The incidence of real estate portfolio composition choices on funds performance: Evidence from the Italian market

By

Marisa Gigante

University LUM Jean Monnet of Casamassima (Italy)

Ph.D. in Banking and Finance

e-mail: ma.gigante@lum.it

tel. +39/3280343730

Version May 2012

Keywords: Real Estate Funds, Portfolio composition, Risk Adjusted Performance

JEL codes: G24, H11, H63, L85,

Abstract

In the economic and financial scenario Italian real estate funds industry continues its growth. This paper aims to investigate the investment policies and portfolio composition choices of Italian real estate funds, analyzing the impact on performance measured through the Sharpe ratio.

In literature several studies deal with portfolio composition choices about sectorial and geographical diversification (Lee and Devaney 2007, Gabrielli and Lee 2009, Byrne and Lee 2010) and their impact on real estate funds performance (Gallo et al. 2000, O'Neal and Page 2000, Morri and Erbanni 2008), which is measured with several Risk Adjusted Performance indicators such as Sharpe ratio and Treynor ratio (Scholz and Wilkens 2005, Eling 2008).

Looking at the Italian market, the theme of real estate funds performance has been taken into account from Morri and Lee (2009), Giannotti and Mattarocci (2010).

This paper collocates in these studies, but differs from the existing literature because it focuses only on the patrimonial aspects of funds, leaving out the aspect of income, evaluating the incidence of the components of property and others investments on the fund performance.

The analysis has been carried out on a sample of 20 Italian listed retail funds over the period 2007-2010. By means of a dataset with semiannual data provided by "Report of Scenari Immobiliari", a pooled OLS and fixed effects panel regression were applied.

The results show how real estate portfolio composition choices impact on the fund performance. The Sharpe ratio is influenced by age and fund setup typology. Furthermore, the study shows how the investment in "financial instruments" affects the fund performance.

Index

Abstract 2

1. Introduction 4

2. Literature review 6
   2.1 Real estate portfolio composition choices 6
   2.2 The impact of real estate portfolio composition choices on funds performance 10

3. Empirical Analysis 13
   3.1 The Sample 13
   3.2 Methodology 20
   3.3. Results 23
      3.3.1 The impact of real estate portfolio investment and composition choices on funds performance 23
4. Conclusions 29
   4.1 Limits of the model and research perspectives 30

References 31

1. Introduction

In Italy the criteria for selecting real estate investments are subjects of discussion between practitioners and academics, because the Italian real estate funds have grown considerably in recent years in terms of both asset under management size and of number of funds. In the economic and financial scenario Italian real estate funds industry continues its growth, infact both the asset under management and assets value increased in 2010 of 5.5% and 4.6% annually.

On December 31, 2010 171 operative real estate funds surveyed by Assogestioni/IPD had an asset under management equal to 23.276,7 mln €, with an increase of 5.1% compared to June 2010 (+5.5% in one year). Besides, the assets value has increased to 40.074,1 mln €, with a growth of 4.8% in 6 months (+4.6% in one year).

On December 2010, these funds were composed for 86.5% by reserved funds and for 13.5% by retail funds.

Fund development has been facilitated also by the evolution of the regulatory framework of these vehicles. The asset under management of fund has to be invested in real estate assets for a percentage between 66.67 per cent (prevalent investment) and 100 percent (exclusive investment).

The measure of two thirds is reduced to 51 per cent if at least 20 percent of the total value of the fund is invested in financial instruments representing the securitization operations concerning property, real estate rights or credit guaranteed by mortgage real estate[1].

This paper aims to investigate the investment policies and portfolio composition choices of Italian real estate funds, analyzing the impact on performance measured by means the Sharpe ratio. The analysis focuses only on the patrimonial aspects of funds leaving out the aspect of income, and by expanding the types of investments considered, it evaluates the incidence of the components of property and other investments on the fund performance.

The research questions are:

- is there a relationship between portfolio composition choices and real estate funds performance?
- does sectorial diversification have a major impact on fund performance than geographical diversification in real estate portfolio composition choices?

[1] See Giannotti and Mattarocci (2012)

-how much the components of residual and prevalent investment contribute to the improvement of fund performance in real estate funds investment policies?

This paper is organized in four sections: literature review about real estate portfolio composition choices (section 2.1), and the impact of real estate portfolio composition choices on funds performance (section 2.2).

The empirical analysis will be illustrated through the sample examined (section 3.1) and the survey methodology (section 3.2). The results of the empirical analysis will be shown in (section 3.3) and the last section summarizes some brief conclusions, the limits of the model and the research perspectives.

2. Literature review

2.1 Real estate portfolio composition choices

The decision relating to the construction of a portfolio concerns the choice of asset classes to be considered, the quantification of the share of resources to be allocated to each asset class, and the specification of the range within which the allocation may vary over time (Caparrelli and Camerini, 2004).

The selection of a specific real estate asset and the decisions on the share to be allocated to the same asset within a portfolio are made according to the time horizon of investment, the investor's specific risk propensity and the rate of return expected (Cacciamani, 2003).

The profile of the uniqueness of each property and the influence of different variables on the return make it appropriate, in assessing the risk of a real estate portfolio, the use of multidimensional analysis, that consider the risk factors underlying the portfolio's volatility which are typical of a real estate market (Sampagnaro and Porzio, 2007).

The Modern Portfolio Theory (MPT) has been considered as the most technically rational approach to the construction of real estate portfolios in order to identify the best combination of assets to hold (Lee, 1992).

In this approach, the importance of each asset is assessed in terms of its individual risk and return characteristics, as measured by its mean and standard deviation and its portfolio risk, as charaterised by the correlation with other assets. Given these parameters, MPT will find the combination of assets which will offer the highest level of return for each risk level. (Lee and Stevenson, 2005).

The success of a particular diversification strategy depends upon the quality of the estimated correlation between the assets (Lee, 2002), as the lower is the level of correlation between the assets, the greater is the potential portfolio risk reduction and the increase of return.

As far as real estate portfolios are concerned, the conventional approach to define the categories of diversification is to use property type and regional classification (Lee, 2001).

The most common classification adopted in literature provides for the segmentation based on target use in: housing, commercial, industrial and offices (Young, 2000).

Another important element of real estate portfolio diversification is the investment location which allows to distinguish properties in terms of region, size of integration context, a particular location inside the urban area (Cacciamani, 2003).

A further category of investment is based on the socio-economic characteristics of an area divide the territory into areas with similar economic and financial structuresn that is a real estate diversification within a country which favors certain areas in relation to the dominant economic activity of regions, instead of areas based on a simple administrative division (Malizia and Simons 1991, Mueller 1993)

At an international level, in literature there are several studies dealing with portfolio composition choices based on regional and sectorial diversification. The main approaches adopted in literature are: correlations analysis, the construction of efficient frontiers on the basis of the principles of Modern Portfolio Theory and the cluster analysis techniques.

Among the numerous contributions, Eichholtz et al. (1995) have analyzed data from the USA and UK to determine whether property-type diversification is better than the geographical one, using a set of methods including correlations analysis and mean-variance analysis. The choice of diversification at sectorial or geographical level varies in relation to both the market studied (US and UK), and the type of property considered.

Lee and Byrne (1998) examine the annual returns in the UK in the period 1981-1997 by comparing Mean Absolute Deviation (MAD) efficient frontiers of portfolios diversified across sectors and those arising from geographically diversified portfolios. The results showed that diversification across the property-type dominates those across the regions.

The analysis adds a further comparison between the efficient frontier from portfolio diversification based on a geographical area and those for "economic" areas. The diversification based on the so called "economic" criteria offers more advantages in terms of risk reduction than geographical diversification.

In a later work Byrne and Lee (2010), extending the time horizon, reconsider whether it is more advantageous, in terms of risk reduction, to diversify the portfolio by sector or by geographical area.

Through the use of the Mean Absolute Deviation portfolio approach and the cluster analysis the results show, in line with the previous work, that portfolios based on the sectorial diversification are preferable to those geographically diversified.

The analysis revealed that comparing the performance of the “conventional regional” classification and one based on modern socio-economic criteria, the approach based on functional areas, may provide a greater reduction in terms of risk.

Hoesli et al. (1997) consider the cluster analysis as a essentially descriptive and exploratory technique and point out the need to use further tests to assess the benefits derived from sector diversification versus geographical one.

Therefore additional criteria were applied such as:

- the methodology of Heston and Rouwenhorst (HR), useful to distinguish the two "factors" (sector and geographic area) and to quantify the importance of each in determining real estate returns;

-analysis of individual risk of the asset and its impact on the portfolio

As regards the first approach, using the methodology of the dummy variables of Heston and Rouwenhorst (HR) and applying cross-sectional regressions: Fisher and Liang (2000) have proved the impact of the two types factors on the US real estate returns, highlighting how the sectorial diversification is more effective than the diversification by geographical areas as the former provides more benefits than the latter.

