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Nature and Performance of Portuguese Real Estate Investment Funds

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ABSTRACT

Portuguese Real Estate Investment Funds are twenty years old and currently growing at unprecedented pace. Tax benefits and current market circumstances are the main drivers of interest on this type of institutional investment. In this paper a characterization and analysis of their nature, and a comparison against other indirect property investment vehicles is presented. Issues like structure, valuation, management, regulations and economical importance are addressed. A study of total return time series, covering trend analysis, descriptive statistics and return distributions, is developed. Evidence of the importance of endogenous factors in performance explanation and conclusive verification of non-normality in return distributions are presented, pointing towards the need of further research on predictability issues.

Keywords : Real Estate Funds, Return Distributions, Performance Prediction

1. INTRODUCTION

Real Estate Investment Funds (REIFs) were legally established in Portugal in 1986. A total of 114 different real estate funds has been established to date, of which 16 are open-end and 98 are closed-end funds, with a total asset value of 8800 million euros (source *Comissão de Mercado de*

Valores Mobiliários[1], August 2006). These are administered by a total 29 managerial societies, with only 9 being responsible for more than 85% of the global asset volume and mostly related to the major financial groups acting on the national market.

Like in other markets, REIFs are an indirect property investment vehicle with exclusive tax exemptions. General reasons for exempting indirect vehicles of real estate investment are the intention to make investment on the property market more accessible to the general public and the purpose to create favorable conditions for the overall increase of institutional investment. The relevance given to institutional investment on property can be justified on social and economical reasons, regarding housing development, property market stability, urban land development, induction of national and international investment in a primary industry and many others. Positive transparency and maturity effects on the real estate industry altogether are also non-negligible (D'Arcy and Lee, 1998) as factors for the establishment of the present fund's legal framework.

The property fund industry currently manages a global Net Asset Value (NAV) of property based investment considerably larger than that of Pension Funds and major national real estate operating companies, which in turn have no special tax treatment. In fact, REIFs are the major indirect real estate investment vehicle for plan sponsors, private companies and other institutional investors acting in a long-term buy-and-hold perspective. Evidence supporting this reality is the factual non-existence of any property investment companies quoted on the *Lisbon Euronext Stock Exchange*. On another key, a large number of closed-end funds have lately been originated in very limited or even single sets of investors, which have incorporated capital under that specific legal form mainly with the objective of being able to profit from this fiscal regime for very specific property investments, mostly opportunistic ones. This situation is built on the same legal framework, but is questionable for not complying with some of the principles behind it, especially with the diversification of the investor base.

The Portuguese property market has changed dramatically in the last 20 years. The REIF industry has been a main actor in this evolution. Exogenous factors like significant international investment since the 1990's, and changes in corporate real estate strategies, among others, have also contributed to this progress. Some of the historical environmental constraints to the structure and development of property investment, like the lack of "institutional quality" office property offer and the nationalized structure of the financial market, have largely been diminished or eliminated. However, reforms in other areas, such as rental laws, lease market structure and property taxes, have been less effective. Overall, the market and its players do not have the same kind of maturity and background experience on stable environmental conditions as other reference markets in the EU (D'Arcy and Lee, 1998).

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[1] *Comissão de Mercado de Valores Mobiliários* (CMVM) is the Portuguese equivalent to the Securities Exchange Commission.

Internationalization of REIFs' portfolios is taking its first steps. It was until recently limited by regulatory issues, namely the possibility of investment through indirect vehicles. Cumulative taxation problems remain due to non-integrated tax regulations across the EU. Therefore, their property asset universe still is mostly national and mainly built on the prime office market (Lisbon and Porto), top commercial areas (mainly large shopping centers in Lisbon and main district capitals) and some warehouses/industrial property with a wider regional spread.

REIFs in Portugal are now a major player in private land development projects and urban space renovation. A key issue for sustaining this role is their ability to keep attracting private and institutional investment. This is ultimately dependent on their actual performance. In a global market, availability of indirect investment vehicles is growing exponentially and international players are today quite at ease in competing with national institutions in their territory. A deep knowledge and inside view of the REIF industry's behavior and performance during the last 20 years can be a valuable contribution to the development of a well sustained evolutionary strategy, both at the individual fund and industry levels.

