DOES PERFORMANCE EXPLAIN MUTUAL FUND FLOWS IN SMALL MARKETS?

THE CASE OF PORTUGAL

Carlos Alves
CEMPRE•, Faculty of Economics, University of Porto
calves@fep.up.pt
Rua Dr. Roberto Frias,
4200-464 Porto, Portugal
Telephone: + 351 225 571 100
Fax: + 351 225 505 050

Victor Mendes
CMVM - Portuguese Securities Commission
victormendes@cmvm.pt
Avenida da Liberdade, nº 252
1056-801 Lisboa
Portugal
Telephone: +351 213177000
Fax: +351 213537077/8

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ABSTRACT

In this paper we study the performance reaction of investors in a small market context. Instead of the asymmetrical investors' reaction to winners and losers, as usually documented for the US, an absence of reaction was observed. A high persistence of fund flows was also noted. Our results are consistent with the idea that the larger financial groups have the capacity "to drive" their customers to funds with larger fees. This practice emerges as a non-transparent means of increasing prices.

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INTRODUCTION

The study of the performance reaction of mutual fund investors has been a matter of investigation for developed markets, particularly the US. Nevertheless, there are reasons to suspect that in small markets the reaction of mutual fund investors can be quite different from that of investors in more developed and complex markets.

Some of the attempts to explain the phenomenon of asymmetrical performance reaction are as much applicable to large and complex markets as to smaller and emerging markets. This is the case of the explanation based on investors' cognitive dissonance and the theory relative to the expected about-turn of investment policy. It is also the case of the explanation based on load costs (particularly the costs of transferring investments from the worst performing funds to winning funds).

However, the applicability of the industry's complexity theory and the concomitant difficulty to compute and compare performances (and the inherent costs of acquiring information) to small economies, with financial systems characterized by a reduced number of intermediaries and mutual funds, is not straightforward. In a market with fewer (and easy to compare) mutual funds, the task of retail investors distinguishing between good and bad performances can be less complex and less costly. This leads one to suspect that, in small markets, mutual funds flows react symmetrically to the mutual fund performances.

On the other hand, small markets are less developed and competitive, and the information dissemination process is likely less efficient. This leads to higher costs of acquiring information about the stock market, as well as the ongoing cost of monitoring a portfolio

of risky assets, and may bring about a sub-optimal performance reaction. Moreover, when the small market is also characterized by a universal banking system, where in the same conglomerate we can find retail banking and fiduciary management (including the mutual fund management), the hypothesis of absence of reaction makes sense. In this case, differing from the US, there are not many independent brokers between retail investors and mutual fund managers. The bank who sells the mutual fund is generally a member of a financial conglomerate. Therefore, when a bank customer asks for advice regarding mutual fund investment, the advice he/she gets may be biased due to conflicts of interest. As a result, absence of mutual fund performance reaction is expected.

It is important to investigate whether the asymmetry documented for large and complex markets also exists in emerging markets, and smaller and less complex, but also less developed, markets. However, no study on the performance reaction of investors in funds in emerging and/or smaller markets is known to exist.

This study aims to start filling this gap. The performance reaction of mutual fund investors is analysed in the context of the Portuguese mutual fund industry. There are two reasons why the Portuguese market is studied. Firstly, the Portuguese securities market is small in size: in the segment of equity funds predominantly investing in Portuguese shares, only 30 funds have existed between 1st January 1994 and 31st December 2005. Moreover, we have a universal banking system in Portugal, in which the financial conglomerate has businesses in other areas besides the fiduciary activities. Mutual funds are usually commercialized by the retail bank of the group, and the mutual funds are managed by the group's mutual fund management company.

Secondly, the information available to the public is unlike that of any other market. In fact, not only is the value of the portfolios managed by the funds and their composition published on a monthly basis, but also the value of each investment unit is published daily.[1,1] Therefore, in Portugal it is possible to monitor the monthly development of fund flows as well as the daily value of investments and respective returns, with negligible search costs. Thus, if Portuguese mutual fund investors do not react to performance, or if there is an asymmetrical reaction, the absence of reaction could not be attributed to the complexity of the market, nor the dissemination of information, but rather to the eventual existence of conflicts of interest (related to the organization of the industry), or the lower investor sophistication, or even load costs.

This paper analyses the performance reaction of the clients of Portuguese funds investing in domestic shares, over a 12 year period. Contrary to most studies that document a convex relation between past performance and fund flows, we conclude that retail investors do not generally react to fund performance: a reaction is either not detected or the inverted reaction phenomenon is observed. In spite of this, the analysis of the capital flows of subsequent demand periods clearly shows that demand persists both on the winners' side and (especially) on the losers' side.

The paper is structured as follows. In section 1 we briefly review related studies. Section 2 describes the dataset. Contingency tables are in section 3, and regression analysis is in section 4. Finally, the main conclusions of the paper are summarized in section 5.

[1] As far as we know, Hungary is the only other country in the EU that publishes portfolios (and their value) each month, but not for all mutual fund categories.

1. BRIEF LITERATURE REVIEW

An issue that has been motivating the work of some researchers is that of understanding the type of investor response to the performance of mutual funds. This is particularly linked to the fact that some studies show that performance persistence is (especially) observable amongst funds recording lower performances (for example, Hendricks et al., 1993; Shukla and Trzcinka, 1994; and Carhart, 1997).

