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ESTUDIO SOBRE LAS COMISIONES DE GESTIÓN DE LOS FONDOS DE INVERSIÓN ESPAÑOLES

(ESSAYS ON MANAGEMENT FEES OF THE SPANISH MUTUAL FUND INDUSTRY)

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INTRODUCTION

This dissertation analyses the management fees paid by investors of the mutual fund industry. Especially it focuses on the type of management fees charged by the Spanish mutual fund industry. We propose three essays with a common objective: we aim to compare the group of mutual funds which charge management fees total or partially on returns (performance-based fee) with those which charge management fees exclusively on assets under management (asset-based fee). The essays are self-contained and we use different data frequencies, samples, models and estimation methodologies. Essay 1 studies the characteristics of mutual funds that determine the choice of a performance-based fee. Essay 2 focuses on studying changes in the type and magnitudes of management fees. Finally, Essay 3 studies whether the way that management fees are charged to investors is relevant regarding mutual fund performance evaluation and performance-expenses relationship.

Each essay is summarized below.

Essay 1. The Choice of Performance-Based Fees In The Mutual Fund Industry: The Case Of Spain

This paper analyses the attributes of a sample of mutual funds that determine the choice of a performance-based fee as opposed to an asset-based fee. According to theoretical literature, performance-based fees are the most appropriate way of solving agency problems between investors and managers; however, only a minority of mutual funds charge management fees tied total o partially to returns. In this paper we investigate a cross-sectional regression of the type of management fee chosen on a set of fund characteristics including investment objective, fund size, experience in the industry, the type of the financial group to which the fund belongs, return-risk profile, fees and expenses for a sample of Spanish mutual funds in 2002-2007. In particular, we find that the likelihood of charging such an incentive fee significantly increases for funds that invest largely in equities and have little experience in the industry. By contrast, funds that manage large volumes of assets and funds owned by banking and financial groups are less likely to establish performance-based fees. These results are robust to very different market scenarios for mutual fund performance.

Different versions of this essay were presented in the IV Quantitative Finances Workshop (University of Valencia), XVII Jornadas Hispano-Lusas de Gestión Científica (University of La Rioja), X Encuentro de Economía Aplicada (University of La Rioja) and XV Foro de Finanzas (University of the Illes Balears). I would like to thank participants of these conferences for their useful comments and suggestions.

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This paper has been published with the title "The choice of performance-based fees in the mutual fund industry: the case of Spain" in "INVESTMENT MANAGEMENT AND FINANCIAL INNOVATIONS", 7-17, Volume 6, Issue 3, (2009). The descriptive analysis and a brief empirical study about which type of management fee is more convenient in regard to returns for each mutual funds has been published with the title "La elección del tipo de comisión de gestión en los Fondos de Inversión españoles"; REVISTA ANÁLISIS FINANCIERO, 16-23, Nº 106 (2008).

Essay 2. The Dynamic of Management Fees in the Mutual Fund Industry

The aim of this paper is to analyse the dynamics of price-setting (through changes in management fees) in the Spanish mutual fund industry. The study is applied to a sample of Spanish mutual funds from 2002 to 2007. Management fee changes account for only 4% of observations, but they are economically significant. A substantial 29% of the total number of funds undergoes management fee changes during the sample period, with the average change being more than 50 base points. Results seem to reveal that small and poor-performing funds (and also management companies) have decreased asset-based management fees as a way to become more competitive in the industry. However, no significant subsequent effects of such changes are found in the paper. Small funds with low excess returns and high quarterly returns which are owned by good-performing management companies have decreased performance-based management fees. These performance-based management fee decreases seem to have had a negative effect on subsequent returns and on net excess returns and a positive impact on the market share of the funds in question. It seems that the decrease in performance-based fees causes the manager to make some slight effort, because a performance-based fee is an explicit incentive for a manager.

Different versions of this Essay have been presented in XVI Foro de Finanzas (IESE), XXXIII Simposio de Analisis Económico (Universidad de Zaragoza), European Financial Management Association 2009 (Milan,) and 16th Annual Conference of the Multinational Finance

Society (Crete). I am grateful for comments and suggestions from participants of these conferences.

This essay is a joint work with my advisor Miguel Angel Martinez Sedano.

Essay 3. The Efficiency of Performance-based-fee Funds

This paper compares the performance of mutual funds which charge management fees total or partially on returns with those which charge management fees exclusively on assets under management. Despite the conclusions from agency theory, which advocates the use of performance-based management fees in order to mitigate the investor-manager agency problems, only a minority of mutual funds worldwide tie the managers' remuneration to the fund performance. In particular, we study mutual fund efficiency through the comparative analysis of the risk-adjusted measures and the performance-expenses relationship. We apply our study to a sample of Spanish mutual funds, from 1999 to 2009, where both type of management fees are authorized. In short, we find that funds with performance-based management fees perform significantly better than the other risky funds considered. Moreover, we have found a strong positive performance-expenses relationship for these funds and negative for the remaining. These results seem to point to more efficient management in the performance-based fees funds, contrasting with their low presence in the fund industry.

This paper will be presented in the European Financial Management Association 2010 (Aarhus) and the 17th Annual Conference of the Multinational Finance Society (Barcelona).

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CHAPTER 1

THE CHOICE OF PERFORMANCE-BASED FEES IN THE MUTUAL FUND INDUSTRY: THE CASE OF SPAIN

1.1. INTRODUCTION

Most savers in developed countries do not manage their financial wealth directly but rather through investment management companies. A recent report by International Financial Services, London (IFSL, 2008) states that the volume of assets managed by this industry reached 61.9 trillion Euros by year-end 2007, an increase of 14% on the previous year and more than double the figure for 2002. Mutual funds managed a third of that total at 21.8 trillion Euros.

This impressive growth in the delegated management industry, and especially in the volume of assets managed by mutual funds, has attracted the interest of the financial academic community and practitioners. The professionalism of management companies, the possibilities of portfolio diversification and cost savings for investors are among the reasons most frequently cited as driving this increasing trend towards delegated portfolio management.

The relationship between final investors and managers established by this delegated management can be considered as part of "agency theory". Conflicts of interests can clearly arise between the aims of managers and investors: investors usually look for maximum return on investment at minimum risk, whereas managers may try to maximize their own income or that of their management company so as to maintain a good reputation in the industry (Gibbons and Murphy (1992)), and/or to maximize the time that they remain at the company, which does not always line up with the aims of investors (Kempf *et al* (2007)).

The relationship is also characterized by asymmetry of information between the two parties as regards both the quality of managers (adverse selection) and the effort put into their activities (moral hazard).

This conflict of interests can result in inefficient allocation of resources and, especially, suboptimal investment decisions. As a way of alleviating such agency problems, economic theorists have proposed the establishment of contracts (capable of generating suitable incentives for managers) for the proper management of delegated portfolios[1]. In our context, these contracts are the management fees that investors have to pay to managers for portfolio supervision services. These management fees are the focal point of the present article.

[1] See for instance Bhattacharya and Pfleiderer (1985) and Holmstrom and Milgrom (1987). See also Core *et al* (2003) for a comprehensive survey of literature on executive remuneration. Bebchuk and Fried (2004) argue that managerial power is the most relevant determinant of executive remuneration.

From both the theoretical and empirical points of view it is important to distinguish whether management fees are charged as a percentage of the total assets managed (henceforth referred as an *asset-based fee*), tied to the returns obtained by management (*performance-based fee*), or made a mixture of the two. Moreover, performance-based fees can be established according to absolute return or to the excess return on a reference portfolio, symmetrically for positive and negative returns or for positive ones only.

Many academic articles have analysed the optimality of this type of contract in theory. Grinblatt and Titman (1989), Golec (1992), Roll (1992), Das and Sundaram (1998a, b and 2002) and Palomino and Prat (2003) are some of the most significant. The prevailing conclusion is that performance-based fees seem to be more appropriate. Thus, Das and Sundaram (1998b) conclude that if risk aversion is assumed in the preferences of investors and managers, the optimal contract has to be linear, and must include a base fee for the amount of assets managed and additional remuneration depending on returns above those of a reference portfolio. The reason put forward is that this type of fee best aligns the interests of managers and investors, with managers encouraged to obtain high returns because their remuneration depends on them.

Academic literature has also analysed a wide range of issues related to performance-based fees. For instance, the convenience of establishing a reference portfolio is analysed in Admati and Pfleiderer (1997), Basak *et al* (2007) and Garvey and Milbourn (2006); Das and Sundaram (2002) and Ross (2004) study the desirability of asymmetry; and Cornel and Roll (2004) and Cuoco and Kaniel (2006) focus on the effect on asset prices[2].

The International Organization of Securities Commissions, IOSCO (2003), gives a comprehensive overview of management fee regulations across its member countries. All of them except the United Kingdom allow this type of fee. A great variety of types is observed, ranging from total absence of restrictions on application (Australia, Japan, Mexico, Netherlands and Portugal) to rules affecting the type of mutual funds which can apply fees, the requirement for a reference portfolio, the calculation method and payment frequency.

Although performance-based fees are common in venture capital (Gompers and Lerner (1999)), real estate, private equity, and hedge funds (Agarwal *et al* (2007)), they are not used so widely by mutual funds. According to Lipper Inc., only 350 American mutual funds (about 4% of all stock funds) had performance-linked fees as of October 31st 2005, accounting for 12.7% of

[2] An elaborate review of the most relevant theoretical literature on delegated portfolio management can be found in Stracca (2006).

total investment in stock funds at the time[3]. Furthermore around 85% of those assets were managed by just two fund companies, Fidelity Investments and Vanguard Group Inc. Similar figures can be found in other economic areas.

There is currently an interesting debate at practitioner level as to whether or not this type of remuneration for managers is advisable (see Arnott (2005)). Proponents of performance-based fees assert that they best align the interests of managers and investors, reward successful managers more than unsuccessful ones and at the same time reduce the aggregate fees paid by investors, as most managers cannot add value to a portfolio. By contrast, opponents argue that performance-based fees encourage managers to take excessive risks with their portfolios (due to the option-like compensation scheme they suppose), allow managers to gamble with the fee by keeping the fund's beta above that of the benchmark index, are opaque and difficult to design and measure (see Damato (2005)), fail to take into account other desirable components of management, such as portfolio diversification, risk management, stable net asset value and portfolio turnover (see Bines and Thel (2004)) and, more importantly, fail to provide additional incentives to managers paid on increased assets (produced in many cases by good performance).

Taking into account the theoretical results, which present performance-based fees as the most appropriate way of solving agency problems between investors and managers, this article empirically analyses the reasons behind the worldwide decision to charge asset-based fees. The main objective of the study is therefore to empirically identify the fund attributes that determine the choice of a performance-based fee. To that end we employ a bias-free dataset of Spanish mutual funds supplied by the industry supervisor. In this sample we investigate the cross-sectional regression of the type of management fee chosen on a set of fund characteristics (explanatory variables) including investment objective, fund size, experience in the industry, the type of financial group to which the fund belongs, return-risk profile and fees and expenses for 2002-2007.

Mutual funds which choose to charge management fees on returns are in fact linking the manager's remuneration to his/her effort and to the performance obtained. So, according to agency theory literature, they should be understood as a commitment to the interest of investors. Thus, smaller, younger funds would supposedly be more likely to charge performance-based fees as a way of increasing their market share. Also, risky, good-performing funds would seem *a priori* to

[3] Golec (2003) and Golec and Starks (2004) discuss the reasons for the prevalence of asset-based management fees in the US industry.

be more likely to establish management fees of this kind purely to obtain greater remuneration than is forthcoming from fees tied only to volume of assets.

To the best of our knowledge, this is the first article to analyse this specific issue, and we believe that it provides new empirical evidence in this regard. Since management fees have an economically significant impact on investors' assets over time, this analysis might be interesting from the investor's perspective. Additionally, management fees, as the price investors have to pay, convey valuable information regarding the economic nature of the industry. Finally, management fee studies can improve the regulatory authorities' understanding of price competition in the mutual fund industry.

The paper is related to other strands of literature on mutual fund ownership costs. Thus, Deli (2002), Deli and Varma (2002), Warner and Wu (2006) and Massa and Patgiri (2008) among others, analyse the choice between linear and piecewise-linear management fees on total assets. Size and age, at both fund and family level, are found to be negatively related to the likelihood of adopting a linear management fee. Additionally, Warner and Wu (2006) show that the likelihood of a switch from a linear contract to a concave one increases with fund growth and age**.**

Also closely related are those papers that analyse the determinants of the (asset-based) management fee amounts[4]. Results confirm significant differences in fees across funds with different investment objectives. Also, both fund assets under management and management company assets appear to have a negative impact on mutual fund fees. Finally, funds managed by companies belonging to banking groups seem to be associated with significantly higher fees. Evidence for other explanatory variables, however, is mixed.

Some articles focus on the effects of the choice of management fees on the manager's risk decisions[5]. Performance-based fees may encourage risk-taking by managers as increases in stock return volatility make for bigger fees. However, since they can increase the sensitivity of the manager's portfolio to firm stock price movements, little risk can be assumed (Carpenter (2000); Ross, 2004).

Finally, Volkman (1999), Elton *et al* (2003) and Giambona and Golec (2007) among others, evaluate mutual funds with performance-based fees. Their results coincide in that these funds perform relatively better than other actively managed funds.

[4] Malhotra and McLeod (1997), Tufano and Sevick (1997), Luo (2002) and Gil-Bazo and Martínez (2004) for the Spanish market are illustrative examples of this literature.
[5] See Brown *et al* (1996), Chevalier and Ellison (1997), Elton *et al* (2003), Golec and Starks (2004), and Low (2006) among others

In short, the results presented in this paper indicate that the likelihood of a performance-based fee being charged is significantly greater for equity funds, the youngest funds in the industry and the smallest in terms of assets managed.

The rest of the paper is organized as follows: Section 1.2 describes the data and variables employed in the analysis; the empirical model estimated and the results are discussed in Section 1.3 and Section 1.4 concludes.

1.2 DATA AND VARIABLES

The Spanish mutual fund industry is currently highly significant and continues to grow. According to the Spanish Asset Management Association (*Asociación de Instituciones de Inversión Colectiva y Fondos de Pensiones,* INVERCO (2008)), the volume of assets managed by mutual funds at year-end 2007 was equivalent to 17.5% of total Spanish family savings, compared to 0.4 % in 1985. A record figure of 0.32 trillion Euros managed was reached (compared with just 0.0017 trillion Euros in 1985), equivalent to 274% of GDP. This made Spain the sixth biggest European country in terms of assets managed.

In accordance with current Spanish legislation, management fees can be charged on the basis of the total volume of assets managed, the returns obtained or a combination of the two. In fact only a minority of Spanish mutual funds tie the remuneration of managers to returns: almost all of them combine the two types of fee by charging a base fee proportional to the assets managed plus an additional fee dependent on performance.

It must be emphasized that Spanish legislation only stipulates the annual maximum permissible for each type of fee (see Appendix). It says nothing about the symmetry of the performance-based fee, and establishes no requirement for a reference portfolio. Regarding this point, a detailed reading of the prospectus of a large number of performance-based fee funds reveals that the expression most often found after the fee percentage is “of the positive annual returns of the fund”. This, along with private discussions with several asset managers, allows us to conclude that performance-based fees are usually asymmetric in the Spanish fund industry. In addition, very few fund prospectuses describe the management fee as a percentage of the return on the fund in excess of a reference portfolio. In such cases it is expressly indicated that the annual management fee chargeable may not exceed the upper limit of the annual positive returns on the fund.

However, since November 2006 Spanish legislation has required the application of a so-called high-water mark, under which managers only receive performance fees for returns not previously achieved.

This means that the Spanish mutual fund industry is a highly appropriate testing ground for determining what fund attributes explain the choice of a performance-based management fee. In addition, a year-by-year analysis allows us to check for time differences in this issue, especially since the high-water mark rule came into effect.

The dataset was obtained from Comisión Nacional del Mercado de Valores (CNMV), the body that supervises and inspects Spanish stock markets, and therefore mutual funds. We initially collected information on all the open-end funds that were operated in the six-year period from 2002 to 2007. Guaranteed funds were excluded from the analysis because of their specific investor remuneration policy (in fact, only one of them used performance-based fees), and funds less than one year old were also eliminated. This leaves a final sample of 1,638 mutual funds in 2002, rising to 1,832 in 2007, accounting for an average of 65% of the Spanish mutual fund industry. This six-year period covers very different scenarios in the behaviour of the Spanish stock market and in the performance of the mutual fund industry, and thus enables us to conduct a very interesting comparative analysis.

As mentioned above, the study is conducted separately for each year, using the information available in the last quarter to capture possible time differences in the results.

Funds are classified into three groups according to the type of management fee charged. We use the term “asset funds” for those that establish a fee on volume of assets alone; funds that tie management fees exclusively to returns are referred to as “performance funds”, and those that combine the two criteria are “mixed funds”. Since the main objective of this study is to analyse the choice of the type of management fee, a binary variable - MFC - is created as the dependent variable in the empirical model. It takes a value of one for funds that tie fees totally or partially to returns (mixed and performance funds) and zero otherwise (asset funds).

We then describe the set of fund attributes considered as explanatory variables in the empirical model characterising the decision as to what type of management fee to use. Basically, these are the attributes previously considered in empirical literature as determinants of the amounts of mutual fund fees. Since they are available in the dataset, we suggest them also as potential determinants of the decision on the type of management fee.

We first consider the type of financial group to which mutual funds belong. Three associate dummy variables are created for funds managed by companies owned by banks (B), savings banks (S) and independent financial groups (I). This distinction allows us to analyse the possibility that

managers of funds belonging to independent financial groups may have more incentive to implement performance-based fees as a way of attracting investors, to counteract the greater marketing capacity of banks and savings banks.

Another potentially interesting characteristic is the investment objective of each fund. Funds are classified into three groups, each associated with a corresponding dummy variable: Equity funds (EFunds), which invest mainly in equities; Bond funds (BFunds), more than 70% of the money in which is invested in fixed-income assets; and finally Global funds (GFunds), a group which contains those funds whose investment policy is not precisely defined and which do not belong to any other category. It seems reasonable to assume that those funds which invest most in equities will be more inclined to charge management fees on performance, given the greater possibility of obtaining high returns.

The number of years since the last modification in the investment objective of the fund (ANTIQ) is also available in the dataset provided by CNMV, and is considered here in order to examine the choice of the type of management fee as a way of competing with longer-established funds. Note that this variable does not therefore represent exactly the number of years since the creation of the fund, which is a more common variable in the relevant literature but is unfortunately not available in this dataset; however, it does capture the same idea of experience in portfolio management.

Volatility of performance (VOLAT) is measured by the standard deviation of the twelve previous monthly returns of the fund, in percentage terms, as supplied by CNMV. The more volatile a fund is, the more likely it is expected to be to charge a performance-based fee, because of the greater expected return. The asymmetry of the management fee charged by Spanish funds (which encourages managers to take high risks as they do not have to assume responsibilities in case of negative returns) reinforces this argument.

Fund size is another attribute that could well be relevant in deciding what type of management fee to charge. It seems reasonable to assume that the smallest funds (which are the easiest to manage) have more incentives to charge a performance-based fee. To analyse this issue empirically, the total volume of assets managed in thousands of Euros (ASSETS) is used to measure fund size. In the empirical analysis in Section 1.3 this variable is measured as its neperian logarithm. The number of shareholders in the fund was also considered as a measure of fund size, but results were not affected when this variable was considered instead of ASSETS; in fact the average correlation between them over the sample period is 0.76.

Annual fund returns, net of all expenses, are also considered (NRET). The well-known risk-adjusted return known as the Sharpe ratio (SHARPE) is also calculated:

$\text{SHARPE}=\frac{\text{NRET}-R_f}{\text{VOLAT}}$, with R_f being the risk-free return (the one-year Spanish Treasury bill). Funds with high levels of past performance are expected to be likely to be tempted to link management fees totally or partially to performance.

Finally, fund fees are also considered. Thus, we collect information about management fees, termed ASSETMF or PERFORMF depending on whether they are based on assets or returns, respectively; the custody fee paid for asset administration and custody, CUSTFEE; the front-end load charged to investors for the purchase of shares in funds, FRONTLOAD; and the redemption fee paid by investors when shares are redeemed, REDFEE. The discount that the management company occasionally applies to the fund is referred to as DISC. In the empirical application in Section 1.3, one-off fees (the front-end load and the redemption fee, net of the discount) are joined together in a non-annual fee termed NONAFEE. As an aggregate measurement of annual fees we also collect information on total expenses borne by the fund (adding in the management fee, custody fees, and other operating costs) as a percentage of the average volume of assets during the year. This is termed EXPENSES.

1.2.1. Descriptive analysis of the data

For the three fund groups established above according to the type of management fee chosen, the two panels in Table 1.1 report the number of funds of each type and the average values of their attributes, respectively, for each year in the sample period, and for the entire period.

Panel A highlights that at year-end 2007 only 256 out of the sample of 1,832 Spanish mutual funds (14%) used performance-based fees, and even then they are almost all *mixed*. However, there is a notable increase from year 2002, when just 7% of the funds in the sample tied management fees to performance. It is also confirmed that this market is dominated by funds belonging to banks and savings banks: only an average of 27.97% belong to independent financial groups.

However, independent funds account for a significantly higher average percentage of *mixed* funds than of *asset* funds: of the aggregate of 1,128 files of *mixed* funds in the total sample, 425 (37.7%) correspond to independent funds, while for *asset* funds the figure is just 26.6%[6]. These percentages remained essentially constant throughout the sample period. These findings are consistent with the idea that independent funds are the most inclined to charge a performance-

[6] The asterisk stands for 5% significance in the test of differences in the proportions of the total number of *asset* funds and *mixed* funds accounted for by each type of fund.

based fee. Note moreover that almost all the *performance* funds are independent. By contrast, funds belonging to banking groups only account on average for 29.4% of the *mixed* funds, with a notable decrease from the beginning of the period.

A similar conclusion can be drawn for Global funds, which account for a significant, and fast increasing, average of 42% of the *mixed* fund group but just 10.36% of *asset* funds. It is also remarkable that more than 34% of Global funds charge their management fees totally o partially on returns. These data, along with the fact that 44.965% of *mixed* funds are Equity funds, lead us to confirm that funds which tie management fees to performance invest mainly in equity assets.

Panel B Table 1.1 shows very interesting differences between the attributes of *mixed* funds and *asset* funds over the sample period: the former are significantly younger, more volatile and smaller, although a noteworthy increase in assets managed is reported between 2002 and 2007.

Remarkably, average management fees for *mixed* funds are very close to the legal limit at 8.26% of performance (the limit is 9%) and 1.09% of volume of assets (the limit is 1.35%), whereas for *asset* funds they are just 1.38%, with the limit being 2.25%. So average total expenses are significantly higher for *mixed* funds (1.87%) than for *asset* funds (1.57%). In addition, *mixed* funds seem to charge significantly higher front and redemption fees.

In an attempt to explain this higher cost of *mixed* funds, the percentage of assets managed accounted for by total management fees (TOTALMF) is calculated. This enables the two types of fund to be fairly compared. Taking into account also that performance-based fees are applied only to positive gross returns (before expenses), GRET, we have the following for *asset* funds:

$$\text{TOTALMF}_a = \text{ASSETMF}_a \qquad \text{for all GRET}_a \qquad (1)$$

while for *mixed* funds:

$$\begin{cases} \text{TOTALMF}_m = \text{ASSETMF}_m + \textit{PERFORMF}_m \times \dfrac{\text{GRET}_m}{100} \\ \text{TOTALMF}_m = \textit{ASSETMF}_m \end{cases} \qquad \text{for GRET}_m > 0 \qquad (2)$$

Panel B in Table 1.1 reports that for *mixed* funds total management fees average 1.87%, significantly higher than the 1.38% for *asset* funds. Moreover, note that in 2005 this figure is 2.38%, above the legal maximum for asset-based fees (2.25%), which reveals that managers are able to use performance-based fees as a way of increasing earnings from management.

Finally, *mixed* funds obtain significantly higher net and risk-adjusted returns than *asset* funds, so they seem to have offset their higher cost and greater volatility[7]. It should be noticed that net fund returns range from –16.67% in 2002 to 13.14% in 2005, embracing very different market conditions, thus enhancing the scope of the analysis and, at the same time, increasing the reliability of findings.

To sum up, during the period from 2002 to 2007 Spanish *mixed* funds invested for the most part in equity assets, a significant percentage of them belonged to independent financial groups and, on average, they were more volatile, younger, smaller and more expensive to investors than *asset* funds. In spite of this higher cost they obtained higher returns.

1.2.2. Selection of variables

Clearly, fund attributes related to management fees charged (ASSETMF, PERFORMF and TOTALMF) should not be considered as explanatory variables in the choice of the type of management fee. The same goes for the variable EXPENSES, given that it basically depends on that choice.

Even so, to avoid collinearity problems that could affect the precision of parameter estimates, we now select the set of potential explanatory variables.

To that end, we obtain the correlation coefficients between all variables for each sample year. Not surprisingly, net returns, volatility and the dummy variable associated with Equity funds are highly correlated, except for 2002, when the most profitable funds were the less volatile Bond funds.

