibility of the fund's financial structure. The borrowing decisions by the investment management company depends on the trade-off between the advantages and the disadvantages associated with the borrowing (Feng *et al.*, 2007) and based on the nature of the investor, the characteristics of the investment and the interest rate applied by the lender, it is possible to define the grounds for determining the greater or lesser convenience of the financial leverage (Giannotti and Mattarocci, 2008a). Alongside these factors, the determination of the financial risk exposure related to investment decisions should also take into account the relation between the expected duration of the investment and the time horizon of the loan (Highfield and Roskelley, 2007), and the relationship between variability and the amount of flows related to the borrowing and the characteristics of the expected incoming flows (Brown and Riddiough, 2003).
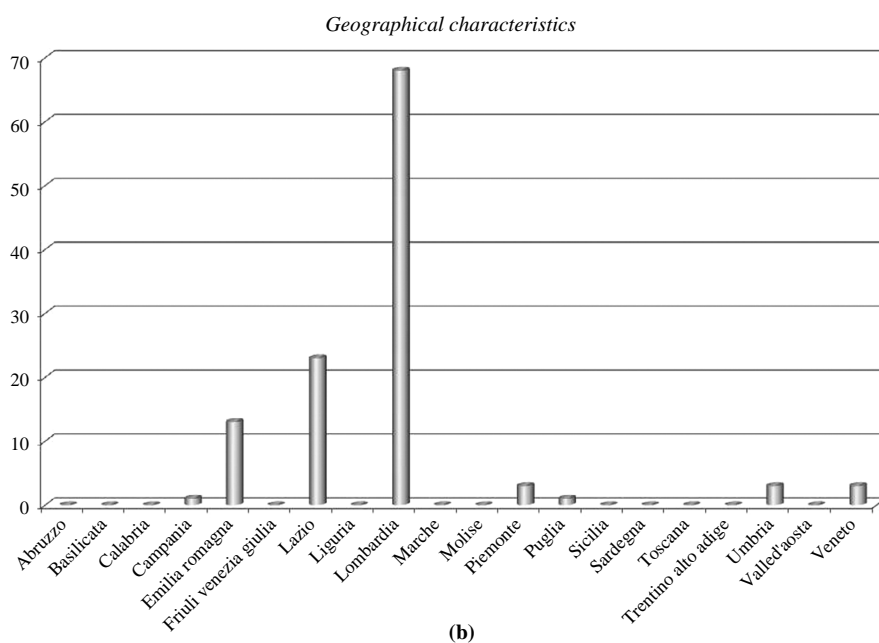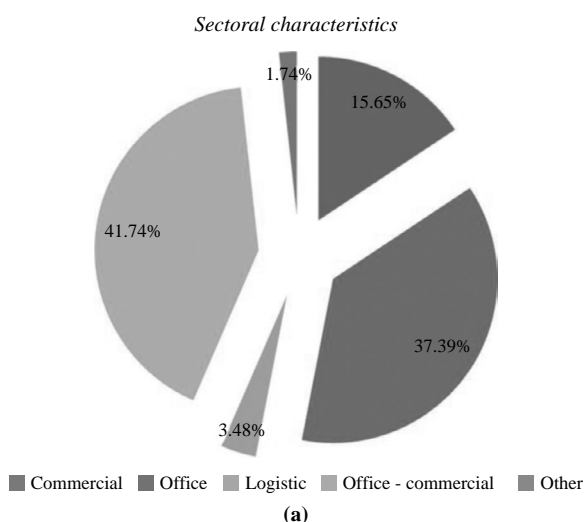
3. Empirical analysis
3.1 Sample
The study of the significance of the characteristics of the single leases and the portfolio composition decisions based on the investment risk requires a detailed survey of the flows generated by each single properties in which the investment management company could invest money.

For this purpose, we have considered the properties included in four real estate funds managed by Beni Stabili Gestioni SGR in the period between 2006 and 2007, building a sample of 199 real estate units with different locations and destinations (Figure 1).

Data collected for each real estate unit allow to construct the *ex ante* and *ex post* inflows and outflows with a daily frequency for the established time horizons and to evaluate the characteristics of the each tenant and of each property. To build useful portfolios for investigating the property portfolio construction criteria, we calculated portfolios with differing dimensions, comprising between a minimum of 3 and a maximum of 60 properties, by randomly extracting the properties from the available sample[3]. A total of 1,000 portfolios for each assumed dimension were built for an overall sample of 58,000 investment portfolios.

Sectoral characteristics

■ Commercial ■ Office ■ Logistic ■ Office - commercial ■ Other

(a)

Geographical characteristics

(b)

Source: Beni Stabili Gestioni SGR data processed by the authors

3.2 Methodology

To evaluate the risk associated with the single properties, monthly schedules of the expected and actual flows were built. On the cash flows constructed for each investment unit are estimated measures of risk of biased estimates respect to real

occurrences and the analysis is made separately for 2006 and 2007. Based on the indications provided by the industry operators (IPD, 2000), the decision was taken to quantify the investment risk in terms of standard deviation and downside risk, based on the formulas as follows:

$$\sigma_j = \sqrt{\sum_{t=1}^{n} \left(\frac{1}{n}\right)^2 (F_t - E(F_r))^2} \tag{1}$$

$$\mathrm{DSR}_j = \sqrt{\sum_{t=1}^{n} \left(\frac{1}{n}\right)^2 (F_t - E(F_r))^2} \quad \forall \ (F_t - E(F_t)) \leq 0 \tag{2}$$

where: F, net flows generated by the property investment j at the time t; $E(F_t)$, net flows forecasted for the investment j at time t; n, number of flows generated in the year.

