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Mutual fund herding and return comovement in Chinese equities

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ABSTRACT

This paper explores the role mutual fund herding plays on the return comovement in Chinese equities. The results show that mutual fund herding significantly reduces the return comovement among Chinese stocks, providing evidence for the existence of a rational herding behavior by mutual funds. We find that the negative effect of mutual fund herding on return comovement is larger for stocks with low volatility and high mutual fund ownership. We also observe that mutual fund herding has a stronger impact on return comovement after the full-implementation of the Split-Share Structure Reform in China in 2012 which allowed all shares to be traded freely among all market participants.

1. Introduction

Comovement between stock returns has always been a subject of interest in the finance literature. Barberis et al. (2005) point to two potential causes of comovement: comovement due to fundamentals in a frictionless economy with rational investors, and comovement due to sentiment changes in an economy with frictions, irrational investors, and limits to arbitrage. Empirical studies show that while the correlation among firms' fundamentals partially explains stock return comovement, systematic noise trading plays an important role as a plausible alternative explanation of stock return comovement as well (e.g., Morck et al., 2000).

Previous literature shows that institutional trading induces the comovement of stock prices to some extent (Coval and Stafford, 2007; Anton and Polk, 2014; Faias and Ferreira, 2017; and Li et al., 2019). As part of institutional trading, herding by institutional investors could particularly play a role in the comovement of stock prices. However, the previous literature, while providing plenty of evidence on institutional herding, does not focus too much on the effect of institutional herding on return comovement especially in emerging markets. For example, Hung et al. (2010) find that mutual funds in the Taiwan stock market herd extensively. Economou et al. (2015) show that fund managers herd significantly in the stock markets of Bulgaria and Montenegro. Hsieh (2013) finds evidence of stronger herding by institutional investors compared to individual investors in the Taiwan stock market. Zheng et al. (2015) investigate institutional herding in China's stock market and confirm that herding among institutional investors is noticeably persistent. Moreover, Li et al. (2017) show that institutional investors are more likely to herd than individual investors in China. In developed market studies, Nofsinger and Sias (1999), Wermers (1999), and Griffin et al. (2003) provide evidence of significant institutional herding in the US stock market. Hudson et al. (2020) confirm that mutual fund herding is highly persistent in the UK and find a unidirectional investor sentiment effect on the herding of UK mutual funds.

In the literature, there are two perspectives in terms of how the herding behavior evolves. While one opinion supports the notion that herding is a rational behavior, the other argues that herding is a non-rational behavior (Devenow and Welch, 1996). The

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proponents of the rational perspective argue that rational herding is information-based. That is, investors herd rationally in response to new information and as a result herding moves prices toward their fundamental values. Therefore, price movements are not likely to reverse after rational herding. By contrast, irrational herding occurs when investors with insufficient information and inadequate risk evaluation disregard their prior beliefs and blindly follow other investors' actions. This non-information-based herding might lead to market inefficiencies and drive asset prices away from their fundamental values, causing mispricing in asset values (Froot et al., 1992; Hirshleifer et al., 1994; Hwang and Salmon, 2004; Hung et al., 2010).

Similarly, the herding behavior of actively managed funds can be categorized as rational or irrational as well. In terms of rational herding, Scharfstein and Stein (1990) show that less able/reputable fund managers imitate the trades of their better-able peers to improve performance and protect their career prospects. Trueman (1994) and Clement and Tse (2005) provide evidence that less reputed finance professionals are more susceptible to follow the actions of the well-reputed ones. Devenow and Welch (1996) show that less skilled fund managers during the acquisition/processing of information may choose to copy the trades of their better-informed peers to extract informational payoffs. De Bondt and Teh (1997) find that relative homogeneity among fund managers in terms of their educational background and professional framework can also lead them to produce correlated trades.

In terms of non-rational trading of institutional investors, De Long et al. (1990) theoretically show that the correlated noise traders in the multiple markets can result in excess volatility and excess covariance as investors follow one another blindly and forgo rational analysis. Fenzl and Pelzmann (2012) show that irrational herding emerges from investor psychology and the consequence of social interactions between investors and their environment. Irrational herding is tied to informational cascades, where managers ignore their private information and instead follow the herd. Barberis et al. (2005) and Greenwood (2008) attribute stock return comovement to uninformed demand shocks of a group of securities which result from noise traders' correlated sentiments. DeVault et al. (2013) show that institutional investors are the sentiment traders whose demand shocks drive prices away from their fundamental values.

The findings of the literature on the source of herding motivate our intention to examine the relation between changes in institutional ownership and return comovement further, particularly in emerging markets where return comovement in relation to institutional herding is not studied extensively. Our intention in examining the relation between institutional herding and return comovement is to figure out whether the source of institutional herding is rational or irrational. We conjecture that if institutional herding is information-based (i.e., rational) where institutional investors independently act in response to new information, this should push stock prices toward their fundamental values, reducing stock mispricing and bringing the level of comovement among stocks to a lower degree. This rational herding behavior then should manifest itself as a negative and significant relation between institutional herding and return comovement in our analyses. On the other hand, if institutional herding is not information-based (i.e., irrational) where investors blindly mimic each other's trades without considering fundamental valuations, this could derive stock prices away from their fundamentals, increasing stock mispricing and leading to a higher degree of comovement in stock returns. This irrational herding behavior would then show up as a positive and significant relation between institutional herding and return comovement in our analyses.

We believe, to the best of our knowledge, no study has explored the relationship between mutual fund herding and return comovement in China's stock market from this perspective. Eun and Huang (2007) cite a Wall Street Journal article (August 22, 2001) resembling China's stock market to casinos, driven by fast money inflows and outflows without much attention (paid by investors) to underlying asset values. Fahey and Chemi (2015) also report that 85% of investors (approximately 200 million investors) in China's stock market are individual investors, trading much more frequently than other individual investors in other countries. These factors at first may direct one person to think that China's stock market is led by irrational investment behavior of these individual investors who primarily trade based on non-information-driven market sentiment. With this paper, we test whether mutual fund herding, on the other hand, a potentially more sophisticated institutional investor behavior, decreases the stock return comovement, and thus provides evidence of a rational herding behavior by mutual funds in Chinese equity markets.

We measure the intensity of mutual fund herding in the Chinese stock market with three standard herding measures: the herding measure (*HM*) of Lakonishok et al. (1992), the adjusted herding measure (*ADJHM*) of Brown et al. (2014), and the herding measure ($H2^{qs}$) developed by Frey et al. (2014) (hereafter denoted as FHW). By using these three measures, we explore the role mutual fund herding plays in the return comovement in Chinese stocks. In our analyses, to isolate the impact of mutual fund herding on return comovement, we also control for the effect of analyst information coverage as well as other stock characteristics that have an impact on return comovement.

The results show that there is significant evidence of mutual fund herding in China's stock market. More importantly, our empirical analyses reveal that mutual fund herding has a significant and negative impact on future return comovement in Chinese equities. This finding, based on our hypothesis, provides evidence for the existence of a rational herding behavior by mutual funds in the Chinese stock market. In other words, the reduction in return comovement following the mutual fund herding suggests that herding is information-based. That is, mutual funds herd rationally in response to new information, and as a result, this pushes prices toward their fundamental values, reducing stock mispricing and bringing the level of comovement among stocks to a lower degree.

Our finding of a negative and significant relation between mutual fund herding and return comovement may suggest evidence of fund manager skill and may at first seem to contradict with the findings of Jiang and Verado (2018) who find a negative relation between herding and fund manager skill. This may be because the herding measures we use in our study differ from Jiang and Verado (2018) in two ways: First, Jiang and Verado's herding measure is at the fund level - it measures the likelihood of a fund to herd. On the contrary, the herding measures we follow are at the stock level – they measure the degree to which a stock is herded by mutual funds. Second, Jiang and Verado's measure captures the tendency of a fund to mimic peers' past trading behavior, whereas the herding measures in our study capture contemporaneous behaviors of mutual funds. These differences in methodology therefore make it difficult to compare the implication derived from our study to Jiang and Verado's findings on fund manager skill.

Our interpretation of reduced mispricing from reduced comovement due to rational mutual fund herding may also at first seem to conflict with the findings of Hameed et al. (2015) who show a positive relation between analyst coverage and stock return comovement (among peers), and attribute this relation to unidirectional information spillovers. The intuition in Hameed et al. (2015) is that investors use information about the bellwether firm to infer changes in fundamentals of less followed firms in the same industry, thus causing the stock returns of the industry to comove with those of the bellwether firms. The same intuition, however, cannot be applied to our study, as our comovement measure captures the comovement between a stock and the entire market, rather than only one industry.

In our subsequent analyses examining robustness of our findings, we also find that the negative relationship between mutual fund herding and return comovement, although shows some variation in different subsamples, is strong across stocks with different levels of stock volatility, stocks with different levels of mutual fund holdings, for alternative prediction horizons, during subsample periods, and for alternative measures of return comovement. Specifically, we find that the negative effect of mutual fund herding on return comovement is larger for stocks with low volatility and for stocks with high mutual fund ownership. Moreover, the negative effect of mutual fund herding on return comovement is observed to be larger after the full implementation of the Split-Share Structure Reform (SSSR) in China by the end of 2011 which allowed all shares to be traded freely among all market participants. Lastly, we find that the negative relation between mutual fund herding and return comovement holds using alternative return comovement measures from multivariate GARCH models which address endogeneity.

