# "On the impact of style investing over institutional herding: evidence from a highly concentrated market"

**AUTHORS** Konstantinos Gavriilidis, Vasileios Kallinterakis, Mario Pedro Leire-Ferreira

**ARTICLE INFO** Konstantinos Gavriilidis, Vasileios Kallinterakis and Mario Pedro Leire-Ferreira (2013). On the impact of style investing over institutional herding: evidence from a highly concentrated market. *Investment Management and Financial Innovations (open-access)*, *10*(4)

**JOURNAL** "Investment Management and Financial Innovations (open-access)"

Konstantinos Gavriilidis (UK), Vasileios Kallinterakis (UK), Mario Pedro Leire-Ferreira (Portugal)

# On the impact of style investing over institutional herding: evidence from a highly concentrated market


## Abstract

Fund managers have been found to herd significantly in major international markets, with evidence suggesting that style investing reinforces their herding. However, research to date has not explored the herding-style relationship in highly concentrated markets, despite the impact that market concentration can confer over this relationship. This study investigates this issue in the context of Portugal using monthly funds' portfolio-holdings and documents evidence suggesting the significant temporal dependence of monthly institutional demand which is for the most part due to herding. The significance of this dependence remains robust when controlling for several styles, as well as accounting for the entry of Portugal into the EURONEXT and the outbreak of the ongoing global crisis. Combining the above with the limited evidence of significance in the presence of the styles controlled for, the authors conclude that Portuguese fund managers herd significantly without style affecting their herding.


**Keywords:** institutional investors, herding, style, Portugal.
**JEL Classification:** G02, G10, G23.

## Introduction

Style investing constitutes a form of characteristic trading according to which, investors base their stock selection on specific characteristics, such as for example a stock's past returns or its market capitalization. For investors following a specific style, the expectation is that their trades will be correlated as they will be conditioned upon the same stock-characteristic, thus suggesting that style investing contributes to herding in capital markets. Evidence on this has been particularly strong as regards institutional investors, who are found to exhibit significant herding as well as style investing in their trades (e.g. Sias, 2004; Choi and Sias, 2009).

It is important to note that the impact of style investing over institutional herding has been investigated on the premises of large markets (mainly the US, as well as a few large Asian and European ones) with small, highly concentrated markets having remained largely outside the scope of this investigation. We believe that this allows for a gap in the literature, since high concentration produces trading dynamics that can affect the relationship between style investing and institutional herding. On the one hand, highly concentrated environments facilitate institutional herding through the greater ease of peer-monitoring and information-sharing, since in these environments fund managers are more likely to know each other and less likely to deviate from their industry's norm in order to avoid being stigmatized as deviants (Do et al., 2008). On the other hand, concentrated market structures render style investing harder to apply, as they allow for less feasible investment options compared to larger markets.

The above suggests that style investing is expected to be of limited significance in highly concentrated markets, contributing little to their institutional herding and our paper tests the validity of this empirically for the first time in the context of such a market, namely Portugal, where both the stock exchange and the funds' industry bear a particularly high level of concentration. The remainder of the paper is organized as follows. Section 1 outlines the data and methodology employed alongside some descriptive statistics. Section 2 presents and discusses the results while the final section concludes.

## 1. Data and methodology

The present study is based upon monthly portfolio reports of Portuguese equity funds obtained from the Portuguese Securities Markets Commission (*Comissão do Mercado de Valores Mobiliários* – CMVM). Our sample includes a total of 65 funds and covers the period between July 1996 and June 2011. The data in the reports provide us with information as per the code and the name of each fund, its designation, the code and the name of the assets held in each fund's portfolio, the number of shares of each stock held by each fund at the end of each month and the value of each fund's position in each stock at the end of each month. Table 1 (see Appendix) provides us with descriptive statistics of our data, where it is shown (Panel A) that the total number of stocks our sample funds have invested in during our sample period is 99. Panel B shows that the average number of active stocks per month traded by at least one fund is 37.8 for the whole period, while the average number of active funds per stock per month is 7.7 (Panel C). These figures are clearly indicative of a small market of rather high concentration where herding is obviously facilitated (with about eight funds being active on average in each stock each month, this suggests that each fund manager has, on average, seven of his peers to monitor).

To empirically investigate the style-herding relationship we utilize the Sias (2004) measure, whose aim is to assess the temporal dependence of institutional demand. The latter is defined here as the raw fraction of funds buying security $k$ during month $t$ ($Raw\Delta_{k,t}$):

$$Raw\,\Delta_{k,t} = \frac{Number\ \ of\ \ funds\ buying\ \ security\ \ k\ during\ \ month\ \ t}{Total\ \ number\ \ of\ \ funds\ active\ in\ security\ \ k\ during\ \ month\ \ t^{1}}. \quad (1)$$

A fund is identified as a "buyer" ("seller") during month $t$ if it has increased (decreased) its position in that security in month $t$ compared to the previous month. $Raw\Delta_{k,t}$ is then standardized by subtracting in each month from each security's $Raw\Delta_{k,t}$ its cross-sectional (across all active stocks in that month) average and divide by its cross-sectional standard deviation as follows:

$$\Delta_{k,t} = \frac{Raw\,\Delta_{k,t} = \overline{Raw\,\Delta_{t}}}{\sigma(Raw\,\Delta_{k,t})}. \quad (2)$$

The temporal dependence of institutional demand is assessed by assuming that $\Delta_{k,t}$ follows a first-order autoregressive process:

$$\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \varepsilon_{k,t}. \quad (3)$$

Both sides of (3) are standardized and equation bears only one explanatory variable; consequently, the slope ($\beta_t$) represents institutional demand's cross-sectional correlation between months $t$ and $t$-1. To identify whether this correlation is due to funds following their own past trades or funds following their peers (herding), Sias (2004) decomposes $\beta_t$ into two parts:

$$\beta_t = \rho(\Delta_{k,t}, \Delta_{k,t-1}) = \left[\frac{1}{(K-1)\sigma(Raw\Delta_{k,t})\sigma(Raw\Delta_{k,t-1})}\right] \times \sum_{k=1}^{K}\left[\sum_{n=1}^{N_{k,t}} \frac{(D_{n,k,t} - \overline{Raw\Delta_t})(D_{n,k,t-1} - \overline{Raw\Delta_{t-1}})}{N_{k,t}N_{k,t-1}}\right] +$$
$$+\left[\frac{1}{(K-1)\sigma(Raw\Delta_{k,t})\sigma(Raw\Delta_{k,t-1})}\right] \times \sum_{k=1}^{K}\left[\sum_{n=1}^{N_{k,t}} \sum_{m=1,m\neq n}^{N_{k,t-1}} \frac{(D_{n,k,t} - \overline{Raw\Delta_t})(D_{m,k,t-1} - \overline{Raw\Delta_{t-1}})}{N_{k,t}N_{k,t-1}}\right], \quad (4)$$

where $N_{k,t}$ is the total number of funds active in stock $k$ in month $t$, $D_{n,k,t}$ is a dummy variable equal to one (zero) if fund $n$ is a buyer (seller) of stock $k$ in month $t$, $Raw\Delta_{k,t}$ is the raw fraction of funds buying stock $k$ in month $t$, $\sigma(Raw\Delta_{k,t})$ is its cross sectional standard deviation across all active securities in month $t$ and $\overline{Raw\Delta_t}$ is the cross-sectional average of $Raw\Delta_{k,t}$ in month $t$. Equation (4) consists of two additive components, the former reflective of "funds following their own trades" and the latter representing "funds following other funds" (herding). A positive (negative) value for the first component indicates that funds in month $t$ follow (reverse) their trades of month $t$-1. A positive (negative) value for the second component indicates that funds in month $t$ follow (assume opposite positions to) other funds' trades of month $t$-1.

Since the purpose of our work is to gauge the impact of style over herding (which is extracted through the decomposition of $\beta_t$), we augment equation (3) as follows:

$$\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \gamma_t X_{k,t-1} + \varepsilon_{k,t}, \quad (5)$$

where $X_{k,t\text{-}1}$ represents the measure of a particular style and its inclusion allows us to assess whether controlling for style bears an effect over the significance of $\beta_t$ − and indirectly, herding. To proxy for style, we employ a series of style-indicators (analysts' recommendations; momentum; size; value/growth; volatility; and volume).

