

# Do Mutual Funds Herd? Evidence from China

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**ABSTRACT:** Using the data of all quarterly transactions made by mutual funds in Chinese stock market, this paper investigates Chinese mutual fund herding behavior by applying LSV and FHW measures. We find higher herding levels in Chinese stock market compared to developed ones, and it is periodic and especially high in the second quarter. We also find that herding being more intense among small medium companies and when the market is under stress. We provide some suggestions on how to reduce herding behaviors based on empirical results.

**KEYWORD:** Mutual Fund; Herding Behavior; LSV; FHW

## 1 INTRODUCTION

Mutual funds, the most important part of institutional investors, are always considered to be responsible to stabilize stock market because they are supposed to be more well-informed and experienced than individuals. However, Chinese stock market are still in high volatility with the accelerated development of mutual fund. Herding describes the tendency of institutions or individuals to show similarity in their behavior and thus act like a herd (Bikhchandani&Sharma, 2000). Herding is considered to be a threat of financial market stability and market efficiency.

This paper makes contribution on investigating herding levels of Chinese mutual funds and its determinants.

The remainder of the paper is organized as follows. Section 2 briefly reviews the literature on herding. Section 3 explains the methodology and describes the data. Section 4 presents the empirical results and Section 5 offers conclusions.

## 2 LITERATURE REVIEW

Herding is commonly defined as the similarities in trading of market participants, including institutional and individual investors. Recent economic theory distinguishes between intentional herding and unintentional herding (Bikhchandani&Sharma, 2000). Unintentional herding is mainly because institutions may consider the same factors and

receive similar private information. This may lead them to make similar conclusions regarding individual stocks (Hirshleifer et al., 1994). Moreover, professionals, such as securities analysts, share a similar educational background and professional qualifications and they are more likely to interpret informational signals similarly. In contrast, intentional herding is more sentiment-driven and involves the imitation of other market participants, resulting in simultaneous buying or selling of the same stocks regardless of prior beliefs or information sets (Scharfstein&Stein, 1990). This type of herding can lead to asset prices failing to reflect the fundamental information, amplify of volatility, and destabilize the whole capital markets, thus having the potential to create, or at least contribute, to bubbles and crashes on financial markets.

For both the two types of herding, the level of herding is related to the availability and uncertainty of information. Less information often leads to higher herding levels. We believe the determinants of herding include:

### 2.1 *Market capitalization and the development of capital market*

Market capitalization of firms usually reflects the quantity and quality of information that are available. We would expect a greater extent of herding when trading small stocks since less information on the company available. However, the empirical results are mixed.

Lakonishok segregate stocks by size and investigate herding within a quarterly time span using a sample of US equity funds, and they find evidence of herding being more intense among small stocks compared to large ones (Lakonishok et al., 1992). Kremer finds no evidence of size effects on herding by using high frequency data in German stock market (Kremer&Nautz, 2011). Qi Bin shows that there is a U-shaped relation between market capitalization and herding levels (Qi et al., 2007). Wu finds a positive correlation between herding and stock capitalization in Chinese capital market (Wu et al., 2004).

There is also evidence for higher herding levels in emerging markets compared to developed ones (Zhao & Wang, 2006, Qi, Yuan et al., 2007, Tian & Zhao, 2011). Higher herding in emerging markets may be attributed to incomplete regulations, and poor market transparency. Deficiencies in corporate disclosure and information quality throw doubt on the reliability of public information, and thus impede fundamental analysis.

## 2.2 Market state

Herding behavior may depend on the state of the financial market. Choe finds higher herding levels before 1997 Asian financial crisis than after the crisis in Korean stock market (Choe et al., 1999). In contrast, Huang finds more herding when the market is under stress (Hwang&Salmon, 2004). Chiang shows that herding is more intense during the period when the financial crisis occurs by analyzing the relationship of the cross-sectional dispersion of returns and their volatility (Chiang&Zheng, 2010). Li finds a positive correlation between the buy herding of open-ended mutual fund and the stock market cycle, while an aversive movement between the close-ended fund and the market cycle (Li et al., 2013).

In this paper, we will consider different herding intensities before and during the recent global financial crisis to find out the relationship between herding and market state.

## 3 METHODOLOY AND DATA

In this section, we review the two herding measures that are proposed by (Lakonishok,Shleifer et al., 1992) and (Frey et al., 2014). We also present the buyer and seller LSV herding measures proposed by (Wermers, 1999).

### 3.1 The LSV herding measure

According to the LSV measure, herding is defined as the tendency of traders to accumulate on the same side of the market in a specific stock and at the same

time, relative to what would be expected if they trade independently(Lakonishok,Shleifer et al., 1992).

