



Spanish mutual fund performance: an analysis of the determinants

M^a Isabel Cambón Murcia

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Abstract

This working document analyses the Spanish mutual fund performance in the period 2000-2009 based on a set of variables which characterise such institutions. The model proposed, which includes non-observable variables which we relate to the skill of the fund manager, is based on the generalised method of moments (GMM) technique applied to panel data. The results of the estimation do not allow us to conclude that there is systematic persistence in the yields of investment funds. Neither do we find that the funds charging higher management and custody fees perform better. Some variables characterising the fund management company do seem to have a bearing on the yield of the fund. For example, we find that the larger the market share of the fund management company, the lower tends to be the yield, and that the funds of management companies belonging to banks and savings banks also tend to show higher yields. Conversely, variables specific to a fund, such as size or age, do not seem to have a bearing on its performance.

Table of contents

1	Introduction	11
<hr/>		
2	Review of the reference literature	13
<hr/>		
3	Data and methodology	17
<hr/>		
3.1	Data	18
<hr/>		
3.2	Description of the model	24
<hr/>		
4	Results	25
<hr/>		
4.1	Results for the industry as a whole and comparison between pure and balanced funds	26
<hr/>		
4.2	Results depending on the geographic focus of the fund	33
<hr/>		
5	Conclusions	37
<hr/>		
	Bibliographic references	39
<hr/>		
	Annex	43
<hr/>		

Index of tables

TABLE 1	Annual yield on investment funds (%)	17
TABLE 2	Number of observations per year	19
TABLE 3	Number of funds with a certain number of observations	20
TABLE 4	Estimation of the equation of the determinants of the mutual fund performance as a whole	27
TABLE 5	Estimation of the equation of the determinants of the mutual fund performance: pure vs. balanced categories	29
TABLE 6	Estimation of the equation of the determinants of the mutual fund performance: by geographic focus of the fund	34

Index of figures

FIGURE 1	Assets of the investment fund industry	14
FIGURE 2	Representativity of the sample in terms of assets (%)	20
FIGURE 3	Averages of some variables of the sample	22

1 Introduction

The investment fund (IF) industry plays an important role within the financial system, since it makes it possible to channel the savings of different kinds of investors, of varying size and degree of sophistication, towards financial instruments in a wide range of markets, to access professional management services, and to benefit from the advantages of diversification.

There is a debate, which resurfaces fairly often, regarding the appropriateness of the investment funds performance. This debate, which is not limited to Spain, has spawned a significant number of academic works on this subject. The analysis, which have mostly focused on equity funds, in general conclude that the industry's performance of investment funds is relatively low. Nevertheless, in recent decades the industry has experienced truly rapid growth at both a domestic and international level, which would be hard to comprehend if the perform of these funds were not reasonable.¹ This paradox has given rise to a great many works which have looked into the factors explaining the investment funds performance and have identified certain investment-related behaviours which are not solely driven by considerations of return/risk in a strict sense.

This article focuses on this paradox and attempts to explain the performance provided by funds on the basis of a number of important variables such as volatility, past yields, the fees charged, the size of the fund or the fund management company, the focus of the fund, its age, etc. To do this an empirical model was proposed based on generalised method of moments (GMM) estimations applied to panel data. This methodology, developed by Arellano and Bond (1991), allows us to enter a constant non-observable variable in the model, which in this context is the skill of the managers, and obtain consistent and asymptotically efficient estimations. The model used enables us to compare a number of hypotheses investigated by previous works (for example, the persistence of performance or the relationship between the return and the fees charged) and others of a relatively innovative nature, such as the relationship between the perform of the fund and whether it is aimed at retail or institutional investors, among others.

The results of the estimations suggest that current fund performance of funds as a whole is not systematically related to past performance. We have also found that funds with higher management and custody fees do not always tend to compensate the participants with higher yields, while, conversely, higher subscription and redemption fees do seem to be linked to better performing funds. We also detect a

1 To evaluate the reasonability of the fund performance, most works compared some measurement of return (either risk-adjusted or not) on the funds referenced to the market (benchmark).

negative relationship between the market share of the fund management company and the fund performance. Finally, we find that the funds managed by fund management companies belonging to banks and savings banks tend to achieve higher yields, particularly in the case of equity focused funds.

The working document is structured in the following manner. In chapter 2 a review is made of existing academic literature on investment fund performance. In chapter 3 there is a description of the data sample used in the study and the model to be estimated. Chapter 4 presents the results of the estimation both for investment funds as a whole and for the different segments of funds (whether pure or balanced-categories funds and their geographical focus). Finally, chapter 5 presents the main conclusions of the article.

2 Review of the reference literature

The volume of literature related to the world of investment funds has increased significantly in recent decades at an international level and also, albeit with some delay, at a domestic level, driven by the strong growth of the collective investment sector. The first empirical works related with the funds performance date from the sixties of the last century and centred, above all, on the equity fund segment of the US market. Basically, these early works tried to ascertain whether the returns obtained by investment funds over a period of time were reasonable.

Nearly all the empirical works that have tried to evaluate performance of mutual funds have made use of some kind of market reference (benchmark), either to match the return on funds directly against them or to build some performance metrics of the fund from which to draw conclusions. The most commonly used performance metrics are Jensen's alpha, the Treynor ratio or the Sharpe ratio, although there are others.² The findings of these works were, in general terms, negative; in other words, investment funds (generally equity funds) were not able to beat the performance of the chosen market³ (whether or not risk adjusted). Studies on the appropriateness of Spanish mutual funds yields returned similar results.⁴

The trouble with studies based on benchmarks is that the results depend on the chosen reference. As Roll demonstrated (1978), the conclusions of these studies may be completely different depending on the benchmark chosen, a less than desirable characteristic since it adds a large degree of ambiguity to the conclusions that can be drawn from the analyses. As a result of these criticisms, works on the evaluation of investment funds began to appear that were based on the composition of the fund portfolio and not on any particular benchmark. The conclusions of some of these works were somewhat more satisfactory.⁵

Despite the fact that, in general terms, the performance achieved by investment funds appears to be disappointing, the fact is that the growth of the investment fund industry has been truly substantial both at home and abroad in recent decades. As we can see in figure 1, in the USA and in the United Kingdom, which are the economies in which the collective investment industry first began to take off, the average annual growth of investment fund assets has been 17%. In Spain,

2 See, for example, Ruiz (2007), which provides a summary of this type of measures.

3 See Sharpe (1966), Jensen (1968), Grinblatt and Titman (1989) or, more recently, Malkiel (1995), Droms and Walker (1995), Ackermann, McNally and Ravenscraft (1999), Detzler (1999) and Edelen (1999).

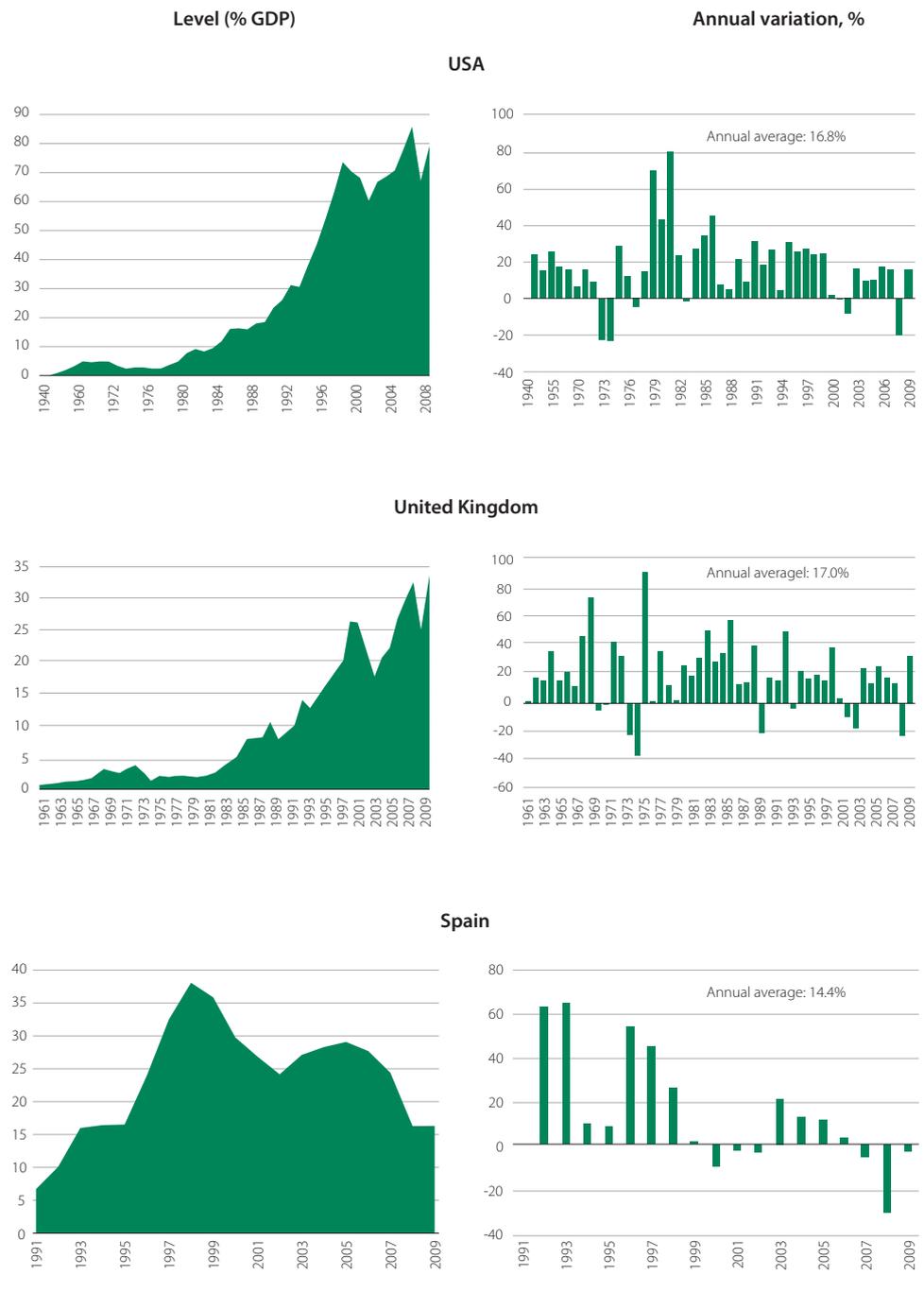
4 See Ferrando and Lassala (1998), Basarrate and Rubio (1999), Matallín and Fernández (1999), Menéndez and Álvarez (2000), Martínez (2001), Fernández *et al.* (2007) and Palacios (2010).