Regarding the investment flows, the survey took into account both the periodical income flows generated by the single investments (rents minus any costs for routine or special maintenance works) and the price of purchase and sale of the property, assuming the expected price of sale at the expiry of the investment to be at least equal to the price initially paid for the property, plus any extra amount as a result of inflation (hypothesis of non-negative actual capital gain of the investment).

Formula (1) above is an estimate of the variability of the flows generated by the investment compared to the expected estimated values, based on the leases entered into and expected minimum selling price and measures the financial risk of the investment calculated at the annual time horizon.

Formula (2) represents the estimate of the risk of losses related to the investment, based on the probability and size of the flows generated at the various timelines and lower than the amounts planned, based on the actual leases entered into and expected minimum selling price.

The data thus collected for 2006 was used to simulate the construction of 58,000 real estate investment portfolios and to calculate the characteristics of the portfolio incoming and outgoing flows generated by the overall investments made. Once the risk and loss levels of the single portfolios was defined, a cluster analysis was carried out to group the single portfolios into uniform risk categories, building assessment models including a number of classes variable from four to ten. Subsequently, the weight to be assigned to the single investments' characteristics and to portfolio composition choices were calculated for the 58,000 portfolios, to obtain a risk measurement estimate consistent with the previously calculated rankings. In the light of the review of the literature and of the characteristics of the portfolios available[4], relationships studied are:

$$\sigma_i = \alpha_0 + \alpha_1 \mathrm{VR}_i + \alpha_2 \mathrm{DR}_i + \alpha_3 \mathrm{CONCECO}_i + \alpha_3 \mathrm{CONCSN}_i + \sum_{j=1}^{n} \alpha_j \mathrm{SETT}_{ii}$$
$$+ \sum_{k=1}^{m} \alpha_k \mathrm{AREAGEO}_{ik} + \sum_{p=1}^{O} \alpha_p \mathrm{CITYDIM}_{ip} + \varepsilon_i \tag{3}$$

$$DSR_i = \alpha_0 + \alpha_1 VR_i + \alpha_2 DR_i + \alpha_3 CONCECO_i + \alpha_3 CONCSN_i + \sum_{j=1}^{n} \alpha_j SETT_{ii}$$

$$+ \sum_{k=1}^{m} \alpha_k AREAGEO_{ik} + \sum_{p=1}^{O} \alpha_p CITYDIM_{ip} + \varepsilon_i$$

(4)

where: VR_i, the vacancy rate of portfolio i; DR_i, the default risk of portfolio i, calculated as the mean rating assigned by Lince[5] to the tenants of the single properties; $CONCSN_i$, the concentration of the portfolio, measured as the relation between the maximum value of the single property unit and the value of the portfolio (single-name concentration); $CONCECO_i$, the ratio of the maximum rent paid by the single tenant to the total rents paid by the tenants of the properties included in portfolio i (economic concentration); $SETT_{ij}$, the significance of the single sector j and is measured as the ratio of the value of investments with these characteristics respect to the value of the overall portfolio; AREA GEO_{ij}, the significance of the single geographical area i and is measured as the ratio of the value of investments with these characteristics respect to the value of the overall portfolio; $CITYDIM_{ip}$, the dimensions of the city, distinguishing between cities, district and towns and is constructed as a set of three variables that compute the number of real estate units that attains to each city dimension.

Once the coefficients relating to the single risk factors of the selected properties and the weight to be assigned to the portfolio composition decisions were defined, the next step was to verify the validity of the proposed analysis model, taking into account the risk measurements built on the same portfolios for 2007 and assessing the probability of achieving a ranking consistent with *ex post* risk manifestation. The study of the model's reliability was carried out by distinguishing the errors generated by the model – according to the economic consequences of the errors (excessive risk exposure or opportunity cost) into errors of the first and second type (under- and overestimation of the investment risk, respectively).

The analysis of the role of borrowing was made separately, as it was not possible to reconstruct the fair cost asked by a bank for a mortgage for each simulated portfolio. The survey of the role of the financial level was, therefore, conducted based on the various mortgage repayment schemes, and assessing how the different decisions relating to the type and amount of borrowing can affect the variability of the flows and, consequently, the ranking of the property portfolios taken into account.

3.3 Results
3.3.1 The model for portfolios without leverage. The portfolio risk analysis presupposes the identification of the number of classes allowing the aggregation of the portfolios into sufficiently uniform groups, with respect to the level of exposure to risk. In order to build an assessment model independent of arbitrary choices, in terms of the number of risk classes, various possible specifications have been taken into account, based on a number of classes that varies from 4 to 10 classes. The results obtained from the model applied *ex post* to the 2006 data show a significant difference in the single risk factors, in respect of the determination of the variability of the flows generated by the portfolio (Table I).