The LSV herding measure is given by:

$$HM_{i,t} = |p_{i,t} - E(p_{i,t})| - E|p_{i,t} - E(p_{i,t})| \quad (1)$$

Where  $p_{i,t} = \frac{B_{i,t}}{B_{i,t} + S_{i,t}}$  is the ratio of number of funds buying stock  $i$  at quarter  $t$  to all funds trading in stock  $i$  at quarter  $t$ ,  $B_{i,t}$  is the number of buyers (sellers) at quarter  $t$ .

The LSV measure assumes that the decision to buy or to sell follows Bernoulli distribution under the null hypothesis of no herding. Thus  $B_{i,t} \sim B(N_{i,t}, p_{i,t})$ , and we have

$$P(k; n_{i,t}, p_{i,t}) = \binom{n_{i,t}}{k} p_{i,t}^k (1 - p_{i,t})^{n_{i,t}-k} \quad (2)$$

$E(p_{i,t})$  is the period-average buyer ratio, where  $E(p_{i,t}) = \frac{\sum_{i=1}^n B_{i,t}}{\sum_{i=1}^n (B_{i,t} + S_{i,t})}$ .

The second term is the adjustment factor to ensure that the herding measure will be zero if there is no herding.

We believe that there is herding behavior when  $HM_{i,t}$  is not zero significantly, higher  $HM_{i,t}$  means higher herding level. For the overall market, herding level is defined as:

$$\overline{HM} = \frac{\sum_{i=1}^N \sum_{t=1}^M HM_{i,t}}{\sum_{t=1}^M \sum_{i=1}^{N_{i,t}} n_{i,t}} \quad (3)$$

To tell whether herding is buyer herding or seller herding, we apply herding measure proposed by (Wermers, 1999), which is:

$$BHM_{i,t} = HM_{i,t} \Big|_{p_{i,t} > E(p_{i,t})} \quad (4)$$

$$SHM_{i,t} = HM_{i,t} \Big|_{p_{i,t} < E(p_{i,t})} \quad (5)$$

Similarly, we have  $\overline{BHM}_{i,t}$  and  $\overline{SHM}_{i,t}$  as the arithmetic mean of  $BHM_{i,t}$  and  $SHM_{i,t}$  respectively.

### 3.2 The FHW herding measure

Although the LSV measure is widely used, it may lead to false conclusion. Frey et al identify that LSV measure is well suited to test whether there is herding or not in the sample, but it is not reliable test statistic under the null hypothesis (Frey,Herbst et al., 2014). When the sample number is small, LSV measure gets a downward bias, and their new measure can makes it up and gets the unbiased estimator. They proposed a modified measure,

namely FHW measure in this paper. They prove that the advantage of their measure increases drastically with the number of investigation.

Following (Frey,Herbst et al., 2014), the new herding level for stock  $i$  at quarter  $t$  is defined as:

$$HMS_{i,t} = \left\{ \left[ p_{i,t} - E(p_{i,t}) \right]^2 - E \left[ p_{i,t} - E(p_{i,t}) \right]^2 \right\} \frac{n}{n-1} \quad (6)$$

All the parameters are the same as LSV measure. Accordingly, we have the overall herding level as

$$\overline{HMS} = \frac{1}{\#A} \sum_{i,t \in A} HMS_{i,t}$$

To compare with the traditional LSV measure, we have the square root

$$\overline{HM}_2 = \sqrt{\overline{HMS}} \quad (7)$$

### 3.3 Data

For the empirical study, we use the quarterly data of the portfolio holdings of mutual funds in Chinese stock markets from Wind dataset that cover the period from first quarter of 2005 to second quarter of 2014. And we filter the data by following principles:

(1) We eliminate the transactions when the change of holdings at quarter  $t$  is less than 0.01% of the capital, because both measures consider the number of transactions instead of trading volumes. We believe fund managers buy and sell stocks to fit portfolio management.

(2) A stock must be purchased or sold by at least five funds in a given quarter. We eliminate the transactions that have less than five active traders to get more accurate results.

(3) Transactions of new issues also excluded because they may lead to the over estimation of herding levels. Capitals always rush into new issued stocks driven by the high excess return.

## 4 EMPIRICAL ANALYSIS

### 4.1 Overall herding levels

Table 1. The overall herding level of Chinese mutual funds

|                           | $HM$            | $BHM$           | $SHM$          | $HM_s$         |
|---------------------------|-----------------|-----------------|----------------|----------------|
| Sample period (2005-2014) | 0.065<br>(0.76) | 0.082<br>(0.69) | 0.054<br>(1.1) | 0.161<br>(2.4) |
| Median                    | 0.048           | 0.063           | 0.035          | 0.133          |
| Standard Deviation        | 0.046           | 0.089           | 0.066          | 0.065          |

\*Standard errors are given in parentheses

Table 1 shows the statistic description of LSV and FHW results. As can be seen, LSV herding level

is 0.065(6.5%), it indicates that out of every 100 transactions, 6.5 more traders trade on the same side of the market than be expected it all traders make decision independently. This number is statistically significant. The FHW measure shows even higher level of 16.1%, proves an underestimation of LSV measure. Besides, Table 1 also suggests that buyer herding is more significant than seller herding.

