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ORIGINAL ARTICLE

Does performance explain mutual fund flows in small markets? The case of Portugal

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Abstract We study the performance reaction of investors in a specific small market context. Our sample includes all Portuguese open-end equity funds that invested in stocks issued by Portuguese companies in the period December 1993–June 2009. Instead of the convex flow–performance relationship usually documented for the US, we find an absence of reaction to past performance. We find no evidence to support the "smart money effect", given that capital flows do not favour next period performance winners. We also document persistence of fund flows. Our results are consistent with the idea that large financial intermediaries have the capacity "to drive" their customers to funds with larger fees.

Keywords Mutual fund · Performance reaction · Investor behaviour · Small markets and regulation

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1 Introduction

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

There is consensus amongst researchers on one point: capital flows are sensitive to past performance. Ippolito (1992), Gruber (1996), Chevalier and Ellison (1997), Goetzmann and Peles (1997), Sirri and Tufano (1998), Christoffersen (2001), Sapp and Tiwari (2004) and Goriaev et al. (2008) have documented this phenomenon for the US market. What has intrigued academics is the diversity of reaction to higher and lower performance. A number of studies have shown that the flow–performance relationship is convex, reporting that investors buy funds with good past performance but do not leave funds with poor performance (Ippolito 1992; Chevalier and Ellison 1997; Goetzmann and Peles 1997; Sirri and Tufano 1998; Christoffersen 2001; Del Guercio and Tkac 2001; Lynch and Musto 2003).

Some attempts to explain the convexity of the flow–performance relationship are as applicable to large and complex markets as they are to smaller and less sophisticated ones. This is the case of explanations based on investors' cognitive dissonance (Goetzmann and Peles 1997) and the theory relative to the expected about-turn of investment policy (Lynch and Musto 2003). 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 (Ippolito 1992; Sirri and Tufano 1998; Barber et al. 2005; Huang et al. 2007).

Gruber (1996) and Zheng (1999), on the other hand, claim that there are informed investors capable of foreseeing future performance based on past performance, channelling their net investments to funds with better future performance (the "smart money effect"). These investors are in contrast to other less informed and less sophisticated investors, the existence of which justifies the continuation of money in funds that will foreseeably record poor performance. However, Sapp and Tiwari (2004) find that the smart money effect is explained by the stock return momentum, which means that investors have no fund selection ability. Frazzini and Lamont (2006) and Friesen and Sapp (2007) claim that fund flows are dumb money and have poor timing ability, i.e., the average individual investor does the wrong thing most of the time.

Sirri and Tufano (1992) 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.[1] Simultaneously, the financial industry has been marked by increasingly 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 better performers and not dwell on the worse performers (Sirri and Tufano 1998; Jain and Wu 2000).[2]

Applying the industry's complexity argument to small economies where financial systems are characterized by a reduced number of intermediaries and mutual funds is not straightforward. In a market with fewer (and easier to compare) mutual funds, the task of retail investors distinguishing between good and bad performance can be less complex and less costly. This leads one to suspect that, in small markets, the relationship between past returns and fund flows of mutual funds might not be convex ("Reaction Without Convexity Hypothesis").

Small markets are less sophisticated and less competitive, and the information dissemination process is likely less efficient. This leads to higher search costs, as well as the ongoing cost of monitoring a portfolio of risky assets, and may lead to a sub-optimal performance reaction. Moreover, when the small market is also characterized by a universal banking system where in the same conglomerate we find retail banking and fiduciary management (including the mutual fund management), the absence of reaction hypothesis becomes stronger. In this case, unlike in the US, there are few independent brokers between retail investors and mutual fund managers. The bank that sells a mutual fund is generally a member of a financial conglomerate. Therefore, when a bank customer asks for advice regarding mutual fund investment, the advice may be biased due to conflicts of interest. As a result, absence of mutual fund performance reaction is expected ("Absence of Reaction Hypothesis").

Evidence in the area of flow–performance relationship in small markets is scarce. Alves and Mendes (2007) touch upon this subject. The authors found evidence consistent with the hypothesis that medium and long-term

[1] 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.

[2] Goriaev et al. (2008) document a hump-shaped lag pattern for the flow-performance relationship, i.e., lower sensitivity of mutual fund flows to very recent performance than to performance half a year or more ago. The authors attribute this pattern to the behaviour of less sophisticated investors who monitor the market less closely.

investors do not react to poor performance due to the fact that they are "imprisoned" by back-end load fees. Nevertheless, their paper doesn't explore the effect of the specific features of small capital markets on the mutual fund flow–performance relationship. The complexity of the market and investor sophistication are not the same in big and small markets, and these could lead to different investor behaviour in small markets. In fact, the lower complexity of small markets could potentially cause a smoothing of the flow–performance relationship, because it is easy and less expensive to distinguish between good and bad performers. On the other hand, the predominance of unsophisticated investors in small, less complex and less competitive markets could lead to an absence of performance reaction. This doesn't mean that there are no unsophisticated investors in the big and more complex markets (Gruber 1996, among others) or that there are no potential conflicts of interest between financial intermediaries and their clients.[3] This only means that in smaller, less sophisticated and less competitive markets, the effect of stronger conflicts of interests and of the presence of unsophisticated investors can overtake the effect of the lower complexity of the market, and instead of a reaction (with or without convexity) one can witness the lack of any reaction at all.

