Herding Behavior on mutual fund investors in Brazil

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ABSTRACT

Herd behavior (i.e. correlated movement of investors), among mutual fund investors can force fund managers to sell or buy assets even when with bad timing, like selling on historical lows or buying at market tops, what could jeopardize investor's return and cause even more volatility of prices, due to the high volume of trading of the herd. This study has found strong evidence of herd behavior heterogeneously distributed among different groups of investors, types of funds and periods of time of Brazilian mutual funds, an evidence against the homogeneous expectations assumption of efficient markets theory.

1. INTRODUCTION

The several crises in financial markets have caused high volality and substantial losses on the global financial markets, besides their impact on economies all over the world. It is common to see on those crisis panic, high volatility and liquidity problems that cause some firms to crash or need government funded bailouts. Asset pricing models based on the market efficiency assumptions may need a revision as, at least on these moments, they are not empirically useful. Furthermore, the crescent volume of money invested in Brazilian mutual funds, including stock funds, becomes a source of worry: in case there is an escape from stock funds, i.e., a general movement of investors (herd behavior), can the asset selling pressure lead to disequilibrium? This paper discusses the existence and characteristics of herd behavior within mutual fund investors, given that they have basically three options regarding their investment on funds: invest more, withdraw their money or do nothing. The first two options force (on net movement of investors), on most cases, the fund manager to buy or sell assets on market, regardless of his opinion about timing.

2. OBJECTIVES

The aim of this study is to empirically detect the occurrence of herd behavior in mutual funds fund-raising in Brazil, in order to test the behavior of investors which are not in accordance with the assumptions of market efficiency, but explained by assumptions supported by behavior finance. The assumptions of the MFT - Modern Finance Theory, of BF - Behavior Finance, the tested behaviors and its interrelationships can be easily understood in the following section.

I. Herd Behavior Occurrence

The herd behavior is a positively correlated movement, or in block, of investors.

In case it does happen, two assumptions of MFT might be contradicted, as follows:

a. Agents maximize their expected usefulness in function of their risk aversion, which is individual and should not lead to individuals deciding in blocks.
b. The price reflects all available information: as there is a correlated movement of investors, they may probably not believe that the current price is fair. If that was the case, there would be no reason to trade.

At the same time, the incidence of such phenomenon supports the BF assumptions that there may be under and overreaction and investors do not make decisions based only on expected usefulness and expectations of future cash flow, but also based on the decision of other investors.

II. Heterogeneous Occurrence of Herd Behavior

If herding occours, but in different "flocks" or groups or investors, that could mean that there is herd behavior, on average, in some groups of investors, but there is not in others, in assets with the same risk/return level. It contradicts the MFT assumption of homogeneous expectations and homogeneous information.

III. Price Anchoring Heuristics Causes Herd Behavior

Testing whether investors make decisions based on historic price – when the main Brazilian stock index - Ibovespa - rises over its maximum level or falls under its minimum level in a given med to long term historic horizon, investors react. In case it is true, there is evidence that investors use heuristics instead of being rational (according to MFT) and simply taking into account in their evaluations the present value of future cash flows of Ibovespa stocks. This work does not aim to test all herd behavior determinants, but contributing to further research on this subject in Brazil.

3. LITERATURE REVIEW

3.1 Modern Finance Theory and Behavioral Finance

Behavioral Finance, in opposition to modern finance theory on asset pricing, in which information and expectations are homogeneous (see Fama (1970) and Fama (1991)), argues that information is not available to everyone, and it has a cost either of acquisition or of research, and it may have different interpretations. In some cases, such cost may top the benefit of information for some agents, but no for others. This fact by itself causes information heterogeneity between agents. At the same time, BF admits that agents may not have all information, nor attach due importance to them, on account of the representativeness bias proposed by Kahneman and Tversky (1974). These authors argue that agents

value more recent information or information that seemed more distinct to them and not necessarily more relevant information, besides ignoring relevant information that they do not have or is not so recent or distinct.

Another aspect stated by MFT is that economic agents are rational, whereas there is a counter-argument in BF: rationality is limited and there are several ways for the people to interpret the market and themselves, according Daft and Weick (1984).

BF postulates that many characteristics of group behavior present in organizations, as there are agency conflicts like managers being able to manipulate the company's decisions, through politics and power, within companies and communities, in order to meet their own interests; that being so, decisions may be not rational nor optimal, in the point-of-view of the society of the company's associates, for public and private managers.

MFT supports the concept of total asset divisibility. This is relevant because it assumes wide access to market assets for agents from all wealth levels. When it comes to finance, such barriers may be the minimum investment, eligibility, information and regulation.

MFT also assumes that there are no consistent opportunities of arbitrage or abnormal profits, suggesting that the market adjusts itself, what corroborate the view of Adam Smith about the "invisible hand". In BF, De Long *et al* (1990) present a counter-argument, stating that there are noise traders, i.e., investors whose behavior is not rational and unpredictable. Rational agents fear negotiating in order to benefit from such disequilibrium, because the unpredictability of such noise traders's behavior may lead to greater disequilibrium, what could cause losses to rational agents that had bet against the disequilibrium hoping to profit when it was gone.

3.2 The Herd Behavior

According to Bikhchandani and Sharma (2001), herd behavior is the correlated movement of investors. When investors are observed trading on the same direction, this may be due to herding. There is no consensus about the source of herding, but there are two main explanations:

1 - It may be explained by investor's similar reactions to shocks and new information. In this case, if it happens homogeneously and simultaneously in any group of agents, the MFT assumption of homogeneous expectations and information is confirmed. In case it happens heterogeneously, such assumption shows itself to be invalid. Another explanation provided by BF is that a group investors reach the same opinion and action because of similar interpretation of the reality or are driven by the same biases or heuristics (see Tversky, A. & Kahneman, D. (1974).

2 - Informational cascades occour: a group of investors behave the same way because they believe there is some informational content on other investor's behavior, despite their anterior opinion. [see Bikhchandani et al (2000), (1998) and (2000), Avery and Zemsky (1998), Park and Sabourian (2010) and Drehmann, Oechssler and Roider

(2005)]. Though it may be considered a rational behavior, it denies the assumption of homogeneous information. Besides, when investors make decisions based on what another investor did, they disregard the information available so far, its own utility function and its level of risk aversion; these are counter-arguments to the assumption that all available information are reflected on the price.

It differs from MFT in the efficient market assumptions that investors are rational (using all available information about assets in the market), that information is homogeneous between the agents, that all agents are price takers and that agents maximize their expected usefulness taking into account the risk / return relationship, according to their level of risk aversion.

While Lakonishok, Schleifer and Vishny (1992) - from now on "LSV" - found only weak evidence to the occurrence of herd behavior, Shapira and Venezia (2006), in their study about transactions made by amateur and professional investors in brokerage in Israel from 1994 until 1998, came to the conclusion that herd behavior happens with both type of investors, but such effect is significantly higher among amateurs. This conclusion contradicts what MFT postulates about homogeneous expectations between agents. There are also several other studies that test the influence of herd behavior on stock returns, such as Cont and Bouchaud (2000), who found that amateur investors show herd behavior, and such behavior increases the kurtosis of stock returns, but such herding does not happen with professional investors. Teh and DeBondt (1997), based on a sample of stock returns from 1980 until 1990, observed that herd behavior has influence over stock returns variance, by using the same methodology as Fama e French (1992). That suggests that the herd behaves inefficiently for the market and for itself. For instance, if the herd is bearish (sell assets) , it will increase the supply of the asset and may cause a "bear" pressure on prices; that would cause losses for the herd itself as the asset will be sold for less; besides, it could unleash more sales (informational cascade). On the other hand, professional investors may be more aware of the impact that their trades might have on short-term prices; thus, they are more cautious when doing big trades. There are several authors who studied, based on LSV methodology, whether there is herd or imitation behavior among mutual funds managers. For instance, Lobão e Serra (2002) found strong evidence of herd behavior in fund managers' investment decisions in the Portuguese stock investment funds market. Other authors have studied informational cascades by modelling herd and contrarian behavior (see Park and Sabourian (2010) and Avery and Zemsky (1998)) and tested models through experiments, as did Drehmann, Oechssler and Roider (2005), who found that contrarian behavior distorts prices, and herding might be prevented by the presence of a flexible market price, on their experiment taken on the internet.