There is consensus amongst researchers on one point: capital flows are sensitive to past performances. Ippolito (1992), Gruber (1996), Chevalier and Ellison (1997), Goetzmann and Peles (1997), Sirri and Tufano (1998) and Christoffersen (2001) have documented this phenomenon for the US market. What has been intriguing academics is the diversity of reaction to higher and lower performances. A number of studies have shown the phenomenon of asymmetry, reporting that the better the past performance the greater the attracted flow is for superior performances, whereas lower performances don't encompass redemption or negative growth rates (Ippolito, 1992; Chevalier and Ellison, 1997; Goetzmann and Peles, 1997; Sirri and Tufano, 1998; Lynch and Musto, 2003; Christoffersen, 2001; and Del Guercio and Tkac, 2001). More specifically, the relationship between performance and flows is convex (Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Del Guercio and Tkac; 2002; amongst others). The phenomenon is perceptible both when the return is risk-adjusted and when it is not risk-adjusted, in much the same way that such is evident when either absolute performance measures are used or when there is reaction to performance rankings.

Christoffersen (2001) documents the phenomenon for funds aimed at institutional and private customers. Gruber (1996) claims that there are informed investors capable of

foreseeing future performance based on past performance, channelling their net investments to funds with better future performances (the “smart money effect”). These investors are in contrast to another type of less informed and less sophisticated investors, the existence of which justifies the continuation of money in funds that will foreseeably record poor performances.

The asymmetry of investor behaviour has been explained by search cost (Ippolito, 1992), in particular the costs involved with acquiring information, and with the redemption of investments from the worse performing funds and the subscription to winning funds. These costs are the (rational) explanation as to why large market shares are not transferred when the fund performances are published. In support of this theory, Ippolito (1992) documents that the net flows of funds with lower load costs are more sensitive to performance than the net flows of funds with higher load costs. Sirri and Tufano (1998) also concluded that funds with larger fees tend to grow less than funds with lower fees. Barber et al. (2005) report a negative relationship between fund flows and front-end load fees and commissions charged by brokerage firms, but no relationship between fund flows and operating expenses. There is also evidence that back-end load costs are an obstacle to performance reaction (Alves and Mendes, 2007).

Sirri and Tufano (1992), in turn, argue that the exponential growth of the US mutual fund industry creates confusion and selection difficulty for investors. This is worsened by the frequent name changes, in addition to the merger and disappearance of existing funds, as well as the constant appearance of new funds.[2] Simultaneously, the financial industry has been marked by increasing competitive complexity. In fact, mutual fund management companies provide different services, at different prices, designed with different

strategies, aimed at different market segments and distributed through distinct marketing channels. Thus, the industry has created differentiated products which, with the aid of marketing, increase investor confusion. The operational complexity of the industry increases the costs of obtaining and handling information regarding the performance of all existing mutual funds. In order to avoid these costs, investors make their decisions based on the information made available to them through marketing initiatives or the media. However, both the marketing initiatives and the media tend to emphasize the better performances and not dwell on the worse performances (Sirri and Tufano, 1998; Jain and Wu, 2000).

Lynch and Musto (2003), in a different type of explanation, propose that the absence of any significant reaction to extreme negative performances can be attributed to the prospect of an investment policy adjustment. They claim that strategy changes occur after bad results; the expectation of more favourable results associated to the change in strategy could lead investors to keep their money in poorly performing funds.

Another approach based on cognitive dissonance phenomena is provided by Goetzmann and Peles (1997), who conclude that investors adjust their main beliefs in order to support the (bad) choices they have made. These authors suggest that a positive bias exists in investors' memories, which is consistent with the absence of any reaction to the worst performances.

2. PORTUGUESE MARKET, DATASET AND VARIABLES

2.1 The Portuguese Market

The Portuguese securities market is small in size: there were only 241 mutual funds at the end of 2005, managing a total net asset value (NAV) of 28,286 million euros. Those mutual funds were managed by 15 management companies (see Table *1*, Panel I). In the segment of equity funds predominantly investing in Portuguese shares, only 30 funds have existed from 1st January 1994 to 31st December 2005. These figures are in stark contrast to the complexity and dimension of the US market, where the total managed value surpassed 3.3 trillion dollars in 1998 (Zheng, 1999).[3]

Portuguese mutual funds are managed by specialized mutual fund companies. In general, each financial conglomerate owns one mutual fund company. The average number of mutual fund companies in the 1994/2005 period was 19. Each mutual fund company manages a fund family that, typically, includes one monetary fund, several bond funds, one Portuguese equity fund, and some international equity funds.[4] The average number of funds per company in the 1994/2005 period was 12, and the market share of the 3 largest mutual fund companies was 58.4% in 2005.[5]

Insert Table *1*

In Portugal, the distribution of funds throughout channels other than banks is virtually inexistent: banks are the primary promoters and distributors of funds.[6] These banks are simultaneously the head of the financial group, the depositary institutions and the fund distributors.

2.2 Sample and Main Variables

The sample includes all 30 Portuguese open-end mutual funds which were classified as

"domestic equity funds" by APFIN[7], between 31st December 1993 and 31st December 2005. Therefore, the sample coincides with the population.