(a) Analysts' recommendations: researchers have recently exhibited a surge in their interest regarding the link between analysts' recommendations and mutual fund managers and how the former affect the decision making process of the latter. Evidence suggests that institutional investors are affected by the recommendations of market analysts (Chen and Cheng, 2005; Busse et al., 2008). Investment professionals that have an informational disadvantage relative to their peers will often be more prone towards following financial analysts in their attempt to infer information from them; this could be the case due to the fact that the majority of investment firms do not have in-house analysts as it is usually the case in the very large investment firms. Nevertheless, even large fund management houses which have their own research departments and analysts tend to pay attention to other analysts' forecasts as well. As O'Brien and Bhushan (1990) and Brown et al. (2009) suggest, this is due to the fact that fund managers are obliged to apply the "prudent man rule", namely act in their clients' best interest; thus paying attention to other analysts' recommendations, and not only those of their in-house analysts, is often viewed by fund managers as evidence of good and ethical practice. To measure analyst recommendations we use the consensus

[1] The total number of funds active in a stock is the sum of those funds that have increased their position in that stock (buyers) and those funds that have decreased their position in that stock (sellers).

analysts' recommendations reported monthly by Thomson DataStream (which uses a 1-5 scale and provides the following classifications: 1-1.49 = "strong buy"; 1.5-2.49 = "buy"; 2.5-3.49 = "hold"; 3.5-4.49 = "underperform"; 4.5-5 = "sell") for all 99 Portuguese stocks held by our funds at any point during our sample period.

(b) Momentum: momentum strategies involve buying stocks that have performed well in the recent past and selling stocks that have performed poorly. In the seminal paper on momentum strategies, Jegadeesh and Titman (1993) found significantly higher returns for the portfolios comprised of winner stocks in contrast to the ones comprised of loser stocks, thus providing the first evidence on momentum profitability for the 1965-1989 period in the US market. Their study was later followed by a series of other works (see e.g. Rouwenhorst, 1998; Forner and Marhuenda, 2003; Galariotis et al., 2007) confirming the profitability of momentum trading worldwide. A wealth of research has indicated that fund managers are prone to pursuing momentum strategies. This has been particularly the case with evidence from the US (Lakonishok et al., 1992; Grinblatt et al., 1995; Brennan and Cao, 1997; Nofsinger and Sias, 1999; Wermers, 1999) as well as other markets including Germany (Walter and Weber, 2006), Poland (Voronkova and Bohl, 2005) and South Korea (Choe et al., 1999).

To measure momentum we use the month-end closing prices[1] for all 99 Portuguese stocks held by our funds at any point during our sample period and calculate their monthly log-differenced returns[2].

(c) Size: perhaps the most common investment style encountered in the market is that based upon the categorization of stocks according to their size. In fact, there is a plethora of mutual funds characterized as "Small-cap" or "Large-cap" reflecting their focus on investing towards small sized or large sized firms respectively. The importance of firms' size and its impact upon stock prices was initially raised by Banz (1981) who found that smaller firms tended to exhibit higher returns than those predicted by the CAPM, outperforming larger firms in the NYSE market during the 1926-1975 period. This phenomenon, coined as the "size effect" and identified as a market anomaly, has been empirically supported by numerous studies in the literature (see e.g. Reinganum, 1981; Keim, 1983), while a vast amount of research (see e.g. Brown and Goetzmann, 1997; Chan et al., 2002) confirms the presence of size as a style used by mutual funds.

To measure size we use the month-end market capitalization values[3] for all 99 Portuguese stocks held by our funds at any point during our sample period.

(d) Value-growth: a common categorization of investment funds is according to whether the stocks they invest in are value or growth stocks. The term "value" is used to refer to those stocks with low P/E ratios and high dividend yield (Lakonishok et al., 1994); in other words these are the stocks that trade below their intrinsic value. On the other hand, "growth" stocks are those with high P/E ratios and low dividend yield and represent companies with high earnings' growth rate (Lakonishok et al., 1994). There is overwhelming evidence suggesting that a strategy investing in value stocks produces returns in excess of those obtained by a strategy investing in growth stocks. Among the first researches in this vein was that of Basu (1977) who documented the relationship between the P/E ratio and expected returns. Using monthly data for over 1400 NYSE firms for the period of 1956-1971, he examined whether stocks with low P/E ratios had significantly higher returns than those with high P/E ratios. After constructing portfolios of high and low P/E stocks, his empirical results reported significantly higher returns for the low P/E portfolios. These seminal findings by Basu (1977) were later confirmed in a series of studies across international markets (Chan et al., 1991). Although Fama and French (1992) attributed the documented superior performance of value strategies to the higher underlying risk of value stocks, a series of studies (Lakonishok et al., 1994; Porta et al., 1997) have indicated that its roots need to be traced to behavioral explanations[4].

To proxy for value/growth trading we use the month-end price-earnings (P/E) values[5] for all 99 Portuguese stocks held by our funds at any point during our sample period.

(e) Volatility: the role of volatility as a style indicator hinges upon the link of volatility to risk and information. High-volatility stocks can constitute rather tempting investment options for rational

---

[1] Source: Thomson DataStream.

[2] The monthly log-differenced return for each stock is given by the difference of the natural logarithms of prices at the end of months $t$ and $t$-1, respectively.

[3] Source: Thomson DataStream.

[4] Lakonishok et al (1994) argued that the higher returns achieved by value strategies are due to the fact that they are actually bucking the trend-chasing strategies of noise traders. The latter tend to pay too much attention to recent earnings' growth and tend to overreact to good or bad news. As a result they tend to overprice the growth ("glamour") stocks and since they overreact to companies that have performed poorly in the recent past, these companies become underpriced. As such, investors who follow value strategies and invest in undervalued companies will eventually earn higher returns than those investing in growth stocks. Porta et al (1997) suggested that investors often make errors in their expectations about the future earnings of glamour stocks; thus when the earnings are actually announced, value stocks − whose expectations were lower - outperform glamour stocks.

[5] Source: Thomson DataStream.

investors, since high volatility is linked to enhanced information flow (Ross, 1989) the latter translated through higher volumes and reduced liquidity risk. Another possibility is that funds target high-volatility stocks in order to enjoy higher returns, if one assumes high volatility to be a proxy of increased risk. To proxy for volatility we use Schwert's (1989) approach which calculates volatility as the monthly standard deviation of daily log-differenced returns for each of the 99 stocks held by our funds at any point during our sample period.

(f) Volume: high-volume stocks allow investors easier entry into (exit from) a position and are thus associated, as mentioned above, with less liquidity risk. High volume is further associated with high visibility (Gervais et al., 2001) and attention-grabbing (Barber et al., 2009), thus reducing the perceived uncertainty regarding a stock (more investors follow it, so it enjoys more coverage) and facilitating the stock-picking process[1]. High volume has also been found to be a useful input in trading. Lee and Swaminathan (2000) showed that it affected the profitability of momentum strategies, with momentum profits (calculated in line with Jegadeesh and Titman, 1993) being higher for high-volume stocks in the US. Additionally, Gervais et al. (2001) examined the existence of the "*high volume premium*" on the premises of the NYSE for the 1963-1996 period with their findings revealing that high volume stocks traded at a premium in the short-run (i.e. exhibiting higher returns compared to low volume stocks). To proxy for volume we use the monthly volume (generated by aggregating all daily volume observations[2] within a month) for each of the 99 stocks held by our funds at any point during our sample period.

The above estimations from equation (3) and (5) cover a rather long window during which Portugal underwent major regulatory changes, the most notable of which was its merger into the EURONEXT-group. To gauge the impact of this event over our estimations, we split the sample period into two sub-periods using September 2002 (when Portugal's merger into EURONEXT was finalized) as the cut-off point and re-estimate equations (3) and (5) for the pre- (July 1996-August 2002) and post-EURONEXT (September 2002-June 2011) periods. What is more, in view of the ongoing credit crisis, we re-estimate equations (3) and (5) for the post-EURONEXT (September 2002-June 2011) period splitting the latter into a pre- (September 2002-December 2007) and a post- (January 2008-June 2011) period in order the assess the effect of the crisis over our estimations.

## 2. Results discussion

To begin with, Portuguese institutional demand exhibits a notably significant (1 percent level) temporal dependence of high magnitude, as reflected through the monthly cross-sectional correlation of institutional demand whose values hover steadily within a 31-36% band for all test results in Tables 2-8 (see Appendix).

This temporal dependence is mostly the result of funds' herding and appears robust when accounting for a series of styles. As one might expect for a highly concentrated market, evidence in favor of significant style investing appears limited, since of the six style-indicators employed here, three (analysts' recommendations; price-earnings; volatility) exhibit no sign of significance in our estimations. It does appear, however, that Portuguese funds engage significantly in contrarian trading, while they also prefer stocks of relatively lower volume and capitalization.

