

## **Mutual Fund Trading and Portfolio Disclosures**

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## **Mutual Fund Trading and Portfolio Disclosures**

### **Abstract**

This paper analyzes a unique database of monthly portfolio holdings of a large sample of Spanish domestic equity funds to test the potential manipulation of the disclosed portfolios in mandatory reports. Both trading activity measures and a new approach based on portfolio allocations both show significant differences in the investment patterns of mutual funds depending on the trading month. The results indicate that, in the reporting months, fund managers prefer large-cap and well-known stocks (i.e., Ibex-35 stocks) with incentives to increase the disclosed portfolio share of return-winners and decrease the weight of return-loser stocks. In addition, the results show that mutual funds participate actively in the January effect through the buy of small-cap stocks at the beginning of the year. Nevertheless, mutual funds own a low percentage of the total Spanish stock market capitalization, which suggests that fund managers are taking advantage of this anomaly rather than causing the January effect.

**EFM classification:** 370, 530.

**Keywords:** Mutual funds, window dressing, January effect, risk-shifting.

# Mutual Fund Trading and Portfolio Disclosures

## 1. Introduction

The manipulation of mutual fund portfolios at the end of performance reporting periods attracts large attention for empirical research. Several studies have analyzed the different incentives and consequences of this behavior on return patterns around reporting dates (Bernhardt and Davies, 2005; Carhart et al., 2002; Gallagher et al., 2009), with a special interest in the role of this institutional practice in some well-known market anomalies such as the January effect (Ackert and Athanassakos, 2000; Haugen and Lakonishok, 1988; Lee et al., 1998; Musto, 1997; Ng and Wang, 2004; Sias and Starks, 1997).

As a result of this potential manipulation, the disclosed portfolio may reveal an uninformative image of the recent management of the fund, thus highlighting agency problems between fund managers and outsiders. Managers have motivations to improve the disclosed portfolio image to create the impression that the fund is performing relatively well to attract larger money inflows (He et al., 2004; Lakonishok et al., 1991; Meier and Schaumburg, 2006; Morey and O'Neal, 2006; Musto, 1999; Ng and Wang, 2004) from investors, who mostly make investment decisions according to recent performance records (Chevalier and Ellison, 1997; Sirri and Tufano, 1998).

However, Elton et al. (2010) recently show that low portfolio data frequency (e.g., semi-annually or even quarterly data) constrains the previous evidence about portfolio manipulation and provides misleading conclusions due to unobservable trades between disclosed reports (intra-period round-trip trades). To solve this problem, our study benefits from a unique monthly portfolio database to appropriately address mutual fund trading around portfolio reports in one of the most relevant European fund industries, Spain. Please

note that this monthly database is available to the supervisory authority, but the access to this information is expensive and very restricted.

The main contributions of this paper are threefold. First, the paper focuses on whether investors can rely on quarterly mandatory portfolio reports. That is, do portfolios disclosed on a quarterly basis reveal meaningful information for fund investors? Second, the paper examines whether fund managers follow some investment strategies in disguise around these quarterly disclosures. The manipulation of disclosed portfolios should result in trading patterns around the reporting schedule different from the usual practice of the fund in the rest of the year. Finally, this study tests in detail the institutional trading during the first quarter of the year, as the highest portfolio turnover is found in these months.

Fund managers in Spain must report to investors quarterly, which exceeds the semi-annual portfolio holdings reports required by the European Union Council Directives. Indeed, our unique monthly information allows us to detect that portfolio turnover ratios based on quarterly data of Spanish equity funds lost 38% of their trades when compare to the use of monthly portfolios. Similarly, Elton et al. (2010) show that with quarterly data from U.S. stock funds, missing trades are 18.5%, whereas using semi-annual data the loss amounts to 34.2%. These comparisons should question the informative content of low-frequency portfolio reports, a bias that, as shown above, is even larger in Spain than in the U.S.

The analysis of monthly turnover ratios allows us to detect anomalous trading to determine either whether investors can trust public quarterly reports or if managers follow certain cosmetic practices. This analysis reveals several atypical trading measures: the highest monthly turnover occurs in January, whereas the lowest occurs in August, and the first quarter of the year reveals the highest trading activity. The abnormally high ratio in January might initially reflect the mutual funds' participation in the turn-of-the year effect, recently documented in the Spanish stock market (Miralles and Miralles, 2007; Ortiz et al., 2010). In

contrast, the low trading in August might reveal a summer-holidays effect in fund management. Still, the high trading levels observed in the first quarter could be consistent with risk-shifting practices because once managers disclose the portfolios at year-end, managers could have incentives to temporarily increase the portfolio risk to benefit from return opportunities. Thus, this practice should result in important and observable trading activities during the first quarter.