There are also several papers on fund manager's herding, i.e. managers imitate the decisions of other managers. Nevertheless, in this research, instead of measuring herd behavior among fund managers, the aim is to measure investors herd behavior when buying or selling mutual fund shares.

3.3 Price Anchoring

Price anchoring is related to heuristics biases and to the investor's memory. It is based on the assumption that an investor evaluates the price or even the future market expectations based on historical information.

Predicting future prices based on past prices has no theoretical validity, but it is widely known in the so-called "technical analysis" or "chart analysis", in a section popularly called "Dow theory". It states that prices vary in a range delimited by a maximum and minimum price in the long run: when price fall more below a historical minimum price (support), it shall sharply decrease by a certain amount; on the other hand, if prices rise above the historical maximum (resistance), the price will sharply increase by a certain amount, and the former price ceiling (resistance) becomes the new floor (support). The occurrence of new maximum or minimum prices is widely broadcasted in newspapers and magazines, with headlines such as "Bovespa breaks a new record…".

Although with no theoretical base for future stock performance, chartists argue that if the majority of the market players believe on Dow Theory, then it can become a self-accomplishing prophecy. Some authors tested those technical analysis trading systems, like Borges (2007), for example, who conducted a study of weekly stock trades volume in Bovespa from January, 2000 to July, 2006, and found evidence that there are abnormal trading volumes when there are new maximum or minimum prices regarding a up to one-year horizon of time before the decision moment.

According to MFT, it should not happen, because it assumes that investors make decisions based on the expected utility hypothesis balancing risk and expected returns. Authors such as Kahneman and Tversky (1979) showed that investors evaluate an investment's risk taking into account loss and profit based on a reference point (anchoring), which may be its initial capital or some level the price has reached.

In this study, we found evidence of a relationship between herd behavior on mutual funds and the occurrence of new maximum and minimum level (price anchoring) of the main Brazilian Stock Index, Ibovespa.

4. THE DATA

The main data used in this paper was a daily series of mutual fund flows, in a sample of the non-exclusive and open mutual funds, in the period between 1st January 2005 and 30th June 2009. The data includes total assets, net flow, fund id, number of investors, institution, management fee, manager and type (classified by ANBIMA). The data was from ANBIMA. We also used daily Ibovespa quotes, provided by Economatica.

4.1 Sample Exclusions

To avoid distortions on our results, some funds were eliminated from the sample, as described below:

- **Small funds:** any record of a fund with a total assets of less than R$10 million (Brazilian Real, the Brazillian currency. For reference to the reader, US$1,00 = R$1,80 when the study was conducted), as these could be new

funds, with marketing efforts to find new shareholders, or small funds owned by few investors, or funds being closed soon.

- **Enormous changes on the total assets:** records with an asset variation of more than 10% in a day. These records could be funds being created or ended, not result of investment decisions);
- **Automatic investment funds from banks:** by classification of management fee over 20% per year**;**
- **Foreign Exchange funds;**
- **Consolidating Funds.** Some institutions use one or more consolidating funds for each kind of investment, but many other funds for market segmentation, all of which invest on a consolidating fund. To avoid double-counting and yet keep the segmentation of investment decisions, we chose to exclude from our sample the consolidating funds.
- **Pension funds**. Pension funds were excluded because of the many restrictions that the investors face regarding withdrawing their money, making herding unlikely even if investors wanted to herd.

4.2 Fund classification

For fund classification, we used two criteria: the average size of investment by shareholder, in terms of volume invested, and fund's investment policy. First we calculate the Average Equity of the Investor (from now on, AEI), given by the following formula:

AEI = Total Assets of the fund / number of investors of the fund;

Using that information, we divided the sample of funds in five "classes", a more synthetic classification than the ANBIMA's, The result is five classes of funds: Stock – Active Strategy, Stock – Passive Strategy (Index Funds), Hedge Funds, Fixed Income and Fixed Income Leveraged.

1) **Agregation in groups.** Seeking to agregate the behavior of fund investors, regarding to risk and return expectancy (fund class) and size of investor (riches and poors), practice corroborated by Jackson (2003) and Cesari and Panetta (2002), the funds were divided in five quantiles for each fund class, being AEI the measure for the quintiles.

   During the period comprehended in the sample, there was new funds, and some funds ceased to exist, or changed their market positioning. To avoid survivorship bias (Elton, Gruber e Blake, 1996) and distortions about the positioning changes, the groups were rebalanced every year, always using the fund data available at the beginning of each year.

   The choice of the number of groups is in accord with the main reference of this paper: LSV (1992). See the Table 4.4.2 for the descriptive statistics of the different groups generated.

Table 4.4.2

Descriptive Statistics of the fund groups, divided by quintiles of the AIE, by group and class of funds. The data are relative to the first working day of the years from 2005 to 2009.

Stock Funds - Active Strategy

		the poorest				the richest	
	Grupos:	**1**	**2**	**3**	**4**	**5**	**Class**
Average Number of Funds		48.60	48.60	48.60	48.20	47.40	241.40
AIE	Avg	10,043	43,377	178,027	505,087	3,821,457	897,807
	Std. Dev	6,794	17,447	63,421	139,309	6,810,717	3,347,058
	Min	19	21,785	81,711	302,651	820,055	19
	Max	21,759	80,818	302,440	819,763	57,495,972	57,495,972
Total Assets of the Funds	Avg	78,255	82,733	52,386	74,980	152,635	87,899
	Std. Dev	139,875	119,967	93,427	106,471	314,139	176,827
	Total Assets	19,015,877	20,104,124	12,729,876	18,070,170	36,174,401	106,094,447

Stock Funds - Passive Strategy

		the poorest				the richest	
	Grupos:	**1**	**2**	**3**	**4**	**5**	**Class**
Average Number of Funds		10.80	10.80	10.80	10.80	10.60	53.80
AIE	Avg	8,610	13,473	18,207	30,544	447,277	102,345
	Std. Dev	2,191	1,048	1,972	7,969	776,918	382,737
	Min	3,696	11,624	15,216	22,014	52,650	3,696
	Max	11,572	15,199	22,006	52,413	3,535,681	3,535,681
Total Assets of the Funds	Avg	37,565	66,810	119,833	97,779	241,590	112,236
	Std. Dev	46,115	62,233	136,579	118,671	691,208	324,444
	Total Assets	2,028,521	3,607,740	6,471,006	5,280,091	12,804,259	30,191,618

Fixed Income Funds - Leveraged

		the poorest				the richest	
	Grupos:	**1**	**2**	**3**	**4**	**5**	**Class**
Average Number of Funds		81.20	81.00	80.20	80.40	79.60	402.40
AIE	Avg	18,937	93,632	334,247	1,227,509	19,589,109	4,209,526
	Std. Dev	12,410	36,175	108,622	469,556	76,506,463	34,843,950
	Min	358	43,667	171,328	554,777	2,283,944	358
	Max	43,666	170,771	553,731	2,280,692	951,200,000	951,200,000
Total Assets of the Funds	Avg	373,151	420,526	541,580	277,742	714,765	464,768
	Std. Dev	671,927	892,455	1,073,330	513,378	1,618,604	1,035,598
	Total Assets	151,499,237	170,312,836	217,173,485	111,652,142	284,476,513	935,114,214

Hedge Funds

		the poorest				the richest	
	Grupos:	**1**	**2**	**3**	**4**	**5**	**Class**
Average Number of Funds		113.20	111.20	110.00	110.00	112.00	556.40
AIE	Avg	58,681	205,436	410,700	802,191	5,568,222	1,413,634
	Std. Dev	31,302	42,849	78,149	166,535	11,111,562	5,407,309
	Min	6,533	127,566	286,242	564,260	1,128,614	6,533
	Max	127,191	285,831	564,072	1,127,907	130,800,000	130,800,000
Total Assets of the Funds	Avg	98,007	99,824	82,141	133,626	241,932	131,246
	Std. Dev	166,101	231,392	126,484	258,161	531,536	304,571
	Total Assets	55,471,775	55,501,936	45,177,355	73,494,063	135,481,763	365,126,892

Fixed Income Funds

		the poorest				the richest	
	Grupos:	**1**	**2**	**3**	**4**	**5**	**Class**
Average Number of Funds		59.40	59.60	58.80	58.60	55.60	292.00
AIE	Avg	16,697	68,761	212,908	761,474	9,602,649	2,041,571
	Std. Dev	9,737	22,253	73,957	315,411	22,819,485	10,602,377
	Min	883	37,030	113,312	365,228	1,518,993	883
	Max	36,904	112,884	364,363	1,516,279	247,800,000	247,800,000
Total Assets of the Funds	Avg	411,708	617,184	861,102	298,474	468,096	532,154
	Std. Dev	990,930	1,473,952	1,634,430	773,538	763,905	1,202,689
	Total Assets	122,277,198	183,920,760	253,164,079	87,452,769	130,130,553	776,945,358

2) **Dummies.** dummy variables generated as stimuli variables, regarding to the anchoring behavior, to be tested in this paper.