We now turn to control for the robustness of our results to the partitioning of our sample period on the premises of Portugal's merger into EURONEXT. Table 9 (see Appendix) presents the estimates from equation (3) where the significance (1 percent level) of $\beta_t$ is confirmed both before (July 1996-August 2002) and after (September 2002-June 2011) the market's entry into EURONEXT. The values of $\beta_t$ post-EURONEXT appear higher compared to pre-EURONEXT, yet there is little evidence[3] suggesting a significance in their difference. The observed significant temporal dependence of institutional demand is again (as in Table 2) mostly the product of herding: the "funds following others' trades" part bears values always larger compared to the "funds following their own trades" part. The "funds following their own trades" component increases in value post-EURONEXT, with the pre- versus post-EURONEXT difference being significant at the 5 percent level in all cases. Conversely, the "funds following others' trades" component mostly decreases post-EURONEXT[4], with the difference pre- versus post-EURONEXT being almost overtly insignificant[5].

[1] The decision to buy a stock is rather different in terms of complexity to the decision of selling one. While the decision to sell a stock involves choosing among the stocks one already owns, the decision to buy involves choosing among the universe of listed stocks. High volume helps alleviate this issue since it can increase the visibility of a stock, grabbing investors' attention and increasing the chances of them considering its purchase.

[2] Source: Thomson DataStream.

[3] Our Wald-tests' statistics indicate that this difference is significant for the full sample of our stocks (5 percent level) and assuming stocks traded by at least 3 funds (10 percent level).

[4] With the exception of the test assuming the full sample of stocks.

[5] With the marginal exception of the test assuming stocks traded by at least 5 funds.

Table 10 (see Appendix) presents the results from equation (5) before and after Portugal's entry into the EURONEXT platform to control for the impact of analysts' recommendations as a style over our findings. As the table indicates, $\beta_t$ maintains its significance (1 percent level) in all cases without its values assuming a uniform direction pre- versus post-EURONEXT[1] and with the pre-/post-EURONEXT difference in its values appearing significant only when assuming stocks traded by at least 3 funds. Much like in Table 3, the coefficient of consensus analysts' recommendations remains insignificant[2], thus again suggesting that it does not constitute a style-indicator significantly followed by Portuguese fund managers.

Table 11 (see Appendix) contains the results pre- versus post-EURONEXT when accounting for the impact of momentum strategies. Here $\beta_t$ is overwhelmingly significant (1 percent level) with its post-EURONEXT values always exceeding the pre-EURONEXT ones; its pre- versus post-EURONEXT difference is significant for the full sample of stocks and when assuming stocks traded by at least three funds. The lagged stock returns' coefficient is always insignificant pre-EURONEXT; its significance grows post-EURONEXT where it appears significantly[3] negative. Consequently, the previously documented significance of the contrarian tendencies of Portuguese fund managers in Table 4 for the full-sample period appears to be related to the market's entry into EURONEXT.

Table 12 (see Appendix) presents the results from equation (5) before and after Portugal's entry into EURONEXT. As the table shows, $\beta_t$ is always significant (1 percent level) and grows larger in magnitude post-EURONEXT. The difference pre- versus post-EURONEXT appears significant for the full sample of our stocks (5 percent level) and assuming stocks traded by at least 2 (10 percent level) and 3 funds (5 percent level). It is further interesting to note that the lagged size-coefficient appears significant (5 percent level) only post-EURONEXT, with no trace of its significance being detected in the pre-EURONEXT period. The sign of the lagged size-coefficient is consistently negative in all cases (with the exception of the test assuming stocks traded by at least five funds pre-EURONEXT), thus suggesting that the aforementioned size-effect reported in Table 5 for the full-sample period is related to the market's merger into EURONEXT.

Table 13 (see Appendix) outlines the estimates obtained from running equation (5) pre- and post-EURONEXT; again here, the significance of $\beta_t$ persists (1 percent level). Its values post-EURONEXT are higher compared to pre-EURONEXT with this difference appearing significant for all tests. The lagged P/E coefficient exhibits no sign of significance be it pre- or post-EURONEXT, in line with the results in Table 6, thus confirming that Portuguese funds do not engage in significant value/growth trading.

Table 14 (see Appendix) again illustrates that $\beta_t$ remains significant (1 percent level) prior to and after the entry of Portugal into EURONEXT when controlling for volatility as a style, with its values again appearing higher post-EURONEXT[4]. The lagged volatility coefficient is significant in only two tests (assuming stocks traded by at least 2 and 3 funds) pre-EURONEXT, with these two tests being the only ones where the pre-/post-EURONEXT difference in volatility appears significant (5 percent level).

Finally, Table 15 (see Appendix) presents the estimates from equation (5) pre- and post-EURONEXT which again confirm that $\beta_t$ is significant (1 percent level) in all cases with its values growing[5] post-EURONEXT. The lagged volume coefficient furnishes us with an interesting pattern: whereas it remains insignificantly positive pre-EURONEXT, it turns significantly (5 percent level) negative post-EURONEXT, thus indicating that the volume-effect detected in table 8 is related to the market's entry into EURONEXT.

The results from Tables 10-15, therefore, show that those styles (contrarian trading; size; volume) appearing significant in the full sample tests (tables 3-8) trace their significance in the period following Portugal's membership into EURONEXT and this needs to be combined with the increase in the "funds following their own trades" part (and the decrease in the "funds following others' trades" part) in Table 9 post-EURONEXT. A possible explanation for the above is that the EURONEXT environment allows for enhanced transparency and improved quality of information, thus reducing the incentive of fund managers to mimic each other in their trades, leading them to pursue their own strategies instead. If this is indeed the case – and

[1] The values of $\beta_t$ grow post-EURONEXT for the full sample of stocks and assuming stocks traded by at least 2 and 3 funds, while they drop post-EURONEXT assuming stocks traded by at least 4 and 5 funds.

[2] The only exception here is the pre-EURONEXT test assuming stocks traded by at least 5 funds, where the analysts' recommendation coefficient is found to be significant at the 10 percent level.

[3] With the exception of the test when assuming stocks traded by at least 5 funds.

[4] The difference in the values of $\beta_t$ pre- versus post-EURONEXT is significant (5 percent level) for the full sample of our stocks and assuming stocks traded by at least three funds.

[5] $\beta_t$ is significantly higher post-EURONEXT compared to pre-EURONEXT for the full sample of stocks and assuming stocks traded by at least three funds.

given the popularity of style investing among fund managers – this would suggest that the significance of the style-variables would be expected to be more evident following Portugal's entry into the EURONEXT which is what Tables 10-15 indicate.

However, the second half of the post-EURONEXT period includes the ongoing financial crisis and it is, therefore, advisable that we control for its impact over our post-EURONEXT results. To that end, we split the post-EURONEXT period into a pre-crisis (September 2002-December 2007) and a post-crisis (January 2008-June 2011) sub-period and run first equation (3) for each of the two sub-periods. Results are presented in table 16 and show that $\beta_t$ remains significant (1 percent level) in all tests, both pre- and post-crisis with its values being rather similar in both sub-periods and with their difference before and after the crisis appearing insignificant. The values of the "funds following their own trades" part are always significant and consistently higher post-crisis; the values of the "funds following others' trades" part are also always significant (1 percent level) and consistently lower post-crisis. It is interesting to note that the difference in the values of each these two parts pre- versus post-crisis is insignificant for all tests.

Table 17 (see Appendix) presents the results pre- versus post-crisis controlling for consensus analyst recommendations. As the table's estimates show, $\beta_t$ declines consistently post-crisis[1] while its values are always significant (1 percent level). With regards to the analysts' recommendation coefficient, it is reflective of very limited statistical significance[2], thus confirming one more time that it does not constitute a style followed by Portuguese equity funds.

Table 18 (see Appendix) provides us with the pre- and post-crisis estimates when accounting for the impact of momentum trading over institutional demand. According to the estimates presented, $\beta_t$ is always significant (1 percent level) and smaller in value post-crisis, without its pre- versus post-crisis difference being significant though. The lagged returns' coefficient appears significantly (5 percent level) negative post-crisis when assuming stocks traded by at least three, four and five funds; its pre-crisis significance is evident only when assuming the full sample of stocks (10 percent level)[3]. These results indicate that the previously documented evidence on the significant contrarian tendencies of Portuguese equity funds is heavily influenced by the crisis-period.