5 For example, Grinblat and Titman (1993) find that temporary changes in the portfolios of a set of US equity investment funds in the period 1974-1984 provide positive results.

where the development of this industry began in the nineties, the trend in investment fund assets has been somewhat more irregular; it grew strongly in that first decade only to suffer more acutely the effects of the current economic crisis. Even so, the average annual growth of Spanish investment fund assets has been in excess of 14%.

Assets of the investment fund industry

FIGURE 1



Source: 2010 Investment Company Fact Book (USA), Investment Management Association (United Kingdom), CNMV (Spain) and Thomson Datastream.

The works which help us identify the components of this paradox attempt to explain the performance of mutual funds by examining a number of variables, and by identifying certain investment-related behaviours which are not solely driven by the dual factors of return and risk. Among the works which attempt to explain the performance of funds, special attention should be paid to those which analyse the performance persistence of the funds; i.e. those which try to ascertain whether the funds which obtain better (worse) results tend to maintain this better (worse) relative position. The phenomenon of persistence of performance was dubbed the “hot hands phenomenon”⁶ in Hendricks *et al*'s study. (1993). The most important works, generally focusing on US equity funds, found there to be persistence in performance over short periods of time, between two and three years,⁷ and, generally, in funds with the worst results.⁸ Performance persistence over longer periods (up to ten years) has very rarely been documented.

In Europe, the most important works, which mostly deal with the UK funds market, have reached similar conclusions.⁹ The most significant studies of the funds industry in Spain¹⁰ also finds evidence of performance persistence, even in fixed income funds, especially with regard to funds at either end of the scale; i.e. the best and the worst funds.

A second approach in the framework of studies which attempts to explain the fund performance aims to evaluate the relationship between the returns obtained by investment funds and the fees they charge. In principle, the fact that one investment fund charges higher fees (mainly management fees) than another fund with a similar risk would be justified by the greater skill of the managers of the first fund, which would ultimately be reflected in a higher yield (adjusted for risk). Generally speaking, this expected positive relationship between performance and fees finds no empirical support in the most important studies.¹¹ Recently, in a study on US equity investment funds for the period 1961-2005, Gil-Bazo and Ruiz Verdú (2009) found strong evidence of the existence of a negative relationship between the yield before fees on the IF and the fees charged. They put forward two explanations for this result: (i) that there may be variables omitted from the regressions and/or (ii) that it is a result of the strategic behaviour of the funds when establishing their fees on the basis of past or expected yields. These authors argue that the funds with the worst historical or expected per-

6 The expression “to have hot hands” comes from the world of US sport. It is based on the belief that a player who is able to score more goals than his teammates in a certain match is more likely to continue scoring because he has hot hands (although *a priori* there is no reason for this to happen). By analogy, an investment fund which obtains better (worse) returns will tend to continue to obtain them in the future. This phenomenon may be indirectly related to momentum strategies in equity markets, in which the momentum of investors' purchases helps maintain the price of securities which used to show higher returns and which are able to maintain that performance even though their fundamentals may have changed.

7 See the works of Grinblatt and Titman (1989), Ippolito (1989), Malkiel (1995), Hallahan and Faff (2001), Carhart, Carpenter, Lynch and Musto (2000), Brown and Goetzman (1995) and Droms and Walker (2001).

8 Carhart (2002).

9 See the works of Blake, Lunde and Timmermann (1998), Blake and Timmermann (1998) and Allen and Tan (1999).

10 See Menéndez and Álvarez (2000), Matallín and Fernández (2001), Ciriaco and Santamaría (2005), Ferruz *et al.* (2003), Toledo and Marco (2006), Ferruz *et al.* (2007), Ruiz (2007) and Marco (2007).

11 See Gruber (1996) and Carhart (1997).

formance raise their fees optimally and target investors who are relatively insensitive to performance, since they do not expect to be able to compete with the best funds in the market targeting more sophisticated investors. In Spain, there are also works which find evidence of this negative relationship between performance and fees.¹²

Finally, we should mention a line of research which tries to ascertain whether the funds which receive a greater proportion of money over a period of time tend to be more profitable in the following periods. This is the theory of smart money, which supposedly flows towards the best funds. The most important works¹³ at an international level conclude that investors are skilful in their selection of funds. In the case of Spain no evidence was found concerning this skill¹⁴ and the result was in part attributed to the very nature of the Spanish funds market, in particular the fiscal captivity which existed until 2003, high redemption fees, and a significant concentration in terms of the marketing channel of these products.

The literature dealing with the modelling of the demand for investment funds is equally comprehensive, with highly disparate approaches, although all take as their starting point the general idea that, when choosing a fund, investors are influenced both by rational factors, hinging on the twin concepts of return and risk, and by “emotional” factors, which are less easy to pin down. This combination of factors in the choice of a fund by investors may give rise to different types of behaviour. The relevant literature has found evidence of the following types of behaviour: a) tendency to bet on the “best funds”, i.e. to invest in the funds with the best performances in previous periods;¹⁵ b) irrational asymmetry of investment behaviour, i.e. the inflows of money into the best funds are not proportional to the outflows from the worst funds;¹⁶ c) a tendency of certain types of investors to take decisions based on not very specialised information, under the influence of advertising campaigns or temporary market conditions;¹⁷ and d) demand flows which are merely the effect of the herding behaviour.¹⁸

Regarding the Spanish market we also find a number of studies which have tried to model the demand for investment funds using different approaches. Among the most important works are those of Ciriaco, Del Río and Santamaría (2002), which find a significant and positive covariance between past yields and present inflows of money into investment funds; those of Toledo and Marco (2006), which as well as finding a positive relationship between good past yields and present inflows of money, also observe a clearly asymmetrical behaviour (not linear) between the premium afforded to the best funds and the penalization given to the worst ones; and those of Marco (2007), which find that, when choosing, the investor takes into account the historical yields and volatilities of the funds, and only the fees he pays expressly (subscription and redemption), not those disbursed implicitly (mainly management and custody).

12 See Álvarez (1995), Freixas *et al.* (1997), Lassala (1998) and more recently, Marco (2007).

13 See Gruber (1996) and Zheng (1999).

14 See Ciriaco, Del Río and Santamaría (2002) and Marco (2007).

15 See Carhart (1997) and Zheng (1999).

16 See Gruber (1996), Sirri and Trufano (1993) and (1998), Goetzman and Peles (1997).

17 See Capon, Fitzsimons and Prince (1996).

18 See Patel, Zeckhauser and Hendricks (1991).

3 Data and methodology

In the last decade the aggregate annual yield (in net terms; i.e. excluding expenses) of Spanish mutual funds as a whole has ranged from -4.2% to 5.7% (see table 1). The various categories of funds show substantial differences in terms of yield, as a

Annual yield investment funds (%)

TABLE 1

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total¹	-1.9	-1.6	-3.6	4.2	3.4	5.0	5.6	2.7	-4.2	5.7
Fixed income ²	3.3	3.7	2.7	1.8	1.7	1.5	2.0	2.7	2.1	1.9
Balance fixed income ³	-0.1	-1.0	-3.6	3.7	3.8	5.0	4.2	1.9	-7.1	6.9
Balanced equity ⁴	-6.9	-7.3	-17.0	10.1	6.2	11.9	10.3	2.7	-22.2	16.5
Euro equity ⁵	-11.0	-13.8	-30.1	23.8	15.3	21.4	27.3	6.1	-39.8	32.4
International equity ⁶	-15.8	-20.6	-33.2	12.8	7.0	25.6	13.4	1.5	-41.7	37.3
Fixed income guaranteed	3.8	4.4	4.5	2.4	2.6	1.7	0.8	2.8	3.3	3.8
Equity guaranteed ⁷	-1.2	0.1	1.1	3.3	4.1	4.0	4.7	2.4	-2.6	3.6
Global funds	-6.1	-11.8	-12.7	4.8	2.2	6.2	4.1	1.5	-8.6	10.9
For comparison purposes⁸:										
Ibex 35	-21.7	-7.8	-28.1	28.2	17.4	18.2	31.8	7.3	-39.4	29.8
Eurostoxx 50	-2.7	-20.2	-37.3	15.7	6.9	21.3	15.1	6.8	-44.4	21.1
Treasury Bills (1-3 m)	4.7	3.1	2.7	2.0	2.0	2.5	3.5	3.9	1.8	0.4
Treasury Bills (12 m)	4.5	3.2	2.6	2.2	2.2	2.8	3.8	4.1	1.9	0.9
Government Debt (10 yr)	5.2	5.1	4.3	4.3	3.6	3.3	4.0	4.4	3.9	4.0
Private fixed income (12 m)	4.8	3.4	2.9	2.4	2.5	3.0	4.1	4.8	3.3	1.4

Source: Thomson Datastream, Bank of Spain and CNMV.