Academic research on property finance in Portugal is in its initial stage. Relevant works addressing the REIF reality are scarce. Razina and Cardoso (2005) present a study on the impact of tax exemption in REIF return, concluding that in 2004 more than 30% of industry's return was due to this fiscal exception framework. Silva (2005) uses different autoregressive models on a sample of monthly return time series to evaluate structure changes due to the 2002 alteration on the legal framework of REIFs. According to the author, each different model that is used in the study for each specific fund provides, in most situations, good explanation of that fund's performance, but little is developed or revealed in the study about either the justification for the use of a specific model on a specific fund, the causes for differences among funds, or on the real nature of return distributions. In reality, there is not yet a consistent body of knowledge on such an important industry nor an in depth analysis of return and performance of this prime indirect investment vehicle.

This paper aims at providing a contribution for understanding the nature of REIFs return and performance. It starts with a basic characterization of REIF nature, covering issues like portfolio structure, valuation, management and regulations and then develops the analysis of REIF historical returns time series. The specific purpose is to found bases for future study of this asset class and for the generation of performance explanatory models.

Performance prediction and asset allocation models should de able to incorporate effects from current and future endogenous (e.g. traducing persistence, autocorrelations and other) and exogenous market factors and should consider the real nature of return distributions (Coleman and Mansour 2005. Lizieri and Ward (2000) recommend caution in using published property based performance indices and the previous examination of the structure and distribution of returns, especially in valuation based indices, which is the case with REIFs and other unitized

investments. Accordingly, this study presents a time series analysis of performance measures, covering trend analysis, descriptive statistics and return distributions. The specific objective of the latter was to determine whether or not REIF returns could be considered fitting a normal distribution, which is a basic hypothesis of the main classical mean-variance prediction and allocation models, which are the most used in current professional practice.

2. REGULATION AND STRUCTURE

Real estate funds are regulated by the CMVM and are subject to extensive requirements of public disclosure. Main fund classes reflect the universal classification regarding unit structure (opened and closed end) and dividend policy (capitalization and distribution).

Total return of this investment vehicle depends on capital growth, based on the variation of the unit price, and dividends paid (gross of tax, net of expenses), if existent. Fund unit value is calculated at the end of every month at least or, for open ended funds, every single day the unit subscription is available, taking into consideration the NAV, dividends paid and the total number of units, according to specific rules defined by the CMVM.

Regulatory terms specify that at least 75% of the fund's NAV should correspond to direct or indirect real estate investment. Regarding the valuation of private commercial real estate, the regulatory framework imposed by the CMVM specifies rules for different asset types.

In general, the value of fully developed direct real estate assets should be established by the management in the time interval between acquisition price and the arithmetic average of mandatory appraisals made by certified external experts. Therefore, real estate asset value is not necessarily at any given time the most probable "Open Market Value" as defined, for instance, by the *Royal Institution of Chartered Surveyors* (RICS) or *The European Group of Valuers' Associations* (TEGoVA). Intuitive implications of this fact are rather immediate – the objective existence of a significant level of management direct influence in the quantitative measures of fund value and fund performance potentially induces strong bias factors and raises doubts about independence and transparency issues. To minimize the latter, regulations also include the obligation of public disclosure of independent external appraisals for every property and the differences from the valuation set by the fund's management, which are named "potential asset value gains". Nevertheless, despite the quantification of this imposed bias being a valuable indicator for the potential investor, to better assess the reality of the underlying assets and of management practices, it neither reveals nor justifies the reasons behind this fact, or even enable in any form the capitalization of those "potential asset value gains" by the investor.

Valuation of properties under development is made according to the methods defined in the fund's management regulation or whenever there is

significant value incorporation due to capital expenditures in construction of over 10% of the previous appraisal, measured according to the quantity surveyor's situation report. This specification is vague and in practice just refers to definition of the moments of revaluation. It does not specify the methods and criteria to be used, thus being even less objective than the one for developed property. Evidence of great flexibility in practices between funds can easily be found by a simple analysis of the public information on property portfolio structure.