Risk measure	Financial risk – σ				Risk of losses – DSR			
No. of classes	4	6	8	10	4	6	8	10
Vacancy rate	−0.24	0.31	1.18**	0.55	0.09	0.86*	−0.89*	−0.07
Default risk	0.01	0.01	−0.05	0.00	−0.01	0.06*	−0.06*	0.00
Portfolio allocation								
Commercial	4.84**	−6.35**	0.58	19.29**	11.30**	−3.00**	−5.26**	−3.12
Logistic	3.84***	−7.08***	−0.16	20.54***	11.54***	−4.32***	−4.52*	−3.29
Office	4.69***	−6.36***	0.60	19.51***	11.34***	−3.37***	−4.99***	−3.29
Miscellanous	4.85***	−6.22***	0.70	19.20***	11.38***	−3.19***	−5.06***	−3.34
North-East	−18.66***	16.18***	9.69	−24.74***	−7.07***	−12.84***	−12.82***	6.29*
North-West	−18.77***	16.12***	9.66	−24.71***	−7.06***	−12.98***	−12.79***	6.27*
Center-South	−18.47***	16.42***	9.91	−24.97***	−7.12***	12.89***	−13.04***	5.98*
Cities	3.69***	3.36***	4.68***	8.91***	9.49***	1.51	19.95***	11.81***
Districts	4.22***	3.81***	4.98*	8.78***	9.61***	1.40	20.21***	11.71***
Towns	3.74***	3.42***	4.62	8.74***	9.49***	1.46	20.06***	11.69***
Concentration								
Single name	−4.50**	−11.55***	−11.66**	−2.53***	3.76***	−11.58***	7.64***	−1.24**
Economic	−2.97***	−1.98***	−1.22**	1.37	−0.18***	−1.08***	0.09***	0.34***
Constant	13.30**	−8.84***	−9.64**	1.55	−11.48***	18.78***	2.16	−9.58*
Statistics								
No. of observations	57,963	57,963	57,963	57,963	57,963	57,963	57,963	57,963
R^2	0.3608	0.2985	0.1386	0.0072	0.2412	0.1751	0.0426	0.0014

Note: Coefficient significant at: *95 and **99 per cent levels, respectively
Source: Beni Stabili Gestioni SGR data processed by the authors

Table I.
The determinants of the risk level of the properties included in the portfolio

The analysis of the different proposed models highlights a reduction of the predictive capability of the model, the higher the number of risk classes considered, independently of the risk measurement taken into account. The analysis of the results of the model, therefore, will be limited to the specification that provides for only four risk classes, since the other models are characterized by lower statistical reliability.

As regards the single variables in the estimate, it can be highlighted how the role of the portfolio vacancy and of the average probability of default by the tenants is not statistically relevant for determining the overall risk of the portfolio.

Concentration in a particular sector positively affects the risk undertaken, while in the case of geographical concentration the result is the opposite. This result supports the assumption that a investment management company – with respect to the notification of payment requests, in the case of delays – has significant advantages if the tenants are all concentrated in the same geographical area because costs and time necessary to collect money from tenants are lower and, normally, for geographically concentrated portfolio the manager is more skilled on specific market dynamics.

Based on the analysis, the relationship between the size of the town in which the property is located and the investment risk appears to be positive. Portfolio diversification in towns and cities of different sizes seems, therefore, to reduce the overall risk of the investment.

The study of the profiles related to the concentration highlights a negative relationship between economic concentration and risk, regardless of the selected risk measurement model. It could be explained looking at the characteristics of more higher renting units in the portfolio that, normally, are those where the tenant is a public company or a big firm with a low-risk profile. Looking at single name concentration, results highlight a positive relationship between the relevance of exposure respect to each tenant and risk of losses, but a negative one between this concentration measure and the financial risk. The higher single name concentration allow to stabilize results during the time horizon of the investment but an excessive concentration determines an higher probability that, if this tenant is unable to respect contract obligation assumed, the overall result of the portfolio will be negative.

The analysis of the validity of the risk assessment models presented above has been conducted considering 58,000 portfolios simulated for 2007, constructed according to the same criteria used for the previous estimate, and verifying the capacity of the model to correctly forecast the level of risk of these portfolios (Table II).

As expected, the proposed models feature a limited capacity for properly classifying the property risk, due to the impossibility of identifying all the factors that might affect the risk of a property investment portfolio. The comparative analysis of the models based on risk of losses and on financial risk highlights a higher predictive capacity than the model based on the estimate of the loss component alone, as the probability of correct classification of the risk equal to about 29 per cent (compared to only 11.19 per cent surveyed for the other model). The model based on risk of losses fits better than the model based on the financial risk, in terms of predictive capacity, because deviations in excess of one class, between the estimated and actual value, are less frequent and, moreover, the probability of underestimating the investment risk (type 1 error) is significantly lower respect to the one estimated using standard deviation model (more than 16 per cent) and so the increase of accuracy attains prevalently the

	Class A (%)	Class B (%)	Class C (%)	Class D (%)
		Ex post value		
Financial risk model – σ				
Forecasted value				
Class A	1.16[a]	0.00[b]	25.15[b]	0.08[b]
Class B	21.78[c]	10.02[a]	15.73[b]	15.81[b]
Class C	0.78[c]	6.24[c]	0.01[a]	3.25[b]
Class D	0.00[c]	0.00[c]	0.00[c]	0.00[a]
Risk of losses model – DSR				
Forecasted value				
Class A	0.00[a]	0.00[b]	0.00[b]	0.00[b]
Class B	23.71[c]	14.62[a]	24.66[b]	19.14[b]
Class C	0.00[c]	0.00[c]	14.51[a]	0.00[b]
Class D	0.00[c]	0.00[c]	1.69[c]	0.00[a]

Table II.
The forecast capability
of the model

Notes: [a]Correct classification; [b]incorrect classification – type I error; [c]incorrect classification – type II error
Source: Beni Stabili Gestioni SGR data processed by the authors

reduction of the more relevant risk for the investor. The results obtained, therefore, support the assumption that – when assessing property investments – it is easier to carry out risk measurements taking into account only the part of distribution of financial flows generating negative results, compared to the alternative solution of taking into account the entire variability that can be recorded in connection with the investment flows. This conclusion is shared in the literature that shows how the distribution of the yields of direct property investments does not follow a normal trend but features a certain degree of asymmetry (Cheng, 2005; Young *et al.*, 2006; Lizieri and Ward, 2000).