The picture when controlling for size before and after the crisis is rather different. As Table 19 (see Appendix) shows, $\beta_t$ is always significant (1 percent level) in all tests. However, the size-coefficient presents us with an interesting pattern. Whereas it appears overwhelmingly significant (5 percent level) and negative pre-crisis, this significance disappears post-crisis[4]. This indicates that the previously documented size-effect in the post-EURONEXT period is the result of the first half of that period and ceases to exist in the crisis-years.

$\beta_t$ maintains its significance (1 percent level) both pre- and post-crisis when controlling for P/E as a proxy for value/growth strategies. As Table 20 (see Appendix) illustrates, its value declines post-crisis without however the pre- versus post-crisis difference being significant in any case. The lagged P/E-coefficient appears consistently insignificant in all tests, thus confirming that Portuguese equity funds do not engage in value/growth trading.

A similar picture emerges when controlling for volatility in Table 21 (see Appendix), with $\beta_t$ remaining always significant (1 percent level) in all tests. The lagged volatility coefficient is almost uniformly insignificant, again suggesting that volatility does not constitute a key style-choice for our sample funds.

When volume is accounted for as a style, the significance (1 percent level) of $\beta_t$ persists (Table 22) (see Appendix). With regards to the lagged volume coefficient, it appears uniformly significantly negative pre-crisis, only to see this significance evaporating post-crisis. This implies that the above mentioned volume-effect in the post-EURONEXT period is mainly the result of the first half of this period, with the outbreak of the financial crisis leading to its dissipation.

The results from Tables 17-22 confirm that the styles tested for and found insignificant in the full-sample tests (Tables 3-8) and the pre- versus post-EURONEXT tests (Tables 10-15), namely those based on consensus analysts' recommendations, value/growth and volatility continue to present themselves significantly when the financial crisis is accounted for. Two of the styles (size; volume) found significant post-EURONEXT were in fact affected by the crisis, since their significance was detected in the pre- yet not in the post-crisis period. Conversely, the established contrarian trading of Portuguese domestic funds for the post-EURONEXT period seems to be rather due to the crisis itself, as no evidence of its significance was found before the crisis' outbreak.

[1] The pre- versus post-crisis difference is significant when assuming stocks traded by at least four (10 percent level) and five (5 percent level) funds.

[2] It is significant at the 10 percent level post-crisis assuming stocks traded by at least four and five funds, respectively.

[3] The difference in the lagged returns' coefficient pre- versus post-crisis is insignificant in all cases.

[4] The only evidence of some significance post-crisis is at the 10 percent level assuming stocks traded by at least three funds.

Summarizing our results, we can state that the demand of Portuguese equity funds for their domestic stocks exhibits significance in its temporal dependence in all tests we conducted with herding being the key driver of this dependence. Controlling for a series of styles, we identified some patterns of insignificance for some and significance for others. To begin with, Portuguese institutional investors do not appear to engage significantly in style-investing on the premises of consensus analysts' recommendations, value/growth or volatility. On the contrary, there seems to be evidence in support of their demand being an inverse function of past month's performance, thus suggesting that Portuguese fund managers are contrarian traders (buying recent losers and selling recent winners) and indicates a stabilizing impact on their behalf. Furthermore, institutional demand here is found to bear an inverse relationship with both market capitalization and volume, which suggests that funds increase their demand as we move to stocks of relatively lower size and trading interest. Using the definition of "demand" in the Sias (2004) framework which is proxied through the fraction of funds buying into a stock, this suggests that funds exhibit greater convergence in their trades when buying stocks of relatively lower size and volume. A possible reason for this is that these stocks are likely to be followed and traded by less funds, with this reduced following rendering it easier for the few funds trading such stocks to monitor – and herd on – each other. What is more, the fact that these stocks are small and less followed renders them further prone to greater informational uncertainty, thus leading those funds active in them to resort to herding as a means towards tackling this informational predicament.

## Conclusion

The present study examines for the first time the effect of style investing over institutional herding in a highly concentrated market setting. Using the empirical design proposed by Sias (2004) which views herding as a determinant of the temporal dependence of funds' demand, we investigate the presence of this effect in the context of the Portuguese market for the July 1996-June 2011 period on the premises of monthly portfolio-statements of Portuguese equity funds.

Our results indicate that the persistence of institutional demand over time always appears highly statistically significant and is, for the most part, driven by Portuguese funds' tendency to mimic each other (i.e. herding). Controlling for the impact of six distinctive styles (consensus analysts' recom-mendations; momentum; size; value-growth; volatility; volume) over our estimations, we notice that some styles exhibit no significance in their presence whatsoever (consensus analysts' recommendations; value-growth; volatility), while others reveal specific patterns in the trading conduct of Portuguese funds. More specifically, the latter are found to be significant contrarian traders (buying past month's losers; selling past month's winners) and tend to exhibit greater persistence in their demand when trading stocks of relatively low size and volume. It is interesting to note here that controlling for style-investing produces no effect over the persistence of institutional demand which remains significant in all tests.

Controlling for the impact of EURONEXT-membership over our results shows that the styles appearing significant for the full-sample tests (contrarianism; size; volume) maintain their significance only in the period following Portugal's merger into EURONEXT. A possible explanation for this is that EURONEXT's environment allows for enhanced transparency and improved quality of information, thus reducing the incentive of fund managers to mimic each other in their trades, leading them to pursue their own strategies instead. However, these post-EURONEXT findings do not appear robust to the impact of the ongoing credit crisis when splitting the post-EURONEXT period into pre- and post-crisis. The styles based on size and volume originally found to be significant post-EURONEXT were in fact affected by the crisis, since their significance was detected in the pre- yet not in the post-crisis period. Conversely, the established contrarian trading of Portuguese domestic funds for the post-EURONEXT period seems to be due to the crisis itself, as no evidence of its significance was found before the crisis' outbreak. It is interesting to note here that the persistence of institutional demand remains significant in all of the above tests without a single exception.

The overall picture stemming from our results is that the persistence of institutional demand over time in Portugal is mostly due to herding and the significance of this persistence does not disappear, irrespective of the style accounted for or the time-period involved. It is further obvious from our findings that the significance of style in Portuguese funds' trading is limited and sensitive to the period tested for. All in all, the above indicate that style-investing does not constitute a consistent practice in highly concentrated markets, whilst also bearing no effect over the significance of the observed herding among fund managers in such environments.