Part of the tests of this research uses time series statistics, in panel regressions. Stationarity tests were done, both Dickey and Fuller (1979) and Phillips-Perron (1988). The tests rejected the unit root hypothesis, suggesting the stationariety of the series.

5. METHODOLOGY

5.1 Herding

On this section we verify the occurrence of herd behavior within the investors of mutual funds. As on many of the researches about herd behavior, LSV (1992) measure was used. Their work tested the existence of herd behavior within stock fund managers. Their herd measure calculates the proportion of buys/sells of each given stock in a set of mutual funds. So, in a given period, are counted how many funds diminished the proportion of the share A in their portfolio, and how many augmented it. The funds that didn't change it were not counted. LSV says that, given zero growth in the long term, the proportion should tend to 50% funds buying and 50% funds selling. The main idea of this statistic is to find if there are assets or a specific time when the proportion is, for a long time, above or below the expected average of 50%. In this study, such a method is applied in a slightly different way: instead of testing the fund manager's behavior, the fund investor's behavior was tested.

The LSV measure, $H_{i,t}$, can be described as follows:

$$H_{i,t} = \left| p_{i,t} - p_t \right| - AF_{i,t} \quad \text{Equation 5.1.1}$$

Being:

$p_{i,t}$ the proportion of funds with positive net flow on group i, at time t;

p_t the proportion of funds with positive net flow on all groups at time t;

$AF_{i,t}$ the adjustment factor, wich consists on the expected value of $H_{i,t} = \left| p_{i,t} - p_t \right|$ under the null hypothesis (no herding), given that such expectation, when the number of funds for a given group in a given time is small, is not zero. The Adjustment Factor compensates the bias. For the calculation of the $AF_{i,t}$, Monte Carlo simulation was used, with 250 simulations made on Stata 10 software, under a normal distribution, for each observation (combination of each group to each day on the sample). Then, the random numbers generated were unstandardized to assume the average and standard deviation of p_t in the whole sample.

The statistic was constructed by the following method:

1. Counting of the number of funds with positive and negative net flow for each group i on each time t;
2. Calculation of $p_{i,t}$, p_t;
3. MonteCarlo simulation and calculation of $AF_{i,t}$;
4. Calculation of $H_{i,t}$ for each group i and time t;
5. Calculation of averages and standard-errors of the statistic estatística $H_{i,t}$ for the whole sample and for shares of the sample, divided by class, group and year, in a daily basis;
6. Hypothesis tests of the herd behavior. They are:

H0: There is no herd behavior — H0: $H_{i,t}$ <= 0

Ha: There is herd behavior — Ha: $H_{i,t}$ > 0

5.2 Price anchoring and herd behavior

This test is based on the study made by Borges (2007), which tests, on weekly data, if there is abnormal volume traded when the price of a given stock reaches a new low or high on the last 52 weeks. If that happens, an abnormal volume of trading is expected when there is a new high or low. In this study, Borges's test is replicated, but with some major differences:

- The asset tested, stocks in Borges's stuty, is now groups of mutual funds, seeking to verify if the behavior of investors that buy stock is comparable to the behavior of investors that buy mutual funds;
- The basis now is daily, not weekly, and subject to the test with lags, to consider the time taken by investors to make a decision after new highs or lows.
- We tested two investor's memory time, instead of one: not just one year (252 working days), but also three months (63 working days). Both were tested.
- Interaction with the caracteristic between groups, for testing the differences of behavior between different segments of investors, on different investment policies.

The intuition behind the test is the hypothesis that the investors herd after new highs or lows on the main Brazilian stock index, the Ibovespa, which are frequently on newspaper and television news programs.

For this test, that consists of fixed effects panel regressions, four dummy variables were used, to mimic the stimuli for trading on new highs and lows, described as follows:

- $D\max 252$: assumes the value 1 when the Ibovespa reaches a new high in the last 252 days, and 0 on every other case.

- $D\min 252$: assumes the value 1 when the Ibovespa reaches a new low in the last 252 days, and 0 on every other case.
- $D\max 63$: assumes the value 1 when the Ibovespa reaches a new high in the last 63 days, and 0 on every other case.
- $D\min 63$: assumes the value 1 when the Ibovespa reaches a new low in the last 63 days, and 0 on every other case.

The panel regressions test the assumption that the event of a new high or low in the stock index has relation with the investment flow on groups of stock funds (both active and passive), leading to herding to buy or sell fund shares, with different lags. The equation 5.3.1 describes the model.

$$H_{i,t} = \alpha + \sum_{k=1}^{k}\sum_{j=1}^{5} B_{k,j} DAnc_{k,t-j} + B_{i,j} Dgrp_{i\cdot,t} + \xi_t \qquad \text{Equation 5.3.1}$$

Being:

- ✓ $H_{i,t}$ the herd measure of the groups i at time t;
- ✓ α the expected H on the sample period;
- ✓ $DAnc_{k,t-j}$ the four price anchoring dummies, with lags up to five days (one working week);
- ✓ $Dgrp_i$ the group dummies, used for the fixed effects panel regressions;
- ✓ ξ_t the error term.

6.RESULTS

6.1 Herd Behavior

The table 6.1.1 presents the results of the average and tests on the herd measure, as well as LSV have done. As the sample is large (1126), most results are statistically significant. It is important to mention that negative averages of H(i) are possible, since the Adjustment Factor is calculated on the expectation of H(i) under the null hypothesis for all groups on the period. In case the herding in a given group is null and the average and standard deviation of $p_{i,t}$ of that group are smaller than those of p_t, the value of $AF_{i,t}$ may lead to a slightly negative value of H(i). On those cases, it is clear that the herd behavior is not significantly different from zero.

Analyzing the results, it is important noticing that the average of H(i) for the whole period was 0.0388. This means that if p, the average fraction of the net flows that are positive, was 0.5, then 53.88% of the mutual funds in general had flow in one direction, and 46.22% in the opposite way. The median is even smaller: 0.0146. This suggests that there is very

small herd behavior in a typical day in a typical group of funds. However, there are large differences on the H(i) average between groups and classes of funds. For example, on all years, the stock – passive funds had herd behavior statistically different from zero.

The second class of funds with major occurrence of herd behavior was the stock – active strategy funds. Considering all years, the groups 4 and 5 (the richest) had more herd behavior that the poorer. Another interesting point is that during 2007, all groups of this class show herd behavior. That year had a long rise on the stock market prices.

In an opposite manner, other classes of funds showed almost no herd behavior. This analysis tells us about the averages, and replicates the LSV analysis. Because of the high volatility of the H(i) measure, in a daily basis, a moving average of 20 days was drawn, and can be compared to the Ibovespa Index on the same time, as a reference, in the Chart 6.1, helping to better understand the behavior of H(i) over the time.

When comparing to the Ibovespa stock index, it is noticeable that the active strategy stock funds and fixed income funds – leveraged showed a strong herd behavior in 2007, mostly with the up-trends. It is also noticed that the herd behavior is not homogeneous within the different groups, when considering the whole sample period. In different times, like the time including 2007 and the first half of 2008, when the stock skyrocketed, there was herd behavior on most groups, but with different intensities. As the herd measure H(i) doesn't capture the sense of the movement (buy or sell), it is not possible to infer if groups are withdrawing money from one class to invest in another class of funds.