The availability of monthly portfolio holdings allows us to draw more robust conclusions about abnormal trading around quarter-ends and to examine whether fund managers have investment strategies in disguise around portfolio disclosures. The test of this hypothesis begins with the analysis of the trading activity, in line with Ng and Wang (2004), thus identifying the stocks that fund managers buy and sell more intensively each month. In addition, we then propose a new complementary measure that identifies strategic variations in portfolio allocation to different stock groups, that is, the identification of those stocks that more intensively increase or decrease their portfolio weights. The underlying structure of this proposal provides new insight because this approach does not analyze stocks individually, but as an entire portfolio. For instance, a manager could intensively sell a specific stock, but the overall management of the fund could make the portfolio weight of this asset increase. Considering that fund managers disclose the portfolio stock weights instead of their buying/selling activities, this complementary method captures the aforementioned effect, which Ng and Wang (2004) do not estimate.

The results of these measures show significant differences in the investment patterns of mutual funds depending on the trading month. In reporting months, mutual funds tend to rebalance their portfolios to disclose well-known stocks. However, in contrast, they tend to buy and increase the portfolio weight of the smallest-cap stocks in those months when clients

are not aware of the public reports. For instance, they seem to participate in the turn-of-the-year effect through the intensive buying of small-cap stocks in January.

In addition to these results, mutual funds seem to participate in the turn-of-the-year effect through the intensive buying of small-cap stocks in January. Unlike in the U.S. market, Spanish mutual funds own a low share of the stock market capitalization. In this sense, the above argument of institutional managers causing the January effect might be a weak one. The analysis of fund trading in the first quarter of the year would allow us to better understand the actual role that funds play in the January effect.

The rest of the paper proceeds as follows. Section 2 describes the domestic equity fund database. Section 3 includes the analysis of turnover ratios, and the empirical results of the fund investment behavior around disclosure dates. Section 4 ends the paper with the main conclusions.

## **2. Data**

The database consists of 239,971 portfolio holdings collected from 7,032 monthly reports of 125 Spanish domestic equity funds from December 1999 to December 2006. The sample excludes those funds that seemed to be misclassified as not meeting the main official investment requirement of this category (more than 75% of the portfolio contains stocks listed in Spanish stock exchange markets). Every month of the study period includes at least 91 funds, and the study is free of the well-known survivorship and look-ahead biases.

The Spanish Securities Exchange Commission (CNMV) provides this monthly information, thereby overcoming reporting selection bias, which is potentially present in the scarce research on monthly portfolios where mutual funds voluntarily supply reports to private data providers (Elton et al., 2010; Liao, Huang, and Wu, 2010). This database is not available for retail and institutional investors. CNMV provided this information exclusively

to the authors for research purposes. Therefore, managers could not anticipate the release of this information.

All the portfolio holdings are carefully identified through the International Securities Identification Numbering (ISIN) codes. Panel A of Table 1 shows the portfolio composition of domestic stocks of the sample. The stock classification procedure begins by classifying the Spanish stocks traded in the last day of each quarter into two groups: stocks belonging to the Spanish benchmark Ibex-35 (*IB*) and the remaining (*NI*). Then, the procedure consists of sorting the stocks within each initial group into two subgroups according to market capitalization: large (*L*) and small (*S*). The large subgroup represents approximately 60% of the total group market capitalization, and the small subgroup contains the remaining 40%. Thus, four size stock groups are obtained: *IB\_L*, *IB\_S*, *NI\_L* and *NI\_S*.

**Table 1.** Portfolio characteristics of Spanish domestic equity funds.

Panel A displays the portfolio composition of domestic stocks of the sample after classification into four size stock groups (*IB\_L*, *IB\_S*, *NI\_L*, and *NI\_S*). Panel B shows, by size stock groups, the proportion of listed stocks that funds hold (% Held) and the fraction of the Spanish stock market that funds own (% Owned). These figures correspond to the last day of December in each year.

	1999	2000	2001	2002	2003	2004	2005	2006
<b>Panel A: Portfolio composition of domestic stocks</b>								
<i>IB_L</i>	46.8%	51.2%	40.4%	35.0%	39.9%	35.2%	32.6%	35.6%
<i>IB_S</i>	41.1%	41.2%	52.2%	54.0%	48.7%	48.4%	49.6%	45.5%
<i>NI_L</i>	5.6%	3.8%	1.8%	4.1%	2.7%	4.4%	4.8%	2.7%
<i>NI_S</i>	6.6%	3.9%	5.5%	7.0%	8.8%	12.0%	12.9%	16.2%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>Panel B: Stock distribution</b>								
<i>IB_L</i>								
% Held	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% Owned	1.0%	0.8%	0.6%	0.6%	0.7%	0.7%	0.8%	0.8%
<i>IB_S</i>								
% Held	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% Owned	1.9%	1.5%	1.3%	1.2%	1.2%	1.4%	1.4%	1.1%
<i>NI_L</i>								
% Held	91.7%	83.3%	66.7%	91.7%	91.7%	91.7%	100.0%	75.0%
% Owned	0.4%	0.2%	0.2%	0.3%	0.2%	0.6%	0.6%	0.3%
<i>NI_S</i>								
% Held	76.6%	76.6%	71.4%	59.8%	73.5%	80.5%	76.6%	74.7%
% Owned	1.2%	0.6%	0.7%	0.6%	1.0%	1.8%	2.1%	1.6%

The remaining portfolio holdings contain a very wide range of foreign stocks, investment societies and other mutual fund units, among others. The definition of domestic equity funds reduces their impact on the portfolio; thus, the analysis of portfolio manipulation excludes these securities.