Lee (2001) analyzes the UK real estate returns over the period 1981-1995, studying the impact on two diversification categories on property portfolio returns showing the predominance of the property-type over the geographical.

In addition, Lee and Devaney (2007) have examined the influence of sectorial and geographical diversification on commercial real estate performance over the period 1987-2002. The study makes evident that the sectorial diversification prevails over the geographic area during the majority of the time subject to analysis, in particular during volatile periods of the real estate cycle. Then the diversification conducted at sectorial level is considered the most important aspect in the development of a portfolio strategy.

By extending the framework to include international portfolio diversification strategies, Glascock and Lynne (2007) adds new considerations to the debate on the benefits derived from real estate portfolios diversification across regions or property types .

With particular reference to the Italian market, Gabrielli and Lee (2009) investigated the benefits of regional versus sectorial diversification of property portfolio.

The analysis, which was conducted on 27 Italian cities during the period 1989 to 2007 applying the cross –sectional regressions, revealed that, in a first period, sector and regional factors affected real estate returns in almost equal measure so a diversification strategy based on regions might be as good as a sector based approach. Later on the analysis

revealed that more recently in Italy the sectorial diversification has started to dominate the regional one.

In light of the literature analyzed, it is evident that in a country, property type (sector) dominates the geographical diversification, (Lee and Byrne 1998, Lee 2001, Lee and Devaney 2007) as the former provides greater potential for reducing the risk (Hamelink et al. 2000, Viezer 2000) so the sectorial diversification should be the first level of analysis when developing a portfolio diversification strategy (Fisher and Liang 2000, Lee 2001, Byrne and Lee 2010).

As regard to the second approach, attention was focused on individual risk of the asset in order to examine the real benefits of diversification.

At a national level, literature was enriched by the contributions investigating this phenomenon by classifying the main risk factors which characterize real estate investment in tenant, exogenous, endogenous (Cacciamani, 2003) and financial, and focusing the attention on the study of risk profiles and their influence on the risk of individual investment and / or the overall portfolio (Mattarocci and Giannotti, 2006).

Through the analysis of the efficient frontier of a portfolio of investment properties, Mattarocci and Giannotti (2008), propose a model for the investments selection based on the major risk profiles of assets and a model for the construction of an efficient real estate portfolio. The results show that an ex-ante study of risk profiles can help identifying the best investment opportunities.

In a subsequent work Mattarocci and Giannotti (2009) in assessing the exposure to risk for a real estate portfolio, studied the impact of specific risk factors with respect to portfolio risk, by applying a panel model that explains risk measures on the basis of the same characteristics of the investments and the portfolio. The study showed that the construction choices of the portfolio impact strongly on the variability of the results of real estate funds.

Finally Porzio and Sampagnaro (2007) examine the degree of diversification of a portfolio generated by the inclusion of a share of real estate. The results demonstrate that the inclusion of one or more real estate asset classes characterized by a good risk-return ratio and a lower correlation with other asset classes, determines a rise and a shift to the left of the efficient frontier.

This leads to identify the best investment opportunities at equal of risk, higlighting a benefit in terms of the overall risk reduction of the portfolio.

2.2 The impact of real estate portfolio composition choices on funds performance

The theme of mutual fund performance has been widely dealt with at both International and European levels, regarding the latter, in particular some works have focused on a comparative study across countries among which Otten and Bams (2002) is investing on funds performance in France, Germany, Italy, Netherlands and United Kingdom, while others have focused on individual countries[2] (Brown and Goetzman (1995), Chen and Knez (1996), Carhart (1997), Blake and Timmermann (1998), Indro et al. (1999), Kothari and Warner (2001), Chen et al. (2004).

With particular reference to real estate, several studies have focused on various performance measures comparing them, others have focused on the impact of the "characteristics" of real estate funds on performance.

The literature on performance assessment has been enhanced by a wide range of indicators whose purpose is to provide for a data of performance filtered by the risk component.

In the asset management industry, the Risk Adjusted Performance (RAP) measures are the best known instruments used in order to synthesize the profile of risk/return of an investment (Cucurachi, 1999).

The literature concerning the risk-adjusted performance measurement of this type of investments is based mainly on the standard mean-variance approach (Young and Graff, 1995). Most asset allocation analyses use this approach in analyzing the trade-off between risk and return (Leland 1999; Sharpe 2007).

Among traditional RAP measures, the most widely known indicator to explain real estate funds perfromance is the Sharpe ratio, which measures the relationship between the risk premium and the standard deviation of the returns generated by the fund, the portfolio, or the asset being measured (Sharpe, 1966).

The study of these performance indicators is fundamental, and it is used in many works: literature offers several empirical analysis concerning the comparison of performance measures, in particular among the Sharpe ratio and other alternative measures.

[2] For a exhaustive review see Otten and Bams (2002)

Scholz and Wilkens (2005) present a system of basic risk-adjusted performance measures in order to understand the key differences between these performance measures and to clarify the links between them. The comparison between RAP measures based on total risk (Sharpe ratio and the total risk Alpha) and RAP measures based on market risk (Treynor ratio and Jensen Alpha) shows that the appropriate risk measure to base the performance measurement on depends on the portfolio subject to be examined.

Several studies in literature show the goodness of these measures in order to select the best investment opportunities (Plantinga and de Groot, 2001, Giannotti and Mattarocci, 2010) and they are widely used to rank real estate mutual funds.

In fact Eling (2008) conducted an analysis on a dataset of 38.954 investment funds invested in seven asset classes over the period 1996–2005, studying whether alternative performance measures lead to different rankings than using the Sharpe ratio, and comparing the results.

The study made evident that performance measures such as Omega, Sortino ratio, Kappa, upside potential ratio, and other indexes, do not lead to significant changes in the ranking of investment funds compared to those obtained using the Sharpe ratio. These results show that, as in the case of hedge funds, the Sharpe ratio is adequate for analyzing funds invested in other asset classes.

With reference to the Italian market, Giannotti and Mattarocci (2010) conducted a study on Italian property funds performance over the period 1999-2009. The paper compares the ranking based on Sharpe ratio with that achieved using different RAP measures constructed using different risk measures.

The results show that the rankings obtained are not strictly correlated and that the measures not assuming the normality of returns identify rankings with a higher degree of stability over time.

At an International and European level a number of works in literature have focused on the relations between the "characteristics" of real estate funds, real estate investment of trusts (REITs) and real estate mutual funds (REMFs) and their performance.

The following studies show that performance is influenced by variables related to the portfolio composition and investment choices but also, the ability of managers can give a significant added value in achieving results.

O'Neal and Page (2000) examined the relationships between the "abnormal performance" REMFs and characteristics of these funds, by using a cross-sectional regression.

Among the characteristcs of REMFs they paid particular attention on the size, the cost, the turnover and age of funds. The results show that the cost impacts positively on the performance and the high turnover is associated with high "abnormal performance". Age is negatively related to performance, suggesting that younger funds achieve better results while there is no relationship between fund size and abnormal performance.

The study conducted by Gallo et al. (2000) on the performance of REMFs in the period 1991-1997, emphasizes the importance of asset allocation in the pursuit of performance and shows that higher fund performance is attributable to fund managers' decisions.

The impact of real estate portfolio composition choices on funds performance has been studied at a national level by Morri and Erbanni (2008), who investigated on the relationships between composition choices and fund performance, analyzing risk and return profiles of an American REITs sample, calculating Sharpe and Treynor ratios. The analysis revealed the convenience for a financial investor to select a plurality of specialized property portfolios and to benefit from specific skills of several funds manager, and that more concentrated REITs have better returns, especially when focusing on property-types rather than on geographical areas.

Looking at the Italian market Morri and Lee (2009) have focused their attention on Italian retail funds performance, identifying and analyzing funds characteristics. By estimating the relationship between Sharpe ratio and funds characteristics using ordinary least squares regressions, the research highlighted that active property management, fund setup typology and Herfindahl Index for property typologies have a significant influence on the risk-adjusted performance.

3. Empirical Analysis

3.1 The Sample

The analysis has been conducted on a sample of 20 Italian listed retail funds, over the period 2007-2010; in particular this paper uses of half-yearly data.

The choice of a time span of 4 years was influenced by the unavailability of detailed data before 2007.

The significance of the sample on the horizon of observation is of 82,16% of the Italian retail funds on December 31, 2010 (Assogestioni, 2010)

The sample was built using the, annual and half-yearly data provided by "Report of Scenari Immobiliari" which provided information in detail on the geographical and sectorial distribution of property, as well as financial reports of retail funds, in order to identify what are the typologies of investment in which the fund invests its asset under management.