Indirect real estate investment vehicles have recently been admitted as a possible component of REIFs' portfolios. This includes equity from property operating companies and also other property funds' units. They are obviously marked to market if quoted in a major regulated stock exchange, but otherwise their valuation is primarily determined by accounting standards. The undefined framework for this indirect condition provides extra subjectivity. Nonetheless, this type of asset still has no relevance in individual fund and global industry portfolios.

This framework for the calculation of the fund's NAV provides two main levels of subjectivity when addressing property assets: the appraiser level and the manager level, the later being apparently more important. An extensive analysis performed by Laymond *et al* (2005) shows evidence of significant differences in valuation criteria among the funds' property portfolio between external appraisers and the management, especially in some market segments. Hence, if appraiser's bias is mainly originated by difficulty to incorporate exogenous market factors (Baum et al 2002), manager's bias may also incorporate commercial motivations, in order to be able to "provide" the ideal (not necessarily the highest) return expected for this investment product, within the legal framework.

3. DATA AND METHODOLOGY

For this work, a significant sample of data regarding the performance of 18 real estate funds was obtained from the *Associação Portuguesa de Fundos de Investimento, Pensões e Patrimónios* (APFIPP), covering a period of eighteen years. This sample includes monthly total holding period returns from May 1987 to May 2004 of a varying set of funds. This includes both open-ended and closed-end funds, ranging from 2 at the beginning of the period to a total of 18 at the end. Election criteria included a minimum NAV of 50 million euros and a diversified portfolio with at least 10 different properties.

The base data sample includes ten open ended, and eight closed ended funds. It is overall quite significant regarding the universe of REIF as it represented around 70% of the global asset volume under management by the industry in December 2004. In sector terms, 10 of the 14 open-ended funds existing in December 2004 are included, representing more than 92% of the global NAV. For closed-ended funds, the sample is naturally less representative in number (8 from a total of 51) but still rather significant in asset volume under management, more than 41% of the total.

From this base, different data samples were used according to the scope, nature and base hypothesis of the different analysis ahead developed. Both nominal and real returns were considered, the latter being determined by deflating the first by the *Consumers Price Index* (CPI), obtained from *Instituto Nacional de Estatística* (INE).

For an analysis of the performance measures of the funds included in the general sample period, three different reference sub-periods were considered: (1) the last three year period from June 2001 to May 2004 including nine open ended funds and seven closed end; (2) a five year period from June 1999 to May 2004 including six open ended funds and five closed end; (3) a ten year period June 1994 to May 2004 including five open ended funds and three closed end. The last reference period was further subdivided for stability analysis.

A detailed analysis on the time series trends and descriptive statistics was developed, covering long term movements, and seasonality evidence or systematic existence of outliers as an indication of discrete valuation inputs. Estimators for return averages, volatility, skewness and kurtosis, in different reference periods, were also determined and circumstantially compared against other previous reported results from similar research in other market realities.

As for testing the normality of return distributions, three statistical tests were used: the Shapiro-Wilk test, the Anderson Darling test and the Jarque-Bera test, following a similar procedure used by Maurer *et al* (2004) for comparing the distributional properties of U.S., U.K., and German direct real estate returns. The adoption of multiple tests is justified by the actual diversity of choices in the specific literature for this kind of procedure, which are in turn based upon different perceptions of the power of each test and of its applicability scope. The Shapiro-Wilk and the Anderson Darling tests are generally considered to be the most powerful statistics for detecting most departures from normality (Stephens,1974). The Jarque-Bera test is widely used in econometric analysis as it is based on the distribution's characteristic parameters of skewness and kurtosis, rather than pure distance considerations.

The Shapiro-Wilk test tests the null hypothesis that a sample $x_1,...,x_n$ came from a normally distributed population. The test statistic is provided by W as defined in equation (1)

$$W = \left(\sum_{i=1}^{n} a_i x_{(i)} \right)^2 \Bigg/ \left(\sum_{i=1}^{n} (x_i - \bar{x})^2 \right) \quad (1)$$

where $x_{(i)}$ is the ith-smallest number in the sample; $\bar{x}$ is the sample mean and the constants a_i are given by equation (2)

$$(a_1,...,a_n) = \frac{m^T V^{-1}}{(m^T V^{-1} V^{-1} m)^{1/2}} \quad (2)$$

where m^T holds the expected values of the order statistics of an identically independent distributed sample from the standard normal distribution, and V is the covariance matrix of those order statistics. The test rejects the null hypothesis if W is too small.