Table 1 reports the portfolio characteristics of the database. Note that the fund sample shows a strong preference for large and well-known Spanish stocks as nearly 90% of the domestic portfolio sample belongs to Ibex-35 stocks ( $IB\_L$  and  $IB\_S$ ). However, the share increase in the smallest cap stocks ( $NI\_S$ ) is also remarkable, as this share tripled between December 1999 and December 2006.

According to Table 1 (Panel B), the aggregate fund portfolio holds every stock listed in Ibex-35 ( $IB\_L$  and  $IB\_S$  groups). These aggregate holdings also contain, on average, 90% and 75% of  $NI\_L$  and  $NI\_S$  stocks, respectively. However, in terms of market capitalization, the figures show the residual role of domestic equity funds in the Spanish stock market, as these funds own less than 2.0% of the total value of each stock group. When considering all Spanish mutual funds, however, they own almost 7% of the Spanish stock market capitalization by December 2006. These results should question the crucial influence of fund management on some price anomalies, as their decisions do not affect a relevant weight of the Spanish stock market, which will be discussed later.

### 3. Empirical analysis

#### 3.1. A turnover examination

The portfolio turnover ratio is used to analyze the intensity of the trading activity of funds during the calendar year. Following Elton et al. (2010), the portfolio turnover in month  $j$  is calculated as follows:

$$C_j^+ = \sum_i (N_{ij} - N_{ij-1}) \bar{P}_{ij} \text{ for all } i, \text{ where } (N_{ij} - N_{ij-1}) \geq 0 \quad (1)$$



$$C_j^- = \sum_i (N_{ij} - N_{ij-1}) \bar{P}_{ij} \text{ for all } i, \text{ where } (N_{ij} - N_{ij-1}) < 0 \quad (2)$$

where  $N_{ij}$  is the number of shares of stock  $i$  held at the end of the month  $j$  and  $\bar{P}_{ij}$  is the average of the prices of stock  $i$  at the beginning and the end of month  $j$ .

For any year, the turnover is the smaller of purchases ( $C^+$ ) or sales ( $C^-$ ) divided by the average of the net asset value of the portfolio over the previous year, where:

$$C^+ = \sum_{j=1}^{12} C_j^+ \quad (3)$$

$$C^- = \sum_{j=1}^{12} C_j^- \quad (4)$$

It is possible to obtain the quarterly turnover using the same set of equations, although the estimation uses four quarterly changes in holdings instead of 12 monthly variations.

We then compare the turnover ratios based on monthly and quarterly data for each fund to confirm the finding of Elton et al. (2010) on missing trades when quarterly information is used to examine the investment decisions of mutual fund managers. Specifically, the average turnover using monthly data is 51%, whereas when using quarterly data, the turnover is 32%. The difference between these estimates is statistically significant at a level of 1%. These results indicate that the use of quarterly data discards 38% of trading observations with respect to monthly information, which supports the validity of the monthly data set to reduce the impact of intra-quarter round-trip trades on the conclusions of this study. This impact is even more relevant than the missing trades reported by Elton et al. (2010) for a large sample of U.S. stock mutual funds.

This study further analyzes trading behavior throughout the calendar year because common incentives to manipulate portfolios should result in significant trading patterns around the quarterly disclosures. A very preliminary approach is the following pool regression model with dummy variables to explain the monthly turnover of fund  $k$  ( $TO_k$ ):

$$TO_k = \beta_{k,0} + \beta_{k,1}QEND_j + \beta_{k,2}YEND_j + \beta_{k,3}QBEG_j + \beta_{k,4}YBEG_j + \varepsilon_{k,j} \quad (5)$$

where  $QEND_j$  takes the value of one when month  $j$  is March, June or September, and zero otherwise.  $YEND_j$  takes the value of one when month  $j$  is December and zero otherwise. Similarly,  $QBEG_j$  is one when month  $j$  is April, July or October, and  $YBEG_j$  is one when month  $j$  is January, and zero otherwise.

Estimates from Equation 5 for the entire sample of funds (Table 2) suggest that funds tend to increase their trading activity in January and at the end of the first three quarters of the year. This conclusion is evident in the positive and significant beta estimates of  $YBEG$  (8.86) and  $QEND$  (5.31), implying that quarterly reports greatly concern fund managers.

**Table 2.** Turnover regression: Dec 1999 through Dec 2006.

This table shows the estimation results from Equation 5. For the entire sample of 125 funds, this table reports the coefficients and their respective  $p$ -values, as well as the  $R^2$  values.