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: there were only 289 mutual funds at the end of June 2009, managing a total net asset value (NAV) of EUR 14.205 million. These mutual funds were managed by 20 management companies. In the segment of equity funds predominantly investing in Portuguese shares, only 30 funds existed between 1st January 1994 and 30th June 2009. These figures are in stark contrast to the complexity and dimension of the US market, where the total managed value surpassed USD 3.3 trillion in 1998 (Zheng 1999).[4] Moreover, the distribution of funds through channels other than banks is virtually inexistent: banks are the promoters and distributors of funds. These banks are simultaneously the head of the financial group, the depositary institutions and the fund distributors. Secondly, there is a lot of information available to the public: the value of the funds' portfolios and the portfolio composition are disclosed on a monthly basis, and the value of each investment unit is known daily.[5] Therefore, in Portugal it is possible to monitor

[3]Bullard et al. (2007), for example, find evidence that investors who transact through investment professionals experience greater losses due to poor timing than investors who buy pure no-load funds. This finding is consistent with the conflicts of interest argument.

[4]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 Schweitzer 2002). These figures are not very different from those for the Portuguese market (EUR 92.8 in the same year; and EUR 49.2 million in June 2009).

[5]This information has been 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.

the monthly development of fund flows as well as the daily performance, with negligible search costs. Thus, if Portuguese mutual fund investors do not react to performance or if there is a convex relation between past returns and fund flows, the absence of reaction could not be attributed to the complexity of the market nor the dissemination of information, but rather to inherent conflicts of interest (related to the organization of the industry), or lower investor sophistication, or even load costs.

Our paper adds to the literature on the performance reaction of mutual fund investors in some important ways. First and foremost, our study of a small market is novel. Yet, the specific features of small capital markets can help explain investors' reaction to fund performance and shed light on the theoretical explanations set forth in the existing literature. We find that instead of a convex flow–performance relationship, as is usually documented for the US, the Portuguese small market exhibits an absence of performance reaction: retail investors do not generally react to fund performance. Thus, our evidence supports the "absence of reaction hypothesis" in the context of a specific small market. In spite of this, an 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. We find, additionally, that financial intermediaries have the capacity to drive their customers to funds with higher fees. These results suggest that, vis-à-vis larger markets, the effects of lower competitiveness and lack of investor sophistication in the Portuguese small market are stronger than the effect of their lower complexity. Our results contribute to challenging the applicability of findings based on data from large and complex markets to smaller, less competitive and less sophisticated markets, like the Portuguese. An interesting question that emerges from our paper is whether other mutual fund markets based in the universal banking system (but that do not have some specific characteristics of the Portuguese market such as small size or availability of information on net asset values) also exhibit an absence of reaction and also whether, under those circumstances, financial intermediaries have the capacity to drive customers to funds with higher fees. It would also be interesting to investigate if other small markets, like the Portuguese but not based in the universal banking system, evidence similar results.

The paper is structured as follows. In Section 2 we briefly describe the dataset. Contingency tables are in Section 3, and regression analysis is in Section 4. The main conclusions are summarized in Section 5.

2 Dataset and variables

The database used in this paper includes all Portuguese open-end equity funds that invested in stocks issued by Portuguese companies, covering the period 31st December 1993 to 30th June 2009. Thus, we have a survivorship-bias free dataset (the sample coincides with the population).[6] The total assets (monthly average) under the management of the domestic equity funds are EUR 464.8 million. On average, the assets under the management of domestic equity funds represent circa 1/3 of the assets under the management of all equity funds in Portugal.

Two variables are used to measure the monthly investment flow of each fund: the absolute capital flows (CF) and the normalized capital flows (NCF).[7] The absolute capital flows are given by

$$\mathrm{CF}_t = \mathrm{NAV}_t + I_t - \mathrm{NAV}_{t-1}\,(1 + R_t) \tag{1}$$

where NAV_t is the total net value of the fund's portfolio, at date t, after income distribution, I_t is the income distributed by the fund and R_t is the fund's return between $t-1$ and t.[8]

The normalised capital flows are given by:[9]

$$\mathrm{NCF}_t = \frac{\mathrm{CF}_t}{\mathrm{NAV}_{t-1}} \tag{2}$$

We use both metrics to test the robustness of our results. The exclusive use of CF 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) continuous raw returns; (ii) Jensen's alpha, taking the CAPM as the equilibrium model; and (iii) the alpha coefficient of Carhart (1997) 4-factor model.[10] During the sample period, the Carhart's alphas were positive in 53.3% of the fund/quarter and 54.3% of the fund/year observations calculated quarterly. Thus, the percentage of the funds that outperformed the market is slightly above 50%. Inside the subgroup of the performance-winner funds (above median quarterly performance), 73.9% (26.1%) exhibited positive (negative) abnormal returns. Within the subgroup of the performance-loser funds, 32.3% (67.7%) show positive (negative) abnormal returns. Thus, our sample is balanced between positive and negative performers, and the most of the time our winners are "positive" performers (and not simply the "best" among negative

[6]See Alves and Mendes (2007) for a better description of the dataset. However, we extend the sample period to June/2009. We use three main sources of information: Dathis (the financial information disclosure service of Euronext Lisbon), the daily quotation bulletins of Euronext Lisbon, and CMVM (the Portuguese Securities Commission).