The Anderson-Darling test is a powerful statistical test for detecting departures from normality and may be used with small samples. The test statistic *A* assesses if data comes from a distribution with cumulative distribution function F and is given by equation (3)

$$A^2 = -N - S \tag{3}$$

where

$$S = \sum_{i=1}^{n} \frac{2i-1}{n} \left[\ln F(x_i) + \ln\left(1 - F(x_{n+1-i})\right) \right]. \tag{4}$$

The test statistic can then be compared against the critical values of the theoretical distribution to determine the p-value.

The Jarque-Bera test is a goodness-of-fit measure of departure from normality, based on the sample kurtosis and skewness. The test statistic JB is defined in equation (5)

$$JB = \frac{n}{6}\left(S^2 + \frac{(K-3)^2}{4} \right) \quad . \tag{5}$$

where n is the number of observations (or degrees of freedom in general), *S* is the sample skewness and *K* is the sample kurtosis. The *JB* statistic has an asymptotic chi-square distribution with two degrees of freedom and can be used to test the null hypothesis that the data is derived from a normal distribution. The null hypothesis imposes that both the skewness and excess kurtosis are zero, like expected from samples retrieved out of a normal distribution.

4. RESULTS

Average fund scatter plots over the reference periods are presented in Figure 1 for open ended funds and in Figure 2 for closed end funds. Generally a long term downtrend in both nominal and real returns can be observed, which is confirmed by the reference periods average returns presented in Figure 3. Evidence of lagged relations to the economical cycle and to commercial real estate market price and rent indexes was found.

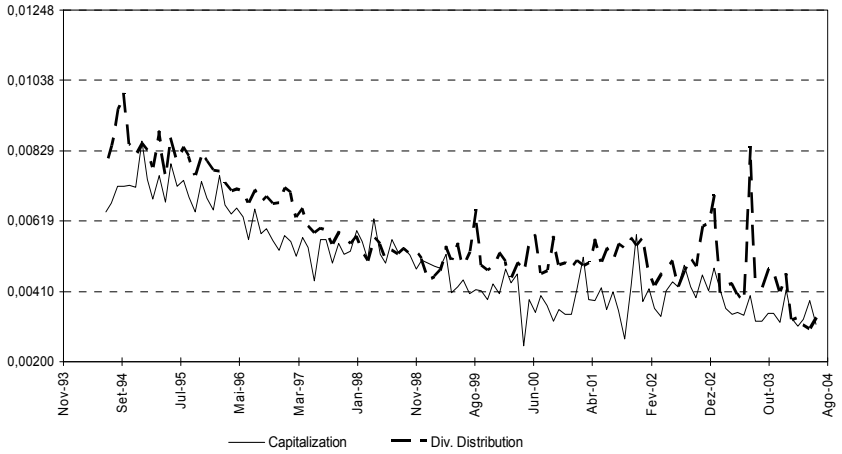

Figure 1 – Trends of O.E. Funds Nominal Monthly Returns (average by type of Fund)

Noticeable differences can be perceived between open-ended and closed-ended funds average return plots. The first exhibit a more regular downward evolution, with some mild peaks or plunges, which probably corresponds to property revaluations and/or transactions with sufficient impact in the consolidated results. The second exhibit a more unstable behavior with many outliers. This may be explained by the differences that exist at the level of demand that their basic nature imposes on asset valuation updating – open ended funds are valued every day and units can be subscribed or withdrawn at any time. As property asset update valuation is ultimately dependant on the fund's management team, different constraints produce different practices which ultimately result in different performance histories.