In the sample, real estate funds were classified in terms of :

- fund setup typology: blind pool funds and seeded funds
- the modality of distribution of proceeds to underwriters: income distribution and income accumulation funds, mixed. The sample is composed as follows:

		FUND SETUP TYPOLOGY		MODE OF PROCEEDS DISTRIBUTION		
SGR	FUNDS	BLIND POOL	SEEDED FUND	DISTRIBUTION	ACCUMULATION	MIX
Aedes Bpm Real Estate	Investietico	BP		D		
Beni Stabili	Immobilium 2001	BP				M
Beni Stabili	Invest Real security (IRS)	BP		D		
Beni Stabili	Securfondo	BP				M
BNL	BNL Portafolio Immobiliare	BP		D		
BNL	Estense grande distribuzione	BP		D		
Caam Re Italia	Caam RE Europa	BP		D		
Caam Re Italia	Caam Re Italia	BP		D		
Fimit Sgr	Fondo Alpha		PB			M
Fimit Sgr	Fondo Beta		PB			M
First Atlantic	Atlantic 1		PR	D		
First Atlantic	Atlantic 2		PR	D		
Investire Immobiliare	Obelisco	BP		D		
Torre	UniCredito Immobiliare Uno	BP		D		
Pirelli	Olinda Fondo Shop		PR	D		
Pirelli	Tecla Fondo Uffici		PR	D		
Polis Fondi Immobiliari	Polis	BP			A	
Rreef Fondimmobiliari	Piramide Globale	BP			A	
Rreef Fondimmobiliari	Valore Immobiliare Globale	BP		D		
Sorgente	Caravaggio	BP				M

Source: Assogestioni data processed by the author

To conduct the analysis the attention is focused, as previously mentioned, on fund setup typology: blind pool funds and seeded funds, in order to find significant differences and analogies in terms of investment and of composition choices.

With regard to *prevalent investment* represented by investment in properties and property rights, blind pool funds have a lower average share of properties in the portfolio (80%) than seeded funds (89%) which have a market share above 94% of total assets (Table 1).

Table 1- Investment in properties and property rights of blind pool and seeded funds (time horizon 2007-2010)

IDR	30/06/2007	31/12/2007	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010
Investietico	89,01	89,43	94,51	94,75	95,00	93,03	96,02	93,93
Immobilium 2001	85,52	63,59	83,35	82,71	84,26	83,79	85,27	73,76
Invest Real security (IRS)	84,84	87,22	98,46	96,24	98,28	96,47	89,76	92,35
Securfondo	82,86	78,77	77,55	83,99	87,40	81,80	77,57	78,02
BNL Portafolio Immobiliare	79,16	74,31	75,42	74,48	74,59	68,73	70,88	68,81
Estense grande distribuzione	94,28	94,24	96,65	95,13	96,64	95,79	96,75	95,96
Caam Re Europa	33,04	34,65	36,90	41,35	37,97	37,69	36,14	36,11
Caam Re Italia	88,07	87,34	78,08	83,90	81,54	89,78	90,57	89,47
Obelisco	88,79	87,53	90,96	91,39	85,18	88,63	90,26	91,05
UniCredito Immobiliare Uno	78,42	74,00	74,00	73,97	74,62	71,06	70,2	68,25
Polis	77,56	86,54	79,45	87,9	90,89	89,40	86,20	96,1
Piramide Globale	72,33	75,20	50,91	75,63	84,93	83,17	81,72	0
Valore Immobiliare Globale	93,28	92,03	96,73	91,97	91,04	93,81	79,60	72,34
Caravaggio	79,83	81,22	82,3	83,37	84,22	85,77	86,09	86,39
MEAN BPF	80,50	79,01	79,66	82,63	83,33	82,78	81,22	74,47
Fondo Alpha	94,13	90,79	89,59	90,95	90,22	88,49	86,12	87,86
Fondo Beta	80,36	71,88	45,98	64,68	76,62	78,49	80,05	72,79
Atlantic 1	96,52	96,86	96,64	96,70	96,48	95,52	95,57	92,85
Atlantic 2	94,63	98,14	98,89	88,63	97,18	91,21	95,94	94,7
Olinda Fondo Shop	80,29	91,82	91,55	93,66	92,58	87,50	83,95	88,73
Tecla Fondo Uffici	92,32	93,03	93,59	97,55	97,58	96,43	96,85	87,38
MEAN SF	89,71	90,42	86,04	88,70	91,78	89,61	89,75	87,39

Source: Scenari Immobiliari data processed by the author

Retail funds are specialized both at sectorial and geographical levels. With reference to target use, most retail funds invest mainly in properties used for "office" and "commercial", while funds investing in other categories (nursing homes, hospitality, logistic, residential, other and industrial) do not exceed 6%.

In the office sector the seeded funds carry the highest investment, while in the commercial sector a reverse trend is quite evident.

In the nursing homes compartment, seeded funds present no investments, while they increase their investments in the hospitality during the period 2007-2009 until they reach 9.68%, compared to the blind pool funds reducing their investment in the same sector.

In residential, the investment is slightly higher for the blind pool funds which show a share of assets invested in "Other" and "Industrial" only at the end of 2010 (Table 2).

Table 2- Average Asset allocation for property typologies of blind pool and seeded funds (time horizon 2007-2010)

		06/30/2007	12/31/2007	06/30/2008	12/31/2008	06/30/2009	12/31/2009	06/30/2010	12/31/2010
OFFICE	BPF	35,79	33,74	31,37	33,76	34,45	37,5	40,47	35,35
	SF	64,1	62,47	61,75	62,87	61,73	56,94	58,07	57,96
COMMERCIAL	BPF	35,01	37,37	39,97	39,47	39,1	37,92	30,61	30,79
	SF	18,95	19,06	19,3	21,3	19,12	20,99	20,42	23,09
MIXED	BPF	10,98	9,72	7,68	9,9	10,3	10,09	8,65	0
	SF	8,1	8,18	8,34	6,12	6,8	7,12	7,26	4,84
NURSING HOMES	BPF	6,08	5,36	9,31	6,1	6,05	5,79	2,99	1,75
	SF	0	0	0	0	0	0	0	0
HOSPITALITY	BPF	5,05	6,13	4,33	3,02	3,15	2,84	2,13	0
	SF	2,63	3	4,12	4,75	4,82	9,68	4,47	0,86
LOGISTIC	BPF	5,13	5,72	5,41	6,03	4,91	5,12	7,3	2,15
	SF	1,78	1,72	1,67	1,57	1,42	1,44	1,48	4,67
RESIDENTIAL	BPF	1,92	1,92	1,9	1,91	1,99	1,94	6,93	8,28
	SF	1,57	2,63	1,67	0,01	2,84	0,01	0	1,67
OTHER	BPF	0	0	0	0	0	0	0	3,02
	SF	2,3	2,31	2,3	2,71	2,62	3,12	7,55	0
INDUSTRIAL	BPF	0	0	0	0	0	0	0	11,48
	SF	0,59	0,64	0,86	0,69	0,67	0,72	0,72	6,88

Source: Scenari Immobiliari data processed by the author

With regard to asset allocation for property locations for macro-area it has been noted how funds are specialized, as they invest primarily in Northwest and Central areas rather than in the South and in the Islands.

Table 3- Average Asset allocation for property locations (macro-area) of retail funds (time horizon 2007-2010)

	06/30/2007	12/31/2007	06/30/2008	12/31/2008	06/30/2009	12/31/2009	06/30/2010	12/31/2010
NORTH WEST	44,62	43,3	47,01	48,14	48	47,56	48,25	43,72
NORTH EAST	13,86	14,06	14	13,83	13,75	13,29	13,46	13,82
CENTRE	33,38	33,7	28,85	28,03	27,84	28,08	28,27	27,19
SOUTH	5,59	6,13	8,61	7,06	7,31	6,91	7,1	7,21
ISLAND	2,51	2,78	2,74	2,91	2,9	3,71	2,9	3,04

Source: Scenari Immobiliari data processed by the author

The analysis, which has been conducted with particular reference to regions, shows that fund investments are concentrated in Lombardy for the Northwest, in Emilia Romagna for the Northeast, while there is a prevalence of investments in Lazio for the Central area.
In particular in Lombardy blind pool funds represent a larger investment (43.65%), although decreasing over time, and much larger investments are also found in Emilia Romagna.

In relation to Lazio, where there are relevant investments, the seeded funds hold a larger share (39.89%) compared to blind pool funds holding (21.65%) (Table 4).