## References

1. Barber, B.M., Odean, T. and Zhu, N. (2009). "Systematic noise", *Journal of Financial Markets*, Vol. 12 (4), pp. 547-569.
2. Basu, S. (1977). "Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis", *The Journal of Finance*, Vol. 32 (3), pp. 663-682.
3. Brennan, M.J. and Cao, H.H. (1997). "International Portfolio Investment Flows", *The Journal of Finance*, Vol. 52 (5), pp. 1851-1880.
4. Brown, N.C., Wei, K.D. and Wermers, R.R. (2009). "Analyst Recommendations, Mutual Fund Herding, and Overreaction in Stock Prices" *SSRN eLibrary*.
5. Brown, S.J. and Goetzmann, W.N. (1997). "Mutual fund styles", *Journal of Financial Economics*, Vol. 43 (3), pp. 373-399.
6. Busse, J.A., Green, T.C. and Jegadeesh, N. (2008). "Stock Selection Skills and Career Choice: Buy Side vs. Sell Side", *SSRN eLibrary*.
7. Chan, L.K.C., Chen, H.-L. and Lakonishok, J. (2002). "On Mutual Fund Investment Styles", *The Review of Financial Studies*, Vol. 15 (5), pp. 1407-1437.
8. Chan, L.K.C., Hamao, Y. and Lakonishok, J. (1991). "Fundamentals and Stock Returns in Japan", *The Journal of Finance*, Vol. 46 (5), pp. 1739-1764.
9. Chen, X. and Cheng, Q. (2005). "Institutional Holdings and Analysts' Stock Recommendations", *SSRN eLibrary*, Vol. 21 (4), pp. 399-440.
10. Choe, H., Kho, B.-C. and Stulz, R.M. (1999). "Do foreign investors destabilize stock markets? The Korean experience in 1997", *Journal of Financial Economics*, Vol. 54 (2), pp. 227-264.
11. Choi, N. and Sias, R.W. (2009). "Institutional industry herding", *Journal of Financial Economics*, Vol. 94 (3), pp. 469-491.
12. Do, V., Guo-Sze Tan, M. and Westerholm, P.J. (2008). "Correlated Trading in Concentrated Market", *Journal of International Finance and Economics*, Vol. 8 (4).
13. Fama, E.F. and French, K.R. (1992). "The Cross-Section of Expected Stock Returns", *The Journal of Finance*, Vol. 47 (2), pp. 427-465.
14. Forner, C. and Marhuenda, J. (2003). "Contrarian and Momentum Strategies in the Spanish Stock Market", *European Financial Management*, Vol. 9 (1), pp. 67-88.
15. Galariotis, E.C., Holmes, P. and Ma, X.S. (2007). "Contrarian and momentum profitability revisited: Evidence from the London Stock Exchange 1964-2005", *Journal of Multinational Financial Management*, Vol. 17 (5), pp. 432-447.
16. Gervais, S., Kaniel, R. and Mingelgrin, D.H. (2001). "The High-Volume Return Premium", *The Journal of Finance*, Vol. 56 (3), pp. 877-919.
17. Grinblatt, M., Titman, S. and Wermers, R. (1995). "Momentum Investment Strategies, Portfolio Performance, and Herding: A Study of Mutual Fund Behavior", *The American Economic Review*, Vol. 85 (5), pp. 1088-1105.
18. Jegadeesh, N. and Titman, S. (1993). "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency", *The Journal of Finance*, Vol. 48 (1), pp. 65-91.
19. Keim, D.B. (1983). "Size-related anomalies and stock return seasonality: Further empirical evidence", *Journal of Financial Economics*, Vol. 12 (1), pp. 13-32.
20. Lakonishok, J., Shleifer, A. and Vishny, R.W. (1992). "The impact of institutional trading on stock prices", *Journal of Financial Economics*, Vol. 32 (1), pp. 23-43.
21. Lakonishok, J., Shleifer, A. and Vishny, R.W. (1994). "Contrarian Investment, Extrapolation, and Risk", *The Journal of Finance*, Vol. 49 (5), pp. 1541-1578.
22. Lee, C.M.C. and Swaminathan, B. (2000). "Price Momentum and Trading Volume", *The Journal of Finance*, Vol. 55 (5), pp. 2017-2069.
23. Nofsinger, J.R. and Sias, R.W. (1999). "Herding and Feedback Trading by Institutional and Individual Investors", *The Journal of Finance*, Vol. 54 (6), pp. 2263-2295.
24. O'Brien, P.C. and Bhushan, R. (1990). "Analyst Following and Institutional Ownership", *Journal of Accounting Research*, Vol. 28 (ArticleType: research-article / Issue Title: Studies on Judgment Issues in Accounting and Auditing / Full publication date: 1990 / Copyright © 1990 Accounting Research Center, Booth School of Business, University of Chicago), pp. 55-76.
25. Porta, R.L., Lakonishok, J., Shleifer, A. and Vishny, R. (1997). "Good News for Value Stocks: Further Evidence on Market Efficiency", *The Journal of Finance*, Vol. 52 (2), pp. 859-874.
26. Reinganum, M.R. (1981). "Misspecification of capital asset pricing: Empirical anomalies based on earnings' yields and market values", *Journal of Financial Economics*, Vol. 9 (1), pp. 19-46.
27. Ross, S.A. (1989). "Information and Volatility: The No-Arbitrage Martingale Approach to Timing and Resolution Irrelevancy", *The Journal of Finance*, Vol. 44 (1), pp. 1-17.
28. Rouwenhorst, K.G. (1998). "International Momentum Strategies", *The Journal of Finance*, Vol. 53 (1), pp. 267-284.
29. Schwert, G.W. (1989). "Why Does Stock Market Volatility Change Over Time?" *The Journal of Finance*, Vol. 44 (5), pp. 1115-1153.
30. Sias, R.W. (2004). "Institutional Herding", *The Review of Financial Studies*, Vol. 17 (1), pp. 165-206.

31. Voronkova, S. and Bohl, M.T. (2005). “Institutional Traders’ Behavior in an Emerging Stock Market: Empirical Evidence on Polish Pension Fund Investors”, *Journal of Business Finance & Accounting*, Vol. 32 (7-8), pp. 1537-1560.
32. Walter, A. and Weber, M., Friedrich (2006). “Herding in the German Mutual Fund Industry”, *European Financial Management*, Vol. 12 (3), pp. 375-406.
33. Wermers, R. (1999). “Mutual Fund Herding and the Impact on Stock Prices”, *The Journal of Finance*, Vol. 54 (2), pp. 581-622.

## Appendix

Table 1. Descriptive statistics

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of stocks | | | | | | 99 | | | | | | | | | | | |
| No. of funds | | | | | | 65 | | | | | | | | | | | |
| No. of stock-holdings positions | | | | | | 129276 | | | | | | | | | | | |
| No. of stock-months | | | | | | 6767 | | | | | | | | | | | |
| Average No. of active stocks per month traded by | Aug `96-Jun `11 | `96 (Aug-Dec) | `97 | `98 | `99 | `00 | `01 | `02 | `03 | `04 | `05 | `06 | `06 | `08 | `09 | `10 | `11 (Jan-Jun) |
| ≥ 1 fund | 37.8 | 49.2 | 52.0 | 54.8 | 51.8 | 43.8 | 35.3 | 30.7 | 26.9 | 28.5 | 32.4 | 33.8 | 32.9 | 34.8 | 35.2 | 34.3 | 32.5 |
| ≥ 2 funds | 34.3 | 44.2 | 47.5 | 49.0 | 47.1 | 38.3 | 29.5 | 25.7 | 23.1 | 25.5 | 29.6 | 32.4 | 32.1 | 33.3 | 33.2 | 31.8 | 30.8 |
| ≥ 3 funds | 31.2 | 39.6 | 43.6 | 44.8 | 42.2 | 35.1 | 26.5 | 23.5 | 20.5 | 22.3 | 26.3 | 30.4 | 29.7 | 31.2 | 30.8 | 29.0 | 25.8 |
| ≥ 4 funds | 28.7 | 34.6 | 40.0 | 41.8 | 39.1 | 32.3 | 24.3 | 21.7 | 18.5 | 20.5 | 23.7 | 27.8 | 26.8 | 29.8 | 29.1 | 26.7 | 24.7 |
| ≥ 5 funds | 26.4 | 31.6 | 37.2 | 39.6 | 37.1 | 30.1 | 21.3 | 19.4 | 15.7 | 18.2 | 21.2 | 25.4 | 25.4 | 27.7 | 26.3 | 24.5 | 22.0 |
| Average No. of active funds per stock per month | Aug `96-Jun `11 | `96 (Aug-Dec) | `97 | `98 | `99 | `00 | `01 | `02 | `03 | `04 | `05 | `06 | `07 | `08 | `09 | `10 | `11 (Jan-Jun) |
| ≥ 1 fund | 7.7 | 7.7 | 9.3 | 10.3 | 10.4 | 9.7 | 7.6 | 7 | 4.4 | 8.3 | 5.9 | 6.6 | 7.0 | 7.3 | 6.9 | 7.9 | 7.5 |
| ≥ 2 funds | 8.2 | 8.0 | 9.5 | 11 | 10.7 | 10.2 | 8.6 | 7.8 | 5.2 | 9.1 | 5.8 | 7.1 | 7.2 | 7.6 | 7.0 | 8.0 | 7.5 |
| ≥ 3 funds | 8.7 | 8.2 | 9.7 | 11.8 | 12 | 10.4 | 9.1 | 9 | 6.2 | 9.3 | 6.3 | 7.0 | 7.4 | 7.9 | 7.6 | 8.3 | 8.4 |
| ≥ 4 funds | 8.9 | 8.9 | 10.2 | 12.9 | 12 | 10.8 | 9.4 | 9.1 | 6.4 | 9.0 | 6.6 | 7.4 | 7.6 | 8.0 | 7.7 | 8.3 | 8.6 |
| ≥ 5 funds | 9.2 | 9.5 | 11.0 | 13.4 | 12.3 | 10.9 | 10.5 | 9.1 | 6.8 | 9.2 | 6.7 | 7.2 | 7.5 | 7.8 | 7.6 | 8.6 | 8.8 |

Table 2. Test for herding

| Average coefficient (β) | Partitioned slope coefficient | | Average $R^2$ |
|---|---|---|---|
| | Funds following their own trades | Funds following others' trades | |
| Stocks traded by ≥ 1 fund | | | |
| 0.3307<br>(20.44)*** | 0.1037<br>(9.76)*** | 0.227<br>(16.87)*** | 0.1537 |
| Stocks traded by ≥ 2 funds | | | |
| 0.3396<br>(19.50)*** | 0.0907<br>(9.04)*** | 0.2489<br>(16.10)*** | 0.1631 |
| Stocks traded by ≥ 3 funds | | | |
| 0.3417<br>20.32)*** | 0.1149<br>(8.59)*** | 0.2268<br>(13.10)*** | 0.1642 |
| Stocks traded by ≥ 4 funds | | | |
| 0.3339<br>(18.70)*** | 0.1255<br>(8.74)*** | 0.2085<br>(10.88)*** | 0.162 |
| Stocks traded by ≥ 5 funds | | | |
| 0.344<br>(18.21)*** | 0.1267<br>(8.31)*** | 0.2173<br>(10.66)*** | 0.181 |

Notes: The table presents the results from equation (1): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \varepsilon_{k,t}$. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and ***indicates significance at the 1% level.