3.3.2 The relevance of the leverage policy on portfolio risk. Potential investors in a property investment vehicle consider not only the quality of the investment but also the borrowing characteristics and the conditions applied by the lenders (Casey *et al.*, 2006). These conditions depend on the characteristics of the properties included in the assessment (Giannotti and Mattarocci, 2006), the degree of leverage (Giannotti and Mattarocci, 2008a, b) and the characteristics of the borrower (Jaffe and Sirmans, 1984).

In the case of Italian property funds, it is generally possible to link the single investment to the pertinent financing on the basis of the fund manager's cash flow statement and, as a rule, the loan repayment schemes are also linked to the sale of the single assets (Giannotti, 2006). The notification of the property portfolio risk, therefore, may be effectively supplemented by information relating to the risk of the loans taken out, related to the technical structure of the borrowing, to the sustainability of the periodical loan charges and to the expected variability of the flows in the case of variable-rate loans.

As regards the technical structure of the loans, property funds generally make use of fixed or mainly variable-rate loans (in the latter case by hedging the interest rate risk by concluding derivative contracts), defining periodical principal repayments (admortizing) or, mainly, by paying back the principal at the sale of the asset and paying the interest during the term of the contract (bullet) (Giannotti, 2005, 2006). The different technical structure directly impacts the financial cost of

the borrowing resulting in the differing importance of the outgoing flows in connection with the payment of the financial charges and, other conditions being equal, the risk and the spread is higher for loans with higher duration and/or loan to value.

The assessment of the sustainability of the loan-related charges must take account not only of the relationship between the amount of the loan and the value of the property, which is usually always guaranteed by the value of the property, the average loan to value being equal to 60 per cent, but also of the relationship between the periodical flows generated by the property and the periodical charges related to the loan (Gau and Wang, 1990). In defining the repayment scheme the lender should preventively make sure that the expected flows generated by the project are at least equal to the charges established contractually in respect of the loan, as well as assess the degree of uncertainty of the forecast (Moody's, 2006). By adapting techniques proposed in the relevant literature for assessing the risk of unexpected loss in credit transactions (Saita, 2000), it is possible to analyse the significance of the risk related to the uncertainty of the flows, with respect to the properties included in the sample of Beni Stabili Gestioni SGR. In detail, the analysis take into account the periodical amounts expected from the investment and compare them with the actual amounts collected, to estimate the likelihood of below-expectation results and the size of the maximum loss that can be sustained to achieve an acceptable confidence level (Table III).

In the light of the empirical evidence produced, in the case of bullet loans, the loan application must be assessed in function of the likelihood that, at the end of the investment, the value of the property is so much lower than expected as not to allow the reimbursement of the capital. Based on the results obtained from the analysis of the property portfolio considered, it can be asserted that the risk of capital account losses is very small and does not feature special problems for its management.

On the contrary, in the case of amortizing loans, the analysis of the reimbursement value shall be supported by a study of the possibility of covering the maximum estimated loss for each financial flow generated by the investment. The analysis of the available data shows that there is a non-neglectable probability that the expected flows

| | | | Maximum loss for confidence level in relation to the expected investment flow | | | | |
| | | Likelihood | $\alpha = 75$ | $\alpha = 80$ | $\alpha = 90$ | $\alpha = 95$ | $\alpha = 99$ |
Type of flows	Year	of loss (%)	(%)	(%)	(%)	(%)	(%)
Price of sale of property[a]	2006	48.74	−3.00	−3.00	−3.00	−3.00	−3.00
	2007	63.32	−2.70	−2.70	−3.00	−3.00	−3.00
Periodical flows generated	2006	48.30	−44.73	−64.44	−92.60	−93.94	−97.25
	2007	45.33	−68.88	−69.35	−92.54	−98.44	−99.93

Notes: [a]The price of sale has been estimated assuming that the capital gain is exactly equal to the mean price appreciation from the investment equal to zero, i.e. a growth of the price of the property, in the year in question, exactly equal to the inflation rate trend; [b]the analysis was made comparing the sum of the incoming or outgoing flows related to each investment unit on a one year time horizon without considering the time of appearance on the year analysed
Source: Beni Stabili Gestioni SGR data processed by the authors

Table III.
Analysis of risk for each
real estate units flow

during the life of the investment are not consistent with the expectations, and in the case this disalignment appears. The assessment of the riskiness of a property portfolio, therefore, should be completed with information on the size of the risk that the rigidity induced by the use of admortizing loans according to the degree of variability recorded in the past by the single payment flows. The high-risk exposure identified for sample analysed is biased by the choice of the cut-off: in fact all inflows generated by real estate units after the end of the year are not considered in the analysis even if they are of economic pertinence of the period, pointing out just a liquidity problem; the risk exposure could be therefore overestimated.

On the contrary, according to a financial assessment rationale underlying the investment, the need appears to investigate the frequency of the delays in the appearance of the flows for the single properties included in the overall sample (years 2006 and 2007) and to link them to the amounts forecasted for the single deadlines (Table IV).