The sample possesses relevant characteristics for our purposes: (*i*) it only includes equity funds of one single country[8]; (*ii*) absence of survivorship bias; (*iii*) investments in bonds are of little significance.[9] These facts contribute to increase the effectiveness of performance measurements.

Two variables are used to measure the monthly investment flow of each fund: the absolute capital flows (CF) and the normalized capital flows (NCF). The absolute capital flows is given by

$$CF_t = NAV_t + I_t - NAV_{t-1}(1 + R_t) \qquad [1]$$

where: NAV_t is the total net value of the fund's portfolio, at date t, after the distribution of income; I_t is the income distributed by the mutual fund; and R_t is the return achieved by the fund between t-1 and t.[10/11]

The normalised capital flows is given by:[12]

$$NCF_t = \frac{CF_t}{NAV_{t-1}}. \qquad [2]$$

The first metric favours larger funds that tend to have higher absolute cash flows disassociated from performance, while NCF tends to amplify the results of smaller funds (Gruber, 1996). Therefore, it is important to use both measurement methods. The exclusive use of the former could hide the reaction of the clients of large funds, in much the same way that the exclusive use of NCF could lead to the excessive prominence of the reaction of clients of smaller funds.

The mutual funds' performance was computed in three distinct ways: (*i*) the continuous raw returns; (*ii*) Jensen's alpha, taking the CAPM as the equilibrium model; and (*iii*) the alpha coefficient of Carhart's (1997) 4 factor model, which, besides the excess of market return gauged by the return differential of the PSIG Index[13] and the return of the LISBOR[14], also includes the HML, SMB and WML factors.[15]

Table *1* (Panel II) reports summary statistics for our variables. The total assets (monthly average) under the management of the domestic equity funds is 506.2 million euros, with a maximum of 1805.6 million euros (April 1998) and a minimum of 90.4 million euros (December 1995).

2.3 Sources of Information

The daily price quotation of each fund, the dates and the sums of the distributed incomes, and the fund monthly portfolios are from Dathis.[16] Market and accounting information for listed companies is from Dathis, from the annual publications issued by Euronext Lisbon with yearly accounting information on listed companies, and from the daily quotation bulletins of Euronext Lisbon. Information regarding the fees charged by each fund was obtained from the funds' management rules published in the quotation bulletins of Euronext Lisbon. Accounting information relative to the management companies of the funds is from the quotation bulletins and the Portuguese Securities Commission.

3. CONTINGENCY TABLES

3.1 PERFORMANCE REACTION

Our study of investors' performance reaction is based on a methodology frequently used to analyse both the mutual fund performance persistence (for large[17] and small[18]

samples), and the response of the funds' management to performance[19]: the analysis of contingency tables. This methodology is appropriate to study small markets (Cortez et al., 1999). However, regressions analysis is also used.

Bi-dimensional tables are used with the variables *i)* performance achieved over a given time period and *ii)* capital flows in the subsequent period.[20] The performance was divided into two categories, winner (W) and loser (L), according to whether the fund reaches an above or below median performance. The demand variable is similarly divided into two categories, W^* (winner) and L^* (loser), according to whether the fund reaches an above or below median net capital flow.

If fund flows are independent of performance it would be expected that the observations would be equally distributed between the 4 cells of the table. However, if good performances are rewarded and bad performances penalised – «the performance reaction hypothesis» - then the observations tend to concentrate in WW^* and LL^*. Another possible reaction may convert winners into losers and vice-versa – «the inverted reaction hypothesis».

In terms of the statistical tests used, the chi-square test (based on the expected frequency of each cell) is used.[21] The other tests used are the cross-product ratio, also known as the odds ratio test or relative risk test (to test the independence of two variables in a multinomial sample), and the repetition of winners and repetition of losers Malkiel (1995) test.

Table *2* presents the main results. The performance reaction hypothesis is rejected. The independence hypothesis is not even rejected in favour of the performance reaction

hypothesis when the performance is measured in quarterly terms (Q/Q) nor when calculated in annual terms (Y/Q). On the contrary, evidence of the inverse reaction of the CF variable exists, relative to the Carhart model (S/S and Y/Q), and there is evidence of inverse reaction for the NCF variable and the CAPM model (Q/Q).

INSERT TABLE *2*

In short, there is no evidence that fund flows react to performance. On the contrary, in terms of risk-adjusted performance, a phenomenon of inverted reaction was observed, where the winners are transformed into losers and the losers converted into winners.[22]

3.2 PERFORMANCE ANTICIPATION

In 3.1. the reaction of investors to past performances was analysed. However, Gruber (1996) and Zheng (1999) provide evidence that investors have some capacity to anticipate performance ("the smart money effect"). If this phenomenon exists, capital flows are significantly correlated to future performances.

The observations are distributed amongst the cells of the contingency table relative to the rankings of demand (CF or NCF) for a given period and the performance rankings of the immediately subsequent period. The null hypothesis is the independence between the demand rankings of one period and the performance rankings of the following period. The alternative is either the «smart money» or the «dumb or misled money» hypothesis: winning (losing) funds in terms of demand record an increased probability of being losers (winners) in performance in the following period.

INSERT TABLE *3*

Results are in Table 3. The smart money hypothesis is always rejected. On the contrary, annual (Y/Y) analyses recorded situations of rejection of the independence hypothesis in favour of the dumb or misled money hypothesis. In other words, the new normalized capital flows recorded year to year do not favour funds that in the following year (CAPM model) perform better in terms of risk-adjusted returns.