Table 4- Average asset allocation for properties locations (Regions) of blind pool and seeded funds (time horizon 2007-2010)

		06/30/2007	12/31/2007	06/30/2008	12/31/2008	06/30/2009	12/31/2009	06/30/2010	12/31/2010
Valle d'Aosta	BPF	0	0	0	0	0	0	0	0
	SF	0	0	0	0	0	0	0	0
Piedmont	BPF	3,09	3,01	3	2,7	2,67	2,46	2,87	2,85
	SF	7,29	8,34	8,5	8,74	8,87	9,91	9,84	9,95
Lombardy	BPF	42,55	40,52	45,33	46,44	43,42	40,13	50,47	40,34
	SF	32,46	31,84	38,37	32,7	33,09	31,34	31,53	31,90
Liguria	BPF	0,63	0,69	0,69	0,89	0,92	1	1,06	1,14
	SF	0,39	0,62	0,65	0,67	0,57	0,41	0,41	0,45
Emilia Romagna	BPF	10,78	10,59	10,27	10,6	10,36	9,54	10,44	10,84
	SF	1,97	2,04	2,13	2,05	2,13	2,21	2,71	2,36
Veneto	BPF	3,25	3,65	4,34	3,53	3,91	4,14	4,41	4,52
	SF	1,11	1,45	0,71	1,03	0,62	0,76	0,76	0,84
Trentino Alto Adige	BPF	0	0	0	0	0	0	0	0
	SF	0	0	0	0	0	0	0	0
Friuli Venezia Giulia	BPF	2,55	2,7	3	2,65	2,39	2,2	2,35	2,37
	SF	1,72	1,53	3,17	1,57	1,5	1,69	1,68	1,52
Tuscan	BPF	3	4,11	1,47	1,23	0,8	0,79	0	0
	SF	0,37	0,27	0,23	0,29	0	1,15	0	0
Marche	BPF	0,5	0,5	0,52	0,52	0,07	0,06	0,05	0,06
	SF	1	0,96	0,98	0,99	0,82	1	0,99	0,98
Umbria	BPF	1,44	1,66	1,51	1,53	0,95	0,97	0,95	1,06
	SF	2.26	2.5	2.81	3.5	3.62	0.43	0	3.71
Lazio	BPF	24,72	26,15	19,88	22,42	19,56	19,97	20,82	19,70
	SF	42,99	41,4	40,47	37,96	39,2	37,46	42,27	37,39
Molise	BPF	0	0	0	0	0	0	0	0
	SF	0,15	0,14	0,13	0,14	0,1	0,09	0	0
Abruzzo	BPF	0,91	0,84	1,15	1,04	0,91	0,82	0,88	0,87
	SF	0	0	0	0	0	0	0	0
Campania	BPF	0,49	0,49	0,52	0,5	0,92	0,94	1,11	1,07
	SF	4,34	4,43	4,31	4,15	4,14	4,26	4,3	4,52
Puglia	BPF	4,31	5,07	6,46	6,89	6	5,67	6,23	6,36
	SF	0,23	0,23	0,17	0,18	0,19	0,19	0,18	0,15
Basilicata	BPF	0	0	0	0	0	0	0	0
	SF	0	0	0	0	0	0	0	0
Calabria	BPF	0	0	0	0	0	0	0	0
	SF	0	0	0	0	0	0	0	0
Sicily	BPF	0,89	0,95	0,23	0,22	0,22	0,2	0,5	0,48
	SF	0,76	0,84	0,87	0,9	0,92	0,74	0,74	0,94
Sardinia	BPF	0,96	1,06	1,27	1,24	1,34	0,09	1,19	1,19
	SF	3,04	3,43	4,55	5,22	5,29	8,41	4,98	5,30

Source: Scenari Immobiliari data processed by the author

Then the attention is focused on the degree of portfolio concentration, by calculating the Herfindahl index for property-typologies and property locations of each fund in the period 2007-2010.

Herfindahl indexes highlight the strong concentration of portfolio at the sectorial and geographical levels because funds have respectively a Herfindahl index of 54 units for property-typologies and 43 for property locations.

In particular Herfindahl index for property-typologies is greater for seeded funds ranging from 60 to 68 units than for blind pool funds ranging from 50 to 54 units (Table 5).

Table 5- Herfindahl index for property-typologies of blind pool and seeded funds (time horizon 2007-2010)

HFDS	30/06/2007	31/12/2007	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010
Investietico	50,105	42,852	44,195	42,362	42,471	42,637	43,018	42,955
Immobilium 2001	72,284	66,519	54,829	54,780	55,313	55,584	73,052	53,808
Invest Real security (IRS)	40,567	40,504	36,016	35,270	34,375	33,343	50,031	35,549
Securfondo	43,598	41,949	39,572	37,831	35,572	37,871	33,540	35,856
BNL Portafolio Immobiliare	41,575	47,505	47,308	46,447	45,945	47,225	47,202	49,642
Estense grande distribuzione	100	100	100	100	100	100	100	100
Caam Re Europa	26,783	26,935	27,148	27,260	32,640	32,592	32,587	32,553
Caam Re Italia	45,904	45,320	34,397	36,570	38,959	46,517	47,022	46,961
Obelisco	100	100	100	100	100	100	57,902	100
UniCredito Immobiliare Uno	39,647	39,639	42,629	35,497	45,077	43,990	43,007	61,403
Polis	46,009	40,131	35,981	45,349	45,266	46,360	57,213	57,867
Piramide Globale	27,226	50,049	100	100	100	100	100	0
Valore Immobiliare Globale	37,42	37,735	38,011	41,332	47,915	48,001	43,861	43,252
Caravaggio	27,362	27,370	27,546	27,634	27,799	28,539	28,703	28,548
MEAN BPF	49,891	50,465	51,974	52,167	53,667	54,476	54,081	49,171
Fondo Alpha	66,848	66,837	75,120	76,397	70,456	62,385	62,204	59,846
Fondo Beta	63,688	53,449	48,324	57,309	43,013	49,496	41,23	38,638
Atlantic 1	63,791	64,183	64,193	64,321	64,289	64,927	66,623	71,635
Atlantic 2	40,407	40,166	38,889	44,726	44,607	39,376	38,735	39,762
Olinda Fondo Shop	74,081	75,819	77,900	98,826	77,084	99,282	34,236	99,282
Tecla Fondo Uffici	67,560	66,950	65,742	68,838	65,007	66,940	66,401	68,864
MEAN SF	62,729	61,234	61,695	68,403	60,743	63,734	51,572	63,005

Source: Scenari Immobiliari data processed by the author

Even in terms of geography there is a highly concentrated portfolio albeit lower than the sector, as the Herfindahl index for property locations is around the 42-45 units for both types of funds, resulting slightly higher for the blind pool funds in the last 5 semesters analyzed (Table 6).

Table 6- Herfindahl index for property locations of blind pool and seeded funds (time horizon 2007-2010)

HFDR	30/06/2007	31/12/2007	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010
Investietico	61,298	60,930	63,742	65,506	65,130	65,418	65,102	65,418
Immobilium 2001	29,503	23,460	32,614	19,158	19,330	19,864	20,394	18,332
Invest Real security (IRS)	24,641	24,646	28,090	25,123	24,991	22,999	28,018	27,867
Securfondo	21,460	21,575	23,187	23,011	21,709	27,119	24,720	25,589
BNL Portafolio Immobiliare	27,872	26,703	26,646	28,133	28,094	29,386	27,139	26,886
Estense grande distribuzione	45,207	40,898	37,629	36,787	33,325	100	29,261	29,523
Caam Re Europa	60,857	59,910	59,653	63,974	59,073	58,954	58,904	58,669
Caam Re Italia	45,108	66,504	33,063	34,838	32,386	21,709	22,398	24,635
Obelisco	61,679	61,010	61,674	62,550	59,041	59,645	60,538	61,252
UniCredito Immobiliare Uno	35,765	35,773	43,010	43,323	43,677	20,572	42,934	42,878
Polis	41,838	22,786	23,989	35,955	36,252	36,726	45,862	45,898
Piramide Globale	40,591	34,465	100	100	100	100	100	0
Valore Immobiliare Globale	78,728	78,440	77,990	76,513	74,402	74,318	69,543	67,641
Caravaggio	31,656	31,646	15,626	31,795	32,091	32,141	33,524	32,370
MEAN BPF	43,300	42,053	44,780	46,190	44,964	47,775	44,881	37,640
Fondo Alpha	64,324	65,314	63,816	66,613	67,544	68,237	67,053	64,45
Fondo Beta	47,977	43,971	41,556	36,396	37,464	41,615	60,699	37,509
Atlantic 1	47,308	44,287	44,497	45,686	46,050	46,296	46,749	50,257
Atlantic 2	39,492	39,506	39,601	37,388	37,785	36,156	36,263	36,046
Olinda Fondo Shop	28,680	28,067	29,683	30,236	31,600	27,450	27,496	27,778
Tecla Fondo Uffici	26,195	23,927	25,428	24,279	25,279	26,467	26,365	23,219
MEAN SF	42,329	40,845	40,764	40,100	40,954	41,037	44,104	39,877

Source: Scenari Immobiliari data processed by the author

The analysis was completed by examining the *residual investment* in which a fund invests its asset under management (table 7 and 8). Both types of funds have the similar values of liquidity equal to 4.72% for the blind pool funds and 4.68% for the seeded funds, while in the financial instruments there is a sharp difference between the blind pool funds recording an average investment of 9.55% and the seeded with 1.49%.