The rest of this paper is organized as follows. Section 2 explains the methodology and the data used in the paper. Section 3 presents the main empirical results. Section 4 conducts various robustness tests, and Section 5 concludes the paper.

2. Methodology and data

2.1. Measures of mutual fund herding and return comovement

In our paper, we first calculate the degree of mutual fund herding with the herding measure developed by Lakonishok et al. (1992), which we will denote as the LSV herding measure hereafter. Since mutual funds report their holdings on a half-year basis in China, we compute the mutual fund herding on a half-year basis as well. Letting $HM_{i,T}$ represent the measure of herding by mutual funds into stock i during a half year T, the LSV herding measure is expressed as:

$$HM_{i,T} = \left|p_{i,T} - E\left[P_{i,T}\right]\right| - E\left|p_{i,T} - E\left[p_{i,T}\right]\right| \tag{1}$$

where $p_{i,T}$ is the proportion of all mutual funds trading stock i that are buyers in the half-year T. In other words, $p_{i,T}$ is the ratio of the number of mutual funds buying stock i to the total number of mutual funds trading stock i (buying and/or selling) in half-year T. Essentially, Eq. (1) is a simple "count" of the number of funds buying the stock during a given half-year as a proportion of the total number of funds trading that stock during the same half-year, minus the expected proportion of buyers$E[p_{i,\ T}]$. As a proxy for the expected proportion of buyers $E[p_{i,\ T}]$, we calculate the average ratio of buyers across all stocks during the half-year T. Lastly, an adjustment factor,$E|p_{i,\ T} - E[p_{i,\ T}]|$, is subtracted to allow for random variation around the expected proportion of buyers under the null hypothesis of independent trading decisions by the funds.

We next compute the modified buy and sell herding measures to segregate stocks by whether they have a higher (or lower) proportion of buyers than the average ratio of buyers across all stocks during the same half-year. The relation between the unconditional LSV herding measure, $HM_{i,T}$, and these conditional herding measures, which we call the "buy herding measure", $BHM_{i,T}$, and the "sell herding measure", $SHM_{i,T}$ are described as follows:

$$BHM_{i,T} = HM_{i,T}\left|p_{i,T} > E\left[p_{i,T}\right]\right. \tag{2}$$

$$SHM_{i,T} = HM_{i,T}\left|p_{i,T} < E\left[p_{i,T}\right]\right. \tag{3}$$

After computing the buy herding and sell herding measures, we next compute the adjusted herding measure (*ADJHM*) developed by Brown et al. (2014). The adjusted herding measure, which we use primarily in all of our regression analyses, is defined as follows:

$$ADJHM_{i,T} = BHM_{i,T} - min(BHM_T)\left|\left(p_{i,T} - p_T\right) > 0\right. \tag{4}$$

or

$$ADJHM_{i,T} = -\left[SHM_{i,T} - min(SHM_T)\right]\left|\left(p_{i,T} - p_T\right) < 0\right. \tag{5}$$

Different form LSV herding measure, this adjusted herding measure also indicates the direction of herding; a positive adjusted herding measure indicates that there are more buyers than expected, and a negative adjusted herding measure indicates that there are more sellers than expected. *ADJHM* makes sure that buy herding is always positive and sell herding is always negative, which makes it is easier to interpret the slope coefficients in regression analyses.

For robustness, in all of our analyses, we also use an alternative herding measure developed by Frey et al. (2014):

$$\mathrm{H}_2^{qs} = \frac{\left(b^{qs} - \widehat{\pi}^q n^{qs}\right)^2 - n^{qs}\widehat{\pi}^q\left(1 - \widehat{\pi}^q\right)}{n^{qs}\left(n^{qs} - 1\right)} \tag{6}$$

where b^{qs} is the number of buyers for stock s in half-year q, $\widehat{\pi}^q$ is the probability of buys in a half-year q, which equals to the ratio of the sum of the number of buyers of each stock to the sum of the number of traders of each stock over half-year q, and n^{qs} is the number of traders for stock s in half-year q.

Next, as the comovement measure, we follow the methodology utilized in Barberis et al. (2005) and Greenwood (2008) and compute the stock return comovement measure for each stock by regressing the daily individual stock returns on the daily returns of the value-weighted stock market index every half-year period. That is, we generate the stock return comovement measure for each stock from the R^2 of the following regression run on a semi-annual basis:

$$RET_{i,t} = \alpha + \beta MKT_t + \varepsilon_{i,t} \tag{7}$$

where $RET_{i,t}$ is the return on stock i in day t and MKT_t is the value-weighted market index return in day t. After running Eq. (7) for every 6 months and obtaining the R-square ($R^2_{i,\ T}$) for each stock on a semi-annual basis, we then apply one final logistic transformation of the $R^2_{i,\ T}$ to get the return comovement as:

$$RSQ_{i,T} = ln\left(R^2_{i,T} \Big/ \left(1 - R^2_{i,T}\right)\right) \tag{8}$$

where $R^2_{i,\ T}$ is the R-square of Eq. (7) for stock i in the half-year T and $RSQ_{i,\ T}$ is the finalized return comovement measure for stock i in the half-year T based on Morck et al. (2000).

2.2. Regression model and data

In our empirical analyses, we use mutual fund herding as our main variable of interest to explain the future comovement in stock returns. For this, we regress the next half-year return comovement on current half-year mutual fund herding in a panel time-series cross-sectional regression setting controlling for other stock characteristics. Since previous studies show that information disclosure and analysts' behavior are strongly related to return comovement (Hameed et al., 2015; Israelsen, 2016), we make sure that we control for analysts' information coverage in our regressions. Following Chan and Hameed (2006), we also include firm size, turnover, leverage, and book to market ratio as the control variables to our regression specification. Specifically, we run the following regression model to estimate the impact of herding on future return comovement:

$$\begin{aligned} RSQ_{i,T+1} &= \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 TURNOVER_{i,T} + \beta_5 SIZE_{i,T} \\ &+ \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T} \end{aligned} \tag{9}$$

where $RSQ_{i,T+1}$ is the return comovement measure defined in Eq. (7) for stock i in the half-year $T + 1$. $HERD_{i,T}$ is the adjusted herding measure (*ADJHM*) of Brown et al. (2014) for stock i in half-year T. As an alternative measure of herding, we use the herding measure developed by Frey et al. (2014) in a separate analysis as well. $COVERAGE_{i,T}$ is the number of analysts reporting one-year earnings forecasts (EPS) for stock i in half-year T. $RETURNS_{i,T}$ is the cumulative 6-month return (not compounded) for stock i in half-year T. $TURNOVER_{i,T}$ is the turnover for stock i in half-year T defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. $SIZE_{i,T}$ is the market capitalization for stock i at the end of half-year T. $DEBT_{i,T}$ is the financial leverage defined as the debt-over-asset ratio for stock i at the end of half-year T. $BM_{i,T}$ is the book-to-market ratio for stock i in half-year T. Lastly, θ and γ refer to the time and industry fixed effects, respectively.[1]

In terms of data, we collect the stock returns, the trading volume, and the accounting data of Chinese stocks, as well as the stock holdings data of mutual funds from CSMAR. Our sample period starts with the beginning of the implementation of the Split-Share Structure Reform (SSSR) in China in 2005 and ends in 2019. The data on Chinese stocks include a total of 3737 stocks traded in the Shanghai Stock Exchange and the Shenzhen Stock Exchange during our sample period. Consistent with prior literature, we exclude the stocks of financial firms from our analyses.

Panel A of Table 1 shows, for the sample period 2005–2019, the descriptive statistics of all variables utilized in our analyses, including the return comovement and several mutual fund herding measures, as well as the stock characteristics used as control variables in our regression models. In terms of the LSV herding measures, the average herding measure (*HM*), the average buy herding measure (*BHM*), and the average sell herding measure (*SHM*) across all stocks are all positive, 0.085, 0.088, and 0.085, respectively, and they are all highly significant at the 1% significance level, providing evidence for the existence of a notable degree of herding among mutual funds in the Chinese stock market. Furthermore, the average adjusted herding measure (*ADJHM*) is −0.019 and the average FHW herding measure ($H2^{qs}$) is 0.043, both are highly significant as well. Overall, these statistics, consistent with the previous literature, confirm that mutual fund herding exists to a great extent in Chinese equities (see Chang et al., 2015).

Panel B of Table 1 presents the average statistic for the number of mutual funds, the number of firms traded by mutual funds, and the proportion of mutual funds buying a stock relative to the total number of funds trading that stock (%) during the sample period 2005–2019. The same panel also reports the year-end figures of these three variables for each odd year from 2005 to 2019. Panel B

[1] We select the semi-annual data frequency rather than the quarterly data in our main analysis since the mutual funds release their stock holdings information only at the end of the second and the fourth quarters in China.

Table 1
Summary statistics.