### 4.2 Herding and trading intensity

Table 2. Herding levels and trading intensity

| Number of active traders | $HM$  | $HM_2$ | Observations |
|--------------------------|-------|--------|--------------|
| $N \geq 5$               | 0.065 | 0.161  | 3964         |
| $N \geq 10$              | 0.063 | 0.155  | 2047         |
| $N \geq 15$              | 0.064 | 0.149  | 1322         |
| $N \geq 20$              | 0.069 | 0.150  | 982          |
| $N \geq 25$              | 0.070 | 0.148  | 754          |

We set different thresholds as the minimum number of transactions in a stock. Table 2 presents the results for both two measures. We find a u-shaped relationship between herding level and trading intensity for LSV measure, whereas the result for the FHW measure is less clear-cut.

### 4.3 Herding and stock size

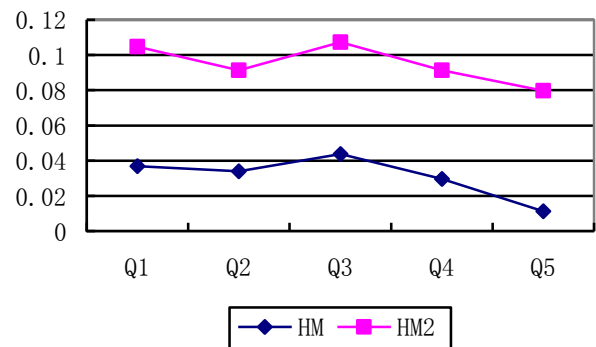


Figure 1. Herding levels with different stock size.

Figure 1 reports results of both measures according to stock size. Total market capitalization is split into quintiles, where quintile 1 (Q1) indicates the smallest stock size and quintile 5 (Q5) represents the largest ones. Sample period is the fourth quarter of year 2012. Results show that compared to large stocks, higher herding level is found in small and medium stocks, especially in medium ones. This is because small and medium stocks have better growth.

Table 3. Herding levels and stock style

| Stock style        | HM    | HM <sub>2</sub> | Observations |
|--------------------|-------|-----------------|--------------|
| Large-cap value    | 0.008 | 0.044           | 198          |
| Large-cap balance  | 0.055 | 0.134           | 239          |
| Large-cap growth   | 0.028 | 0.070           | 198          |
| Medium-cap value   | 0.005 | 0.032           | 289          |
| Medium-cap balance | 0.209 | 0.306           | 538          |
| Medium-cap growth  | 0.129 | 0.299           | 401          |
| Small-cap value    | 0.088 | 0.198           | 408          |
| Small-cap balance  | 0.210 | 0.419           | 1088         |
| Small-cap growth   | 0.117 | 0.269           | 600          |

To further study the relationship between herding and stock size, we compute the herding level by stock style categories. We get similar results, as can be seen in Table 3. Funds managers tend to herd more when investing medium size stock and in trading growth stock.

#### 4.4 Herding and market maturity

Table 4. Studies on herding of different countries

| Country | Authors          | Sample period* | HM    | HM <sub>2</sub> |
|---------|------------------|----------------|-------|-----------------|
| USA     | Lakonishok et al | 1985-1989.Q    | 0.027 | NA              |
|         | Grinblatt et al  | 1975-1984.Q    | 0.025 | NA              |
| Germany | Frey et al       | 1998-2004.Q    | 0.055 | 0.153           |
| China   | Qi et al         | 2000-2005.S    | 0.081 | NA              |
|         | Tian et al       | 2002-2009 Q    | 0.052 | 0.865           |
|         | Tao et al        | 2005-2014.Q    | 0.065 | 0.161           |

\* Q denotes quarterly samples, represents semi-annual samples

According to the literatures, herding is more likely to happen in emerging markets due to poor information disclosure and regulation system. Table 4 presents the comparisons among different stock markets. It shows that herding in Chinese stock market is significantly higher than developed countries such as the USA and Germany.

## 5 CONCLUSIONS

This paper contributes to the empirical study on herding behavior of mutual funds by using LSV and FHW measures in Chinese stock market. We find that mutual fund managers are tend to follow the herd, and herding behavior is more intensive in emerging markets, small and medium cap stocks and when the market is under stress.

Based on the empirical results, we suggest that sound corporate disclosure, high information quality and complete regulations are needed to improve the

status. Moreover, unreasonable evaluation system of fund managers stimulates them to follow others' strategy and ignore their own information to get better performances. More scientific evaluations should pay attention to manager's long-term return instead of short-term return.

## ACKNOWLEDGEMENTS

The authors would like to thank the editor and the anonymous reviewers for their comments. This paper was supported by the National Science Foundation of China, No.71733029.

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