We also use the variance-inflation-factor (VIF) collinearity test. VIF_j is computed as $(1-R_j^2)^{-1}$ where R_j^2 is the determination coefficient from the regression of x_j on the rest of the explanatory variables. A high VIF corresponds to a high R_j^2, and is a sign of collinearity. Fox (1991) considers that the precision of coefficient estimates suffers from collinearity when VIFs exceed 4. As in the correlation matrix, the results of this test confirm collinearity problems for net returns and volatility, especially in 2002 and 2005. We therefore decided to remove net returns (NRET) from the analysis of these two years, leaving the risk-adjusted returns, SHARPE, as the fund's performance measurement. The new VIF test indicates that collinearity is no longer a serious problem.

[7] A quite large number of funds with negative excess returns and low volatility explain the negative average Sharpe ratios.

For the sake of brevity the correlation matrix and the VIF test are not reported, but they are available to interested readers on request.

1.3. THE EMPIRICAL MODEL

In this section a probit model is estimated in order to examine the main determinants of the type of management fee charged by Spanish mutual funds. The analysis is carried out separately for each year in the 2002-2007 period, and also for the complete period. As mentioned above, the endogenous variable is the binary variable MFC, which takes a value of one for *mixed* and *performance* funds and zero for *asset* funds, while the fund attributes selected in the previous section are considered as explanatory variables[8].

For the estimation, we assume the existence of an unobserved latent variable, y_i^*, which determines the value of the binary variable that we observe. Formally:

$$\left\{ \begin{array}{ll} y_i = 1 & \text{if } = X_i \beta + u_i > 0 \\ y_i = 0 & \text{otherwise} \end{array} \right\} \qquad (3)$$

where β is the vector of the parameters, X_i the matrix of the explanatory variables, and u_i the residuals, which we assume to have mean zero and standard deviation one.

We apply the maximum likelihood estimation via the iterative scoring algorithm. The percentage of correct predictions and the so-called pseudo R^2 are used as the adjustment kindness of the model. In probit models the coefficients of the variables are not directly interpretable, so we take the partial effects of the explanatory variables, which represent their marginal impact on the likelihood of observing a value of one in the dependent variable when the fund charges management fees on returns.

Estimation results are reported in Table 1.2. The six first columns report the results for each year separately, and the last that of the entire period. The control group included in the constant term comprises Bond funds belonging to a savings bank financial group.

The table shows that, jointly for the whole period, the likelihood of the management fee being charged partially on returns (*mixed* funds) is significantly greater for Equity (EFunds) and

[8] Pure *performance* funds, which establish management fees exclusively on the basis of returns obtained, are removed from the empirical analysis because of their limited presence in the sample.

Global funds (GFunds), for the youngest funds (ANTIQ), for the most profitable (NRET) and for the most expensive in terms of custody and non-annual fees (CUSTFEE and NONAFEE, respectively). By contrast, it is lower for funds belonging to banking financial groups (BANKS). Focusing on the yearly regressions, it must be highlighted that the negative effect of this last variable is only found at the end of the sample period. On the other hand, it is also interesting to observe that a higher volume of assets managed (ASSETS) significantly reduces the probability of management fees being on performance at the very beginning of the period, but that effect disappears with time (when mixed funds are larger in size). All these results confirm the main ideas derived from the descriptive analysis in Section 1.2.

The lack of explanatory power of the fund risk (VOLAT) may seem surprising. However, although the VIF test fails to identify collinearity problems, the high correlation between this variable and EFunds (0.65) could cause the risk effect picked up by this investment objective. Finally, the variable representing the independent funds does not significantly affect the choice of the management fee type, once the effect of the other variables is considered.

From these results, it seems reasonable to conclude that managers who charge their management fees partially on performance are more involved in finding high future returns (through greater knowledge or effort). From previous results, these are funds that invest mainly in risky assets (EFunds and GFunds), and have less experience (ANTIQ) and a smaller market share (ASSETS) in the industry. Thus, the choice of a performance-based fee could to some extent be understood as a sign of commitment to the interests of investors, through the incentives that it generates in portfolio managers. In addition, this sort of fund charges higher one-off fees (front and redemption fees), which reinforces the argument of commitment and permanence in the manager-investor relationship.

Finally, regarding the effects that the introduction in November 2006 of the high water mark could have on the decision whether to charge management fees on performance, Table 1.2 reports no relevant changes in results between regressions in 2006 and 2007 except for the net return variable. The number of *mixed* funds increased from 242 to 252 (see table 1.1, Panel A), but the management fee choice seems to be driven by the same set of explanatory variables.

1.4. CONCLUSIONS

This paper studies the fund attributes which determine the decision as to what type of management fee is implemented, on the basis of assets managed (asset-based fee), returns

(performance-based fee), or both. While academic literature tends to conclude that the performance-based fee best aligns the interests of managers and investors, in practice the industry tends for the most part to favour asset fee schemes.

Our findings allow us to conclude that from 2002-2007 the likelihood of the management fee for a sample of Spanish funds being charged on returns is significantly greater for equity-oriented funds and for the youngest funds. By contrast, it is lower for funds owned by banking financial groups and those that manage large volumes of assets. These results are confirmed in very different economic scenarios for the market and mutual funds over the period 2002-2007. Thus, Spanish funds implementing performance-based fees seem to be the most dynamic and the most involved in good management, as might be expected.

The predominant practice in the fund industry of establishing asset-based management fees could be interpreted as a consequence of the lack of competition; the usual asset-based scheme might therefore be understood as merely a way of guaranteeing a fixed amount of earnings on the part of asset management services, with no commitment to investors' interests.

In our opinion, funds implementing performance-based fees are a very interesting sub-group which deserves more attention from academics. Preliminary findings in this paper suggest that many topics related to the mutual fund industry (the risk-return profile, efficiency, competition in the sector, etc.) should be re-examined for performance fee funds.

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APPENDIX: LEGAL MAXIMUM FEES IN SPAIN

The table shows the upper limits set by Spanish regulations for management fees, custody fees, front-end, and redemption charges.

Fund type	Management fee	Custodial fee	Front-end and Redemption charges
MUTUAL FUNDS	If based on assets managed: 2.25%	0.2% of custodial assets	5% of assets purchased or redeemed
	If based on fund performance: 18%		
	If based on assets and performance: 1.35% of assets and 9% of performance		
MONEY MARKET FUNDS	If based on assets managed: 1%	0.15% of custodial assets	1% of assets purchased or redeemed
	If based on fund performance: 10%		
	If based on assets and performance: 0.67% of assets and 3.33% of performance		

TABLE 1.1. DESCRIPTIVE STATISTICS OF THE SPANISH FUND SAMPLE

Panel A shows the distribution of the Spanish fund sample for each year in the 2002-2007 period, grouped according to the type of management fee charged. *Asset* funds charge management fees on the basis of the total assets managed, *Performance* funds on the returns obtained and *mixed* funds on a combination of the two. Funds are classified depending on the financial group to which they belong: Independent, I; Savings Banks, S; and Banks, B; and their investment objectives: equities, EFunds; fixed-income assets, BFunds; and global, GFunds. The number of funds of each type is reported. An asterisk stands for 5% significance in the differences in proportions test between *asset* funds and *mixed* funds.

Panel B shows the average age of the investment objective (ANTIQ), volatility (VOLAT), assets managed in thousands of Euros (ASSETS), net return (NRET), Sharpe ratio (SHARPE), management fee on assets (ASSETMF), on performance (PERFORMF), total management fee (TOTALMF), custody fee (CUSTFEE), front-end loads (FRONTLOAD), redemption fee (REDFEE), discount (DISC) and total expenses over assets (EXPENSES). In this case, an asterisk stands for 5% significance in the differences in averages test between *asset* funds and *mixed* funds.

Panel A

		2002	2003	2004	2005	2006	2007	TOTAL	%
		1,638	**1,643**	**1,682**	**1,747**	**1,712**	**1,832**	**10,254**	
I	***mixed***	39*	39	62*	95*	101*	89*	425*	37.68
	asset	387	386	406	428	409	411	2,427	26.66
	performance	1	1	4	4	3	3	16	76.19
S	***mixed***	24*	39	58	74	80	96	371	32.89
	asset	497	521	537	540	526	602	3,223	35.40
	performance	0	0	0	0	0	0	0	0.00
B	***mixed***	48	59	46*	51*	61*	67*	332*	29.43
	asset	639	598	569	555	531	563	3,455	37.95
	performance	3	0	0	0	1	1	5	23.81
EFunds	***mixed***	66*	83*	83*	98	91	85*	506	44.86
	asset	697	640	608	607	644	650	3,846	42.24
	performance	1	0	0	0	0	0	1	4.76
BFunds	***mixed***	20*	23*	22*	25*	29*	30*	149*	13.21
	asset	757	772	772	748	602	665	4,316	47.40
	performance	1	0	1	0	0	0	2	9.52
GFunds	***mixed***	25*	31*	61*	97*	122*	137*	473*	41.93
	asset	69	93	132	168	220	261	943	10.36
	performance	2	1	3	4	4	4	18	85.71

Panel B

		2002	2003	2004	2005	2006	2007	TOTAL
ANTIQ	***mixed***	2.49*	3.06*	3.48*	3.86*	4.18*	4.45*	3.78*
	asset	3.01	3.71	4.42	5.09	5.45	5.81	4.59
	performance	3.24	2.99	2.74	2.99	2.99	3.99	3.18
VOLAT	***mixed***	4.71*	2.90*	1.64*	1.87*	1.65*	1.62	2.14*
	asset	3.06	1.92	1.05	1.39	1.41	1.49	1.72
	performance	1.95	0.44	0.64*	2.00	0.91	1.26	1.31
ASSETS	***mixed***	18,897.90*	25,354.97*	71,278.53	77,172.20	84,463.40	79,498.91	66,361.07*
	asset	83,729.74	94,738.69	99,481.62	110,100.80	94,251.54	84,157.59	94,344.53
	performance	12,185.75	6,197.00	13,817.25	7,616.00	17,721.25	13,444.25	12,635.00
NRET	***mixed***	-16.67*	10.01	5.08	13.14*	8.54	3.07*	5.40*
	asset	-11.60	8.60	4.89	10.14	8.42	2.07	3.70
	performance	-7.11	3.05	1.47	5.09	6.85	3.41	1.99
SHARPE	***mixed***	-5.75	1.52*	0.54*	1.47*	0.37*	-4.34*	-0.91*
	asset	-9.60	-1.00	-8.53	-9.56	-2.28	-7.51	-6.45
	performance	-4.54	1.91	-0.83	1.75	2.75	-0.75	-0.22
ASSETMF	***mixed***	1.13*	1.14*	1.10*	1.05*	1.09*	1.03*	1.08*
	asset	1.43	1.40	1.36	1.35	1.39	1.36	1.38
	performance	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERFORMF	***mixed***	8.27*	8.36*	8.42*	8.35*	8.27*	8.00*	8.26*
	asset	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	performance	11.25	18.00	12.75	16.00	15.25	15.25	14.29
TOTALMF	***mixed***	1.24*	2.20*	1.74*	2.38*	2.00*	1.49*	1.87*
	asset	1.44	1.40	1.36	1.35	1.39	1.35	1.38
	performance	0.22	0.70	0.29	1.05	1.37	0.51	0.69
CUSTFEE	***mixed***	0.13	0.12	0.12*	0.12	0.12	0.11	0.12
	asset	0.12	0.12	0.11	0.11	0.11	0.11	0.11
	performance	0.05	0.20	0.14	0.17	0.14	0.14	0.13
FRONTLOAD	***mixed***	0.07	0.08	0.12	0.26*	0.45*	0.41*	0.27*
	asset	0.03	0.03	0.03	0.03	0.06	0.06	0.04
	performance	0.00	0.00	0.00	0.00	0.00	0.00	0.00
REDFEE	***mixed***	0.42	0.47	0.38*	0.33	0.45*	0.41*	0.41*
	asset	0.38	0.36	0.29	0.30	0.31	0.30	0.32
	performance	0.03	0.00	0.25	0.13	0.38	0.38	0.22
DISC	***mixed***	0.00	0.01	0.01	0.01	0.02	0.01	0.01
	asset	0.01	0.01	0.01	0.01	0.02	0.01	0.01
	performance	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXPENSES	***mixed***	1.79	2.29*	1.69*	2.26*	1.83*	1.48	1.87*
	asset	1.65	1.56	1.54	1.51	1.60	1.53	1.57
	performance	0.88	0.83	0.59	1.21	1.36	0.80	0.96

TABLE 1.2. PROBIT ESTIMATION

The table shows the results of the probit estimation separately for each year and for the whole period 2002-2007:

$y_i = 1$ if $y_i^* = X_i \beta + u_i > 0$

$y_i = 0$ otherwise

with β being the vector of the parameters, X_i the matrix of the explanatory variables, and u_i the residuals, which we assume to have mean zero and standard deviation one. The explanatory variables are the financial group to which the funds belong (Independent, I and Banks, B), investment objective (equities, EFunds and global, GFunds), average age of the investment objective (ANTIQ), volatility (VOLAT), neperian logarithm of assets managed in thousands of Euros (ASSETS), net return (NRET), Sharpe ratio (SHARPE), custody fee (CUSTFEE), and non-annual fee (NONAFEE). The asterisk stands for 5% significance. The two last rows exhibit the percentage of cases correctly predicted by the model and the pseudo R^2, respectively.

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**TOTAL**
I	0.0247	0.0068	-0.0131	0.0010	0.0189	0.0131	0.0052
B	0.0194	0.0166	-0.0267*	-0.0416*	-0.0478*	-0.0384*	-0.0231*
EFunds	0.0254	0.0602*	0.0675*	0.0895*	0.0767*	0.1055*	0.0822*
GFunds	0.2128*	0.2344*	0.2698*	0.3036*	0.2854*	0.2937*	0.3158*
ANTIQ	-0.0084	-0.0095*	-0.0140*	-0.0151*	-0.0135*	-0.0149*	-0.0089*
VOLAT	0.0034	0.0089*	0.0072	0.0049	0.0098	-0.0080	0.0003
ASSETS	-0.0089*	-0.0139*	-0.0058	-0.0095*	-0.0019	0.0009	-0.0068*
NRET		-0.0019*	-0.0006		-0.0009	0.0028*	0.0008*
SHARPE	0.0001	0.0001	0.0009*	0.0001	0.0001	0.0006	0.0002
CUSTFEE	0.1574	0.0829	0.1503	0.2092	0.3617*	0.1654*	0.1782*
NONAFEE	0.0024	0.0060	0.0025	0.0146*	0.0133	0.0146*	0.0107*
%	93.20	91.70	90.00	87.60	86.20	86.70	88.90
R2	0.10	0.11	0.15	0.16	0.14	0.15	0.14

CHAPTER 2
THE DYNAMIC OF MANAGEMENT FEES IN THE MUTUAL FUND INDUSTRY

2.1. INTRODUCTION

According to a recent report by International Financial Services, London (IFSL, 2008), total asset volume in the global fund management industry increased 15% in 2006 to nearly double the figure for 2002, reaching a record $61.9 trillion at year-end 2006, with a further $21.8 trillion invested in mutual funds. The Investment Company Institute, ICI, (2008) reports an additional 20% increase in total worldwide mutual fund assets in the course of 2007.

This impressive growth in the delegated fund management industry, and especially in the volume of assets under management by mutual funds, has attracted the interest of the financial academic community and practitioners. The professionalism of management companies, the possibilities of portfolio diversification and cost savings for investors are some of the most frequently cited reasons driving this increasing trend towards delegated portfolio management.

Since the pioneering paper of Jensen (1968), mostly devoted to analysing and evaluating performance or the manager's ability to outperform the market, academic literature on mutual funds has recently redirected its attention towards the price that investors have to pay for the services that they receive, i.e. mutual fund fees or expenses. Firstly, since some of these expenses are deducted from returns before performance is assessed, the conclusions could be affected by the level of these fees. In particular, Grinblatt and Titman (1989), Droms and Walker (1996) and Cesari and Panetta (2002), among others, find that mutual funds do not underperform the market when gross returns (before expenses) are considered. A similar result is found by Martínez (2003) for the Spanish market.

Second, considering mutual fund fees as the price that investors have to pay to participate in this industry, management fee studies point to price-setting here. In addition, these studies could throw some light on competition in this sector. Coates and Hubbard (2007) draw up an excellent analysis of that issue. Gil-Bazo and Ruiz-Verdú (2008) present another recent theoretical contribution to the relevant literature.

Third, the mutual fund management industry accounts nowadays for a non negligible share of national financial statements. For instant, ICI (2008) reports $12 trillion managed by US mutual funds, and an asset-weighted average 0.86% of fees and expenses at the end of 2007, representing more than 0.75% of US GDP. Moreover, more than 44% of US households own mutual funds.

Finally, investors have recently become much more cost-conscious than previously. Thus, a survey conducted by ICI in 2006 found that 74% of investors reviewed or asked questions about

fund fees and expenses before purchasing, even over and above the historical performance of the fund. Recent studies also show that individual investors are paying attention to fund expenses and that net fund flows are influenced by fund costs. See Sirri and Tufano (1998), Khorana and Servaes (2004), Barber, Odean, and Zheng (2005) and Woodrow (2007).

Although investors have to pay different fees (the custody fee, paid for asset administration and custody; the front-end load, charged to investors at the time of the share purchase; and the redemption fee, paid by investors when fund shares are redeemed), this paper focuses on the fees that investors have to pay to managers for portfolio supervision services, i.e. management fees. The main reason is that management fees are the largest component of fund operating expenses[9]. Thus in our sample management fees account for 90% of total average fund expenses. So the price-setting policy of management companies is implemented through changes in management fees.

A considerable number of topics have been analysed by academic literature on management fees[10]. Following the initial paper by Bhattacharya and Pfleiderer (1985), several authors have studied the optimal structure of management fees both theoretically and empirically, either as a simple percentage of the total assets managed or tied to the returns obtained by the management. Modigliani and Pogue (1975), Starks (1987), Grinblatt and Titman (1989), Golec (1992), Roll (1992), Das and Sundaram (1998a, b and 2002), Ou-Yang (2003), Palomino and Prat (2003) and Dybvig et al (2004) are some of the most significant.[11]

Other empirical papers focus on the determinants of management fees. Ferris and Chance (1987), Malhotra and McLeod (1997), Tufano and Sevick (1997), Luo (2002), an more recently Prather et al (2004) and Malhotra et al (2007) are illustrative examples of this literature[12].

Another related issue analysed in the relevant literature is the relationship between management fees and fund performance (a non-exhaustive list includes Ippolito (1989), Golec (1996), Gruber (1996), Carhart (1997), Chevallier and Edison (1999), Elton et al (2003)), volatility (Chevallier and Edison (1999), Cremers and Petajisto (2007) and Kaniel and Hugonnier (2008)

[9] Khorana *et al* (2008) report the level of management fees, total expense ratios and total shareholder costs (adding annualised loads) for 18 countries in December 2002. With substantial differences across countries and fund investment objectives, management fees account for an average of 70% of total expense ratios.

[10] An elaborate review of the most relevant theoretical literature on delegated portfolio management can be found in Stracca (2006).

[11] The choice between linear and piecewise-linear management fees is analysed in Coles *et al* (2000), Deli (2002), Deli and Varma (2002), Warner and Wu (2006) and Massa and Patgiri (2007) among others. Academic literature has also analysed a wide range of issues related to performance-based fees. For instance, the convenience of establishing a reference portfolio is analysed in Admati and Pfleiderer (1997), Basak *et al* (2007) and Garvey and Milbourn (2006); Starks (1987), Das and Sundaram (2002) and Ross (2004) study the desirability of asymmetry; and Brennan (1993), Cornel and Roll (2004) and Cuoco and Kaniel (2006) focus on the effect on asset prices.

[12] See Gil-Bazo and Martínez (2004) for the Spanish market**.**

among others) and flows, (Sirri and Tufano (1998), Khorana and Servaes (2004) and Barber et al (2005)).

In a recent paper Khorana et al (2008) provide extensive research on the differences in mutual fund fees worldwide, focusing on funds themselves, management companies and national characteristics.

This paper extends this literature by investigating empirically the variations in the management fees applied by management companies to fund shareholders. Since management fees have an economically significant impact on investment performance, this analysis is clearly in the interest of the large community of mutual fund shareholders. It is also of interest to management companies, in making them aware of the extent of the competitive environment and the price policy of competitors in the mutual fund industry, since this directly affects their profitability. Finally, regulators could also gain from a better understanding of the fee policy implemented in the industry.

In particular, we analyse how management fees change over time, focusing on the causes and effects (on performance and market share) of those changes. The typical management fee in the Spanish mutual fund industry is a fixed percentage of the assets managed, with no explicit performance component. Only 9% of mutual funds sponsors use performance-based fee contracts with their management firms. One distinguishing characteristic of Spanish mutual fund regulation is that it relies on caps or maximum fees. Appendix 1 shows the maximum fees allowed by Spanish regulations according to the way in which they are determined and the type of fund. We collect data on the changes in the fixed percentages charged in both asset-based and in performance-based management fees.

To the best of our knowledge, the only two studies focused on management fee changes are those of Warner and Wu (2006) and Kunhen (2005), who analyse advisory contracts. So we believe that this paper can provide new empirical evidence in the field of management fees. As indicated by Warner and Wu (2006) we find that the number of fee changes is limited but economically significant. Only 5% of the fund-time observations are variations in management fees. However, more than 29% of the sample funds are affected by management fee changes over the course of the period of analysis. Moreover, the average changes are very large, equivalent in the case of the increases in asset-based management fees for 66% of the fees previously charged.

We find that in the Spanish fund industry there have been few asset-based management fee changes, but those that have taken place are economically significant and their aggregate effect is offset. Successful funds and management companies in terms of asset volume and performance

have implemented price increasing policies, while unsuccessful ones have decreased management fees as a way of becoming more competitive in the industry. However, no significant effects are found in the paper in connection with such purposes.

In regard to performance-based management fee changes, we find that small funds, with low excess returns, high quarterly returns and owned by good-performing management companies have decreased performance-based management fees. The price policy implemented by Spanish funds through performance-based management fee decreases seems to have had a negative effect on subsequent returns and on net excess returns and a positive impact on the market share of funds. Decreases in performance fees seem to induce the manager to make some slight effort because performance-based fees are an explicit incentive for managers.

The rest of this paper is organized as follows. Section 2.2 describes the data and variables employed in the analysis. The results of the empirical model estimating determinants and consequences of the management fee changes are discussed in Section 2.3, separately for increases and decreases in the asset-based and performance-based management fees. Finally, Section 2.4 concludes and summarizes the main findings of the paper.

2.2. DATA AND VARIABLES

The Spanish mutual fund industry is highly significant and continues to grow. According to the Spanish Asset Management Association (Asociación de Instituciones de Inversión Colectiva y Fondos de Pensiones), INVERCO (2008), the volume of assets under management by mutual funds at year-end 2007 was equivalent to 11.5% of total Spanish family financial savings, compared to 0.4% in 1985. At that time a record figure of 0.32 trillion Euros managed was reached (compared with just 0.0017 trillion Euros in 1985), equivalent to 26.7% of GDP. This made Spain the sixth biggest European country in terms of assets under management. 49% of Spanish families (a total of 9.69 million shareholders) are involved to some degree in mutual fund investments.

The dataset was obtained from the body that supervises and inspects Spanish Stock Markets, and therefore mutual funds: Comisión Nacional del Mercado de Valores (CNMV). This institution publishes a quarterly data sheet that includes all the information used in this study. The data set available initially comprised all the existing open-end funds from the second quarter of 2002 to the second quarter of 2007. The quarterly average number of funds is 2,644, ranging from

2,508 in the third quarter of 2003 to 2,923 in the second quarter of 2007. The total asset volume managed increased from 0.18 to 0.28 trillion Euros in the course of the sample period.

Guaranteed funds were excluded from the analysis (because of their specific investor remuneration policy[13]) as were funds less than one year old. In order to perform a time series analysis we only consider mutual funds with complete information throughout the period analysed. This leaves a final sample of 710 mutual funds, which represent 27.0% of the average number of existing funds and 31.7% of the average total asset volume. It must be stressed that the fund sample characteristics very closely match those of the full available data. In particular, the dynamic pattern of the management fees that we are interested in is almost identical. Thus, we are very confident that the sample chosen is representative of the industry as a whole in Spain.

The analysis is conducted on a semi-annual basis, and data referring the two first quarters need to be used for lagged explanatory variables. So the total number of items in the data set is 6,390 (710 funds, analysed in 9 quarters). Changes in management fees are considered separately for increases and decreases.

In accordance with current Spanish legislation, management fees are charged at fund level on the basis of the total volume of assets managed, the returns obtained or a combination of the two. In fact, as in the mutual fund industry worldwide, only a minority of Spanish mutual funds (9%) tie the remuneration of managers to returns, by charging a base fee proportional to the assets managed plus an additional fee dependent on performance. In our sample there are no funds that charge management fees only on returns. One distinguishing characteristic of Spanish mutual fund regulation is that it relies on caps or maximum fees. Appendix 1 shows the maximum fees allowed by this regulation according to the way in which they are determined and the fund type.