[7]We exclude capital flows of funds of funds of the same financial group, i.e., we just compute capital flows derived by mutual fund final investors' decisions.

[8]We assume that the income distribution occurs on date t. We use Gruber's (1996) follow the money approach.

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

[10]The factors included were the excess of market return, and the book-to-market, size and momentum factors. 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 these factors.

performers) and our "losers" are negative performers (and not simply the "worst" among negative performers).[11]

3 Bivariate analysis

3.1 Performance reaction

We begin our investigation of investors' performance reaction using contingency tables. A contingency table is a table of counts. A two-dimensional table is formed by classifying observations by two variables. Each variable is divided into mutually exclusive categories. Observations fall into one and only one cell of the contingency table. This methodology has been mostly used within performance persistence studies,[12] as well as in studies of the response of the funds' management to performance.[13] However, it can easily be adapted to study the performance reaction of mutual fund investors. In our case, the variables are fund performance over a given time period and capital flows in the following period. Both variables were divided into two categories, winner and loser. We differentiate winners from losers by ranking fund performance (net capital flows) according to the performance (capital flows) variable used, and defining the top half of the list as winners and the bottom half as losers. W (W*) and L (L*) represent, respectively, performance (demand) winners and performance (demand) losers.[14] If fund flows were independent from performance, one would find the demand/performance observations equally distributed between the cells of the table. On the other hand, if investors chose funds with better performance, then the observations would tend to concentrate in the "winning–winning" cell. If investors penalize bad performance, then the observations would concentrate in the "loser–loser" cell of the contingency table. If the statistical evidence shows that the observations tend to concentrate in WW* and LL* then we have a case for the performance reaction hypothesis. If we find statistical evidence that shows that funds are winners in both performance and demand, but they are not losers in both performance and demand, then the case for asymmetric (convex) reaction is inferred. To analyse statistical significance, we use the chi-square test, and the repetition of winners and the repetition of losers Malkiel (1995) tests.[15]

[11] Carhart estimates are available for readers upon request.

[12] *Vide* Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), Malkiel (1995), Kahn and Rudd (1995) and Cortez et al. (1999).

[13] *Vide* Brown et al. (1996), Busse (2001) and Goriaev et al. (2005).

[14] In Sections 3.2 and 3.3 (related to performance anticipation and persistence of fund flows) we also use the contingency table analysis.

[15] 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. We also compute the odds-ratio and the joint-repetition tests, but results were robust and are not reported.

The main results of the tests (based on the underlying contingency table) are in Table 1. There we have results with absolute and normalized capital flows, and raw and risk-adjusted returns. Moreover, in order to test the possibility that demand adjusts to recent performance or to performance several months prior, we use the previous quarter, the previous 6 months and the previous year. We analyze the quarterly, half-year and annual flows.

The performance reaction hypothesis (chi-square test) is rejected in the vast majority of the cases. The independence hypothesis is rejected in favour of the performance reaction hypothesis in 7 cases. However, in all but two cases (Q2/Q3, NCF, Carhart and Y/Q1, CF, Raw) the percentages of winner