	<b>Intercept</b>	<b>QEND</b>	<b>YEND</b>	<b>QBEG</b>	<b>YBEG</b>
$\beta$	33.30 (0.00)	5.31 (0.00)	-2.49 (0.27)	2.27 (0.16)	8.86 (0.00)
$R^2$	0.004				

To better understand trading behavior during the calendar year, Table 3 reports the aggregate turnover ratios for each month. The results illustrate that the trading activity during the first half of the year is significantly higher (6.40%) than in the second semester. In fact, the most important turnover ratios detected at quarter-ends occur in the first semester (March, 41.31%; June, 39.58%). In addition, the January turnover (42.12%) is the highest for the entire year and differs from the 12-month average ratio (35.66%) at the 1% significance level. Another remarkable result is that the lowest trading occurs in August (24.09%), which may reflect the dampening effect of summer holidays in fund management.

With special attention to the fiscal year-end, the findings show that the turnover in December (30.81%) is the smallest in the year with the only exception being the

aforementioned summer effect. Furthermore, due to the high concentration of the Spanish fund industry, we also check the robustness of these trading patterns for a subsample of those funds managed by the 10 largest fund companies. The results of this check reveal quite similar results to the whole sample. Detailed results have been omitted for the sake of brevity.

**Table 3.** Monthly turnover ratios: Dec 1999 through Dec 2006.

This table shows the mean turnover ratios across the sample of 125 funds for each month (%), the standard deviation (SD) and the difference (Diff) between each month and the year average (Avg). In addition, this table reports the average turnover for semesters (S1 and S2) and quarters (Q1, Q2, Q3, Q4). \* 5% significant; \*\* 1% significant.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
Mean	42.12	39.62	41.31	35.00	35.99	39.58	35.78	24.09	35.07	35.97	33.68	30.81	35.66
Diff	6.46**	3.96	5.65*	-0.66	0.33	3.92*	0.12	-11.57**	-0.59	0.31	-1.98	-4.85*	
SD	53.52	51.86	66.88	58.87	50.95	46.97	44.08	43.87	44.14	48.00	45.74	49.33	
	<b>S1</b>						<b>S2</b>						<b>S1-S2</b>
Average	38.93						32.53						6.40**
	<b>Q1</b>			<b>Q2</b>			<b>Q3</b>			<b>Q4</b>			
Average	41.01			36.86			31.64			33.39			

The significant trading activity in January might initially suggest that these funds participate actively in the turn-of-the-year effect in the Spanish market. Nevertheless, the low percentage held by domestic equity funds in the stock market (see Panel B of Table 1) questions the lead role of these institutional portfolios in this price anomaly. Therefore, mutual funds probably participate in taking advantage of the anomaly rather than causing the January effect.

Fund managers seem to engage in abnormally high trading just before reporting dates in the two first quarters. In addition, managers seem to have more incentives to trade in the first-half of the year, especially in the first quarter. This strategy could be consistent with risk-shifting practices by purchasing riskier assets disproportionately at year-beginning periods (Ackert and Athanassakos, 2000; Chevalier and Ellison, 1997; Ng and Wang, 2004).

Although previous evidence on portfolio manipulation in the U.S. fund market is especially relevant at year-end (Elton et al., 2010; He et al., 2004; Lakonishok et al., 1991;

Ng and Wang, 2004), the lack of evidence for significant trading in December should question portfolio manipulation by Spanish fund managers just before the fiscal year-end.

After these preliminary findings, it is necessary to check the institutional trading around disclosure dates more thoroughly to obtain further conclusions on potential portfolio manipulation.

### *3.2. Trading behavior of mutual funds around disclosure dates*

This section focuses on the characteristics of stocks that funds tend to sell, buy and hold each month to better understand their investment activity, with special attention to those trading strategies around mandatory portfolio reports. The goal is to first examine whether investment strategies significantly differ between reporting months and the rest of the year, and then to analyze investment activity in the first quarter of the year.

To accomplish these objectives, Spanish stocks are classified into different size and performance groups to better identify the characteristics of the traded securities. The first step is therefore to sort domestic stocks by the cumulative return over the previous 11 months. This step gives four performance quartiles labeled as high (*QH*), medium-high (*QMH*), medium-low (*QML*) and low (*QL*). These performance quartiles complement the four stock groups according to market capitalization (i.e., *IB\_L*, *IB\_S*, *NI\_L*, *NI\_S*).

To evaluate the potential interaction between size and performance, the next stage consists of obtaining 11-month return quartiles within each size group, totaling 16 performance subgroups in all. However, this study only analyses the top and bottom performance subgroups (*IB\_LH*, *IB\_LL*, *IB\_SH*, *IB\_SL*, *NI\_LH*, *NI\_LL*, *NI\_SH*, *NI\_SL*) because stocks with extreme performance are the most susceptible to portfolio manipulation. Furthermore, all these size and performance groups are rebalanced each quarter.

We follow the approach of Ng and Wang (2004) to identify which type of stocks managers buy and sell more intensively around the disclosure schedule. This approach consists of

computing the value of monthly holdings, sales and purchases of each stock group for each mutual fund.