Time variations in the fixed percentages charged on assets and/or performance are considered as changes in the price policy of the fund, and constitute the key point of the paper.

Over the period and for the sample considered, a total of 177 decreases and 138 increases in management fees occurred, accounting, respectively, for 2.8% and 2.2% of the total number of items. These changes affected 208 funds, 29% of the total. In particular only 27 out of the 191 changing funds varied asset-based management fees in both directions during the sample period. For the performance-based management fee changes, 9 out of 55 funds made changes in opposite directions. We also found simultaneous opposite variations in asset-based and performance-based

[13] At the end of the guarantee period, guaranteed funds usually extend (and modify) the initial guarantee but charge a different management fee. However, the new management fee responds to the characteristics of the guarantee rather than to any change in the price policy of the fund.

management fees, mainly related to a transformation in the benchmark used for the management fee.

The level of changes is surprisingly high, with an average larger than 50 basis points. In particular, the average increase (decrease) in the asset-based management fee is 59 (47) basis points, which is equivalent to 66% (32%) of the fee charged two quarters before the change. With respect to performance-based fees, the average increase is 803 basis points and the average decrease is 816.

However, the levels of increases and decreases seem to offset each other, and the time-series of the equally-weighted average management fees exhibits a very stable pattern.

To sum up, the sample of management fees from Spanish funds analysed is characterised by a very small number of management fee changes, but those changes are economically significant, and their aggregate effect is offset.

Since the main objective of this study is to analyse increases and decreases in management fees, we collect information about these fees, referred to here as asset-based management fees (AMF) or performance-based management fees (PMF), depending on the variable on which they are based, being ΔAMF and ΔPMF each respective change. Two dummy variables, INC and DEC, are created as the dependent variables for the empirical model which studies the decision to change the management fee. INC (DEC) takes a value of one for quarter-fund observations that increase (decrease) management fees, and zero if no change occurs.

Next we describe the set of fund attributes considered as explanatory variables in the empirical model. Basically, these are the fund characteristics considered previously in empirical literature as determinants of the amounts of mutual fund fees, and we suggest them also as potential determinants of the decision to change management fees.

We first consider the investment objective of the fund. Funds are classified into three groups, each associated with a corresponding dummy variable: Equity funds (EFunds), which invest mainly in equities; Bond funds (BFunds), in which more than 70% is invested in fixed income assets; and finally Global funds (GFunds), which have no precisely defined investment policy and do not belong to any other category.

Funds are also classified into two groups according to the type of management fee charged. We use the term “asset funds” (with AFunds as the associated dummy variable) for those which set fees exclusively on volume of assets, and “mixed funds” (MFunds) for funds that tie a fraction of the management fee to the returns obtained.

The number of years since the last modification in the investment objective of the fund (ANTIQ) is also considered, so as to examine the likelihood of changes in management fees[14].

Volatility of fund performance (VOLAT) is measured by the standard deviation of the twelve monthly returns, in percentage terms.

Fund size is another potentially relevant attribute in deciding whether to change management fees. To empirically analyse this issue, the volume of assets managed in thousands of Euros (ASSETS) and the number of shareholders (SHAREH) are used to assess fund size. Additionally, the market share of the fund (out of the total assets managed by all funds with the same investment objective) is computed and termed MSASSETS.

Quarterly and annual fund returns, net of all expenses, are also available in the dataset (QNRET and ANRET, respectively). We also computed the quarterly fund excess returns over the average in the same investment objective, EXCQNRET.

Finally, others fund fees are also considered. The custody fee paid for asset administration and custody, CUSTFEE; the front-end load charged to investors for the purchase of fund shares, FRONTLOAD; and the redemption fee paid by investors when fund shares are redeemed, REDFEE. The discount that the management company occasionally applies to the fund is referred to as DISC. In the empirical application, one-time fees (the front-end load and the redemption fee, net of the discount) are joined together in a non-annual fee termed NONAFEE. As an aggregate measurement of all fees, we also collect information on total expenses borne by the fund (adding in the management fee, custody fees, and other operating costs) as a percentage of the average volume of assets during the quarter. This variable is referred to as EXPENSES.

To investigate whether the fund price policy is implemented at family level, some additional information for the management company the fund belongs to is also collected. Thus, the total volume of assets under management (MC-ASSETS), equally-weighted quarterly fund returns (MC-QNRET), annual fund returns (MC-ANRET) and market share (MC-MSASSETS) are computed and used in the empirical analysis.

Appendix 2 lists and defines all the variables considered in the paper.

2.2.1. Descriptive analysis of the data

This section briefly describes the main characteristics of the sample analysed in this study. 710 mutual funds are studied on a semi-annual basis from the second quarter of 2003 to the second

[14] Note that this variable does not therefore represent exactly the years from the creation of the fund, but it does capture the same idea of experience in portfolio management.

quarter of 2007, which provides a total of 6,390 fund-semester items. Around 50% of the funds in the sample are Equity funds, 10% Global funds and the remaining 40% Bond funds. Only around 9% are mixed funds.

Table 2.1 characterizes the time-series distribution of the number of management fee changes according to the fund investment objective and the type of management fee charged. Panel A reports information on changes in asset-based fees and panel B in performance-based fees.

The number of changes in asset-based management fees ranges from 50 in the second quarter of 2003 to 12 in the fourth of 2005. In the course of the period considered there are 143 decreases and 102 increases in all, accounting for 2.24% and 1.6%, respectively, of the total number of observations.[15] No clear time pattern in the number of this kind of management fee changes is observed in the sample, although a slight increase can be observed in the last part. Only 38% of the changes affect Equity funds, although those funds account for 50% of the sample. More interestingly, almost 61% of those changes are increases in management fees. By contrast, 74% of the changes affecting Bond funds are decreases. Global funds seem (relatively) to change asset-based management fees twice as often as other funds, with a slight preference for decreases. On the contrary, mixed funds show a relatively high proportion of management fee changes (17%) given that they on average account for 9% of the sample, with those changes being clearly dominated by decreases.

The distribution of the number of changes in performance-based management fees is reported in Panel B. It is obvious that, unlike asset-based management fees, performance-based fees are charged only by mixed funds, which on average account for just 9% of the sample. Thus, Panel B reinforces the idea that mixed funds change management fees more often than others. The total number of changes is 70: 34 decreases and 36 increases. These changes affect 6% and 6.3%, respectively, of mixed fund items, roughly above the changes in asset-based fees. Surprisingly, Equity mixed funds decreased management fees more often than they increased them, whereas the contrary was the case for the funds with other investment objectives.

Table 2.2 describes the number of funds involved in management fee changes in the sample period. 143 decreases in asset-based management fees were made by 121 different funds, with eighteen of them changing fees twice during the sample period and two funds decreasing them three times. There were 102 increases, affecting 97 funds, five of which changed fees twice.

[15] These figures are slightly higher than those in Warner and Wu (2006) for the advisory contract changes in the US market for 1995-2001.

Regarding price policy, 27 funds varied their fees in opposite directions during the period considered.

Changes in performance-based management fees affected 55 funds: 30 decreased their fees (with two funds making three changes) and 34 funds increased them (two of them changing twice), with 9 funds varying fees in opposite directions.

Also in terms of pricing policy, we have found simultaneous opposite variations in asset-based and performance-based management fees. 23 of the 36 performance-based fee increases coincided with simultaneous decreases in asset-based fees; all these increases actually result in the introduction of performance-based fees, turning the relevant funds into mixed funds. Also, 15 out of the 34 performance-based fee decreases coincided with an opposite variation in asset-based fees, all but one of which entailed conversion to asset funds.

The time-series distribution for the amounts of management fees changes (variation in management fees) are reported in Table 2.3. For asset-based management fees (Panel A), the average increase was a remarkable 59 basis points. With a 0.9% average fee on assets managed before the change, this makes for an average increase of 66%. Notice the exceptional increase in the second quarter of 2006. The average decrease is smaller but still significant at 47 basis points. Although there are no major differences across the fund groups considered, Equity funds seem to be responsible for a significant fraction of large asset-based management fee changes.

Panel B shows the information for performance-based management fee changes. It can be deduced that almost all changes in these fees are in funds which introduce or eliminate performance-based fees in their management fee structures[16]. In practice, these changes result in a modification in the type of fund from asset fund to mixed fund or viceversa. Obviously, such a modification in the structure of the management fees charged might be sparked by reasons other than merely changing fee amounts, so this point deserves additional research.

In spite of these considerable activities in the price policy, the average aggregate cost to investors has not changed much. Table 2.4 reports the changes over time in equally-weighted average management fees. Bond and Global funds experienced a slight decrease in asset-based fees over the four-year period analysed, accounting for 5% and 10%, respectively. However, Equity funds actually underwent a 4% increase. In regard to performance-based fees, Global funds underwent a substantial 34% increase, whereas a 31% decrease was experienced by Equity funds.

[16] An evident example of that fact is the data for the second quarter of 2007, when 12 funds eliminated performance-based management fees and one fund introduced such a fee.

Table 2.5 reports summary statistics of the variables for the sample selected. Panel A is for the first quarter considered, i.e. the second quarter of 2003; Panel B reports data for the second quarter of 2007, the last quarter analysed; and, finally, Panel C shows the time-series average for the whole period. As can be deduced from the table, economically significant time-series differences over the four-year period are observed in the cross-sectional means of some of the most significant variables: volatility and returns. By contrast, management fees and expenses seem to be very stable throughout the period analysed, as previously reported.

Most interestingly, Table 2.6 shows the cross-sectional average behaviour of relevant variables from four quarters before to four quarters after management fee variations. In order to shed some light on the subject considered in this paper, items corresponding to management fee increases (INC), decreases (DEC) and non-changing funds (NOCHANG) are reported separately from the total. Panel A shows the results for changes in asset-based management fees and Panel B for performance-based fees. We perform a differences in average test between changing (INC/DEC) and non-changing (NOCHANG) funds.

From Panel A in Table 2.6 it is clear that before the changes those funds which increased asset-based management fees were cheaper in terms of the associated fees, but more expensive in terms of performance-based fees. Not surprisingly, after the change those funds increasing (decreasing) fees became more expensive (cheaper), but at the same time drastically reduced (increased) their performance-based management fees. So it appears that a combined (and opposite) price-setting policy regarding asset-based and performance-based management fees was implemented, as reported previously.

Regardless of market conditions, funds decreasing their asset-based management fees performed worse before the change in terms of quarterly, annual and excess returns. Thus, one might think that their relatively low performance encouraged these funds to reduce their management fees. After the changes, these funds improved their returns, but continued to relatively perform poorly except in terms of excess returns. However, funds which increased their asset-based fees did not obtain exceptional returns before the change that could justify that decision. Nor did their relative performance worsen after the increase. So no clear positive relationship between previous returns and asset based-management fee increases seems to be found in the data.

The smallest funds seem to have been more inclined to increase asset-based management fees. Rather surprisingly, these funds increased their average number of shareholders and the volume of assets that they managed after the changes. Funds which reduced fees were also able subsequently to capture a relevant fraction of assets, especially in their target investment groups,

as evidenced by the remarkable rise in their market share: they became the funds with the biggest market share.

Low-volatility funds seem to have been more inclined to decrease asset-based management fees, although that change has not modified their asset allocation policy. Some quarters after the fee decrease the risk assumed by these funds continues to be half that of the others. Moreover, younger funds seem to have increased asset-based management fees more often than more established funds.

No significant differences are found in the size of management companies before the fee changes; however, after the changes those companies managing funds which increased fees gained market share. By contrast, companies managing funds which decreased asset-based management fees obtained significantly lower quarterly and annual returns than the others before the changes, while no clear pattern is observed after the changes.

Panel B in Table 2.6 illustrates that the funds which decreased their performance-based management fees had the smallest asset-based fees and the largest performance fees before the change. Afterwards, the latter remained above average, while the asset-based fee increased. Clear simultaneity and opposite decisions in the two management fees appear in funds which increased their performance-based management fees.

As for asset-based fees, funds which increased performance-based fees did not obtain exceptional returns before the change. What is more interesting is that the best past performers (for quarterly and annual returns, but not for excess returns) decreased these fees. After the change, these funds obtained worse returns and indeed became the worst performers. However, the funds which increased the fraction of their management fees tied to returns improved their returns after the change. The incentives that this kind of fee create for managers seem to have worked correctly, because the managers of these funds put in more effort and obtained better returns.

Funds which increased (decreased) performance-based fees were larger (smaller) in size before the change; they experienced a significant reduction in asset volume and market share, but a surprising rise in the number of shareholders three quarters after the increase. It should be also highlighted that risky funds and funds belonging to small management companies were notably the most inclined to reduce performance-based fees.

2.3. ECONOMETRIC APPROACH AND RESULTS

After the description of the management fee changes in the previous section, we now go on to provide an empirical analysis of their determinants and consequences. In order to investigate differences between changes in asset-based management fees and performance-based fees, we analyse each type separately. In addition, alternative price policies (e.g. management fee increases and decreases) are independently analysed.

In this empirical application, we sort funds in each quarter into terciles based on the variables ANRET, MC-ASSETS, MC-QNRET and MC-ANRET, denoted as large, medium and small. We also transform the total volume of assets managed by each fund and by each management company by its neperian logarithm.

2.3.1. Determinants of management fee changes

Firstly, we estimate the main determinants of the changes in the management fees charged by the funds in our Spanish sample. As mentioned above, in this analysis the endogenous variables are the dummy variables INC and DEC, which take a value of one for quarter-fund observations in which fees increase or decrease and zero when no change occurs. The two-quarter lagged fund attributes selected in the previous section are considered as explanatory variables, along with the current investment objective.

For the logit estimation, we assume the existence of an unobserved latent variable, y_i^*, which determines the value of the binary variable that we observe. Formally:

$$\left\{ \begin{array}{ll} y_i = 1 & \text{if } = X_i \beta + u_i > 0 \\ y_i = 0 & \text{otherwise} \end{array} \right\} \qquad (1)$$

where β is the vector of the parameters, X_i the matrix of the explanatory variables and u_i the residuals, which we assume to have mean zero and standard deviation one.

We apply the maximum likelihood estimation the iterative scoring algorithm. The pseudo R^2 is used as the adjustment kindness of the model. In logit models the coefficients of the variables are not directly interpretable, so we take the partial effects of the explanatory variables, which represent their marginal impact on the likelihood of observing a value of one in the dependent variable when the fund charges management fees on returns.

The results of our estimation are reported in Table 2.7; Panel A is for the changes in the asset-based management fees and Panel B for performance-based ones. Note the reader that the number of observations varies for each case. Thus, the sample in the first column of Panel A (when decreases in asset-based management fees are analysed) has 6,288 items, equivalent to the total number of observations (6,390) minus the number of increases (102); the dummy variable DEC accounts in this case for 143 observations.

As can be deduced from the table, an increase in asset-based management fees is significantly more likely for small, Global and funds with high annual previous returns which belong to large and profitable management companies.

By contrast, fee decreases are more likely to occur in small, Global, secure, poor-performing funds (in terms of EXCQNRET) which are managed by management companies with low returns, as can be deduced from the table. Moreover, funds belonging to large management companies are relatively less inclined to decrease that kind of fee.

To sum up, it appears that successful funds and management companies have been able to exploit that advantage to go through with a high-price policy, while unsuccessful ones have decreased management fees as a way to become more competitive in the industry.

2.3.1.1. Asset-based management fees

As can be deduced from the table, an increase in asset-based management fees is significantly more likely for funds with high annual returns which are Global funds and for those belonging to large, profitable management companies. By contrast, it is lesser for big funds.

By contrast, fee decreases are more likely to occur in small, secure, poor-performing funds (in terms of EXCQNRET) which are managed by management companies with low volumes of assets and annual returns, as can be deduced from the table. Moreover, Global funds are relatively more inclined to decrease that kind of fee.

To sum up, it appears that successful funds and management companies have been able to exploit that advantage to go through with a high-price policy, while unsuccessful ones have decreased management fees as a way to become more competitive in the industry.

2.3.1.2. Performance-based management fees

As regards as the results for performance-based management fees changes, Panel B in Table 2.7 illustrates that the likelihood of a fee increase is significantly greater for cheap, small, Global funds and for those belonging to management companies with low quarter return. We have not found any effect of previous fund returns to the probability of increase the performance-based

management fees. Readers should remember that such changes are usually simultaneous with others in the opposite direction for asset-based management fees.

Performance-based management fee decreases are inversely related to size and fund excess-return.[17] Thus, small funds with low excess returns were more inclined to decrease these fees. Rather surprisingly, funds with high quarterly returns owned by good-performing management companies also decreased performance-based management fees more often.

2.3.2. Determinants of the magnitudes of management fee changes

Additionally, we analysed the factors that determined the amounts by which management fees changed. To that end we ran OLS with heteroscedasticity correction regressions only for the changing observations, using as dependent variables the levels of the changes:

$$Y_i = \alpha + b*X_i + e_i \qquad (2)$$

where Y_i is the amount of the increase or decrease in the asset-based or performance-based management fee charged by the fund *i*, X_i is the matrix of the explanatory variables which are defined in Appendix 2 and e_i the residuals.

The results in Table 2.8 show that greater decreases in asset-based management fees are related to the most expensive and the smallest funds. No significant differences are found as to the fund investment objectives. Indeed, the cheapest funds seem to be involved in large management fee increases.

Performance-based management fee decreases are greater for expensive funds and funds with low previous quarterly return; while young, secure, and small funds experience the most significant increases.[18]

2.3.3. Effects of management fee changes

This section analyses the effects of management fee changes on relevant fund characteristics. In particular, the consequences of these fee variations for quarterly returns, excess quarterly returns and market shares are estimated in the quarter when funds change their management fees and in the four quarters thereafter. Thus, the variables QNRET, EXCQNRET and MSASSETS are used respectively as dependent variables in OLS with heteroscedasticity correction regressions, while the dummies INC and DEC (and others used as control variables)

[17] Note the reader that the possibility of decrease the performance-based management fee is limited to the mixed funds.

[18] The small number of observations in Panel B seriously limits the scope of this subsection.

aim to capture the effects of management fee increases and decreases on the former. Thus, we run the following OLS regression for the whole 6,390 observations:

$$DP_i = \lambda_0 + \lambda_1 INC + \lambda_2 DEC_i + \Gamma CV_i + \upsilon_i \qquad (3)$$

where DP_i are the alternatives variables we are interested on (QNRET, EXCQNRET and MSASSETS), INC (DEC) is the dummy variable representing the increase (decrease) in the management fee, CV_i is the set of control variables, and, finally, υ_i is the error term.

Table 2.9 shows the results; Panel A is for the changes in the asset-based management fees and Panel B for those in performance-based fees.

2.3.3.1. Asset-based management fees

Management fee increases seem to have a cuasi-permanent negative effect on quarterly net returns, especially relevant in the third subsequent quarter. These findings allow us to conclude that there is not an incentive effect on the manager effort related to the increase in the asset-based management fees. Surprisingly, also management fee decreases seem to decrease contemporaneous and posterior returns. In this case, the negative incentives that fee reduction may provoke in the manager activity could explain these findings. Fund market share is not significantly affected by asset-based fee changes.

To conclude, the price policy implemented by Spanish funds through asset-based management fee variations does not seem to have been as effective as anticipated, at least in terms of fund performance and market share.

2.3.3.2. Performance-based management fees

Panel B shows that a fee decrease has a significant, negative effect on fund's quarterly returns in the quarter when the change happens and in the third subsequent quarter. However, it must be highlighted that the coefficients are very much larger (in absolute value) than in the case of asset-based management decreases. Therefore, decreases in the performance-based management fees seem to have a stronger effect on posterior returns that the reduction in the asset-based management fees, pointing to a more incentive related of the former. Additionally, market share is significantly positively affected by decreases in performance-based management fees in the quarter when the change happens and in the two subsequent ones.

When we analyse the effects of increasing performance-based management fees, a positive (although not statistically different from zero) effect on returns is found in the sort run (in the quarter the fee increase occurs and the next one). Note the reader that fund returns in the dataset

are measured after the fund expenses are paid; so, the positive effect of performance-based management fee increases on (after-expenses) returns can be thought to be in line with the incentive arguments regarding this type of fee; especially when the effect is negative (although not statistically significant) when asset-based management fee increases are considered..

In conclusion, the price policy implemented by Spanish funds through performance-based management fee decreases seem to have had a negative effect on subsequent returns and on net excess returns and a positive impact on the market share of funds, as anticipated above in the hypothesis. Decreasing performance fees seems to make managers put in some slight effort because performance-based fees are an explicit incentive for managers. Also the effects found regarding fee increases could be explained by the previous incentive arguments.

2.4. CONCLUDING REMARKS

The mutual fund industry is one of the most prominent in the financial area. Its recent trend worldwide is towards increases in volume of assets and number of shareholders. A comprehensive analysis of the price policy in this sector is clearly of interest to investors, management companies and regulators. This paper empirically analyses the determinants and consequences of changes in management fees in a sample of Spanish mutual funds for 2003-2007.

The average equally-weighted management fee remained in the same range of magnitude over the sample period. However, price-setting affected a significant proportion (29%) of funds, with the average change being greater than 50 basis points.

Results seem to reveal that small, poor-performing funds (and management companies) decreased asset-based management fees in an attempt to become more competitive in the industry. Nevertheless, after the variations there was no significant enhancement of performance or market share.

Small funds with low excess returns and high quarterly returns, owned by good-performing management companies decreased performance-based management fees. These decreases seem to have had a negative effect on subsequent returns and on net excess returns and a positive impact on the market share of funds. Decreasing performance-based management fees seems to make managers put in some slight effort because performance-based fees are an explicit incentive for managers.

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APPENDIX 1: LEGAL MAXIMUM FEES IN SPAIN

The table shows the upper limits set by Spanish regulations for management fees, custody fees, front-end, and redemption loads.

Fund type	**Management fee**	**Custody fee**	**Front-end and Redemption loads**
MUTUAL FUNDS	If based on assets managed: 2.25% If based on fund performance: 18% If based on assets and performance: 1.35% of assets and 9% of performance	0.2% of custodial assets	5% of assets purchased or redeemed
MONEY MARKET FUNDS	If based on assets managed: 1% If based on fund performance: 10% If based on assets and performance: 0.67% of assets and 3.33% of performance	0.15% of custodial assets	1% of assets purchased or redeemed

APPENDIX 2: VARIABLE DEFINITIONS

***Fund level variables**:*
AMF: Asset-based management fee charged by the fund.
PMF: Performance-based management fee charged by the fund.
AMF variation: The amount of change in the asset-based management fee charged by the fund.
PMF variation: The amount of change in the performance-based management fees charged by the fund.
INC (DEC): Binary variable which takes a value of one for quarter-fund observations in which there is an increase (decrease) in management fees, and zero when no change occurs.
EFunds: Binary variable which takes a value of one if the fund invests mainly in equities, and zero otherwise.
BFunds: Binary variable which takes a value of one if the fund invests more than 70% in fixed income assets, and zero otherwise.
GFunds: Binary variable which takes a value of one if the fund is global (i.e. a fund with no precise definition of investment policy which does not belong to any other category), and zero otherwise.
AFunds: Binary variable which takes a value of one if the fund charges their management fees exclusively on volume of assets, and zero otherwise.
MFunds: Binary variable which takes a value of one if the fund ties a fraction of their management fees to the returns obtained, and zero otherwise.
ANTIQ: Number of years since the last modification in the investment objective of the fund.
VOLAT: Volatility of the fund performance, measured by the standard deviation of the twelve previous monthly returns, in percentage terms.
ASSETS: Volume of assets managed by the fund in thousands of Euros.
SHAREH: Number of shareholders in the fund.
MSASSETS: Market share of the fund, out of the assets managed by all the funds with the same investment objective.
QNRET: Quarterly fund return, net of all expenses.
ANRET: Annual fund return, net of all expenses.
EXCQNRET: Quarterly excess return of the fund, over the average for all the funds with the same investment objective.
CUSTFEE: Custody fee charged by the fund to investors for asset administration and custody.
FRONTLOAD: Front-end load charged by the fund to investors for the purchase of fund shares.
REDFEE: Redemption fee charged by the fund to investors when fund shares are redeemed.
DISC: Discount occasionally applied by the fund by some management companies.
NONAFEE: Sum of all one-time fees charged by the fund, front-end load and redemption fee, net of discount.
EXPENSES: Quarterly total expenses borne by the fund, as a percentage of the average total volume of assets.

***Management company level variables**:*
MC-ASSETS: Total volume of assets managed by the management company the fund belongs to, in thousands of Euros.
MC-QNRET: Equally-weighted quarterly fund return obtained by the management company the fund belongs to.
MC-ANRET: Equally-weighted annual fund return obtained by the management company the fund belongs to.
MC-MSASSETS: Market share of the management company the fund belongs to.