Table 3. Analysts’ recommendations

| Average coefficient ($\beta_1$) | Analysts’ recommendations coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 1 fund | | |
| 0.3134<br>(17.27)*** | 0.0011<br>(0.07) | 0.1924 |
| Stocks traded by ≥ 2 funds | | |
| 0.3276<br>(17.90)*** | -0.0078<br>(-0.48) | 0.2015 |
| Stocks traded by ≥ 3 funds | | |
| 0.3240<br>(17.91)*** | -0.0142<br>(-0.76) | 0.2076 |

Table 3 (cont.). Analysts' recommendations

| Average coefficient ($\beta_1$) | Analysts' recommendations coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 4 funds | | |
| 0.3120 (15.42)*** | -0.0139 (-0.68) | 0.2173 |
| Stocks traded by ≥ 5 funds | | |
| 0.3188 (14.87)*** | -0.0150 (-0.68) | 0.2374 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{k,t-1}$ the variable controlling for the recommendations of analysts. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 4. Momentum

| Average coefficient ($\beta_1$) | Momentum coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 1 fund | | |
| 0.3483 (20.28)*** | -0.0210 (-1.37) | 0.1968 |
| Stocks traded by ≥ 2 funds | | |
| 0.3478 (19.78)*** | -0.0248 (-1.54) | 0.2026 |
| Stocks traded by ≥ 3 funds | | |
| 0.3460 (19.79)*** | -0.0366 (-2.14)** | 0.2030 |
| Stocks traded by ≥ 4 funds | | |
| 0.3341 (18.18)*** | -0.0443 (-2.55)** | 0.2090 |
| Stocks traded by ≥ 5 funds | | |
| 0.3492 (17.65)*** | -0.0364 (-2.11)** | 0.2278 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the past returns. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 5. Market value

| Average coefficient ($\beta_1$) | Market value coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 1 fund | | |
| 0.3452 (20.39)*** | -0.1748 (-2.68)** | 0.1857 |
| Stocks traded by ≥ 2 funds | | |
| 0.3507 (20.00)*** | -0.1852 (-2.61)** | 0.1950 |
| Stocks traded by ≥ 3 funds | | |
| 0.3498 (20.29)*** | -0.2212 (-2.68)** | 0.2020 |
| Stocks traded by ≥ 4 funds | | |
| 0.3410 (18.56)*** | -0.1759 (-1.89)* | 0.2096 |
| Stocks traded by ≥ 5 funds | | |
| 0.3543 (18.48)*** | -0.1602 (-1.61) | 0.2297 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the market value. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 6. Value strategies

| Average coefficient ($\beta_1$) | P/E coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 1 fund | | |
| 0.3479 (20.18)*** | -0.0001 (0.00) | 0.2018 |
| Stocks traded by ≥ 2 funds | | |
| 0.3524 (19.88)*** | -0.0068 (-0.33) | 0.2077 |

Table 6 (cont.). Value strategies

| Average coefficient ($\beta_1$) | P/E coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 3 funds | | |
| 0.3487<br>(19.18)*** | -0.0064<br>(-0.26) | 0.2168 |
| Stocks traded by ≥ 4 funds | | |
| 0.3328<br>(16.90)*** | 0.0067<br>(0.28) | 0.2191 |
| Stocks traded by ≥ 5 funds | | |
| 0.3409<br>(16.29)*** | 0.0175<br>(0.73) | 0.2342 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the P/E ratio. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 7. Volatility

| Average coefficient ($\beta_1$) | Volatility coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 1 fund | | |
| 0.3470<br>(19.98)*** | 0.0057<br>(0.26) | 0.1935 |
| Stocks traded by ≥ 2 funds | | |
| 0.3426<br>(20.06)*** | -0.0017<br>(0.08) | 0.1983 |
| Stocks traded by ≥ 3 funds | | |
| 0.3502<br>(21.36)*** | 0.0019<br>(0.08) | 0.2013 |
| Stocks traded by ≥ 4 funds | | |
| 0.3323<br>(18.05)*** | 0.0367<br>(1.44) | 0.2102 |
| Stocks traded by ≥ 5 funds | | |
| 0.3490<br>(17.90)*** | 0.0316<br>(1.12) | 0.2322 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the volatility. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 8. Volume

| Average coefficient ($\beta_1$) | Volume coefficient ($\beta_2$) | Average $R^2$ |
|---|---|---|
| Stocks traded by ≥ 1 fund | | |
| 0.3374<br>(19.50)*** | -0.0222<br>(-2.30)** | 0.1913 |
| Stocks traded by ≥ 2 funds | | |
| 0.3492<br>(19.18)*** | -0.0200<br>(-1.99)** | 0.2026 |
| Stocks traded by ≥ 3 funds | | |
| 0.3533<br>(19.99)*** | -0.0185<br>(-1.80)* | 0.2093 |
| Stocks traded by ≥ 4 funds | | |
| 0.3430<br>(17.95)*** | -0.0181<br>(-1.71)* | 0.2176 |
| Stocks traded by ≥ 5 funds | | |
| 0.3581<br>(17.90)*** | -0.0118<br>(-1.15) | 0.2342 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the volume. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 9. Herding pre- and post-EURONEXT

| Average coefficient ($\beta$) | | | Partitioned slope coefficient | | | | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Funds following their own trades | | | Funds following others' trades | | | | |
| Pre-EURONEXT | Post-EURONEXT | *t* test | Pre-EURONEXT | Post-EURONEXT | *t* test | Pre-EURONEXT | Post-EURONEXT | *t* test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | | | | |
| 0.2806<br>(12.98)*** | 0.3647<br>(16.33)*** | (-2.71)** | 0.0694<br>(5.74)*** | 0.1269<br>(8.20)*** | (-2.93)** | 0.2112<br>(10.41)*** | 0.2378<br>(13.27)*** | (-0.98) | 0.1089 | 0.1842 |

Table 9 (cont.). Herding pre- and post-EURONEXT

| Average coefficient ($\beta$) | | | Partitioned slope coefficient | | | | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Funds following their own trades | | | Funds following others' trades | | | | |
| Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 2 funds | | | | | | | | | | |
| 0.3129 (13.61)*** | 0.3588 (14.68)*** | (-1.33) | 0.0541 (5.47)*** | 0.1156 (7.77)*** | (-3.42)*** | 0.2588 (10.75)*** | 0.2422 (11.97)*** | (-0.53) | 0.1293 | 0.1861 |
| Stocks traded by ≥ 3 funds | | | | | | | | | | |
| 0.3072 (13.65)*** | 0.3652 (15.50)*** | (-1.78)* | 0.0731 (4.66)*** | 0.1433 (7.41)*** | (-2.82)** | 0.2341 (8.31)*** | 0.2219 (10.09)*** | (-0.34) | 0.1282 | 0.1886 |
| Stocks traded by ≥ 4 funds | | | | | | | | | | |
| 0.3231 (14.19)*** | 0.3413 (13.25)*** | (-0.53) | 0.0813 (4.99)*** | 0.1555 (7.41)*** | (-2.79)** | 0.2418 (8.49)*** | 0.1858 (7.26)*** | (1.46) | 0.1290 | 0.1844 |
| Stocks traded by ≥ 5 funds | | | | | | | | | | |
| 0.3382 (12.79)*** | 0.3480 (13.26)*** | (-0.26) | 0.0788 (4.44)*** | 0.1592 (7.21)*** | (-2.84)** | 0.2593 (8.11)*** | 0.1888 (7.20)*** | (1.71)* | 0.1545 | 0.199 |