The analysis of the average payment times highlights that the largest exposures within the portfolio (1 and 2 percentiles) do not feature a significant risk of delay in compliance with the contract obligations and, therefore, can be financed by borrowing, while in the case of the other properties a relationship can be found between the amount of outstanding rents and delays in rent payment. The availability of information on the quality of the portfolio and the likelihood/amount of delay, with respect to the single investments, represents, therefore, a significant tool for assessing the financial sustainability of the loan.

In the case of variable-rate repayment schemes not hedged by derivatives, it is, on the contrary, necessary to consider not just the sustainability of the debt, but also the investor's expectations *vis-à-vis* the benchmark interest rate trends, and the significance of the floating percentage of amount of interests paid at each deadline. (*cosa è la variable share... forse sono assonnato*) The weight to be assigned to the variability of the benchmark indexes depends on how the instalments are calculated and the higher the weight of the variable component the higher should be the focus on the trend of the debt benchmark parameter. In the analysis of exposure to this type of risk a similar methodology to the proposed one can be used to assess the sustainability of the debt, based on the projections relating to the benchmark interest rate trends and the actual realizations relating to the single periods of the survey.

In order to define a synthetic measure of risk for a portfolio of real estate investments is sufficient to make a weighted mean of the value at risk related to each

Analysis of full sample		*Mean*		*Median*		σ		*Range*	
		39.41		14.65		84.05		Min0–Max720	
			Mean	σ				*Mean*	σ
Analysis of exposures	Percentile I – Max		23.63	65.43	Percentile VI			32.50	39.94
reclassified for total	Percentile II		20.50	30.00	Percentile VII			69.28	86.45
amount of outstanding	Percentile III		33.02	51.83	Percentile VIII			40.82	60.44
rents	Percentile IV		72.12	159.07	Percentile IX			53.48	109.36
	Percentile V		23.95	31.30	Percentile X – Min			26.25	96.16

Table IV.
Payment delays for properties included in the sample for the period 2006-2007

Source: Beni Stabili Gestioni SGR data processed by the authors

property using as weight the ratio between the market value of the real estate unit respect to the overall value of the portfolio.

Once the sustainability of the loan has been defined for the property fund, according to the characteristics of the investments, it should be determined how – based on the hierarchy of rights in the relations between the funds and their stakeholders – these financial risks could affect the potential investors. According to Italian law, quotaholders have no recoupment rights *vis-à-vis* the investment management company, and are subordinate, with respect to economic rights, to the other creditors of the fund. In this context, any unexpected variability of the investment flows generated by the fund negatively affect the expected result for the quotaholders.

For the purpose of assessing the variation of the project risk, with respect to the fund's borrowing decisions, it therefore becomes necessary to consider the target yields notified to the market by the investment management company (the so-called target TIR), which represents the base to define the overperformance fee for the fund manager company (Beretta, 2006) and is normally considered by potential investors in defining their yield expectations. Assuming that this yield accurately reflects the investor's expectations, it is possible to reconstruct the expected incoming flow schedules for the investor and determine the charges the fund manager would have to incur not to disappoint market expectations.

The study of the investors' risk, therefore, may be carried out by assessing the sustainability not only of the outgoing flows, with respect to the debt, but also the outgoing flows deriving from the need to abide by the commitments undertaken with investors as to the payment of the proposed remuneration. Looking at the Italian real estate market is possible to evaluate how this risk is correctly managed by SGR and the probability that a different level of leverage could impact on the performance for the investor[6] (Table V).

The analysis of the performance achieved by high-leveraged funds demonstrates that in some years those funds had a lower capability to achieve results equal to the target TIR. Analyses of maximum losses based on high degree of confidence normally points out less significant differences because, especially for some years where the overall number of Italian real estate funds listed is lower, the sample of worst funds with highly leverage and the sample of overall worst funds are the same.

On the basis of previous results obtained with the analysis of the characteristics of flows generated by single real estate units, this lack of coherence between expected and real TIR could be related to indebtness policy and for highly leveraged funds the probability for the investor to obtain lower gains respect to the value expected is higher. The evaluation of financial risk assumed by the investment management company is so necessary in order to estimate the risk of variability of the IRR respect to the expected value.

4. Conclusions

Assessing the risk of the Italian real estate funds requires the simultaneous examination of the risks related to the fund's assets and to the fund's financial liabilities. The best option to achieve an overall risk estimate of the fund is through the definition of a methodology allowing the determination of real estate investment and portfolio risk and then assessing the effects of financial leverage.