- 1 Neither passive management funds nor absolute return funds, created in 2009, are included, since not even one full year of data is available.
- 2 Up to 1Q09 includes: short-term fixed income, long-term fixed income, international fixed income, monetary funds and FIAMM (the latter until 2006). Since 2Q09 includes: euro fixed income, international fixed income and money market funds.
- 3 Up to 1Q09 includes: balanced fixed income and balanced international fixed income. Since 2Q09 includes: balanced euro fixed income and balanced international fixed income.
- 4 Up to 1Q09 includes: balanced equity and balanced international equity. Since 2Q09 includes: balanced euro equity and balanced international equity.
- 5 Up to 1Q09 includes: domestic equity and euro equity. Since 2Q09 includes euro equity (which already includes domestic equity).
- 6 Up to 1Q09 includes: international equity Europe, international equity Japan, international equity USA, international equity emerging and international equity others. Since 2Q09: international equity.
- 7 Up to 1Q09: equity guaranteed. Since 2Q09: guaranteed and partially guaranteed equity.
- 8 The annual rate of change of the equity indices (Ibex 35 and Euro Stoxx 50) are provided as are the interest rates as at 31 December of each year for fixed income instruments.

result of the different degree of risk assumed in each one. Fixed income funds have shown a more stable yield, ranging from 1.5% to 3.7%. Conversely, yields of equity funds suffered from truly significant fluctuations in the last decade, with years with close to 40% losses, at the critical moments of the crisis, or gains of over 30%, depending on the state of the stock market at the time. The yields of mixed funds (fixed income and equity) are somewhere in the middle, depending on the relative importance of the investments made in fixed income or equity securities. Finally, the yield of guaranteed funds, depending on their composition, has ranged from 0.8% to 4.5% in the fixed income category and from -2.6 to 4.7% in the equity income category.

3.1 Data

The analysis presented below has been made on the basis of information that UCITS managers send regularly to the CNMV. We have taken annual data from the investment funds in existence between 2000 and 2009, except for guaranteed funds, since we feel that the determinants of the performance of these funds relate to factors of a different nature than those which are to be considered in this work.

Data has been taken of all funds for which we have a minimum of five observations (five years); in other words, we do not require the funds to have existed during the entire ten years of the study, but they must have existed for a long enough period of time for the estimation. In this way we reduce the survivorship bias present in some previous studies.

We allow and include in our study any fund merger processes and changes of category that have occurred during the period under study. Given the high number of categories present in the investment fund industry, we decided to group these categories into a smaller number. The groups used were:

- 1) Fixed income: includes money market funds (also the former FIAMM) and short-term fixed income, long-term fixed income and international fixed income funds according to the classification which existed prior to 1 April 2009. It includes money market, euro fixed income and international fixed income funds under the new classification.¹⁹
- 2) Balanced fixed income: includes balanced fixed income and balanced international fixed income funds under the old classification and balanced euro fixed income and balanced international fixed income funds under the new one.
- 3) Balanced equity: includes balanced equity and balanced international equity funds under the old classification and balanced euro equity and balanced international equity funds under the new one.
- 4) Euro equity: includes domestic equity and euro equity funds under the old classification and euro equity and passive management funds under the new one.

¹⁹ CNMV Circular 1/2009, of 4 February, on categories of UCITS based on their investment profile.

- 5) International equity: includes international equity Europe, USA, Japan, emerging and other funds under the old classification and international equity under the current classification.
- 6) Global: includes global funds under the old classification and global and absolute return funds under the new one.

In order to prevent the existence of atypical data from distorting the results of the empirical study, several atypical value detection studies have been carried out. First of all, for each variable and year we have checked for the existence of extreme atypical data, which we define as data values which are three times higher than the interquartile to median range. To the set of endogenous variables we have applied a technique known as “winsorization”²⁰ whereby the lower and upper extreme values are replaced by the lowest and highest values, respectively, which are not extreme for that variable in that period of time.

After applying all these criteria, we arrive at a sample of 1,782 funds with a total of 15,076 observations. Table 2 sets out the number of observations which we have for each year, including a breakdown by investment focus. The number of observations per year ranged from 1,218 in 2000 to 1,722 in 2005.

Number of observations per year

TABLE 2

	Number of observations	RF (%)	RFM (%)	RVM (%)	RVE (%)	RVI (%)	GL (%)
2000	1,218	39	16	15	13	13	5
2001	1,385	35	15	15	12	17	5
2002	1,509	34	14	15	12	18	7
2003	1,569	34	13	14	12	19	8
2004	1,721	34	13	13	11	18	12
2005	1,722	33	12	13	11	18	13
2006	1,534	26	12	14	13	20	16
2007	1,606	31	11	12	13	17	16
2008	1,523	32	11	12	13	16	16
2009	1,289	32	11	12	14	15	16
Total	15,076	33	13	13	12	17	11

No. funds 1,782

Source: CNMV. Note that the total number of funds per category for the period as a whole cannot be provided, since changes in the investment category of funds were allowed.

RF: fixed income, RFM: balanced fixed income, RVM: balanced equity, RVE: euro equity, RVI: international equity and GL: global funds

²⁰ See the works of Flannery and Rangan (2006) and Yale and Forsythe (1976).

In table 3, the number of funds is broken down by the number of available observations. As we can see, for over 70% of the funds we have at least eight observations. To be more precise, the number of funds with observations for all ten years considered accounts for 41% of the total and for 20% of the funds there are nine observations.

Number of funds with a certain number observations

TABLE 3

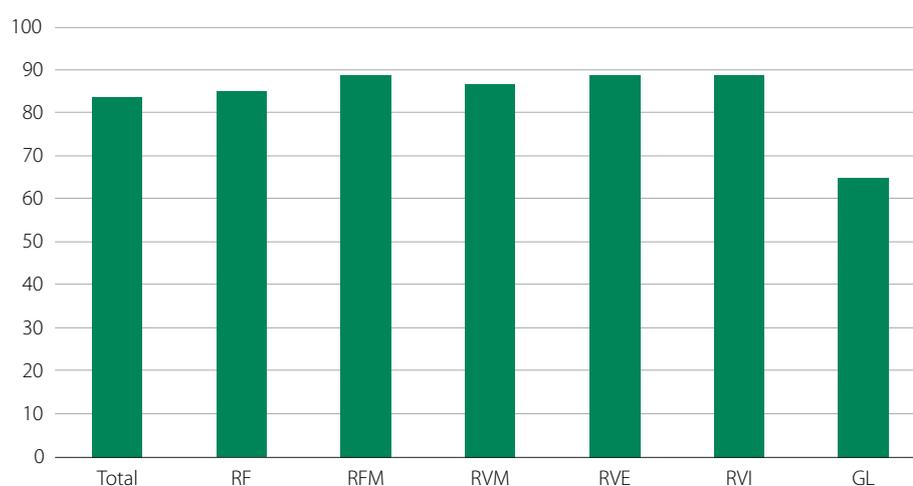
Number of observations	Number of funds	Total number of observations
5	179	895
6	183	1,098
7	131	917
8	180	1,440
9	364	3,276
10	745	7,450
Total	1,782	15,076

Source: CNMV.

The representativity of the final sample used by the study in terms of assets is high. As we can see in figure 2, the assets of the funds included in the sample represent around 84% of the total assets of the funds in average terms for the ten-year period under study. Representativity is high in all fund categories, with assets representing between 85% and 89% of the total, except for the case of global funds where the percentage falls to 65% due to the relative youth of this category of funds (remember that a minimum of five yearly observations were required during the ten-year period of the sample).

Representativity of the sample in terms of assets¹ (%)

FIGURE 2



Source: CNMV.

¹ Assets of the sample as a percentage of the total assets of the funds or of each category.

RF: fixed income, RFM: balanced fixed income, RVM: balanced equity, RVE: euro equity, RVI: international equity and GL: global funds.

With regard to the variables of the model, the dependent variable is the net annual yield of the fund, y_t , which is defined as the percentage variation of the net asset value of the unit between the close of one year and the close of the previous year. The explanatory variables of the model are related to the various characteristics of the fund, which are:

- Volatility (VOL_t), defined as the annualised typical deviation of the monthly yields of the fund in the previous twelve months. It is a standard risk metric used to assess the risk profile of investment funds.
- Net subscriptions (SN_t), defined as the quotient between the net flows of investment in the funds (net subscriptions for positive values and net redemptions for negative values) during the period under study and the assets of the fund at the beginning of that period.
- Explicit and implicit fees. We consider the two types of fees charged to investment funds: implicit fees (CGD_t), which comprise management fees (on assets or results) and custody fees, and the explicit fees, which are the subscription and redemption fees (CSR_t). The difference between the two types of fees lies in the fact that the net returns provided by investment funds already take the implicit fees into account; i.e. the calculation of the net asset value of the unit of the fund already discounts the expenses accrued for the management of the fund and the custody of its securities. However, explicit fees are only accrued when the investors enter or leave the fund; i.e. when they subscribe or redeem units.
- Age of the fund ($EDAD_t$): number of years the fund has existed.
- Size of the fund ($PATF_t$): assets of the fund at the close of each year.
- Market share of the fund management company ($CUOTAG_t$): assets managed by the fund management company as a percentage of the total assets of the industry.
- Percentage of the assets of the fund in the hands of institutional investors ($INSTIT_PATRIM_t$): this variable aims to identify the focus of an investment fund with regard to the type of target client. In order to facilitate analysis, all legal persons investing are considered to be institutional investors, although strictly speaking these figures are not completely coincident.²¹
- Type of group to which the fund management company belongs, whether it belongs to a bank ($BANCO_t$), a savings bank ($CAJA_t$), or an independent financial group.
- Changes experienced by the investment funds during the period in question: mergers ($FUSIÓN_t$) and changes of investment category ($CAMBIOVOC_t$).