Notes: The table presents the results from equation (1): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \varepsilon_{k,t}$. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 10. Analysts' recommendations pre- and post-Euronext

| Average coefficient ($\beta$) | | | Analysts' recommendations coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.2870 (12.00)*** | 0.3314 (12.88)*** | (-1.26) | 0.0043 (0.20) | -0.0010 (-0.05) | (0.18) | 0.1504 | 0.2210 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3211 (13.57)*** | 0.3321 (12.64)*** | (-0.31) | -0.0046 (-0.21) | -0.0099 (-0.44) | (0.17) | 0.1644 | 0.2267 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3146 (13.31)*** | 0.3303 (12.77)*** | (1.97)*** | -0.0183 (-0.69) | -0.0115 (-0.44) | (-0.18) | 0.1697 | 0.2333 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3328 (13.96)*** | 0.2978 (9.96)*** | (0.92) | -0.0428 (-1.53) | 0.0057 (0.20) | (-1.21) | 0.1796 | 0.2429 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3467 (12.34)*** | 0.2998 (9.83)*** | (1.13) | -0.0479 (-1.70)* | 0.0073 (0.23) | (-1.30) | 0.2018 | 0.2615 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the analysts' recommendations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 11. Momentum

| Average coefficient ($\beta$) | | | Momentum coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.2925 (12.08)*** | 0.3862 (16.75)*** | (-2.80)** | 0.0129 (0.63) | -0.0440 (-2.06)** | (1.92)* | 0.1403 | 0.2352 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3160 (13.01)*** | 0.3695 (15.16)*** | (-1.55) | -0.0016 (-0.07) | -0.0406 (-1.83)* | (1.23) | 0.1588 | 0.2323 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3051 (12.41)*** | 0.3737 (15.66)*** | (-2.00)** | -0.0204 (-0.79) | -0.0476 (-2.09)** | (0.79) | 0.1629 | 0.2303 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3192 (13.16)*** | 0.3441 (13.16)*** | (-0.70) | -0.0317 (-1.16) | -0.0529 (-2.34)** | (0.60) | 0.1756 | 0.2317 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3326 (11.54)*** | 0.3605 (13.40)*** | (-0.71) | -0.0426 (-1.54) | -0.0322 (-1.46) | (-0.29) | 0.2009 | 0.2461 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the past returns. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 12. Market value

| Average coefficient ($\beta$) | | | Market value coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.2872 (11.99)*** | 0.3846 (17.02)*** | (-2.96)** | -0.0105 (-0.12) | -0.2864 (-3.14)*** | (2.20)** | 0.1369 | 0.2189 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3160 (13.26)*** | 0.3742 (15.32)*** | (-1.71)* | -0.0277 (-0.29) | -0.2921 (-2.94)*** | (1.92)* | 0.1561 | 0.2213 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3086 (13.18)*** | 0.3778 (15.80)*** | (-2.07)** | -0.0292 (-0.29) | -0.3516 (-2.95)*** | (2.07)** | 0.1562 | 0.2332 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3208 (13.63)*** | 0.3546 (13.44)*** | (-0.96) | -0.0079 (-0.07) | -0.2901 (-2.17)** | (1.58) | 0.1663 | 0.2391 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3414 (12.64)*** | 0.3631 (13.69)*** | (-0.57) | 0.0274 (0.20) | -0.2877 (-2.07)** | (1.62) | 0.1954 | 0.2529 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the market value. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 13. Value/Growth strategies

| Average coefficient ($\beta$) | | | P/E coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.2758 (11.82)*** | 0.3969 (17.17)*** | (-3.69)*** | 0.0208 (0.87) | -0.0142 (-0.55) | (0.99) | 0.1424 | 0.2422 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.2872 (12.18)*** | 0.3966 (16.36)*** | (-3.24)** | -0.0076 (-0.25) | -0.0063 (-0.22) | (-0.03) | 0.1594 | 0.2405 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.2763 (11.75)*** | 0.3979 (15.92)*** | (-3.54)*** | -0.0118 (-0.34) | -0.0028 (-0.08) | (-0.18) | 0.1669 | 0.2507 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.2854 (11.51)*** | 0.3650 (12.98)*** | (-2.12)** | 0.068 (0.18) | 0.0066 (0.21) | (0.00) | 0.1745 | 0.2494 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.2927 (10.11)*** | 0.3737 (12.97)*** | (-1.98)** | 0.0361 (1.01) | 0.0049 (0.15) | (0.65) | 0.1984 | 0.2586 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the P/E ratio. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 14. Volatility

| Average coefficient ($\beta$) | | | Volatility coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT | t test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.2962 (12.22)*** | 0.3742 (16.21)*** | (-2.33)** | 0.0320 (1.12) | -0.024 (-0.87) | (1.41) | 0.1583 | 0.2175 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3216 (14.35)*** | 0.3642 (14.68)*** | (-1.28) | 0.0608 (2.19)** | -0.0318 (-1.05) | (2.26)** | 0.1463 | 0.2214 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3040 (13.56)*** | 0.3816 (16.94)*** | (-2.44)** | 0.0586 (1.76)* | -0.0366 (-1.22) | (2.12)** | 0.1668 | 0.2248 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3141 (13.85)*** | 0.3446 (12.85)*** | (-0.87) | 0.0329 (0.94) | 0.0393 (1.10) | (-0.13) | 0.1719 | 0.2361 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3362 (12.90)*** | 0.3577 (12.96)*** | (-0.57) | 0.0157 (0.40) | 0.0424 (1.08) | (-0.48) | 0.2003 | 0.2539 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the volatility. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 15. Volume

| Average coefficient ($\beta$) | | | Volatility coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-EURONEXT | Post-EURONEXT | *t* test | Pre-EURONEXT | Post-EURONEXT | *t* test | Pre-EURONEXT | Post-EURONEXT |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.2903<br>(12.29)*** | 0.3693<br>(15.51)*** | (-2.36)** | 0.0106<br>(0.84) | -0.0444<br>(-3.31)*** | (3.00)** | 0.1409 | 0.2255 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3183<br>(13.39)*** | 0.3701<br>(14.32)*** | (-1.48) | 0.0138<br>(1.13) | -0.0429<br>(-2.99)*** | (3.01)** | 0.1564 | 0.2340 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3113<br>(13.01)*** | 0.3818<br>(15.56)*** | (-2.06)** | 0.0128<br>(1.04) | -0.0397<br>(-2.69)*** | (2.73)** | 0.1581 | 0.2441 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3241<br>(13.81)*** | 0.3558<br>(12.77)*** | (-0.87) | 0.0114<br>(0.89) | -0.0381<br>(-2.50)** | (2.49)** | 0.1634 | 0.2543 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3430<br>(12.86)*** | 0.3684<br>(12.99)*** | (-0.65) | 0.0149<br>(1.24) | -0.0300<br>(-1.99)** | (2.33)** | 0.1855 | 0.2674 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the volume. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 16. Herding pre- and post-crisis

| Average coefficient ($\beta$) | | | Partitioned slope coefficient | | | | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Funds following their own trades | | | Funds following others' trades | | | | |
| Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | | | | |
| 0.3672<br>(12.01)*** | 0.3609<br>(11.21)*** | (1.98) | 0.1221<br>(8.28)*** | 0.1343<br>(4.17)*** | (2.00) | 0.2451<br>(9.72)*** | 0.2265<br>(9.42)*** | (1.98) | 0.1900 | 0.1753 |
| Stocks traded by ≥ 2 funds | | | | | | | | | | |
| 0.3569<br>(10.35)*** | 0.359<br>(10.62)*** | (1.98) | 0.1015<br>(7.46)*** | 0.137<br>(4.32)*** | (2.00) | 0.2554<br>(9.15)*** | 0.2220<br>(7.82)*** | (1.98) | 0.1946 | 0.1732 |
| Stocks traded by ≥ 3 funds | | | | | | | | | | |
| 0.3629<br>(10.90)*** | 0.3685<br>(11.70)*** | (1.98) | 0.126<br>(6.95)*** | 0.1695<br>(4.21)*** | (2.00) | 0.2369<br>(7.70)*** | 0.1990<br>(6.68)*** | (1.98) | 0.1973 | 0.1754 |
| Stocks traded by ≥ 4 funds | | | | | | | | | | |
| 0.3415<br>(9.80)*** | 0.341<br>(8.98)*** | (1.99) | 0.1315<br>(6.30)*** | 0.1919<br>(4.56)*** | (2.00) | 0.2100<br>(5.95)*** | 0.1490<br>(4.20)*** | (1.98) | 0.1936 | 0.1703 |
| Stocks traded by ≥ 5 funds | | | | | | | | | | |
| 0.3531<br>(9.98)*** | 0.3401<br>(8.73)*** | (1.99) | 0.1409<br>(6.26)*** | 0.1870<br>(4.25)*** | (2.00) | 0.2122<br>(5.77)*** | 0.1531<br>(4.36)*** | (1.98) | 0.2107 | 0.1811 |