3.3. DEMAND PERSISTENCE

In this section funds are assessed to see if they are persistent winners and/or losers relative to the rankings of net capital flows. The rankings of each one of the demand variables for a given period and in the immediately subsequent period are compared (Table 4).

INSERT TABLE *4*

There is strong evidence of persistence, both in relation to winners and, above all, in relation to losers. In fact, our results indicate the persistence of winners and of losers, in both quarterly and half-yearly terms. In annual terms, only the persistence of losers was observed. This means that, in general, the ranking of one period and the ranking of the following period are not independent. On the contrary, winners are repeatedly winners and losers are repeatedly losers.[23]

4. REGRESSION ANALYSIS

In section 3 we used the contingency table methodology to assess the extent of investor reaction to fund performance. This approach is quite simple and intuitive, but of limited power insofar as contingency tables do not capture and control for many other important

factors influencing flows. We now turn to multivariate analysis. In fact, risk, market structure, stock performance, and other fund characteristics, when taken together, could better explain fund flows' performance reaction.

The methodology used in this section is similar to that used by Carhart (1997) and Sirri and Tufano (1998), which consists of individually analysing the observations of each period.[24] In other words, an explanatory model of the NCF variable was estimated for each month, using, therefore, just one observation per fund. Then, considering the time series of the coefficients, the estimates of each coefficient were calculated, as well as the respective t statistics, using the method of Fama and MacBeth (1973). This method hinders any potential dependence on periodic observations, and it is noted for producing more conservative conclusions regarding the individual significance of each one of the variables.

We therefore estimate the model

$$NCF_{ft} = f(PERF_{ft-1}, PERF_{ft+1}, QF_{ft-1}, QSG_{ft-1}, CT60M_{ft}, ID_{ft}, NCF_{ft-1}). \qquad [3]$$

The dependent variable is the normalized capital flows of fund *f* in month *t*.[25] The range of explanatory variables includes only variables of a sectional nature (prone to variation from fund to fund). The first one is the performance recorded in the preceding period ($PERF_{t-1}$), computed in a number of ways in order to check the robustness of the results and given the fact that the performance measurement to which the investors react is not clear. As for the calculation method, raw returns and the alphas of the model of Carhart were used. The following periods were tested (see Table 5): the month (Panel A), quarter (Panel B) and year (Panel C) prior to the period for which the calculation of the dependent variable was made. Other control variables are the fund's market share (of

domestic equity funds) in the previous quarter (QF_{t-1}) and the respective management company's share (QSG_{t-1}) in the domestic mutual fund market in the three preceding months. In a number of studies the size of the fund or the fund complex into which the fund is incorporated is used as a proxy for the costs of acquiring information that each investor is faced with.[26] In the context of the reduced size of the Portuguese market, the share of each management company can be regarded as an indicator of the size of the financial group, for which reason it can be seen as an indicator of that financial group's capacity to attract investment from private clients.

It is known that the normalised capital flows benefit (younger and) smaller funds. Therefore, in order to understand by how much the effect attributed to QF_{t-1} is a reflection of the reputation of the fund or the (natural) mirror of the loss of market share of the oldest and larger funds, the age of each fund (ID) is included amongst the explanatory variables. ID is the quarterly average of the number of years since the fund started operations, computed at the beginning of each month.[27]

Along the lines of Sirri and Tufano (1998) and Barber et al. (2005), the total cost of each mutual fund (which includes subscription, management, custody and redemption costs), assuming a five year investment horizon (CT60M), is included as a regressor as well.

Finally, two other variables were included as regressors: the lagged dependent variable (NCF_{t-1}) and the next period performance ($PERF_{t+1}$). With the first variable, we intend to confirm the demand persistence phenomenon reported in table 4. As for $PERF_{t+1}$, it allows one to test the absence of the smart money effect reported in table 3.

INSERT TABLE *5*

The Fama-MacBeth coefficient estimates are in Table 5. It can be concluded that the funds with the largest market share in the equity fund segment tend to grow less rapidly than smaller funds, in much the same way that old funds tend to lose market share to young funds. In fact, the estimated coefficient of QF_{t-1} is negative in all regressions (and significant in the raw returns case), which means that bigger funds tend to lose market share; the mutual fund age variable (ID) exhibits a negative coefficient in all regressions (and significant in the monthly and quarterly analysis), meaning that the youngest funds are preferred by capital inflows.

Moreover, the most expensive funds are the most successful in attracting new capital flows.[28] Consistent with these results is the idea that management companies use the discretionary power resulting from their reputation and the unwillingness of their customers to bear search costs (or the lower investor sophistication) to channel the savings entrusted to them to these more expensive funds.

On the other hand, given that the new funds launched in the Portuguese market have costs that are on average 30.5% higher than the equity funds of the same management company existing at the time the new fund is launched, it can be concluded that management companies were able to launch new funds with higher costs for investors (instead of increasing fees for existing funds[29]) and still attract investors. So, there is evidence that financial groups drive their costumers to funds with larger fees, and we can (at least) suspect that they launch new (and more expensive funds) funds with this objective. Moreover, new funds launched by companies that have never previously managed equity funds are on average 15.5% cheaper, which means that the launching of new and more

expensive funds exists - mainly - amongst the largest management companies.