With reference to financial instruments the blind pool funds have seen a slight decline of investments between 2008 and 2009, while the seeded funds have always remained on 1% reaching a peak of 3.03% in December 2008.

Table 7- Investment in liquidity of blind pool and seeded funds (time horizon 2007-2010)

LIQ	30/06/2007	31/12/2007	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010
Investietico	4,21	8,68	3,65	4,48	4,00	5,02	3,27	5,20
Immobilium 2001	11,89	5,41	13,26	4,73	0,73	2,13	1,95	1,58
Invest Real security (IRS)	13,36	2,18	0,25	2,39	0,44	2,44	8,78	0,76
Securfondo	0,98	3,24	6,38	5,53	1,89	4,26	2,30	2,10
BNL Portafolio Immobiliare	1,18	1,07	2,30	0,75	0,79	0,81	1,68	6,55
Estense grande distribuzione	0,58	0,46	0,93	0,74	1,45	1,28	1,28	1,41
Caam Re Europa	9,07	2,95	6,27	3,48	2,25	4,02	3,38	6,49
Caam Re Italia	5,98	9,12	17,5	1,57	2,23	2,50	1,30	5,45
Obelisco	10,21	4,25	8,45	7,98	5,77	10,36	8,72	8,23
UniCredito Immobiliare Uno	0,87	0,47	0,23	0,13	1,01	2,00	0,97	0,90
Polis	1,78	7,12	10,65	3,56	0,81	1,56	10,32	1,31
Piramide Globale	23,47	0,27	32,37	20,34	10,97	12,67	1,67	39,93
Valore Immobiliare Globale	0,35	1,18	1,52	5,84	5,84	3,25	2,39	1,98
Caravaggio	2,07	2,53	1,51	1,28	0,44	1,58	1,77	1,29
MEAN BPF	6,14	3,50	7,52	4,49	2,76	3,85	3,56	5,94
Fondo Alpha	0,56	0,06	0,09	0,07	1,02	2,71	4,85	2,75
Fondo Beta	5,48	9,79	37,38	9,39	3,17	2,61	1,49	10,27
Atlantic 1	0,25	0,25	0,75	0,29	0,80	1,11	1,26	3,28
Atlantic 2	3,53	0,56	0,35	10,31	1,30	7,49	2,95	2,31
Olinda Fondo Shop	5,30	5,26	6,89	5,35	6,56	11,55	9,16	9,43
Tecla Fondo Uffici	6,46	5,95	5,12	0,97	1,31	2,66	2,30	11,66
MEAN SF	3,60	3,65	8,43	4,40	2,36	4,69	3,67	6,62

Table 8- Investment in financial instruments of blind pool and seeded funds (time horizon 2007-2010)

SF	30/06/2007	31/12/2007	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010
Investietico	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Immobilium 2001	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Invest Real security (IRS)	0,27	0,27	0,29	0,28	0,31	0,31	0,32	0,34
Securfondo	15,03	12,46	15,11	9,65	9,81	7,89	8,26	8,12
BNL Portafolio Immobiliare	14,45	19,25	17,09	19,36	16,70	23,05	19,47	13,77
Estense grande distribuzione	3,01	3,74	1,27	2,59	0,66	1,44	0,64	2,00
Caam Re Europa	53,59	62,25	56,7	48,67	43,33	46,99	48,49	49,33
Caam Re Italia	0,99	2,42	2,67	7,75	7,62	1,43	1,52	1,66
Obelisco	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
UniCredito Immobiliare Uno	18,88	23,43	23,44	23,68	21,40	23,77	27,33	29,33
Polis	0,00	2,55	0,00	0,00	0,00	0,00	0,00	0,00
Piramide Globale	3,58	23,01	13,33	1,64	1,86	1,89	14,16	15,37
Valore Immobiliare Globale	2,08	4,98	0,00	0,01	0,23	0,16	15,31	24,02
Caravaggio	7,51	8,13	8,52	8,70	9,05	9,41	9,90	10,71
MEAN BPF	8,53	11,61	9,89	8,74	7,93	8,31	10,39	11,05
Fondo Alpha	1,48	2,97	2,83	2,06	1,72	1,45	1,21	1,21
Fondo Beta	4,25	6,46	3,26	13,95	3,79	3,48	0,22	0,57
Atlantic 1	1,67	1,37	0,86	1,40	0,92	1,62	1,37	2,76
Atlantic 2	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,72
Olinda Fondo Shop	0,55	0,53	0,46	0,38	0,30	0,24	0,97	0,92
Tecla Fondo Uffici	0,53	0,47	0,41	0,36	0,27	0,24	0,14	0,03
MEAN SF	1,41	1,97	1,30	3,03	1,17	1,17	0,65	1,20

Source: Scenari Immobiliari data processed by the author

3.2 Methodology

In order to achieve the aim of paper, some hypotheses of research were formulated:

Hp1: there is a significant relationship between portfolio composition choices and real estate funds performance

Hp2: sectorial diversification have a major impact on fund performance than geographical diversification, in a Country, in line with the literature

Hp3: the components of residual and prevalent investment contribute to the improvement of fund performance

In order to verify these hypotheses, the Sharpe ratio was built and a "multiple regression analysis" was made among the Sharpe ratio and the variables examined, in order to assess which variables most impact on fund performance.

Among the several RAP measures, the Sharpe ratio was chosen, as despite being criticized it, is widely used from by theoretical and practical points of view (Scholz and Wilkens 2005, Eling 2008, Morri and Erbanni 2008, Morri and Lee 2009, Giannotti and Mattarocci 2010). The Sharpe ratio was built taking into account the half-yearly average return of each fund and risk measured in terms of standard deviation of daily returns into semesters.

The half-yearly average return of funds was calculated considering the return for each trading day built up with the logarithm of the ratio between the current closing price plus dividends eventually paid and the closing price in the previous trading day. In formulas:

$$_{t-1}R_t = \ln\left(\frac{P_t + D_t}{P_{t-1}}\right)$$

where:

ln is the natural logarithm.

$_{t-1}R_t$ = daily return

P_t is the closing price at time t,

D_t is the dividend eventually paid at time t

P_{t-1} is the closing price at time t-1,

The daily returns thus defined, it was possible to calculate average returns among daily returns within the half-year and their respective standard deviation, in this way obtaining the half-yearly Sharpe ratio for each fund.

The risk free rate was calculated as the average of rate of return of Italian Treasury Bills in several semesters of the period examined (2007-2010).

$$S_i = \frac{R_i - R_f}{\sigma_i}$$

where

R_i represents the half-yearly average return on a fund,

R_f is the risk-free rate

σ_i is the standard deviation of the daily returns in the semester.

Starting from Morri and Lee's work (2009) which estimated the relationship between the performance and characteristics of Italian real estate funds by means an OLS regression, this paper analyzes the impact of a set of variables on the Sharpe ratio using a *pooled OLS model* which is coherent with the data examined.

The analysis was also carried out applying the *panel model with fixed effects*, in order to verify if this could add value to the analysis conducted.

The regression examined is the following:

$$Sharpe_i = \beta_0 + \beta_1 Age_i + \beta_2 IDR_i + \beta_3 HFDS_i + \beta_4 HFDR_i + \beta_5 IM_i + \beta_6 Liq_i + \beta_7 SF_i + \beta_8 foa_i + \beta_9 fda_i + \varepsilon_i$$

where:

Age_i = number of semesters since inception of fund i at time t,

IDR_i = value of investments in properties and property rights considered, given by the ratio between the value of the properties and total assets

$HFDS_i$= fund Herfindahl-Hirschman index for property-typologies (9 typologies, according to "Scenari Immobiliari")

$HFDR_i$= fund Herfindahl-Hirschman index for property locations (20 regions, according to "Scenari Immobiliari")

IM_i= average property investment determined by the ratio between AUM and the number of properties held directly by the fund

Liq_i = value of liquidity[3] given by the ratio between the value of liquidity and total assets

[3] Liquidity includes: cash, liquidity to be received from for transactions to be settled, committed liquidity for operations to be adjusted (Statement of assets and liabilities, Half year Report of the funds)

SF_i = value of financial instruments[4] given by the ratio between the value of financial instruments and total assets

Two dummy variables were used:

Fao_i = fund setup typology (0 seed fund, 1 blind pool fund).