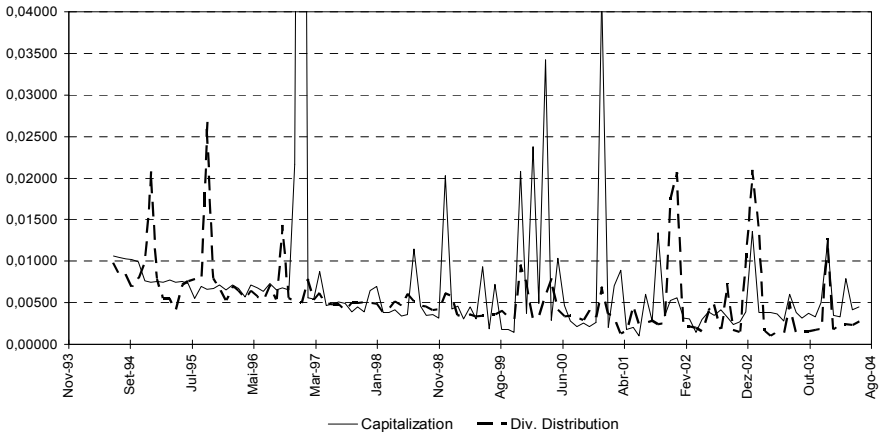

Figure 2 – Trends of C.E. Funds' Nominal Monthly Returns (average by type of Fund)

Further insight into this subject requires scrutiny of the individual fund scatter plots[2] identifying totally different behaviors from different funds, both within and between fund classes. At this level, many different types of behavior can be observed, again leading to the obvious conclusion that discretionary management procedures regarding the update of unit values, mostly regarding the property values contribution, have a major impact on return measures and their evolution.

Regarding open-ended funds, the only differences of behavior between dividend distributing and capitalization funds structural lie on mild seasonal effects derived from the periodic distribution of dividends. Despite this fact and also the previously referred common overall trend, there are significant behavioral differences at the individual fund level regarding especially short term performance variations and also some suggestion of persistent winners and losers. In shorter and more recent series there is further lack of stability, which may in some cases be linked to recent and/or small fund structures, to which may be added some potential impact of properties under development in small size portfolios.

For closed-ended funds short term performance differences at the individual fund level are substantial and may not be attributed to dividend policy or other class distinctions. Strong suggestions of persistence in the performance and impact of properties under development are also present.

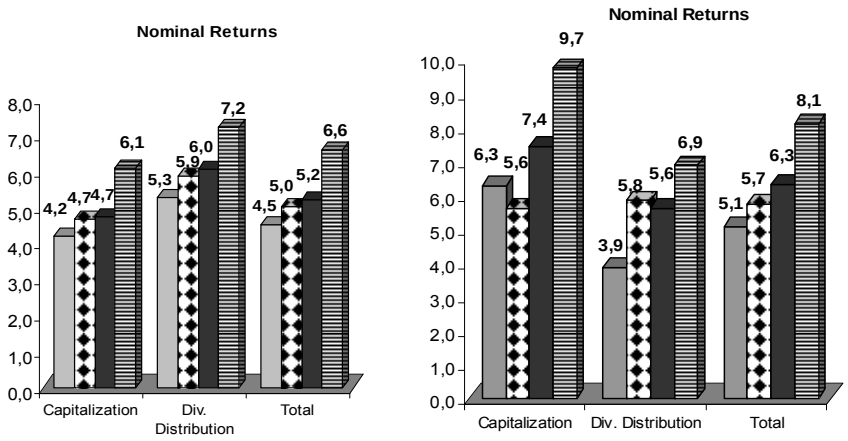

Figure 3 - Average Total Monthly Returns for O.E. (left) and C.E. (right) Fund Classes (Annualized and in percent)

Descriptive statistics for nominal and real returns were determined for different reference periods and types of funds. Selected exhibits of these are presented in Tables 1 and 2 for some different specific reference periods and regarding nominal returns.

[2] Individual fund returns scatter plots are not presented here due to space restrictions, but may gladly be provided by the authors at request.

Although there is some tendency for positive skewness in open ended fund returns, especially for longer reference periods, there is no strong evidence pointing to a systematic incidence. Out of 20 samples of nominal return time series, 12 were positively skewed and 8 negatively skewed. Real return samples presented similar results. Results for the same fund differ between reference time periods.