21 For example, non-financial companies are legal persons which are not considered to be institutional investors.

The annex, which contains the main statistics describing the variables to be used in the estimation for the funds as a whole and for each investment category, throws up some interesting patterns. The panels of figure 3 show the averages of the key variables.

First of all it is important to note that the mean annual yield of the funds in the sample in the reference period 2000-2009 is 1.3%. Pure and balanced fixed income funds exceed this average with figures of 2.7% and 2.3%, respectively, while global funds average 2.1%. The turbulences in financial markets in the early years of the decade and at the end of it due to the financial crisis reduced the yield of the riskier funds down to 1.1% in euro equity, 0.6% in balanced equity, and even reached negative figures in the case of international equity funds (-0.9%).

The average volatility of the yield of the funds in the sample during the decade was 6.8%. The riskier funds showed a higher volatility (with a maximum of 12.2% for international equity funds), while the more conservative funds, particularly the pure fixed income funds, showed an average volatility of 2.7%.

Averages of some variables of the sample

FIGURE 3



Source: CNMV.

RF: fixed income, RFM: balanced fixed income, RVM: balanced equity, RVE: euro equity, RVI: international equity and GL: global funds.

For funds as a whole, average net annual subscriptions were negative during the decade. Market turbulences and competition from other financial instruments, such as high yield bank deposits, gave rise to a substantial volume of redemptions during this period. By investment category we see that the highest relative volume of redemptions corresponds to global funds, a result which may be influenced by the sample's smaller size due, in turn, to its relative youth. If we exclude this focus, we can see that the largest net redemptions in relative terms were in the fixed income categories.

The average custody and management fees of the funds amounted to 1.45%. All the equity funds topped this average, with a maximum of 1.9% for international equity funds and 1.8% for euro equity funds, while the lowest management and custody fees were charged by pure fixed income funds, at 1.1%. The average subscription and redemption fees amount to 0.27%. Once again, equity funds top the average (0.50% for international equity) while fixed income funds charge less than the average (0.13% for pure fixed income).

The age variable shows that, on average, the fixed income funds of the sample have a longer life than equity funds and global funds. The size of fixed income funds is also higher on average than equity funds, except for euro equity where the domestic funds raise the average.

The fund management company market share variable shows that the larger management company are more active in pure fixed income funds, pure equity funds, and global equity funds.

32% of the assets of the funds in the sample are in the hands of institutional investors. In this case, the equity categories show a higher percentage of institutional participation (nearly 38% in the case of international equity funds), while for fixed income funds the average is under 30%.

With regard to which financial group the fund management company belongs to, it should be noted that 41% of the observations of the sample correspond to funds belonging to banks and nearly 36% to funds belonging to savings banks. The percentage of bank-managed funds in each focus is more evenly distributed, with percentages ranging from 39.5% to 43%, while savings banks concentrate more on pure fixed income funds and pure equity funds, with a much smaller share in global funds.

The percentage of funds which have undergone one or more merger processes in the period under study is 27% for the sample as a whole. By category, the relative importance of mergers was greater for balanced fixed income funds and international equity funds. Finally, between 2000 and 2009 a little over 19% of the funds underwent some change in category within one of the six classifications considered in this work.

3.2 Description of the model

The model we propose for estimating the determinants of the Spanish mutual fund performance is the following:

$$y_{i,t} = \alpha y_{i,t-1} + x'_{i,t} \beta + \lambda_i \gamma + \eta_i + u_{i,t}, \quad |\alpha| < 1 \quad (1)$$

for $i=1,\dots,N$ and $t=1,\dots,T$, where $y_{i,t}$ is the yield (net) of the fund i in the period t , $x_{i,t}$ is a row vector of regressors, λ_i represents the time dummies vector (2000-2009) and η_i represents a non-observable permanent attribute (non-observable heterogeneity) of the i -th fund which, in the framework of this study, could be linked to the skill of the manager.

The vector of regressors $x_{i,t}$ contains a set of variables which characterise the fund i in the period t and which have already been mentioned in the previous point: $VOL_{i,t-1}$, $SN_{i,t-1}$, $CGD_{i,t}$, $CSR_{i,t}$, $EDAD_{i,t}$, $PATF_{i,t}$, $CUOTAG_{i,t}$, $INSTIT_PATRIM_{i,t}$, $BANCO_{i,t}$, $CAJA_{i,t}$, $FUSIÓN_{i,t}$ and $CAMBIOVOC_{i,t}$. Note that the volatility (VOL) and the net subscriptions are entered with a lag to test whether the funds which were most volatile or received a higher volume of net subscriptions compared with the previous period tend to be more profitable in the following period. The variables relating to age (EDAD) and assets (PATF) are entered in logarithms. BANCO, CAJA, FUSIÓN and CAMBIOVOC are dummy variables which take the value 1 if they meet the condition in question and zero if they do not.

$u_{i,t}$, the error term of the equation, satisfies the classical assumptions, which is to say it is a random independent identically distributed variable with zero mean and variance σ_v^2 .

4 Results

Here we present the results of the estimation of the equation of the determinants of Spanish mutual funds performance as a whole and for certain category-based subgroups. The estimation was made using the generalised method of moments (GMM) applied to panel data, which allows us to obtain consistent and asymptotically efficient estimations.²² GMM first difference estimators for the model AR(1) using panel data were developed by Arellano and Bond (1991) and Holtz-Eakin, Newey and Rosen (1998). In this study we use a very useful transformation proposed by Arellano and Bover (1995) as an alternative to the first difference approach, which considers the variables expressed in orthogonal deviations:

$$y_{it}^O = \alpha y_{it-1}^O + v_{it}^O, \quad (2)$$

where the transformation takes into account the weighted average of future observations of the interest variable in accordance with the following expression:

$$y_{it}^O = \left(\frac{T-t+1}{T-t+2} \right)^{1/2} \left[y_{i,t-1} - \frac{1}{T-t+1} (y_{i,t} + y_{i,t+1} + \dots + y_{i,T}) \right] \quad (3)$$

It can be demonstrated that the optimal GMM estimator obtained from any transformation of the original equation in levels (not only this orthogonal deviations transformation), which satisfies two constraints: (i) that it eliminates η_i , and (ii) that it does not introduce shocks with lags greater than one period in the transformed error, is the same as is obtained from the traditional GMM estimation in first differences. In the case of incomplete panels like ours, it is more appropriate to use orthogonal deviations, which avoid the problems that appear in first differences when an observation is missing, and minimises any measuring errors affecting the variables.

In point 4.1 we establish a first comparison of the results of the estimation between the pure and balanced equity and fixed income categories and between those and global funds (see the classification criteria by focuses in point 3.1). In pure equity funds, we also differentiate between those investing in the Euro area and those investing in the rest of the world. In point 4.2, we will not take into account whether the funds are pure or balanced but rather their geographical focus: domestic versus international.

Before we move on to the results of the estimation it is important to make two clarifications. The first is that within each category we have only considered the

22 See Hansen (1982).

funds which had that category for at least five periods, and the information regarding the periods during which the focus was different has been omitted, in order to obtain the most representative estimations possible of each category. This criterion means that the sum of the number of funds considered in the analysis by focus is lower than the number of funds in the entire sample. Secondly, we need to remember that the properties of the estimator used are asymptotical, which means that the results of the categories with fewer funds need to be regarded with greater caution.

4.1 Results for the industry as a whole and comparison between pure and balanced funds

The results of the estimation of equation (1) using GMM in orthogonal deviations for investment funds as a whole and for the subgroups based on whether the investment focus is pure or balanced are presented in tables 4 and 5, respectively.

In particular, in table 4 we present two estimations of the equation for investment funds as a whole, which are differentiated only by the manner in which the variable concerning the market share of the fund management company is presented. The first contains the variable just as it is defined in point 3.1, while the second makes a distinction in terms of the type of group the fund management company belongs to (bank, savings bank, or independent entity).

Prior to this, both for the funds as a whole and for the different classifications of funds, the equation was estimated using both ordinary least squares (OLS) and the within-group method (WG). The usefulness of these estimation methods lies in the fact that the bias of these methods provides us with an upper limit (OLS) and a lower limit (WG) for the estimation of the autoregressive coefficient of the equation, which in our case we identify with the persistence of mutual funds performance.

Persistence. For mutual funds as a whole, the results of the OLS and the WG indicate that any consistent estimation of the parameter α should be between 0.026 and -0.075. As we can see in the first row of table 4, the coefficient of α resulting from the two GMM estimations are within the range set by OLS and WG. It should also be noted that, in both cases, it is not significantly different from zero; which is to say that there is no evidence of persistence in the performance of investment funds. Neither is there any evidence of persistence in the performance of funds in any of the fund categories considered (see table 5).