Table 1 Contingency tables and investor performance reaction tests

	Panel A: absolute capital flow (CF)						Panel B: normalised capital flow (NCF)					
	Independence test of χ^2		Repeat winners test		Repeat losers test		Independence test of χ^2		Repeat winners test		Repeat losers test	
	χ^2	p	RW	p	RL	p	χ^2	p	RW	p	RL	p
	Raw returns						Raw returns					
Q1/Q2	0.07	0.80	0.51	0.39	0.50	0.46	0.82	0.37	0.46	0.21	0.48	0.32
Q2/Q3	0.74	0.39	0.53	0.29	0.53	0.26	0.55	0.46	0.46	0.17	0.50	0.46
Q3/Q4	0.22	0.64	0.48	0.32	0.49	0.43	0.11	0.74	0.48	0.32	0.50	0.50
Q4/Q1	0.64	0.42	0.47	0.28	0.47	0.29	0.07	0.78	0.48	0.35	0.50	0.50
	CAPM model						CAPM model					
Q1/Q2	1.68	0.19	0.46	0.20	0.45	0.16	4.86	0.03**	0.42	0.04**	0.44	0.08*
Q2/Q3	0.53	0.47	0.52	0.32	0.53	0.29	0.52	0.47	0.50	0.46	0.54	0.18
Q3/Q4	0.00	0.94	0.50	0.46	0.51	0.42	0.75	0.39	0.46	0.20	0.48	0.35
Q4/Q1	0.02	0.89	0.50	0.46	0.50	0.46	0.16	0.69	0.48	0.32	0.50	0.46
	Carhart model						Carhart model					
Q1/Q2	5.54	0.02**	0.42	0.05**	0.42	0.05**	6.16	0.01**	0.41	0.02**	0.43	0.07*
Q2/Q3	2.16	0.14	0.55	0.15	0.55	0.15	3.44	0.06*	0.54	0.19	0.58	0.04**
Q3/Q4	0.65	0.42	0.46	0.22	0.48	0.35	0.16	0.69	0.47	0.29	0.50	0.50
Q4/Q1	0.37	0.55	0.48	0.35	0.48	0.32	0.36	0.55	0.47	0.29	0.49	0.39
	Raw returns						Raw returns					
Y/Q1	3.47	0.06*	0.56	0.10*	0.56	0.09*	2.57	0.11	0.54	0.18	0.56	0.09*
Y/Q2	0.07	0.79	0.49	0.43	0.49	0.43	0.07	0.79	0.50	0.50	0.52	0.35
Y/Q3	0.47	0.50	0.52	0.35	0.53	0.28	0.07	0.79	0.49	0.42	0.53	0.28
Y/Q4	0.13	0.72	0.48	0.34	0.50	0.46	0.04	0.85	0.50	0.50	0.51	0.39
	CAPM model						CAPM model					
Y/Q1	0.28	0.59	0.52	0.35	0.52	0.35	0.63	0.43	0.52	0.35	0.54	0.23
Y/Q2	7.08	0.01***	0.41	0.03**	0.41	0.03**	1.79	0.18	0.45	0.13	0.47	0.23
Y/Q3	0.17	0.68	0.48	0.35	0.49	0.42	0.08	0.78	0.47	0.28	0.51	0.42
Y/Q4	0.12	0.73	0.50	0.46	0.52	0.35	0.00	0.95	0.50	0.46	0.51	0.42
	Carhart model						Carhart model					
Y/Q1	0.00	1.00	0.50	0.50	0.50	0.50	0.07	0.79	0.50	0.50	0.52	0.35
Y/Q2	2.14	0.14	0.45	0.15	0.45	0.15	0.44	0.51	0.47	0.26	0.49	0.39
Y/Q3	1.20	0.27	0.46	0.19	0.47	0.25	0.17	0.68	0.47	0.25	0.50	0.46
Y/Q4	0.40	0.53	0.47	0.27	0.49	0.39	0.01	0.94	0.49	0.42	0.50	0.46
	Raw returns						Raw returns					
S1/S2	2.46	0.12	0.46	0.18	0.44	0.10	0.57	0.45	0.48	0.36	0.47	0.25
S2/S1	1.60	0.21	0.54	0.20	0.54	0.17	0.75	0.39	0.53	0.25	0.53	0.29
	CAPM model						CAPM model					
S1/S2	1.29	0.26	0.47	0.24	0.46	0.18	0.75	0.39	0.48	0.31	0.47	0.23
S2/S1	0.36	0.55	0.48	0.33	0.48	0.34	0.00	0.95	0.50	0.46	0.50	0.50

Table 1 (continued)

	Panel A: absolute capital flow (CF)						Panel B: normalised capital flow (NCF)					
	Independence test of χ^2		Repeat winners test		Repeat losers test		Independence test of χ^2		Repeat winners test		Repeat losers test	
	χ^2	p	RW	p	RL	p	χ^2	p	RW	p	RL	p
	Carhart model						Carhart model					
S1/S2	3.80	0.05*	0.44	0.10*	0.43	0.07*	1.29	0.26	0.47	0.24	0.46	0.18
S2/S1	0.04	0.85	0.49	0.43	0.49	0.46	0.04	0.85	0.51	0.43	0.51	0.46
	Raw returns						Raw returns					
Y/Y	0.51	0.48	0.49	0.44	0.54	0.12	0.83	0.36	0.48	0.33	0.56	0.04**
	CAPM model						CAPM model					
Y/Y	0.40	0.53	0.49	0.41	0.54	0.13	0.73	0.39	0.48	0.30	0.56	0.04**
	Carhart model						Carhart model					
Y/Y	0.30	0.59	0.46	0.15	0.51	0.39	1.42	0.23	0.43	0.03**	0.51	0.39

Obs.: (i) Qi/Qj, Sk/Sl, Y/Qi and Y/Y identify the time horizon for performance (first symbol) and capital flows (second symbol), where Q1, Q2, Q3, Q4, S1, S2 and Y represent respectively the first, second, third and fourth quarter, the first and second semester and the year; (ii) although not in the table, the cells of the underlying contingency table contain the number of funds that were double winners (performance rankings of a given period and capital flows rankings of the subsequent period), the number of funds that were double losers (performance rankings of a given period and capital flows rankings of the subsequent period), the number of funds that were winners on performance rankings and losers on capital flows rankings of the subsequent period, and the number of funds that were losers on performance rankings and winners on capital flows rankings of the subsequent period; (iii) χ^2 is the chi-square statistic; RW (RL) is the percentage of repetition of winners (losers); p is the p value for one-sided tests (except for the chi-square test); (iv) the symbols ***, ** and * show statistical significance at 1%, 5% and 10%, respectively

and loser repetitions are both below 50%. This means that, in these 5 cases, performance winners (losers) are mostly demand losers (winners), ie, there is some evidence of an inverted reaction. There is one case only where we document performance reaction at the 5% level of significance: the 3rd quarter (Q3) normalized capital flows (NCF) seem to react to the 2nd quarter (Q2) performance exhibited by the fund (Carhart model) and performance losers are mainly demand losers. However, we have no significant reaction to positive performance. There is also one case where we document reaction to both positive and negative performance, but at the 10% significance level: Y/Q1, CF, Raw.

