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Pu Gong & Jun Dai

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Herding on lottery-type stocks: evidence from the Chinese stock market

Pu Gong and Jun Dai
School of Management, Huazhong University of Science and Technology, Wuhan, China

ABSTRACT
Previous studies have provided evidence that investors have gambling propensity in the stock market and exhibit a preference for lottery-type stocks. In this study, we use high total skewness and high maximum daily return (MAX) to measure lottery-type stocks and examine whether investors do exhibit distinct herding pattern in these stock types. Empirical results show that investors display stronger herding among lottery-type stocks, thereby indicating that such stocks induce correlated behaviour with the investors. In addition, we find that stocks with the highest skewness exhibit stronger herding under upmarkets, whereas stocks with the lowest skewness display stronger herding under downmarkets. Regarding the highest MAX portfolio, no significant herding asymmetry is seen between upmarket and downmarket. The results reported in this article demonstrate that comovement in stock returns may be partly attributed to the nonstandard preferences of investors in the stock market.

KEYWORDS
Herding behaviour; lottery-type stocks; skewness; MAX

JEL CLASSIFICATION
G15; G14

I. Introduction

In financial markets, herding behaviour is a behavioural tendency of investors to imitate the actions of others rather than draw from their own information and beliefs. Existing studies have investigated herding behaviour under different market conditions and different investment styles in both emerging and developed markets (Chang, Cheng, and Khorana 2000; Chiang and Zheng 2010; Tan et al. 2008; Yao, Ma, and He 2014). However, to the best of our knowledge, this study is the first to examine the impacts of gambling propensity of investors on herding behaviour in the stock market. A number of studies have provided evidence that investors show gambling attitude during stock investment decisions and exhibit a preference for lottery-type stocks. Kumar (2009) shows that certain investors, especially retail investors, are drawn towards stocks with lottery-type features, which he defines as low-priced stocks with high idiosyncratic skewness and high idiosyncratic volatility. Barberis and Huang (2008) argue that investors may overweight low probability events and prefer high skewness stocks. Bali, Cakici, and Whitelaw (2011) propose extreme positive returns to measure the lottery-type stocks and find a significant negative relationship between the maximum daily return over the past month and expected stock returns in the following month. If investors truly have gambling propensity and preference over lottery-type stocks, they may display distinct behaviour patterns in these stocks. In this study, we use high total skewness of stock returns and high maximum daily return (MAX) in each month, respectively, to measure the lottery-type stocks and examine whether investors exhibit different herding pattern in these stock types in the Chinese stock market. The remainder of this study is organized as follows. Section II introduces the methodology of the study. Section III describes the data and presents the empirical results. Section IV concludes.

II. Methodology

In this study, we use the herding testing method proposed by Chang, Cheng, and Khorana (2000). These authors argue that rational asset pricing models imply a linear relationship between equity return dispersions and market return. However, if investors tend to herd towards the market consensus, then this relationship will not hold and the equity return dispersions either increase at a decreasing rate or

Stocks with high total skewness are attractive to investors because they have a small probability to obtain a large gain.
decrease monotonically. Specifically, they adopt the cross sectional absolute deviation (CSAD) to measure the equity return dispersions as follows:

$$\text{CSAD}_t = \frac{1}{N} \sum_{i=1}^{N} |R_{i,t} - R_{m,t}|$$

(1)

where $R_{i,t}$ is the stock return of firm $i$ at time $t$ and $R_{m,t}$ is the cross-sectional average of $N$ stock returns in the portfolio at time $t$. Then the nonlinear regression is estimated at

$$\text{CSAD}_t = \beta_0 + \beta_1 |R_{m,t}| + \beta_2 R_{m,t}^2 + \epsilon_t$$

(2)

In Equation (2), the negative and statistically significant coefficient on the nonlinear term indicates the existence of herding behaviour because investors may react in a more uniform manner during periods of larger average price movements.

In addition, previous studies find that herding is stronger under downmarkets than upmarkets (Chang, Cheng, and Khorana 2000; Yao, Ma, and He 2014). To examine whether investors behave differently under different market conditions, we run the following regression:

$$\text{CSAD}_t = \gamma_0 + \gamma_1 D|R_{m,t}| + \gamma_2 (1-D)|R_{m,t}| + \gamma_3 D R_{m,t}^2 + \gamma_4 (1-D) R_{m,t}^2 + \epsilon_t$$

(3)

where $D$ is the dummy variable that takes the value of 1 if $R_{m,t} > 0$ and 0 otherwise. This regression examines the asymmetric herding patterns in different market conditions.

As stated earlier, we use high total skewness and high MAX(3) in each month to measure lottery-type stocks, in which total skewness is the measure of the third central moment of returns and MAX(3) measures the average of the three highest daily returns during the month.² To ensure the reliability of our estimated skewness and MAX, we require at least 15 trading days for each stock per month to reduce the infrequent trading impacts on estimation.

### III. Data and empirical results

The stock-level data in this study is obtained from Wind database. The daily individual stock return is calculated by

$$R_t = 100 \times \left( \log(P_t) - \log(P_{t-1}) \right),$$

where $P_t$ is the closing price on day $t$. Our sample period is from 1 January 2006 to 31 March 2016 for all firms listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange.³ The final data set includes 2488 daily observations.