Notes: The table presents the results from equation (1): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \varepsilon_{k,t}$. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 17. Analysts' recommendations

| Average coefficient ($\beta$) | | | Analysts' reccomendations coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.3376<br>(9.42)*** | 0.3218<br>(9.04)*** | (1.98) | 0.0100<br>(0.34) | -0.0178<br>(-0.62) | (1.98) | 0.2396 | 0.1925 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3546<br>(10.05)*** | 0.2978<br>(7.68)*** | (1.99) | -0.0139<br>(-0.44) | -0.0039<br>(-0.13) | (1.98) | 0.2552 | 0.1831 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3616<br>(10.66)*** | 0.2827<br>(7.21)*** | (1.99) | -0.0304<br>(-0.82) | 0.0175<br>(0.54) | (1.98) | 0.2669 | 0.1820 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3400<br>(9.01)*** | 0.2335<br>(4.89)*** | (1.99)* | -0.0301<br>(-0.72) | 0.0602<br>(1.81)* | (1.98)** | 0.2780 | 0.1893 |

Table 17 (cont.). Analysts' recommendations

| Average coefficient ($\beta$) | | | Analysts' reccomendations coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3523<br>(9.40)*** | 0.2198<br>(4.43)*** | (1.99)** | -0.0411<br>(-0.93) | 0.081<br>(1.95)* | (1.98)** | 0.2997 | 0.2033 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the analysts' recommendations. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 18. Momentum

| Average coefficient ($\beta$) | | | Momentum coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.3993<br>(12.33)*** | 0.3663<br>(11.78)*** | (1.98) | -0.0567<br>(-1.77)* | -0.0247<br>(-1.07) | (1.98) | 0.2536 | 0.2072 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3834<br>(11.15)*** | 0.3482<br>(10.74)*** | (1.98) | -0.0434<br>(-1.28) | -0.0365<br>(-1.60) | (1.98) | 0.2531 | 0.2007 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3832<br>(11.33)*** | 0.3594<br>(11.40*** | (1.98) | -0.0457<br>(-1.29) | -0.0504<br>(-2.43)** | (1.98) | 0.2447 | 0.2083 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3523<br>(9.83)*** | 0.3318<br>(8.85)*** | (1.98) | -0.0423<br>(-1.29) | -0.0690<br>(-2.46)** | (1.98) | 0.2424 | 0.2154 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3763<br>(10.37)*** | 0.3363<br>(8.49)*** | (1.99) | -0.0081<br>(-0.25) | -0.0690<br>(-2.54)** | (1.98) | 0.2592 | 0.2261 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the past returns. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 19. Market value

| Average coefficient ($\beta$) | | | Market value coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.3870<br>(12.25)*** | 0.3810<br>(12.26)*** | (1.98) | -0.3776<br>(-3.11)*** | -0.1475<br>(-1.08) | (1.99) | 0.2284 | 0.2043 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3793<br>(11.14)*** | 0.3664<br>(10.86)*** | (1.98) | -0.3928<br>(-2.88)*** | -0.1386<br>(-1.00) | (1.98) | 0.2363 | 0.1985 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3757<br>(11.18)*** | 0.3809<br>(11.77)*** | (1.98) | -0.3822<br>(-2.38)** | -0.3051<br>(-1.72)* | (1.99) | 0.2426 | 0.2189 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3527<br>(9.76)*** | 0.3577<br>(9.41)*** | (1.98) | -0.3513<br>(-1.87)* | -0.1968<br>(-1.10) | (1.98) | 0.2515 | 0.2203 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3667<br>(10.29)*** | 0.3577<br>(9.02)*** | (1.99) | -0.3558<br>(-1.83)* | -0.1838<br>(-0.97) | (1.98) | 0.2679 | 0.2302 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the market value. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 20. Value/Growth strategies

| Average coefficient ($\beta$) | | | P/E coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis | *t* test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.3987<br>(12.44)*** | 0.3941<br>(12.16)*** | (1.98) | 0.0069<br>(0.19) | -0.0464<br>(-1.33) | (1.98) | 0.2523 | 0.2268 |

Table 20 (cont.). Value/Growth strategies

| Average coefficient ($\beta$) | | | P/E coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | t test | Pre-crisis | Post-crisis | t test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3995<br>(12.08)*** | 0.3922<br>(11.14)*** | (1.98) | 0.0125<br>(0.31) | -0.0350<br>(-0.95) | (1.98) | 0.2546 | 0.2191 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.4008<br>(11.69)*** | 0.3936<br>(10.99)*** | (1.98) | -0.0100<br>(-0.20) | 0.0081<br>(0.20) | (1.98) | 0.2679 | 0.2246 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3710<br>(9.74)*** | 0.3557<br>(8.61)*** | (1.99) | 0.0025<br>(0.05) | 0.0129<br>(0.34) | (1.98) | 0.2687 | 0.2198 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3870<br>(10.27)*** | 0.3533<br>(7.86)*** | (1.99) | -0.0105<br>(-0.22) | 0.0284<br>(0.71) | (1.98) | 0.2774 | 0.2299 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the P/E ratio. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 21. Volatility

| Average coefficient ($\beta$) | | | Volatility coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | t test | Pre-crisis | Post-crisis | t test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.3732<br>(11.50)*** | 0.3756<br>(12.00)*** | (1.98) | -0.0308<br>(-0.89) | -0.0149<br>(-0.31) | (1.99) | 0.2233 | 0.2086 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3706<br>(10.95)*** | 0.3545<br>(9.86)*** | (1.98) | -0.0649<br>(-1.79)* | 0.0187<br>(0.36) | (1.99) | 0.2308 | 0.2071 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3855<br>(12.30)*** | 0.3756<br>(12.00)*** | (1.98) | -0.0508<br>(-1.32) | -0.0149<br>(-0.31) | (1.99) | 0.2354 | 0.2086 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3405<br>(9.45)*** | 0.3508<br>(8.76)*** | (1.99) | 0.0227<br>(0.50) | 0.0647<br>(1.09) | (1.99) | 0.2451 | 0.2225 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3602<br>(10.00)*** | 0.3540<br>(8.15)*** | (1.99) | 0.0117<br>(0.23) | 0.0891<br>(1.43) | (1.99) | 0.2702 | 0.2291 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the volatility. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 22. Volume

| Average coefficient ($\beta$) | | | Volume coefficient ($\beta_2$) | | | Average $R^2$ | |
|---|---|---|---|---|---|---|---|
| Pre-crisis | Post-crisis | t test | Pre-crisis | Post-crisis | t test | Pre-crisis | Post-crisis |
| Stocks traded by ≥ 1 fund | | | | | | | |
| 0.3611<br>(10.79)*** | 0.3819<br>(11.87)*** | (1.98) | -0.0748<br>(-4.14)*** | 0.0019<br>(0.11) | (1.98)** | 0.2432 | 0.1985 |
| Stocks traded by ≥ 2 funds | | | | | | | |
| 0.3706<br>(10.33)*** | 0.3695<br>(10.23)*** | (1.98) | -0.0719<br>(-3.64)*** | 0.0013<br>(0.07) | (1.98)** | 0.2588 | 0.1961 |
| Stocks traded by ≥ 3 funds | | | | | | | |
| 0.3743<br>(10.95)*** | 0.3931<br>(11.59)*** | (1.98) | -0.0635<br>(-3.14)*** | -0.0033<br>(-0.17) | (1.98)** | 0.2680 | 0.2077 |
| Stocks traded by ≥ 4 funds | | | | | | | |
| 0.3467<br>(9.20)*** | 0.3697<br>(9.01)*** | (1.99) | -0.0631<br>(-3.03)*** | 0.0000<br>(0.00) | (1.98)** | 0.2785 | 0.2175 |
| Stocks traded by ≥ 5 funds | | | | | | | |
| 0.3657<br>(9.64)*** | 0.3725<br>(8.73)*** | (1.99) | -0.0528<br>(-2.60)** | 0.0048<br>(0.23) | (1.98)* | 0.2943 | 0.2263 |

Notes: The table presents the results from equation (3): $\Delta_{k,t} = \beta_t \Delta_{k,t-1} + \beta_2 X_{k,t-1} + \varepsilon_{k,t}$, where $X_{1,t-1}$ the variable controlling for the volume. * Indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.