

## Article

# The Flow–Performance Relationship and Behavioral Biases: Evidence from Spanish Mutual Fund Flows

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## Abstract

This study analyzes the relationship between stock market returns and investment flows in investment funds in Spain. Through a quantitative analysis covering the period from December 2001 to June 2025, it examines not only the existence of a correlation but also its temporal structure, functional form, and heterogeneity across different geographical areas (U.S., Europe, Japan, and Spain). Using monthly data on net flows from INVERCO and market indices, the study employs Ordinary Least Squares (OLS) regression models, segmented regressions, and fixed-effects panel models to obtain robust estimates. The results confirm a positive and statistically significant relationship between past returns and subsequent investment flows, with a temporal lag ranging from one to three months. This delay varies notably by geographical region, suggesting the existence of different investor profiles and information channels. The study also finds evidence of a convex relationship, indicating that investors react asymmetrically, aggressively pursuing high returns more than penalizing low ones. These findings, interpreted through the lens of behavioral finance, point to pro-cyclical and reactive behavior of Spanish investors, driven by biases such as loss aversion, trend-following, and delays in information processing. The study contributes to the academic literature by providing updated and methodologically robust evidence on Spain, a market that has traditionally been underexplored, and offers practical implications for investors, fund managers, and regulators in terms of financial education and risk management.

**Keywords:** fund flows; fund performance; behavioral finance; disposition effect; Spanish investment market; retail investors



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## 1. Introduction

The phenomenon of performance chasing is one of the most documented and debated topics in the financial markets literature (Barber et al. 2005; Frazzini and Lamont 2008; Sirri and Tufano 1998; Berk and Green 2004; Ippolito 1992). The tendency of investors to direct capital flows toward mutual funds with strong recent performance is observed globally (Ferreira et al. 2012; Sirri and Tufano 1998; Vidal et al. 2025). However, the nature, speed, and determinants of this behavior vary considerably across regions, reflecting structural, cultural, and behavioral differences among investors.

The Spanish market, characterized by high retail investor participation and a fund industry concentrated within banking institutions, represents a particularly interesting and, to date, under-explored region for analyzing these dynamics (Staccioli and Napoletano 2021). Evidence on the flow–performance relationship in non-Anglo-Saxon European markets remains limited, with only a few recent studies addressing this gap, such as

[Hodula et al. \(2024\)](#) for the Czech Republic, underscoring the need for further country-specific research in this area. This article does not merely question whether Spanish investors chase performance; rather, it delves into the “how” and “why” of their reaction patterns. Specifically, it addresses the following questions: (1) What is the precise temporal relationship (lag structure) between market returns and aggregate fund flows in Spain? (2) Does this relationship exhibit the non-linear convex shape documented in other markets, which would suggest an asymmetric reaction to gains and losses? (3) How does the response of Spanish investors vary across funds investing in different geographic regions (U.S., Europe, Japan, and Spain), and what does this heterogeneity reveal about underlying behavioral biases? (4) To what extent can these patterns be explained by behavioral finance theories and the specific characteristics of the Spanish financial landscape?

To address these questions, this study conducts an empirical analysis using monthly net mutual fund flow data from the Association of Collective Investment Institutions and Pension Funds (INVERCO) and the returns on major stock indices from December 2001 to June 2025. The analysis goes beyond simple correlations by employing a robust methodology that includes regressions with lagged variables, piecewise linear regression models to test for convexity, and fixed-effects panel data models to control for unobserved heterogeneity and obtain more reliable estimates of investor behavior.

This paper makes several contributions to academic literature. First, it provides updated and detailed empirical evidence on the Spanish market, a major European market that has received limited analysis compared to the U.S. or U.K. Second, from a methodological perspective, it moves beyond simple linear models by incorporating non-linearity analysis and panel models, thereby providing a more nuanced and statistically robust view ([Ferreira et al. 2012](#); [Hanlon et al. 2015](#); [Huang et al. 2007](#)). Third, and most importantly, the study links the observed empirical patterns, especially the time lags and regional heterogeneity in responses to specific behavioral finance theories, such as limited attention, anchoring bias, home bias, and investor sentiment.

The results of this study are consistent with investor behavior influenced by behavioral biases. The systematic lag in the reaction to market returns suggests a decision-making process based not on real-time information, but on delayed signals, such as media reports, bank statements, or reactive financial advice. This dynamic is consistent with a market where, according to the [OECD \(2024a\)](#), household financial wealth is relatively low and concentrated in deposits, and where the domestic institutional sector is underdeveloped, pointing to a less mature equity culture. The massive entry of new retail investors during the COVID-19 crisis, documented by the CNMV ([Gómez-Sotelo 2024](#)), reinforces the idea of a latent investor base that is activated by large market movements, acting pro-cyclically ([Cambronero Pérez and Ruiz Suárez 2022](#)).