It is also noticeably, mostly on market tops and lows, a lag between the herd reaction of groups of richest and groups of poorest, mostly on stock-active strategy and hedge funds.

6.2. The relation between price anchoring and the herd behavior

For this test, a fixed effects panel regression was used, in order to control and measure the effect of the characteristic of each group, as well as count for the time effect, and to isolate the effect of the price anchoring on herd behavior. Six regressions were done, five of them considering the groups on each class of funds, and a sixth for all classes of funds. The results can be seen on the Table 6.2.1.

First, some analyisis about the R2 is apropriated: the R2 within groups, the explaing power of the dummy variables over the herd behavior, is quite low, varying according to the fund classes, between 1.6% and 3.7%. High figures were not expected, since the explaining variables are dummies. However, the R2 between groups, ie the explaining power of the non-observed characteristics of each group that do not vary with time, is high (except in the passive strategy stock funds). That suggests that the influence of the event of new highs and lows over the herding, ie the mutual fund investors in Brazil, yet may exist, has little relevance.

Table 6.1.1 (continues)

Statistics of herd behavior by class of fund, group of funds and year, based on a sample comprehending the period from the begining of 2005 to the first half of 2009. The classes of funds are divided in five quantiles, each called a group of funds, based on the AIE (average investor equity) based on the data of the begining of each ear, being the groups rebalanced anually. All the calculations are done over the statistic H(i), from LSV (1992), defined on the 5.5.1 equation. On the lines refering hypothesis tests on averages, the first number is the Z statistic, and the number in parenthesis are p-values for the two-tailed test for H0: average of H(i) <= 0 and Ha: H(i) > 0. The number os observations is 1126 days, for all tests. When H0 was not rejected, the font is bolded. The averages over 0,06 (6%) and significantly different of zero were underligned.

Stock Funds - Active Strategy

Average Equity of the Investor		Smaller				Greater	
Year	Group	1	2	3	4	5	Class
2005	Average (standard error)	0.0631 (0.0064)	0.0464 (0.0061)	0.0559 (0.0065)	0.0739 (0.0077)	0.0958 (0.0082)	0.0670 (0.0032)
	Standard Deviation	0.1011	0.0964	0.1028	0.1219	0.1289	0.1120
	Average Hypothesis Test	9.888 (0.000)	7.621 (0.000)	8.626 (0.000)	9.606 (0.000)	11.753 (0.000)	21.177 (0.000)
	Minimum and Maximum	-0.2299 e 0.3514	-0.1443 e 0.3862	-0.1709 e 0.3964	-0.1980 e 0.4533	-0.1442 e 0.6055	-0.2299 e 0.6055
2006	Average (standard error)	0.0204 (0.0058)	0.0312 (0.0067)	0.0614 (0.0075)	0.0396 (0.0065)	0.0946 (0.0084)	0.0494 (0.0032)
	Standard Deviation	0.0919	0.1054	0.1182	0.1032	0.1333	0.1142
	Average Hypothesis Test	3.501 (0.000)	4.666 (0.000)	8.195 (0.000)	6.056 (0.000)	11.196 (0.000)	15.271 (0.000)
	Minimum and Maximum	-0.1832 e 0.3409	-0.1488 e 0.4339	-0.1642 e 0.4273	-0.1543 e 0.3578	-0.1526 e 0.4835	-0.1832 e 0.4835
2007	Average (standard error)	0.0767 (0.0069)	0.0782 (0.0068)	0.1670 (0.0071)	0.1598 (0.0068)	0.1899 (0.0067)	0.1343 (0.0033)
	Standard Deviation	0.1085	0.1070	0.1117	0.1069	0.1054	0.1177
	Average Hypothesis Test	11.180 (0.000)	11.552 (0.000)	23.646 (0.000)	23.632 (0.000)	28.478 (0.000)	40.327 (0.000)
	Minimum and Maximum	-0.1777 e 0.3410	-0.1380 e 0.3410	-0.1739 e 0.4463	-0.1139 e 0.4249	-0.0979 e 0.4425	-0.1777 e 0.4463
2008	Average (standard error)	0.0057 (0.0053)	0.0141 (0.0053)	0.0013 (0.0060)	0.0637 (0.0072)	0.0313 (0.0063)	0.0232 (0.0028)
	Standard Deviation	0.0852	0.0846	0.0960	0.1150	0.1010	0.0995
	Average Hypothesis Test	**1.066 (0.143)**	2.664 (0.004)	**0.218 (0.414)**	8.829 (0.000)	4.943 (0.000)	8.322 (0.000)
	Minimum and Maximum	-0.1924 e 0.3265	-0.2165 e 0.2827	-0.2246 e 0.2812	-0.2015 e 0.3884	-0.2140 e 0.3414	-0.2246 e 0.3884
2009	Average (standard error)	0.0462 (0.0076)	0.0472 (0.0076)	0.0271 (0.0064)	0.0181 (0.0076)	0.0597 (0.0106)	0.0396 (0.0037)
	Standard Deviation	0.0843	0.0843	0.0709	0.0837	0.1176	0.0905
	Average Hypothesis Test	6.051 (0.000)	6.179 (0.000)	4.217 (0.000)	2.383 (0.009)	5.603 (0.000)	10.816 (0.000)
	Minimum and Maximum	-0.0996 e 0.2513	-0.1135 e 0.2247	-0.0805 e 0.2107	-0.1114 e 0.2659	-0.1122 e 0.4136	-0.1135 e 0.4136
Total	Average (standard error)	0.0419 (0.0030)	0.0429 (0.0030)	0.0664 (0.0036)	0.0770 (0.0035)	0.0980 (0.0039)	0.0652 (0.0015)
	Standard Deviation	0.0995	0.0996	0.1192	0.1190	0.1300	0.1160
	Average Hypothesis Test	14.124 (0.000)	14.448 (0.000)	18.682 (0.000)	21.725 (0.000)	25.279 (0.000)	42.180 (0.000)
	Minimum and Maximum	-0.2299 e 0.3514	-0.2165 e 0.4339	-0.2246 e 0.4463	-0.2015 e 0.4533	-0.2140 e 0.6055	-0.2299 e 0.6055