As regards performance, there is no perceptible evidence that fund investors react to past performance.[30] The phenomenon of inverted reaction is imperceptible as well. There is also no evidence in favour of the smart money effect. Finally, positive and significant (last 3 regressions) coefficients for NCF_{t-1} where found, which can be interpreted as evidence of demand persistence.

5. CONCLUSIONS

The results put forth in the previous sections allow us to conclude that, in the Portuguese market, fund investors do not generally react to performance. On the contrary, in terms of risk-adjusted performance it was perceptible that, in some circumstances, the winners are transformed into losers and the losers into winners. The smart money hypothesis was also studied and rejected. The hypothesis of demand persistence is elected, suggesting that the characteristics of each fund or of each management company can be relevant in explaining the behaviour of demand.

It was also concluded that bigger and older funds tend to loose market share, and that the most expensive funds grow relatively faster than other funds. Additionally, given that management companies with more than one fund launch new funds that are more expensive than the ones they currently manage, we conclude that these companies possess the capacity to "divert" investors to the more expensive funds (which are, in some cases, the more recently created mutual funds).

In short, contrary to most studies that document a convex relation between past performance and fund flows, we find that investors do not react to fund performance. Given that the Portuguese market is small, that the costs of acquiring information on the daily value of each investment unit are negligible, and that the more expensive funds tend to grow more, the absence of reaction can be attributed to either lower investor sophistication or conflicts of interests in the context of the Portuguese universal banking industry. This deserves further research.

A number of regulatory policy implications emerge from this paper. Firstly, the importance of public dissemination mechanisms regarding the performance and costs of different mutual funds is evident. Similarly, the creation of conditions that allow capital to be transferred from one fund to another at the lowest possible cost is important. Moreover, it seems evident that financial intermediaries have a wide margin of influence on the fund selection decisions of their clients, and use this margin of manoeuvre to channel investment to funds with higher fees. When applied to funds with the same investment policy, and the same level of service, this practice emerges as a non-transparent means of increasing prices, a fact worthy of the attention of supervisory and regulatory authorities. Finally, one word regarding financial education. The existence of information, per se, does not necessarily mean that financial understanding among investors is high. It is necessary that investors acquire the skills and ability to understand financial concepts and terms. It is also necessary to provide investors with objective advice so that they can make informed choices using the available financial information.

[1] This information is available at the Portuguese Securities Commission website (www.cmvm.pt) since 2002. Before 2002, some daily newspapers published this information in the markets section. Therefore, the costs of monitoring a portfolio of risky assets are negligible.

[2] The name changing strategy has proven to be quite successful. Cooper et al. (2005) analysed the relationship between capital flows and the change of mutual fund names. The results denote that the flows to funds dramatically increase when funds change their names to obtain a greater association with the styles that are producing higher returns at that time. This outcome is true even for those funds that do not change their portfolios to profiles closer to the style implied by the new name.

[3] The Portuguese mutual fund industry is comparable to other European countries in some aspects. In France, for instance, the average fund size was USD 87 million in 1997 (Otten and Shweitzer, 2002). These figures are not very different from those for the Portuguese market (EUR 92.8 in the same year; and EUR 117.4 million in 2005).

[4] The possibility to switch across different funds belonging to the same family at no (or negligible) costs is virtually inexistent. In fact, there were transaction costs in Portugal, and these dissuade mutual fund investors from transferring their money from one member of the family to another. Additionally, inside each family, the Portuguese equity funds (funds that invested in shares of stock issued by Portuguese companies) were managed independently from the other equity funds investing in foreign stocks (international equity funds).

[5] In 1997 there were 17,000 funds in Europe, managed by 1,400 mutual funds companies (Otten and Shweitzer, 2002), or 12.1 funds per company. The concentration indicator in Portugal is similar to that exhibited in other European countries as well (Otten and Shweitzer, 2002).

[6] In Europe, 53% of the mutual funds are distributed throughout banks (Otten and Shweitzer, 2002).

[7] APFIN is the Portuguese association of mutual fund management companies.

[8] The inclusion of foreign shares would mean taking into consideration the systematic risk of other countries. The importance of local factors in the calculation of the price of the risk of each one of the return generating factors is documented by Serra (2000).

[9] The mean aggregate percentage of domestic shares in the NAV managed by the samples' funds is 82.0%.

[10] We assume that the income distribution occurs on date *t*. Events, such as fund mergers, are handled using

the follow the money approach (Gruber, 1996).

[11] Purchases (net of sales) made by fund of funds of the same financial group were deducted from the total flow, thereby ensuring that only capital flows originating from clients outside of the fund complex is considered.

[12] NCF is used by Ippolito (1992), Sirri and Tufano (1998) and Zheng (1999), among others.

[13] We use the PSIG Index (the Euronext general Index for Euronext Lisbon) as the market returns proxy.

[14] We use the Lisbor 3 months (an inter-bank monetary rate) as a proxy of risk-free interest rate.

[15] The HML variable quantifies the book-to-market effect and corresponds to the return of a portfolio that is long in high book-to-market stocks and short in low book-to-market stocks; SMB measures the size effect, and corresponds to the return of a portfolio that is long in small caps and short in big caps; WML measures the momentum effect, and is the return of a portfolio long in stock winners and short in recent losers. Due to the reduced size of the Portuguese stock market, the small markets methodology of Alves and Mendes (2004) is used in the calculation of the HML, SMB and WML factors.