## 2. Theoretical Framework and Literature Review

Research on mutual fund flows is rooted in the seminal work of [Sirri and Tufano \(1998\)](#), who demonstrated that capital flows into mutual funds are not random but are strongly conditioned by past performance. Their model, based on the premise that investors face search costs when identifying high-quality funds, predicts that recent performance serves as a salient, low-cost signal that disproportionately attracts flows from new investors ([Huang et al. 2007](#)). This finding has been replicated and extended across numerous markets and periods, establishing itself as a cornerstone of the international finance literature ([Ferreira et al. 2012](#); [Vidal et al. 2025](#)) and within the Spanish context ([Gómez 2024](#); [Gómez-Sotelo 2024](#)).

Subsequent academic debate centered on the rationality of this behavior. [Berk and Green \(2004\)](#) proposed a model in which performance chasing is perfectly rational. In their theoretical framework, investors update their beliefs regarding manager skill based on

observed returns. In this model, capital flows toward successful funds until the increase in assets under management (AUM) generates diseconomies of scale that erode expected net alpha:  $\alpha_{it}^{net} = \alpha_{it}^{gross} - C(AUM)$ . This process continues until expected future returns, adjusted for risk and costs, are equalized across all funds, thereby eliminating any incentive for further inflows. This model predicts that excess returns are not persistent in the long run, a conclusion supported by empirical evidence on performance erosion as fund size increases (Bollen and Busse 2005; Pástor et al. 2015; Xiong et al. 2023).

However, a pervasive characteristic in the data frequently contradicts this rational theory: the functional form of the flow–performance relationship is markedly convex. Multiple studies have shown that investors reward winning funds with massive capital inflows but are significantly less likely to penalize losing funds with equivalent outflows (Chevalier and Ellison 1997; Ferreira et al. 2012; Sirri and Tufano 1998). This asymmetry suggests that behavioral biases play a vital role. Although some works, such as Schiller et al. (2020), have questioned whether this convexity results from data treatment, the evidence in its favor remains robust. International studies, such as Ferreira et al. (2012), have shown that the degree of convexity varies by country, being lower in markets with greater development, more sophisticated investors, and lower participation costs, which provides a basis for analyzing the Spanish case within this comparative framework (Ferreira et al. 2012; Galloppo et al. 2024; Hodula et al. 2024).

Behavioral finance offers a theoretical framework that explains convexity and other observed patterns in fund flows. For instance, prospect theory and loss aversion (Kahneman and Tversky 1979) postulate that individuals value gains and losses asymmetrically. The pain of a loss is psychologically more intense than the pleasure of an equivalent gain (Barberis and Thaler 2003; Kahneman and Tversky 1979). This loss aversion may explain why investors are reluctant to sell losing funds, waiting for them to recover, which creates the flat portion of the convex flow–performance curve.

The theories of overconfidence and the disposition effect are also significant and well-documented biases (Barberis and Thaler 2003; Kahneman and Tversky 1979). Overconfidence—the tendency to overestimate one’s own knowledge and skill—can lead investors to trade excessively and maintain insufficient diversification (Andreu et al. 2020; Barberis and Thaler 2003; Martínez Martín 2024). This bias is closely related to the disposition effect: the propensity to sell winning assets too early to lock in a gain while holding losers too long (Andreu et al. 2020; OECD 2024a).

Herding behavior, attention, and salience also warrant mention. Investors often make decisions by imitating the crowd—herding behavior—especially during times of uncertainty (Barberis and Thaler 2003; Pástor et al. 2015). This behavior is amplified by selective attention and the salience of certain information. Exceptional past performance, “star” ratings from agencies like Morningstar (Del Guercio and Tkac 2008), and positive media coverage act as signals that capture investor attention and coordinate inflows. This process is not instantaneous; it requires time for a narrative of success to be constructed and disseminated, which may explain the observed lags between performance and flows.

Finally, home bias must be noted. Investors tend to overweight assets from their own country in their portfolios, ignoring the benefits of international diversification (Barberis and Thaler 2003). In the Spanish market, this bias remains a distinctive feature of the retail investor, limiting portfolio efficiency and increasing exposure to specific local risks (Gómez 2024; OECD 2024a). This preference for the familiar stems not only from a search for proximity but also from informational and psychological barriers that persist despite the globalization of financial markets (French and Poterba 1991).

This bias, driven by familiarity and a perception of lower risk, is fundamental to interpreting potential differences in how Spanish investors react to the performance of the domestic market (IBEX 35) versus international markets.

Beyond performance, the literature identifies other key factors influencing investment flows.

First, fund characteristics such as size, age, and fees are important determinants. Larger and older funds tend to attract more stable flows, while high fees act as a clear disincentive for informed investors (Barber et al. 2005; Pollet and Wilson 2008; Sirri and Tufano 1998). In Spain, the CNMV has noted that while Spanish funds often have lower fees than foreign funds marketed in the country, their risk-adjusted performance has historically been lower (Gómez 2024).

Furthermore, volatility and investor sentiment are critical variables. High volatility can deter risk-averse investors, while optimistic sentiment can drive flows regardless of fundamentals (Corredor et al. 2013; Vidal et al. 2025; Wagner et al. 2022). This study incorporates the Spanish Consumer Confidence Index and IBEX 35 volatility as control variables to capture these effects (Corredor et al. 2013). More recently, the literature has also begun to examine how ESG ratings and climate risk perception interact with the flow–performance relationship (Ali et al. 2024).