TABLE 2.1. DISTRIBUTION OF MANAGEMENT FEE CHANGES

This table shows the semi-annual time-series distribution of the number of changes in asset-based (Panel A) and performance-based management fees (Panel B), separately for increases and decreases (INC and DEC, respectively), according to fund investment objectives (equities, EFunds; fixed-income assets, BFunds; and global, GFunds), and the type of management fee charged (asset funds, AFunds, if based exclusively on assets under management, and mixed funds, MFunds, if also charged on returns obtained).

Panel A: Asset-based management fees

	2º -2003		4º -2003		2º -2004		4º -2004		2º -2005		4º -2005		2º -2006		4º -2006		2º -2007		TOTAL	
	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC
	33	17	13	12	13	13	9	4	16	9	4	8	17	13	22	12	16	14	143	102
BFunds	21	7	7	5	7	3	3	1	5	4	3	1	8	3	17	1	7	3	78	28
EFunds	7	9	3	7	4	6	5	2	3	2	0	5	6	10	3	7	6	9	37	57
GFunds	5	1	3	0	2	4	1	1	8	3	1	2	3	0	2	4	3	2	28	17
MFunds	2	1	2	1	1	5	4	1	7	2	1	1	3	3	5	2	1	0	26	16
AFunds	31	16	11	11	12	8	5	3	9	7	3	7	14	10	17	10	15	14	117	86

Panel B: Performance-based management fees

	2º -2003		4º -2003		2º -2004		4º -2004		2º -2005		4º -2005		2º -2006		4º -2006		2º -2007		TOTAL	
	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC
	1	2	0	3	8	3	0	6	1	8	0	3	10	2	2	8	12	1	34	36
BFunds	0	2	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	1	5
EFunds	1	0	0	2	8	1	0	6	1	2	0	2	8	1	2	2	9	0	29	16
GFunds	0	0	0	1	0	2	0	0	0	6	0	0	1	1	0	4	3	1	4	15
MFunds	0	2	0	3	1	3	0	6	0	8	0	3	1	2	0	8	0	1	2	36
AFunds	1	0	0	0	7	0	0	0	1	0	0	0	9	0	2	0	12	0	32	0

TABLE 2.2. NUMBER OF FUNDS INVOLVED IN MANAGEMENT FEE CHANGES

This table reports the number of funds involved in management fee increases and decreases from 2-2003 to 2-2007; Panel A is for asset-based management fees and Panel B for performance-based fees.

Panel A: Asset-based management fees

Nº of increases\ Nº of decreases	**0**	**1**	**2**	**3**	**Total**
0	519	78	16	0	613
1	66	23	2	1	92
2	4	0	0	1	5
Total	589	101	18	2	710

Panel B: Performance-based management fees

Nº of increases\ Nº of decreases	**0**	**1**	**2**	**3**	**Total**
0	655	21	0	0	676
1	25	7	0	0	32
2	0	0	0	2	2
Total	680	28	0	2	710

TABLE 2.3. DISTRIBUTION OF THE AMOUNTS OF MANAGEMENT FEES CHANGES

This table shows the semi-annual time-series distribution of the average management fees and the average amount of changes (variation) in asset-based management fees, AMF, (Panel A), and performance-based management fees, PMF, (Panel B), separately for increases and decreases (INC and DEC, respectively), according to the fund investment objective (equities, EFunds; fixed-income assets, BFunds; and global, GFunds), and the type of management fee charged (asset funds, AFunds, if based exclusively on asset volume, and mixed funds, MFunds, if also charged on returns.). Row three in each panel shows the number of decreases and increases in each quarter.

Panel A: Asset-based management fees

		2º -2003		4º -2003		2º -2004		4º -2004		2º -2005		4º -2005		2º -2006		4º -2006		2º -2007		TOTAL	
		DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC
		33	17	13	12	13	13	9	4	16	9	4	8	17	13	22	12	16	14	143	102
AMF(t-2)		1.50	1.19	1.26	0.79	1.50	0.84	1.22	0.81	1.45	1.24	1.09	0.72	1.54	0.65	1.35	0.58	1.69	1.10	1.45	0.90
variation		-0.51	0.45	-0.59	0.74	-0.25	0.47	-0.69	0.34	-0.58	0.42	-0.30	0.52	-0.68	1.06	-0.26	0.64	-0.30	0.49	-0.47	0.59
AMF(t-2)	**BFunds**	1.50	0.62	1.24	0.49	1.48	0.63	0.92	1.25	1.55	1.21	1.12	0.00	1.42	0.43	1.29	0.40	1.63	0.63	1.40	0.66
variation		-0.46	0.52	-0.47	0.80	-0.31	0.34	-0.60	0.10	-0.53	0.54	-0.22	0.33	-0.72	0.85	-0.21	0.10	-0.27	0.52	-0.40	0.55
AMF(t-2)	**EFunds**	1.51	1.69	1.65	1.01	1.81	1.01	1.35	0.75	1.38	1.75		0.65	1.90	0.71	1.80	0.60	1.79	1.27	1.65	1.04
variation		-0.77	0.39	-1.32	0.69	-0.20	0.67	-0.85	0.39	-0.92	0.25		0.64	-0.75	1.13	-0.42	0.72	-0.30	0.56	-0.67	0.67
AMF(t-2)	**GFunds**	1.47	0.60	0.93		0.92	0.73	1.50	0.50	1.42	0.95	1.00	1.25	1.17		1.25	0.59	1.65	1.00	1.31	0.81
variation		-0.39	0.40	-0.13		-0.14	0.28	-0.20	0.50	-0.49	0.37	-0.55	0.30	-0.43		-0.41	0.63	-0.37	0.15	-0.38	0.38
AMF(t-2)	**MFunds**	1.68	0.00	1.50	0.00	1.75	0.83	1.44	0.50	1.58	1.13	0.80	0.00	1.08	0.50	1.26	0.45	2.25	0.00	1.44	0.58
variation		-0.80	1.25	-0.65	0.40	-0.40	0.24	-1.06	0.50	-0.86	0.20	-0.20	0.33	-0.19	0.50	-0.35	0.30	-0.90	0.00	-0.65	0.39
AMF(t-2)	**AFunds**	1.49	1.26	1.22	0.86	1.47	0.84	1.05	0.92	1.35	1.28	1.18	0.82	1.64	0.69	1.38	0.61	1.66	14.00	1.45	0.96
variation		-0.50	0.40	-0.58	0.77	-0.24	0.62	-0.40	0.29	-0.37	0.48	-0.33	0.54	-0.79	1.23	-0.23	0.71	-0.26	14.00	-0.43	0.63

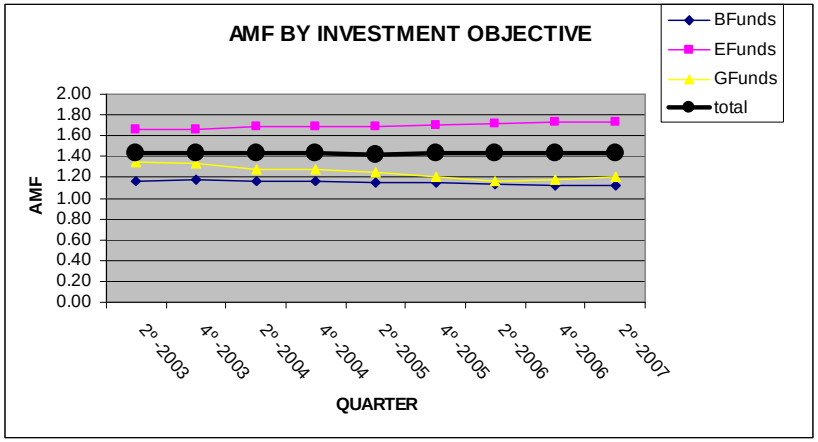
Panel B: Performance-based management fees

		2º -2003		4º -2003		2º -2004		4º -2004		2º -2005		4º -2005		2º -2006		4º -2006		2º -2007		TOTAL	
		DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC	DEC	INC
		1	2	0	3	8	3	0	6	1	8	0	3	10	2	2	8	12	1		34
PMF(t-2)		9.00	0.00		0.00	7.32	0.00		0.00	9.00	0.00		0.00	9.00	0.00	9.00	1.03	9.00	0.00	8.61	0.23
variation		-9.00	9.00		6.02	-6.45	9.00		9.00	-9.00	8.38		9.00	-8.17	9.00	-9.00	6.38	-9.00	9.00	-8.16	8.03
PMF(t-2)	**BFunds**		0.00										0.00	9.00			0.00			9.00	0.00
variation			9.00										9.00	-9.00			5.17			-9.00	7.47
PMF(t-2)	**EFunds**	9.00			0.00	7.32	0.00		0.00	9.00	0.00		0.00	9.00	0.00	9.00	0.00	9.00		8.54	0.00
variation		-9.00			4.54	-6.45	9.00		9.00	-9.00	9.00		9.00	-9.00	9.00	-9.00	8.50	-9.00		-8.30	8.38
PMF(t-2)	**GFunds**				0.00		0.00				0.00			9.00	0.00		2.07	9.00	0.00	9.00	0.55
variation					9.00		9.00				8.17			-0.74	9.00		5.94	-9.00	9.00	-6.94	7.85
PMF(t-2)	**MFunds**		0.00		0.00	9.00	0.00		0.00		0.00		0.00	9.00	0.00		1.03		0.00	9.00	0.23
variation			9.00		6.02	-2.00	9.00		9.00		8.38		9.00	-0.74	9.00		6.38		9.00	-1.37	8.03
PMF(t-2)	**AFunds**	9.00				7.08				9.00				9.00		9.00		9.00		8.58	
		-9.00				-7.08				-9.00				-9.00		-9.00		-9.00		-8.58	

TABLE 2.4. CHANGES OVER TIME IN MANAGEMENT FEES, BY INVESTMENT OBJECTIVE

This table shows the trend in the semi-annual time-series of equally-weighted average asset-based management fees, AMF, (Panel A) and performance-based management fees, PMF, (Panel B), according to the investment objectives of funds (equities, EFunds; fixed-income assets, BFunds; and global, GFunds) and for the complete sample.

	Panel A: Asset-based management fees				Panel B: Performance-based management fees			
QUARTER	**BFunds**	**EFunds**	**GFunds**	**total**	**BFunds**	**EFunds**	**GFunds**	**total**
2º -2003	1.17	1.66	1.35	1.43	0.22	0.91	1.89	0.68
4º -2003	1.17	1.67	1.33	1.43	0.22	0.96	1.86	0.71
2º -2004	1.17	1.69	1.28	1.44	0.19	0.81	2.20	0.67
4º -2004	1.16	1.68	1.27	1.43	0.19	0.97	2.09	0.75
2º -2005	1.15	1.68	1.25	1.42	0.16	1.03	2.61	0.83
4º -2005	1.15	1.70	1.20	1.43	0.20	1.08	2.51	0.87
2º -2006	1.14	1.72	1.16	1.43	0.20	0.86	2.62	0.78
4º -2006	1.13	1.73	1.18	1.43	0.24	0.86	2.87	0.83
2º -2007	1.12	1.73	1.21	1.44	0.24	0.63	2.53	0.69



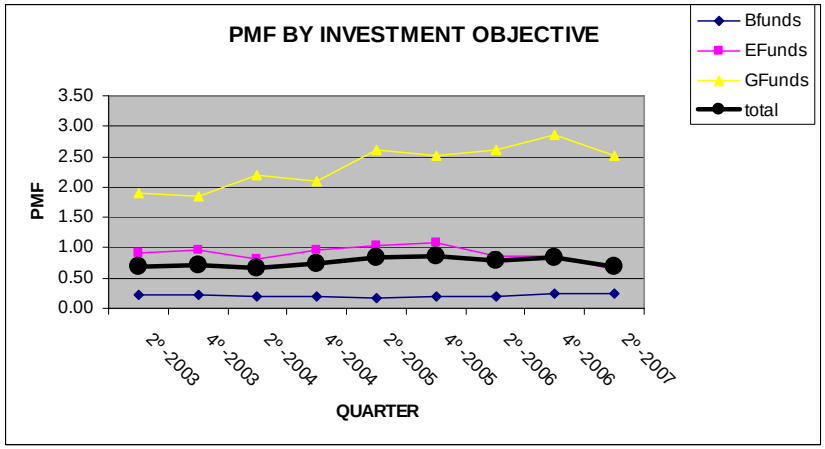


TABLE 2.5. DESCRIPTIVE STATISTICS FOR THE SAMPLE CONSIDERED

The table reports summary statistics for all the variables in the sample. Panel A is for the second quarter of 2003; Panel B is for the second quarter of 2007 and Panel C shows the time-series average. Variables are defined in Appendix 2.

	Panel A				Panel B				Panel C			
	2º -2003				2º -2007				TOTAL PERIOD			
Variable	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**
VOLAT	3.49	3.10	0.03	15.86	1.21	0.99	0.02	4.75	1.80	1.77	0.00	15.86
QNRET	7.25	6.53	-5.45	29.97	2.42	3.26	-13.15	17.43	2.62	4.67	-14.13	29.97
ANRET	-2.91	8.86	-32.37	18.54	11.48	10.54	-6.74	46.67	7.57	10.18	-32.37	68.41
AMF	1.43	0.60	0.00	2.25	1.44	0.59	0.00	2.25	1.43	0.60	0.00	2.25
PMF	0.68	2.34	0.00	9.00	0.69	2.32	0.00	9.00	0.76	2.45	0.00	9.00
CUSTFEE	0.11	0.06	0.00	0.40	0.12	0.06	0.00	0.20	0.12	0.06	0.00	0.40
FRONTLOAD	0.06	0.45	0.00	5.00	0.04	0.38	0.00	5.00	0.05	0.38	0.00	5.00
REDFEE	0.41	0.64	0.00	5.00	0.30	0.59	0.00	5.00	0.36	0.61	0.00	5.00
DISC	0.01	0.09	0.00	1.50	0.01	0.11	0.00	1.50	0.01	0.18	0.00	5.00
MSASSETS	0.00	0.01	0.00	0.22	0.00	0.01	0.00	0.15	0.00	0.01	0.00	0.36
ASSETS	64,636.01	178,913.30	24.00	2,542,678.00	80,780.31	200,284.60	132.00	2,520,665.00	76,485.06	190,956.40	24.00	3,107,156
SHAREH	2,333.93	6,105.09	1.00	88,408.00	2,421.63	5,391.64	1.00	71,211.00	2,426.38	5,415.27	1.00	88,408
MC-ASSETS	2,104,860.00	3,707,934.00	410.00	13,000,000.00	2,681,301.00	4,556,362.00	3,058.00	16,000,000.00	2,519,185.00	4,294,849.00	189.00	16,200,000
NONAFEE	0.47	0.83	-1.00	10.00	0.34	0.75	-1.00	10.00	0.39	0.77	-4.50	10.00
MC-QNRET	7.25	2.65	0.17	18.23	2.42	0.98	-1.96	5.57	2.62	2.96	-7.85	18.23
AMF variation	-0.01	0.18	-2.00	1.25	0.00	0.10	-0.90	1.20	0.00	0.14	-2.00	2.25
PMF variation	0.01	0.59	-9.00	9.00	-0.14	1.21	-9.00	9.00	0.00	0.88	-9.00	9.00
EXCQNRET	-0.81	5.03	-17.31	25.41	-0.36	2.84	-18.40	12.18	-0.29	3.22	-18.40	25.41
MC-ANRET	-2.91	3.04	-14.84	7.28	11.48	3.32	1.49	32.87	7.57	5.27	-14.84	32.87
ANTIQ	3.28	1.20	1.48	4.48	7.28	1.20	5.48	8.48	5.28	1.76	1.48	8.48
EXPENSES	0.44	0.24	-0.08	2.28	0.43	0.22	-2.42	1.40	0.44	0.40	-4.05	19.72
MC-MSASSETS	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
% of BFunds	42.25				39.30				40.00			
% of EFunds	51.13				49.72				50.00			
% of GFunds	6.62				10.99				10.00			
% of MFunds	8.16				8.45				9.06			
% of AFunds	91.84				91.55				90.94			

TABLE 2.6. CHANGES OVER TIME IN RELEVANT VARIABLES BEFORE AND AFTER MANAGEMENT FEE CHANGES

The table shows the cross-sectional average behaviour of relevant variables from four quarters before to four quarters after management fee changes (the quarter of the change is T), separately for increases (INC), decreases (DEC), non-changing funds (NOCHANG) and the complete sample. Panel A is for the changes in asset-based management fees and Panel B for performance-based fees. An asterisk stands for 5% significance in the differences in averages test between changing and non-changing funds. Variables are defined in Appendix 2.

Panel A: Asset-based management fee changes

QUARTER		N	AMF	PMF	QNRET	ANRET	EXCQNRET	SHAREH	ASSETS	MSASSETS	VOLAT	EXPENSES	ANTIQ	MC-ASSETS	MC-MSASSETS	MC-QNRET	MC-ANRET
T-4	INC	102	1.00	2.15	-0.16	0.67	-0.84	1,383.83	41,366.95	0.27%	2.45	0.38 *	4.03	2,151,033	0.16%	0.55	1.26
	DEC	143	1.45	0.17 *	-0.22 *	0.85 *	-0.56	2,020.43	63,302.36	0.39%	1.29 *	0.44	4.26	2,132,131	0.15%	-0.25 *	0.99 *
	NOCHANG	6,145	1.44	0.73	1.49	3.00	-0.13	2,414.46	71,726.69	0.43%	2.21	0.47	4.28	2,305,069	0.14%	1.46	2.85
	total	6,390	1.43	0.74	1.42	2.92	-0.15	2,389.19	71,053.55	0.42%	2.20	0.47	4.28	2,298,740	0.14%	1.41	2.79
T-3	INC	102	0.96 *	2.15 *	0.59	3.65	0.64 *	1,360.51 *	41,285.90 *	0.27%	2.33	0.42	4.28	2,179,646	0.16%	0.18	3.38
	DEC	143	1.43	0.17 *	-0.19	1.79 *	-0.30	1,971.66	62,162.22	0.38%	1.22 *	0.39 *	4.51	2,148,467	0.15%	-0.80 *	2.70 *
	NOCHANG	6,145	1.44	0.73	0.54	5.21	-0.02	2,451.54	73,485.20	0.43%	2.09	0.42	4.54	2,357,497	0.14%	0.56	5.08
	total	6,390	1.43	0.74	0.52	5.11	-0.01	2,423.39	72,717.83	0.42%	2.07	0.42	4.29	2,349,980	0.14%	0.52	5.00
T-2	INC	102	0.90 *	2.15 *	2.58	3.57	-0.59	1,349.97 *	41,562.89 *	0.26%	2.38	0.52	4.53	2,386,680	0.16%	2.94	3.67
	DEC	143	1.45	0.10 *	1.23 *	1.31 *	-0.88 *	1,892.21	57,976.39	0.40%	1.22 *	0.38 *	4.76	2,297,013	0.15%	2.05 *	1.45 *
	NOCHANG	6,145	1.44	0.75	2.70	5.02	-0.27	2,438.15	74,806.89	0.43%	2.05	0.44	4.79	2,425,411	0.14%	2.67	4.96
	total	6,390	1.43	0.75	2.66	4.92	-0.29	2,408.56	73,899.59	0.42%	2.04	0.44	4.54	2,421,919	0.14%	2.66	4.86
T-1	INC	102	1.22 *	0.91	1.68	5.50	-0.32	1,808.72	46,656.15	0.32%	2.23 *	0.41	4.78	2,498,701	0.16%	1.39	5.55
	DEC	143	1.19 *	0.88	0.52 *	1.61 *	-0.32	1,890.02	57,007.66	0.43%	1.19 *	0.36 *	5.01	2,335,776	0.15%	0.78 *	2.24 *
	NOCHANG	6,145	1.43	0.74	1.65	6.95	-0.15	2,474.28	76,686.83	0.42%	1.90	0.42	5.04	2,487,620	0.14%	1.65	6.90
	total	6,390	1.43	0.75	1.63	6.81	-0.15	2,450.58	75,767.07	0.42%	1.89	0.42	4.79	2,484,399	0.14%	1.63	6.77
T (quarter of the change)	INC	102	1.49	1.21 *	2.73	7.68	-0.31	2,385.69	48,120.80	0.32%	2.14 *	0.50	5.03	2,680,595	0.16%	2.89	7.40
	DEC	143	0.98 *	1.47 *	1.83 *	3.36 *	-0.13	1,899.90	59,886.29	0.67% *	1.15 *	0.38 *	5.26	2,465,836	0.15%	3.19 *	5.06 *
	NOCHANG	6,145	1.44	0.73	2.63	7.66	-0.30	2,439.31	77,342.14	0.42%	1.80	0.44	5.29	2,517,747	0.14%	2.60	7.63
	total	6,390	1.43	0.76	2.62	7.57	-0.29	2,426.38	76,485.06	0.42%	1.80	0.44	5.04	2,519,185	0.14%	2.62	7.57
T+1	INC	88	1.47	1.40 *	2.24	8.92	-0.19	2,803.94	55,474.47	0.38%	2.11 *	0.43 *	5.28	3,066,952	0.18%	1.92	9.34
	DEC	127	0.98 *	1.58 *	1.27 *	5.05 *	-0.09	2,123.33	68,889.72	0.84% *	1.09 *	0.32 *	5.51	2,769,361	0.16%	1.85 *	8.13 *
	NOCHANG	5,465	1.44	0.72	2.24	9.66	-0.24	2,481.49	78,361.74	0.41%	1.72	0.42	5.54	2,549,737	0.14%	2.23	9.59
	total	5,680	1.43	0.75	2.22	9.55	-0.23	2,478.48	77,795.36	0.42%	1.71	0.42	5.29	2,562,661	0.14%	2.22	9.55
T+2	INC	88	1.47	1.40 *	2.81 *	9.67	0.07	2,912.65	58,885.69	0.40%	1.84	0.51	5.53	3,141,593	0.18%	2.43	9.04
	DEC	127	0.97 *	1.58 *	1.57	5.37 *	-0.24	2,188.70	72,426.44	0.89% *	0.95 *	0.33	5.76 *	2,786,350	0.16%	2.68 *	8.86
	NOCHANG	5,465	1.44	0.74	2.04	8.94	-0.23	2,436.09	78,378.53	0.41%	1.59	0.44	5.79	2,556,782	0.14%	2.02	8.87
	total	5,680	1.43	0.77	2.04	8.88	-0.23	2,437.94	77,943.45	0.42%	1.58	0.44	5.54	2,570,975	0.14%	2.04	8.88
T+3	INC	76	1.52	1.34 *	1.73	9.44	-0.59	3,839.58 *	64,364.61	0.46%	1.76	0.45	5.78 *	3,602,150 *	0.21% *	1.84 *	9.37
	DEC	105	0.95 *	1.59	1.61 *	7.30	-0.09	2,147.84	76,848.13	0.95%	0.96 *	0.32	6.01 *	2,748,392	0.16%	2.00	10.70
	NOCHANG	4,789	1.43	0.73	2.39	9.82	-0.25	2,483.81	79,700.86	0.41%	1.55	0.42	6.04	2,594,750	0.14%	2.38	9.75
	total	4,970	1.42	0.76	2.36	9.76	-0.25	2,497.44	79,406.07	0.42%	1.54	0.42	5.79	2,613,401	0.14%	2.36	9.76
T+4	INC	76	1.51	1.34 *	1.72	8.81	-0.50	3,221.17	62,941.14	0.44%	1.71	0.47	6.03	3,616,765 *	0.20% *	1.80	8.34
	DEC	105	0.96 *	1.59 *	0.58 *	5.57 *	-0.37	2,118.60	77,948.54	0.87%	0.93 *	0.33 *	6.26	2,770,335	0.16%	1.11 *	8.16
	NOCHANG	4,789	1.44	0.75	1.73	8.83	-0.18	2,447.49	79,702.91	0.41%	1.51	0.43	6.29	2,595,615	0.14%	1.72	8.78
	total	4,970	1.43	0.77	1.70	8.76	-0.19	2,452.38	79,409.53	0.42%	1.50	0.43	6.04	2,614,922	0.14%	1.70	8.76