Panel A: Summary statistics for the variables												
	RSQ	*HM*	*BHM*	*SHM*	*ADJHM*	$H2^{qs}$	*COVERAGE*	*RETURNS*	*TURNOVER*	*SIZE*	*DEBT*	*BM*
Mean	−0.800***	0.085***	0.088***	0.085***	−0.019***	0.043***	10.522***	0.001***	32.767***	15.415***	0.504***	0.627***
Std. Err.	0.004	0.001	0.001	0.001	0.001	0.000	0.061	0.000	0.101	0.004	0.017	0.001
Std. Dev.	1.062	0.138	0.142	0.135	0.301	0.097	12.403	0.026	25.758	1.036	4.180	0.247
25%	−1.328	−0.011	−0.015	−0.011	−0.266	−0.003	2.000	−0.001	14.525	14.738	0.276	0.441
50%	−0.694	0.064	0.066	0.069	−0.049	0.012	6.000	0.000	25.508	15.330	0.448	0.635
75%	−0.120	0.173	0.179	0.173	0.235	0.068	14.000	0.003	43.772	16.003	0.611	0.819
Min	−18.242	−0.246	−0.246	−0.246	−0.748	−0.250	0.000	−0.159	0.004	11.467	−0.195	0.000
Max	2.774	0.606	0.606	0.551	0.779	0.520	160.000	4.725	329.894	21.864	877.256	6.546
Obs	65,381	55,704	25,758	28,779	54,537	51,691	40,737	65,443	65,427	65,443	61,767	60,674

Panel B: Characteristics of mutual fund trading activities									
	Mean	2005	2007	2009	2011	2013	2015	2017	2019
Number of mutual funds	1187	172	292	476	743	951	1836	3028	3375
Number of firms traded by mutual funds	2029	1214	947	1306	2060	2138	2774	3354	3418
Proportion of mutual funds buying a stock (%)	42.04	51.28	53.10	49.16	57.24	25.78	30.68	27.24	52.08

Panel A presents the summary statistics for return comovement, several mutual fund herding measures, and stock characteristics used as control variables in our regression analyses. *RSQ* is the return comovement measure defined as in Eq. (7). *HM* is the LSV mutual fund herding measure defined as in Eq. (1). *BHM* is the conditional LSV buy herding measure and *SHM* is the conditional LSV sell herding measure defined as in Eqs. (2) and (3), respectively. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FWH mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Panel B presents the average statistic for the number of mutual funds, the number of firms traded by mutual funds, and the proportion of mutual funds buying a stock relative to the total number of funds trading that stock (%) during the sample period 2005–2019. Panel B also reports the year-end figures of these three variables for each odd year from 2005 to 2019.

shows a dramatic increase in the number of mutual funds in China from 172 in 2005 to 3375 in 2019. Along with this increase, we also find that the number of firms traded by mutual funds has almost tripled during the same period. This increase in the number of firms traded by mutual funds particularly in between 2009 and 2013 is likely attributable to the full implementation of the Split-Share Structure Reform which enabled full circulation of the stocks in Shanghai and the Shenzhen Stock Exchanges in 2012. In addition, the introduction of the GEM Board (Shenzhen Stock Exchange's version of Nasdaq) at the end of 2009 (Carpenter et al., 2021) must have contributed to this increase in the number of firms traded by mutual funds during this period as well. Interestingly, Panel B of Table 1 also reveals that the proportion of funds buying a stock relative to the total number of funds trading that stock has shown significant variation from year to year, which is important for our analysis to test the significance of mutual fund herding on return comovement.[2]

Table 2 shows the correlation matrix among the independent variables we utilize in our regressions to explain the future return comovement. We find that the magnitude of correlation between our two measures of herding, *ADJHM* and $H2^{qs}$, is quite low at 0.017, suggesting that these two measures capture different aspects of the mutual fund herding. Furthermore, stock returns have a positive and significant relation with both of the mutual fund herding measures, which shows that mutual funds tend to herd stocks with higher stock returns. On the other hand, size, leverage, and book-to-market have negative and significant correlations with the two mutual fund herding measures, suggesting that funds tend to herd more of the low book-to-market, small, and less-levered stocks. Lastly, even though most of the correlation coefficients in the correlation matrix are significant, the magnitudes of these correlations are quite low, suggesting that there is no risk of a multicollinearity issue in our regression analyses.

3. Empirical results

3.1. Panel regressions of return comovement on mutual fund herding

In this section, to test the effect of mutual fund herding on return comovement in Chinese stocks, we run the panel time-series cross-sectional regressions in Eq. (9), and report results from these regressions in Table 3. In Panel A of Table 3, we first use the adjusted herding measure (*ADJHM*) of mutual funds as the main independent variable in all three different regression models we estimate. In all of the regression specifications, we find that the current half-year mutual fund herding is significantly and negatively related to the next half-year return comovement in Chinese stocks.

Moreover, the results indicate that the analyst information coverage variable has a significant and negative effect on the return comovement in Model (2). This suggests that as the number of security analysts covering a stock increases, this generates better firm-specific information for the stock, and as a result, helps stock prices diverge from each other and move toward their fundamental values, decreasing the total level of comovement among stocks. In other words, our finding supports the notion that presence of more security analysts increases the availability of firm-specific information and thus reduces the stock return comovement in Chinese stocks. Our finding contributes to the literature in terms of the ongoing debate whether analyst coverage provides more firm-specific or market-wide information, and whether this results in lower or higher stock return synchronicity. Our result is consistent with the findings of Bai et al. (2016) who show that analyst coverage is significantly and inversely associated with stock return synchronicity in the Chinese IPO market, supporting analysts' role as producers of firm-specific information. On the other hand, our finding contrasts with Chan and Hameed (2006) who find that greater analyst coverage increases stock price synchronicity in emerging markets, indicating analysts generate mainly market-wide information rather than firm-specific information. Supporting the results from Chan and Hameed (2006), Gao et al. (2020) also find that after brokerage mergers and closures, the reduced analysts coverage leads to a decrease in stock price synchronicity (i.e., a positive relation between analyst coverage and return comovement) in a sample of Chinese firms. With the ongoing and evolving debate in the literature on the impact of analyst coverage on return comovement, we do not aim to take any sides on this relationship, but rather use analyst coverage as a control variable in examining the relationship between mutual fund herding and future return comovement, our main topic of interest. In fact, the important result in our analyses is the fact that the significance of analyst coverage does not reduce or eliminate the negative and significant impact of mutual fund herding on future return comovement in Chinese stocks.

In terms of the other firm characteristics, we find that the effects of the control variables on return comovement are consistent with Li et al. (2019). For example, we find that turnover, size, and book to market ratio are significantly and positively related to future return comovement in Model (3). On the other hand, past 6-month cumulative stock returns and leverage are significantly and negatively related to the next half-year return comovement. However, most importantly, the significance of these control variables does not affect the negative and significant impact of mutual fund herding on future return comovement.[3]

[2] Table 1 Panel B shows that the proportion of mutual funds buying a particular stock relative to funds trading (buying or selling) a stock drops from 57.24% in 2011 to 25.78% in 2013 and remains at these low levels until 2017 before rising back again to 52.08% in 2019. When we investigate this drop in the data from 2011 to 2017, we find that the average number of mutual funds buying a stock actually remains at a stable level between 2011 and 2017. On the other hand, the average number of mutual funds trading (buying or selling) that stock increases significantly during the same time period. Hence the drop in the proportion of funds buying a stock between 2011 and 2017 is mainly driven by the vast increase in the number of funds selling that stock.

[3] As a robustness test, we also use the herding measure (*HM*) by Lakonishok et al. (1992) in our panel time-series cross-sectional regressions. The results show that mutual fund herding once again has a significant and negative relation with future return comovement in all model specifications. The results from this analysis is available upon request.

Table 2
The correlations between the explanatory variables.

	ADJHM	$H2^{qs}$	*COVERAGE*	*RETURNS*	*TURNOVER*	*SIZE*	*DEBT*	*BM*
ADJHM	1.000							
$H2^{qs}$	0.017***	1.000						
COVERAGE	0.065***	−0.104***	1.000					
RETURNS	0.088***	0.077***	−0.012**	1.000				
TURNOVER	−0.039***	0.103***	−0.176***	0.034***	1.000			
SIZE	−0.001	−0.143***	0.487***	−0.004	−0.109***	1.000		
DEBT	−0.032***	−0.033***	−0.008	−0.001	0.003	−0.022***	1.000	
BM	−0.052***	−0.026***	−0.122***	−0.035***	−0.349***	−0.078***	−0.010**	1.000

This table provides the correlation matrix of the explanatory variables of return comovement during the sample period 2005–2019. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FWH mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3
Panel regressions of return comovement on mutual fund herding.

	Panel A: HERD = ADJHM			Panel B: HERD = $H2^{qs}$		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
HERD	−0.173***	−0.262***	−0.200***	−0.517***	−0.566***	−0.597***
	(−13.096)	(−17.593)	(−13.522)	(−12.220)	(−10.967)	(−11.445)
COVERAGE		−0.001**	−0.001*		−0.002***	−0.001**
		(−2.036)	(−1.982)		(−3.914)	(−2.143)
RETURNS			−0.951*			−0.996*
			(−1.873)			(−1.851)
TURNOVER			0.005***			0.005***
			(17.158)			(17.746)
SIZE			0.083***			0.073***
			(7.389)			(6.430)
DEBT			−0.209***			−0.223***
			(−5.599)			(−5.875)
BM			0.891***			0.943***
			(21.678)			(22.231)
Constant	−1.340***	−1.229***	−3.137***	−1.056***	−1.126***	−2.941***
	(−19.740)	(−15.446)	(−17.334)	(−15.745)	(−14.353)	(−16.323)
R-square	0.307	0.334	0.386	0.308	0.329	0.385
Observation	54,400	37,339	36,830	51,571	36,735	36,236

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding with and without controlling for stock characteristics. The panel regressions are run for the following full model and its alternative versions:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FWH mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In Panel B of Table 3, we replace the adjusted herding measure (*ADJHM*) of Brown et al. (2014) with the FHW herding measure ($H2^{qs}$) of Frey et al. (2014) as the main independent variable and run similar panel time-series cross-section regression models. We find that the current half-year mutual fund herding is again significantly and negatively related to the following half-year return comovement in all of the model specifications. Similarly, analyst information coverage is also significantly and negatively related to future return comovement with somewhat stronger statistical significance. Furthermore, the other control variables once again keep their sign and significance (i.e., expected effects) on return comovement as well. More importantly, however, the negative and significant cross-sectional relation between mutual fund herding and future return comovement continues at the presence of these statistically significant control variables.