The sell ratio measures the selling activity by fund  $k$  in stock group  $i$  in month  $j$ :

$$Sell\ ratio = \frac{SELL(i, j, k)/HOLD(i, j-1, k)}{\sum_i SELL(i, j, k) / \sum_i HOLD(i, j-1, k)} \quad (6)$$

where  $SELL(i, j, k)$  is the value of sales by fund  $k$  in month  $j$  and in stock group  $i$ , and  $HOLD(i, j-1, k)$  is the value of the holdings at the end of the previous month of the same stocks belonging to group  $i$  in month  $j$ . Values of  $SELL$  and  $HOLD$  use the average stock prices between the beginning and end of month  $j$ .

The numerator of Equation 6 is the ratio of the sales in a stock group to holdings of the same stocks at the end of the previous month, while the denominator is the ratio of total sales in month  $j$  to holdings at the end of the previous month. That is, the sell ratio measures the selling activity of a fund in a given stock group relative to the overall selling activity. For instance, suppose a manager sells 60% of the  $IB\_L$  group held in the fund portfolio, but only sells 40% of the total stock holdings. Then, according to Equation 6, the sell ratio for the  $IB\_L$  group is 1.5, which means that this fund sells 50% more of  $IB\_L$  stock than other types of stock.

Similarly, the buy ratio measures the buying activity by fund  $k$  in stock group  $i$  in month  $j$ :

$$Buy\ ratio = \frac{BUY(i, j, k)/HOLD(i, j, k)}{\sum_i BUY(i, j, k) / \sum_i HOLD(i, j, k)} \quad (7)$$

where  $BUY(i, j, k)$  is the value of purchases by fund  $k$  in month  $j$  and in stock group  $i$ , and  $HOLD(i, j, k)$  is the value of holdings by fund  $k$  in month  $j$  and in stock group  $i$ . Again, both variables use the average of the stock prices at the beginning and end of month  $j$ . Therefore, the buy ratio shows the proportion of purchases of stock group  $i$  during the month  $j$  relative to the proportion of the total purchases across all stock groups.

To complement the aforementioned measures of trading intensity, we propose a new complementary approach that allows the identification of the intensity in changes in the portfolio allocations to the different stock groups. The importance of this method lies in the additional information reported because it examines the trading patterns of the different stock groups with respect to the entire portfolio. Whereas measures of trading intensity show the purchase/sale activity of funds, measures of portfolio allocation show the final results that funds actually report to unit-holders. This new insight captures the general effect on the stock weights, which mainly determine the portfolio image. Therefore, those managers with incentives to manipulate this portfolio image should be concerned with this overall effect.

The portfolio share decrease/increase ratios by fund  $k$  in stock group  $i$  during month  $j$ :

$$\text{Share decrease} = \frac{[\text{SHARE}(i, j, k) - \text{SHARE}(i, j-1, k)]^-}{\text{AVERAGE}_i[\text{SHARE}(i, j, k) - \text{SHARE}(i, j-1, k)]^-} \quad (8)$$

$$\text{Share increase} = \frac{[\text{SHARE}(i, j, k) - \text{SHARE}(i, j-1, k)]^+}{\text{AVERAGE}_i[\text{SHARE}(i, j, k) - \text{SHARE}(i, j-1, k)]^+} \quad (9)$$

where  $\text{SHARE}(i, j, k)$  is the portfolio percentage invested by fund  $k$  in the stock group  $i$  in month  $j$ . Equation 8 is appropriate for monthly decreases in the portfolio share ( $[\text{SHARE}(i, j, k) - \text{SHARE}(i, j-1, k)] < 0$ ). Similarly, Equation 9 applies when the difference  $[\text{SHARE}(i, j, k) - \text{SHARE}(i, j-1, k)]$  is positive.

For share increases, the numerator of Equation 9 shows the increase of the portfolio share of stock group  $i$  in month  $j$  over that share in the previous month. The denominator is the average of increases in all stock groups during month  $j$ . Therefore, this ratio indicates the increase intensity of stock group  $i$  during the month  $j$  with respect to the total increments in the portfolio allocations of fund  $k$ . Suppose a fund that has 20% of its assets invested in stocks belonging to the low performance quartile ( $QL$ ) in month  $j-1$  and 50% in month  $j$ , which is a positive difference of 30%. The average of the increments in all performance quartiles during month  $j$  is 15%. Therefore, the share increase ratio is 2.0, which means that

this fund increased portfolio allocations to *QL* stocks at twice the average. The same works for the share decrease ratio as well.

From the monthly, equally weighted averages of all the ratios for each stock group across funds, we carry out several analyses to understand the trading behavior of mutual funds around disclosure dates.

### *3.2.1. Differences among disclosure and non-disclosure months*

First, this section tests whether fund managers follow some investment strategies in disguise around disclosure dates. The existence of portfolio manipulation should result in trading patterns around the reporting dates that differ from the usual practice of the fund in the rest of the year. Therefore, we examine whether fund trading differs between disclosure months (March, June, September and December), denoted hereafter as *Qs*, and the other eight months, denoted hereafter as *OM*. Table 4 reports the difference of the equally weighted averages of the ratios in *Qs* minus *OM*.