In short, there is no evidence that fund flows react to performance, and this supports the absence of reaction hypothesis. In fact, we find no clear evidence that neither recent performance nor performance several months previously has influence on future fund flows. We conclude that investors in Portuguese domestic equity funds do not seem to timely update mutual fund performance information. On the contrary, we report signs of inverted reaction, where the winners are transformed into losers and the losers converted into winners.[16]

[16] Alves and Mendes (2007) report similar results with aggregate data for a subsample that ends in 2005. Investors could be sensitive to the performance of each calendar year and react in response to these. Results (not shown) indicate that the flows of new capital do not react to the returns of the previous calendar year as well.

3.2 Performance anticipation

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 performance. However, Frazzini and Lamont (2006) and Friesen and Sapp (2007) argue that fund flows are dumb money and have poor timing ability. We explore this issue in the following paragraphs.

Table 2 Contingency tables and smart money effect tests

	Panel A: absolute capital flow (CF)						Panel B: normalised capital flow (NCF)					
	Independence test of χ^2		Repeat winners test		Repeat losers test		Independence test of χ^2		Repeat winners test		Repeat losers test	
	χ^2	p	RW	p	RL	p	χ^2	p	RW	p	RL	p
	Raw returns						Raw returns					
Q1/Q2	0.06	0.80	0.52	0.32	0.50	0.46	0.07	0.80	0.52	0.32	0.50	0.46
Q2/Q3	1.12	0.29	0.47	0.23	0.46	0.22	0.28	0.60	0.48	0.35	0.48	0.35
Q3/Q4	0.98	0.32	0.45	0.13	0.49	0.39	0.11	0.74	0.49	0.42	0.53	0.25
Q4/Q1	0.00	1.00	0.51	0.43	0.49	0.43	0.00	1.00	0.51	0.43	0.49	0.43
	CAPM model						CAPM model					
Q1/Q2	0.07	0.79	0.50	0.46	0.51	0.39	0.27	0.60	0.51	0.39	0.52	0.32
Q2/Q3	0.07	0.79	0.50	0.50	0.52	0.35	0.00	1.00	0.49	0.43	0.51	0.43
Q3/Q4	0.80	0.37	0.49	0.43	0.45	0.14	0.76	0.38	0.49	0.42	0.45	0.15
Q4/Q1	0.63	0.43	0.48	0.35	0.46	0.23	3.46	0.06*	0.45	0.13	0.43	0.07*
	Carhart model						Carhart model					
Q1/Q2	0.61	0.43	0.47	0.26	0.48	0.32	0.07	0.79	0.49	0.39	0.50	0.46
Q2/Q3	0.04	0.84	0.50	0.50	0.51	0.39	0.54	0.46	0.52	0.35	0.53	0.26
Q3/Q4	1.91	0.17	0.48	0.32	0.43	0.07*	0.89	0.35	0.49	0.42	0.45	0.13
Q4/Q1	0.16	0.69	0.50	0.46	0.48	0.32	0.29	0.59	0.49	0.42	0.47	0.29
	Raw returns						Raw returns					
S1/S2	2.06	0.15	0.44	0.10	0.46	0.22	1.33	0.25	0.45	0.15	0.47	0.28
S2/S1	0.06	0.80	0.55	0.13	0.43	0.07*	0.06	0.80	0.55	0.13	0.43	0.07*
	CAPM model						CAPM model					
S1/S2	0.22	0.64	0.56	0.10	0.41	0.03**	0.00	0.97	0.58	0.05*	0.42	0.06*
S2/S1	0.13	0.72	0.48	0.35	0.54	0.19	0.53	0.46	0.45	0.13	0.50	0.46
	Carhart model						Carhart model					
S1/S2	1.69	0.19	0.53	0.25	0.38	0.01***	0.06	0.81	0.57	0.08*	0.42	0.04**
S2/S1	0.20	0.65	0.45	0.13	0.52	0.31	1.00	0.32	0.43	0.06*	0.50	0.46
	Raw returns						Raw returns					
Y/Y	0.60	0.44	0.49	0.38	0.46	0.21	1.41	0.24	0.47	0.28	0.45	0.14
	CAPM model						CAPM model					
Y/Y	1.83	0.18	0.49	0.38	0.42	0.05*	3.05	0.08*	0.47	0.28	0.41	0.03**
	Carhart model						Carhart model					
Y/Y	1.44	0.23	0.48	0.31	0.44	0.12	1.09	0.30	0.48	0.35	0.45	0.14