Kurtosis values present the same general indefiniteness: from the 20 samples of nominal return time series, 12 showed positive kurtosis, but only 3 had significant leptokurtic characteristics, thus meaning less peakedness than normally distributed data or in other words the indication of a "short tailed" distribution. Nonetheless, the results are again non-uniform, suggesting that real factors behind the nature of the return series are endogenous to each fund.

In closed end funds the evidence of positive skewness and kurtosis is more generalized. Again, the results are not consistent throughout the sample, supporting the suggestion that the real factors behind the nature of each fund's return series are endogenous. No significant differences between real and nominal returns were found.

Table 1 – Exhibit of Descriptive Statistics for Nominal Returns of Open Ended Funds

Open Ended Funds - Monthly Nominal Returns – Jun1999 to May 2004							
	Range	***Minimum***	***Maximum***	***Mean***	***Std. Dev.***	***Skewness***	***Kurtosis***
OE2	0,0028	0,0020	0,0048	0,0038	0,0005	-0,8610	1,3507
OE4	0,0037	0,0026	0,0063	0,0039	0,0009	0,7660	0,1231
OE5	0,0018	0,0022	0,0040	0,0033	0,0005	-0,8337	-0,2607
OE8	0,0017	0,0039	0,0057	0,0048	0,0004	-0,6101	0,2122
OE9	0,0150	0,0012	0,0162	0,0049	0,0024	1,9946	7,1692
OE10	0,0035	0,0034	0,0069	0,0050	0,0007	-0,0277	-0,0805
Open Ended Funds - Nominal Monthly Returns – Jun1994 to May 2004							
	Range	***Minimum***	***Maximum***	***Mean***	***Std. Dev.***	***Skewness***	***Kurtosis***
OE2	0,0065	0,0020	0,0085	0,0052	0,0016	0,1694	-1,2816
OE5	0,0076	0,0022	0,0098	0,0044	0,0014	0,9601	0,7340
OE8	0,0056	0,0039	0,0096	0,0056	0,0011	1,1929	1,0649
OE9	0,0150	0,0012	0,0162	0,0061	0,0025	0,7113	1,5701
OE10	0,0054	0,0034	0,0088	0,0057	0,0014	0,6126	-0,7034

Table 2 – Exhibit of Descriptive Statistics for Nominal Returns of Open Ended Funds

Closed Ended Funds - Nominal Monthly Returns – Jun1999 to May 2004

	Range	*Minimum*	*Maximum*	*Mean*	*Std. Dev.*	*Skewness*	*Kurtosis*
CE2	0,0712	-0,0062	0,0650	0,0056	0,0113	3,5997	14,6251
CE4	0,0456	0,0009	0,0465	0,0065	0,0094	3,1049	9,1340
CE5	0,0534	-0,0026	0,0507	0,0062	0,0112	2,9711	8,9215
CE7	0,0018	0,0025	0,0043	0,0033	0,0005	0,4481	-0,8151
CE8	0,0016	0,0024	0,0040	0,0032	0,0004	0,4621	-0,5033

The previous results are inconclusive as to ascertaining defined characteristics to return distributions at the industry level. They point to the supremacy of specific endogenous fund factors behind return distributions. The large behavioral differences in short term variation of returns for this type of investment point to substantial weight of the subject of property asset valuation within each fund's structure, which is closely related to the construction and reality of their performance measures. This appears to justify the use of performance models based (at least partially) in lagged performance factors (cf. Silva, 2005). If so, ultimately the question is: "For each fund, what are the underlying criteria for quantification and incorporation timing of capital returns in the NAV and in the corresponding fund unit value?".

Normality tests, as presented for nominal returns in table 3, are in turn rather conclusive. The null hypothesis of the samples belonging to a normal distribution were rejected at least at the 5% significance level simultaneously by the 3 tests in more than 95% on the cases both in open ended and closed ended funds, for real and nominal returns. For all samples the rejection of the null hypothesis at the 1% a significance level occurred at least in 2 out of the 3 tests. These results are in line with most of the literature regarding the non-normal nature of property based index returns (see for instance Young *et al*, 2006)