Panel B: Performance-based management fee changes

QUARTER		N	AMF	PMF	QNRET	ANRET	EXCQNRET	SHAREH	ASSETS	MSASSETS	VOLAT	EXPENSES	ANTIQ	MC-ASSETS	MC-MSASSETS	MC-QNRET	MC-ANRET
T-4	**INC**	36	1.40	1.50 *	0.52	3.78	-2.79 *	2,878.11	85,656.06	0.82% *	2.23	0.45	4.04	2,130,427	0.14%	1.26	5.47
	DEC	34	1.16 *	7.81 *	3.73 *	4.60	0.47	1,269.00	16,343.18 *	0.20%	3.52 *	0.42	4.22	490,700 *	0.03%	2.50	4.93
	NOCHANG	6,320	1.43	0.69	1.42	2.90	-0.14	2,392.43	71,264.70	0.42%	2.19	0.47	4.28	2,309,425	0.14%	1.41	2.76
	total	6,390	1.43	0.74	1.42	2.92	-0.15	2,389.19	71,053.55	0.42%	2.20	0.47	4.28	2,298,740	0.14%	1.41	2.79
T-3	**INC**	36	1.39	1.50 *	1.71	6.39	0.77	2,812.58	81,633.50	0.84% *	2.00	0.49 *	4.29	2,133,784	0.13%	1.28	8.20
	DEC	34	1.17 *	8.07 *	4.79 *	13.15 *	-0.03	1,241.85	17,793.68 *	0.20%	3.30 *	0.92 *	4.47	517,947 *	0.03% *	3.67 *	9.82 *
	NOCHANG	6,320	1.43	0.70	0.50	5.06	-0.02	2,427.53	72,962.52	0.42%	2.06	0.42	4.53	2,361,068	0.14%	0.50	4.95
	total	6,390	1.43	0.74	0.52	5.11	-0.01	2,423.39	72,717.83	0.42%	2.07	0.42	4.53	2,349,980	0.14%	0.52	5.00
T-2	**INC**	36	1.39	0.23	1.39	4.70	-1.28 *	2,675.19	70,419.22	0.85% *	1.86	0.36	4.54	2,195,688	0.13%	1.52 *	5.66
	DEC	34	1.17 *	8.61 *	4.34 *	14.47 *	-0.61	1,171.06	17,338.09 *	0.17%	3.08 *	0.62 *	4.72	499,610 *	0.03% *	2.71	10.53 *
	NOCHANG	6,320	1.43	0.72	2.66	4.87	-0.28	2,413.70	74,223.70	0.42%	2.03	0.44	4.78	2,433,550	0.14%	2.67	4.82
	total	6,390	1.43	0.75	2.66	4.92	-0.29	2,408.56	73,899.59	0.42%	2.04	0.44	4.78	2,421,919	0.14%	2.66	4.86
T-1	**INC**	36	1.20 *	4.31 *	1.86	5.56	0.07	2,630.19	70,689.78	0.88% *	1.79	0.41	4.79	2,263,042	0.13%	1.67	6.08
	DEC	34	1.44 *	2.06 *	3.16 *	17.17 *	-0.54	1,277.00	19,760.68	0.16%	2.90 *	0.54 *	4.97	752,513 *	0.04% *	2.25	11.80 *
	NOCHANG	6,320	1.43	0.72	1.62	6.76	-0.15	2,455.87	76,097.29	0.42%	1.88	0.42	5.03	2,494,977	0.14%	1.62	6.75
	total	6,390	1.43	0.75	1.63	6.81	-0.15	2,450.58	75,767.07	0.42%	1.89	0.42	5.03	2,484,399	0.14%	1.63	6.77
T	**INC**	36	0.97 *	8.26 *	3.00	8.19	0.22	2,645.89	67,627.58	0.82% *	1.62	0.43	5.04	2,307,790	0.13%	2.91	7.56
(quarter	**DEC**	34	1.44	0.45	-1.02 *	11.55 *	-2.29 *	1,212.29	18,060.24 *	0.13%	2.64 *	0.48	5.22	689,069 *	0.04% *	-0.61 *	8.10
of the	**NOCHANG**	6,320	1.43	0.72	2.63	7.54	-0.28	2,431.66	76,849.82	0.42%	1.79	0.44	5.28	2,530,234	0.14%	2.63	7.56
change)	**total**	6,390	1.43	0.76	2.62	7.57	-0.29	2,426.38	76,485.06	0.42%	1.80	0.44	5.28	2,519,185	0.14%	2.62	7.57
T+1	**INC**	35	0.96 *	7.98 *	3.06	9.54	0.75 *	2,660.94	67,168.60	0.80% *	1.63	0.52 *	5.29	2,406,857	0.13%	2.56	9.08
	DEC	22	1.30	1.95 *	1.93	5.30 *	-0.88	829.77	15,809.32	0.14%	2.95 *	0.44 *	4.99	532,977 *	0.03% *	1.40 *	3.38 *
	NOCHANG	5,623	1.43	0.70	2.21	9.57	-0.24	2,483.79	78,104.03	0.42%	1.71	0.42	5.53	2,571,572	0.14%	2.22	9.58
	total	5,680	1.43	0.75	2.22	9.55	-0.23	2,478.48	77,795.36	0.42%	1.71	0.42	5.53	2,562,661	0.14%	2.22	9.55
T+2	**INC**	35	0.96 *	7.47 *	1.59	9.88	-0.34	2,586.29	64,649.46	0.73%	1.59	0.39	5.54	2,365,470	0.13%	2.22	9.83
	DEC	22	1.30	2.77 *	4.63 *	6.41	-1.48 *	784.09	15,649.50	0.13%	2.54 *	0.50	5.09	507,755 *	0.03% *	3.21 *	4.73 *
	NOCHANG	5,623	1.43	0.72	2.03	8.88	-0.22	2,443.49	78,269.92	0.42%	1.58	0.44	5.78	2,580,327	0.14%	2.03	8.89
	total	5,680	1.43	0.77	2.04	8.88	-0.23	2,437.94	77,943.45	0.42%	1.58	0.44	5.78	2,570,975	0.14%	2.04	8.88
T+3	**INC**	27	0.98 *	7.48 *	3.10	11.39	-0.52	4,122.96	48,618.15	0.57%	1.52	0.51 *	5.79	2,949,569	0.16%	2.87	11.58
	DEC	20	1.23	3.05 *	1.71	3.81 *	-1.00	844.55	16,047.75	0.13%	2.48 *	0.53 *	5.34	510,332 *	0.03% *	1.25 *	2.85 *
	NOCHANG	4,923	1.43	0.71	2.36	9.78	-0.25	2,495.24	79,832.32	0.42%	1.54	0.42	6.03	2,620,101	0.14%	2.37	9.78
	total	4,970	1.42	0.76	2.36	9.76	-0.25	2,497.44	79,406.07	0.42%	1.54	0.42	6.03	2,613,401	0.14%	2.36	9.76
T+4	**INC**	27	0.98 *	8.15 *	1.30	9.38	-0.23	4,402.00 *	48,949.78	0.52%	1.66	0.48	6.04	2,896,162	0.16%	1.06	9.35
	DEC	20	1.23	2.15 *	3.68 *	12.51 *	-0.76	812.25	16,137.55	0.13%	2.37 *	0.45	5.59	511,613 *	0.03% *	2.39	8.70
	NOCHANG	4,923	1.43	0.73	1.70	8.74	-0.18	2,448.35	79,833.63	0.42%	1.49	0.43	6.28	2,621,924	0.14%	1.70	8.75
	total	4,970	1.43	0.77	1.70	8.76	-0.19	2,452.38	79,409.53	0.42%	1.50	0.43	6.28	2,614,922	0.14%	1.70	8.76

TABLE 2.7. LOGIT ESTIMATION FOR THE DETERMINANTS OF MANAGEMENT FEE CHANGES

Panel A is for asset-based management fees changes and Panel B is for performance-based management fees changes. lnASSETS and lnMC-ASSETS are the neperian logarithm of assets managed by the fund and the management company, respectively. The remaining variables are defined in Appendix 2. Coefficients and marginal effects are given for each variable. The asterisk stands for 5% significance. The last two files of the table show the unconditional probability and the pseudo R^2 of Logit model, respectively.

	Panel A: Asset-based management fees				**Panel B: Performance-based management fees**			
	decrease		**increase**		**decrease**		**increase**	
Dependent variable	**Y= 1 if decrease AMF Y= 0 if no changing AMF**		**Y= 1 if increase AMF Y= 0 if no changing AMF**		**Y= 1 if decrease PMF Y= 0 if no changing PMF**		**Y= 1 if increase PMF Y= 0 if no changing PMF**	
	coefficient	**marginal effect**	**coefficient**	**marginal effect**	**coefficient**	**marginal effect**	**coefficient**	**marginal effect**
MC-ANRET(t-2)	-0.062*	-0.09%	-0.026	-0.04%	0.128*	0.01%	0.017	0.00%
EXPENSES(t-2)	-0.227	-0.33%	0.123	0.17%	0.140	0.01%	-0.742*	-0.21%
ANTIQ(t-2)	0.065	0.09%	0.003	0.00%	0.155	0.01%	-0.097	-0.03%
EXCQNRET(t-2)	-0.103*	-0.15%	-0.014	-0.02%	-0.150*	-0.01%	-0.104	-0.03%
MC-QNRET(t-2)	-0.111*	-0.16%			-0.240	-0.02%	-0.207*	-0.06%
VOLAT(t-2)	-0.368*	-0.53%	-0.021	-0.03%	0.166	0.01%	-0.214	-0.06%
QNRET(t-2)	0.081	0.12%	-0.027	-0.04%	0.190*	0.01%	0.089	0.02%
ANRET(t-2)	-0.016	-0.02%	0.002*	0.00%	0.014	0.00%	-0.005	0.00%
lnASSETS(t-2)	-0.130*	-0.19%	-0.225*	-0.31%	-0.727*	-0.06%	-0.432*	-0.12%
smallMC-ASSETS(t-2)	-0.270	-0.37%			-0.128	-0.01%	-0.572	-0.15%
largeMC-ASSETS(t-2)	-0.418*	-0.56%			-1.505	-0.10%	0.255	0.08%
EFunds	-0.468	-0.68%	0.472	0.66%	0.047	0.00%		
GFunds	0.894*	1.88%	0.992*	2.12%			1.565*	0.91%
BFunds					-1.602	-0.12%	-0.981	-0.26%
smallMC-QNRET(t-2)			-0.136	-0.19%				
largeMC-QNRET(t-2)			0.542*	0.84%				
lnMC-ASSETS(t-2)			0.148*	0.21%				
constant	-1.557		-4.244		-0.438		0.304	
N								
Y=1	6,288		6,247		6,354		6,356	
uncondicional	143		102		34		36	
probability	2.24%		1.60%		0.53%		0.56%	
pseudo-R^2	8.17%		3.15%		21.00%		12.73%	

TABLE 2.8. OLS ESTIMATION FOR THE DETERMINANTS OF THE SIZE OF CHANGES IN MANAGEMENT FEES

This table shows the OLS with heteroscedasticity correction estimations: $Y_i = \alpha + b*X_i + e_i$, where Y_i is the amount of the increase or decrease in the asset-based or performance-based management fee charged by the fund *i*, X_i is the matrix of the explanatory variables which are defined in Appendix 2 and e_i the residuals. Panel A is for asset-based management fees changes and Panel B is for performance-based management fees changes. lnASSETS is the neperian logarithm of a fund's assets. Coefficients are given for each variable. The asterisk stands for 5% significance. The last row of the table shows the R^2 of the OLS model.

	Panel A: Asset-based management fees		**Panel B: Performance-based management fees**	
	decrease	**increase**	**decrease**	**increase**
Dependent variable	**Y= AMF variation for decrease**	**Y= AMF variation for increase**	**Y= PMF variation for decrease**	**Y= PMF variation for increase**
	coefficient	**coefficient**	**coefficient**	**coefficient**
MC-ANRET(t-2)	-0.003	0.003	0.121	0.105
EXPENSES(t-2)	0.551*	-0.079*	3.271*	0.810
ANTIQ(t-2)	-0.008	-0.005	-0.170	-0.703*
EXCQNRET(t-2)	0.012	0.015	0.169	-0.043
MC-QNRET(t-2)	-0.001	-0.164	0.363	-0.234
VOLAT(t-2)	0.072	0.019	-0.321	-0.662*
QNRET(t-2)	0.027	0.088	-0.532*	0.114
ANRET(t-2)	0.009	-0.007	0.021	0.010
lnASSETS(t-2)	-0.056*	0.011	-0.649	-0.495*
smallMC-ASSETS(t-2)	-0.108	0.024	1.716	0.767
largeMC-ASSETS(t-2)	-0.143	0.012	2.523	1.589
EFunds	-0.071	-0.085	2.639	-0.057
GFunds	-0.137	-0.218	1.879	-0.691
constant	0.852*	0.151	10.110*	15.821*
N	143	102	34	36
R^2	20.00%	20.00%	64.00%	65.00%

TABLE 2.9. OLS ESTIMATION FOR THE CONSEQUENCES OF MANAGEMENT FEE CHANGES

The table reports the estimation results of the following OLS regression: $DP_i = \lambda_0 + \lambda_1 INC + \lambda_2 DEC_i + \Gamma CV_i + \upsilon_i$, where DP_i are the alternatives variables we are interested on (QNRET, EXCQNRET and MSASSETS), INC (DEC) is a binary variable which takes a value of one for quarter-fund observations when there is an increase (decrease) in management fees and zero when no change occurs, CV_i is the set of control variables, and, finally, υ_i is the error term. Panel A is for asset-based management fee changes, and Panel B for the performance-based ones. The asterisk stands for 5% significance. The last row of the table shows the R^2 of the OLS model.

Panel A: Asset-based management fee changes

Dependent variable	***QNRET***					***EXCQNRET***					***MSASSETS***				
QUARTER	**T**	**T+1**	**T+2**	**T+3**	**T+4**	**T**	**T+1**	**T+2**	**T+3**	**T+4**	**T**	**T+1**	**T+2**	**T+3**	**T+4**
QNRET(t-2)	0.128*	0.128*	0.128*	0.128*	0.210*	0.135*	0.028*	0.093*	0.032	0.098*	0.000*	0.000*	0.000	0.000*	0.000*
smallANRET(t-2)	1.155*	0.006	-0.014	-0.682*	-0.642*	-0.082	0.014	-0.002	-0.107	-0.402*	0.000	0.000	-0.001	0.000	0.000
largeANRET(t-2)	-0.502*	1.527*	0.495*	2.340*	0.515*	0.599*	1.326*	0.741*	1.289*	0.626*	-0.002*	-0.001*	-0.002*	-0.001*	-0.001*
AMF(t-2)	0.182	-0.001	0.138	0.200*	-0.097	0.163	0.045	-0.015	0.049	-0.132	0.000*	-0.001	-0.001	-0.001*	-0.001*
DEC	-0.044	-0.320	0.084	-0.486	-0.661*	-0.044	-0.215	-0.268	-0.274	-0.511*	0.002	0.003	0.004	0.004	0.004
INC	-0.225	-0.183	0.440	-0.902*	-0.032	-0.027	-0.105	0.289	-0.422	-0.313	-0.001	-0.001	0.000	0.000	0.000
lnASSETS(t-2)	0.105*	-0.096*	0.130*	-0.007	-0.032	0.055	-0.066	0.030	-0.038	-0.010	0.004*	0.004*	0.004*	0.004*	0.004*
lnMC-ASSETS(t-2)	-0.055	0.052*	-0.022	0.021	0.056*	0.009*	0.032*	0.018	0.014	0.035	0.000	0.000*	0.000*	0.000*	0.000*
EFunds	3.231*	2.253*	2.824*	3.137*	1.166*	-1.575*	-1.305*	-1.151*	-1.286*	-1.217*	0.002*	0.002*	0.002*	0.002*	0.002*
GFunds	1.611*	1.471*	1.504*	1.971*	0.786*	1.676*	1.519*	1.332*	1.696*	0.936*	0.015*	0.015*	0.014*	0.014*	0.013*
ANTIQ(t-2)	-0.489*	0.300*	-0.292*	0.133*	0.073*	0.115*	-0.049	0.085*	-0.010	-0.005	-0.001*	-0.001*	-0.001*	-0.001*	-0.001*
constant	2.293*	-0.988*	0.828	-0.329	-0.211	-1.710*	0.193	-1.207*	-0.075	-0.190	-0.042*	-0.040*	-0.039*	-0.038*	-0.037*
R^2	21%	18%	13%	30%	15%	11%	10%	8%	11%	9%	31%	30%	29%	29%	29%

Panel B: Performance-based management fee changes

Dependent variable	***QNRET***					***EXCQNRET***					***MSASSETS***				
QUARTER	**T**	**T+1**	**T+2**	**T+3**	**T+4**	**T**	**T+1**	**T+2**	**T+3**	**T+4**	**T**	**T+1**	**T+2**	**T+3**	**T+4**
QNRET(t-2)	0.130*	0.082*	-0.098*	-0.214*	0.210*	0.135*	0.029*	0.092*	0.032	0.097*	0.000*	0.000*	0.000	0.000*	0.000*
smallANRET(t-2)	1.143*	-0.002	-0.008	-0.697*	-0.632*	-0.089	0.010	0.000	-0.111	-0.396*	0.000	0.000	-0.001	0.000	0.000
largeANRET(t-2)	-0.487*	1.530*	0.491*	2.335*	0.516*	0.605*	1.327*	0.746*	1.287*	0.632*	-0.002*	-0.002*	-0.002*	-0.001*	-0.001*
PMF(t-2)	-0.030	0.044	-0.059	0.008	0.003	-0.003	0.010	-0.020	-0.003	0.000	0.000	0.000	0.000	0.000	0.000
DEC	-4.718*	-1.528	1.416	-2.317*	0.986	-1.860*	-0.506	-0.924	-0.658	-0.428	0.002*	0.003*	0.003*	0.002	0.002
INC	0.355	0.280	-0.444	-0.145	-0.540	0.124	0.416	-0.285	-0.749	-0.234	0.002	0.002	0.002	0.001	0.001
lnASSETS(t-2)	0.082*	-0.095*	0.119*	-0.019	-0.023	0.040	-0.067*	0.028	-0.042	-0.001	0.004*	0.004*	0.004*	0.004*	0.004*
lnMC-ASSETS(t-2)	-0.056	0.050	-0.015*	0.022	0.053	0.012	0.032	0.018	0.015	0.030	0.000*	0.000*	0.000*	0.000*	0.000*
EFunds	3.370*	2.232*	2.932*	3.244*	1.125*	-1.480*	-1.285*	-1.133*	-1.251*	-1.271*	0.002*	0.002*	0.002*	0.002*	0.002*
GFunds	1.690*	1.361*	1.659*	1.947*	0.771*	1.693*	1.484*	1.379*	1.708*	0.918*	0.015*	0.015*	0.014*	0.014*	0.013*
ANTIQ(t-2)	-0.481*	0.305*	-0.294*	0.144*	0.072	0.122*	-0.046	0.083*	-0.007	-0.007	-0.001*	-0.001*	-0.001*	-0.001*	-0.001*
constant	2.712*	-1.016*	1.044*	-0.057	-0.402	-1.437*	0.234	-1.183*	0.001	-0.380	-0.042*	-0.041*	-0.040*	-0.039*	-0.038*
R^2	21%	18%	13%	30%	15%	11%	10%	9%	11%	8%	31%	30%	29%	28%	28%

CHAPTER 3
THE EFFICIENCY OF PERFORMANCE-BASED-FEE FUNDS

3.1. INTRODUCTION

Since the seminal paper by Jensen (1968), literature on mutual fund performance evaluation generally concludes that, on average, equity mutual funds underperform the appropriate benchmark return. One of the more recurrent arguments is the high level of fees charged; in fact, fund performance is not significantly negative when before-expenses returns are considered. In particular, Grinblatt and Titman (1989), Malkiel (1995), Droms and Walker (1996), Gruber (1996) and Cesari and Panetta (2002), among others, find that mutual funds do not underperform the market when gross returns (before-expenses) are considered. A similar result is found by Martínez (2003) for the Spanish market. Therefore, the amount of expenses charged to investors appears to be a key element in mutual fund performance evaluation.

With that being so, the aim of this paper is to analyse whether the way that expenses are charged to investors is also relevant with regard to mutual fund performance evaluation and performance-expenses relationship.

Annual operating expenses include management fees, which investors have to pay to managers for portfolio supervision services; custody fees, paid for asset administration and custody, and other distribution, legal and administrative costs. Management fees are the main component of expenses, usually accounting for 90-95% of them.

Mutual fund management fees are generally charged to investors as a fixed percentage of total assets under management (*asset-based fee*); thus, asset growth, instead of returns, appears to be a desirable objective from a fund-manager perspective. However, as the asset volume increases with both capital inflows and asset appreciation, an implicit incentive to managers to achieve good performance could also be recognized in this fee structure.

Additionally, current worldwide mutual fund regulations usually allow management fees to be charged total o partially on returns obtained (*performance-based fee*).[19] In fact, all the country members of the International Organization of Securities Commissions, IOSCO, envisage this type of management fee. In spite of this legal possibility, only a minority of mutual funds in practice uses remuneration structures tied to the attained fund returns. For instance, research from Lipper (2007) shows that the overall proportion of U.S. open-end funds using such structures remains at just over 2%. In the case of the major European fund markets, between 10% and 20% of funds use performance-fee management fees.

[19] Thus, mutual funds could charge both a fee based on the asset volume and an incentive fee based on the fund's performance.

Mutual funds which choose to charge management fees on returns are in fact linking the manager's remuneration to his/her effort and to the performance obtained. So, according to agency theory literature, it should be understood as a commitment to the interest of investors, mainly focused on high returns.

Many academic articles have theoretically analysed the optimality of this fee structure. Grinblatt and Titman (1989), Golec (1992), Roll (1992), Das and Sundaram (1998a, b and 2002), Palomino and Prat (2003) and, recently, Li and Tiwari (2009) are some of the most significant. The prevailing conclusion is that performance-based fees seem to be more appropriate. Thus, Das and Sundaram (1998b) conclude that if risk aversion is assumed in the preferences of investors and managers, the optimal contract has to be linear, and must include a base fee for the amount of assets under management and an additional remuneration depending on returns above those of a benchmark portfolio. The reason put forward is that this type of fee best aligns the interests of managers and investors, with managers encouraged to obtain high returns as their remuneration depends on them.

Therefore, in our opinion, this type of mutual funds appears as a very interesting subgroup which deserves separate analysis from the aggregate mutual fund industry. Unfortunately, financial literature has devoted little attention to these funds mainly motivated by their low quantitative relevance (both in number of funds and asset volume under management). This paper focuses on this small but promising group of mutual funds. In particular, the paper seeks to investigate the extent to which these funds are more efficient than the remainders, mainly through the analysis of its performance evaluation and the performance-expenses relationship. Our main concern is that these performance-based-fee funds are more efficient than the ones which charge management fees only on the asset volume under management.

Regarding performance issues, Volkman (1999), Elton *et al* (2003) and Giambona and Golec (2007) agree to show that U.S. mutual funds with performance-based fees perform relatively better than other actively managed funds.

Some other articles focus on the risk-taking behaviour of the managers paid on performance. For instance, Brown *et al* (1996), Chevalier and Ellison (1997), Elton *et al* (2003), Golec and Starks (2004), and Low (2006) conclude that performance-based fees may encourage risk-taking by managers as increases in stock return volatility make for bigger fees. However, since they can increase the sensitivity of the manager's portfolio to firm stock price movements, little risk can be assumed (Carpenter (2000); Ross, (2004)).

In a related article, Massa and Patgiri (2009) also analyse the impact of the incentives on the manager's remuneration on the risk and performance obtained for U.S. mutual funds. Instead

of a performance-based management fee, they consider the shape of the asset-based fee structure as the incentive component, with the fee percentage being usually diminished as the managed asset volume increases. In our opinion, the existence of a performance-based fee may be able to capture in a more direct way the incentive for the fund manager than the shape in the asset-based fee.[20]

From the efficiency point of view, higher expenses should be linked to better performance and/or services (Grossman and Stiglitz (1980)). Thus, in an empirical setting we would expect a cross-sectional positive relationship between fund expenses and before-expenses risk-adjusted fund returns. Funds which incur high costs, and translate them to investors as high total expenses, could only survive in the market if their performance (or other services) compensates such overheads. So, we expect that fund expenses adjust to make after-expenses risk-adjusted returns very similar across funds.

Contrary to these theoretical implications, Gil-Bazo and Ruiz-Verdú (2009) has recently found a robust negative relation between raw risk-adjusted performance and expenses in a comprehensive sample of U.S. equity mutual funds. Nevertheless, that seems not to be the case for the best-governed funds, which appear to charge fees more in line with performance. This paper seeks to empirically analyse this performance-expenses relationship separately for funds charging the management fee total or partially on returns. Given the special features of this type of funds, we hypothesize a different behaviour of these funds in this regard.

We apply our study to a sample of Spanish mutual funds, from 1999 to 2009. Available information for them allows us to identify the type and amount of management fee charged to investors; so, a comparative study can be carried forward. Although Spanish legislation envisages that management fees be charged on the basis of the total volume of assets under management, the returns obtained or a combination of the two, the typical management fee in the Spanish mutual fund industry is a fixed percentage of asset volume, with no explicit performance component. However, 7.6% of Spanish mutual funds used performance-based management fees along the sample period, for a 4.7% of the total asset volume under management.[21] So, the Spanish mutual fund industry appears to be as a very appropriate testing ground for evaluating the efficiency of the particular group of funds which establish the management fees on achieved performance.

[20] Some words of caution should be included here. The ideal way to deal with the manager's incentives must consider the final remuneration paid to the manager from the management company. Unfortunately, this information is not always available to researchers. This is also the case in the present paper. Instead of that, we use the costs that management companies charge to investors in order to compensate for management and other services. We suppose that the way investors are charged by the management companies is closely related to the way that fund managers are compensated from the management companies.

[21] In a related paper, Díaz-Mendoza and Martínez (2009) analyse the attributes of a sample of Spanish mutual funds which determine the choice of a performance-based fee as opposed to an asset-based fee.