| Type of funds | Year | Mean difference of *ex post* (actual) and *ex ante* (target) IRR (%) | Maximum loss for confidence level as a difference actual IRR respect to the target IRR | | | | |
			$\alpha = 75$ (%)	$\alpha = 80$ (%)	$\alpha = 90$ (%)	$\alpha = 95$ (%)	$\alpha = 99$ (%)
All real estate funds	2000	− 3.39	− 5.50	− 5.80	− 7.75	− 8.50	− 8.50
	2001	− 3.23	− 5.50	− 6.70	− 7.56	− 8.50	− 8.50
	2002	− 1.97	− 5.45	− 6.10	− 8.05	− 8.50	− 8.50
	2003	− 3.61	− 5.50	− 6.27	− 8.00	− 8.50	− 8.50
	2004	− 2.58	− 5.50	− 5.50	− 8.05	− 8.50	− 9.66
	2005	− 2.59	− 5.09	− 5.50	− 6.85	− 8.43	− 8.50
	2006	− 0.09	− 3.39	− 4.36	− 5.05	− 5.55	− 6.24
	2007	− 3.39	− 5.50	− 5.80	− 7.75	− 8.50	− 8.50
Real estate funds with high degree of leverage	2000	− 3.28	− 5.50	− 7.00	− 8.50	− 8.50	− 8.50
	2001	− 3.39	− 5.50	− 7.00	− 8.50	− 8.50	− 8.50
	2002	− 3.42	− 5.50	− 7.00	− 8.50	− 8.50	− 8.50
	2003	− 3.98	− 6.45	− 7.60	− 8.40	− 8.50	− 8.50
	2004	− 3.68	− 5.50	− 7.00	− 8.50	− 8.88	− 9.78
	2005	− 2.92	− 5.17	− 5.80	− 7.90	− 8.50	− 8.50
	2006	0.01	− 4.36	− 4.92	− 5.40	− 5.87	− 6.30
	2007	− 3.28	− 5.50	− 7.00	− 8.50	− 8.50	− 8.50

Table V.
Risk for Italian real estate funds for the period 2000-2007

Notes: High leveraged funds are those funds that had used more of the 50 per cent of the maximum degree of leveraged established by Italian law. Similar results could be obtained using different cut-off level
Source: Assogestioni (different years) data processed by the authors

The empirical evidence obtained with respect to a property portfolio relating to the Italian market has highlighted the greater importance of the portfolio construction decisions (portfolio allocation and diversification) as compared to the criteria for selecting the single investment opportunities (vacancy rate and probability of tenant default).

Although the proposed models feature a limited capacity for properly forecasting the level of risk of a property portfolio, the model based on risk of losses (downside risk) seems to fit better than the model based on the financial risk (standard deviation), in terms of predictive capacity.

The assessment of the riskiness of a property portfolio has to be completed with the risk related to the rigidity induced by the use of financial leverage. The analysis of the borrowing policies highlights the need to monitor all the debt characteristics and to assess the impact of the decisions taken on the likelihood of remunerating the banks and the quotaholders on a timely basis. In the bullet loans, the variability of the expected periodical cash flows and of the selling price of the property assumes importance for the payment of the interests and the principal and consequently for the variability of the quotaholders yields (IRR) compared to the expected value. The analysis of the performances of Italian real estate funds demonstrates that, in some

years, the high-leveraged funds had a lower capacity to achieve results equal to the target IRR.

This paper takes into account the variability of the generated flows and the amount of any deferments of payment, in respect of Italian properties, without combining the two sets of information through future financial flows discount methods. Subsequent developments in risk management themes, in connection with property funds, might consider the possibility of directly quantifying the cost for deferments in the case of properties[7]. The availability of criteria for the objective definition of this parameter, in fact, would allow the transformation of the *ex ante* and *ex post* cash flows into actual values and, therefore, to enable estimates of the investment risks over the medium-to-long-term.

Notes

1. Within this macro-category a distinction may usually be made between contribution and ordinary funds: in the former case, the investment management company sets up a fund using the properties contributed by the members, while in the latter case it is free to chose the best investments from among the investment opportunities available when the portfolio is built up (Cacciamani, 2006).
2. For more details on eviction procedures in Italy see Ministero delle Infrastrutture and Nomisma (2007).
3. The choice of minimum number of properties is assumed to be in line with the existence of any regulatory constraints (see "Regolamento sulla gestione collettiva del risparmio" issued by the Bank of Italy on 14 April 2005), which require property funds not to invest – either directly or through a subsidiary – more than one third of portfolio value in a single property with unitary urban planning and functional features. On the contrary, the definition of the maximum number of properties to include in a portfolio has been based on a study of the marked characteristics of listed Italian property funds which, with the exception of the Fondo Immobili Pubblici, have invested in portfolios comprising no more than 60 properties.
4. With respect to the analysis, the possibility of taking account of the advantages of the active management of the investment was excluded, as no historical series were available relating to the theoretical or actual sales prices of the properties, for the various months of the year.
5. Lince represents one of the External Credit Assessment Institution authorized from Bank of Italy to offer counterparty evaluation services to financial intermediaries in order to develop IRB standard models. For more information see Lince web site: available at: www.lince.it/home/index.phtml
6. The analysis is limited to Italian real estate funds that pays periodically gains. All accumulation and mixed funds are excluded from the analysis because to analyze these types of funds is necessary to consider all the time horizon of the investment and the number of Italian funds for which the time period expired is not sufficient to make a statistical analysis.
7. As regards the problems relating to the identification of the proper actualization rate, to assess the differential between expected and actual flows generated in connection with credit transactions, reference should be made to Gibilaro and Mattarocci (2007).

References

Assogestioni (different years), "Rapporto semestrale sui fondi immobiliari", available at: www.assogestioni.it/index.cfm/1,175,0,49,html/dati (accessed 1 January 2009).

Beretta, S. (2006), "Il business plan del fondo immobiliare", in Giannotti, C. (Ed.), *La gestione del fondo immobiliare*, EGEA, Milan, pp. 33-90.

Biasin, M. (2003), "L'esperienza di Real Estate Investment Trust statunitensi: alcune indicazioni per i fondi immobiliari italiani", *Bancaria*, Vol. 59 No. 3, pp. 70-82.