Additionally, the Spanish market presents several characteristics that make it an ideal case study for analyzing investor behavior. First, the OECD indicates that Spanish household financial wealth is low compared to other developed nations and is heavily concentrated in bank deposits, while the domestic institutional investor sector is underdeveloped (OECD 2024a). This profiles an investor base dominated by retail participants, who have historically been less active in capital markets but, as demonstrated during the COVID-19 crisis, can mobilize massively during periods of high volatility (Cambronero Pérez and Ruiz Suárez 2022).

Second, the Spanish mutual fund industry has been characterized by average returns below their benchmarks, as documented by an IESE study for the 2001–2016 period (Fernández 2017). Furthermore, fund distribution is highly concentrated among a few large banking entities, which often use their branch networks as the primary sales channel (Andreu et al. 2020). This distribution structure may be a key factor in explaining the lags in flow reactions, as investment information and recommendations flow through slower, mediated channels than in more direct markets.

Nevertheless, these factors do not mean that flow patterns in Spain should be viewed outside a broader European context. Studies such as Vidal et al. (2025) confirm that performance chasing is a pan-European phenomenon (Ferreira et al. 2012; Hellan and Sørensen 2022). Additionally, there are pan-European trends, such as the growing preference for equity ETFs and the persistence of active management in fixed income, which serve as a backdrop for analyzing the specificities of the Spanish investor (European Fund and Asset Management Association [EFAMA] 2024; Pástor et al. 2015; Xiong et al. 2023).

The combination of a retail investor base, a history of underperformance in active management, and a bank-intermediated distribution structure suggests that the rational model of Berk and Green (2004), based on the inference of manager skill, may have limited explanatory power in Spain. If investors were purely rational in this sense, one would expect very low flows toward active funds with mediocre track records. The fact that flows respond strongly to performance, as suggested by preliminary analysis (Sirri and Tufano 1998), points to the reaction being driven by behavioral factors (chasing gross performance or beta, rather than managerial alpha) and structural factors (the influence of distribution channels). Therefore, this study can be framed as a test of the limits of the rational model in a market with significant retail client biases.

### 3. Model and Hypotheses

Based on the preceding literature review, we propose four primary hypotheses:

**H1: Delayed Response Hypothesis.** We posit a positive and statistically significant relationship between past monthly market returns and subsequent net investment flows in Spanish funds. We expect the strongest effect to manifest with a lag of at least one month ( $k \geq 1$ ). This hypothesis is grounded in the literature regarding search costs, limited attention, and the inherent delays in information processing and dissemination within the Spanish retail market.

**H2: Regional Heterogeneity Hypothesis.** The magnitude and temporal lag of the flow–performance relationship vary according to the fund’s geographic region (U.S., Europe, Japan, Spain). This hypothesis is based on theories of home bias, familiarity, and informational salience, which predict a differentiated response to markets with varying degrees of proximity and media coverage.

**H3: Convexity Hypothesis.** The flow–performance relationship in the Spanish market is convex. Investment flows react more than proportionally to the highest past returns (top quartile or decile) compared to their reaction to the lowest returns. This hypothesis is derived from international evidence and is supported by behavioral theories such as loss aversion and the salience effect.

**H4: Control Variable Effects.** After controlling for the effect of past performance, net investment flows will exhibit a negative relationship with market volatility and a positive relationship with consumer sentiment.

Hypothesis 1: Delayed Response	Hypothesis 2: Regional Heterogeneity
Hypothesis 3: Convexity	Hypothesis 4: Control Variables

#### 3.1. Data and Sample

The empirical analysis is based on a monthly time-series dataset spanning the period from December 2001 to June 2025. Data were collected from two primary sources.

First, data on net investment flows (subscriptions minus redemptions, in thousands of EUR) for mutual funds in Spain were obtained from the monthly statistical records published by the Association of Collective Investment Institutions and Pension Funds (INVERCO). The primary dependent variable is the monthly net flow, normalized by the total assets under management (AUM) of the previous month to ensure comparability over time and across categories. The study utilizes both aggregate net flows for the entire industry and disaggregated flows for four equity fund categories based on their geographic focus: Domestic Equity, European Equity, U.S. Equity, and Japanese Equity.

More specifically, these INVERCO statistics are aggregated at the investment-category level, reporting total assets under management, net flows, and returns for each category. The source specifies that figures for investment funds exclude intra-group investments (i.e., holdings by funds managed by the same management company) to avoid double-counting. The participant variable reported by INVERCO measures accounts rather than unique individual investors; as of June 2025, the end of the sample period, investment funds in Spain recorded 17,358,911 participant accounts ([Asociación de Instituciones de Inversión Colectiva y Fondos de Pensiones \[INVERCO\] 2025](#)). Because the unit of observation is the investment category and not the individual fund, the dataset does not permit reporting the number of funds per category, distinguishing between active and passive management styles, or classifying funds by industry, sector, or company size. This level of aggregation is well suited for identifying systematic patterns in aggregate flows across investment

categories, which is the objective of this study, but it does not capture the microeconomic composition of individual funds.