Stock Funds - Passive Strategy

Average Equity of the Investor		Smaller				Greater	
Year	Group	1	2	3	4	5	Class
2005	Average (standard error)	0.0683 (0.0068)	0.0968 (0.0080)	0.1311 (0.0088)	0.1035 (0.0090)	0.1206 (0.0103)	0.1040 (0.0039)
	Standard Deviation	0.1077	0.1260	0.1399	0.1422	0.1614	0.1380
	Average Hypothesis Test	10.048 (0.000)	12.175 (0.000)	14.851 (0.000)	11.488 (0.000)	11.746 (0.000)	26.641 (0.000)
	Minimum and Maximum	-0.2602 e 0.4064	-0.2537 e 0.3811	-0.1542 e 0.3980	-0.1317 e 0.4943	-0.1020 e 0.6388	-0.2602 e 0.6388
2006	Average (standard error)	0.0539 (0.0074)	0.1624 (0.0070)	0.0564 (0.0077)	0.0627 (0.0071)	0.1043 (0.0099)	0.0879 (0.0037)
	Standard Deviation	0.1160	0.1110	0.1213	0.1126	0.1567	0.1312
	Average Hypothesis Test	7.336 (0.000)	23.098 (0.000)	7.334 (0.000)	8.785 (0.000)	10.501 (0.000)	23.649 (0.000)
	Minimum and Maximum	-0.1495 e 0.4613	-0.1081 e 0.3876	-0.2213 e 0.4107	-0.1399 e 0.4136	-0.1020 e 0.5601	-0.2213 e 0.5601
2007	Average (standard error)	0.1601 (0.0105)	0.0887 (0.0085)	0.0529 (0.0075)	0.0360 (0.0067)	0.1316 (0.0091)	0.0939 (0.0040)
	Standard Deviation	0.1663	0.1340	0.1186	0.1057	0.1431	0.1428
	Average Hypothesis Test	15.225 (0.000)	10.470 (0.000)	7.052 (0.000)	5.386 (0.000)	14.532 (0.000)	23.244 (0.000)
	Minimum and Maximum	-0.1815 e 0.6064	-0.1776 e 0.4301	-0.1392 e 0.3750	-0.1627 e 0.3746	-0.1678 e 0.5663	-0.1815 e 0.6064
2008	Average (standard error)	0.1429 (0.0109)	0.1212 (0.0099)	0.0925 (0.0083)	0.0417 (0.0066)	0.0493 (0.0074)	0.0895 (0.0041)
	Standard Deviation	0.1732	0.1568	0.1320	0.1049	0.1177	0.1444
	Average Hypothesis Test	13.157 (0.000)	12.298 (0.000)	11.168 (0.000)	6.337 (0.000)	6.670 (0.000)	22.075 (0.000)
	Minimum and Maximum	-0.1952 e 0.6059	-0.1660 e 0.5657	-0.1812 e 0.4469	-0.1931 e 0.3476	-0.1980 e 0.4720	-0.1980 e 0.6059
2009	Average (standard error)	0.1256 (0.0116)	0.0614 (0.0097)	0.1100 (0.0116)	0.0972 (0.0134)	0.1144 (0.0125)	0.1017 (0.0053)
	Standard Deviation	0.1284	0.1067	0.1284	0.1470	0.1379	0.1318
	Average Hypothesis Test	10.806 (0.000)	6.358 (0.000)	9.461 (0.000)	7.275 (0.000)	9.120 (0.000)	19.030 (0.000)
	Minimum and Maximum	-0.0742 e 0.4884	-0.1531 e 0.3375	-0.1112 e 0.3775	-0.1148 e 0.5422	-0.1020 e 0.3674	-0.1531 e 0.5422
Total	Average (standard error)	0.1086 (0.0044)	0.1112 (0.0040)	0.0862 (0.0039)	0.0648 (0.0037)	0.1026 (0.0044)	0.0947 (0.0018)
	Standard Deviation	0.1486	0.1341	0.1318	0.1237	0.1476	0.1385
	Average Hypothesis Test	24.509 (0.000)	27.804 (0.000)	21.959 (0.000)	17.552 (0.000)	23.262 (0.000)	51.235 (0.000)
	Minimum and Maximum	-0.2602 e 0.6064	-0.2537 e 0.5657	-0.2213 e 0.4469	-0.1931 e 0.5422	-0.1980 e 0.6388	-0.2602 e 0.6388

Table 6.1.1 (continues)

Statistics of herd behavior by class of fund, group of funds and year, based on a sample comprehending the period from the begining of 2005 to the first half of 2009. The classes of funds are divided in five quantiles, each called a group of funds, based on the AIE (average investor equity) based on the data of the begining of each ear, being the groups rebalanced anually. All the calculations are done over the statistic H(i), from LSV (1992), defined on the 5.5.1 equation. On the lines refering hypothesis tests on averages, the first number is the Z statistic, and the number in parenthesis are p-values for the two-tailed test for H0: average of H(i) <= 0 and Ha: H(i) > 0. The number os observations is 1126 days, for all tests. When H0 was not rejected, the font is bolded. The averages over 0,06 (6%) and significantly different of zero were underligned.

Fixed Income Funds - Leveraged

Average Equity of the Investor		Smaller				Greater	
Year	Group	1	2	3	4	5	Class
2005	Average (standard error)	-0.0224 (0.0028)	-0.0014 (0.0036)	0.0321 (0.0047)	0.0094 (0.0041)	0.0540 (0.0055)	0.0143 (0.0020)
	Standard Deviation	0.0445	0.0565	0.0751	0.0648	0.0871	0.0722
	Average Hypothesis Test	**-7.957 (1.000)**	**-0.398 (0.655)**	6.774 (0.000)	**2.291 (0.011)**	9.822 (0.000)	7.042 (0.000)
	Minimum and Maximum	-0.2452 e 0.1266	-0.1940 e 0.1864	-0.2425 e 0.2437	-0.1815 e 0.2488	-0.2590 e 0.2788	-0.2590 e 0.2788
2006	Average (standard error)	0.0146 (0.0052)	0.0331 (0.0047)	-0.0075 (0.0046)	0.0001 (0.0046)	0.0009 (0.0043)	0.0082 (0.0021)
	Standard Deviation	0.0819	0.0749	0.0729	0.0732	0.0675	0.0755
	Average Hypothesis Test	2.802 (0.003)	6.978 (0.000)	**-1.627 (0.948)**	**0.031 (0.488)**	**0.203 (0.419)**	3.850 (0.000)
	Minimum and Maximum	-0.1755 e 0.2418	-0.1700 e 0.2282	-0.1528 e 0.2113	-0.2115 e 0.2077	-0.1761 e 0.2497	-0.2115 e 0.2497
2007	Average (standard error)	0.1096 (0.0057)	0.0689 (0.0055)	0.0215 (0.0051)	0.0137 (0.0048)	-0.0093 (0.0048)	0.0409 (0.0026)
	Standard Deviation	0.0897	0.0873	0.0809	0.0766	0.0760	0.0926
	Average Hypothesis Test	19.332 (0.000)	12.472 (0.000)	4.204 (0.000)	2.830 (0.002)	**-1.939 (0.974)**	15.605 (0.000)
	Minimum and Maximum	-0.0917 e 0.3074	-0.1118 e 0.2998	-0.1343 e 0.3184	-0.1688 e 0.1997	-0.1501 e 0.2506	-0.1688 e 0.3184
2008	Average (standard error)	-0.0302 (0.0041)	-0.0207 (0.0044)	0.0021 (0.0048)	0.0263 (0.0053)	0.0482 (0.0059)	0.0051 (0.0023)
	Standard Deviation	0.0646	0.0700	0.0766	0.0842	0.0941	0.0837
	Average Hypothesis Test	**-7.437 (1.000)**	**-4.714 (1.000)**	**0.428 (0.334)**	4.982 (0.000)	8.161 (0.000)	**2.186 (0.014)**
	Minimum and Maximum	-0.2597 e 0.1634	-0.1840 e 0.1778	-0.2212 e 0.2402	-0.1869 e 0.2750	-0.1667 e 0.3394	-0.2597 e 0.3394
2009	Average (standard error)	0.0587 (0.0072)	0.0032 (0.0055)	-0.0139 (0.0044)	-0.0090 (0.0052)	0.0018 (0.0059)	0.0081 (0.0028)
	Standard Deviation	0.0800	0.0610	0.0489	0.0573	0.0650	0.0683
	Average Hypothesis Test	8.096 (0.000)	**0.576 (0.282)**	**-3.149 (0.999)**	**-1.743 (0.959)**	**0.302 (0.381)**	2.940 (0.002)
	Minimum and Maximum	-0.0776 e 0.2598	-0.1237 e 0.1660	-0.1097 e 0.1257	-0.1388 e 0.1840	-0.1288 e 0.1817	-0.1388 e 0.2598
Total	Average (standard error)	0.0221 (0.0027)	0.0180 (0.0023)	0.0092 (0.0023)	0.0101 (0.0022)	0.0212 (0.0025)	0.0161 (0.0011)
	Standard Deviation	0.0908	0.0788	0.0757	0.0741	0.0846	0.0812
	Average Hypothesis Test	8.177 (0.000)	7.656 (0.000)	4.089 (0.000)	4.586 (0.000)	8.417 (0.000)	14.912 (0.000)
	Minimum and Maximum	-0.2597 e 0.3074	-0.1940 e 0.2998	-0.2425 e 0.3184	-0.2115 e 0.2750	-0.2590 e 0.3394	-0.2597 e 0.3394