The most important finding from this study can be summarized as follows: mutual funds which charge management fees to investors based on performance seem to be more efficient than funds which establish them exclusively on assets under management. Risk-adjusted measures are found to be slightly more positive in this group of funds, and, more important, the cross-sectional performance-expenses relationship is significantly positive for these funds, whereas it is clearly negative for the rest of funds. Therefore, costly funds in this group compensate investors with high risk-adjusted returns, although such relation is found to be driven for the more profitable funds.

Accordingly, the paper contributes to the existing literature on mutual fund performance evaluation by detecting a type of fund with apparent superior managerial skills. With the only exception of the U.S. fund industry, financial literature has devoted very limited attention to this group of funds, now presented as being very promising funds in terms of portfolio management. Regulators, management companies and fund investors can benefit from the findings of the paper regarding the disparity in the efficiency of the different type of funds.

The paper also gives support to the agency theory literature, which suggests that portfolio management should be compensated through incentive contracts in order to better align the manager's interest with that of the investors. Our findings confirm that fund managers compensated partial or totally on returns perform better than the ones paid on the volume of asset under managements. Hence, the incentives triggered by the performance-based fees in the manager work correctly.

The rest of this paper is organized as follows. Section 3.2 describes the data and variables employed in the analysis. Section 3.3 presents the results regarding the efficiency of the fund sample, separately for funds using asset-based or performance-based management fees. Alternative estimation methodologies are checked in section 3.4, in order to evaluate the robustness of the findings, and finally, Section 3.5 concludes and summarizes the main findings of the paper.

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3.2. DATA AND DESCRIPTIVE ANALYSIS

The Spanish mutual fund industry has shown a rapid increase in volume of asset managed during the last two decades. According to the Spanish Asset Management Association (*Asociación de Instituciones de Inversión Colectiva y Fondos de Pensiones,* INVERCO (2010)), the volume of assets under management by mutual funds at year-end 2009 was equivalent to 18.8% of total Spanish family savings, compared to 0.4% in 1985. Despite the massive figures of redemptions in the fund industry worldwide in 2007 and, especially, in 2008, the Spanish industry managed 0.17

trillion Euros (compared with just 0.0017 trillion Euros in 1985), equivalent to 19.0% of GDP. This made Spain the sixth biggest European country in terms of assets under management.

In accordance with current Spanish legislation, management fees can be charged on the basis of the total volume of assets under management, the returns obtained or a combination of the two. Given the main objective of the paper, funds are classified into two groups according to the type of management fee charged. We will use the term *asset* funds for those that establish the management fee exclusively on volume of assets; funds that tie management fees partial or exclusively to returns are referred to as *mixed* funds. Similar to other countries, only a minority of Spanish mutual funds ties the remuneration of managers to returns; moreover, almost all *mixed* funds combine the two types of fee by charging a base fee proportional to the assets under management, plus an additional incentive fee dependent on the fund's overall performance.

The dataset was obtained from Comisión Nacional del Mercado de Valores (CNMV), the body that supervises and inspects Spanish stock markets and mutual funds. It initially comprised monthly information regarding all the Spanish open-end funds that existed during the ten-year period from June 1999 to June 2009. Since the dataset includes all funds that existed during this period, our data are free of the survivorship-bias documented by Brown *et al*. (1992) and Brown and Goetzmann (1995). The proportion of *mixed* funds in the Spanish fund industry is limited: only an average 7.6% of the open-end funds charge management fees on performance, accounting for a reduced 4.7% of the volume of assets.

The study is focus on the funds investing mainly on risky assets: Equity funds (EFunds) and Global funds (GFunds), according to the Spanish fund classification.[22] Equity funds include funds which invest more than 30% in equities; Global funds contain those funds whose investment policy is not precisely defined and which do not belong to any other category. This sample selection accounts for an average 40% of the number of Spanish open-end funds, but only for a 21.7% of the total assets managed in the industry. However, the sample covers an average 80.4% and 81.5% of the number of funds and assets under management within *mixed* funds category, respectively. So, the sample chosen can be considered to be very representative of the group of funds charging management fees total or partially on performance, yielding a total of 127,257 fund-month observations.

For each mutual fund in the sample, the dataset includes the date of the inception in the CNMV registers, the investment objective, and monthly information regarding the net (after-

[22] Bond funds (BFunds), which invest more than 70% in fixed income assets, Guaranteed funds (GUARANT), and others funds (OTHERS) were excluded from the analysis. The first and second ones are removed because of their limited use of performance-based management fees; the third one because of its recent emergence in the Spanish fund industry. When all said and done, risky funds are the most analysed in the literature on mutual funds.

expenses) asset value, the total volume of assets under management, and the performance-based and the asset-based management fee charged. Finally, the total annual expenses are also provided and monthly expenses are computed just by dividing annual expenses by 12.

Net asset values allow us to compute the net fund returns (NRET), which is the figure usually displayed to investors; gross (before-expenses) fund returns (GRET) are obtained adding monthly expenses to the net fund returns. Additionally, given the empirical evidence that incentives affect fund returns and risk-taking, we construct alternative risk-adjusted performance measures.

In order to estimate the risk-adjusted fund excess returns (Jensen's alpha), CAPM, Fama and French (1993) and Carhart (1997) multifactor models are used. So, we need to construct the hedge portfolios that underlie market (MKT), size (SMB), Book-to-Market (HML) and momentum (WML) factors. We use the Factset-JCF database to extract, for the period June 1999-June 2009 the following information for the Spanish Stock Market: i) monthly returns (adjusted for dividends, capital increases, splits and reverse splits), ii) the average return of the three-month interest rate of government bonds as the proxy for the return of the risk-free asset, iii) the Book-to-Market ratio is calculated by dividing the book value of the equity per share by the closing stock price, iv) the market value we consider is the product of the closing stock price and the number of shares. The alpha from CAPM is called α_{CAPM}, the corresponding to the three-factor Fama and French model is α_{FF}, and, finally, the alpha for the four-factor model of Carhart is denoted as α_{FFM}. In order to gain robustness in results, all the risk-adjusted returns are estimated separately both with net returns (after-expenses, α^{N}_{CAPM}, α^{N}_{FF} and α^{N}_{FFM}) and gross returns (before-expenses, α^{G}_{CAPM}, α^{G}_{FF} and α^{G}_{FFM}).

Thus, we estimate the alphas of the mutual funds of the excess returns on the risk-free rate with respect to the risk factors. Therefore, the following evaluation models are estimated with a rolling time-series ordinary least squares (OLS) regression:

$$MODEL\ 1:\ R_{pt} - r_{ft} = \alpha_{pCAPM} + \left(R_{mt} - r_{ft}\right)\beta_{mp} + u_{pt}$$

$$MODEL\ 2:\ R_{pt} - r_{ft} = \alpha_{pFF} + \left(R_{mt} - r_{ft}\right)\beta_{mp} + SMB_t\beta_{SMBp} + HML_t\beta_{HMLp} + \varepsilon_{pt}$$

$$MODEL\ 3:\ R_{pt} - r_{ft} = \alpha_{pFFM} + \left(R_{mt} - r_{ft}\right)\beta_{mp} + SMB_t\beta_{SMBp} + HML_t\beta_{HMLp} + WML_t\beta_{WMLp} + \pi_{pt}$$

where R_{pt} is the (after or before-expenses) return on fund p in month t; r_{ft} is the return on the risk-free asset in month t; R_{mt} is the return on the value-weighted market portfolio proxy in t; SMB_t and HML_t are the Fama-French factors to capture the effects of size and Book-to-Market,

respectively; WML_t is the price momentum in *t*, calculated as the difference in month *t* between the returns on the portfolios of winners and losers. The portfolio of winners (losers) is the equally weighted portfolio containing the 30% of the stocks with the highest (lowest) returns in the previous period beginning in month *t*-12 and ending in *t*-2.[23] Finally, u_{pt}, ε_{pt}, and π_{pt} are the error terms.

The constant term in each previous time series regression, the so-called Jensen alpha, measures the monthly risk-adjusted fund return. The alternative slope coefficients (β_p) capture the sensitivity of fund excess returns to the corresponding factor; so, they measure the fund exposure to the alternative risk factors.

The first alphas (and betas) are estimated with a set of 36 observations, corresponding to our first 36 months in the sample and they are assigned to May 2002 for the subsequent cross-section estimation. Next, the alphas corresponding to June 2002 are estimated with the first 37 observations of the sample. We continue successively up to a total of 60 months. From here, the set of observations for the alpha estimation remains constant, incorporating an additional observation as it eliminates the first one. In the end, we have for each fund a series of 86 alphas relative to the three alternative models which refer to every month from May 2002 to June 2009. These risk-adjusted fund returns will be used to separately assess the performance of the *asset* funds versus the *mixed* funds ones, and, of course, in the cross-sectional performance-expenses relationship estimation.

We then describe the set of fund attributes considered as control variables in the empirical estimation of the performance-expenses relationship. All of them are variables likely related to the fund performance, and whose effect should be considered in order to clearly identify the performance-expenses relationship.

Firstly, we consider the number of years from the registration of the fund (AGE). The volatility of performance (VOLAT) is measured by the standard deviation of the twelve previous monthly fund returns, in percentage terms. Fund size is proxied by the total volume of assets under management in thousands of Euros (ASSETS).[24] Total expenses borne by the fund includes the management fee, custody fee, and other operating costs; and is computed as a percentage of the average volume of assets during the year. Dividing annual expenses by 12, we get a proxy for monthly expenses (EXPENSES).

[23] See Fama and French (1993) for details regarding the construction of the SMB and HML factors, and Carhart (1997) and Jegadeesh and Titman (1993) for the construction of the momentum factor.
[24] In the empirical analysis in Section 3, this variable is measured as its neperian logarithm.

3.2.1. Descriptive analysis of the data

Summary monthly statistics for the four factors portfolios considered, market (MKT), size (SMB), book to market (HML) and momentum (WML), are reported in Table 3.1 for the period from June 1999 to June 2009. All the premiums are positive, indicating that risky, small, value-oriented and especially past-winners stocks obtained superior returns. Note also the relatively high variance of the monthly factors returns; both together suggest that these factors could account for much cross-sectional variation in the mean return on the Spanish stock portfolios over the period analysed. Regarding the Pearson correlation matrix, the low cross-correlations imply that multicollinearity does not seem to substantially affect the estimated factor-loadings.[25]

Table 3.2 reports the number of funds (Panel A) and the relative asset volume under management (Panel B) according to the fund investment objective (Equity, Global, Bond, Guaranteed and Others funds) and the type of management fee charged (*asset* and *mixed* funds), at each year-end of the sample period, from June 1999 to June 2009.

As mentioned before, the number of *mixed* funds in the Spanish industry on average is 7.6% over the total, going from a 4.6% in 1999 to a maximum 10.6% in 2006, when 299 *mixed* funds were registered in CNMV. Regarding the market share, *mixed* funds account for an average 4.7% of the assets under management, with the minimum occurring in 2002 (1.5%) and a maximum 9.1% achieved in 2006, for a total of 24,593 million of Euros. A considerable increase in the presence of *mixed* funds in the Spanish mutual fund industry can be observed, with its highest relevance reached in the period 2005-2007. Not surprisingly, during 2008 a considerable decrease in both the number and relative assets under management by *mixed* funds is observed. In fact, whereas the total asset volume in the Spanish industry fell a 30%, the *mixed* funds managed a 70% less than in 2007 (6,296 million of Euros).

According to the fund investment objective, Table 3.2 shows that Equity and Global funds include the most part of *mixed* funds, in number and assets managed. Therefore, investors in risky Spanish funds are more likely to pay management fees linked to fund performance than others. Accordingly, limiting the analysis to the Equity and Global funds only removes a 20% of the fund-month observations with performance-based management fees. The outstanding role of Global funds in the group of performance-based fee funds should also be highlighted; as they are a relatively small type of funds, the number and size of *mixed* funds with such investment objective is very significant. Global funds account for an average 5.9% of the total asset volume along the

[25] Although not shown in the Table, both the VIF (Varianza Inflation Factor) test and the Condition Index confirm that there are no multicollinearity problems between our four estimates of risk factors.

sample period, but for a considerable 57% (2.65/4.65) regarding the asset under management by *mixed* funds.

Table 3.3 reports summary statistics of the relevant variables for the sample, separately for *asset* and *mixed* funds.[26] As can be deduced from the table, economically significant differences over the ten-year period are observed in almost all the attributes, for the two types of funds. In comparison with *asset* funds, *mixed* funds managed a significant higher volume of assets on average during our sample period and were less volatile. These surprising findings are mainly due to the last two years of the sample, where a substantial increase in size and a noteworthy reduction in the risk-taking behaviour of the *mixed* funds took place.[27] As expected, *mixed* funds are younger than *asset* funds.

The negative performance of the Spanish risky *asset* funds, independently of the measure considered, is remarkable. All the before-expenses measures of performance are on average negative, except when the four-factor Carhart model is used. For instance, the monthly mean gross risk-adjusted return (when the CAPM model is used) reaches the negative figure of -0.02%. This is consistent with the findings of the literature on Spanish mutual fund evaluation.[28]

Nevertheless, the performance evaluation of the Spanish risky funds which charge management fee on returns is not so negative; in fact, only one of the measures of gross performance is negative. For comparison, the monthly mean gross risk-adjusted return (when the CAPM model is used) is +0.03 for the *mixed* funds. Such a statistically significant difference in performance is robust across the alternative measures considered. Note also that all the maximum (minimum) values of the alternatives risk-adjusted returns are higher (lower) for the *mixed* funds than for the *asset* ones.

Although the next section will analyse this issue in greater depth, these findings seem to put forward a different behaviour between *asset* and *mixed* funds in terms of asset management and performance evaluation. However, no significant differences regarding fund expenses are found between *mixed* and *asset* funds. So, irrespective of the way that performance fees are charged to investors, the total cost for them is similar, accounting for a monthly average of 0.15% of the assets under management.

Table 3.4 reports the results for the models 1-3 for the whole sample of funds and for the *asset* and *mixed* funds. Regarding the risk factor loadings, the results suggest that Spanish risky

[26] The irregular number of observations used for each variable is caused by the existence of missing values in some of them.
[27] The statistics for each year of the sample are not shown in the table, but are available to readers upon request.
[28] For the Spanish market, most of the empirical studies conclude that mutual funds, on average, underperform the appropriate benchmark return. See, for instance, Rubio (1993), Martínez (2003).

funds tend to follow patterns in their investments. The performance of these funds is generated by small and value stocks with negative momentum. The coefficients associated to *mixed* funds, related to *asset* funds, are always lower for Market, Size and Book-to-Market factors and higher for momentum factor.

Next, the risk premiums are also estimated, according to the two-steps procedure of Fama and MacBeth (1973). Therefore, for the three models we used in the first step, we run an OLS cross-sectional regression of fund excess returns to the estimated risk exposures (betas) for each month from May 2002 until December 2008 as follows:[29]

$$MODEL\ \ 4:\ R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{mpt} + u_{pt}$$

$$MODEL\ \ 5:\ R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{mpt} + \gamma_{2t}\hat{\beta}_{SMBpt} + \gamma_{3t}\hat{\beta}_{HMLpt} + \varepsilon_{pt}$$

$$MODEL\ \ 6:\ R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{mpt} + \gamma_{2t}\hat{\beta}_{SMBpt} + \gamma_{3t}\hat{\beta}_{HMLpt} + \gamma_{4t}\hat{\beta}_{WMLpt} + \pi_{pt}$$

where R_{pt} is the (after or before-expenses) excess return on fund p in month t; the regressors, $\hat{\beta}_p$, are the betas estimated in the first step from models 1-3 respectively. Finally, u_{pt}, ε_{pt}, and π_{pt} are the error terms. The respective slope coefficients γ_{1t}, γ_{2t}, γ_{3t}, and γ_{4t} represent the premium paid for the fund returns to the Market, Size, Book-to-Market and momentum risk exposures.

Table 3.5 shows the final estimator as the average of the 80 cross-sectional monthly gammas estimates, separately for the *asset* funds and the *mixed* ones. Irrespective of the model considered, and of the moment in which returns are measured (before or after the expenses were deducted), all the risk premiums are not statistically different from zero. We have not found evidence of fund returns reflecting the risks assumed. Moreover, results in Table 3.5 allow us to conclude that both, *asset* and *mixed* fund returns behave similarly regarding this issue.

In Table 3.6, the coefficients of correlation between all the variables considered are presented, separately for the whole sample (Panel A), *asset* (Panel B) and *mixed* funds (Panel C). Regarding the differences between both types of funds, three issues of interest appear. First, the correlation between the alternative risk-adjusted performance measures and the fund age is negative for *mixed* funds, but positive or very close to zero for *asset* funds. Second, volatility is positively correlated to alphas for *mixed* funds (especially from the four-factor Carhart model) but negatively correlated for *asset* funds. Third and more important, expenses correlate negatively with all measures of *asset* funds risk-adjusted performance (even for the before-expenses ones), but positively (except for the three-factor FF model) for the *mixed* ones. Thus, for the gross risk-adjusted returns based on the CAPM, FF three-factor, and Carhart four-factor models, the

[29] We run 80 cross-sectional regressions and not 86 because the annual fund expenses for 2009 it is not available.

correlations with the monthly expenses become 0.06, -0.06 and 0.08, respectively, for the *mixed* funds; whereas that for the *asset* funds the figures are -0.07, -0.10 and -0.06. We will go back to this relevant issue in the empirical section of the paper.

Additionally, in order to analyse further the statistical differences between performance for *mixed* funds and *asset* funds, we use the simple matching estimator methodology of Abadie and Imbens (2006).[30] This methodology provides a systematic procedure to find matches when matching is done on several variables simultaneously. We use the simplest methodology, where only one matched fund is considered. So, each *mixed* fund is matched to one *asset* fund with similar values of one or more matching variables. In our empirical application, fund size, age, and expenses are utilized as matching variables, both individual or simultaneously. Once the matching procedure is completed, and a matched *asset* fund is identified for each *mixed* fund, the difference in the alternative performance measures between *mixed* and *asset* funds is estimated by averaging the differences between each *mixed* fund and the corresponding matched *asset* fund. A positive coefficient indicates that the value of the performance variable is higher for *mixed* funds than for *asset* funds.

Instead of a monthly frequency, in which the highly-information-demanding matching procedure finds serious difficulties to operate correctly, in Table 3.7 we consider annual frequency for all the variables. Similar to Gil-Bazo, Ruiz-Verdú and Santos (2009) the annual performance measure is merely computed as the sum of the twelve monthly ones. Panel A reports the average of the alternative annual performance measured separately for *mixed* and *asset* funds, and tests the statistic significance of the differences between both. Panel B shows the matching estimator (and *t*-statistic) for the difference in performance between the *mixed* and the matched *asset* funds, using individually size, age and expenses as matching variables. In Panel C, we use the matching variables simultaneously.

Panel A corroborates the negative performance obtained for the Spanish risky *asset* funds, and the significantly better behaviour of the *mixed* funds, also in annual terms. For instance, the gross no-risk-adjusted annual performance (GRET) is -0.90% for the *asset* funds, but a significantly better (although also negative) -0.23% is reported for the *mixed* ones. As it was found in Table 3.3, the best performance is reached when the four-factor Carhart model is used to estimate fund risk-adjusted performance; in this case, the average annual alpha estimates are 0.07% and 0.24% for the *asset* and *mixed* funds, respectively.

[30] See Abadie *et al*. (2004) for the implementation of the matching estimator in Stata, and Gil-Bazo, Ruiz-Verdú and Santos (2009) for an application to the US fund industry.

As such differences could be motivated by attributes others than the way the management fee is charged, Panels B and C compare the performance of *mixed* and *asset* funds with similar attributes, the matching variables. The coefficient in each cell is the matching estimator, and must be understood as the mean difference in the respective performance measure between the *mixed* funds and the matched *asset* funds. Thus, for instance, the first value in Panel B indicates that *mixed* funds obtain on average an annual net return 2.88% higher than the one earned by the matched *asset* funds, with a similar asset volume (as the matching variable is size, ASSETS).

Although not all the coefficients are statistically different from zero, it should be pointed out that all of them are positive, irrespective of the performance measure and the matching variables considered. The economic significance of the matching estimators is (as expected) higher for the non-risk-adjusted performance measures. For instance, when size, age and expenses are the matching variables, *mixed* funds obtain an annual gross return 3.53% superior than the matched *asset* funds. This difference is substantial, considering that the average annual gross return for *mixed* funds is -0.23 %.

These findings allow us to conclude that *mixed* funds performed on average better than *asset* ones with similar size, age and expenses,

As regards the effect of each of the matching variables, the findings are not conclusive. The smaller estimator for the risk-adjusted performance measures is found when funds are matched by size; moreover, these estimators are always lower than the non-matched difference in Panel A. Thus, we could be tempted to conclude that size is driven mainly the differences in risk-adjusted performance between *mixed* and *asset* funds. However, when performance is not adjusted by risk, all the matching estimators are larger than the differences in Panel A; this implies that the matching variables considered are not capable of explaining the differences in raw returns between *mixed* and *asset* funds.

3.3. EMPIRICAL ANALYSIS OF THE EFFICIENCY

This section deals with the efficiency of the Spanish risky mutual funds. As mentioned before, the focus is on analysing the differences between the funds which charge the management fee exclusively on asset volume (*asset* funds) and the ones which tie the management fee total or partially to the performance (*mixed* funds). Our hypothesis is that *mixed* funds are more efficient than *asset* funds. If that is the case, it could be concluded that the commitment with investors, that

the performance-based fee implies, works in the correct way, increasing the returns to investors. Thus, *mixed* funds should be considered as an exceptional type of funds, in spite of its limited presence in the fund industry worldwide.

The analysis of the fund efficiency will be carried out through two complementary strategies. The first one is to analyse the alternative risk-adjusted and non-risk-adjusted estimations. We will evaluate the differences in performance between the two groups of mutual funds by just reporting the proportion of (significantly) positive and negative estimations for the alternatives performance measures considered. Our hypothesis is that the proportion of significantly positive fund-month observations should be higher for the *mixed* funds than for the *asset* funds. Secondly, we will empirically examine the relationship between the performance achieved by the fund and the expenses charged to investors. According to the Grossman and Stiglitz's efficiency criterion, a positive cross-sectional relationship should be found between the before-expenses fund performance and the expenses charged. We will expect a significant difference in the estimated slope of that linear relation for both groups of funds, with it being higher for the *mixed* funds than for the *asset* ones. This will allow us to confirm a higher efficiency of the Spanish *mixed* funds.

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3.3.1. Performance evaluation

In order to assess the differences in performance shown in Tables 3.3 and 3.7, we report in Table 3.8 the distribution of the fund-month performance measure observations in our sample period according to its quantity, separately for the two groups of funds considered. Panel A shows the percentage of positive values for the net (NRET) and gross returns (GRET), and for the alternative estimations of risk-adjusted returns (α^{N}_{CAPM}, α^{N}_{FF}, α^{N}_{FFM}, α^{G}_{CAPM}, α^{G}_{FF} and α^{G}_{FFM}). Panels B and C report the percentage of statistically significant (at the 5% of significance) positive and negative estimations, respectively.

As expected from the statistical evidence in Table 3.3, less than one half of the risk-adjusted performance estimations for the *asset* funds are positive. Attending to the gross risk-adjusted measures, the figures range from 36% for the FF three-factor model to 48% for the CAPM and the Carhart four-factor ones. When we turn to the *mixed* funds the estimations are significantly higher, suggesting a relatively better performance of these funds. Thus, for instance, a 48.13% of the *asset* funds obtained positive Carhart four-factor alphas, whereas it was a significantly higher 52.76% of in the case of the *mixed* funds. However, when we look at the after-expenses risk-adjusted

estimations (the net ones), no relevant differences are found, except for the CAPM alpha (α^{N}_{CAPM}).[31]

Panel B corroborates previous results. *Mixed* funds obtained significantly positive alphas more often than *asset* funds, irrespective of the way performance is evaluated, but especially in the case of before-expenses alphas. The percentage of such fund-month observations for the *mixed* funds is in the range of 7%-11%, depending on the model considered; whereas that for the *asset* funds the range is 4%-8%.

Regarding the percentage of significantly negative risk-adjusted estimations, Panel C reveals that, surprisingly, they occur more often in *mixed* funds than in *asset* funds. This finding is in line with the risk taking increase suggested by the agency theory literature, and reported by the empirical evidence aforementioned. It should be highlighted that only in the before-expenses (gross) case the percentages of significantly positive alphas are noticeably superior than the negative ones for both groups of funds. Thus, a 6.21% (7.88%) of the month-fund performance estimates of the four-factor Carhart for the *asset* (*mixed*) funds are significantly positives, whereas only a 1.34% (2.19%) is negative. As can be seen in the Table, opposite figures are found when net risk-adjusted measures are computed.[32]

To sum up, Table 3.8 shows evidence that for our fund sample and period considered *mixed* funds perform relatively better than *asset* funds, irrespective of the way performance is computed. Bad *mixed* funds also seem to be worse than the bad *asset* funds. Elton *et al* (2003) find similar evidence for the US fund market.