[16] Financial information disclosure service of Euronext Lisbon.

[17] *Vide* Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), Malkiel (1995) and Kahn and Rudd (1995).

[18] *Vide* Cortez et al (1999).

[19] *Vide* Busse (2001) and Goriaev et al. (2002).

[20] Different time horizons were considered in order to assess the robustness of the results.

[21] The independence hypothesis of performance rankings and the rankings of capital flows of the following period is the null hypothesis of all the formulated tests.

[22] Investors could be sensitive to the performances of each calendar year and react in function of these. Results (not shown) indicate that the flows of new capital do not react to the returns of the previous calendar year as well.

[23] Analysis fund by fund (results not shown) allows us to conclude that there are funds that are systematically winners (12 funds, using absolute quarterly flows). Ten other funds (one third of the sample) are repeatedly losers. These results confirm the evidence of demand persistence shown in Table 4.

[24] Despite the fact that our sample is a pool of time and sectional-based data, the use of OLS on the entire

pool could lead to incorrect inferences: "*the models can be estimated on the entire dataset as a pool, in which each firm-year observation is considered an independent observation. This technique may inappropriately underestimate standard errors and overestimate t-statistics if each fund-year is not an independent observation*" - Sirri and Tufano (1998, p. 1597).

[25] CF was also used as dependent variable. Results are very similar and are not reported.

[26] Sirri and Tufano (1998) assess the reputation of each fund and each fund complex using the lagged logarithm of the total amount of managed assets. The underlying idea is that the largest fund complexes have greater visibility and therefore investors will preferentially opt, minimizing the costs of obtaining information, for the larger funds and fund complexes. The need to include both the size of each fund as well as the size of the management company is based on the fact that the largest companies usually possess more than one equity fund, so it is important to distinguish the reputation of the fund from the reputation of the company managing it.

[27] Sawicki and Finn (2002) report both a size and an age effect on fund flows.

[28] The coefficient of CT60M is always positive and significant.

[29] In our sample, there is no case of increasing fees for existing funds.

[30] It is not surprising that investors do not react to risk-adjusted measures of performance. Del Guercio and Tkac (2002) claim that pension fund sponsors appear to be more sophisticated than mutual fund investors, and that mutual fund flows do have a strong relation with unadjusted returns. In a small market like the Portuguese, the typical investor, at most, has access to rudimentary performance measures (such as historical returns). It seems that in Portugal they lack the ability to understand the information, or they do not care to get informed.

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TABLE *1* – PORTUGUESE MUTUAL FUND MARKET AND SAMPLE CHARACTERISTICS

Panel I - Portuguese Mutual Funds						
	1994	1997	2000	2003	2005	Average 1994-2005
Number of Mutual Funds	126	205	266	215	241	219
Total Net Asset Value	10,260	19,019	21,729	22,857	28,286	19,898
Average Size	81.4	92.8	81.7	106.3	117.4	90.0
Number of Companies	25	21	19	16	15	19
Concentration Ratio - CR3 [%]	*62.6*	*57.2*	*70.4*	*61.8*	*58.4*	*63.8*

Panel II - Sample Main Characteristics				
	Total NAV	NAV per Fund	CF	NCF
Average	506.2	30.3	1.2	6.3%
Maximum	1,805.6	331.9	54.6	131.1%
Minimum	90.4	5.6	-55.0	-41.8%
Standard Deviation	441.0	46.2	2.9	31.2%

Obs.: (*i*) Panel I has information on Portuguese mutual fund industry. The total number of mutual funds as at the end of each year is in row 1; the total net asset value as at the end of each year is in row 2; the average size (Total Net Asset Value/Number of Mutual Funds) is in row 3; the number of companies that manage mutual funds as at the end of each year is in row 4; the concentration ratio is the market share of the 3 biggest mutual fund companies, and is reported in row 5. (*ii*) Panel II contains information on the monthly Total Net Asset Value (Total NAV) computed for all funds at the end of each month for the full sample; the NAV per fund computed for each fund and the full sample; the absolute capital flows (CF) and the normalized capital flows (NCF) used to measure the monthly investment flow of each fund, computed for each fund and the full sample; (*iii*) All monetary values are in EUR millions.