Biasin, M. (2005), *L'investimento immobiliare*, Il Mulino, Bologna.

Brown, D.T. and Riddiough, T.J. (2003), "Financing choice and liability structure of real estate investment trusts", *Real Estate Economics*, Vol. 31 No. 3, pp. 313-46.

Cacciamani, C. (Ed.) (2003), *Il rischio immobiliare, una soluzione di rating dell'investimento immobiliare*, EGEA, Milan.

Cacciamani, C. (Ed.) (2006), *I fondi immobiliari ad apporto specializzati*, EGEA, Milan.

Camagni, R. and Martellato, D. (2007), "The Milan housing market", in Andersson, A.E., Pettersson, L. and Strömquist, U. (Eds), *European Metropolitan Housing Market*, Springer, Berlin, pp. 213-40.

Cammarano, G. (2007), "SIIQ e fondi immobiliari: discipline a confronto e problemi aperti", *Bancaria*, Vol. 63 No. 2, pp. 93-7.

Capozza, D.R., Israelsen, R.D. and Thomspon, T.A. (2005), "Appraisal, agency and atypicality: evidence from manufactured homes", *Real Estate Economics*, Vol. 33 No. 3, pp. 509-37.

Caselli, S. and Gatti, S. (1999), *Il Corporate Lending*, Bancaria Editrice, Rome.

Casey, K.M., Sumner, G. and Packer, J. (2006), "REIT capital structure: is it market imposed?", *Managerial Finance*, Vol. 32 No. 12, pp. 981-7.

Cheng, P. (2005), "Asymmetric risk measures and real estate returns", *Journal of Real Estate Finance & Economics*, Vol. 30 No. 1, pp. 89-102.

Crockett, J. (1982), "Competition and efficiency in transacting: the case of residential real estate brokerage", *Real Estate Economics*, Vol. 10 No. 2, pp. 209-27.

Davis, J.L. (2001), "Mutual fund performance and manger style", *Financial Analyst Journal*, Vol. 57 No. 1, pp. 19-27.

Feng, Z., Ghosh, C. and Sirmans, C.F. (2007), "On the capital structure of real estate investment trust (REITs)", *Journal of Real Estate Finance & Economics*, Vol. 34 No. 1, pp. 81-105.

Fitch (2007), "Updated criteria for US Equity REIT capital standards", available at: www.fitchratings.com/corporate/reports/report_frame.cfm?rpt_id=352922&sector_flag=9&marketsector=1&detail= (accessed 1 January 2009).

Flanagan, R. and Norman, G. (2003), *Risk Management and Construction*, Blackwell Publishing, Oxford.

Gabriel, S.A. and Nothaft, F.E. (1988), "Rental housing markets and the natural vacancy rate", *Real Estate Economics*, Vol. 16 No. 4, pp. 419-29.

Gabriel, S.A. and Nothaft, F.E. (2001), "Rental housing markets, the incidence and duration of vacancy and the natural vacancy rate", *Journal of Urban Economics*, Vol. 49 No. 1, pp. 121-49.

Gallo, J.G., Lockwood, L.J. and Rutherford, R.C. (2000), "Asset allocation and performance of real estate mutual funds", *Real Estate Economics*, Vol. 28 No. 1, pp. 165-84.

Gau, G.W. and Wang, K. (1990), "Capital structure decision in real estate investment", *Real Estate Economics*, Vol. 18 No. 4, pp. 501-21.

Ge, W. and Zheng, L. (2006), "The frequency of mutual fund portfolio disclosure", available at: SSRN: http://ssrn.com/abstract=557186

Geltner, G. (1990), "Return risk and cash flow risk with long term riskless leases in commercial real estate", *Real Estate Economics*, Vol. 18 No. 4, pp. 377-402.

Giannotti, C. (2005), "La leva finanziaria nei fondi immobiliari ad apporto privato: vincoli, opportunità e rischi", *Bancaria*, Vol. 61 No. 3, pp. 82-96.

Giannotti, C. (2006), "La gestione finanziaria dei fondi immobiliari ad apporto", in Cacciamani, C. (Ed.), *I fondi immobiliari ad apporto specializzati*, EGEA, Milan, pp. 149-84.

Giannotti, C. and Mattarocci, G. (2006), "La costruzione di un portafoglio immobiliare e i criteri di diversificazione", in Giannotti, C. (Ed.), *La gestione del fondo immobiliare*, EGEA, Milan, pp. 129-78.

Giannotti, C. and Mattarocci, G. (2008a), "I fondi immobiliari: tipologie, disciplina e leva finanziaria", in Cacciamani, C. (Ed.), *Real Estate*, EGEA, Milan, pp. 451-82.

Giannotti, C. and Mattarocci, G. (2008b), "Risk diversification in a real estate portfolio: evidence from Italian market", *Journal of European Real Estate Research*, Vol. 1 No. 3, pp. 214-34.

Gibilaro, L. and Mattarocci, G. (2007), "The selection of the discount rate in estimating the loss given default", *Global Journal of Business Research*, Vol. 1 No. 2, pp. 15-35.

Grinblatt, M. and Titman, S. (1989), "Mutual fund performance: an analysis of quarterly portfolio holdings", *Journal of Business*, Vol. 69 No. 3, pp. 393-416.

Gualtieri, P. (2003), "L'esperienza e le prospettive della finanza immobiliare in Italia: aspetti tecnici", in Cesarini, F. (Ed.), *Banca e finanza immobiliare*, Bancaria Editrice, Rome, pp. 27-33.