As we commented in chapter 2, the majority of studies of Spanish investment funds detect a certain persistence in performance in the short term, especially in the case of equity funds and extreme funds; i.e. the funds with the highest returns and those with the lowest yields. If persistence of performance tends to be concentrated in extreme equity funds and in relatively short periods of time, it would seem reasonable for the coefficient related to persistence of performance in our model for the universe of investment funds in the decade to be insignificant.

Estimation of the equation of the determinants of the mutual fund performance as a whole

TABLE 4

	GMM d.o. ¹	GMM d.o. ¹
Yield in t-1, Y_{t-1}	0.009 (0.941)	0.012 (0.929)
Volatility in t-1, VOL_{t-1}	-0.488 (0.404)	-0.350 (0.585)
Net subscriptions in t-1, SN_{t-1}	0.010 (0.945)	0.088 (0.479)
Management and custody fees t, CGD_t	-0.137 (0.822)	0.029 (0.963)
Subscription and redemption fees in t, CSR_t	2.112*** (0.004)	2.220*** (0.003)
Age of the fund in t, $EDAD_t$	-0.007 (0.910)	0.036 (0.520)
Assets of the fund in t, $PATF_t$	-0.019 (0.906)	-0.068 (0.418)
Market share of the fund management company in t, $CUOTAG_t$	-0.149** (0.023)	
Market share of the fund management company in t (BANCO)		-0.179** (0.015)
Market share of the fund management company in t (CAJA)		-0.099 (0.352)
Market share of the fund management company in t (INDEP)		3.214** (0.037)
Percentage of assets in the hands of institutional investors in t, $INSTIT_PATRIM_t$	-0.413** (0.029)	-0.362* (0.066)
$BANCO_t$	7.851*** (0.000)	7.371*** (0.001)
$CAJA_t$	4.013*** (0.001)	4.817*** (0.005)
$FUSIÓN_t$	-0.180 (0.894)	0.083 (0.957)
$CAMBIOVOC_t$	-0.429 (0.542)	-0.260 (0.698)
Hypothesis tests		
m1	-2.19 (0.028)	-2.04 (0.042)
m2	-1.88 (0.060)	-1.66 (0.097)
Sargan	35.33 (0.105)	35.76 (0.121)

1 GMM estimation in orthogonal deviations that are robust to heteroscedasticity and serial correlation. As instrumental variables we use lags up to t-2 of the variable yt (yield), snt (net subscriptions) and vt (volatility).

Estimated coefficients and p-value of the statistic t in parentheses.

* 10% significance level.

** 5% significance level.

*** 1% significance level.

m1 and m2 correspond to tests on the first- and second-order serial correlations, respectively, on first difference errors. The p-value is provided.

Sargan is a test which checks the validity of the instruments used. The p-value is provided. The null hypothesis tested is "the set of instruments used is valid", therefore a sufficiently high p-value (for example, over 0.05) would not reject the validity of the instruments.

Volatility. Neither does the model find any positive and statistically significant effect of past volatility on the present performance on the fund. However, the fact that in the course of the decade there have been several periods of turbulence of varying nature which have substantially impaired the performance of the riskier investment funds may be influencing the relationship observed between the two variables. For the funds as a whole, the relationship might possibly be more obvious if we looked at a sufficiently long period of time. By category, this positive relationship is detected in fixed income funds, in line with the findings of Lassala (1998), and in international equity funds.

Net relative subscriptions. With regard to the relationship between previous net subscriptions and later performance, the rejection of the positive effect does not lend support to the smart money theory, whereby money flows towards the best funds, contrary to the findings of the early studies of Gruber (1996) and Zheng (1999) for the US market. Rather this result is in line with previous studies on the domestic fund market. As pointed out in chapter 2, some authors link the results of the domestic market to the specific features of that market. Specifically they refer to the tax treatment of the capital gains of the funds (something which changed in 2003 but does not appear to have had a significant effect in this respect), the high redemption fees, and the high level of concentration of the fund marketing channel, factors which may limit the mobility of participants between funds. By category, we can only see a significant and positive relationship between net subscriptions and the performance of the funds in the balanced fixed income category (more interesting results are obtained if we compare funds with a domestic focus with those which have an international focus).

Fees. The estimation results relating to the fees charged by investment funds, whether implicitly (management and custody fees) or explicitly (subscription and redemption fees) are particularly important. In principle, a fund which charges its participants higher fees should reward this extra cost with a yield higher than other funds. At this point it should be made clear that the yield taken as reference for the analysis is a net figure; i.e. the management and custody fees of the fund, which are accrued on a daily basis have been discounted, but not so the subscription and redemption fees, which only have to be paid on entering or leaving the funds. Whether to use gross or net yields in this type of analysis has been the subject of extensive debate in academic literature, which has not as yet reached a clear consensus. In this study we have chosen to include net yields which ultimately are the performance that the participants (actual or potential) see from investment funds.

We would expect the sign of the coefficients associated with the CGD and CSR variables to be affected by the use of net yields in the calculation. Given that the net return excludes management and custody fees but not subscription and redemption fees we might *a priori* expect a neutral or positive relationship between the yield on the fund and management and custody fees, and a positive relationship with subscription and redemption fees. In the case of management and custody fees, the relationship would be nil if the extra gross yield achieved by the fund manager were to be relatively similar to the extra fees charged compared with another fund (and therefore would be nullified in net terms). However, if the extra gross yield were to be relatively higher than the extra fee charged, the relationship should be a positive one.

**Estimation of the equation of the determinants mutual fund performance:
pure vs. balanced-categories**

TABLE 5

	TOTAL IF	RF	RFM	RVM	RVE	RVI	GL
Yield in t-1, Y_{t-1}	0.009 (0.941)	-0.209 (0.372)	-0.144 (0.529)	-0.062 (0.788)	-0.006 (0.980)	0.029 (0.732)	-0.234 (0.101)
Volatility in t-1, VOL_{t-1}	-0.488 (0.404)	2.079** (0.042)	3.153** (0.010)	1.622 (0.163)	2.199 (0.141)	1.729*** (0.000)	-0.125 (0.766)
Net subscriptions in t-1, SN_{t-1}	0.010 (0.945)	0.047 (0.479)	0.205** (0.043)	-0.027 (0.856)	0.043 (0.772)	0.065 (0.387)	-0.034 (0.688)
Management and custody fees t, CGD_t	-0.137 (0.822)	0.067 (0.557)	0.251 (0.168)	0.729* (0.081)	-1.168** (0.040)	0.379 (0.202)	-0.660* (0.099)
Subscription and redemption fees in t, CSR_t	2.112*** (0.004)	0.004 (0.953)	-0.027 (0.641)	0.894* (0.087)	-0.029 (0.576)	0.265* (0.059)	-0.080 (0.631)
Age of the fund in t, $EDAD_t$	-0.007 (0.910)	-0.094** (0.028)	0.312 (0.229)	-1.062* (0.051)	-0.023 (0.476)	0.276 (0.174)	0.209 (0.275)
Assets of the fund in t, $PATF_t$	-0.019 (0.906)	-0.010 (0.789)	-0.122* (0.062)	-0.070 (0.485)	0.058 (0.660)	-0.160*** (0.003)	-0.128* (0.069)
Market share of the fund management company in t, $CUOTAG_t$	-0.149** (0.023)	0.001 (0.897)	0.008 (0.618)	0.012 (0.741)	-0.024** (0.045)	-0.014** (0.018)	-0.004 (0.823)
Percentage of assets in the hands of institutional investors in t, $INSTIT_PATRIM_t$	-0.413** (0.029)	-0.817* (0.099)	0.012 (0.962)	-2.403 (0.139)	-2.139* (0.052)	0.169 (0.172)	-0.111 (0.625)
BANCO _t	7.851*** (0.000)	4.218* (0.067)	0.158 (0.729)	1.872 (0.189)	2.860** (0.015)	1.632*** (0.009)	-0.341 (0.406)
CAJA _t	4.013*** (0.001)	1.992** (0.038)	-0.226 (0.565)	-0.592 (0.616)	1.414** (0.021)	0.784** (0.039)	0.122 (0.289)
FUSIÓN _t	-0.180 (0.894)	-0.493 (0.220)	0.249 (0.390)	0.091 (0.842)	0.085 (0.806)	1.476*** (0.001)	0.683* (0.097)
CAMBIOVOC _t	-0.429 (0.542)						
Hypothesis tests							
m1	-2.19 (0.028)	-2.08 (0.037)	-2.40 (0.016)	-2.04 (0.041)	-2.39 (0.017)	-4.70 (0.000)	-2.82 (0.005)
m2	-1.88 (0.060)	-0.71 (0.480)	0.22 (0.824)	-0.65 (0.517)	-1.38 (0.169)	-0.84 (0.400)	-1.87 (0.062)
Sargan	35.33 (0.105)	48.95 (0.073)	39.31 (0.175)	26.59 (0.227)	19.19 (0.158)	23.50 (0.172)	56.73 (0.078)
For comparison purposes:							
Number of funds	1,782	585	207	215	202	309	218
Number of observations	15,076	4,838	1,744	1,813	1,693	2,484	1,489

GMM estimation in orthogonal deviations that are robust to heteroscedasticity and serial correlation. As instrumental variables we use lags up to t-2 of the variable yt (yield), snt (net subscriptions), vt (volatility) and patf (assets).

Estimated coefficients and p-value of the statistic t in parentheses.