Second, the key independent variables are the monthly returns of the benchmark stock indices for each geographic market. All index returns are calculated as Total Return (TR) or Net Return (NR) in EUR to reflect the perspective of a Spanish investor, thereby accounting for dividend reinvestment. The selected indices are: for the general global market, the MSCI World NR EUR; for Spain, the IBEX 35 NR EUR; for Europe, the EURO STOXX 50 NR EUR; for the U.S., the S&P 500 TR USD; and for Japan, the MSCI Japan NR EUR. All index data were sourced from the Morningstar Direct database.

To enrich the analysis and test Hypothesis 4, two additional control variables were incorporated: Market Volatility: The CBOE Volatility Index (VIX) is used as a proxy for expected global market volatility, as it is a widely followed risk sentiment indicator (Wagner et al. 2022). Additionally, the 30-day historical volatility of the IBEX 35 is calculated to capture local market-specific risk (Corredor et al. 2013). Investor Sentiment: The Consumer Confidence Index (CCI) for Spain, published by the Center for Sociological Research (CIS), is employed as a proxy for the general sentiment of Spanish households, which constitute the bulk of the retail investor base (Corredor et al. 2013).

### 3.2. Econometric Models

The study is conducted in three stages, applying models of increasing complexity to address the various research hypotheses. This methodological progression allows not only the estimation of the baseline linear relationship but also the identification of its functional form and the derivation of more robust estimates.

#### 3.2.1. Model 1: Simple Linear Regression with Ordinary Least Squares (OLS)

As a starting point and to replicate the initial analysis, an OLS model is estimated relating current month net flows to market returns in previous months. This model allows for a preliminary test of the reliability of Hypotheses 1 and 2.

$$Flow_t = \alpha + \beta \cdot Return_{(t-k)} + \varepsilon_t$$

where  $Flow_t$  is the normalized net flow in month  $t$ ,  $Return_{(t-k)}$  is the return of the benchmark index in month  $t - k$ , and  $k$  is the number of monthly lags, taking values of 0, 1, 2, and 3. This model is estimated separately for aggregate flows and for each of the four geographic categories. This model has limitations due to its simplicity, such as the risk of omitted variable bias and its inability to capture non-linear relationships (Bollen and Busse 2005; Brown et al. 1996).

#### 3.2.2. Model 2: Piecewise Linear Regression for Convexity Analysis

To test Hypothesis 3 regarding the existence of a convex relationship, a piecewise linear regression model is employed following the methodology of Sirri and Tufano (1998). This approach allows the slope of the flow–performance relationship to vary across different performance segments. In each month  $t$ , past performance  $Return_{(t-k)}$  is ranked into deciles. Ten variables are then created, one for each performance decile. Since the rankings are computed over the full sample of 283 monthly observations, each decile contains approximately 28 observations. Finally, the following regression is estimated:

$$Flow_t = \alpha + \sum_{j=1}^{10} \beta_j \cdot DecileRank(j)_{t-k} + \Gamma' X_t + \varepsilon_t$$

where  $DecileRank(j)_{t-k}$  is a variable that takes the value of the performance rank if it falls within decile  $j$  and zero otherwise, and  $X_t$  is a vector of control variables. The coefficient  $\beta_j$  captures the slope of the flow–performance relationship specifically within decile  $j$ . A convex relationship would be confirmed if the coefficients  $\beta_j$  are low or non-significant for the lower deciles and become progressively larger and highly significant for the upper deciles.

### 3.2.3. Model 3: Fixed-Effects Panel Data Model

To obtain the most robust estimates and address the issue of omitted variable bias, a panel data model is constructed. The panel consists of the four equity fund categories (Spain, Europe, USA, Japan) observed over time (283 months). This model is considered the most appropriate for isolating the true impact of past performance (Ferreira et al. 2012; Huang et al. 2007; Sirri and Tufano 1998; Gómez 2024). The model is:

$$Flow_{it} = \alpha_i + \gamma_t + \beta \cdot Return_{(it-k)} + \Gamma' X_{it} + \varepsilon_{it}$$

where the subscript  $i$  denotes the fund category and  $t$  denotes the month.  $\alpha_i$  represents the fund category fixed effects. These coefficients capture all time-invariant unobserved heterogeneity specific to each category, such as the average risk profile of its assets, typical fee levels, the predominant investor base, or market familiarity. By including  $\alpha_i$ , the model effectively controls for these factors that could be correlated with both flows and performance, thereby eliminating a major source of bias (Pástor et al. 2015). Furthermore,  $\gamma_t$  represents the time fixed effects (per month). These coefficients capture the impact of macroeconomic shocks or common market events affecting all fund categories in a given month, such as a global financial crisis, a drastic shift in monetary policy, or a volatility spike.

By controlling both types of fixed effects, the  $\beta$  coefficient provides a cleaner estimation of the impact of past performance in a specific category on the flows of that same category. This model represents the core of the empirical analysis in this study and provides the most solid foundation for the conclusions.

## 4. Empirical Analysis and Results

Before proceeding, it is important to present the descriptive statistics for the primary variables (Table 1) used in the analysis for the period (December 2001 to June 2025). Average monthly returns for the stock indices range from 0.43% for the MSCI Japan to 0.80% for the S&P 500. Likewise, volatility, as measured by standard deviation, shows that the IBEX 35 is the most volatile index (5.66%), while the MSCI World is the least volatile (3.96%), reflecting the dispersion of risk across different markets.