Lastly, in addition to utilizing panel regressions, as a robustness check, we also use the Fama-MacBeth method to test the relationship between mutual fund herding and future return comovement. Consistent with results obtained from panel regressions, we again find a significant and negative relation between mutual fund herding and return comovement using cross-sectional Fama-MacBeth regressions. We provide detailed results from this analysis in Table A1 of the Appendix.[4]

In sum, all these results from our regression analyses strongly support the notion that mutual fund herding in Chinese equities is rational as this herding helps stock prices get back closer to their fundamental values and as a result decrease the comovement in stock returns.[5]

4. Robustness checks

4.1. The effect of mutual fund herding on return comovement for stocks with different levels of volatility

A number of papers in the literature use volatility as a proxy for the extent of disagreement on a stock among market participants. While for volatile stocks, market participants are more likely to possess divergent views, those market participants are more likely to share common views for less volatile stocks (Chan et al., 2005). From this perspective, if most market participants already have divergent views on a particular stock, then rational herding by mutual funds should have less chance to reduce the return comovement of this stock with other stocks when compared to the effect of mutual fund herding on a different stock where market participants share similar views. In other words, the effect of mutual fund herding on return comovement should be higher for low volatility stocks in which market participants tend to share similar views in comparison to high volatility stocks where there are divergent views among market participants.

To test this conjecture, for each half-year period, we sort the sample of stocks into terciles based on the stocks' 6-month volatility and name each group as low volatility stocks, medium volatility stocks, and high volatility stocks, respectively. We then run our panel time-series cross-sectional regressions for each of the three groups of stocks separately. In Panel A of Table 4, we use the adjusted herding measure (*ADJHM*) in our regressions and find that mutual fund herding is negatively related to future return comovement in all three sub-groups of stocks, and this negative relation is statistically strongest (with the largest coefficient on the herding measure observed) in low volatility stocks. This finding confirms our conjecture that mutual fund herding has a stronger negative effect on return comovement in stocks where market participants have unified views. In Panel B of Table 4, when we use FHW herding measure ($H2^{qs}$) as an explanatory variable of return comovement in our regression analyses, the results show once again that mutual fund herding is significantly and negatively related to return comovement; and the coefficient on the herding measure once more is the largest for stocks with low volatility. In sum, these results suggest that the negative effect of mutual fund herding on return comovement is larger for stocks in which market participants tend to share similar views, which cause these stocks to have smaller volatility in the first place.

4.2. The effect of mutual fund herding on return comovement for stocks with different levels of mutual fund ownership

We believe institutional ownership might have an impact on the relationship between mutual fund herding and return comovement since higher institutional ownership means mutual funds have more shares to trade, and as a result their trading behavior could have a stronger impact on return comovement (see Faias and Ferreira, 2017). To test this conjecture, for each half-year period, we sort the stocks into terciles based on mutual fund ownership and name each group as stocks with low institutional ownership (Low IO), stocks with medium institutional ownership (Medium IO), and stocks with high institutional ownership (High IO), respectively. We then run our panel regressions for each of the three groups of stocks separately. In Panel A of Table 5, we use the adjusted herding measure (*ADJHM*) in our regressions and find that mutual fund herding is significantly and negatively related to future return comovement in all three groups of stock. However, more importantly, both the magnitude and the statistical significance of this negative relation increases with mutual fund ownership. This finding confirms our conjecture that mutual fund herding has a stronger negative effect on return comovement in stocks where there is larger mutual fund ownership. In Panel B of Table 5, we use the FHW herding measure ($H2^{qs}$) as an explanatory variable of return comovement in our regression analyses. The results once again show that mutual fund herding is significantly and negatively related to return comovement across all three groups of stocks with different levels of mutual fund ownership; and the significant and negative effect is strongest for stocks with the highest mutual fund ownership.

[4] In an alternative analysis, following Chang and Dong (2006), we also use the change in mutual fund holdings to measure the degree of mutual fund herding, and check its impact on return comovement as well. Once again, we find that mutual fund herding is significantly and negatively related to future return comovement. We provide detailed results from this analysis in Table A2 of the Appendix. This finding supports the view that the negative relationship between mutual fund herding and return comovement is robust to alternative ways of measuring the mutual fund herding.

[5] A number of mutual funds in China report their holdings to the CSMAR database on a quarterly basis. As a robustness check, using this quarterly holdings data, we run our regressions for this small sample as well. We once again find that the negative and significant cross-sectional relation between mutual fund herding and future return comovement continues after controlling for all relevant stock characteristics. We report results from this analysis in Table A3 of the Appendix.

Table 4
Panel regressions of return comovement on mutual fund herding for different groups of stocks based on their return volatility.

	Panel A: HERD = ADJHM			Panel B: HERD = $H2^{qs}$		
	Low *VOL*	Medium *VOL*	High *VOL*	Low *VOL*	Medium *VOL*	High *VOL*
HERD	−0.229***	−0.144***	−0.158***	−0.498***	−0.458***	−0.457***
	(−9.490)	(−5.970)	(−6.110)	(−5.140)	(−5.350)	(−5.670)
COVERAGE	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(−1.310)	(−0.710)	(−0.980)	(−1.560)	(−1.170)	(−1.370)
RETURNS	−1.071**	−0.387*	−2.580***	−1.234**	−0.378*	−2.817***
	(−2.160)	(−1.780)	(−4.840)	(−2.050)	(−1.810)	(−5.070)
TURNOVER	0.008***	0.005***	0.003***	0.008***	0.005***	0.004***
	(15.130)	(11.240)	(8.090)	(15.410)	(11.290)	(8.690)
SIZE	0.036**	0.128***	0.110***	0.030*	0.122***	0.101***
	(2.130)	(6.990)	(5.150)	(1.770)	(6.490)	(4.620)
DEBT	−0.296***	−0.189***	−0.053	−0.307***	−0.185***	−0.076
	(−4.620)	(−2.910)	(−0.880)	(−4.780)	(−2.730)	(−1.250)
BM	1.067***	0.772***	0.486***	1.121***	0.789***	0.546***
	(18.700)	(9.260)	(8.320)	(19.640)	(9.120)	(9.210)
Constant	−2.486***	−3.721***	−3.320***	−2.454***	−3.303***	−3.127***
	(−9.020)	(−12.720)	(−9.400)	(−9.140)	(−11.230)	(−8.460)
R-square	0.399	0.419	0.359	0.397	0.420	0.359
Observation	15,010	11,299	10,521	15,009	11,032	10,195

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding controlling for stock characteristics. The panel regressions are estimated for low, medium, and high volatility group stocks separately using the following model:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.3. The relation between mutual fund herding on return comovement during the partial circulation vs. the full circulation period

By the end of 2011, China was able to complete its Split-Share Structure Reform (SSSR) which enabled all shares of stocks registered in Shanghai and Shenzhen stock markets to be traded by all market participants. The Split-Share Structure was a unique equity structure where shares of a company were split into tradeable and non-tradeable shares in the early days of the Chinese stock market. Prior to SSSR, the majority of the shares of a company were non-tradeable to help the state to retain the control of a company. The reform aimed at getting rid of the Split-Share Structure so that all shares can be traded by market participants. Starting in 2005, the SSSR has gradually made more shares tradeable and the Shanghai and the Shenzhen Stock Exchanges realized full circulation by the beginning of 2012 (see Li et al., 2019).

We believe after the removal of these frictions to trade, the impact of mutual fund herding on return comovement should be stronger. To test this conjecture, we divide our sample into two subsample periods. The first sample is from 2005 to 2011, which we identify as the partial circulation period, and the second sample is from 2012 to 2019, which we identify as the full circulation period. We run our panel time-series cross-sectional regressions for each of the two subsample periods separately. In Panel A of Table 6, we use the adjusted herding measure (*ADJHM*) in our regressions and find that mutual fund herding has a negative effect on subsequent return comovement in both subsamples, but consistent with our expectations, the effect is stronger (with a larger coefficient on the herding measure and a higher t-statistic) in the 2012–2019 full circulation period. This shows that mutual fund herding started having a stronger impact on return comovement after all shares were allowed to be traded among all market participants. This is probably because these reforms allowed mutual funds to hold significantly more shares in their portfolios after 2011.