Comparing the results in Panels A and B, the buy/sell ratios and share increase/decrease are mostly consistent in the sign of the difference, that is, the trading activity of funds is also reflected in the final portfolio allocation. However, the proposed measures of share increase/decrease might have more useful information for this analysis because they show the final results that funds report to investors.

Regarding size groups, results show that for *IB\_S*, funds tend to more intensively increase their portfolio weights during disclosure months than during the rest of the year. In contrast, funds increase their allocations to *NI\_S* less during disclosure months than during the remaining periods.

However, the results are much more interesting when combining size and performance because some results for the size groups are a combination of opposite patterns among interim performance subgroups. For instance, the analysis finds contrary and significant

results in the high and low performance quartiles of *IB\_L*. These results illustrate that funds tend to increase the portfolio share of return-winner large stocks in reporting periods more than in other months. On the contrary, funds tend to decrease the share of these stocks during other periods more than in disclosures. However, the opposite occurs with return-loser large stocks (*IB\_LL*), with higher share increase ratios in *OM* and higher share decrease ratios in *Qs*, both with statistically significant differences at the 1% level. Furthermore, the finding for *IB\_LL* stocks is the most robust result in Table 4 because funds also show a clear intention to buy these stocks more actively those non-reporting periods (see the buy ratio in Panel A). This fact seems to suggest that funds avoid large cap stocks with poor past return records in their mandatory reports.

Results for the *IB\_S* group are in line with those in the *IB\_L* group. Funds show different behavior between the extreme return-winners and losers: managers tend to increase the share of high-performance stocks (*IB\_SH*) in reporting months more than during the rest of the year, while they show the opposite behavior for return-loser stocks (*IB\_SL*).

Previous findings on investment strategies for Ibx-35 stocks suggest that funds have quarter-end image strategies that differ from those followed in the remaining months. This conclusion is especially relevant due to the leading role of these blue-chip stocks in the portfolios of the sample (see Table 1). The results found here seem to indicate that during the reporting months, fund managers prefer large-cap and well-known stocks (i.e., Ibx-35 stocks), with incentives to increase the disclosed portfolio share of return-winners and decrease the weight of return-loser stocks, especially for those Ibx-35 stocks with the largest capitalization.

These results might be consistent with the window-dressing hypothesis, that is, managers intend to improve the portfolio image by increasing the disclosed weight of well-



known and return-winner stocks and decreasing the portfolio share of those stocks with poor return records.

**Table 4.** Differences of measures among disclosure dates and other months: Dec 1999 through Dec 2006.

At the end of each quarter, domestic stocks are classified using two independent criteria: size and performance. The size classification consists of sorting stocks into two groups: Ibex-35 (*IB*) and No-Ibex (*NI*). Then the procedure divides each size group into large-cap stocks (*L*) and small-cap stocks (*S*), where the large subgroup contains the stocks that represent approximately 60% of total group market capitalization and the small subgroup the remaining 40% (*IB\_L*, *IB\_S*, *NI\_L*, *NI\_S*). Finally, the procedure obtains top (*H*) and bottom (*L*) 11-month return quartiles for these four size subgroups. Additionally, we obtain four performance quartiles in relation to the previous 11-month cumulative returns: high performance (*QH*), medium-high performance (*QMH*), medium-low performance (*QML*) and low performance (*QL*). Panel A shows the equally weighted average across funds of the different trading activity ratios (Equations 6 and 7) for disclosure months (*Qs*) and other months (*OM*). Panel B reports the same structure for portfolio allocation measures (Equations 8 and 9). This table also shows the difference between *Qs* and *OM* (*Diff*) for each measure. \* 5% significant; \*\* 1% significant.

	Panel A: Measures of trading activity						Panel B: Measures of portfolio allocation						
	Sell ratio			Buy ratio			Share decrease ratio			Share increase ratio			
	Qs	OM	Diff	Qs	OM	Diff	Qs	OM	Diff	Qs	OM	Diff	
<b>IB_L</b>	0.80	0.80	0.00	0.76	0.82	-0.06*	<b>IB_L</b>	2.04	2.04	0.00	2.02	2.09	-0.07
IB_LH	1.52	1.31	0.21	1.37	1.49	-0.12	IB_LH	2.02	2.21	-0.19*	2.12	1.96	0.16*
IB_LL	1.75	1.67	0.08	1.63	2.18	-0.55**	IB_LL	2.29	1.93	0.36**	2.22	2.46	-0.24**
<b>IB_S</b>	1.30	1.30	0.00	1.26	1.23	0.03	<b>IB_S</b>	0.91	0.90	0.01	0.95	0.90	0.05**
IB_SH	1.51	1.68	-0.17*	1.46	1.50	-0.04	IB_SH	0.94	0.98	-0.04	0.97	0.90	0.07**
IB_SL	1.51	1.43	0.08	1.58	1.47	0.11	IB_SL	0.82	0.79	0.03	0.78	0.88	-0.10**
<b>NI_L</b>	3.84	3.96	-0.12	4.03	4.33	-0.30	<b>NI_L</b>	0.95	0.95	0.00	0.92	0.87	0.05
NI_LH	4.74	4.80	-0.06	4.38	6.02	-1.64**	NI_LH	1.05	1.21	-0.16	0.95	0.98	-0.03
NI_LL	4.03	3.99	0.04	5.18	5.71	-0.53	NI_LL	0.85	0.70	0.15**	0.90	0.91	-0.01
<b>NI_S</b>	3.11	3.02	0.09	2.78	2.92	-0.14	<b>NI_S</b>	0.60	0.61	-0.01	0.56	0.62	-0.06*
NI_SH	4.69	3.69	1.00	3.10	3.59	-0.49	NI_SH	0.74	0.79	-0.05	0.63	0.71	-0.08*
NI_SL	4.13	3.64	0.49	2.88	3.33	-0.45	NI_SL	0.53	0.52	0.01	0.48	0.58	-0.10**
<b>QH</b>	1.42	1.50	-0.08	1.32	1.42	-0.10*	<b>QH</b>	0.98	1.05	-0.07**	0.94	0.94	0.00
<b>QMH</b>	1.06	1.04	0.02	0.96	1.03	-0.07**	<b>QMH</b>	0.99	1.00	-0.01	1.01	1.01	0.00
<b>QML</b>	1.07	1.04	0.03	1.03	1.02	0.01	<b>QML</b>	0.99	0.97	0.02	1.06	0.96	0.10**
<b>QL</b>	1.18	1.11	0.07	1.29	1.14	0.15**	<b>QL</b>	0.94	0.92	0.02	0.93	1.02	-0.09**