3.3.2. Performance-expenses relationship

Once the comparative performance of *asset* funds and *mixed* funds has been evaluated, we next try to analyse whether there is a dissimilar relationship between the ability to generate abnormal returns and the fund expenses charged to investors.

According to economic efficiency principles, funds charging high expenses to investors should provide them with valuable services in term of returns, risk and others.

[31] The comparatively better behavior of *mixed* funds versus the *asset* ones, when gross risk-adjusted performance is computed instead of the net ones, could be explained by higher costs charged to investors in the former. However, evidence in Table 3 does not support such a justification.

[32] The case for the FF three-factor net alphas is noteworthy; 6.81% (7.93%) of them are significantly negatives for the *asset* (*mixed*) funds, accounting for three times the percentage of significantly positive alphas.

Data on costs translated to investors are easily available for researchers as the fees paid to the management company. Regarding fund services, the fund return-risk profile is likewise accessible to empirical analysis. Other fund services are more difficult to measure or estimate; fund services are therefore usually approximated through the (risk-adjusted) return provided to investors. This subsection deals with the cross-sectional estimation of the performance-expenses relationship in order to empirical assess the economic efficiency of the fund industry. Our aim is to investigate the existence or not of a distinct behaviour depending on the way the management fee is established, this is to say, for *mixed* and for *asset* funds.

Efficiency requires fund services to compensate costs, and consequently, once expenses are deducted, net performance should not be as diverse between funds. Alternatively, a close one-to-one relationship connecting expenses and gross performance should be present in the mutual fund industry. In contrast to this prediction, Gil-Bazo and Ruíz-Verdú (2009) recently found a puzzling and robust negative relation between gross performance and expenses in a sample of diversified U.S. equity mutual funds: funds with worse gross performance charge higher expenses.[33] Finally, they show that this relation may be explained as the outcome of strategic fee setting by mutual funds in the presence of investors with different degrees of sensitivity to performance.

Similar results are reported in a European study by Otten and Bams (2002), who find that the relationship between management expenses and risk-adjusted performance is significantly negative in Germany, Netherlands and UK over the period 1991-1998.

In keeping with the main objective of the paper, this subsection tries to contrast if the results obtained by the literature are driven by asset-based fee funds. Taking into account that the vast majority of funds belong to this type, the results could be explained by the high proportion of *asset* funds. In order to do so, we will analyse the relation performance-expenses in both groups of funds, *asset* funds and *mixed* funds, separately. We hope that this relation is not as negative, at least in the group of funds with performance-based fees. This would mean that m*ixed* funds are more efficient than *asset* funds, confirming previous conclusions. Therefore, the following model is estimated with a cross-sectional OLS regression for each of the 80 months from May 2002 until December 2008:

$$\textit{MODEL 7}: \text{PERFORMANCE}_{pt} = \lambda_0 + \lambda_1 \text{EXPENSES}_{pt} + \Gamma \text{CV}_{pt} + \upsilon_{pt}$$

where PERFORMANCE_{pt} are the alternatives measures of fund performance: net return (NRET), gross return (GRET), and the estimations of the risk-adjusted excess returns, according to the

[33] Previously, Elton *et al* (1993) and Carhart (1997) had shown similar results. However, Ippolito (1989) found that risk-adjusted returns are unrelated to expense ratio for U.S. funds.

CAPM (α_{CAPM}), the Fama and French (1993) (α_{FF}) and the Carhart (1997) (α_{FFM}) multifactor models, both with net and raw returns; $EXPENSES_{pt}$ is the total expenses over assets; and CV_{pt} is a set of control variables which includes age (AGE), volatility (VOLAT), and the neperian logarithm of assets under management in thousands of Euros (lnASSETS), with Γ being the 3x1 vector of parameters. Finally, υ_{pt} is the error term.

Results in Table 3.9 show the average of the cross-section 80 monthly estimates, over the period May 2002 to December 2008, for the previous model.[34] Once again, we report separately the results for the *asset* funds and the *mixed* ones. We will focus mainly on the coefficient of the expenses variable.

The results are very revealing. Let us first examine the case of the risk-adjusted performance measures. For the total sample, the performance-expenses relationship is clearly negative, even for the before-expenses case. Similar to previous studies for U.S. and European mutual fund markets, we find that the Spanish risky funds with relatively bad risk-adjusted performance do not charge the lowest management fees or expenses. On the contrary, they seem to charge higher than the average expenses. That is, in a cross-sectional analysis funds which incur in relatively high (low) expenses perform relatively badly (well), contrary to the suggestions of the efficiency principle.

When the *mixed* and *asset* funds are considered separately, we find significant economic and statistic differences. For the *asset* funds, the slope of the performance-expenses estimation is significantly negative, irrespective of the risk-adjusted performance measure considered, as for the whole sample. The cross-sectional relation of fund expenses and the risk-adjusted performance is very close to -1 for the gross measures and to an average of -1.7 for the after-expenses ones. Nevertheless, the group of *mixed* funds seems to conduct in a remarkably contrasting way. Irrespective of the performance measure, fund expenses vary cross-sectionally in the same direction as risk-adjusted performance; better (worse) funds translate into higher (lower) costs to investors. Thus, it seems there be a positive relationship between risk-adjusted returns offered to the investors by *mixed* funds and the costs they have to pay for them. The high values of the slope of this relation is also remarkable, reaching, for instance in the case of the net and gross Carhart four-factor alphas, coefficients of 1.03 and 1.41, respectively. It is also interesting to note that the performance of *mixed* funds is to some extent better estimated (in terms of the explained variance, R square) in the models of Table 3.9 than the *asset* ones.

[34] We choose this two-step procedure instead of a pooled regression in order to better capture the performance-expenses relationship. Results from the pool regression are similar and are available upon request.

Regarding the non-risk-adjusted returns, the average coefficient of the cross-section performance-expenses estimation to the *mixed* funds is 5.89 for the net returns, and -1.15 to the *asset* ones. When before-expenses returns are considered (GRET), all the coefficients are (obviously) increased by +1, resulting in a non significant relation for the *asset* funds. It should be emphasized that the non-adjusted performance-expenses relationship for the whole sample of Spanish risky funds is very close to zero (+0.08) for the net returns and very close to one (1.08) for the before-expenses returns.

Table 3.9 also allows us to analyse the effects of other fund characteristics, such as size, age and volatility, to explain risk-adjusted returns separately for *mixed* and *asset* funds.[35]

Irrespective of the way the management fees are charged, and contrary to previous findings of related literature, older funds in our sample obtained higher performance than younger ones. Regarding the effect of fund volatility on performance, a positive relationship is reported, although lower for the *mixed* funds than for the *asset* ones. Finally, a robust positive relation is found between performance and total fund assets, but only for the *asset* funds.[36] Concerning *mixed* funds, however, larger funds do not seem to achieve better performance.

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3.4. ROBUSTNESS ANALYSIS

Several additional analyses have been performed to check the robustness of previous findings regarding the performance-expenses relationship. In this section, we present each of them separately.

Firstly, we use the novel multi-way clustering econometric methodology outlined by Petersen (2009) –in a Finance context- and by Gow *et al.* (2009) –in Accounting- in order to control for cross-sectional and time-series dependence. We use as clusters the investment fund and the date to correct for cross-sectional and time-series dependence simultaneously. We likewise develop a SAS program to estimate three-way cluster-robust standard errors, following the theoretical derivation in Cameron *et al.* (2009). This allows us to simultaneously correct for within-date (time-series) dependence, within-investment funds (cross-sectional) dependence and within-investment style (cross-sectional) dependence. The results clearly show a negative relation between before-fee performance and expenses for *asset* funds but this is not the case for the *mixed* ones. The

[35] See Ferreira, Freitas and Ramos (2009) and references herein for a recent comprehensive study on this issue.
[36] Otten and Bams (2002) likewise found a significantly positive relationship between the log of fund assets and risk-adjusted performance in the European industry, contrary to the negative size effect reported in the U.S. market.

R-squared values of these pooled time-series cross-sectional (Model 7) regressions are lower than those obtained with cross-sectional regressions.[37]

Second, net and gross no risk-adjusted fund returns (NRET and GRET, respectively) are available from June 1999 to June 2009. We estimate the regressions from June 1999 to December 2008 and results remain unaltered.

Third, we also estimated the performance-expenses relationship by the quantile regressions (Koenker and Bassett, 1978). Table 3.10 and Figure 3.1 show the results for the four-factor Carhart risk-adjusted performance estimates, both with net and gross (α^{N}_{FFM} and α^{G}_{FFM}, respectively), but similar results are found for the alternative performance measures considered. For the sake of concision, only the coefficients for the EXPENSES variable in Model 7 are reported. An interesting pattern across the quantiles is found, with the effect of the expenses being non uniform along the quantile regressions. In fact, a monotonic increase in the effect of expenses on performance is reported when we move to higher quantiles of performance. Therefore, fund expenses are charged to investors more in line with performance the more performance the fund obtains. In addition to this (increasing-with-performance) expected pattern in the effect of fund expenses on performance, the most interesting issue in the Table 3.10 is the sign of these effects. Thus, regarding the *asset* funds, the negative global coefficient of expenses on performance displayed in Table 3.9 is shown now to be motivated mainly for the first quantiles. In fact, when gross four-factor Carhart risk-adjusted performance measure is analysed, the coefficients for the higher three quantiles are significant positives; nevertheless, they are smaller in economic significance than the negative ones from the first quantiles. As a consequence, *asset* funds in the best performance ranking charged costs to investors directly related to the performance offered to them. When we look at the after-expenses risk-adjusted performance measures, all the coefficients are significantly negatives, except the last one. On the contrary, *mixed* funds in the (four) worst quintiles of performance charged higher expenses the lower risk-adjusted performance they achieved. Accordingly, these results in Table 3.10 allow us to conclude that the positive performance-expenses relationship reported previously in Table 3.9 for *mixed* funds is exclusive to the funds in the highest quantiles of performance.[38]

[37] All results and/or SAS program to estimate three-way cluster-robust standard errors are available upon request.

[38] Although not reported in the Table, a monotonic increasing (decreasing) pattern is also found in the effects of volatility (age) on performance along the quantile regressions, for *asset* and *mixed* funds. However, the pattern for the fund size effect is increasing for the *asset* funds, but decreasing for the *mixed* ones.

3.5. CONCLUDING REMARKS

The efficiency of Spanish mutual funds which charge management fees total or partially on returns (*mixed* funds) is analysed in detail. Performance-based fees are occasional in the worldwide mutual fund industry, even though agency theory literature puts forward this type of compensation for managers in order to best align investors' and managers' interests. Thus, very little academic research is devoted to this type of funds. However, the incentives created by these performance fees to the fund managers may induce a different behaviour in the portfolio management with relevant implications in the fund performance evaluation.

Our main finding regarding performance evaluation is that *mixed* funds perform significantly better than the rest of risky Spanish funds analysed. Moreover, we have found strong cross-section evidence that for *mixed* funds, expenses affect performance positively, once the effect of volatility, age and size is controlled for; whereas this effect is negative for the rest of funds. Although a performance-increasing pattern is found in the performance-expenses relationship for the whole sample, the aggregate differences found between *mixed* and the remainder funds are very appealing from an academic and a practical point of view. As a negative relation is the most common result in the literature of equity mutual funds, our findings identify a particular group of funds, which deserve, in our opinion, additional academic attention. In short, our results seem to point to a greater efficiency of *mixed* funds, according to the Grossman and Stiglitz's efficiency criterion.

The implications of our findings are several. First, aggregate fund performance evaluation studies may hide particularly well-managed funds. So, investors would be grateful for academic research identifying fund characteristics which determine performance. According to our results, the way the management fee is charged to investors seems to be one of them. Second, the incentives that the performance-based fees trigger among fund managers are shown to be strong enough to improve the return-risk profile of the management. Thus, agency theory suggestions seem to be corroborated with our findings. Finally, the limited appliance of the performance-based fees in the mutual fund industry contrasts with the performance evaluation results of the funds using it. Further in-depth academic research seems to be needed in order to clarify the reasons behind this puzzling behaviour.

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TABLE 3.1. DESCRIPTIVE STATISTICS FOR THE RISK FACTORS

This Table shows the monthly descriptive statistics for the four risk factors considered. MKT is the excess return of the value-weighted market portfolio proxy over the risk-free asset; SMB and HML are the Fama-French factors-mimicking portfolios to capture the effects of size and Book-to-Market, respectively; and WML is the factor-mimicking for one-year return momentum of Carhart (1997).

	Obs	**Mean**	**Std. Dev**	**Min**	**Max**	**Pearson Cross Correlations**			
						MKT	**SMB**	**HML**	**WML**
MKT	121	0.21	5.61	-15.24	17.81	1.00			
SMB	121	0.28	3.82	-8.20	11.78	-0.40	1.00		
HML	121	0.13	3.44	-10.97	9.39	0.03	-0.10	1.00	
WML	121	0.69	4.60	-23.83	12.83	-0.24	0.06	-0.26	1.00

TABLE 3.2. DISTRIBUTION OF THE SPANISH FUND INDUSTRY

Panel A shows the distribution of the Spanish fund industry at year-end from 1999 to 2009 period, grouped according to the type of management fee charged. *Asset* funds charge management fees on the basis exclusively of the total assets under management, and *mixed* funds total or partially on the returns obtained. Funds are classified depending on their investment objectives: equities, EFunds; fixed-income assets, BFunds; global, GFunds, Guaranteed, GUARANT, and others. The number of funds of each type is reported. Panel B reports the relative percentage of assets under management for each type of mutual fund.

Panel A: Number of funds

		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
EFunds	***Asset***	558	722	848	833	716	696	687	700	724	711	585	7,780
	Mixed	68	81	84	87	97	89	106	107	87	58	60	924
	Total	626	803	932	920	813	785	793	807	811	769	645	8,704
BFunds	***Asset***	884	897	849	828	862	833	813	779	774	789	767	9,075
	Mixed	22	31	23	26	28	25	28	39	30	35	35	322
	Total	906	928	872	854	890	858	841	818	804	824	802	9,397
GFunds	***Asset***	43	98	93	100	144	196	229	267	311	335	145	1,961
	Mixed	9	16	21	32	52	90	117	151	159	134	56	837
	Total	52	114	114	132	196	286	346	418	470	469	201	2,798
GUARANT	***Asset***	582	605	637	597	620	664	724	780	837	846	841	7,733
	Mixed	1	1	2	5	4	1	1	2	4	4	21	46
	Total	583	606	639	602	624	665	725	782	841	850	862	7,779
OTHERS	***Asset***	0	0	0	0	0	0	0	0	0	0	165	165
	Mixed	0	0	0	0	0	0	0	0	0	0	60	60
	Total	0	0	0	0	0	0	0	0	0	0	225	225
total	***Asset***	2,067	2,322	2,427	2,358	2,342	2,389	2,453	2,526	2,646	2,681	2,503	26,714
	Mixed	100	129	130	150	181	205	252	299	280	231	232	2,189
	Total	2,167	2,451	2,557	2,508	2,523	2,594	2,705	2,825	2,926	2,912	2,735	28,903

Panel B: Relative percentage of assets

		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	TOTAL
EFunds	***Asset***	19.60	25.01	19.68	14.19	13.16	12.43	13.96	15.02	13.99	7.65	7.03	14.73
	Mixed	1.11	1.46	1.00	0.71	0.78	1.13	1.57	1.76	1.46	0.39	0.48	1.14
	Total	20.71	26.47	20.68	14.90	13.94	13.56	15.53	16.78	15.44	8.04	7.51	15.87
BFunds	***Asset***	55.41	48.55	54.24	61.54	58.79	55.71	52.37	47.48	48.29	54.85	53.76	53.36
	Mixed	0.57	0.61	0.24	0.20	0.28	0.32	0.46	1.27	1.21	1.23	1.35	0.71
	Total	55.99	49.16	54.48	61.74	59.07	56.02	52.83	48.75	49.50	56.07	55.11	54.07
GFunds	***Asset***	0.41	0.84	1.09	0.93	2.59	3.48	4.30	6.51	6.35	4.49	1.36	3.22
	Mixed	0.31	0.37	0.43	0.54	0.91	4.29	4.74	6.04	5.29	1.81	0.60	2.65
	Total	0.73	1.22	1.52	1.46	3.50	7.77	9.03	12.55	11.64	6.30	1.96	5.87
GUARANT	***Asset***	22.58	23.10	23.32	21.83	23.47	22.63	22.59	21.89	23.36	29.43	29.94	23.76
	Mixed	0.01	0.06	0.01	0.08	0.01	0.01	0.02	0.03	0.06	0.15	0.44	0.07
	Total	22.58	23.16	23.33	21.90	23.48	22.64	22.61	21.92	23.41	29.58	30.38	23.83
OTHERS	***Asset***	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	0.28
	Mixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	0.08
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.04	0.36
total	***Asset***	98.00	97.51	98.33	98.48	98.01	94.25	93.21	90.91	91.99	96.42	95.97	95.35
	Mixed	2.00	2.49	1.67	1.52	1.99	5.75	6.79	9.09	8.01	3.58	4.03	4.65
	Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 3.3. DESCRIPTIVE STATISTICS

The Table shows the descriptive statistics for the assets under management (ASSETS), volatility (VOLAT), total expense ratio (EXPENSES), years from inscription (AGE), and alternatives measures of performance: net return (NRET), gross return (GRET), and the estimations of the risk-adjusted fund excess returns, (Jensen's alpha), according to the CAPM (α_{CAPM}), the Fama and French (1993) (α_{FF}) and the Carhart (1997) (α_{FFM}) multifactor models, both with net and raw returns. The symbols ***, **, and * denote that the difference between *mixed* funds and *asset* funds is statistically significant at the 1%, 5% and 10% significance levels, respectively.

		Obs	Mean	Std. Dev.	Min	Max
ASSETS* **	***Asset***	107,229	45,346.52	10,3791.00	1.00	2,278,357.00
	Mixed	20,028	54,500.47	16,5513.70	1.00	2,975,930.00
	Total	127,257	46,787.19	11,5756.30	1.00	2,975,930.00
VOLAT* **	***Asset***	97,754	3.65	2.53	0.00	46.20
	Mixed	18,514	2.94	2.71	0.00	46.19
	Total	116,268	3.54	2.58	0.00	46.20
EXPENSES	***Asset***	98,764	0.15	0.06	0.00	1.48
	Mixed	18,399	0.15	0.09	0.00	1.61
	Total	117,163	0.15	0.07	0.00	1.61
AGE* **	***Asset***	107,178	6.24	4.46	0.00	22.64
	Mixed	19,988	4.76	3.93	0.00	22.10
	Total	127,166	6.01	4.41	0.00	22.64
NRET* **	***Asset***	106,531	-0.18	4.86	-98.92	102.61
	Mixed	19,837	-0.08	4.41	-96.79	74.83
	Total	126,368	-0.16	4.79	-98.92	102.61
GRET*	***Asset***	98,492	-0.05	4.63	-68.48	92.50
	Mixed	18,314	0.02	4.28	-90.64	74.95
	Total	116,806	-0.04	4.58	-90.64	92.50
α^{N}_{CAPM}*	***Asset***	44,354	-0.19	0.66	-3.20	2.72
	Mixed	6,170	-0.17	0.69	-2.46	3.16
	Total	50,524	-0.19	0.67	-3.20	3.16
α^{G}_{CAPM}* **	***Asset***	38,758	-0.02	0.68	-2.98	2.81
	Mixed	5,203	0.03	0.72	-2.14	3.25
	Total	43,961	-0.01	0.69	-2.98	3.25
α^{N}_{FF}* **	***Asset***	44,354	-0.38	0.66	-3.48	2.56
	Mixed	6,170	-0.33	0.69	-2.85	3.54
	Total	50,524	-0.37	0.66	-3.48	3.54
α^{G}_{FF}* **	***Asset***	38,758	-0.23	0.67	-3.26	2.63
	Mixed	5,203	-0.14	0.73	-2.71	3.62
	Total	43,961	-0.22	0.68	-3.26	3.62
α^{N}_{FFM}* **	***Asset***	44,354	-0.15	0.57	-2.90	3.03
	Mixed	6,170	-0.12	0.62	-2.58	3.70
	Total	50,524	-0.15	0.57	-2.90	3.70
α^{G}_{FFM}* **	***Asset***	38,758	0.02	0.58	-2.72	3.10
	Mixed	5,203	0.07	0.66	-2.44	3.78
	Total	43,961	0.02	0.59	-2.72	3.78

TABLE 3.4. RISK EXPOSURES ESTIMATES

This Table reports the results of the estimation of models 1, 2 and 3 in a rolling time series regression:

$$MODEL\ 1:\ R_{pt} - r_{ft} = \alpha_{pCAPM} + \left(R_{mt} - r_{ft}\right)\beta_{mp} + u_{pt}$$

$$MODEL\ 2:\ R_{pt} - r_{ft} = \alpha_{pFF} + \left(R_{mt} - r_{ft}\right)\beta_{mp} + SMB_t\beta_{SMBp} + HML_t\beta_{HMLp} + \varepsilon_{pt}$$

$$MODEL\ 3:\ R_{pt} - r_{ft} = \alpha_{pFFM} + \left(R_{mt} - r_{ft}\right)\beta_{mp} + SMB_t\beta_{SMBp} + HML_t\beta_{HMLp} + WML_t\beta_{WMLp} + \pi_{pt}$$

where R_{pt} is the (net or gross) return on fund p in month t; r_{ft} is the return on the risk-free asset in month t; R_{mt} is the return on the value-weighted market portfolio proxy in t; SMB_t and HML_t are the Fama-French factors-mimicking portfolios to capture the effects of size and Book-to-Market in t, respectively; and WML_t is the factor-mimicking for return momentum in t of Carhart (1997). The cross-sectional average is computed for each coefficient monthly from May 2002 until December 2008; then, the time average of the 80 monthly mean coefficients is reported in the Table**.** The symbols ***, **, and * denote that the coefficient is statistically significant at the 1%, 5% and 10% significance levels, respectively.

		CONST	MKT	SMB	HML	WML	R^2 (%)
$CAPM^N$	***Asset***	-0.28***	0.08***				7.41
	Mixed	-0.26***	0.07***				6.14
	Total	-0.28***	0.08***				7.24
$CAPM^G$	***Asset***	-0.12***	0.05***				4.41
	Mixed	-0.09	0.04***				3.76
	Total	-0.12***	0.05***				4.31
FF^N	***Asset***	-0.47***	0.16***	0.28***	0.12***		13.82
	Mixed	-0.41***	0.13***	0.24***	0.09***		11.89
	Total	-0.46***	0.15***	0.28***	0.12***		13.57
FF^G	***Asset***	-0.32***	0.13***	0.30***	0.12***		11.13
	Mixed	-0.25***	0.11***	0.25***	0.09***		9.80
	Total	-0.31***	0.13***	0.30***	0.12***		10.95
FFM^N	***Asset***	-0.21***	0.15***	0.27***	0.05***	-0.33***	28.56
	Mixed	-0.17***	0.13***	0.23***	0.03***	-0.31***	25.21
	Total	-0.21***	0.15***	0.27***	0.05***	-0.33***	28.14
FFM^G	***Asset***	-0.05	0.12***	0.29***	0.05***	-0.35***	26.97
	Mixed	0.00	0.10***	0.24***	0.02***	-0.32***	23.92
	Total	-0.05	0.12***	0.28***	0.04***	-0.35***	26.60

TABLE 3.5. RISK PREMIUMS ESTIMATES

The Table reports the time average of the 80 monthly cross-sectional estimates from May 2002 until December 2008 of the following models:

$$MODEL\ \ 4:\ R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{mpt} + u_{pt}$$

$$MODEL\ \ 5:\ R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{mpt} + \gamma_{2t}\hat{\beta}_{SMBpt} + \gamma_{3t}\hat{\beta}_{HMLpt} + \varepsilon_{pt}$$

$$MODEL\ \ 6:\ R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{mpt} + \gamma_{2t}\hat{\beta}_{SMBpt} + \gamma_{3t}\hat{\beta}_{HMLpt} + \gamma_{4t}\hat{\beta}_{WMLpt} + \pi_{pt}$$

where R_{pt} is the (after or before-expenses) excess return on fund p in month t; the alternative $\hat{\beta}_p$, are the betas estimated from models 1-3 respectively.. The symbols ***, **, and * denote that the coefficient is statistically significant at the 1%, 5% and 10% significance levels, respectively.