In Panel B of Table 6, when we use the FHW herding measure ($H2^{qs}$) as the independent variable to explain return comovement, we find that the mutual fund herding has even a stronger significant and negative impact on return comovement in the second half our subsample period. We find that the effect of mutual fund herding on return comovement is significantly larger both in terms of magnitude and significance during the 2012–2019 full circulation period (−0.766 with a t-statistic of −10.179) compared to the 2005–2011 partial circulation period (−0.214 with a t-statistic of −3.652).

4.4. The relation between mutual fund herding on return comovement during expansion vs. contraction periods

We believe that the relation between mutual fund herding and return comovement might show some variation in different business

Table 5
Panel regressions of return comovement on mutual fund herding for different groups of institutional ownership.

	Panel A: HERD = ADJHM			Panel B: HERD = $H2^{qs}$		
	Low IO	Medium IO	High IO	Low IO	Medium IO	High IO
HERD	−0.059**	−0.176***	−0.278***	−0.464***	−0.542***	−0.830***
	(−1.960)	(−7.170)	(−13.05)	(−5.430)	(−6.910)	(−8.140)
COVERAGE	0.002	−0.0005	−0.001	0.002	−0.001	−0.001*
	(0.800)	(−0.360)	(−1.180)	(0.850)	(−0.540)	(−1.810)
RETURNS	−2.714***	−0.635*	−1.476*	−2.561***	−0.662*	−1.861
	(−4.750)	(−1.700)	(−1.700)	(−4.500)	(−1.720)	(−1.630)
TURNOVER	0.003***	0.003***	0.006***	0.003***	0.003***	0.007***
	(5.550)	(6.750)	(14.980)	(5.880)	(6.890)	(15.320)
SIZE	0.060***	0.087***	0.089***	0.049**	0.069***	0.086***
	(2.890)	(4.480)	(5.380)	(2.320)	(3.530)	(5.100)
DEBT	−0.338***	−0.221***	−0.134**	−0.345***	−0.209***	−0.175***
	(−4.880)	(−3.510)	(−2.410)	(−4.980)	(−3.380)	(−3.130)
BM	0.678***	0.700***	1.027***	0.700***	0.726***	1.114***
	(8.830)	(9.250)	(20.560)	(8.810)	(9.340)	(22.170)
Constant	−2.362***	−2.811***	−3.526***	−1.889***	−2.468***	−3.492***
	(−7.100)	(−8.750)	(−13.48)	(−5.420)	(−8.150)	(−13.270)
R-square	0.390	0.332	0.451	0.392	0.333	0.446
Observation	7506	12,277	17,047	7135	11,982	17,119

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding controlling for stock characteristics. The panel regressions are estimated for low, medium, and high institutional ownership (IO) group stocks separately using the following model:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

cycle states as Kacperczyk et al. (2014) and Brockman et al. (2010) show that both fund manager behavior and return comovement vary with business cycles. In fact, in line with these findings, we find in our data that the return comovement is higher during periods of stock market crashes, including the 2008 global financial crisis and the 2015 China's stock market turbulence. In Fig. 1, we plot the cross-sectional average of the return comovement measure on a half-year basis from 2005 to 2019 with contraction periods shaded in gray color. As the figure illustrates, and also consistent with Brockman et al. (2010) who show that comovement patterns are countercyclical, the return comovement is noticeably higher during contraction periods of the Chinese economy, including the stock market crashes of 2008 and 2015. Therefore, based on this finding, as another robustness test, we next analyze the relation between mutual fund herding and return comovement in different states of business cycles (i.e., expansions vs. contractions).

For this test, we utilize the China's composite leading indicators data provided by OECD to identify the turning points of contraction and expansion in the Chinese economy. Based on this data, the full years of 2008 and 2011, the period from 2014 to the first half of 2016, as well as the full years of 2018 and 2019 are identified as contraction periods and the rest of the sample period is identified as expansion periods. We run our panel time-series cross-sectional regressions for these two subsamples (expansions vs. contractions) separately and report results in Table 7. In Panel A, we use the adjusted herding measure (*ADJHM*) in our regressions as the main independent variable of interest, and find that mutual fund herding has a negative and significant effect on subsequent return comovement in both contraction and expansion periods, with a slightly stronger effect (a slightly larger negative coefficient on the herding measure) in the contraction periods. We should note that most of the contraction periods in our sample are concentrated in the second half of our sample period 2012–2019 where full circulation of stock shares is implemented in 2012 following the Split-Share Structure Reform (SSSR). This is the period in which we find earlier (in Table 6) a stronger effect of mutual fund herding on return comovement due to implementation of the Split-Share Structure Reform (SSSR). Thus, the slightly stronger effect of mutual fund herding on return comovement in contraction periods could be due to the confounding effect of the SSSR in the second half of the sample. Overall, this new result from Table 7 suggests that even though the past studies show that fund manager behavior and return comovement show variation in different states of business cycles, the negative effect of mutual fund herding on return comovement in Chinese stocks remains persistently significant in both expansion and contraction periods.

In Panel B of Table 7, when we use the FHW herding measure ($H2^{qs}$) as our independent variable to explain return comovement, consistent with results in Table 7 Panel A, we find that the mutual fund herding continues to have a strong negative and significant impact on return comovement in both expansion and contraction periods.

Table 6
The effect of mutual fund herding on return comovement during the two subsample periods.

	Panel A: HERD = ADJHM		Panel B: HERD = $H2^{qs}$	
	2005–2011	2012–2019	2005–2011	2012–2019
HERD	−0.156***	−0.194***	−0.214***	−0.766***
	(−8.507)	(−10.047)	(−3.652)	(−10.179)
COVERAGE	−0.003***	−0.000	−0.003***	−0.001
	(−3.215)	(−0.052)	(−3.233)	(−0.815)
RETURNS	−0.300***	−4.296***	−0.351**	−4.435***
	(−2.644)	(−9.516)	(−2.465)	(−9.479)
TURNOVER	0.006***	0.004***	0.006***	0.004***
	(13.900)	(12.981)	(13.994)	(13.917)
SIZE	0.131***	0.054***	0.118***	0.048***
	(9.202)	(3.893)	(8.110)	(3.432)
DEBT	−0.207***	−0.211***	−0.191***	−0.229***
	(−4.167)	(−4.444)	(−4.028)	(−4.783)
BM	0.983***	0.882***	1.058***	0.915***
	(18.302)	(17.339)	(19.411)	(17.635)
Constant	−3.883***	−2.237***	−3.688***	−2.107***
	(−17.728)	(−10.258)	(−16.435)	(−9.593)
R-square	0.353	0.353	0.358	0.354
Observation	11,560	25,270	11,252	24,984

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding controlling for stock characteristics. The panel regressions are estimated for the two subsample periods using the following model:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The first subsample is from 2005 to 2011, which we name as the partial circulation period, and the second subsample is from 2012 to 2019, which we name as the full circulation period. The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

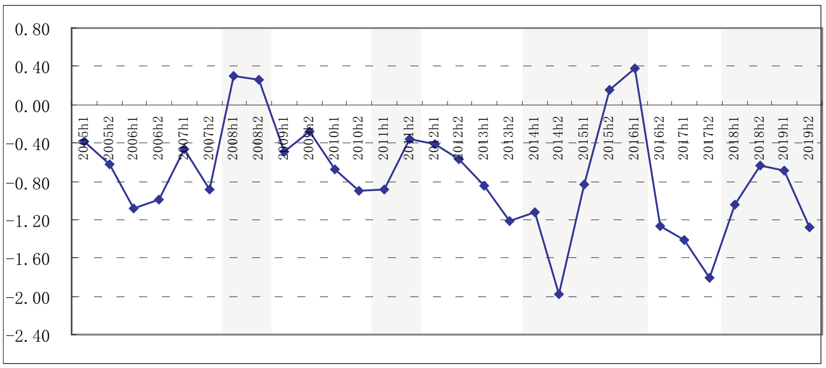

Fig. 1. Variation in return comovement through time.
This figure plots the cross-sectional average of the return comovement measure on a half-year basis from 2005 to 2019 The shaded areas in the figure refer to the contraction periods in China.

4.5. Long-term relation between mutual fund herding and comovement

We next examine the impact of mutual fund herding over future return comovement for periods longer than a half-year period. To conduct this test, in our panel time-series cross-sectional regression analyses, we measure our dependent variable, return comovement, for the next 1-year (h = 2) and the next one-and-a-half-year (h = 3) periods separately, and regress them on our mutual fund herding measure and the control variables observed in the current half-year period. Table 8 reports results from these regressions that analyze the long-run predictive power of mutual fund herding on return comovement. In these regressions, in Panel A, we report results from using the adjusted herding measure (*ADJHM*) as our main measure of mutual fund herding. In Panel B, we report results from using the

Table 7
The effect of mutual fund herding on return comovement during expansion and contraction periods.