Hettenhouse, G.W. and Dee, J.J. (1976), "A component analysis of rates of return in real estate investment", *Real Estate Economics*, Vol. 4 No. 1, pp. 7-21.

Highfield, M.J. and Roskelley, K.D. (2007), "The determinants of the debt maturity decision for real estate investment trusts", *Journal of Real Estate Research*, Vol. 29 No. 2, pp. 173-200.

Hutchison, N.E., Adair, A.S. and Leheny, I. (2005), "Communicating investment risk to clients: property risk scoring", *Journal of Property Research*, Vol. 22 Nos 2/3, pp. 137-61.

IPD (2000), "The assessment and management of risk in the property investment industry", available at: https://members.ipf.org.uk/membersarealive/downloads/download. asp?ref=81&hash=a0c7ca94e38913b62924f62f954cedc5 (accessed 1 January 2009).

Jacobs, N. (2005), "Active asset management: practicalities and realities", *Journal of Retail and Leisure Property*, Vol. 4 No. 4, pp. 301-12.

Jaffe, A.J. and Sirmans, C.F. (1984), "The theory and evidence on real estate financial decisions: a review of the issues", *Real Estate Economics*, Vol. 12 No. 3, pp. 378-400.

Lin, C.Y. and Young, K. (2004), "Real estate mutual funds: performance and persistence", *Journal of Real Estate Research*, Vol. 26 No. 1, pp. 69-93.

Ling, D.C. and Naranjo, A. (1997), "Economic risk factors and commercial real estate returns", *Journal of Real Estate Finance & Economics*, Vol. 14 No. 3, pp. 283-307.

Liu, C.H. and Mei, J. (1994), "An analysis of real estate risk using the present value model", *Journal of Real Estate Finance & Economics*, Vol. 8 No. 1, pp. 5-20.

Lizieri, C. and Ward, C. (2000), "Commercial real estate return distribution: a review of literature and empirical evidence", in Knight, J. and Satchell, S. (Eds), *Return Distributions in Finance*, Butterworth-Heinemann, Oxford.

McDonald, J.F. (2000), "Rent, vacancy and equilibrium in real estate markets", *Journal of Real Estate Practice and Education*, Vol. 3 No. 1, pp. 55-69.

Ministero delle Infrastrutture and Nomisma (2007), "La condizione abitativa in Italia. Fattori di disagio e strategie di intervento", available at: www.nomisma.it/uploads/media/20070920-001_01.pdf (accessed 1 January 2009).

Moody's (2004), "Key ratios for rating REITs and other property firms", available at: www. moodys.com/moodys/sbin/login/LoginPg.aspx?reqURL=%2Fcust%2Fgetdocument bynotesdocid%2Easp%3Fcriteria%3Dpbc%5F91014 (accessed 1 January 2009).

Moody's (2006), "Rating methodology for REITs and other commercial property firms", available at: www.moodys.com/cust/getdocumentByNotesDocId.asp?criteria=PBC_96211 (accessed 1 January 2009).

Pellat, P.G.K. (1972), "The analysis of real estate investment under uncertainity", *Journal of Finance*, Vol. 27 No. 2, pp. 459-71.

Porzio, C. and Sampagnaro, G. (2007), *L'investimento immobiliare*, Bancaria Editrice, Rome.

Riggs, K.P. Jr, Marling, J.H. and Harms, R.W. (2000), "Property level performance measurement; the key to understanding implicit financial attributes", *Real Estate Issues*, Vol. 25 No. 4, pp. 26-35.

Rodriguez, J. (2007), "A critical look at the forecasting ability of real estate mutual fund manager", *Journal of Real Estate Portfolio Management*, Vol. 13 No. 2, pp. 99-106.

Saita, F. (2000), *Il Risk Management in Banca*, EGEA, Milan.

Short, P., Minnery, J., Mead, E., Adkins, B., Peake, A., Fredrick, D. and O'Flaherty, M. (2003), "Tenancy databases: risk minimization and outcomes", available at: www.ahuri.edu.au/global/docs/doc577.pdf (accessed 1 January 2009).

Standard and Poor's (1995), "Property condition assessment criteria", available at: www. standardandpoors.com/spf/pdf/fixedincome/main_property.pdf (accessed 1 January 2009).

Standard and Poor's (2004), "Rating criteria for U.S. REITs and REOCs", available at: www. standardandpoors.com/spf/pdf/fixedincome/REIT%20Criteria_Final.pdf (accessed 1 January 2009).

Sullivan, C. and Fisher, R.M. (1988), "Consumer credit delinquency: characteristics of consumers who fall behind", *Journal of Retail Banking*, Vol. 10 No. 1, pp. 53-64.

Wincott, R. (1997), "Vacancy rate and reasonableness", *Appraisal Journal*, Vol. 65 No. 4, pp. 361-70.

Young, M.S., Lee, S.L. and Devaney, S.P. (2006), "Non-normal real estate return distributions by property type in the UK", *Journal of Property Research*, Vol. 23 No. 2, pp. 109-33.

Further reading

Ministero dell'Interno (2007), "Andamento delle procedure di rilascio di immobili ad uso abitativo", available at: http://dait.interno.it/dcds/compendio04/file07/04_sfratti.pdf (accessed 1 January 2009).

Corresponding author

Gianluca Mattarocci can be contacted at: gianluca.mattarocci@uniroma2.it

www.manaraa.com