* 10% significance level.

** 5% significance level.

*** 1% significance level.

m1 and m2 correspond to tests on the first- and second-order serial correlations, respectively, on first difference errors. The p-value is provided.

Sargan is a test which checks the validity of the instruments used. The p-value is provided. The null hypothesis tested is "the set of instruments used is valid", therefore a sufficiently high p-value (for example, over 0.05) would not reject the validity of the instruments.

As can be seen in table 4, the relationship between the yield on the funds and the management and custody fees is not significantly different from zero for investment funds as a whole. That is to say, in general terms it would seem that the funds which charge higher fees of this type are capable of obtaining higher gross yields but of a relatively similar magnitude to that of the increase in the fee. In other words, the increase in management and custody fees cancels out the increase in the gross annual yield obtained by the fund.

Looking at the results by category, it is interesting to see the heterogeneity of the results obtained. Of the six categories examined, the coefficient is significant in three of them but with different signs. For balanced equity category the sign is positive, while for euro equity funds and global funds the sign of the coefficient is negative. These results suggest that, for somewhat more conservative funds, an increase in management and custody fees is offset in the form of a better yield in gross and net terms. Conversely, for the riskier funds the increase in management and custody fees totally cancels out any possible extra yield obtained by the funds.

As we mentioned previously, the expected positive relationship between the yield of the funds and the fees applied have not found support in the most important empirical studies. In fact, some recent studies, such as Gil-Bazo and Ruiz Verdú (2009) on the US equity income fund market, or Marco (2007) on Spanish funds in general, find a negative relationship between the yield provided by the funds and the fees they charge.

In order to explain the negative relationship they find between the fees and the yields of US investment equity income funds, Gil-Bazo and Ruiz Verdú (2009) suggest that the funds with the worst historical or expected performance raise their fees optimally and target investors who are relatively insensitive to performance, since they do not expect to be able to compete with the best funds in the market targeting more sophisticated investors. In this respect, it cannot be ruled out that this mechanism may also be operating in the Spanish fund market, in which there is a high degree of concentration and in which the entities may be capable of distinguishing the sensitivity of investors to performance and, consequently, segment and optimally target their offer of funds.

Another possible explanation of this negative relationship which is found between the fees charged by funds and the yields of the funds, one which is not wholly independent of the previous explanation and which may also be applicable to the Spanish funds industry, is related to the fixed marketing cost of the funds. The costs associated with the marketing of funds to participants who are going to make relatively small contributions are proportionally high for the management company of these funds. Consequently, these fund managers may have an incentive to increase the management and/or custody fee of the funds acquired by these participants in order to recoup, at least in part, the higher marketing cost.

Conversely, the coefficient estimated for subscription and redemption fees is positive and significantly different from zero; in other words, the management companies which set the highest fees for entering or leaving their funds do tend to compensate their participants with a higher net yield. Breaking down the results by category, we find evidence of this in two categories of equity (balanced equity and

international equity), which is logical, since these types of fees are predominant in these categories of funds and practically non-existent in fixed income funds.

Age of the fund. The estimations do not detect any significant relationship between the variable related to the age of the fund and the yield of that fund. That is to say, the more recent funds, which might be benefiting from more sophisticated management models, do not provide better yields. This result is consistent with other studies of the Spanish fund market, such as those of Lassala (1998) and Marco (2007), and of international funds, in which even a negative relationship has been detected between the age of a fund and its performance in the case of equity funds of some European countries. In this work we also detect this negative relationship between the age of the fund and its performance in the case of pure fixed income funds and balanced equity funds.

Size of the fund. The hypothesis whereby economies of scale might be exploited do not find support in the model's estimations. Thus, the relationship between the size of the fund and its performance is not statistically different from zero. At this point it is worth noting that the average size of Spanish funds is very small in comparison with European funds and even smaller compared with US funds.²³ The Spanish funds may not be large enough for economies of scale to have any positive effect on their performance. The substantial increase in the number of mergers between funds in the last two years may lead to a more appropriate offer of funds in the future.

Droms and Walker (1995) suggest that the negative relationship between size and performance that they found is explained by the fact that larger funds tend to have a more diversified portfolio and, therefore, a lower risk and also a lower performance. This hypothesis is partially compatible with some of the findings we obtain in this work in the estimations by category, in which we find this positive relationship between volatility and yield of funds and a negative relationship between size and yield. Specifically, this occurs in the balanced fixed income and international equity categories.

A final explanation for this negative relationship between size and performance of funds may be linked to the characteristics of the firms which manage the larger funds. As we will see in the following paragraph, the estimated relationship between the size of the fund management company and the yield of the fund is negative. If we bear in mind that, generally speaking, the larger funds are marketed by fund management companies with a larger relative market share which tend to obtain lower yields, then it would be reasonable to expect the negative sign obtained for the relationship between size and the yield of the funds.

Size of the fund management company. The model's estimation identifies a negative relationship between the net yield of a fund and the size of its fund management company (measured in terms of the fund management company's market share). The results of the second estimation for investment funds as a whole, in which we look at market share by type of financial group of the fund management company, are interesting: the relationship between the yield obtained by the fund and the size

23 In mid-2007 the average size of European funds was 190 million euro while the average size of US funds was over one billion euro. Spanish funds averaged less than 100 million euro per fund.

of the fund management company is statistically negative when the fund management company belongs to a bank, not significant when it belongs to a savings banks, and positive in the case of independent entities.²⁴

The results of both estimations suggest that large entities, mainly belonging to banks, are able to exercise considerable market power. This negative relationship between yield and the fund company's market share can be found in the pure equity categories; i.e. domestic equity and euro and international equity, and also in domestic fixed income when we only make a distinction between domestic or international focus, as we do in the next chapter. The results obtained in this respect are in line with those obtained by Fernández, Aguirreamalloa and Avendaño (2010).

*Participation of institutional investors.*²⁵ We find a negative relationship between the net yield of funds and the percentage of their assets which are in the hands of institutional investors; i.e. those funds with a greater presence of institutional investors which, in theory, are somewhat more sophisticated, tend to show lower yields. This relationship is detected for pure fixed income funds and euro equity (see table 5). At least as far as fixed income focuses are concerned, we might expect this negative relationship to be explained in part by the fact that a substantial part of non-financial company's cash surpluses are invested in short-term fixed income funds, about which they may not have carried out a reasonable evaluation of the yield they provide.

More broadly, this negative relationship between institutional investment and the yield of the funds may also be due to the fact that there is a certain percentage of institutional investors whose investment in certain funds is not solely driven by considerations of the expected return/risk but pursues additional objectives. The commitment of some institutional investors to investing in certain collective investment schemes, for example in socially responsible investment funds, or the institutional investor's link with the financial institution managing or marketing the fund are a couple of examples of factors other than the twin considerations of expected yield and risk which may influence the investment decision of institutional investors. In this respect, we should also note the existence of significant investments of investment funds in other investment funds of the same management company.

Type of financial group. The estimated coefficients capturing possible effects linked to the financial group of the fund management company show that, all else being equal, fund management companies belonging to banks and savings banks obtain higher yields than those belonging to other groups (independent groups). If we break the results down by category we see that banks and savings banks obtain higher yields than the independent groups in the pure fixed income and pure equity categories. This result coincides with the findings of Lassala (1998) and partially with those of Marco (2007). The latter finds better results for the independent groups in funds as a whole; however, in his analysis by focus, in general terms he

24 We should remember that fund management companies of independent entities are, on average, much smaller than those belonging to banks and savings banks.

25 We should remember that companies are not institutional investors but are included in this group for analytical purposes.

finds that in the higher risk categories, banks and savings banks tend to obtain higher yields.

Changes of category and mergers. In terms of the strategic decisions taken by fund managers, such as the change of category of the fund or its merger with another fund, generally speaking such decisions do not appear to have a significant effect on the yield of the fund. By category, the estimations indicate that funds which have undergone one or more merger processes in the course of the period under study end up having higher yields in the international equity and global funds categories.

4.2 Results based on the geographic focus of the fund

We remind that in this classification we take into account the geographic focus of the fund rather than whether it is pure or balanced. That is to say we consider domestic and international fixed income funds and domestic and international equity funds,²⁶ as well as global funds which we consider separately due to their special characteristics.

The most interesting results obtained (see table 6) are as follows:

Persistence. In this case and once again, no coefficients significantly different from zero were obtained for any of the focuses considered. In other words, no persistence was found in the performance of the funds if we break them down by geographic focus.