Obs.: (i) although not in the table, the cells of the contingency table contain the number of funds that were double winners (capital flows rankings of a given period and performance rankings of the subsequent period), the number of funds that were double losers (capital flows rankings of a given period and performance rankings of the subsequent period), 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 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 is similar to Table 1

Table 3 Investor demand persistence

	Contingency table				Test of χ^2		Repeat winners test		Repeat losers test	
	W*W*	W*L*	L*W*	L*L*	χ^2	p	RW	p	RL	p
	Panel A: Absolute Capital Flow (FC)									
Q/Q	295	168	157	290	74.37	0.00***	0.64	0.00***	0.65	0.00***
S/S	127	89	84	127	15.39	0.00***	0.59	0.00***	0.60	0.00***
Y/Y	58	47	40	60	4.77	0.03**	0.55	0.14	0.60	0.02**
	Panel B: Normalised Capital Flow (NFC)									
Q/Q	263	192	179	276	31.04	0.00***	0.58	0.00***	0.61	0.00***
S/S	122	96	89	120	7.64	0.01***	0.56	0.04**	0.57	0.02**
Y/Y	54	48	41	62	3.56	0.06*	0.53	0.28	0.60	0.02**

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) Q/Q, S/S and Y/Y identify the time horizon for demand in a given period (first symbol) and demand in the following period (second symbol), where Q, S and Y represent respectively the quarter, the semester and the year; (iii) in other aspects, this table is similar to Table 1

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: in the first case, winner (loser) funds in terms of demand record an increased probability of being winner (loser) funds in performance in the following period; in the second case, winner (loser) funds in terms of demand record an increased probability of being loser (winner) funds in performance in the following period. We use the methodology outlined in the previous section.

The results are in Table 2. The smart money hypothesis is rejected in the majority of the cases. Exceptions are the half-year (S1/S2) analysis for abnormal returns and normalized capital flows. On the contrary, annual (Y/Y) analyses recorded cases of rejection of the independence hypothesis in favour of the dumb money hypothesis. In other words, the normalized annual capital flows 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 following period are compared. However, given that our results are robust and in the interest of space, we aggregate information at the quarter, half-year and annual level (Table 3).[17]

[17] Complete results are available upon request.

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 flows. The persistence of losers was observed in annual flows. This means that, in general, the ranking of one period and the ranking of the following period are not independent: winners are repeatedly winners and losers are repeatedly losers.[18]

4 Regression analysis

The contingency table methodology is quite simple and intuitive, but of limited power insofar as it does not capture and control for 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. Regression analysis does complement contingency table analysis because it allows one to study the impact of the relevant variables (the flow–performance relationship) while controlling for other fund characteristics (e.g. age of the fund, market structure, fees, demand persistence, etc.) that may have an impact on fund flows.

We estimate the model (3) below by OLS, with clustered standard errors and time (month) fixed effects, like in Huang et al. (2007), taking advantage of the pooled characteristics of our sample:

$$\mathrm{NCF}_{ft} = f\big(\mathrm{PERF}_{ft-1}, \mathrm{PERF}_{ft+1}, \mathrm{SIZE}_{ft-1}, \mathrm{SIZE\,MC}_{ft-1}, \mathrm{FEES}_{ft}\ , \mathrm{AGE}_{ft}, \mathrm{MkGrowth}_{t}, \mathrm{NCF}_{ft-1}\big) \qquad (3)$$

In line with the analysis performed in Section 3, the dependent variable is the normalized capital flows of fund f in month t.[19] Amongst the regressors we include lagged performance (PERF_{t-1}), our main variable of interest (Jain and Wu 2000; Sapp and Tiwari 2004; Goriaev et al. 2008). This variable is computed in a number of ways in order to check the robustness of the results and in light of the fact that the performance measurement to which the investors react is not clear. As for the calculation method, raw returns and Carhart's alphas were used. The following lags were tested (see Table 4): the month (Panel A), quarter (Panel B) and year (Panel C).[20] An insignificant coefficient would contradict the reaction hypothesis. We expect a negative or insignificant coefficient, in line with the contingency table results.

[18]Analysis fund by fund (results not shown) allows us to conclude that there are funds that are systematically winners (more than one third). Other funds (around one third of the sample) are repeatedly losers. These results confirm the evidence of demand persistence shown in Table 3.

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

[20]Cashman et al. (2007) find evidence that investors do react to performance over windows shorter than the year.