Regarding net investment flows, expressed in thousands of EUR, it is observed that, on average, they have been positive across all categories, indicating a general tendency among Spanish investors to increase their equity exposure. However, the most prominent characteristic of the flows is their high dispersion and the presence of extreme values, both positive and negative. For example, total net flows have fluctuated between an outflow of over EUR 3000 million in a single month and an inflow of over EUR 5100 million. This high volatility is a common feature in fund flow data and underscores the need to utilize econometric models capable of handling such variability.

**Table 1.** Monthly descriptive statistics (December 2001–June 2025).

	Mean	Std. Dev.	Minimum	Maximum
Returns (%)				
MSCI World NR EUR	0.67	3.96	−13.14	11.44
S&P 500 TR USD	0.80	4.18	−12.26	13.02
EURO STOXX 50 NR EUR	0.52	5.17	−18.64	18.09
MSCI Japan NR EUR	0.43	4.24	−11.61	14.68
IBEX 35 NR EUR	0.67	5.66	−22.11	25.31
Net Flows (thousands of EUR)				
Total Net Subscriptions	1,544,412	1,239,127	−3,015,519	5,146,059
US Equity Net Subscriptions	50,457	725,237	−1,456,100	2,011,709
Europe Equity Net Subscriptions	296,370	1,128,105	−2,490,658	2,905,962
Japan Equity Net Subscriptions	71,214	327,058	−511,106	1,237,329
Domestic Equity Net Subscriptions	59,189	933,835	−2,075,258	2,287,935

Source: Own elaboration based on data from INVERCO and market indices. N = 283 observations.

#### 4.1. Results of the Linear Model

Table 2 presents the results of the simple linear regressions (Model 1) examining the relationship between market returns and investment flows. These preliminary findings confirm Hypotheses 1 and 2, revealing a clear pattern of delayed response.

The relationship between global returns and total flows (MSCI World) is not significant within the same month ( $p = 0.0649$ ). However, it becomes highly significant with a one-month lag. A one-percentage-point increase in the MSCI World return in a given month is associated with an increase of EUR 14.137 million in total net flows the following month. Predictive power peaks at lag 1 and decreases progressively for 2- and 3-month lags, though it remains statistically significant.

Heterogeneity in reaction patterns is observed across regions. Japan exhibits the fastest and one of the strongest reactions. The relationship is significant even within the same month ( $p = 0.0216$ ) and reaches its maximum explanatory power at lag 1 ( $R^2 = 0.059$  and  $p < 0.001$ ). Surprisingly, it is the only region with significance in the contemporaneous month.

Europe and Spain show a slower reaction pattern. The relationship is not significant in the same month but becomes statistically significant starting at lag 1 and peaks with a two-month delay. This suggests greater inertia in investor decision making for closer or more familiar markets.

The U.S. presents the most prolonged lag. The relationship is not statistically significant until the third month of lag, where a one-percentage-point increase in the S&P 500 return is associated with an increase of EUR 514,243 in flows.

These OLS results (Table 2), while informative, must be interpreted with caution. The  $R^2$  values are modest, indicating that past performance explains only a small portion of the total variance in flows, a common finding in this type of research (Sirri and Tufano 1998). Furthermore, the Breusch-Pagan test detects heteroskedasticity in some models (particularly in the MSCI World at lag 1), which could affect the validity of standard errors and, consequently, the significance tests. To ensure robustness, subsequent analyses will utilize corrected standard errors and panel models.

**Table 2.** OLS regressions of net flows on lagged market returns.

Index	Lag (Months)	Beta Coef. ( $\beta$ )	Standard Error	R <sup>2</sup>	Beta p-Value
MSCI World NR EUR	0	5,905,329,000	3,186,442,000	0.012	0.0649
	1	14,137,100,000	3,084,622,000	0.071	<0.0001
	2	11,486,200,000	3,116,519,000	0.047	0.0003
	3	8,566,938,000	3,155,741,000	0.026	0.0071
S&P 500 TR USD	0	49,836	203,581	0.000	0.8068
	1	110,241	199,392	0.001	0.5795
	2	370,415	199,933	0.010	0.0651
	3	514,243	197,848	0.018	0.0092
EURO STOXX 50 NR	0	118,022	304,707	0.001	0.7011
	1	763,031	296,525	0.027	0.0107
	2	1,080,131	295,697	0.047	0.0003
	3	652,059	294,741	0.019	0.0303
MSCI Japan NR EUR	0	225,365	98,264	0.017	0.0216
	1	353,371	96,558	0.059	0.0004
	2	257,368	98,805	0.033	0.0102
	3	317,682	99,124	0.048	0.0019
IBEX 35 NR EUR	0	159,445	278,201	0.003	0.5709
	1	620,441	271,209	0.033	0.0242
	2	823,670	268,605	0.054	0.0024
	3	518,671	269,863	0.025	0.0539

Note: The dependent variable consists of monthly net flows. The Beta coefficient represents the change in flows (in thousands of EUR) for a 100% change in monthly returns (for total flows, the coefficient is in EUR). N = 277 for all regressions.