Fda_i= modality of distribution of proceeds to underwriters (0 other modality of distribution of proceeds, 1 income distribution fund)

In this work sectorial and geographical concentration indexes were constructed. In formula: $HHI = \sum_{i=0}^{n} (q_i * 100)^2$

where q_i indicates in the:

- Herfindahl-Hirshman for property-typologies, the investment percentage of properties in different sectors: office, commercial, mixed, RSA, hospitality, logistics, residential, other, industrial.
- Herfindahl-Hirshman for property locations, the percentage of investment of properties in the 20 Italian regions analyzed.

This model, compared to Morri and Lee's work, adds the variables of:

-the investment in properties and property rights (IDR), and average property investment (IM),

-considers also the residual investment components: the value of liquidity (Liq), and financial instruments (SF) .

[4] Financial instruments include listed financial instruments such as controlling interest and non-controlling, other equity securities, debt instruments, shares in O.I.C.R, and unlisted financial instruments such as equities, debt instruments, shares in O.I.C.R (Statement of assets and liabilities, Half year Report of the funds)

3. Results

3.1 The impact of real estate portfolio composition choices on funds performance

In the period 2007-2010 Sharpe ratios of funds are higher for seeded funds than for the blind pool funds. A higher Sharpe ratio corresponds to a better performance in relation to the unit of risk (Table 9).

Table 9- Sharpe ratio of blind pool and seeded funds (time horizon 2007-2010)

Sharpe	06/30/2007	12/31/2007	06/30/2008	12/31/2008	06/30/2009	12/31/2009	06/30/2010	12/31/2010
Investietico	0,207	-0,122	-0,082	-0,186	0,052	0,027	0,100	0,110
Immobilium 2001	0,210	0,112	-0,050	-0,020	-0,062	0,055	-0,154	-0,028
Invest Real security (IRS)	0,280	-0,168	-0,052	-0,260	0,001	0,058	0,051	0,064
Securfondo	0,074	-0,028	-0,050	0,004	-0,002	-0,026	-0,066	0,012
BNL Portafolio Immobiliare	0,220	-0,108	-0,093	-0,154	0,129	-0,061	-0,107	0,088
Estense grande distribuzione	-0,034	0,074	-0,113	0,047	-0,047	-0,014	0,000	-0,004
Caam Re Europa	-0,024	-0,068	-0,263	-0,211	0,054	-0,118	0,019	-0,001
Caam Re Italia	0,136	-0,007	-0,055	-0,197	0,018	-0,013	0,049	0,204
Obelisco	0,052	0,013	-0,291	-0,241	0,033	0,017	0,004	0,043
UniCredito Immobiliare Uno	0,229	-0,067	-0,162	-0,141	0,081	0,099	-0,009	0,042
Polis	0,065	-0,052	-0,121	-0,144	0,057	0,019	0,039	0,005
Piramide Globale	0,169	0,053	-0,039	-0,084	-0,084	0,062	0,003	0,053
Valore Immobiliare Globale	0,185	0,055	0,025	-0,066	0,013	0,000	-0,098	0,034
Caravaggio	-0,060	0,051	-0,074	0,027	-0,111	0,050	-0,010	0,070
MEAN BPF	0,122	-0,019	-0,101	-0,116	0,009	0,011	-0,013	0,049
Fondo Alpha	0,152	0,075	-0,149	-0,186	0,016	0,102	-0,032	0,043
Fondo Beta	0,118	0,114	-0,031	-0,084	-0,110	0,131	-0,059	0,043
Atlantic 1	0,150	-0,143	-0,083	-0,052	0,093	0,095	-0,010	-0,026
Atlantic 2	0,196	-0,073	-0,013	-0,073	-0,018	0,012	-0,105	-0,006
Olinda Fondo Shop	0,195	-0,048	-0,087	-0,116	0,001	0,061	0,025	0,043
Tecla Fondo Uffici	0,223	-0,033	0,031	-0,058	0,000	0,032	0,000	0,034
MEAN SF	0,172	-0,018	-0,055	-0,095	-0,003	0,072	-0,030	0,022

Source: Datastream data processed by the author

The main descriptive statistics of the sample reported in table 10 show that the performance of the funds examined, as measured by Sharpe ratio, ranges between a minimum of -0.29 and a maximum of 0.28, and real estate funds have an average performance of -0.0026 and a low volatility.

The average age is 7 years as there are funds newly established and others that have an age which reaches 12 years.

On average the portfolio is invested in properties and property rights (IDR) for 83%, in liquidity (Liq) for 4% and in financial instruments (SF) for 7%, which indicates how the residual component has a lower incidence in the portfolio.

The Herfindahl-Hirshman at the sectoral (HFDS) and geographical (HFDR) level presents, respectively, an average concentration of 54 and 43 units indicating a high portfolio concentration.

Finally, we can see the prevalence of blind pool funds (0.70%) than the seeded ones, and the predominance of income distribution funds (0.65%) on those with a mode of distribution of income accumulation funds or mixed.

Tab. 10 – Descriptive statistics (time horizon 2007-2010)

	N	Min	Max	Mean	Std dev
Sharpe	160	-0,29	0,28	-0,0026	0,10323
Age	160	2,17	23,75	13,3536	4,90900
IDR	160	0,00	98,89	83,0652	15,66651
HFDS	160	0,00	100,00	54,8822	22,68500
HFDR	160	0,00	100,00	43,1389	20,02547
IM	160	0,00	47,00	21,3516	7,41800
Liq	160	0,00	39,93	4,7054	6,01099
SF	160	0,00	62,25	7,1337	12,41843
Foa	160	0,00	1,00	0,7000	0,45970
Fda	160	0,00	1,00	0,6500	0,47847

Source: Data processed by the author

The correlations analysis shows significant and positive correlations ($p < 0.01$) highlighting the existence of a moderate positive linear correlation among variables.

As you can see from the table below, among the different variables investigated several variables have a positive correlation of medium intensity.

Moreover, the analysis shows significant and negative correlations between the Sharpe ratio and the financial instruments (Sharpe-SF), indicating how the performance increases in presence of lower investments in financial instruments in the portfolio.

Tab. 11- Correlations (time horizon 2007-2010)

	Sharpe	Age	IDR	HFDS	HFDR	IM	Liq	SF	Foa	Fda
Sharpe	1									
Age	-0,001	1								
IDR	0,084	-0,307**	1							
HFDS	-0,019	-0,291**	0,363**	1						
HFDR	-0,064	0,135	-0,015	0,296**	1					
IM	-0,024	0,230**	-0,026	0,117	0,447**	1				
Liq	0,059	-0,021	-0,426**	0,057	0,089	0,010	1			
SF	-0,162*	0,312**	-0,798**	-0,365**	0,084	0,151	-0,056	1		
Foa	-0,068	0,480**	-0,256**	-0,196*	0,062	0,292**	0,003	0,299**	1	
Fda	-0,027	-0,232**	0,155*	0,099	0,043	-0,076	-0,192*	0,120	-0,023	1

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

Source: Data processed by the author

For the analysis a *pooled OLS model* was applied, which showed a low R^2 (R^2 = 0.046) and a p-value which is not significant. The following table illustrates in detail the regression coefficients and statistics test.

In order to assess the soundness of the results some inferential tests have been carried out, in order to verify that the model is not affected by problems of multicollinearity and heteroskedasticity.

Multicollinearity was verified by calculating of the variance inflation factor (VIF) and the condition indexes.

The VIF are normal except for investment in properties and property rights (IDR), liquidity (Liq) and financial instruments (SF) variables exceeding the thresholds value specified in the literature (3 and 4).

Moreover, the ten dimensions of condition index show high values on the variables already identified by the VIF such as investments in properties and property rights, liquidity and financial instruments relating to the prevalent and residual investment components (Table 13).

The analysis has revealed the presence of the multicollinearity, as you can note from table 12, (model 1) subsequently solved by the ortogonalization (table 12, model 2).

Finally this model does not suffer of heteroskedasticity because the White test is not significant (p-value> 0.05).