Table 3 – Exibit of Normality Tests for Nominal Returns

		OE2	OE5	OE8	OE9	OE10	CE2	CE4	CE5
Shapiro-Wilk	W	0,928	0,925	0,883	0,966	0,919	0,200	0,495	0,618
	p-value	0,000	0,000	0,000	0,004	0,000	0,000	0,000	0,000
Anderson-Darling	A^2	3,968	3,141	5,453	0,575	3,928	+ ∞	19,02	12,84
	p-value	0,000	0,000	0,000	0,133	0,000	0,000	0,000	0,000

Jarque-Bera	JB	9,086	19,29	31,16	19,16	10,03	47535	1224	1140
	p-value	0,011	0,000	0,000	0,000	0,007	0,000	0,000	0,000

5. CONCLUSIONS

REIFs are presently a major actor in private land development and urban space renovation in Portugal. In this paper a characterization of the nature, portfolio structure, valuation rules, management and regulations of REIFs was presented as a preamble to a quantitative time series analysis of fund performance measures, covering trend analysis, descriptive statistics and return distributions. The specific purposes were the establishment of bases for future study of this asset class and the creation of performance explanatory models, by following criteria and methodologies inspired by similar research in other markets.

From the results presented in this paper regarding time series analysis and descriptive statistics of returns, there is evidence of behavioral heterogeneity across the industry, pointing to the importance of endogenous factors at the fund level in performance explanation. This indicates the special relevance of managerial property asset valuation criteria in return series behavior.

There is fairly strong evidence of non-normality in return distributions, in line with similar work made on appraisal based property indexes.

This research indicates that analysis of predictability, especially the evaluation of persistence and determination of specific endogenous and exogenous explanatory factors needs further investigation.

6. REFERENCES

Bera, A. and C. M. Jarque, 1980, "Efficient tests for normality, homoscedasticity and serial independence of regression residuals". *Economics Letters* 6 (3): 255–259.

Baum, A., N. Crosby, P. McAllister, 2002, “Appraiser behavior and appraisal smoothing: some qualitative and quantitative evidence” *American Real Estate Society Annual Meeting* Naples, Florida

Byrne, P. and S.Lee, 1997, “Real Estate Portfolio Analysis under Conditions of Non-Normality: The Case of NCREIF, *Journal of Real Estate Portfolio Management*, Vol.3, 37-45.

Coleman M.S. and A. Mansour, 2005, “Real Estate in the Real World: Dealing with Non-Normality and Risk in an Asset Allocation Model”, *Journal of Real Estate Portfolio Management*, Vol.11:1, 37-54.

D'Arcy, E. and S. Lee, 1998, “A Real Estate Portfolio Strategy for Europe: A Review of the Options” *Journal of Real Estate Portfolio Management* Vol. 4:2, 113-123.

Laymond, G. et al, IPD/Imométrica, 2005,“Avaliações de Activos

Imobiliários para Fundos de Investimento em Portugal" - *Cadernos do Mercado de Valores Mobiliários CMVM,* nº20, 66-94.

Lizieri, C.M. and C.W.R. Ward, 2000, "Commercial Real estate Return Distributions: A Review of the Literature and Empirical Evidence", *University of Reading Working Paper No. 01/00*.

Maurer, R., F. Reiner and S. Sebastian, 2004, "Characteristics of German Real Estate Return Distributions: Evidence from Germany and Comparisons to the U.S. and U.K.", *Journal of Real Estate Portfolio Management*, Vol.10:1, 59-76.

Razina F. and L. Cardoso, 2005, "Impacto dos Benefícios Fiscais na Rendibilidade dos Fundos de Investimento Imobiliário:Uma Análise Empírica" - *Cadernos do Mercado de Valores Mobiliários -CMVM* , nº 20, 95-108;

Silva, P., 2005," O Impacto do Regulamento da CMVM N.º 8/2002 na Rendibilidade das UP de Fundos de Investimento Imobiliário" - *Cadernos do Mercado de Valores Mobiliários-CMVM* , nº 20, 109-138

Stephens, M.A., 1974, "EDF Statistics for Goodness of Fit and Some Comparisons", *Journal of the American Statistical Association 69*: 730-737.

Young M. S., S. L. Lee and S. P. Devaney, 2006 "Non-Normal Real Estate Return Distributions by Property Type in the U.K ", *Journal of Property Research. 23(*2): 1-25