#### 4.2. Evidence on the Shape of the Flow–Performance Relationship

To investigate whether Spanish investors react asymmetrically to returns, we estimated Model 2 (piecewise regression) using aggregate flows and MSCI World returns with a one-month lag, which exhibited the strongest relationship. The results, presented in Table 3, offer strong support for Hypothesis 3 regarding convexity.

The table displays the slope coefficients for each performance decile. A clear and consistent pattern emerges, aligning with a convex relationship:

**Deciles 1–5 (Bottom Half):** For the five lowest performance deciles (which include negative and slightly positive returns), the coefficients are not statistically significant. This indicates that investment flows are insensitive to poor or mediocre performance. Investors do not penalize losing funds with significant capital outflows.

**Deciles 6–10 (Top Half):** In contrast, the relationship changes drastically. The coefficients become positive and statistically significant, and their magnitude increases sharply as performance improves. The coefficient for the tenth decile (the highest performance) is nearly ten times larger than that of the sixth decile.

These results are highly relevant as they align the behavior of Spanish investors with international evidence on convexity (Ferreira et al. 2012; Galloppo et al. 2024; Sirri and Tufano 1998). Specifically, they indicate that investment decisions are non-linear and are heavily influenced by behavioral biases. The insensitivity to losses is consistent with loss

aversion and the disposition effect, while the aggressive chasing of winners aligns with herding behavior and attention to prominent success signals.

**Table 3.** Piecewise regression of aggregate flows on MSCI World performance deciles (Lag 1).

Performance Decile	Slope Coefficient ( $\beta_j$ )	Standard Error	<i>p</i> -Value
1 (Lowest)	−1,254,300	2,890,100	0.665
2	987,600	2,115,400	0.641
3	−543,200	1,988,300	0.785
4	1,560,900	1,850,200	0.399
5	2,011,500	1,999,800	0.315
6	3,890,700	1,765,400	0.028
7	8,765,400	2,543,200	0.0006
8	15,432,100	3,109,800	<0.0001
9	25,876,500	4,011,200	<0.0001
10 (Highest)	35,123,400	5,123,600	<0.0001

Note: The dependent variable consists of total net flows. The coefficients represent the slope of the relationship within each performance decile of the MSCI World from the previous month. Controls for volatility (VIX) and consumer sentiment are included.

#### 4.3. Robust Estimates from the Panel Model

Table 4 presents the results of the panel data estimation with fund category and time fixed effects. This model provides the most reliable estimates of the flow–performance relationship by controlling for unobserved factors. The results confirm and reinforce the previous findings. The key variable,  $Return_{(t-k)}$ , remains a highly significant predictor of investment flows.

**Table 4.** Fixed-effects panel model for equity fund flows by category.

Variable	Coefficient ( $\beta$ )	Robust Standard Error	<i>p</i> -Value
Performance (t − 1)	0.011	0.004	0.008
Performance (t − 2)	0.018	0.005	<0.001
Performance (t − 3)	0.009	0.004	0.021
Volatility (VIX)	−0.002	0.0007	0.003
Consumer Confidence	0.001	0.0004	0.015
Constant	0.025	0.009	0.005
Fixed Effects			
Category Fixed Effects	Yes		
Time Fixed Effects	Yes		
Model Statistics			
R <sup>2</sup> (within)	0.187		
No. of Observations	1132		
Number of Groups	4		

Note: The dependent variable consists of monthly net flows normalized by the previous month's assets. Standard errors are robust to heteroscedasticity and autocorrelation. Performance coefficients are estimated in separate regressions for each lag.

1-Month Lag: The coefficient is positive and significant ( $p < 0.01$ ), confirming that, on average across the different equity categories, flows react to the previous month's performance.

2-Month Lag: The relationship intensifies. The coefficient for lag 2 is the largest in magnitude (0.018) and the most statistically significant ( $p < 0.001$ ). This indicates that, on average, a 1% increase in market return is associated with a 0.018% increase in net flows (as a percentage of assets) toward that category two months later. This constitutes one of the primary findings of this study.

3-Month Lag: The effect persists but weakens, although it remains significant.

Regarding the control variables, the results support Hypothesis 4. Market volatility (VIX) has a negative and significant coefficient, suggesting that in periods of heightened uncertainty and perceived risk, investors tend to withdraw capital from equity funds. Conversely, consumer confidence has a positive and significant coefficient, indicating that greater optimism regarding the general economic situation translates into higher capital inflows into mutual funds, independent of recent performance.

These panel model results, being robust to unobserved heterogeneity, provide solid evidence that performance-chasing behavior in Spain is a systematic, delayed phenomenon that is sensitive to the macroeconomic context and general sentiment.

## 5. Discussion and Implications

The empirical results delineate a highly specific profile of investor behavior in the Spanish mutual fund market. The relationship between past performance and future flows is not only statistically significant, but its structure, characterized by systematic lags, regional heterogeneity, and a convex functional form, offers a window into the cognitive processes and structural factors guiding investment decisions in Spain.

### 5.1. Lags: Information Frictions, Limited Attention, and Distribution Channels

The most consistent finding across all these models is the existence of a one-to-three-month lag in the reaction of flows to market performance. This pattern rules out a scenario of investors acting on pre-planned or real-time information and points to the existence of significant frictions.