Table 4 Normalized capital flows: pooled regressions

	Panel A		Panel B				Panel C	
	Monthly performance		Quarterly performance				Annual performance	
	Raw returns		Raw returns		Carhart model		Raw returns	Carhart model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.427***	0.427***	0.429***	0.432***	0.282***	0.198***	0.166**	0.208***
	3.54	3.50	3.55	3.55	2.73	2.80	2.30	2.84
$PERF_{t-1}$	−0.177	−0.181	−0.528	−2.535	−0.055	−0.420	−1.200	0.637
	−0.61	−0.62	−0.84	−0.98	−0.15	−0.50	−0.49	0.54
Age	−0.098***	−0.097***	−0.098***	−0.096***	−0.079***	−0.063***	−0.061***	−0.065***
	−4.85	−4.79	−4.85	−4.78	−4.07	−4.44	−4.14	−4.44
Fees	0.425***	0.441***	0.426***	0.427***	0.436***	0.373***	0.300**	0.244**
	2.79	2.87	2.80	2.80	3.16	3.10	2.43	1.96
SIZE MC_{t-1}	0.006	0.006	0.006	0.006	0.009**	0.005**	0.005*	0.006**
	1.16	1.17	1.16	1.17	2.14	2.08	1.87	2.14
$SIZE_{t-1}$	−0.013**	−0.013**	−0.013**	−0.013**	−0.009	−0.005	−0.003	−0.005
	−2.17	−2.18	−2.17	−2.19	−1.54	−1.13	−0.66	−1.01
MkGrowth	1.063***	1.063***	1.062***	1.061***	1.173***	1.160***	1.136***	1.146***
	2.82	2.82	2.82	2.82	3.30	3.24	3.15	3.21
NCF_{t-1}		0.001		0.001		0.001	0.001	0.001
		0.73		0.74		0.97	0.90	0.95
$PERF_{t+1}$		0.194		1.077		0.159	2.538	1.221
		0.91		1.05		0.52	1.63	1.02
N	2,771	2,749	2,768	2,757	2,731	2,709	2,583	2,579
R2	13.5%	13.6%	13.5%	13.5%	16.7%	17.0%	16.6%	16.8%

Obs.: (i) the dependent variable is the normalized capital flows (NCF), computed for each fund and period; (ii) the equations were estimated by OLS, with clustered standard errors and time (month) fixed effects; (iii) the symbols ***, ** and * show statistical significance at 1%, 5% and 10%, respectively

The control variables are the fund's size in the previous quarter ($SIZE_{t-1}$), proxied by the logarithm of the NAV of the fund, and the respective management company's size ($SIZE\ MC_{t-1}$) in the domestic mutual fund market in the three preceding months (proxied by the logarithm of the assets under the management of the company). In a number of studies the size of the fund (Jain and Wu 2000; Sapp and Tiwari 2004; Huang et al. 2007; Goriaev et al. 2008) or the fund family (Sirri and Tufano 1998; Huang et al. 2007; Goriaev et al. 2008) are used as a proxy for search costs and visibility. In the case of Portugal, the size of the management company is a proxy for the size of the financial intermediary (even more so because the distribution of funds throughout channels other than banks is virtually non-existent), and can be seen as an indicator of visibility.

It is known that the normalised capital flows benefit younger funds (Gruber 1996; Sawicki and Finn 2002; Huang et al. 2007; Goriaev et al. 2008). In order to understand by how much the effect attributed to $SIZE_{t-1}$ 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 (AGE) is included amongst the explanatory variables. AGE is the logarithm of the quarterly average of the number of years since the fund started operations, computed at the beginning of each month. Along the lines of Sirri and Tufano (1998), Sapp and Tiwari (2004), Barber et al. (2005), and Huang et al. (2007), among others, the total cost of each mutual fund (which includes subscription, management, custody and redemption costs as a percentage of the NAV of the fund), assuming a five-year investment horizon (FEES), is included as a regressor as well.[21] In fact, investors may react negatively to costs such as load fees and brokerage commissions. We also include a market growth variable (MkGrowth—the normalized aggregate flows into the domestic equity funds) as a control (Huang et al. 2007; Goriaev et al. 2008). MkGrowth controls for other factors that can have an influence on fund flows, such as sentiment shifts (Huang et al. 2007).

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 3 and documented by Jain and Wu (2000), Sapp and Tiwari (2004), and Cashman et al. (2007), among others. We expect a positive coefficient, corresponding to the strong persistence phenomenon unveiled in Section 3.3. As for $PERF_{t+1}$, it is introduced in line with the contingency table analysis performed in Section 3.2, and allows one to test the absence of the smart money effect reported in Table 2.

[21] Unlike in the US market, these are not the expression of the split of fixed costs of operations. They are percentages applied to the NAV, thus they are variable costs. This is important to understand that when new funds charge higher costs this is a commercial decision of the management company, and does not reflect any mathematical effect of fixed costs.

The regression estimates are in Table 4. There is no perceptible evidence that fund investors react to past performance (the coefficient of lagged performance is in general negative but not significant).[22] This confirms results from the contingency table analysis but contradicts the existing evidence reviewed in Section 1 for larger and complex economies and financial markets. There is also no evidence in favour of the smart money effect. There is no case for the dumb money hypothesis either.

We conclude that the most expensive funds are the most successful in attracting new capital flows.[23] 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 lower investor sophistication) to channel the savings entrusted to them to these more expensive funds. Cashman et al. (2007) and Goriaev et al. (2008) present evidence of a positive effect of load fees on net capital flows, while Sapp and Tiwari (2004) do not find such evidence, and Huang et al. (2007) report unstable coefficient estimates. However, Barber et al. (2005) find that investors react negatively to fees such as subscription fees and brokerage costs. 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 are able to launch new funds with higher costs for investors (instead of increasing fees for existing funds[24]) and still attract investors. So, there is evidence that financial intermediaries drive their costumers to funds with larger fees, and we can (at least) suspect that they launch new (and more expensive) 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 occurs, mainly, amongst the largest management companies.