Table 1 provides the regression results based on Equation (2) that are sorted by total skewness and MAX(3) every month. Panel A of Table 1 shows that the herding coefficients ($\beta_i$) are all negative at the 1% level of significance sorted by total skewness of stock returns, thereby indicating that the linear relationship between CSAD and the market return does not hold. Furthermore, the herding level increases monotonically across the total skewness tertile portfolios. Meanwhile, the evidence in Panel B shows that the highest MAX(3) portfolio displays the strongest herding level, whereas the lowest MAX(3) portfolio presents no evidence of herding. These results suggest that investors exhibit stronger herding among lottery-type stocks especially among the highest MAX(3) stocks, which is also consistent with the finding by Kumar, Page, and Spalt (2016) that correlated trading by gambling-motivated investors generates excess return comovement among stocks with lottery features.

Table 2 reports the regression results based on Equation (3) that are sorted by total skewness and MAX(3) under different market conditions. Panel A of Table 2 shows that investors herd stronger under downmarkets on the lowest total skewness stocks.

<table>
<thead>
<tr>
<th>Sample</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: regression results sorted by total skewness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (Lowest)</td>
<td>1.3144***</td>
<td>0.2072***</td>
<td>-0.0111***</td>
<td>0.12</td>
</tr>
<tr>
<td>(40.4565)</td>
<td>(6.7021)</td>
<td>(-2.6318)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.5777***</td>
<td>0.1636***</td>
<td>-0.0120***</td>
<td>0.06</td>
</tr>
<tr>
<td>(48.0955)</td>
<td>(5.6787)</td>
<td>(-2.9601)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (Highest)</td>
<td>1.7058***</td>
<td>0.1911***</td>
<td>-0.0125***</td>
<td>0.11</td>
</tr>
<tr>
<td>(54.4848)</td>
<td>(6.2963)</td>
<td>(-2.7606)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panel B: regression results sorted by MAX(3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (Lowest)</td>
<td>1.0873***</td>
<td>0.1688***</td>
<td>-0.0023</td>
<td>0.19</td>
</tr>
<tr>
<td>(36.6590)</td>
<td>(6.1524)</td>
<td>(-0.6054)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.4389***</td>
<td>0.1627***</td>
<td>-0.0104***</td>
<td>0.08</td>
</tr>
<tr>
<td>(46.6861)</td>
<td>(5.5167)</td>
<td>(-2.4353)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (Highest)</td>
<td>2.0753***</td>
<td>0.2294***</td>
<td>-0.0224***</td>
<td>0.07</td>
</tr>
<tr>
<td>(59.2547)</td>
<td>(7.1853)</td>
<td>(-4.8609)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table reports regressions results of Equation (2) for total skewness and MAX(3) tertile portfolios; portfolios are constructed based on total skewness and MAX(3) every month. The numbers in the parentheses are $t$-statistics based on Newey and West (1987)’s heteroscedasticity and autocorrelation consistent SEs. ***, **, * represent statistical significance at the 1%, 5%, 10% levels, respectively. $R^2$ is the adjusted $R^2$.

*Unreported results show that we obtain similar results in this article when sorting stocks by MAX(1), MAX(2), MAX(4), MAX(5).
²Our sample includes only A-share markets, not B-share markets.
Whereas stronger herding level is exhibited on the highest total skewness portfolio under upmarkets ($\gamma_4 < \gamma_3 < \gamma_2$ significantly less than $\gamma_1$). These results indicate that high skewness stocks are attractive to investors under upmarkets, whereas under downmarkets, investors have a consistent tendency to disregard low skewness stocks that have a small probability bring them a large loss. Regarding the MAX(3) tertile portfolios, Panel B reports that the lowest MAX(3) portfolio displays herding under downmarkets and none under upmarkets. Dissimilar from the herding pattern among the highest skewness stocks, the highest MAX(3) stocks exhibit herding under both upmarket and downmarket, but no significant herding asymmetry is found under different market conditions.

IV. Conclusion

The Chinese stock market, which is dominated by unsophisticated retail investors, provides an interesting setting to examine whether lottery-type stocks induce distinct herding pattern among these stock types.

In this study, we characterize the lottery-type stocks with high total skewness and high maximum daily return (MAX) supported by previous studies (Barberis and Huang 2008; Bali, Cakici, and Whitelaw 2011). Empirical results find that investors exhibit stronger herding behaviour among lottery-type stocks that may be attributed to their attractiveness to investors, especially retail investors. We also find that investors herd stronger on low skewness stocks under downmarkets, whereas they exhibit stronger herding on high skewness stocks under upmarkets, indicating that investors display distinct preferences for stocks under different market conditions. In addition, the lowest MAX(3) portfolio shows evidence of herding under downmarkets, whereas the highest MAX(3) portfolio shows herding under both upmarkets and downmarkets but no significant herding asymmetry under different market conditions.

The traditional view considers that comovement in stock returns are mainly attributed to correlated cash flows and systematic shifts in discount rates among certain stocks (Kumar, Page, and Spalt 2016). However, in this study, we find that investors exhibit stronger herding among lottery-type stocks, which may reflect their gambling preferences in the stock market. Hence, nonstandard preferences by investors may partly explain the comovement in stock returns in related research.

Disclosure statement

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ORCID

Pu Gong http://orcid.org/0000-0002-4086-3850
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