TABLE *2* – CONTINGENCY TABLES AND INVESTOR PERFORMANCE REACTION TESTS

	Contingency Table				Test of χ^2		Odds Ratio Test		Repeat Winners Test		Repeat Losers Test	
	WW*	WL*	LW*	LL*	χ^2	p	CP	p	RW	p	RL	p
Panel A: Absolute Capital Flow (CF)												
	Raw Returns											
Q/Q	189	195	197	193	0.13	0.72	0.95	0.36	0.49	0.38	0.49	0.42
S/S	93	95	95	91	0.10	0.76	0.94	0.38	0.49	0.44	0.49	0.38
Y/Q	183	179	182	191	0.23	0.63	1.07	0.32	0.51	0.42	0.51	0.32
Y/Y	43	43	40	49	0.45	0.50	1.23	0.25	0.50	0.50	0.55	0.17
	CAPM Model											
Q/Q	188	200	198	188	0.63	0.43	0.89	0.21	0.48	0.27	0.49	0.31
S/S	101	113	87	73	1.89	0.17	0.75	0.08 *	0.47	0.21	0.46	0.13
Y/Q	177	193	188	177	0.99	0.32	0.86	0.16	0.48	0.20	0.48	0.28
Y/Y	45	45	38	47	0.49	0.48	1.24	0.24	0.50	0.50	0.55	0.16
	Carhart Model											
Q/Q	188	200	198	188	0.63	0.43	0.89	0.21	0.48	0.27	0.49	0.31
S/S	99	115	89	71	3.21	0.07 *	0.69	0.04 **	0.46	0.14	0.44	0.08 *
Y/Q	168	196	197	174	3.55	0.06 *	0.76	0.03 **	0.46	0.07 *	0.47	0.12
Y/Y	39	46	44	46	0.16	0.69	0.89	0.35	0.46	0.22	0.51	0.42
Panel B: Normalised Capital Flow (NCF)												
	Raw Returns											
Q/Q	176	208	200	190	2.30	0.13	0.80	0.06 *	0.46	0.05 *	0.49	0.31
S/S	95	93	94	92	0.00	1.00	1.00	0.50	0.51	0.44	0.49	0.44
Y/Q	178	184	180	193	0.06	0.80	1.04	0.40	0.49	0.38	0.52	0.25
Y/Y	41	45	39	50	0.26	0.61	1.17	0.30	0.48	0.33	0.56	0.12
	CAPM Model											
Q/Q	173	215	203	183	4.96	0.03 **	0.73	0.01 **	0.45	0.02 **	0.47	0.15
S/S	105	109	84	76	0.43	0.51	0.87	0.26	0.49	0.39	0.48	0.26
Y/Q	175	195	183	182	0.59	0.44	0.89	0.22	0.47	0.15	0.50	0.48
Y/Y	43	47	37	48	0.32	0.57	1.19	0.29	0.48	0.34	0.56	0.12
	Carhart Model											
Q/Q	184	204	192	194	0.42	0.52	0.91	0.26	0.47	0.15	0.50	0.46
S/S	95	93	94	92	0.00	1.00	1.00	0.50	0.51	0.44	0.49	0.44
Y/Q	169	195	189	182	1.50	0.22	0.83	0.11	0.46	0.09 *	0.49	0.36
Y/Y	35	50	45	45	1.37	0.24	0.70	0.12	0.41	0.05 *	0.50	0.50

Obs.: (*i*) Q/Q, S/S, Y/Q and Y/Y identify the time horizon for performance (first symbol) and capital flows (second symbol), where Q, S and Y represent respectively the quarter, the semester and the year; (*ii*) WW* is the number of funds that were double winners (performance rankings of a given period and capital flows rankings of the subsequent period); LL* identifies the number of funds that were double losers (performance rankings of a given period and capital flows rankings of the subsequent period); WL* is the number of funds that were winners on performance rankings and losers on capital flows rankings of the subsequent period; and LW* identifies the number of funds that were losers on performance rankings and winners on capital flows rankings of the subsequent period; (*iii*) χ^2 identifies the qui-square statistic; CP identifies the cross product (odds ratio); RW (RL) identifies the percentage of repetition of winners (losers); p identifies the p-values for one-sided tests (except for the qui-square test); (*iv*) the symbols ***, ** and * show statistical significance at 1%, 5% and 10%, respectively.

TABLE *3* – CONTINGENCY TABLES AND SMART MONEY EFFECT TESTS

	Contingency Table				Test of χ^2			Odds Ratio Test			Repeat Winners Test			Repeat Losers Test		
	W*W	W*L	L*W	L*L	χ^2	p		CP	p		RW	p		RL	p	
Panel A: Absolute Capital Flow (CF)																
	Raw Returns															
Q/Q	191	202	196	184	0.69	0.41		0.89	0.20		0.49	0.29		0.48	0.27	
S/S	89	93	98	80	1.37	0.24		0.78	0.12		0.49	0.38		0.45	0.09	*
Y/Y	44	46	46	39	0.48	0.49		0.81	0.24		0.49	0.42		0.46	0.22	
	CAPM Model															
Q/Q	190	203	200	180	1.42	0.23		0.84	0.12		0.48	0.26		0.47	0.15	
S/S	104	78	108	70	0.46	0.50		0.86	0.25		0.57	0.03	**	0.39	0.00	***
Y/Y	48	42	53	32	1.46	0.23		0.69	0.11		0.53	0.26		0.38	0.01	**
	Carhart Model															
Q/Q	189	204	200	180	1.59	0.21		0.83	0.10		0.48	0.22		0.47	0.15	
S/S	98	84	111	67	2.68	0.10		0.70	0.05	*	0.54	0.15		0.38	0.00	***
Y/Y	42	48	49	36	2.11	0.15		0.64	0.07	*	0.47	0.26		0.42	0.08	*
Panel B: Normalised Capital Flow (NCF)																
	Raw Returns															
Q/Q	192	193	195	193	0.01	0.91		0.98	0.46		0.50	0.48		0.50	0.46	
S/S	89	94	98	79	1.63	0.20		0.76	0.10		0.49	0.36		0.45	0.08	*
Y/Y	43	45	47	40	0.47	0.49		0.81	0.25		0.49	0.42		0.46	0.23	
	CAPM Model															
Q/Q	183	202	207	181	2.62	0.11		0.79	0.05	*	0.48	0.17		0.47	0.09	*
S/S	102	81	110	67	1.53	0.22		0.77	0.11		0.56	0.06	*	0.38	0.00	***
Y/Y	45	43	56	31	3.14	0.08	*	0.58	0.04	**	0.51	0.42		0.36	0.00	***
	Carhart Model															
Q/Q	187	198	202	186	0.94	0.33		0.87	0.17		0.49	0.29		0.48	0.21	
S/S	100	83	109	68	1.78	0.18		0.75	0.09	*	0.55	0.10		0.38	0.00	***
Y/Y	41	47	50	37	2.07	0.15		0.65	0.08	*	0.47	0.26		0.43	0.08	*