	Panel A: HERD = ADJHM		Panel B: HERD = $H2^{qs}$	
	Expansion	Contraction	Expansion	Contraction
HERD	−0.171***	−0.237***	−0.418***	−0.647***
	(−7.650)	(−12.290)	(−6.580)	(−9.330)
COVERAGE	−0.003***	−0.0002	−0.003***	−0.0005
	(−3.660)	(−0.290)	(−4.080)	(−0.820)
RETURNS	−0.336***	−3.214***	−0.389**	−3.202***
	(−2.700)	(−6.330)	(−2.420)	(−6.120)
TURNOVER	0.004***	0.005***	0.004***	0.005***
	(9.180)	(15.450)	(9.690)	(16.010)
SIZE	0.053***	0.101***	0.041***	0.095***
	(3.680)	(10.030)	(2.820)	(9.380)
DEBT	−0.113***	−0.262***	−0.122***	−0.290***
	(−2.710)	(−6.140)	−2.860	−6.580
BM	0.920***	0.873***	0.975***	0.917***
	(18.980)	(16.530)	19.910	16.640
Constant	−2.527***	−1.969***	−2.347***	−1.841***
	(−11.420)	(−11.270)	−10.510	−10.310
R-square	15,730	20,390	15,511	20,033
Observation	0.3596	0.495	0.356	0.495

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding controlling for stock characteristics. The panel regressions are estimated for the expansion and contraction periods separately:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

Based on the China's composite leading indicators data provided by OECD the full years of 2008 and 2011, the period from 2014 to the first half of 2016, as well as the full years of 2018 and 2019 are identified as contraction periods and the rest of the sample period is identified as expansion periods. The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

FHW herding measure ($H2^{qs}$) as our main measure of mutual fund herding. The results show that the effect of mutual fund herding on return comovement, as expected, weakens slightly as the prediction horizon widens, but overall remains negative and highly significant across all horizons tested for both of the two herding measures utilized. These results suggest that the effect of mutual fund herding on return comovement in Chinese stocks is not short-lived, and in fact, lasts for as long as one and a half years.

4.6. The dynamic interaction between return comovement and mutual fund herding

While all our results so far indicate that mutual fund herding results in a reduction in return comovement among Chinese stocks in subsequent periods, one may think that reverse causality of the relationship between mutual fund herding and return comovement is also possible. In other words, mutual funds might be simply reacting to the prior return comovement in Chinese stocks, and therefore, the mutual fund herding in the current half-year could actually be a function of the previous half-year's return comovement. In order to address this potential endogeneity issue between mutual fund herding and return comovement in our study, we run the following panel VAR model:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 RSQ_{i,T} + \beta_2 HERD_{i,T} + \beta_3 COVERAGE_{i,T} + \beta_4 RETURNS_{i,T} + \beta_5 SIZE_{i,T} + \beta_6 TURNOVER_{i,T} + \beta_7 DEBT_{i,T} + \beta_8 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T} \tag{10}$$

$$HERD_{i,T+1} = \beta_0 + \beta_1 RSQ_{i,T} + \beta_2 HERD_{i,T} + \beta_3 COVERAGE_{i,T} + \beta_4 RETURNS_{i,T} + \beta_5 SIZE_{i,T} + \beta_6 TURNOVER_{i,T} + \beta_7 DEBT_{i,T} + \beta_8 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T} \tag{11}$$

Table 9 reports results from this panel VAR model where both Eqs. (10) and (11) are run simultaneously so that the effect of each variable (mutual fund herding and return comovement) on the other one is controlled at the same time. In Panel A of Table 9, we use the adjusted herding measure (*ADJHM*) as the measure of mutual fund herding in our panel VAR model estimation. Interestingly, Model 2 in Panel A reveals that future mutual fund herding is influenced by the current half-year return comovement as well. The negative and significant coefficient on the return comovement variable (RSQ_T) in Model 2 in Panel A suggests that mutual funds react in the opposite direction of the prior period's return comovement. That is, mutual funds tend to reduce the intensity of herding when they observe an increase in return comovement in the previous period. This once again suggests that mutual funds in China react

Table 8
The predictive power of mutual fund herding on return comovement for longer horizons.

	Panel A: HERD = ADJHM		Panel B: HERD = $H2^{qs}$	
	h = 2	h = 3	h = 2	h = 3
HERD	−0.083***	−0.042***	−0.481***	−0.376***
	(−6.095)	(−3.060)	(−9.456)	(−7.414)
COVERAGE	−0.001	−0.001	−0.001*	−0.001
	(−1.563)	(−1.207)	(−1.646)	(−1.339)
RETURNS	−0.241	−0.233*	−0.230	−0.196*
	(−0.835)	(−1.760)	(−0.803)	(−1.659)
TURNOVER	0.005***	0.005***	0.005***	0.005***
	(18.564)	(16.017)	(19.014)	(16.033)
SIZE	0.106***	0.120***	0.094***	0.110***
	(9.391)	(10.387)	(8.212)	(9.346)
DEBT	−0.136***	−0.099**	−0.149***	−0.099**
	(−3.806)	(−2.520)	(−4.069)	(−2.501)
BM	0.741***	0.632***	0.774***	0.647***
	(20.079)	(14.337)	(20.913)	(14.521)
Constant	−3.200***	−2.882***	−3.298***	−3.280***
	(−18.212)	(−15.834)	(−17.585)	(−17.668)
R-square	0.420	0.417	0.417	0.417
Observation	34,165	32,448	33,583	31,878

This table reports results from panel time-series cross-sectional regressions of future half-year return comovements on current half-year mutual fund herding controlling for stock characteristics. For each horizon, the panel regressions are estimated separately using the following model:

$$RSQ_{i,T+H} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

Specifically, we measure our dependent variable, return comovement, *RSQ*, for the next 1-year (h = 2), next one-and-a-half-year (h = 3) periods separately, and regress them on our mutual fund herding measure and the control variables observed in the current half-year period. The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

rationally to changes in stock prices. This new finding (the negative and significant effect of return comovement on subsequent period mutual fund herding) from the panel VAR model, however, does not eliminate or weaken our original finding that mutual fund herding leads to a significant decline in return comovement in Chinese stocks in the following period. We still observe a negative and significant coefficient on the mutual fund herding variable ($HERD_T$) in Model 1 in Panel A of Table 9. In fact, comparing the magnitudes of coefficients on the mutual fund herding variable ($HERD_T$) in Model 1 vs. the return comovement variable (RSQ_T) in Model 2 (−0.074 vs. -0.026), we see that the impact of mutual fund herding on future return comovement is stronger than the impact of return comovement on future mutual fund herding. In addition, in Model 1, consistent with our earlier findings, the other control variables once again keep their sign and significance (i.e., expected effects) on return comovement in this new panel VAR setting as well, but their significance does not eliminate the negative and significant effect of mutual fund herding on future return comovement.[6]

Lastly, in Panel B of Table 9, when we use the FHW herding measure ($H2^{qs}$) as our main mutual fund herding measure in the panel VAR model estimation, we essentially obtain very similar results to those reported in Panel A. Once again, the negative coefficient on the return comovement variable (RSQ_T) in Model 4 in Panel B suggests that mutual funds tend to react in the opposite direction of return comovement. This, however, does not eliminate or weaken our original finding that mutual fund herding leads to a significant decline in future return comovement. Similar to the results obtained from Panel A, comparing the magnitudes of coefficients on the mutual fund herding variable ($HERD_T$) in Model 3 in Panel B vs. the return comovement variable (RSQ_T) in Model 4 in Panel B (−0.122 vs. -0.001), we see that both the magnitude and significance of mutual fund herding on future return comovement is much stronger than the impact of return comovement on future mutual fund herding. In sum, these results suggest that after addressing the potential endogeneity issue between return comovement and mutual fund herding, the negative and significant effect of mutual fund herding on return comovement prevails at a strong pace even in the panel VAR framework.

[6] Analyzing the effect of stock characteristics on mutual fund herding in Model 2 of Panel A in Table 9, we see that size, analyst coverage, and leverage have a significant and negative effect on the mutual fund herding. Moreover, previous period stock returns and book to market ratio are significantly and positively related to mutual fund herding. These results on previous period stock returns are in line with the prior literature that shows that mutual fund herding is higher among stocks with larger prior positive returns (Falkenstein, 1996; Wermers, 1999; and Sias, 2004; Chan et al., 2005; Hudson et al., 2020).

Table 9
Panel VAR model with return comovement and mutual fund herding.

Dependent variable	Panel A: HERD = ADJHM		Panel B: HERD = $H2^{qs}$	
	Model 1	Model 2	Model 3	Model 4
	RSQ_{t+1}	$HERD_{t+1}$	RSQ_{t+1}	$HERD_{t+1}$
RSQ	0.338***	−0.026***	0.337***	−0.001
	(32.910)	(−10.390)	(32.560)	(−1.170)
HERD	−0.074***	−0.049***	−0.122**	0.077***
	(−4.780)	(−7.670)	(−2.030)	(7.560)
COVERAGE	0.0002	−0.001***	0.0002	−0.0001***
	(0.420)	(−4.930)	(0.420)	(−3.100)
RETURNS	−13.168***	4.915***	−15.195***	−0.160
	(−8.580)	(7.930)	(−9.990)	(−1.200)
TURNOVER	0.006***	−0.0001	0.006***	0.000
	(26.240)	(−1.140)	(26.230)	(0.630)
SIZE	0.083***	−0.005**	0.078***	−0.008***
	(10.400)	(−2.100)	(9.670)	(−13.970)
DEBT	−0.176***	−0.059***	−0.175***	−0.001
	(−6.350)	(−6.250)	(−6.150)	(−0.220)
BM	0.436***	0.064***	0.448***	0.007***
	(15.010)	(7.320)	(15.030)	(3.410)
Constant	−2.102***	0.021	−2.332***	0.146***
	(−15.520)	(0.560)	(−16.310)	(14.200)
R-square	0.460	0.107	0.457	0.039
Observation	33,085	30,492	32,267	29,545