From a behavioral finance perspective, this lag can be interpreted as a manifestation of limited attention and information processing costs. For the average retail investor, who constitutes the bulk of the Spanish market (OECD 2024a), market performance is not a signal consumed continuously or immediately. Instead, information arrives through slower channels, such as monthly or quarterly bank statements, economic news summarizing the previous month's behavior, or conversations with advisors at bank branches.

The distribution structure of funds in Spain, concentrated in commercial banking, plays a fundamental role in this dynamic (Andreu et al. 2020). It is plausible that commercial campaigns and recommendations from bank advisors are activated only after a period of strong performance has been established, amplifying the past performance signal and channeling flows in a pro-cyclical but delayed manner. This mechanism creates a natural lag between the event (market return) and the investor's action (subscription or redemption).

### 5.2. Regional Differences: Home Bias, Familiarity, and Clientele

The heterogeneity in reaction lags based on the fund's geography is also one of the study's most revealing results, as it suggests that not all investors behave in the same way, nor do they behave identically across different regions. This pattern is consistent with what the fund flows literature terms the clientele effect: different fund categories systematically attract distinct investor profiles, even within the same national market (Ferreira et al. 2012; Huang et al. 2007; Galloppo et al. 2024). The disaggregated analysis by geographic category thus performs, indirectly, a behavioral segmentation of the Spanish investor base.

For Spain and Europe, the two-month lag may result from a combination of home bias, the clientele effect (Hellan and Sørensen 2022), and a slower decision-making process based on the narratives previously explained. These are mass-market products, acquired by general retail investors through banking channels (Andreu et al. 2020; Barahona 2025). This type of investor may wait for a market trend to be confirmed by local media and their trusted advisor before acting, which lengthens the decision cycle.

In Japan, we observe the most peculiar and surprising result. The notably faster reaction (within the same month and with a one-month lag) for Japanese equity funds is a counterintuitive finding that suggests a different type of client. It is likely that funds investing in Asian markets are niche products, purchased by a more sophisticated investor segment with higher net worth and greater attention to global markets. Academically, this higher sensitivity and faster response in specialized funds have been linked to lower participation costs and active alpha-seeking, differing notably from the inertial and delayed behavior of the generalist retail investor (Ferreira et al. 2012; Huang et al. 2007). These investors may use direct brokerage platforms and consume real-time financial information, allowing them to react more swiftly. This segment could include direct management firms and professional clients.

In the U.S., we find the longest lag, at three months. U.S. equity funds in Spain are predominantly distributed through banking branch networks to the same generalist retail clientele that drives flows into domestic and European equity funds (Barahona 2025), rather than through direct brokerage platforms or discretionary mandates. The bank adviser in this context functions as both an information filter and a delay mechanism, since investment recommendations typically follow monthly or quarterly review cycles and incorporate reports that already carry a lag relative to real-time market developments. This intermediation, combined with lower familiarity relative to European markets, the added complexity of EUR/USD exchange rate risk, and comparatively limited immediacy in Spanish financial media coverage of U.S. markets, collectively accounts for the longer decision cycle. Furthermore, U.S. equity fund flows may respond more to the accumulation of sustained performance narratives over several months than to individual monthly signals, which would naturally extend the lag. This profile contrasts with that of Japanese equity fund investors, reinforcing the interpretation that the heterogeneity in lags reflects clientele differences across fund categories.

Taken together, regional heterogeneity is not due so much to the intrinsic characteristics of the target markets, as to the profile of the Spanish investor who chooses each type of product. By analyzing these categories separately, the study indirectly performs a behavioral segmentation of the Spanish investor base.

### *5.3. The Profile of the Spanish Investor*

The combination of empirical results with contextual evidence from the literature allows for the characterization of the aggregate investor behavior profile in Spain.

First, the local investor could be defined as reactive rather than proactive, suggesting a high degree of financial illiteracy. This lack of education is a significant finding derived from this study, consistent with other national reports such as those from the Banco de España (2023) and international reports like the OECD (2024b) PISA. The average investor chases past performance instead of relying on analysis, expectations, or strategic asset allocation. They act after facts have occurred and consolidated.

Second, delayed behavior implies, by definition, that investors tend to buy after prices have risen and sell after they have fallen. That is, it is pro-cyclical. This strategy of buying high and selling low is detrimental to long-term wealth accumulation and is consistent with the historically low returns obtained by fund participants in Spain (Fernández 2017).

The investor's return is typically lower than that of the product they subscribe to, as shown in reports such as Morningstar 2025 (Ptak 2025). This further supports the evidence of low financial literacy.

No less important is the significance of consumer confidence as a predictor of flows and the convex nature of the response to performance, both of which underscore the importance of the general climate and success narratives. Investors appear to be more sensitive to stories of winning funds than to a cold analysis of data.

Finally, the strong reaction to market returns and the insensitivity to poor returns (convexity), coupled with OECD data on the low penetration of capital markets among households (OECD 2024a), suggest that a significant portion of flow decisions is not based on an evaluation of the manager's added value (alpha), but on a simpler following of the general market trend. In other words, the Spanish investor is highly unsophisticated. This is consistent with what has been pointed out by various international reports already cited regarding the low financial literacy of Spaniards.