Tab. 12- Pooled OLS- Regression Coefficients and Statistics Test (2007-2010)

	Model 1				Model 2			
	Coeff std	t	p-value	VIF	Coeff std	t	p-value	VIF
Cost.		0,656	0,513			-0,100	0,920	
Age	0,075	0,748	0,456	1,584	0,075	0,748	0,456	1,584
IDR	-0,168	-0,645	0,520	10,628	-0,063	-0,645	0,520	1,495
HFDS	-0,072	-0,747	0,456	1,449	-0,072	-0,747	0,456	1,449
HFDR	-0,053	-0,557	0,579	1,450	-0,053	-0,557	0,579	1,450
IM	0,064	0,649	0,518	1,535	0,064	0,649	0,518	1,535
Liq	-0,009	-0,061	0,951	3,194	0,071	0,856	0,393	1,068
SF	-0,337	-1,423	0,157	8,803	-0,198	-2,134	0,034*	1,359
Foa	-0,074	-0,779	0,437	1,437	-0,074	-0,779	0,437	1,437
Fda	0,068	0,696	0,487	1,482	0,068	0,696	0,487	1,482
R^2	0,046							
F(9,150)	0,807		p-value (F)	0,610				
White test	65,167		p-value (χ^2)	0,103				

* Significant at 90%

Source: Data processed by the author

Tab. 13 –Collinearity Diagnostics –Model 1 (2007-2010)

Collinearity diagnostics[a]

Model	Dimension	Eigenvalue	Condition index	Variance Proportions									
				(Constant)	Age	IDR	HFDS	HFDR	IM	Liq	SF	Foa	Fda
1	1	7,629	1,000	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00
	2	,836	3,021	,00	,00	,00	,01	,00	,00	,02	,08	,01	,00
	3	,632	3,475	,00	,00	,00	,00	,00	,00	,23	,01	,00	,05
	4	,353	4,647	,00	,02	,00	,00	,00	,01	,04	,01	,13	,36
	5	,228	5,779	,00	,00	,00	,03	,10	,01	,01	,02	,40	,18
	6	,120	7,979	,00	,10	,00	,00	,44	,01	,00	,01	,22	,02
	7	,094	8,993	,00	,15	,00	,59	,16	,00	,00	,03	,14	,08
	8	,067	10,688	,00	,16	,00	,10	,16	,71	,00	,00	,01	,00
	9	,039	14,047	,01	,54	,02	,26	,12	,20	,00	,02	,09	,16
	10	,001	71,509	,98	,03	,98	,00	,01	,06	,69	,83	,00	,15

a. Dependent variable: Sharpe

Tab. 14 – Collinearity Diagnostics - Model 2 (2007-2010)

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition index	Variance Proportions									
				(Constant)	Age	Unstandardized Residual	HFDS	HFDR	IM	Liq	SF	Foa	Fda
1	1	6,732	1,000	,00	,00	,00	,00	,00	,00	,01	,00	,00	,00
	2	1,100	2,474	,00	,00	,52	,00	,00	,00	,01	,01	,00	,02
	3	,804	2,894	,00	,00	,00	,01	,00	,00	,16	,46	,01	,00
	4	,564	3,456	,00	,00	,05	,01	,00	,00	,67	,16	,00	,03
	5	,299	4,744	,00	,01	,15	,00	,00	,01	,06	,05	,18	,39
	6	,228	5,431	,00	,00	,00	,03	,11	,01	,05	,13	,39	,19
	7	,095	8,431	,01	,02	,02	,51	,50	,00	,01	,17	,01	,12
	8	,092	8,545	,03	,37	,08	,07	,26	,01	,00	,02	,38	,00
	9	,063	10,347	,00	,22	,06	,11	,09	,76	,00	,01	,01	,02
	10	,023	16,943	,96	,37	,10	,26	,03	,20	,04	,00	,03	,24

a. Dependent Variabile:Sharpe

Source: Data processed by the author

The analysis was repeated by applying a *panel model with fixed effects* in order to verify whether the application of the panel model could give an added value to the analysis, improving the results.

The results show the goodness of the model, as they show an increase of R^2 and a significant p-value (F). The independent variables studied explain 33.5% of the variance of the dependent ($R^2 = 0.335$).

Unlike the pooled model, the main explanatory variable of performance is the variable Age (β = -0.005), despite the fund setup typology (β = -0.034) also has a good influence on the Sharpe ratio.

The p-value <0.05 confirms the significance of the same variables, that is, the age and fund setup typology affect performance significantly.

Although the variables on portfolio diversification at the sectorial and geographical levels are not significant, the analysis highlights the inverse relationship that links these types of diversification to the fund performance.

With regard to the residual components of the investment, the Sharpe ratio increases of an average 0.003 for each percentage supplementary point invested in liquidity, while it is evident a negative relationship of dependent variable of -0.001 regarding the investment in financial instruments .

This confirms the results of the analysis of the correlations between the performance index and the variable related to investments in financial instruments.

The adequacy of the panel model was verified by making the "redundant test ", which was significant (p-value = 0.000), the conclusion is that, the two models considered, the panel model is preferable.

Tab. 15 - Panel model with fixed effects: Regression Coefficients and Statistics Test (2007-2010)

	Coeff	T statistic	P-value
Age	-0,005	2,383	0,018 **
IDR	0,000	0,013	0,988
HFDS	-0,000	-0,613	0,540
HFDR	-0,000	-1,390	0,166
IM	0,001	0,858	0,392
Liq	0,003	1,346	0,180
SF	-0,001	-0,758	0,449
Foa	-0,034	-1,713	0,089 *
Fda	0,014	0,711	0,478
R^2	0,335	R^2 adj	0,193
F (28, 131)	2,365	P value (F)	0,000
Observations	160		
N° groups	20		
Obsevation for each group	8		

**Significant at 95%

*Significant at 90%

Source: Data processed by the author

This survey provides useful information concerning the existence of a significant relationship between the real estate portfolio composition choices and performance of retail funds, which makes it was possible to test the first research hypothesis.

In particular, as far as composition choices about sectorial and geographical diversification are concerned, the results obtained from both analysis of the correlations and from the panel model with fixed effects, although not significant, show an inverse relationship between the sectorial and geographical Herfindahl-Hirshman index and the Sharpe ratio, indicating how a better performance is obtain in presence of greater diversification at the portfolio level.

Geographical diversification has a slightly higher impact on performance compared to the sectorial one. This results allows us to give an answer the second research hypothesis.

Finally, with reference to the latest research hypotheses, among the variables examined the prevalent investment has a significant impact within the investment policies of the Italian real estate funds.

With regard to the residual investment, only financial instruments give added value in the pursuit of performance even though in a marginal way.

4. Conclusions

The analysis focused on the investment chioces of Italian retail real estate funds, considering the importance of the different types of investment in the prevalent and residual investment, trying to show how these can affect the performance of funds.

Regarding prevalent investment, from the analysis of the portfolio composition for the target use and location of properties, the retail funds are specialized in commercial and office sector, with a natural concentration of investment, especially in the North and the Centre area.

The analysis of the residual investment detects a lower incidence of investments in liquidity and financial instruments in the investment policies of the retail funds.

The survey was carried out by applying of both a pooled OLS model and panel model with fixed effects; between the two models, the latter is more suitable for the analysis.

The results show that the investment and portfolio composition choices impact on fund performance (Sharpe ratio) and, as evidenced by previous studies (Morri and Lee 2009), the variables having the greatest effect on the latter are the fund setup typology and age.

Particular attention was paid to fund setup typology which affect the investment policies, in fact, for the time span examined, it could be seen that an increase in performance may occur in relation to the fund setup typology, as in presence of seeded funds is possible to obtain a higher performance than in the presence of blind pool funds.

The performance is negatively related to the age of funds, which means that new constitution funds lead to better performance than more mature ones.

This result is coherent with the literature analyzed (O'Neal and Page 2000, Morri and Lee 2009) but it is in contrast with the evidences of Gregory et al. (1997).

The results of the survey show that the sectorial and geographical concentration indexes are negatively correlated with the Sharpe ratio as they highlight that, the performance of the funds improves with appropriate diversification strategies.

Compared to Morri and Lee's work (2009), the model built provides four additional variables including two for property investment which are properties and property rights and average property investment, and two for the residual (liquidity and financial instruments).

The first has a significant effect in the context of investment policies, as highlighted in this work, and one of the components of the residual investment, “financial instruments”, affects fund performance, although in marginal way. Indeed, it is negatively correlated to the Sharpe ratio, that is, a lower share of financial instruments in the portfolio investment would increase the performance, while the variable related to the liquidity has no relevance on the performance.

4.1 Limits of the model and research perspectives

The future perspectives for this work are to extend the sample on a wider time horizon overcoming the limits of the panel model, due to sample size, in order to achieve more significant results.

The analysis of the composition choices, might be particularly interesting, diversifying property portfolios through the use of an additional criteria for the classification of funds, that is the approach based on socio-economic criteria in order to further segment the Italian market funds.

References

Assogestioni, “Rapporto semestrale fondi immobiliari italiani”, 2007-2010

Biasin M. (1995) “L’investimento immobiliare. Mercato, intermediari e forme proprietarie. Il Mulino

Byrne P. and Lee S.L (2010) “Sector, region or function? A MAD reassessment of Real Estate Diversification in Great Britain”, Journal of Property Investment & Finance, Vol. 29 No 2, pp.167 - 189

Blake D., and Timmermann A. (1998) “Mutual Fund Performance: Evidence for the UK”, European Finance Review, Vol. 2, pp. 57-77

Brown, S.J. and Goetzmann W.N. (1995) “Performance Persistence” Journal of Finance, Vol.50 No. 2 pp. 679-698

Cacciamani C. (edited by) (2003) “Il rischio immobiliare. Una soluzione di rating dell’investimento immobiliare”, Egea, Milano.