This table reports results from the panel VAR model of return comovement and mutual fund herding controlling for stock characteristics. The panel VAR is run for the following two models:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 RSQ_{i,T} + \beta_2 HERD_{i,T} + \beta_3 COVERAGE_{i,T} + \beta_4 RETURNS_{i,T} + \beta_5 SIZE_{i,T} + \beta_6 TURNOVER_{i,T} + \beta_7 DEBT_{i,T} + \beta_8 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

$$HERD_{i,T+1} = \beta_0 + \beta_1 RSQ_{i,T} + \beta_2 HERD_{i,T} + \beta_3 COVERAGE_{i,T} + \beta_4 RETURNS_{i,T} + \beta_5 SIZE_{i,T} + \beta_6 TURNOVER_{i,T} + \beta_7 DEBT_{i,T} + \beta_8 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

These two models are run simultaneously so that the effect of each variable (mutual fund herding and return comovement) on the other one is controlled at the same time. *RSQ* is the return comovement measure defined as in Eq. (7). *HERD* is the mutual fund herding measure. We use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.7. Alternative measures for return comovement

In this section, we check if the negative relation between mutual fund herding and future return comovement prevails for alternative measures of return comovement as well. For this, we develop two alternative versions of return comovement using the multivariate GARCH model with constant conditional correlations (CCC-GARCH) (Bollerslev, 1990) as well as the multivariate GARCH model with dynamic conditional correlations (DCC-GARCH) (Engle, 2002).[7] In this setting, the return comovement is generated from the correlation between individual stock returns and the value-weighted market index return utilized in Eq. (7). In Panel A of Table 10, we use the adjusted herding measure (*ADJHM*) as the measure of mutual fund herding while return comovement is estimated from the CCC-GARCH and DCC-GARCH models, respectively. We find that mutual fund herding has a negative effect on subsequent return comovement for both of the comovement measures generated from the multivariate GARCH models. The coefficients of control variables are consistent with our previous findings as well.

In Panel B, we use the FHW herding measure ($H2^{qs}$) as the measure of mutual fund herding, and comovement is once again estimated from the CCC-GARCH and the DCC-GARCH models, respectively. Similar to our previous finding, we again find that the mutual fund herding has a significant and negative effect on subsequent return comovement for both of the comovement measures generated from the multivariate GARCH models. In sum, the results in Table 10 show that the negative and significant relationship between mutual fund herding and return comovement is not only robust to alternative measures of herding, but is robust to alternative measures of comovement as well.

[7] The multivariate GARCH models here are set as CCC-GARCH (1) and DCC-GARCH (1). The distribution assumption is normal distribution.

Table 10
The effect of mutual fund herding on return comovement for different comovement measures generated from multivariate GARCH models.

	Panel A: HERD = ADJHM		Panel B: HERD = $H2^{qs}$	
	CCC-GARCH	DCC-GARCH	CCC-GARCH	DCC-GARCH
HERD	−0.034***	−0.037***	−0.099***	−0.104***
	(−16.370)	(−17.500)	(−12.810)	(−13.240)
COVERAGE	−0.0004***	−0.0005***	−0.0005***	−0.0005 ***
	(−4.700)	(−5.370)	(−5.300)	(−6.040)
RETURNS	−0.135**	−0.148**	−0.142**	−0.156**
	(−2.110)	(−2.080)	(−2.080)	(−2.050)
TURNOVER	0.001***	0.001***	0.001***	0.001***
	(16.970)	(16.140)	(17.700)	(16.880)
SIZE	0.015***	0.014***	0.014***	0.013***
	(9.320)	(8.680)	(8.310)	(7.710)
DEBT	−0.032***	−0.033***	−0.036***	−0.037***
	(−5.620)	(−5.740)	(−6.050)	(−6.220)
BM	0.156***	0.164***	0.165***	0.173***
	(23.560)	(24.520)	(24.000)	(24.930)
Constant	0.157***	0.173***	0.175***	0.196***
	(5.800)	(6.440)	(6.430)	(0.027)
R-square	0.460	0.456	0.457	0.452
Observation	36,120	36,120	35,544	35,544

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding with and without controlling for stock characteristics. The panel regressions are run for the following full model and its alternative versions:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). We use CCC-GARCH and DCC-GARCH models to generate two alternative return comovement measures, respectively. The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

5. Conclusion

In this paper, we explore the effect of mutual fund herding on the return comovement in Chinese equities. The results contribute to the literature by showing that mutual fund herding significantly reduces the return comovement among Chinese stocks, providing evidence for the existence of a rational herding behavior by mutual funds. The reduction in return comovement following the mutual fund herding suggests that herding is information-based. In other words, mutual funds herd rationally in response to new information, and as a result, this pushes prices toward their fundamental values, reducing mispricing and bringing the level of comovement among stocks to a lower degree.

We find that the negative and significant relation between mutual fund herding and subsequent return comovement holds after controlling for various stock characteristics as well, including the analyst information coverage. Moreover, various robustness tests performed show that the main findings hold for both alternative measures of herding and for alternative sub-groups of stocks analyzed. In our tests conducted for different sub-groups of stocks, we find that the negative effect of mutual fund herding on return comovement is especially stronger among low volatility stocks and among stocks with large institutional ownership. In our subsample test, we also discover that mutual fund herding has a stronger impact on return comovement after the full implementation of the Split-Share Structure Reform in China in 20,012 which allowed all shares to be traded freely among all market participants. Lastly, we find that the negative effect of mutual fund herding on return comovement also holds when we use alternative comovement measures developed from multivariate GARCH models.

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Appendix

Table A1
Fama-MacBeth cross-sectional regressions of return comovement on mutual fund herding.

	Panel A: HERD = ADJHM			Panel B: HERD = $H2^{qs}$		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
HERD	−0.188***	−0.269***	−0.143***	−0.493***	−0.598***	−0.452***
	(−4.578)	(−6.624)	(−7.163)	(−4.848)	(−3.895)	(−3.964)
COVERAGE		−0.003*	−0.003**		−0.006**	−0.004**
		(−1.730)	(−2.264)		(−2.368)	(−2.734)
RETURNS			−5.962			−8.246*
			(−1.255)			(−1.905)
TURNOVER			0.005***			0.006***
			(6.969)			(9.007)
SIZE			0.085**			0.077**
			(2.570)			(2.347)
DEBT			−0.349***			−0.359***
			(−4.071)			(−4.522)
BM			1.020***			1.113***
			(19.360)			(13.057)
Constant	−0.664***	−0.606***	−2.578***	−0.623***	−0.564***	−2.523***
	(−4.884)	(−4.547)	(−5.250)	(−4.803)	(−4.428)	(−5.194)
R-square	0.011	0.022	0.149	0.005	0.013	0.156
Observation	54,400	37,339	36,830	51,571	36,735	36,236

This table reports results from Fama-MacBeth cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding with and without controlling for stock characteristics. Fama-MacBeth regressions are run for the following full model and its alternative versions:

Table A2
Measuring mutual fund herding with change in mutual fund holdings.

	Model 1	Model 2	Model 3
DFUND	−0.015***	−0.016***	−0.008***
	(−15.370)	(−15.580)	(−8.260)
COVERAGE		−0.002***	−0.001
		(−3.800)	(−1.070)
RETURNS			−21.868***
			(−10.650)
TURNOVER			0.006***
			(18.810)
SIZE			0.072***
			(6.200)
DEBT			−0.245***
			(−5.970)
BM			0.888***
			(19.610)
Constant	−1.422***	−1.228***	−2.966***
	(−20.770)	(−14.670)	(−15.770)
R-square	0.300	0.330	0.388
Observation	47,363	33,262	32,816

This table reports results from panel time-series cross-sectional regressions of subsequent half-year return comovement on current half-year mutual fund herding with and without controlling for stock characteristics. The panel regressions are run for the following full model and its alternative versions:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 DFUND_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_t + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *DFUND*, is the mutual fund herding measure, which is defined as the change in mutual fund holdings as in Chang and Dong (2006). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A3
Panel regressions of return comovement on mutual fund herding by using quarterly data.