Hedge Funds

Average Equity of the Investor		Smaller				Greater	
Year	Group	1	2	3	4	5	Class
2005	Average (standard error)	0.0556 (0.0045)	-0.0176 (0.0033)	0.0077 (0.0040)	0.0033 (0.0043)	0.0005 (0.0041)	0.0099 (0.0019)
	Standard Deviation	0.0715	0.0517	0.0626	0.0673	0.0649	0.0684
	Average Hypothesis Test	12.331 (0.000)	**-5.394 (1.000)**	**1.958 (0.025)**	**0.784 (0.216)**	**0.113 (0.455)**	5.135 (0.000)
	Minimum and Maximum	-0.1882 e 0.2165	-0.2463 e 0.1337	-0.2464 e 0.1988	-0.2404 e 0.2436	-0.2584 e 0.2305	-0.2584 e 0.2436
2006	Average (standard error)	-0.0137 (0.0041)	0.0370 (0.0061)	0.0120 (0.0047)	-0.0136 (0.0044)	0.0107 (0.0049)	0.0065 (0.0022)
	Standard Deviation	0.0650	0.0957	0.0738	0.0691	0.0774	0.0791
	Average Hypothesis Test	**-3.328 (1.000)**	6.095 (0.000)	2.565 (0.005)	**-3.116 (0.999)**	**2.191 (0.014)**	2.889 (0.002)
	Minimum and Maximum	-0.1579 e 0.1470	-0.1605 e 0.2716	-0.1875 e 0.1813	-0.1579 e 0.3214	-0.2334 e 0.2152	-0.2334 e 0.3214
2007	Average (standard error)	-0.0406 (0.0033)	0.0432 (0.0046)	-0.0176 (0.0042)	-0.0161 (0.0036)	-0.0075 (0.0040)	-0.0077 (0.0019)
	Standard Deviation	0.0529	0.0727	0.0657	0.0575	0.0637	0.0686
	Average Hypothesis Test	**-12.122 (1.000)**	9.379 (0.000)	**-4.238 (1.000)**	**-4.439 (1.000)**	**-1.850 (0.968)**	**-3.979 (1.000)**
	Minimum and Maximum	-0.1783 e 0.1524	-0.1110 e 0.2936	-0.1690 e 0.1983	-0.1421 e 0.1709	-0.1495 e 0.2241	-0.1783 e 0.2936
2008	Average (standard error)	0.0187 (0.0042)	-0.0087 (0.0037)	-0.0218 (0.0038)	-0.0082 (0.0040)	-0.0406 (0.0038)	-0.0121 (0.0018)
	Standard Deviation	0.0662	0.0585	0.0605	0.0640	0.0604	0.0649
	Average Hypothesis Test	4.506 (0.000)	**-2.372 (0.991)**	**-5.746 (1.000)**	**-2.035 (0.979)**	**-10.727 (1.000)**	**-6.661 (1.000)**
	Minimum and Maximum	-0.1901 e 0.1796	-0.1657 e 0.1953	-0.1697 e 0.1536	-0.2070 e 0.1512	-0.2527 e 0.1626	-0.2527 e 0.1953
2009	Average (standard error)	0.0198 (0.0061)	-0.0105 (0.0048)	0.0516 (0.0062)	0.0400 (0.0062)	0.0311 (0.0070)	0.0264 (0.0029)
	Standard Deviation	0.0676	0.0530	0.0683	0.0688	0.0778	0.0706
	Average Hypothesis Test	3.242 (0.001)	**-2.178 (0.985)**	8.343 (0.000)	6.424 (0.000)	4.414 (0.000)	9.240 (0.000)
	Minimum and Maximum	-0.1266 e 0.1727	-0.1322 e 0.1343	-0.1211 e 0.2392	-0.1663 e 0.2196	-0.1165 e 0.2485	-0.1663 e 0.2485
Total	Average (standard error)	0.0067 (0.0022)	0.0107 (0.0022)	0.0011 (0.0021)	-0.0034 (0.0020)	-0.0050 (0.0021)	0.0021 (0.0010)
	Standard Deviation	0.0730	0.0745	0.0697	0.0671	0.0715	0.0714
	Average Hypothesis Test	3.094 (0.001)	4.834 (0.000)	**0.546 (0.293)**	**-1.684 (0.954)**	**-2.334 (0.990)**	**2.156 (0.016)**
	Minimum and Maximum	-0.1901 e 0.2165	-0.2463 e 0.2936	-0.2464 e 0.2392	-0.2404 e 0.3214	-0.2584 e 0.2485	-0.2584 e 0.3214

Table 6.1.1 (conclusion)

Statistics of herd behavior by class of fund, group of funds and year, based on a sample comprehending the period from the begining of 2005 to the first half of 2009. The classes of funds are divided in five quantiles, each called a group of funds, based on the AIE (average investor equity) based on the data of the begining of each ear, being the groups rebalanced anually. All the calculations are done over the statistic H(i), from LSV (1992), defined on the 5.5.1 equation. On the lines refering hypothesis tests on averages, the first number is the Z statistic, and the number in parenthesis are p-values for the two-tailed test for H0: average of H(i) <= 0 and Ha: H(i) > 0. The number os observations is 1126 days, for all tests. When H0 was not rejected, the font is bolded. The averages over 0,06 (6%) and significantly different of zero were underligned.

Fixed Income Funds

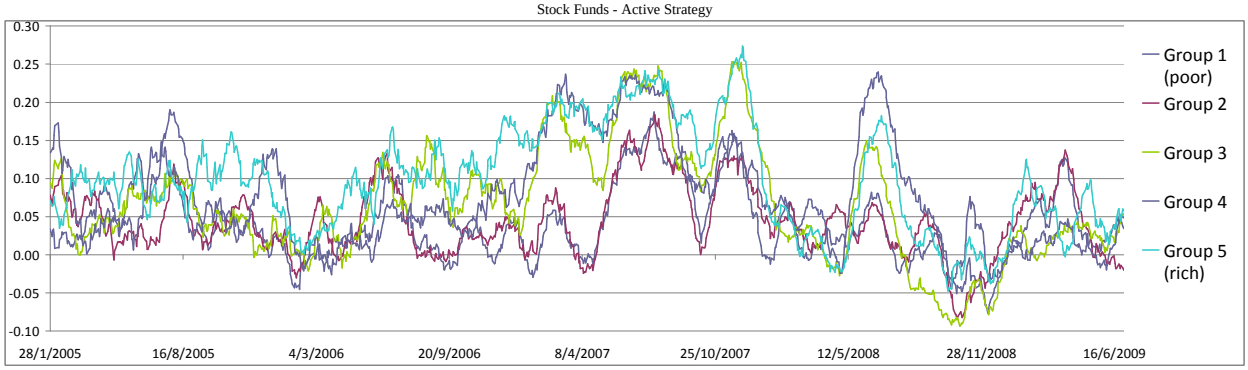
Average Equity of the Investor		Smaller				Greater	
Year	Group	1	2	3	4	5	Class
2005	Average (standard error)	0.0057 (0.0036)	-0.0190 (0.0031)	-0.0075 (0.0037)	0.0097 (0.0041)	0.0304 (0.0054)	0.0039 (0.0019)
	Standard Deviation	0.0568	0.0486	0.0582	0.0643	0.0849	0.0658
	Average Hypothesis Test	**1.583 (0.057)**	**-6.183 (1.000)**	**-2.041 (0.979)**	2.394 (0.008)	5.674 (0.000)	**2.083 (0.019)**
	Minimum and Maximum	-0.2478 e 0.1932	-0.2184 e 0.1128	-0.2145 e 0.1935	-0.2336 e 0.1976	-0.1249 e 0.3216	-0.2478 e 0.3216
2006	Average (standard error)	-0.0010 (0.0049)	-0.0191 (0.0034)	-0.0216 (0.0034)	-0.0246 (0.0036)	-0.0173 (0.0040)	-0.0167 (0.0018)
	Standard Deviation	0.0772	0.0534	0.0544	0.0568	0.0633	0.0621
	Average Hypothesis Test	**-0.213 (0.584)**	**-5.637 (1.000)**	**-6.257 (1.000)**	**-6.823 (1.000)**	**-4.317 (1.000)**	**-9.495 (1.000)**
	Minimum and Maximum	-0.1997 e 0.2142	-0.1360 e 0.1425	-0.1457 e 0.1224	-0.1622 e 0.1530	-0.1945 e 0.2096	-0.1997 e 0.2142
2007	Average (standard error)	0.0878 (0.0045)	0.0341 (0.0066)	-0.0054 (0.0050)	-0.0165 (0.0047)	-0.0274 (0.0038)	0.0145 (0.0025)
	Standard Deviation	0.0711	0.1047	0.0792	0.0744	0.0603	0.0897
	Average Hypothesis Test	19.512 (0.000)	5.146 (0.000)	**-1.071 (0.858)**	**-3.504 (1.000)**	**-7.186 (1.000)**	**5.718 (0.000)**
	Minimum and Maximum	-0.1833 e 0.2416	-0.1645 e 0.2856	-0.1759 e 0.1893	-0.1570 e 0.2377	-0.1612 e 0.1865	-0.1833 e 0.2856
2008	Average (standard error)	-0.0050 (0.0049)	-0.0079 (0.0042)	-0.0374 (0.0043)	-0.0039 (0.0044)	0.0282 (0.0055)	-0.0052 (0.0022)
	Standard Deviation	0.0786	0.0673	0.0682	0.0708	0.0870	0.0775
	Average Hypothesis Test	**-1.005 (0.843)**	**-1.870 (0.969)**	**-8.729 (1.000)**	**-0.885 (0.812)**	5.166 (0.000)	**-2.390 (0.992)**
	Minimum and Maximum	-0.1901 e 0.1641	-0.1652 e 0.1929	-0.2186 e 0.1836	-0.1973 e 0.2422	-0.1854 e 0.3254	-0.2186 e 0.3254
2009	Average (standard error)	0.0219 (0.0066)	0.0044 (0.0050)	-0.0239 (0.0040)	0.0071 (0.0056)	0.0334 (0.0065)	0.0086 (0.0026)
	Standard Deviation	0.0725	0.0552	0.0442	0.0618	0.0722	0.0648
	Average Hypothesis Test	3.333 (0.000)	**0.879 (0.190)**	**-5.962 (1.000)**	**1.267 (0.103)**	5.108 (0.000)	3.267 (0.001)
	Minimum and Maximum	-0.1118 e 0.2103	-0.1081 e 0.1455	-0.1352 e 0.1296	-0.1565 e 0.2035	-0.1121 e 0.2242	-0.1565 e 0.2242
Total	Average (standard error)	0.0218 (0.0024)	-0.0022 (0.0022)	-0.0186 (0.0019)	-0.0070 (0.0020)	0.0068 (0.0024)	0.0001 (0.0010)
	Standard Deviation	0.0800	0.0732	0.0648	0.0676	0.0790	0.0744
	Average Hypothesis Test	9.127 (0.000)	**-0.999 (0.841)**	**-9.653 (1.000)**	**-3.499 (1.000)**	2.901 (0.002)	**0.147 (0.442)**
	Minimum and Maximum	-0.2478 e 0.2416	-0.2184 e 0.2856	-0.2186 e 0.1935	-0.2336 e 0.2422	-0.1945 e 0.3254	-0.2478 e 0.3254