Cacciamani C. and Ielasi F. (2006) “I fondi immobiliari quotati: andamento e prospettive” in Giannotti C. (edited by), La gestione del fondo immobiliare: Rischio, diversificazione e pianificazione, Egea, Milano.

Cacciamani C. and Ielasi F. (2010) “Il Rischio Immobiliare: una valutazione a livello di singolo investimento e di portafoglio”, in Cacciamani C. (edited by) “Real Estate: economia, diritto, marketing e finanza immobiliare, Egea, Milano.

Carhart M. (1997) “On persistence in Mutual Fund Performance” Journal of Finance, Vol. 52 No. 1 pp. 57-82

Chen Z. and Knez P.J (1996) “Portfolio performance measurament: Theory and Applications, in Review of Financial Studies, Vol. 9 No. 2 pp. 511-556

Chen Joseph, Harrison Hong, Ming Huang and Jeffrey D. Kubik (2004) “Does Fund Size Erode Mutual Fund Performance? The role of Liquidity and Organization”, American review Economic Vol. 94, No. 5 pp. 1276-1302

Caparrelli F. and Camerini E., (2004) “Guida all’Asset Allocation” La gestione del portafoglio: strategica, tattica, dinamica, Bancaria Editrice, Roma

Cucurachi P.A. (1999) "L'analisi della performance e la valutazione degli asset manager" in Carluccio E.M. (ed.), Strategie, benchmarking e performance nell'asset management, Bancaria editrice, Roma

Eichholtz P.M.A, Hoesli M., MacGregor B.D, Nanthakumaran N. (1995): "Real estate portfolio diversification by property type and region", Journal of Property Finance, Vol. 6 No.3, p 39.

Eling M. (2008) "Does the Measure Matter in the Mutual Fund Industry?" Financial Analysts Journal, Vol. 64 No. 3, pp. 1-13.

Fisher, J.D. and Liang, Y. (2000) "Is Property-type Diversification More Important than Regional Diversification?", Real Estate Finance, Vol. 17 No. 3, pp. 35-40.

Gabrielli L. and Lee S.L. (2009) "The Relative Importance of Sector and Regional Factors in Italy" Journal of Property Investment & Finance, Vol.27 No. 3, pp 277-289.

Gallo J.G, Lockwood L.J. and Rutherford R.C. (2000) "Asset allocation and the Performance of Real Estate Mutual Funds", Real Estate Economics, Vol. 28 No. 1, pp. 165-184.

Giannotti C. and Mattarocci G. (2006) "La costruzione di un portafoglio immobiliare e i criteri di diversificazione" in Giannotti C. (edited by), "La gestione del fondo immobiliare: Rischio, diversificazione e pianificazione", Egea, Milano.

Giannotti C. and Mattarocci G. (2008) "Risk diversification in a real estate portfolio: evidence from the Italian market", Journal of European Real Estate Research, Vol. 2 No. 3, pp. 213-234.

Giannotti C. and Mattarocci G. (2009) "How to evaluate risk for Italian real estate funds", Journal of European Real Estate Research, Vol. 2 No. 2, pp. 132-150.

Giannotti C. and Mattarocci G. (2010) "The role of risk measures choices in ranking real estate funds: evidence from the Italian market", ERES Conference, Milano

Giannotti C. and Mattarocci G. (2012) "I fondi immobiliari: tipologie, disciplina e leva finanziaria" in Cacciamani C. (edited by) Real Estate: Economia, diritto, marketing e finanza immobiliare, Egea, Milano.

Glascock J.L. and Lynne J. K. (2007) "The Relative Effect of Property Type and Country Factors in Reduction of Risk of Internationally Diversified Real Estate Portfolios", SSRN.

Hamelink F., Hoesli M., Lizieri C., MacGregor B.D. (2000) "Homogeneous Commercial Property Markets Groupings and Portfolio Construction in the United Kingdom," Environment and Planning Vol. A, No. 32, pp. 323-344.

Hoesli M., Lizieri C, MacGregor, (1997) "The Spatial Dimensions of Investment performance of UK Commercial Property", Urban Studies, Vol. 34 No. 9 pp. 1475-94

Hoesli M. and Morri G., (2010) "Fondi comuni d'investimento immobiliari italiani" in Hoesli M. and Morri G. (edited by) Investimento Immobiliare: Mercato, valutazione, rischio e portafogli", Hoepli, Milano.

Indro D.C., Jiang C.X., Hu M.Y., Lee W.Y, (1999) "Mutual Fund Performance: Does Fund Size Matter?", Financial Analysts Journal Vol. 55, pp. 74-87.

Kothari, S. P. and Warner, J. B. (2001) "Evaluating Mutual Fund Performance", Journal of Finance, Vol. 56 No. 5, pp. 1985-2010.

Lee, S. L. (1992) "Emerging Concepts for the Management of Portfolios and the Role of Research, Property in the Portfolio Context*"* Society of Property Researchers, London.

Lee S.L. (2001) "The Relative Importance of Property Type and Regional Factor in Real Estate Returns", Journal of Real Estate Portfolio management, Vol.7 No. 2, pp. 159-168.

Lee S.L (2002) "Correlation Shifts and Real Estate Portfolio Management", The ARES Annual Meeting, Naples, Florida.

Lee, S. L. and Byrne P. J. (1998) "Diversification by Property type, Region or Function? A Mean Absolute Deviation Optimization", Journal of Property Valuation and Investment, Vol. 16 No. 1, pp. 38-56.

Lee, S and Devaney, S. (2007) "The Changing Importance of Sector and Regional Factors in Real Estate Returns: 1978-2002", Journal of Property Research, Vol. 24 No.1, pp. 55-69.

Lee S.L and Stevenson S. (2005) "Real Estate Portfolio Construction and Estimation Risk", Journal of Property Investment & Finance, Vol. 23 No. 3 pp. 234-253

Leland H.E. (1999) “Beyond Mean–Variance: Performance Measurement in a Nonsymmetrical World”, Financial Analysts Journal, Vol. 55, No. 1 pp. 27-36.

Malizia E.E.E.R.A and Simons (1991) “Comparing regional classifications for real estate portfolio diversification”, Journal of Real Estate Research, Vol. 6. No 1 pp 53-77

Markowitz, H. M. (1952) “Portfolio Selection”, Journal of Finance, Vol. **7**, No. 1 pp. 77-91

Morri G. and Erbanni A. (2008) “Diversificazione del rischio nella gestione di portafogli immobiliari: analisi della performance dei REITs americani”, Finanza Marketing e Produzione, EGEA, No. 3.

Morri G. and Lee S.L. (2009) “The performance of Italian real estate mutual funds”, Journal of European Real Estate Research, Vol. 2 No. 2, pp. 170-185

Mueller G.R. (1993) “Refining economic diversification strategies for real estate portfolios” Journal of Real Estate Research, Vol. 8 No 1, pp 55-68.

O’Neal E.S. and Page D.E. (2000) “Real Estate Mutual Fund: Abnormal Performance and Fund Characteristics”, Journal of Real Estate Portfolio Management, pp. 239-247

Otten R. and Bams D. (2002) “European Mutual Fund Performance”, European Financial Management, Vol. 8 No. 1 pp. 75-101

Plantinga A. and de Groot S. (2001) “Risk-adjusted Performance measures and implied risk-attitudes”, SSRN.

Porzio C. and Sampagnaro G. (2007) “Il ruolo del real estate nella diversificazione del portafoglio” in Porzio and Sampagnaro (edited by) L’investimento immobiliare: valutazione, rendimenti, asset allocation, Bancaria Editrice, Roma.

Scenari Immobiliari, “ I fondi immobiliari in Italia e all’estero”, 2007- 2010

Scholz H. and Wilkens M, (2005) **“**A Jigsaw Puzzle of Basic Risk-adjusted Performance Measures” The Journal of Performance Measurement, pp. 57-64

Sharpe W.F. (1966) “Mutual Fund Performance”, Journal of Business, Vol.39, pp. 119-138

Sharpe W.F. (2007) “Expected Utility Asset Allocation”, Financial Analysts Journal, Vol. 63 No. 5, pp. 18–30.

Young M. S. (2000) “REIT Property Type Sector Integration”, Journal of Real Estate Research, Vol.19 No. 1, pp. 3-21

Young M.S. and Graff R.A. (1995), “Real estate is not normal: a fresh look at real estate return distribution”, Journal of Real Estate Finance and Economics, Vol. 10, No. 3, pp. 225-259

Viezer, T.W. (2000) “Evaluating Within Real Estate Diversification Strategies”, Journal of Real Estate Portfolio Management, Vol. 6 No. 1, pp 75-98.