Obs.: (*i*) W*W identifies the number of funds that were double winners (capital flows rankings of a given period and performance rankings of the subsequent period); L*L is the number of funds that were double losers (capital flows rankings of a given period and performance rankings of the subsequent period); W*L identifies the number of funds that were winners on capital flows rankings of a given period and losers on performance rankings of the subsequent period; and L*W is the number of funds that were losers on capital flows rankings of a given period and winners on performance rankings of the subsequent period; (*ii*) In other aspects, this table should be read similarly to Table *2*.

TABLE *4* – INVESTOR DEMAND PERSISTENCE

	Contingency Table				Test of χ^2			Odds Ratio Test			Repeat Winners Test			Repeat Losers Test		
	W*W*	W*L*	L*W*	L*L*	χ^2	p		PC	p		RW	p		RL	p	
Panel A: Absolute Capital Flow (CF)																
Q/Q	252	141	130	247	67.62	0.00	***	3.40	0.00	***	0.64	0.00	***	0.66	0.00	***
S/S	104	77	72	104	9.78	0.00	***	1.95	0.00	***	0.57	0.02	**	0.59	0.01	***
Y/Y	48	42	35	50	2.59	0.11		1.63	0.05	*	0.53	0.26		0.59	0.05	*
Panel B: Normalised Capital Flow (NCF)																
Q/Q	218	167	154	231	21.30	0.00	***	1.96	0.00	***	0.57	0.00	***	0.60	0.00	***
S/S	100	82	76	99	4.73	0.03	**	1.59	0.01	**	0.55	0.09	*	0.57	0.04	**
Y/Y	45	43	35	52	2.10	0.15		1.55	0.07	*	0.51	0.42		0.60	0.03	**

Obs.: (*i*) W*W*, W*L*, L*W* and L*L* identify, respectively, the number of funds that were double winners, initially winners and then losers, initially losers and then winners, and double losers; (*ii*) In other aspects, this table should be read similarly to Table *2*.

TABLE 5 – NORMALIZED CAPITAL FLOW REGRESSIONS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A		Panel B				Panel C	
	Monthly Performance		Quarterly Performance				Annual Performance	
	Raw Returns		Raw Returns		Carhart Model		Raw Returns	Carhart Model
C	0.035 **	0.000	0.026	0.047	0.010	-0.007	-0.029	-0.010
	2.02	*0.00*	*1.19*	*0.95*	*0.77*	*-0.29*	*-0.74*	*-0.37*
$PERF_{T-1}$	-3.646	*-9.935*	-8.656	-37.531	-7.216	-14.998	-38.588	-23.022
	-0.69	*-0.38*	*-0.78*	*-1.16*	*-1.14*	*-0.97*	*-0.42*	*-0.36*
QF_{t-1}	-0.045	-0.126 *	-0.051	-0.117 *	-0.050	-0.101	-0.116 **	-0.104
	-0.76	*-1.35*	*-0.86*	*-1.62*	*-0.84*	*-1.06*	*-2.09*	*-1.12*
CT60M	0.202 **	0.425 **	0.245 **	0.501 ***	0.236 **	0.358 **	0.400 **	0.343 *
	1.79	*2.00*	*2.19*	*2.45*	*2.07*	*1.70*	*1.80*	*1.47*
QSG_{t-1}	0.053	*0.052*	0.071 *	0.019	0.074 *	-0.025	0.008	-0.009
	1.14	*0.53*	*1.48*	*0.31*	*1.57*	*-0.42*	*0.14*	*-0.17*
ID	-0.005 ***	-0.003 *	-0.004 ***	-0.002	-0.003 ***	-0.001	0.000	-0.002
	-5.27	*-1.33*	*-4.31*	*-0.90*	*-2.36*	*-0.40*	*-0.18*	*-1.18*
NCF_{T-1}		0.778		0.070		0.132 **	0.334 *	0.590 *
		1.11		*0.77*		*1.69*	*1.48*	*1.49*
$PERF_{T+1}$		*-6.075*		30.524		8.404	68.113	-2.405
		-0.32		*0.96*		*0.62*	*0.91*	*-0.05*
N	142	142	140	140	140	140	132	132

Obs.: (*i*) the dependent variable is the normalized capital flow (NCF), calculated for each fund; (*ii*) the Fama-MacBeth (1973) method was applied to estimate coefficients and calculate t statistics; (*iii*) N is the number of first step regressions; (*iv*) the symbols ***, ** and * show statistical significance at 1%, 5% and 10%, respectively.