We also report a positive coefficient for the market growth variable (consistent with the evidence presented by Huang et al. 2007 and Goriaev et al. 2008), which by no means hinders the sign and significance of the remaining coefficients. Moreover, the largest funds seem to grow less rapidly than smaller funds, in much the same way that old funds tend to lose market share. In fact, the coefficient of $SIZE_{t-1}$ is negative in all regressions (and significant in regressions 1 to 4), which means that bigger funds tend to lose market share; the AGE variable exhibits a negative coefficient in all regressions (and

[22] 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 Portugal, the typical investor, at most, has access to rudimentary performance measures (such as historical returns). It seems that in Portugal investors lack the ability to understand the information, or they do not care to get informed.

[23] The coefficient of FEES is always positive and significant.

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

strongly significant), meaning that the youngest funds are preferred by capital inflows. These results are consistent with the existing literature: Jain and Wu (2000), Sawicki and Finn (2002), Sapp and Tiwari (2004), Huang et al. (2007), Cashman et al. (2007) and Goriaev et al. (2008) report a negative size effect, and Sawicki and Finn (2002), Huang et al. (2007) and Goriaev et al. (2008) a negative age effect on capital flows.

In terms of the SIZE MC coefficient, our results provide evidence that the visibility of the financial intermediary influences net capital flows. Sirri and Tufano (1998), Jain and Wu (2000), Barber et al. (2005), Huang et al. (2007) and Goriaev et al. (2008) present evidence that funds belonging to larger families, funds advertising in financial magazines, and funds with higher marketing and distribution fees tend to attract larger flows. Finally, positive (although not significant) coefficients for the lagged NCF variable were found, which can be interpreted as evidence of demand persistence.[25]

In addition to the results presented thus far, we have undertaken the following robustness tests (results not reported in the interest of space but available from the authors upon request). Firstly, we used a methodology similar to that used by Carhart (1997) and Sirri and Tufano (1998), and more recently by Chen et al. (2004), Cashman et al. (2007) and Huang et al. (2007), which consists of individually analysing the observations of each period. In other words, an explanatory model of the NCF variable was estimated for each month using 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). Given that this methodology is unable to handle time-specific observations, we estimated model (3) excluding the MkGrowth variable, again for the month, quarter and year lags. Our results confirm the absence of reaction, as well as the smart/dumb inexistency hypotheses (the coefficient of future performance—$PERF_{ft+1}$—is not significant in any regression). The results also confirm the AGE, FEES, SIZE MC, NCF and SIZE effects. Positive and significant (in two cases) coefficients for the lagged NCF variable were found, which can be interpreted once again as evidence of demand persistence. Besides, we get a significant negative coefficient for SIZE in one regression, reinforcing the idea that funds with the largest market share in the equity fund segment tend to grow less rapidly than smaller funds.

Secondly, we split funds into positive and negative performers and estimate model (3) accounting for the possibility of different reaction to positive and negative performance. The results were essentially unchanged, with no evidence of reaction to either negative or positive performance.

[25] We have run our regressions with the fund market share and management company market share variables instead of the logarithm of fund and company size, and with the age of the fund in years. Results are similar and not reported.

5 Conclusions

The results presented in this paper add to our understanding of the behaviour of mutual fund investors in small markets. We conclude that, instead of the convexity of the flow–performance relationship shown for large financial markets, the small Portuguese market is characterized by an absence of performance reaction that cannot be attributed to the complexity of the market or search costs related to the dissemination of information. On the contrary, it could be attributed to lower investor sophistication or conflicts of interests in the context of the Portuguese universal banking industry. On the other hand, the transaction costs of disinvestment may decisively influence investor behaviour, being an obstacle to the penalization of poor performance. This deserves further research.

As regards performance anticipation, we reject both the smart and the dumb money hypothesis. We find that capital flows in one period are independent from the fund performance in the following period. Besides, we find support to the demand persistence hypothesis. Effectively, there are funds that are systematically winners and other funds that are repeatedly losers. Our results are aligned with the existing evidence for larger markets in several other aspects. In fact, it was concluded that bigger and older funds tend to lose market share, and that the most expensive funds grow relatively faster than other funds.

Additionally, given that management companies with more than one fund often launch new funds that are more expensive than the ones they currently manage, we conclude that these companies were able to launch new equity funds with higher fees for investors and still attract new investment. Moreover, search costs are not a deterrent of fund net flows, and this enables management companies to increase the discretionary power they already have. These results support the argument that management companies use the discretionary power resulting from their reputation and the unwillingness of their customers to bear search costs (and/or lower investor sophistication) to channel the savings entrusted to them to these more expensive funds. These results deviate from the existing evidence for larger markets, where it is documented that investors react negatively to mutual fund fees. Our results lead one to question whether in other markets without all the specific characteristics of the Portuguese one also exhibit an absence of performance reaction and whether in those markets financial intermediaries have the capacity to drive customers to funds with higher fees.

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