The observations for *NI* stocks suggest that funds tend to buy and increase the portfolio share of the smallest-cap stocks more actively in those months when clients are not aware of public reports. Although we do not find a clear tendency towards selling and share decreasing of these stocks in disclosure months, the results could loosely be in accordance with the window-dressing hypothesis.

Regarding return quartiles, Table 4 shows varied results. Considering only extreme quartiles, the results (Panel A) suggest that funds buy winner stocks less intensively in those months with an obligation to disclose portfolios, and they buy more loser stocks in the reporting periods than in the rest of the year. This evidence is not consistent with the window-dressing hypothesis.

Other potential explanations behind investment decisions based on recent return records could be momentum strategies. According to momentum, buy ratios should be higher than sell ratios in the *Winner* return quartile. Furthermore, selling activity should also be more intense than buying activity in the *Loser* quartile. Table 4 rejects momentum hypothesis. Additionally, momentum strategy as a standard practice of the fund should be present during the entire calendar year and not only be concentrated around quarterly disclosure dates.

In general, Table 4 displays different behaviors based on size and performance criteria. Although the investment on Ibex-35 stocks seems initially to follow window-dressing patterns, the results are doubtful for this hypothesis when only considering return records. Specifically, managers seem to be more concerned about disclosing well-known stocks than return-winners in portfolio reports.

### *3.2.2. Detailed analysis of the first quarter of the year*

To finish the empirical analysis, this section details fund management during the first quarter of the year to examine those trading patterns behind the high portfolio turnover seen in these months (Table 3). Specifically, the January analysis might allow us to better understand the influence of fund trading on the widely documented January effect of the Spanish stock market. As the analysis is based on trading activities, Table 5 only reports sell and buy ratios (Equations 6 and 7).

**Table 5.** Investment activity in the first quarter: Dec 1999 through Dec 2006.

The table reports the trading activity of funds during the first quarter of the year for the different stock groups, that is, the equally weighted average of the buy and sell ratios across funds. The  $t$ -test is for the test of equality of means between measures ( $Diff(B, S)$ ). \* 5% significant; \*\* 1% significant.

	January			February			March		
	Buy	Sell	Diff (B,S)	Buy	Sell	Diff (B,S)	Buy	Sell	Diff (B,S)
<b>IB_L</b>	0.83	0.81	0.02	0.86	0.76	0.10	0.79	0.88	-0.09
IB_LH	1.94	1.62	0.31	1.03	1.38	-0.35*	1.35	1.66	-0.31
IB_LL	1.31	1.72	-0.41	1.34	1.26	0.08	1.57	1.55	0.03
<b>IB_S</b>	1.14	1.27	-0.12**	1.26	1.31	-0.05	1.22	1.30	-0.08
IB_SH	1.41	1.61	-0.20	1.16	2.04	-0.88**	1.40	1.82	-0.42**
IB_SL	1.53	1.28	0.25	1.54	1.61	-0.07	1.47	1.67	-0.20
<b>NI_L</b>	6.28	3.43	2.85**	2.14	5.88	-3.74**	2.41	3.17	-0.76
NI_LH	7.32	4.06	3.26*	3.46	9.71	-6.25**	3.93	4.43	-0.50
NI_LL	9.35	3.48	5.87**	3.04	4.97	-1.94	4.29	3.27	1.02
<b>NI_S</b>	4.76	2.55	2.21*	3.27	2.52	0.76	2.38	2.94	-0.56
NI_SH	5.62	2.54	3.08*	3.48	3.28	0.20	2.55	4.76	-2.20
NI_SL	3.70	3.43	0.27	3.64	3.33	0.32	3.25	3.12	0.12
<b>QH</b>	1.49	1.66	-0.18	1.07	1.71	-0.64**	1.24	1.39	-0.15
<b>QMH</b>	1.33	1.24	0.09	1.04	0.99	0.05	1.04	1.03	0.01
<b>QML</b>	0.83	0.96	-0.13*	1.28	0.94	0.34**	1.14	0.99	0.15*
<b>QL</b>	1.01	0.99	0.02	1.17	1.11	0.06	1.22	1.42	-0.20