26 We include euro equity as they present relatively similar risks.

**Estimation of the equation of the determinants of the mutual fund performance:
by geographic focus of the fund**

TABLE 6

	TOTAL IF	RF	RF Int	RV	RV Int	GL
Yield in t-1, Y_{t-1}	0.009 (0.941)	-0.230 (0.317)	-0.023 (0.840)	0.021 (0.918)	0.001 (0.993)	-0.234 (0.101)
Volatility in t-1, VOL_{t-1}	-0.488 (0.404)	1.357* (0.094)	0.940* (0.091)	0.246 (0.738)	1.306* (0.052)	-0.125 (0.766)
Net subscriptions in t-1, SN_{t-1}	0.010 (0.945)	0.109 (0.219)	0.150* (0.072)	-0.288* (0.073)	0.260** (0.049)	-0.034 (0.688)
Management and custody fees in t, CGD_t	-0.137 (0.822)	0.078 (0.574)	0.035 (0.504)	-1.599* (0.077)	0.184 (0.710)	-0.660* (0.099)
Subscription and redemption fees in t, CSR_t	2.112*** (0.004)	-0.242 (0.116)	-0.158 (0.157)	-0.057 (0.359)	0.476* (0.052)	-0.080 (0.631)
Age of the fund in t, $EDAD_t$	-0.007 (0.910)	-0.075 (0.111)	-0.299** (0.026)	-0.472* (0.067)	0.338 (0.259)	0.209 (0.275)
Assets of the fund in t, $PATF_t$	-0.019 (0.906)	-0.171* (0.057)	0.110*** (0.009)	0.237 (0.166)	0.004 (0.967)	-0.128* (0.069)
Market share of the fund management company in t, $CUOTAG_t$	-0.149** (0.023)	-0.031*** (0.003)	0.012* (0.058)	-0.025** (0.027)	-0.079** (0.012)	-0.004 (0.823)
Percentage of assets in the hands of institutional investors in t, $INSTIT_PATRIM_t$	-0.413** (0.029)	-2.669** (0.013)	-0.150 (0.119)	-3.494*** (0.006)	0.156 (0.385)	-0.111 (0.625)
BANCO _t	7.851*** (0.000)	3.763** (0.021)	-0.099 (0.342)	3.291*** (0.006)	2.089* (0.060)	-0.341 (0.406)
CAJA _t	4.013*** (0.001)	1.469** (0.040)	-0.946 (0.261)	1.419*** (0.009)	1.807** (0.025)	0.122 (0.289)
FUSIÓN _t	-0.180 (0.894)	-0.609 (0.228)	0.012 (0.929)	-0.749 (0.192)	1.798** (0.033)	0.683* (0.097)
CAMBIOVOC _t	-0.429 (0.542)					
Hypothesis tests						
m1	-2.19 (0.028)	-2.72 (0.007)	-3.13 (0.002)	-2.32 (0.020)	-2.68 (0.007)	-2.82 (0.005)
m2	-1.88 (0.060)	-0.73 (0.463)	-1.27 (0.203)	-1.95 (0.052)	-0.78 (0.436)	-1.87 (0.062)
Sargan	35.33 (0.105)	42.60 (0.063)	46.46 (0.137)	16.77 (0.158)	23.44 (0.435)	56.73 (0.078)
For comparison purposes:						
Number of funds	1,782	674	116	351	374	218
Number of observations	15,076	5,609	903	2,968	2,979	1,489

GMM estimation in orthogonal deviations that are robust to heteroscedasticity and serial correlation. As instrumental variables we use lags up to t-2 of the variable yt (yield), snt (net subscriptions), vt (volatility) and patf (assets).

Estimated coefficients and p-value of the statistic t in parentheses.

* 10% significance level.

** 5% significance level.

*** 1% significance level.

m1 and m2 correspond to tests on the first- and second-order serial correlations, respectively, on first difference errors. The p-value is provided.

Sargan is a test which checks the validity of the instruments used. The p-value is provided. The null hypothesis tested is "the set of instruments used is valid", therefore a sufficiently high p-value (for example, over 0.05) would not reject the validity of the instruments.

Net subscriptions. We obtain a positive and significant coefficient between net subscriptions and the yield of funds in categories of an international nature, both fixed income and equity. Thus, in these focuses the investors show skill in the selection of funds, since those which tend to receive relatively higher inflows are the ones which later perform better. However, we obtain a negative and significant coefficient between net subscriptions and the yield of funds in the domestic equity category.

Management and custody fees. The coefficient associated with this variable, which for the funds as a whole was not significantly different from zero, maintains the trend shown in the previous point where we analyse the different focuses. Thus, we find a negative relationship between these fees and the performance in the case of domestic equity and global funds. Once again, for the riskier funds, those that charge higher fees of this type do not compensate the participants with higher net yields (except in the case of international equity funds). For the rest of the categories, the coefficient is not significantly different from zero.

Subscription and redemption fees. We detect a positive relationship between explicit fees and the performance of international equity funds. This result is similar to that of the estimations in the previous point, although it should be made clear that the category of international equity funds is more comprehensive than in the first classification, since it includes both pure and balanced international equity funds.

Size of the fund management company. The negative relationship between the market share of the fund management company and the yield of the funds which we found for the funds as a whole is maintained in the two equity categories, while for fixed income the results are mixed. Thus, for domestic fixed income funds this relationship continues to be negative, while for international fixed income funds the relationship is significantly positive; i.e. in this category of funds, the larger the fund management company the higher the net yields. This latter relationship can be explained by the fact that in this category the presence of fund management companies belonging to banks, where the negative relationship between the market share of the fund company and the yield is much stronger, is quite small, while the proportion of fund management companies belonging to savings banks or independent groups (where the relationship between market share and yield is positive) is greater.

Participation of institutional investors in the fund. As has been mentioned previously, the model detects a negative relationship between the percentage of assets in the hands of institutional investors and the yield of the fund in the domestic fixed income and equity categories. In the international categories this relationship is not statistically significant.

Type of financial group. We find that banks and savings banks obtain better performance than independent groups do in the equity categories and in domestic fixed income funds.

Mergers. Finally, the estimations indicate that the funds which have undergone one or more merger processes during the period under study end up having better performance in the categories of international equity and global funds.

5 Conclusions

In this working document we conduct a study of the influence of various factors on the performance of Spanish mutual funds during the period 2000-2009. The results obtained, based on the estimation of a panel data model, indicate that, for funds as a whole, current yields are not related to past yields. We also found that funds with higher management and custody fees do not always tend to compensate their participants with higher net yields.

The existence of funds which charge higher fees given a certain level of performance suggests the presence of certain factors which may be limiting the mobility of investors when it comes to reassigning their savings among different funds, which gives the fund management companies a certain degree of market power, especially the larger ones.²⁷ In fact, the funds offered by these fund management companies tend to show relatively lower yields. In this respect, it may be that, as has been suggested in previous literature, the fund management companies offer products with a more modest expected yield to the investors who are less sensitive to performance, adjusting their fees strategically. Finally, the evidence presented in this article indicates that the age or size of the fund does not seem to have any significant influence on its performance, while the funds of management companies belonging to banks and savings banks obtain higher net yields, particularly in the case of equity funds.

27 We should remember that the two largest fund management companies account for 40% of the total assets of investment funds and the ten largest companies account for 70% (of a total of over 120 fund management companies).

Bibliographic references

- Ackermann, C., McNally, R and Ravenscraft, D. (1999). "The performance of hedge funds: risk, return and incentive". *Journal of Finance* 54, pp 833-874.
- Agarwal, V. and Naik, N. (2000). "Multi-period performance persistence analysis of hedge funds", *Journal of Financial and Quantitative Analysis*, 35, pp 327-42.
- Allen, D.E., and Tan, M.L. (1999). "A Test of the Persistence in the Performance of UK Managed Funds". *Journal of Business Finance and Accounting*, 25, pp 559-593.
- Álvarez, J. (1995). "Análisis de los fondos de inversión de renta fija en España". *Investigaciones Económicas*, vol. XIX (3), September, pp 475-488.
- Arellano, M. and Bond, S. R. (1991). "Some test of specification for panel data: Monte Carlo evidence and an application to employment equations". *Review of Economic Studies*, 58, pp 277-297.
- Arellano, M. and Bover, O. (1995). "Another look at the instrumental-variable estimation of error-component models". *Journal of Econometrics*, 68, pp 29-52.
- Basarrate, B. and Rubio, G. (1999). "Nonsimultaneous prices and the evaluation of management portfolios in Spain". *Applied Financial Economics*, 9, pp 273-281.
- Blake, D. and Timmermann, A. (1998). "Mutual Fund Performance: Evidence from the UK". *European Finance Review*, 2, pp 57-77.
- Blake, D., Lunde, A., and Timmermann, A. (1998). "The hazards of mutual fund underperformance: A Cox regression analysis". *Journal of Empirical Finance*, Elsevier, vol. 6(2), April, pp 121-152.
- Brown, S. and Goetzman, W. (1995). "Performance persistence". *Journal of Finance* 50, pp 679-698.
- Capon, N., Fitzsimons, G. and Prince, R.A. (1996). "An individual level analysis of the mutual fund investment decision". *Journal of Financial Services Research* 10, pp 59-82.
- Carhart, M. (1997). "On persistence in mutual fund performance". *Journal of Finance* 52, pp 57-82.
- Carhart, M., Carpenter, J., Lynch, A. and Musto, D. (2000). "Mutual fund survivorship". <http://ssrn.com/abstract=238713> or DOI: 10.2139/ssrn.238713.