	Panel A: HERD = ADJHM			Panel B: HERD = $H2^{qs}$		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
HERD	−0.247***	−0.377***	−0.311***	−0.352***	−0.450***	−0.489***
	(−14.740)	(−17.980)	(−13.760)	(−8.030)	(−7.020)	(−6.710)
COVERAGE		−0.006***	−0.004***		−0.007***	−0.004***
		(−5.990)	(−4.100)		(−6.720)	(−4.670)
RETURNS			−1.579**			−1.597**
			(−2.450)			(−2.410)
TURNOVER			0.003***			0.003***
			(13.030)			(13.200)
SIZE			0.055***			0.059***
			(5.090)			(5.360)
DEBT			−0.145***			−0.154***
			(−3.780)			(−3.870)
BM			0.970***			1.000***
			(25.110)			(25.010)
Constant	−0.807***	−1.093***	−2.650***	−0.785***	−0.742***	−2.336***
	(−12.130)	(−10.700)	(−14.530)	(−9.370)	(−7.710)	(−12.150)
R-square	0.227	0.261	0.292	0.228	0.256	0.289
Observation	110,032	66,156	65,498	100,360	63,978	63,340

This table reports results from panel time-series cross-sectional regressions of subsequent quarter return comovement on current quarter mutual fund herding with and without controlling for stock characteristics. The panel regressions are run for the following full model and its alternative versions:

$$RSQ_{i,T+1} = \beta_0 + \beta_1 HERD_{i,T} + \beta_2 COVERAGE_{i,T} + \beta_3 RETURNS_{i,T} + \beta_4 SIZE_{i,T} + \beta_5 TURNOVER_{i,T} + \beta_6 DEBT_{i,T} + \beta_7 BM_{i,T} + \theta_T + \gamma_i + \varepsilon_{i,T}$$

The dependent variable, *RSQ*, is the return comovement measure defined as in Eq. (7). The main variable of interest, *HERD*, is the mutual fund herding measure. As the mutual fund herding measure, we use the adjusted herding measure (*ADJHM*) in Panel A, and the FWH herding measure ($H2^{qs}$) in Panel B. *ADJHM* is the adjusted herding measure of Brown et al. (2014) defined as in Eqs. (4) and (5). $H2^{qs}$ is the FHW mutual fund herding measure defined as in Eq. (6). *COVERAGE* is the number of analysts reporting 1-year earnings forecasts (EPS) for a stock. *RETURNS* is the cumulative 6-month return (not compounded) of a stock. *TURNOVER* is the stock turnover defined as the average monthly turnover over the past 6 months where monthly turnover is calculated as the total number of shares traded over a month divided by the number of shares outstanding. *SIZE* is the stock's market capitalization. *DEBT* is the financial leverage of a stock defined as the debt-over-asset ratio. *BM* is the stock's book-to-market ratio. θ and γ refer to the time and industry fixed effects, respectively. The adjusted t-statistics clustered at the firm level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

References

Anton, M., Polk, C., 2014. Connected stocks. J. Financ. 69 (3), 1099–1127.
Bai, X., Wang, F., Zhang, J., 2016. Analyst coverage and stock return synchronicity: evidence from regulation changes in China's IPO market. Appl. Econ. 48 (47), 4538–4557.
Barberis, N., Shleifer, A., Wurgler, J., 2005. Comovement. J. Financ. Econ. 75 (2), 283–317.
Bollerslev, T., 1990. Modelling the coherence in short-run nominal exchange rates: a multivariate Generalized ARCH Model. Rev. Econ. Stat. 72 (3), 498–505.
Brockman, P., Liebenberg, I., Schutte, M., 2010. Comovement, information production and the business cycle. J. Financ. Econ. 97 (1), 107–129.
Brown, C., Wei, K., Wermers, R., 2014. Analyst recommendations, mutual fund herding and overreaction in stock prices. Manag. Sci. 60 (1), 1–20.
Carpenter, J.N., Lu, F., Whitelaw, R.F., 2021. The real value of China's stock market. J. Financ. Econ. 139 (3), 679–696.
Chan, K., Hameed, A., 2006. Stock price synchronicity and analyst coverage in emerging markets. J. Financ. Econ. 80 (1), 115–147.

Chang, C.H., Lin, S.J., 2015. The effects of national culture and behavioral pitfalls on investors' decision-making: Herding behavior in international stock markets. International Review of Economics and Finance 37 (C), 380–392.
Chan, K., Hwang, C., Mian, G.M., 2005. Mutual Fund Herding and Dispersion of analysts' Earnings Forecasts (Working paper).
Chang, C., Dong, S., 2006. Idiosyncratic volatility, fundamentals, and institutional herding: evidence from the Japanese stock market. Pac. Basin Financ. J. 14 (2), 135–154.
Clement, M.B., Tse, S.Y., 2005. Financial analyst characteristics and herding behavior in forecasting. J. Financ. 60 (1), 307–341.
Coval, J., Stafford, E., 2007. Asset fire sales (and purchases) in equity markets. J. Financ. Econ. 86 (2), 479–512.
De Bondt, W.F.M., Teh, L.L., 1997. Herding behavior and stock returns: an exploratory investigation. Swiss J. Econ. Stat. 133 (2/2), 293–324.
De Long, J., Shleifer, A., Summers, L., Waldmann, R., 1990. Noise trader risk in financial markets. J. Polit. Econ. 98 (4), 703–738.
DeVault, L., Sias, R., Starks, L., 2013. Who are the Sentiment Traders? Evidence from the Cross-Section of Stock Returns and Demand. Unpublished working paper.
Devenow, A., Welch, I., 1996. Rational herding in financial economics. Eur. Econ. Rev. 40 (3–5), 603–615.
Economou, F., Gavriilidis, K., Kallinterakis, V., Yordanov, N., 2015. Do fund managers herd in frontier markets—and why. Int. Rev. Financ. Anal. 40 (C), 76–87.
Engle, R., 2002. Dynamic conditional correlation: a simple class of multivariate generalized autoregressive conditional heteroskedasticity models. J. Bus. Econ. Stat. 20 (3), 339–350.
Eun, C.S., Huang, W., 2007. Asset pricing in China's domestic stock markets: Is there a logic? Pacific-Basin Finance Journal 15 (5), 452–480.
Fahey, M., Chemi, E., 2015. Three Charts Explaining China's Strange Stock Market. CNBC report.
Faias, J.A., Ferreira, M.A., 2017. Does institutional ownership matter for international stock return comovement? J. Int. Money Financ. 78 (C), 64–83.
Falkenstein, E.G., 1996. Preferences for stock characteristics as revealed by mutual fund portfolio holdings. J. Financ. 51 (1), 111–135.
Fenzl, T., Pelzmann, L., 2012. Psychological and social forces behind aggregate financial market behavior. Journal of Behavioral Finance 13 (1), 56–65.
Frey, S., Herbst, P., Walter, A., 2014. Measuring mutual fund herding – A structural approach, Journal of International Financial Markets. Institutions and Money 32 (C), 219–239.
Froot, K.A., Scharfstein, D.S., Stein, J.C., 1992. Herd on the street: informational inefficiencies in a market with short-term speculation. J. Financ. 47 (4), 1461–1484.
Gao, K., Lin, W., Yang, L., Chan, K., 2020. The impact of analyst coverage and stock price synchronicity: evidence from brokerage mergers and closures. Financ. Res. Lett. 33, 101190.
Greenwood, R., 2008. Excess comovement: evidence from cross-sectional variation in Nikkei 225 weights. Rev. Financ. Stud. 21 (3), 1153–1186.
Griffin, J.M., Harris, J.H., Topaloglu, S., 2003. The dynamics of institutional and individual trading. J. Financ. 58 (6), 2350–2385.
Hameed, A., Morck, R., Shen, J., Yeung, B., 2015. Information, analysts, and stock return comovement. Rev. Financ. Stud. 28 (11), 3153–3187.
Hirshleifer, D., Subrahmanyam, A., Titman, S., 1994. Security analysis and trading patterns when some investors receive information before others. J. Financ. 49 (5), 1665–1698.
Hsieh, S., 2013. Individual and institutional herding and the impact on stock returns: evidence from Taiwan stock market. Int. Rev. Financ. Anal. 29 (C), 175–188.
Hudson, Y., Yan, M., Zhang, D., 2020. Herd behaviour & investor sentiment: evidence from UK mutual funds. Int. Rev. Financ. Anal. 71 (C).
Hung, W., Lu, C., Lee, C., 2010. Mutual fund herding its impact on stock returns: evidence from the Taiwan stock market. Pac. Basin Financ. J. 18 (5), 477–493.
Hwang, S., Salmon, M., 2004. Market stress and herding. J. Empir. Financ. 11 (4), 585–616.
Israelsen, R.D., 2016. Does common analyst coverage explain excess comovement? J. Financ. Quant. Anal. 51 (4), 1193–1229.
Jiang, H., Verado, M., 2018. Does herding behavior reveal skill? An analysis of mutual fund performance. J. Financ. 73, 2229–2269.
Kacperczyk, M., van Nieuwerburgh, S., Veldkamp, L., 2014. Time-varying fund manager skill. J. Financ. 69 (4), 1455–1484.
Lakonishok, J., Shleifer, A., Thaler, R., Vishny, R., 1992. The impact of institutional trading on stock prices. J. Financ. Econ. 32 (1), 23–43.
Li, W., Rhee, G., Wang, S., 2017. Differences in herding: individual vs. institutional investors. Pac. Basin Financ. J. 45 (C), 174–185.
Li, J., Zhang, Y., Feng, X., An, Y., 2019. Which kind of investor causes comovement? J. Int. Financ. Mark. Inst. Money 61 (C), 1–15.
Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? J. Financ. Econ. 58 (1), 215–260.
Nofsinger, J.R., Sias, R.W., 1999. Herding and feedback trading by institutional and individual investors. J. Financ. 54 (6), 2263–2295.
Scharfstein, D.S., Stein, J.C., 1990. Herd behavior and investment. Am. Econ. Rev. 80 (3), 465–479.
Sias, R.W., 2004. Institutional herding. Rev. Financ. Stud. 17 (1), 165–206.
Trueman, B., 1994. Analyst forecasts and herding behavior. Rev. Financ. Stud. 7 (1), 97–124.
Wermers, R., 1999. Mutual fund herding and the impact on stock prices. J. Financ. 54 (2), 581–622.
Zheng, D., Li, H., Zhu, X., 2015. Herding behavior in institutional investors: evidence from China's stock market. J. Multinatl. Financ. Manag. 32, 59–76.