In January, funds focus their trading activity on No-Ibex stocks ( $NI_L$  and  $NI_S$ ) with a clear purchase intention. The buy ratio is higher than the sell ratio in these stock groups and in their extreme performance subgroups. These differences are significant at the 1% and 5% levels, except for  $NI_SL$ . This finding might be related to the January effect in small-cap stocks that some papers recently report in the Spanish stock market (Miralles and Miralles, 2007; Ortiz et al., 2010). Nevertheless, a suitable argument could support that funds may actively trade this kind of stock in January to take advantage of the anomaly and its subsequent rise in prices. This study, therefore, could not suggest that their trading is enough to cause any relevant price pressure in the market given that domestic equity funds own less than 2% for each stock group market capitalization (see Panel B of Table 1).

A risk-shifting strategy could be another possible explanation for the fact that mutual funds buy disproportionately more No-Ibex stocks relative to the proportion of the total

purchases across all stock groups. Regarding this strategy, Ackert and Athanassakos (2000) and Ng and Wang (2004), among others, find that once managers disclose the portfolio holdings at year-end, they tend to rebalance and manipulate the risk of their portfolios by purchasing smaller stocks. These authors suggest that institutional managers especially engage in this practice at the beginning of the year because they are less concerned with including well-known stocks in their portfolios and can tolerate more risk, as they have enough time to adjust their portfolios if needed. However, the trading behavior in February suggests that funds quickly reverse their positions in risky stocks because they actively sell the small stocks that they bought in January, particularly *NI\_L* stocks. This behavior could indicate that after the abnormally large January returns in small stocks, funds again modify their portfolios to reduce risks. Finally, the high turnover in March could be explained by high buy and sell ratios of No-Ibex stocks, although ratio differences are not significant.

In summary, fund trades in No-Ibex stocks primarily cause the high turnover observed in the first quarter. Funds exploit the January effect through purchases of small stocks and then reverse their positions in February. These trading patterns could be related to risk-shifting strategies, but an appropriate test of this hypothesis requires further analysis.

#### **4. Conclusions**

Several studies analyze the trading behavior of mutual funds near mandatory portfolio report periods to verify the truthfulness of these disclosed reports. However, few of them use a holdings data frequency higher than quarterly, which could severely bias their conclusions. A reporting bias could also be present in the findings of these previous studies. This paper, therefore, examines an extensive and official fund database of monthly portfolio holdings to determine mutual fund trading around disclosure dates. The empirical section examines whether Spanish domestic equity funds manipulate their portfolios to improve their disclosed image.

The evidence of a relevant percentage of missing trades using quarterly information strengthens the use of monthly information for an appropriate comparison between disclosed and undisclosed portfolio holdings. Preliminary tests on the turnover ratios during the calendar year seem to indicate higher levels of trading activity in reporting periods, which may be in accordance with the portfolio manipulation hypothesis.

Trading activity measures and a new portfolio allocation approach provide several interesting investment patterns around quarter transitions that depend on size and recent performance records of the stocks. The new approach of this work with respect to the entire portfolio captures the general effect of trading activities on the stock weights, which mainly determine a portfolio's image.

The results for the large-cap and well-known Ibex-35 stocks suggest that funds tend to rebalance their portfolios to increase the share of return-winner stocks and to decrease the share of poor-return stocks in disclosure months. Interestingly, non-disclosure months show the opposite trend. These results are especially relevant due to the leading role of these blue-chip stocks in the fund portfolio holdings. On the other hand, the results for *NoIbex* stocks suggest that funds tend to increase their share of these small-cap stocks more actively in non-disclosure months. Thus, funds might manipulate their portfolios to show well-known stocks in their quarterly reports, a behavior that is consistent with the window-dressing hypothesis.

The trading behavior of funds during the first quarter of the year is mainly concentrated in No-Ibex stocks. The results indicate that funds actively participate in the January effect, especially through the purchase of small-cap stocks. However, domestic equity funds own a low capitalization percentage of Spanish listed companies which suggests that funds participate in the January effect more in the sense of taking advantage of the anomaly rather than being a causative factor. This argument thus states that a window-dressing practice could

not play a leading role in explaining the well-known January effect in the Spanish market, as earlier studies hypothesize.

Finally, the findings also reject that calendar patterns might be simply the result of standard fund management practices such as momentum strategies. In addition, the test of the risk-shifting practices constitutes an interesting topic for further research because evidence in favor of this strategy might explain high trading figures in small stocks seen in the first quarter of the year. Future research with additional information will be necessary to verify appropriately these hypotheses.

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