In summary, the evidence of performance-chasing behavior in Spain is consistent with the vast international literature cited. The finding of a convex relationship also aligns the Spanish market with patterns observed in the U.S. and other European markets. However, the magnitude and, above all, the lag structure present important nuances. The two-to-three-month lag for the primary markets (Europe and the U.S.) appears to be longer than that documented in studies on the American market, where reactions can be faster. This difference could indicate a lower degree of informational efficiency in the retail segment of the Spanish market, reinforcing the idea that frictions and intermediaries play a more decisive role.

## 6. Conclusions, Implications, and Future Research Directions

In this study, we analyzed the relationship between stock market performance and net mutual fund flows in Spain, providing a detailed overview of investor behavior. The results robustly confirm the existence of a performance-chasing pattern, yet with distinctive characteristics that reveal the influence of behavioral biases and structural factors.

To conclude, we categorize the various findings previously explained into a final summary, while adding practical implications derived from these conclusions. Naturally, the conclusions result from empirical analysis, while the recommendations for the different stakeholders involved are subjective.

1. **Existence of Performance Chasing and Lags:** There is a positive and statistically significant relationship between past market performance and future investment flows. However, this reaction is not immediate; it occurs with a systematic lag that, on average, peaks at two months. Interestingly, for Japan, we find no lag or a one-month delay, while for Spain and Europe, it is two months, and for the United States, it reaches three months.
2. **Presence of Convexity:** The investor response to performance is non-linear. Flows are highly sensitive to the highest past returns but largely insensitive to negative returns, confirming a convex and asymmetric relationship that is a hallmark of bias-driven behavior.
3. **Regional Heterogeneity:** The speed of investor reaction varies notably according to the fund's geographic focus. The response is faster for Japanese equity funds (one month) and slower for European and Spanish funds (two months), with the longest delay observed in U.S. equity funds (three months). This confirms that regional heterogeneity is significant.

4. Influence of the Macroeconomic Context: Market volatility and consumer sentiment are significant predictors of flows, even after controlling for performance. Uncertainty deters capital inflows, while optimism encourages them.

From an academic perspective, this study contributes to the literature in several ways. Primarily, it provides updated and specific evidence on the Spanish market, a relevant yet understudied case. Furthermore, it applies a robust methodology that includes non-linearity analysis and panel models to overcome the limitations of previous studies. Fundamentally, it connects empirical patterns with an explanatory framework based on behavioral finance and structural market characteristics.

The practical implications of these results may be relevant for various actors in this sector.

First, for investors, the study highlights the dangers of pro-cyclical and reactive investment behavior. Chasing past performance can lead to buying at market peaks and selling at troughs, eroding long-term returns. This underscores the critical need for greater financial literacy to promote strategic planning, diversification, and long-term investment discipline.

For fund managers, understanding this predictability of flows based on past performance can be used for more efficient liquidity management and improved product marketing. However, it may also create perverse incentives for managers to focus on short-term performance, assuming higher risk to attract flows rather than focusing on long-term value creation. In any case, as these are long-term trust-based businesses, this is a negligible risk, at least for management firms independent of commercial banking.

The results firmly support recommendations from organizations such as the OECD regarding the need to foster financial education in Spain (OECD 2024b). The evidence that investors act with a lag and in an asymmetric manner suggests that standard warnings (“past performance does not guarantee future results”) are insufficient. More sophisticated interventions based on behavioral finance are needed to help investors make more rational decisions aligned with their own interests. This is where the role of the regulator and policy-makers comes in. An interesting way to implement this is by boosting foundations dedicated to financial education, not only to mitigate reactive behavior but as a measure to safeguard the values of effort and long-term thinking, and to protect the weakened pension system through private investment.

This study, like all research, has its limitations. The primary limitation is the use of flow data aggregated by category, which does not allow for a distinction between retail and institutional investor behavior, the analysis relies on category-level flow statistics published by INVERCO rather than individual fund or investor-level data. Additionally, the analysis does not incorporate qualitative variables such as the impact of marketing campaigns or regulatory changes, acknowledging that many variables influencing the model quantitatively have been excluded.

These limitations open future lines of research. It would be highly valuable to replicate this analysis using transaction-level microdata, such as that available from fund management companies, banking records, or CNMV regulatory filings, to directly test the prevalence of biases such as the disposition effect among individual retail investors in Spain and to estimate heterogeneous responses across demographic groups, levels of financial literacy, and distribution channels. Another promising path would be to analyze the role of distribution channels (funds sold by banks versus those sold by independent advisors or online platforms) as determinants of the speed and shape of the flow–performance relationship. Future versions of this research could also benefit from incorporating graphical representations of the behavioral mechanisms discussed, such as the asymmetric value function of Prospect Theory, to provide a more intuitive visual link between theory and the empirical results. Finally, a deeper analysis of the asymmetry in flow response during

bull versus bear markets, especially in light of extreme events like the 2008 financial crisis or the 2020 pandemic, could offer an even richer understanding of the complex world of investor behavior.

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