		***Asset* funds**						***Mixed* funds**					
		γ_0	γ_1	γ_2	γ_3	γ_4	**R^2 (%)**	γ_0	γ_1	γ_2	γ_3	γ_4	**R^2 (%)**
α^N_{CAPM}	***mean***	-0.01	0.11				10.16	-0.03	-0.01				12.86
	t	0.00	0.01					-0.01	0.00				
α^G_{CAPM}	***mean***	0.16	0.16				10.00	0.18	0.53				12.72
	t	0.04	0.01					0.05	0.03				
α^N_{FF}	***mean***	-0.02	0.22	0.40	-0.26		30.67	-0.03	-0.22	0.78	-0.92		32.95
	t	-0.01	0.02	0.06	-0.03			-0.01	-0.01	0.12	-0.10		
α^G_{FF}	***mean***	0.12	0.18	0.52	0.13		31.62	0.11	1.01	0.48	0.13		35.80
	t	0.05	0.01	0.08	0.01			0.04	0.05	0.07	0.01		
α^N_{FFM}	***mean***	0.10	-0.17	0.91	-0.41	0.76	40.51	-0.13	-0.15	0.87	-0.84	-0.02	44.77
	t	0.08	-0.01	0.14	-0.05	0.12		-0.12	-0.01	0.13	-0.09	0.00	
α^G_{FFM}	***mean***	0.22	-0.24	1.05	-0.14	0.64	42.10	-0.07	1.33	0.61	0.02	-0.56	49.28
	t	0.17	-0.02	0.16	-0.02	0.10		-0.05	0.10	0.08	0.00	-0.07	

TABLE 3.6. CORRELATION BETWEEN VARIABLES

This table shows the Pearson correlation coefficients between the assets under management (ASSETS), volatility (VOLAT), total expense ratio (EXPENSES), years from inscription (AGE), net return (NRET), gross return (GRET), and the net and gross risk-adjusted returns, according to the CAPM, three-factor FF and four-factor Carhart models (α^N_{CAPM}, α^N_{FF} , α^N_{FFM}, α^G_{CAPM}, α^G_{FF} and α^G_{FFM}). Panel A is for the whole sample, and Panel B and C are for the *asset* funds and *mixed* ones, respectively. The symbols ***, **, and * stand for significance levels of 1%, 5% and 10%, respectively.

Panel A: Whole sample

	ASSETS	VOLAT	EXPENSES	AGE	NRET	GRET	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
ASSETS	1.00											
VOLAT	-0.07***	1.00										
EXPENSES	-0.03***	0.21***	1.00									
AGE	0.15***	0.00	0.11***	1.00								
NRET	0.02***	-0.10***	0.02***	0.03***	1.00							
GRET	0.03***	-0.12***	0.04***	0.03***	1.00***	1.00						
α^N_{CAPM}	0.08***	-0.21***	-0.10***	-0.01**	0.07***	0.07***	1.00					
α^G_{CAPM}	0.09***	-0.20***	-0.04***	-0.01**	0.07***	0.07***	1.00***	1.00				
α^N_{FF}	0.05***	-0.15***	-0.15***	-0.01*	0.02***	0.00	0.96***	0.96***	1.00			
α^G_{FF}	0.07***	-0.15***	-0.09***	-0.01	0.00	0.00	0.96***	0.96***	1.00***	1.00		
α^N_{FFM}	0.10***	-0.07***	-0.10***	0.02***	0.09***	0.08***	0.94***	0.93***	0.93***	0.93***	1.00	
α^G_{FFM}	0.11***	-0.05***	-0.03***	0.03***	0.08***	0.08***	0.93***	0.94***	0.93***	0.93***	1.00***	1.00

Panel B: *Asset* funds

	ASSETS	VOLAT	EXPENSES	AGE	NRET	GRET	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
ASSETS	1.00											
VOLAT	-0.04***	1.00										
EXPENSES	-0.02***	0.22***	1.00									
AGE	0.21***	-0.03***	0.14***	1.00								
NRET	0.03***	-0.09***	-0.01***	0.03***	1.00							
GRET	0.03***	-0.12***	0.00	0.03***	1.00***	1.00						
α^N_{CAPM}	0.08***	-0.25***	-0.13***	0.00	0.07***	0.07***	1.00					
α^G_{CAPM}	0.09***	-0.26***	-0.07***	0.00	0.07***	0.07***	1.00***	1.00				
α^N_{FF}	0.05***	-0.19***	-0.16***	0.00	0.02***	0.00	0.96***	0.96***	1.00			
α^G_{FF}	0.07***	-0.20***	-0.10***	0.01*	0.00	0.00	0.96***	0.96***	1.00***	1.00		
α^N_{FFM}	0.10***	-0.11***	-0.14***	0.03***	0.09***	0.08***	0.94***	0.93***	0.93***	0.93***	1.00	
α^G_{FFM}	0.11***	-0.10***	-0.06***	0.04***	0.08***	0.08***	0.93***	0.94***	0.93***	0.93***	1.00***	1.00

Panel C: *Mixed* funds

	ASSETS	VOLAT	EXPENSES	AGE	NRET	GRET	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
ASSETS	1.00											
VOLAT	-0.16***	1.00										
EXPENSES	-0.05***	0.18***	1.00									
AGE	-0.02***	0.08***	0.03***	1.00								
NRET	0.02	-0.11***	0.17***	0.01*	1.00							
GRET	0.02	-0.11***	0.19***	0.01	1.00***	1.00						
α^N_{CAPM}	0.11***	-0.01	0.02	-0.09***	0.08***	0.08***	1.00					
α^G_{CAPM}	0.11***	0.07***	0.06***	-0.10***	0.07***	0.07***	1.00***	1.00				
α^N_{FF}	0.10***	0.03	-0.09***	-0.08***	0.03***	0.02	0.97***	0.96***	1.00			
α^G_{FF}	0.11***	0.11***	-0.06***	-0.09***	0.01	0.01	0.97***	0.97***	1.00***	1.00		
α^N_{FFM}	0.10***	0.15***	0.05***	-0.05***	0.08***	0.08***	0.93***	0.94***	0.93***	0.94***	1.00	
α^G_{FFM}	0.10***	0.21***	0.08***	-0.05***	0.07***	0.07***	0.94***	0.94***	0.93***	0.94***	1.00***	1.00

TABLE 3.7. MATCHING ESTIMATORS

Panel A in this Table shows the average for the annual alternative measures of performance: net return (NRET), gross return (GRET), and the estimations of the risk-adjusted fund excess returns, (the Jensen alpha), according to the CAPM (α_{CAPM}), the Fama and French (1993) (α_{FF}) and the Carhart (1997) (α_{FFM}) multifactor models, both with net and raw returns, separately for *asset* funds and *mixed* funds. It also reports the means differences test between the two groups of funds. Panel B reports the matching estimator coefficient between *mixed* and matched *asset* funds for the same performance measures, and its t-statistic. In this panel, we use the matching variables individually including size, age, and expenses. In Panel C the matching variables are used simultaneously. The symbols ***, **, and * denote that the difference between *mixed* funds and *asset* funds is statistically significance at the 1%, 5% and 10% significance levels, respectively.

Panel A: Average of the alternative performance measures

	NRET	GRET	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
Asset	-2.51	-0.90	-0.79	-0.08	-1.70	-0.97	-0.62	0.07
Mixed	-1.51	-0.23	-0.52	0.11	-1.09	-0.45	-0.33	0.24
Total	-2.35	-0.79	-0.75	-0.05	-1.60	-0.89	-0.58	0.10
difference	1.00***	0.67***	0.27**	0.19	0.60***	0.52***	0.29***	0.16
t-statistic	6.22	4.31	2.21	1.59	4.68	4.34	2.81	1.60

Panel B: Matching estimator with matching variables individually

	NRET		GRET		α^N_{CAPM}		α^G_{CAPM}		α^N_{FF}		α^G_{FF}		α^N_{FFM}		α^G_{FFM}	
matching variables	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**
ASSETS	2.88***	4.67	2.54***	4.07	0.15	1.02	0.06	0.41	0.46***	3.08	0.37***	2.67	0.17	1.37	0.04	0.30
AGE	1.98**	2.18	1.70*	1.88	0.37*	1.90	0.26	1.38	0.75***	3.73	0.64***	3.34	0.36**	2.13	0.23	1.35
EXPENSES	3.32***	4.28	3.33***	4.29	0.18	0.92	0.24	1.27	0.38*	1.94	0.44**	2.41	0.22	1.35	0.21	1.28

Panel C: Matching estimator with matching variables simultaneously

	NRET		GRET		α^N_{CAPM}		α^G_{CAPM}		α^N_{FF}		α^G_{FF}		α^N_{FFM}		α^G_{FFM}	
matching variables	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**	**coef**	**t**
ASSETS AGE	2.35***	3.87	2.15***	3.54	0.27*	1.84	0.33**	2.29	0.40***	2.74	0.46***	3.26	0.27**	2.10	0.29**	2.33
ASSETS AGE EXPENSES	3.51***	4.97	3.53***	5.00	0.06	0.33	0.20	1.18	0.10	0.59	0.24	1.41	0.13	0.87	0.23	1.53

TABLE 3.8. PERFORMANCE MEASURES DISTRIBUTION

The Table shows the distribution of the fund-month performance measure observations in our sample according to its quantity, separately for the two groups considered, *asset* and *mixed* funds, and the t-statistic for the proportion differences test between both groups. Panel A details the percentage over each category of positive values for the net (NRET) and gross returns (GRET), and for the alternatives estimations of risk-adjusted returns (α^N_{CAPM}, α^N_{FF}, α^N_{FFM}, α^G_{CAPM}, α^G_{FF} and α^G_{FFM}). Panels B and C report the percentage over each category of statistically significant positive and negative estimations, respectively. The symbols ***, **, and * denote that the difference in proportions between *mixed* funds and *asset* funds is statistically significant at the 1%, 5% and 10% significance levels, respectively.

Panel A: Proportion of funds with positive values of the performance measures

	NRET	GRET	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
Asset	53.96	56.27	34.06	48.02	24.59	36.29	32.32	48.13
Mixed	58.04	61.04	32.53	49.97	24.51	39.53	32.98	52.76
difference	4.08***	4.77***	-1.54**	1.95***	- 0.09	3.24***	0.66	4.63***
t	10.60	11.98	- 2.39	2.64	-0.15	4.56	1.05	6.27

Panel B: Proportion of funds with significant positive values of the performance measures

	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
Asset	4.14	7.82	1.93	4.45	2.89	6.21
Mixed	4.75	10.97	2.71	6.77	3.44	7.88
difference	0.61**	3.15***	0.78***	2.32***	0.55**	1.67***
t	2.23	7.78	4.09	7.41	2.39	4.62

Panel C: Proportion of funds with significant negative values of the performance measures

	α^N_{CAPM}	α^G_{CAPM}	α^N_{FF}	α^G_{FF}	α^N_{FFM}	α^G_{FFM}
Asset	2.71	0.75	6.81	2.90	3.69	1.34
Mixed	4.59	1.63	7.93	4.15	4.73	2.19
difference	1.87***	0.89***	1.12***	1.25***	1.04***	0.85***
t	8.15	6.55	3.24	4.93	4.00	4.83

TABLE 3.9. FUND PERFORMANCE-EXPENSES RELATIONSHIP

The Table shows the time average of the cross-section performance-expenses relationship estimates for each of the 80 months from May 2002 until December 2008:

$$PERFORMANCE_{pt} = \lambda_0 + \lambda_1 EXPENSES_{pt} + \Gamma CV_{pt} + \upsilon_{pt}$$

where $PERFORMANCE_{pt}$ are the alternatives measures of performance: net return (NRET), gross return (GRET), and the estimations of the risk-adjusted returns, according to the CAPM (α_{CAPM}), the FF (α_{FF}) and the Carhart (α_{FFM}) multifactor models, both with net and raw returns; $EXPENSES_{pt}$ is the total expenses over assets; and CV_{pt} is a set of control variables which includes age (AGE), volatility (VOLAT), and the neperian logarithm of assets under management in thousands of Euros (lnASSETS), with Γ being the 3x1 vector of parameters. Finally, υ_{pt} is the error term. Results for *asset* funds and *mixed* funds are reported separately. The symbols ***, **, and * denote that the coefficient is statistically significant at the 1%, 5% and 10% significance levels, respectively.

		TOTAL		***Asset* funds**		***Mixed* funds**	
		Coef.	**t**	**Coef.**	**t**	**Coef.**	**t**
NRET	**Intercept**	-0.16	-1.27	-0.08	-0.58	-0.75***	-4.61
	EXPENSES	0.08	0.24	-1.15***	-3.54	5.89***	6.35
	VOLAT	0.01	0.09	0.04	0.40	-0.13	-1.38
	AGE	0.01**	2.22	0.01***	2.72	0.00	0.27
	lnASSETS	0.02	1.62	0.02*	1.68	0.02	1.38
	R^2 (%)	24.93		25.01		34.54	
GRET	**Intercept**	-0.16	-1.27	-0.08	-0.58	-0.75***	-4.61
	EXPENSES	1.08***	3.10	-0.15	-0.48	6.89***	7.43
	VOLAT	0.01	0.09	0.04	0.40	-0.13	-1.38
	AGE	0.01**	2.22	0.01***	2.72	0.00	0.27
	lnASSETS	0.02	1.62	0.02**	1.68	0.02	1.38
	R^2 (%)	25.15		25.05		35.46	
α^N_{CAPM}	**Intercept**	-0.38***	-26.11	-0.37***	-24.87	-0.53***	-7.05
	EXPENSES	-0.91***	-13.31	-1.67***	-21.56	1.51***	6.37
	VOLAT	0.03**	2.15	0.05***	2.97	0.00	-0.35
	AGE	0.01***	7.91	0.01***	8.43	0.00***	2.11
	lnASSETS	0.02***	9.91	0.02***	11.77	0.00	0.12
	R^2 (%)	18.21		22.64		28.83	
α^G_{CAPM}	**Intercept**	-0.35***	-22.55	-0.36***	-24.55	-0.58***	-6.45
	EXPENSES	-0.26***	-3.68	-0.87***	-11.06	1.92***	8.93
	VOLAT	0.03**	2.22	0.05***	3.03	0.00	-0.23
	AGE	0.01***	9.65	0.01***	9.42	0.00***	3.06
	lnASSETS	0.02***	9.32	0.02***	11.78	0.01*	1.78
	R^2 (%)	18.15		21.29		33.10	
α^N_{FF}	**Intercept**	-0.38***	-26.30	-0.37***	-22.36	-0.49***	-6.74
	EXPENSES	-1.07***	-15.96	-1.80***	-20.56	1.06***	4.72
	VOLAT	-0.01	-0.46	0.01	0.48	-0.02*	-1.90
	AGE	0.01***	8.07	0.01***	8.32	0.00***	2.26
	lnASSETS	0.01***	4.47	0.02***	6.92	-0.01	-1.10
	R^2 (%)	17.89		21.79		25.91	

		TOTAL		***Asset* funds**		***Mixed* funds**	
		Coef.	**t**	**Coef.**	**t**	**Coef.**	**t**
α^{G}_{FF}	**Intercept**	-0.34***	-22.81	-0.35***	-21.63	-0.53***	-5.99
	EXPENSES	-0.43***	-6.23	-1.01***	-11.24	1.43***	7.00
	VOLAT	0.00	-0.35	0.01	0.59	-0.02	-1.61
	AGE	0.01***	9.94	0.01***	9.29	0.00***	3.18
	lnASSETS	0.01***	4.07	0.02***	6.40	0.01	0.69
	R^2 (%)	17.44		20.05		29.45	
α^{N}_{FFM}	**Intercept**	-0.34***	-24.37	-0.33***	-17.52	-0.43***	-6.20
	EXPENSES	-1.03***	-15.76	-1.76***	-23.28	1.03***	3.55
	VOLAT	0.04***	3.81	0.06***	4.11	0.02**	2.06
	AGE	0.01***	11.05	0.01***	10.90	0.01***	4.62
	lnASSETS	0.01***	6.66	0.02***	8.70	-0.01	-1.63
	R^2 (%)	12.94		16.77		26.04	
α^{G}_{FFM}	**Intercept**	-0.30***	-24.24	-0.31***	-18.31	-0.50***	-5.91
	EXPENSES	-0.39***	-5.88	-0.97***	-12.80	1.41***	5.51
	VOLAT	0.04***	3.90	0.06***	4.20	0.02***	2.07
	AGE	0.01***	13.50	0.01***	12.30	0.01***	5.22
	lnASSETS	0.01***	6.37	0.02***	8.39	0.01	0.90
	R^2 (%)	12.75		15.02		30.74	

TABLE 3.10. FUND PERFORMANCE-EXPENSES RELATIONSHIP QUANTILE REGRESSION

The Table shows the results from the quantile regression of the model 7:

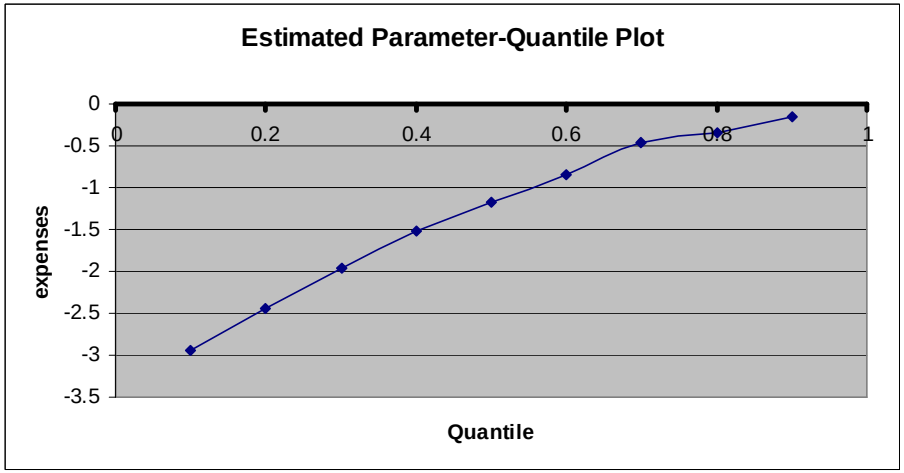
$$PERFORMANCE_{pt} = \lambda_0 + \lambda_1 EXPENSES_{pt} + \Gamma CV_{pt} + \upsilon_{pt}$$

where $PERFORMANCE_{pt}$ are the risk-adjusted performance measures according to the Carhart (α_{FFM}) multifactor model, both with net and raw returns; $EXPENSES_{pt}$ is the total expenses over assets; and CV_{pt} is a set of control variables which includes age (AGE), volatility (VOLAT), and the neperian logarithm of assets under management in thousands of Euros (lnASSETS), with Γ being the 3x1 vector of parameters. Finally, υ_{pt} is the error term. Only results for the coefficient of EXPENSES (and the Objective function and Predicted Value at Mean) are shown, separately for *asset* funds and *mixed* funds. The symbols ***, **, and * denote that the coefficient is statistically significant at the 1%, 5% and 10% significance levels, respectively.

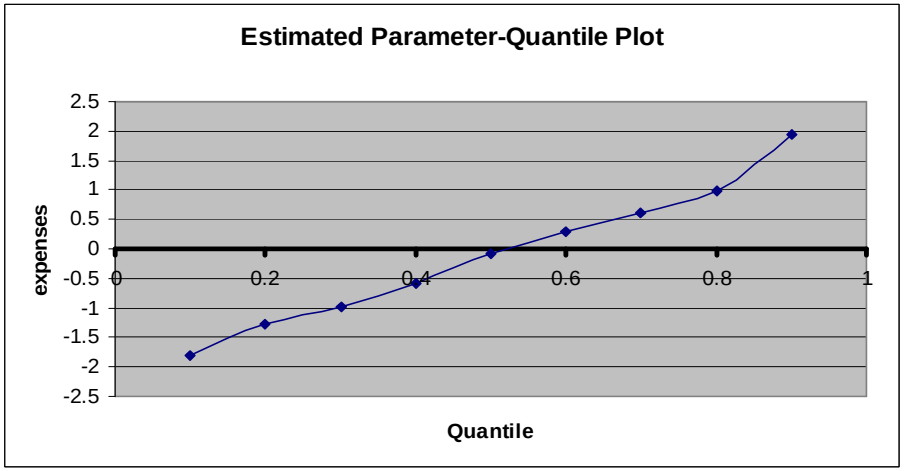
		***Asset* funds**				***Mixed* funds**			
	Quantile	**objective function**	**predicted Value at Mean**	**expenses estimate**	**t**	**objective function**	**predicted Value at Mean**	**expenses estimate**	**t**
α^N_{FFM}	**0.1**	3,677.15	-0.79	-2.93***	-33.35	540.38	-0.83	-1.82***	-13.19
	0.2	5,777.69	-0.57	-2.44***	-43.26	866.49	-0.59	-1.27***	-7.99
	0.3	7,206.70	-0.43	-1.97***	-35.84	1,072.77	-0.40	-0.98***	-6.94
	0.4	8,092.71	-0.30	-1.52***	-32.54	1,188.90	-0.25	-0.58***	-5.12
	0.5	8,513.97	-0.19	-1.18***	-23.65	1,229.62	-0.12	-0.07	-0.56
	0.6	8,474.23	-0.06	-0.85***	-15.11	1,200.56	0.00	0.28***	2.60
	0.7	7,894.43	0.08	-0.47***	-6.96	1,106.55	0.13	0.60***	4.88
	0.8	6,649.18	0.28	-0.35***	-4.09	926.39	0.33	0.98***	5.14
	0.9	4,341.82	0.63	-0.15	-1.35	610.24	0.64	1.93***	7.63
α^G_{FFM}	**0.1**	3,604.86	-0.63	-2.08***	-23.16	518.84	-0.67	-1.66***	-12.00
	0.2	5,662.90	-0.42	-1.52***	-27.53	839.87	-0.43	-1.14***	-6.54
	0.3	7,067.13	-0.27	-1.06***	-19.31	1,044.06	-0.23	-0.72***	-4.61
	0.4	7,938.92	-0.15	-0.64***	-12.94	1,158.91	-0.08	-0.33***	-2.42
	0.5	8,356.43	-0.03	-0.32***	-5.98	1,201.53	0.05	0.21*	1.73
	0.6	8,311.73	0.09	0.05	0.89	1,178.14	0.18	0.46***	3.67
	0.7	7,743.01	0.24	0.29***	4.24	1,084.87	0.33	0.88***	6.34
	0.8	6,520.72	0.44	0.46***	5.46	902.38	0.53	1.75***	9.44
	0.9	4,258.08	0.79	0.52***	4.57	591.48	0.84	2.44***	9.54

FIGURE 3.1. QUANTILE REGRESSION. EXPENSES COEFFICIENT AND PERFORMANCE QUANTILE

Panel A: α^{N}_{FFM}

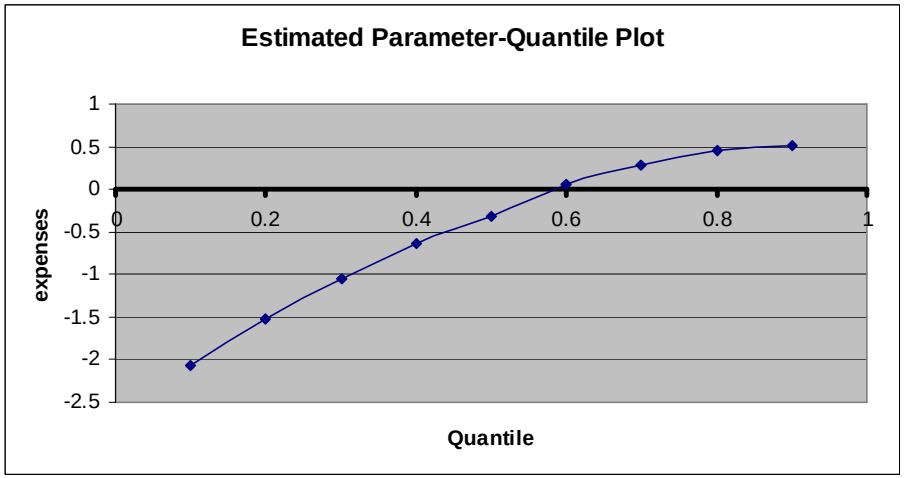


Asset funds

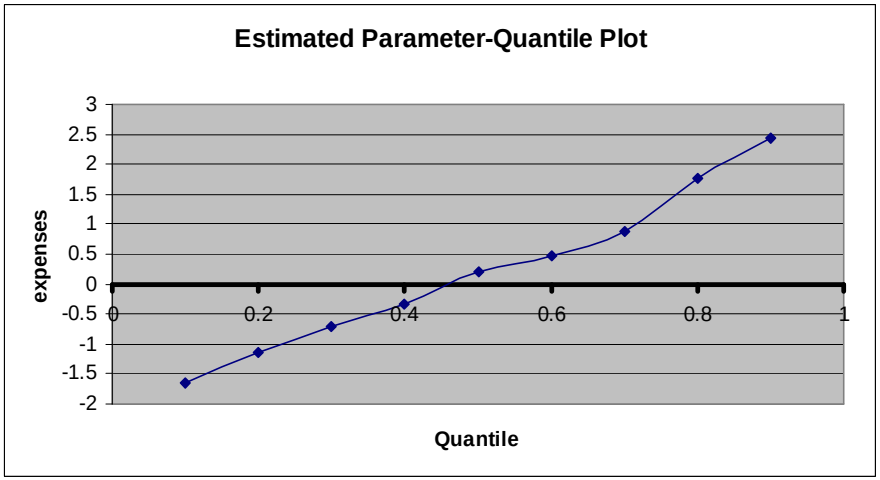


Mixed funds

Panel B: α^{G}_{FFM}



Asset funds



Mixed funds