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# Empirical investigation of herding behavior in Chinese stock markets: Evidence from quantile regression analysis

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## ABSTRACT

This study examines the herding behavior of investors in Chinese stock markets. Using a least squares method, we find evidence of herding within both the Shanghai and Shenzhen A-share markets and no evidence of herding within both B-share markets. A-share investors display herding formation in both up and down markets. However, we cannot find herding activity for B-share investors in the up market. By applying quantile regression analysis to estimate the herding equation, we find supporting evidence of herding behavior in both A-share and B-share investors conditional on the dispersions of returns in the lower quantile region.

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## 1. Introduction

In the recent finance literature, empirical analysis of herding behavior has received considerable attention in studies examining the grouping behavior of investors. The importance of investigating herding behavior stems from the fact that investors, following the actions of others, tend to form a collective decision that, in turn, drives stock prices away from their underlying fundamental values. The resulting divergence between market price and fundamental value offers arbitragers an opportunity to reap excess profits. A long-run consequence of this herding behavior may lead to greater instability and inefficiency if the market correction fails to make the market price and the fundamental value converge.

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Numerous papers have been devoted to the study of herding activities in global markets.<sup>1</sup> For instance, by applying firm-level data to examine whether investors in global markets have a tendency to exhibit herd behavior, [Chang, Cheng, and Khorana \(2000\)](#) find significant evidence of herding in South Korea and Taiwan and partial evidence of herding in Japan. However, there is no evidence of herding for market participants in the U.S. and Hong Kong. The evidence indicates that herding behavior is more likely taking place in emerging markets. Following the same approach, [Demirer and Kutan \(2006\)](#) test whether investors in Chinese markets, in making their investment decisions, are following market consensus during periods of market stress rather than private information. Their test results find no evidence of herd formation, suggesting that market participants in Chinese stock markets make investment choices rationally. However, a recent study of Chinese stock markets by [Tan, Chiang, Mason, and Nelling \(2008\)](#) reports that herding occurs under both rising and falling market conditions. This herding phenomenon is more profound in A-share investors.<sup>2</sup> Thus, the evidence on herding behavior in the Chinese markets is inconclusive.

This paper attempts to provide new empirical evidence that helps to resolve the mixed findings of herding behavior in Chinese markets. Our study is also motivated by the inadequacy of using aggregate data in analyzing herding behavior. In particular, previous studies of Chinese stock market behavior customarily follow the classifications A-share vs. B-share markets or Shanghai stock exchange vs. Shenzhen stock exchange. While this conventional approach offers a general direction for herding activity in terms of market classification, its drawback is that it fails to provide precise information that explains behavioral changes conditional on a particular market condition.

The approach used by [Christie and Huang \(1995\)](#), [Chang et al. \(2000\)](#), and [Gleason, Mathur and Peterson \(2004\)](#) attempts to argue that the formation of herds is more likely to be present during periods of market stress, since investors are more likely to suppress their own beliefs and use market consensus during large changes in price. The testing methodology thus suggests that equity return dispersions are sensitive to aggregate market returns squared, especially during periods of market stress. If applying least squares estimators produces a negative coefficient on the market return squared term, it would suggest the existence of herding behavior.

It is generally recognized that least squares estimators are based on the *mean* of the conditional distribution of stock return dispersions. Such a model specification is inconsistent with behavior involving stressful environments, since the tail information has not been addressed. The innovation of this paper is to examine the data conditional on different quantiles and test the behavioral relation between stock return dispersions and aggregate market movements with different quantile distributions. An additional benefit from using quantile regression is that some of the statistical problems, such as errors in variables, sensitivity to outliers, and non-Gaussian error distribution, can be alleviated ([Barnes & Hughes, 2002](#)).

The remainder of this paper is organized as follows. [Section 2](#) presents the methodology used to detect herding behavior. [Section 3](#) describes the data. [Section 4](#) reports evidence of herding behavior based on a least squares estimator by organizing Chinese stock data into aggregate level, A-share and B-share groups, and four sub-markets. [Section 5](#) presents a quantile regression method and applies it to estimate the herding equation. [Section 6](#) concludes the paper.

## 2. Detecting herding behavior by investors

Two studies that have proposed methods of detecting herding behavior using stock return data are [Christie and Huang \(1995\)](#) (hereafter CH) and [Chang et al. \(2000\)](#) (hereafter CCK). CH suggest that the investment decision-making process used by market participants depends on overall market conditions. They contend that during normal periods, rational asset pricing models predict that the dispersion in returns will increase with the absolute value of the market return, since individual investors are trading based on their own private information, which is diverse. However, during periods of extreme market movements, individuals tend to suppress their own beliefs, and their investment decisions are more likely

<sup>1</sup> Herding behavior has been studied for various groups, including mutual fund managers ([Lakonishok, Shleifer, & Vishny, 1992](#); [Wermers, 1999](#)); financial analysts ([Trueman, 1994](#); [Graham, 1999](#); [Welch, 2000](#); [Hong, Kubik, & Solomon, 2000](#); [Clement & Tse, 2005](#)), and market participants ([Chang et al., 2000](#)).

<sup>2</sup> [Hwang and Salmon \(2006\)](#) examine herding behavior in the U.S., U.K., and South Korean stock markets, and they find beta herding when investors believe that they know where the market is heading rather than when the market is in crisis.

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