Overall (all classes)

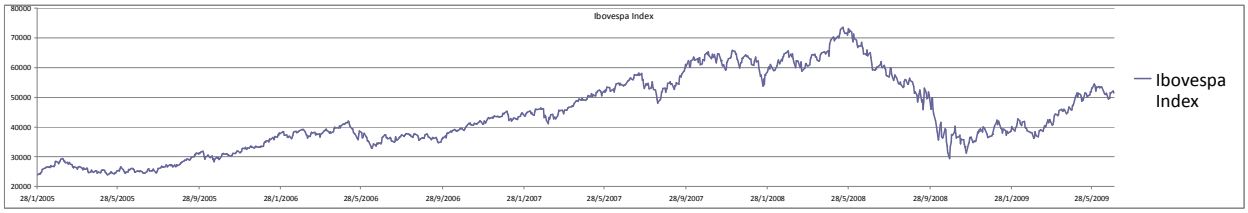
Year	Group	1
2005	Average (standard error)	0.0435 (0.0013)
	Standard Deviation	0.1068
	Average Hypothesis Test	32.9184 (0.0000)
	Minimum and Maximum	0.0157
2006	Average (standard error)	0.0292 (0.0013)
	Standard Deviation	0.1042
	Average Hypothesis Test	22.5857 (0.0000)
	Minimum and Maximum	0.0066
2007	Average (standard error)	0.0561 (0.0015)
	Standard Deviation	0.1184
	Average Hypothesis Test	38.2268 (0.0000)
	Minimum and Maximum	0.0332
2008	Average (standard error)	0.0262 (0.0014)
	Standard Deviation	0.1112
	Average Hypothesis Test	19.1249 (0.0000)
	Minimum and Maximum	0.0051
2009	Average (standard error)	0.0396 (0.0017)
	Standard Deviation	0.0978
	Average Hypothesis Test	22.8222 (0.0000)
	Minimum and Maximum	0.0187
Total	Average (standard error)	0.0388 (0.0006)
	Standard Deviation	0.1096
	Average Hypothesis Test	60.6244 (0.0000)
	Minimum and Maximum	0.0146

Chart 6.1 - Mean average (20) for each group, on each investor's size class, and the Ibovespa Stock Index (in points). Source: Economatica.