- Carhart, M., Carpenter, J., Lynch, A. and Musto, D. (2002). "Mutual Fund Survivorship". *The Review of Financial Studies*, Winter 2002, Vol. 15, No 5, pp 1439-1463.
- Ciriaco, A., Del Río, C. and Santamaría, R. (2002). "El inversor ante la elección de fondos de inversión. Algunos datos para la reflexión". *Papeles de Economía Española*, no. 94, pp 122-133.
- Ciriaco, A., and Santamaría, R. (2005). "Persistencia de resultados en los fondos de inversión españoles". *Investigaciones Económicas*, vol. XXIX (3), pp 525-573.
- Detzler, M. L. (1999). "The performance of global bond mutual funds". *Journal of Banking and Finance*, 23, pp 1195-1217.
- Droms, W.G. and Walker, D.A. (1995). "Determinants of variation in mutual fund returns". *Applied Financial Economics*, 5, pp 383-389.
- Droms, W.G. and Walker, D.A. (2001). "Persistence of mutual fund operating characteristics: returns, turnovers rates and expense ratios". *Applied Financial Economics*, 11 (4), pp 457-466.
- Edelen, R.M. (1999). "Investor flows and the assessed performance of open-end mutual funds". *Journal of Financial Economics*, 53, pp 439-466.
- Fernández, P., Aguirreamalloa, J. and Avendaño, L. (2010). "Ranking of the Mutual Fund Industry in Spain: 1991-2010." IESE. <http://ssrn.com/abstract=1746849>
- Fernández, P., Carabias, J.M. and de Miguel, L. (2007). *Rentabilidad de los fondos de inversión de renta variable nacional en España 1991-2006*. IESE. <http://ssrn.com/abstract=982821>
- Ferrando, M. and Lassala, C. (1998). "Evaluación de la gestión de los FIAMM y de los FIM de renta fija en España en el periodo 1993-1995". *Revista Española de Financiación y Contabilidad*, 94, pp 197-231.
- Ferruz et al. (2007). "Análisis de la persistencia en rentabilidad de los FIAMM y de los determinantes de sus comisiones". *Revista española de financiación y contabilidad*, Vol. XXXVI, no 136, October-December 2007, pp 689-706.
- Ferruz, L., Sarto, J. L. and Vargas, M. (2003). "Analysis of performance persistence in Spanish Short Term Fixed Interest Investment Funds (1994-2002)". *European Review of Economics and Finance*, 2(3), pp 1-75.
- Flannery, M.J. and Rangan K. P. (2006). "Partial adjustment toward target capital structures". *Journal of Financial Economics* 79, pp 469-506.
- Freixas, X., Marín, J., Martínez, M. and Rubio, G. (1997). "La evaluación de los fondos de inversión en España". Editorial Civitas, Colección Economía.
- Gil-Bazo, J. and Ruiz Verdú, P. (2009). "The Relation between Price and Performance in the Mutual Fund Industry". *Journal of Finance*, 64 (5), pp 2153-2183.

- Goetzman, W. and Peles, N. (1997). "Cognitive dissonance and mutual fund investors". *The Journal of Portfolio Research*, Vol. 20, No. 2, pp 145-158.
- Grinblatt, M. and Titman, S. (1989). "Mutual fund performance: An analysis of quarterly portfolio holdings". *Journal of Business*, 62, pp 393-416.
- Grinblatt, M. and Titman, S. (1993). "Performance measurement without benchmarks: An examination of mutual fund returns". *Journal of Business*, 66, pp 47-68.
- Gruber, M.J. (1996). "Another puzzle, the growth in actively managed mutual funds". *Journal of Finance*, 51, (3), pp 783-810.
- Hallahan, T. A. and Faff, R. W. (2001). "Induced persistence of reversals in fund performance? the effect of survivorship bias". *Applied Financial Economics*, 11, pp 119-26.
- Hansen, L.P. (1982). "Large sample properties of Generalised Method of Moments Estimators", *Econometrica*, 50, pp 1029-1054.
- Hendricks, D., Patel, J. and Zeckhauser, R. (1993). "Hot hands in mutual funds: Short run persistence of performance, 1974-88". *Journal of Finance* 48, pp 93-130.
- Holtz-Eakin, D., W. Newey and H. S. Rosen (1998). "Estimating Vector Autoregressions with Panel Data". *Econometrica* 56, pp 1371-1396.
- Ippolito, R. (1989). "Efficiency with costly information: A study of mutual fund performance, 1965-1984". *Quarterly Journal of Economics* 104, pp 1-24.
- Jensen, M. (1968). "The performance of mutual funds in the period 1945-1964". *Journal of Finance*, Vol. 23, No 2, pp 389-416.
- Lassala, C. (1998). "Factores explicativos de las diferencias de rentabilidad financiera en los FIM de renta fija". *Revista Española de Financiación y Contabilidad*, vol. XXVI, no 97, pp 1005-1031.
- Malkiel, B. (1995). "Returns from investing in equity mutual funds 1971-1991". *Journal of Finance* 50, pp 549-572.
- Marco, R. (2007). "Rentabilidad y crecimiento patrimonial en el mercado de fondos de inversión". *Revista de Economía Aplicada*, no 44 (vol. XV), pp 41-84.
- Martínez, M.A. (2001). "El puzzle de los fondos de inversión en España: un enfoque de demanda". *Moneda y Crédito*, 213, pp 129-154.
- Matallín, J.C. and Fernández M.A. (1999). "Análisis de la performance a través del estilo del fondo de inversión". *Revista Española de Financiación y Contabilidad*, 28 (99), pp 413-442.
- Matallín, J.C. and Fernández, M.A. (2001). "La evaluación de los FIM de renta variable: un enfoque endógeno y multiperiodo". *Revista Española de Financiación y Contabilidad*, 30 (107), pp 67-102.

- Menéndez, S. and Álvarez, S. (2000). "La rentabilidad y la persistencia de los resultados de los fondos de inversión de renta variable". *Revista Española de Financiación y Contabilidad* 103, pp 15-36.
- Palacios, J. (2010). *A vueltas con los fondos de inversión españoles: nuevas sorpresas en la década 2000-2009*. Documento de investigación DI-849. IESE.
- Patel, J., Zeckhauser, R. and Hendricks, D. (1991). "The rationality struggle: illustrations from financial markets". *American Economic Review*, no 81, May, pp 232-236.
- Patel, J., Zeckhauser, R. and Hendricks, D. (1991). "Non-rational Actors and Financial Market Behavior". *Theory and Decision*, volume 31, pp 257-287.
- Roll, R. (1978). "Ambiguity when performance is measured by the securities market line". *Journal of Finance* 33 (September), pp 1051-69.
- Ruiz, M. (2007). *Los fondos de inversión: performance y persistencia*. CNMV Monograph no. 26.
- Sharpe, W. (1966). "Mutual fund performance". *Journal of Business* 39, pp 119-138.
- Sirri, R. and Trufano, P. (1993). *Buying and selling mutual funds: Flows, performance, fees and services*. Working Paper, Harvard Business School.
- Sirri, R. and Trufano, P. (1998). "Costly search and mutual flows". *Journal of Finance* 53, pp 1589-1622.
- Toledo, I. and Marco, R. (2006). "¿Persisten las rentabilidades en el mercado de fondos de inversión español? Un análisis empírico para el periodo 1994-2001". *Estadística Española*, vol. 48, no. 161, pp 5-38.
- Yale, C. and Forsythe A.B. (1976). "Winsorized regression". *Technometrics*, 18, pp 291-300.
- Zheng, L. (1999). "Is money smart? A study of mutual fund investors' fund selection ability". *Journal of Finance*, 54 (3), pp 901-933.

Annex

Statistics concerning the variables of the sample

ANNEX 1

Mean (standard deviation)	Total ⁵	RF	RFM	RVM	RVE	RVI	GL
Yield	0.013 (0.140)	0.027 (0.092)	0.023 (0.106)	0.006 (0.130)	0.011 (0.186)	-0.010 (0.194)	0.021 (0.145)
Volatility	0.068 (0.077)	0.027 (0.048)	0.049 (0.046)	0.073 (0.058)	0.115 (0.088)	0.122 (0.092)	0.069 (0.071)
Net subscriptions	-0.161 (0.645)	-0.164 (0.632)	-0.169 (0.547)	-0.160 (0.438)	-0.147 (0.635)	-0.149 (0.728)	-0.192 (0.801)
% management and custody fees	1.450 (0.629)	1.075 (0.496)	1.472 (0.595)	1.683 (0.598)	1.833 (0.577)	1.865 (0.567)	1.261 (0.565)
% subscription and redemption fees	0.272 (0.546)	0.129 (0.392)	0.284 (0.498)	0.333 (0.595)	0.353 (0.600)	0.505 (0.667)	0.187 (0.484)
Age ¹	1.913 (0.675)	2.000 (0.716)	2.030 (0.632)	2.018 (0.608)	1.972 (0.639)	1.693 (0.612)	1.802 (0.654)
Assets of the fund ¹	10.100 (1.519)	10.787 (1.598)	9.980 (1.359)	9.811 (1.264)	10.144 (1.323)	9.606 (1.278)	9.626 (1.478)
% market share of the fund management company	6.755 (14.775)	7.329 (14.983)	5.619 (13.734)	3.376 (9.247)	6.460 (14.211)	8.576 (16.634)	8.046 (16.956)
Institutional assets	0.320 (0.298)	0.298 (0.287)	0.275 (0.308)	0.279 (0.293)	0.345 (0.288)	0.377 (0.289)	0.335 (0.312)
Bank ²	0.412	0.395	0.396	0.395	0.405	0.412	0.430
Savings bank ²	0.355	0.414	0.332	0.362	0.351	0.388	0.125
Merger ³	0.267	0.274	0.290	0.219	0.248	0.291	0.206
Changes of category ⁴	0.194	-	-	-	-	-	-

Source: CNMV.

1 In logarithms.

2 Percentage of observations of the sample where this dummy has the value 1.

3 Proportion of funds of the sample which have been merged once or more times.

4 Proportion of funds of the sample which have undergone one or more changes of category (within the sets of categories considered).

5 The average of the variables of the different categories is not consistent with the average value of the total since the sum of the category-based subsamples is not the same as the sum total. This is due to the requirement that all the funds of each classification may have only belonged to that category in the period under study; i.e. no changes of category are allowed and, besides, a minimum number of observations are required.