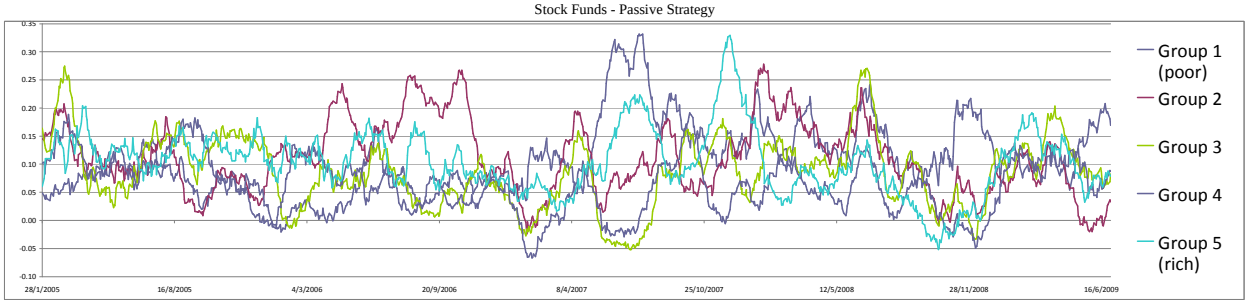
Stock Funds - Active Strategy



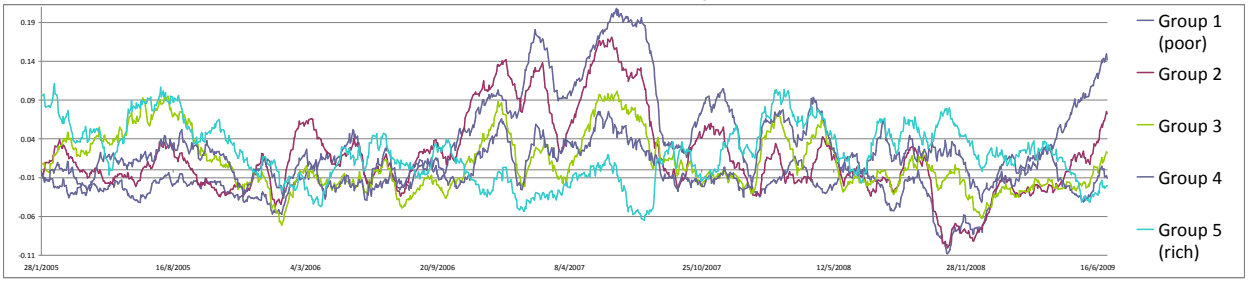
Ibovespa Stock Index



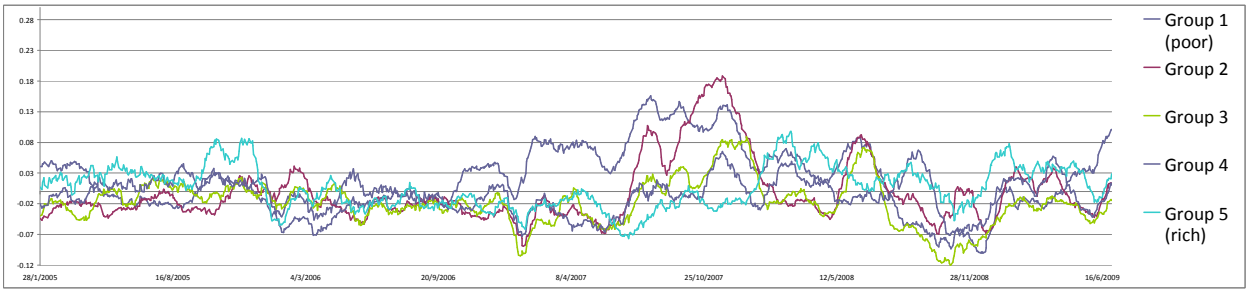
Stock Funds - Passive Strategy



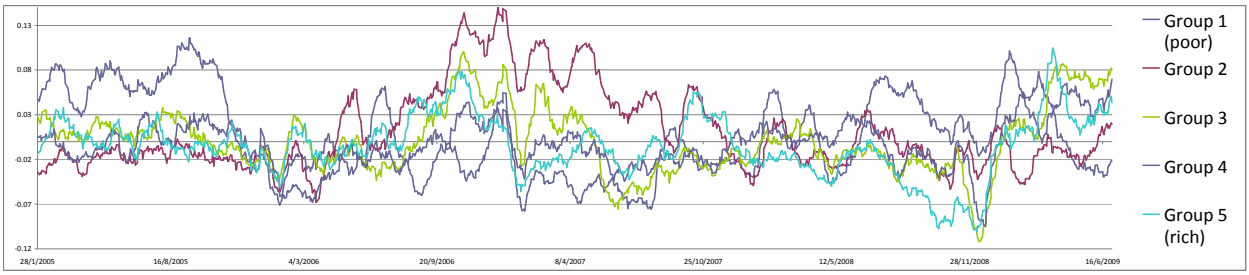
Fixed Income Funds - Leveraged



Fixed Income Funds



Hedge Funds



New highs, in a year and in three months

The results achieved suggests that new highs in a period of one year had positive relationship with herding on stock – active strategy funds, when no lag is used, and a lagged negative relation with hedge and leveraged fixed income funds. However, in a period of three months, there was no evidence of a significant impact of new highs on stock funds. Some effect is observed on hedge funds, being it negative in the one-year horizon, but positive on the three months time. No theoretical support was found for explaining such a result.

New lows, in a year and in three months

In a general way, the results on new lows were more consistent and with larger coefficients than with new highs. The new lows in one year had larger coefficients than in three months, what indicates that investors are more concerned on one year past price levels.

On the one-year term, new lows are related to smaller figures of the measure of herd behavior, in all classes of funds, both one and four days lagged from the event.

No theoretical support was found for explaining the result.

Future studies may test if there is a greater volume of trading after new lows, but without a market consensus.

From the regression, it is possible to infer that the price anchoring, although has some influence, has little explaining power on the herd behavior, but there are a set of non-observed variables related to the groups, captured by the panel regression, which better explain the herd behavior.

7. CONCLUSIONS

This study aimed to detect, empirically, by means of statistic inference, the occurrence of herd behavior on mutual fund flows in Brazil, as well as test one of it's possible causes: the price anchoring.

Differently of LSV's study, herding was tested on mutual fund's investors, not managers, and was found evidence of herd behavior on different groups of investors of stock mutual funds with an active strategy, in a heterogeneous way, and within investors of stock (passive strategy) mutual funds.

Besides detecting the herd behavior, as did LSV in 1992, it was possible, by means of charts, to verify that the herding measure varies greatly over time, types of funds and segments of invefstors, although it follows trends over the time, and some times there is a consensus between different groups, but in most of the time the herd behavior is heterogeneous between groups.

In a second test, was possible to detect a small explaining power of event dummies related to new price anchors, ie. new highs and lows in the Ibovespa stock index.

Table 6.2.1

The resulting coefficients and R2 of the panel regressions of the herding measure (H(i)) explained by the dummy anchoring variables on the different mutual fund classes. The variables mean: Dmax252 is 1 when there is a new high over the period of one year. Dmin252 is the same for new lows. The Dmax 63 and Dmin63 variables are the same as those above. but for a 3-month period. Each column reffers to one regression. All regressions were statistically significant.

Stimulli	Stock - active	Stock - passive	Fixed Income Lev.	Hedge	Fixed Income	All
D max 252	**0.025****	0.003	0.011	0.001	0.008	0.010*
Lag 1	0.008	0.015	0.009	-0.008	-0.003	0.004
Lag 2	0.006	-0.004	0.007	**-0.015***	0.004	0.000
Lag 3	0.010	-0.001	**0.017***	-0.004	0.007	0.007
Lag 4	0.016	-0.013	0.008	-0.011	0.002	0.001
Lag 5	0.015	0.002	**-0.024****	**-0.033****	0.001	-0.008*
D min 252	**-0.044***	-0.025	-0.008	0.005	-0.016	-0.016*
Lag 1	**-0.044***	**-0.087****	**-0.055****	**-0.053****	**-0.036***	**-0.055****
Lag 2	-0.016	-0.050	-0.005	-0.022	0.004	-0.015
Lag 3	-0.021	0.046	0.031	0.016	0.002	0.015
Lag 4	-0.029	**-0.066***	**-0.070****	**-0.042****	**-0.047****	**-0.053****
Lag 5	**-0.045***	-0.001	0.023	0.011	-0.006	-0.003
D max 63	-0.007	-0.001	0.000	0.002	-0.005	-0.002
Lag 1	0.003	-0.007	0.001	0.006	0.001	0.001
Lag 2	-0.009	0.002	0.004	**0.022****	0.001	0.003
Lag 3	-0.013	-0.001	-0.009	0.004	-0.008	-0.007*
Lag 4	-0.007	0.007	-0.003	0.005	-0.006	-0.002
Lag 5	-0.004	-0.013	**0.018****	**0.014***	-0.007	0.002
D min 63	-0.010	0.007	-0.010	-0.013*	-0.014*	-0.008
Lag 1	0.012	0.008	**0.033****	0.007	0.004	0.018**
Lag 2	-0.015	-0.007	0.014	-0.007	-0.018*	-0.007
Lag 3	-0.005	-0.022	-0.029**	-0.010	-0.009	-0.016**
Lag 4	0.010	**0.035***	**0.035****	**0.026****	**0.025****	**0.029****
Lag 5	0.005	-0.002	-0.018*	-0.008	**-0.023****	-0.009
R2 within groups	**3.2%**	**1.6%**	**2.4%**	**3.7%**	**2.9%**	**1.4%**
	<	**<**	**<**	**<**	**<**	**<**
R2 between groups	**59.2%**	**5.1%**	**75.5%**	**13.8%**	**76.2%**	**16.9%**
general R2	3.1%	1.6%	2.4%	3.7%	2.8%	1.2%
average of obs.	1115.8	1106.2	1116.0	1116.0	1116.0	1114.0

* significant at 5% confidence level Source: the author

By those results, there is no strong evidence that investors use the price anchoring heuristic on their investment decisions, differently from the results found by Borges (2002), which also tested this heuristic bias, mentioned by many authors in the Behavioral Finance line of research, like Shefrin (2000), but over the volume of stock traded on the Bovespa Stock Exchange.

This study had the following caveats, which are future research topics:

The sample, although had a large number of observations, comprehends a small period of time, only four and a half years. That was due to a restriction on data availability. With such a caveat, it is not possible to test the relation of herd behavior and the stock market crisis. A study comprehending a larger sample, and other markets worldwide, could lead to a better comprehension of this phenomena within investors. Also, the herd measure is not perfect, since it is not possible to know the exact number of people that are deciding to buy, sell or keep fund shares.

Although this study is not conclusive on the matter, there are many relevant factors that could lead to herding, not yet researched, leading to questions like:

Is there a sequential dissemination of the herding, maybe induced by a sequential, lagged dissemination of the information between groups of investors? Does the herd behavior influences the stock market returns?

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