



# Monetary policy, exchange rate fluctuation, and herding behavior in the stock market



Pu Gong\*, Jun Dai

Department of Finance, School of Management, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan 430074, China

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## ABSTRACT

Interest rate and exchange rate are two important macroeconomic variables that exert considerable effects on the stock market. In this study, we investigate whether variations in interest and exchange rates induce herding behavior in the Chinese stock market. Empirical results indicate that interest rate increase and Chinese currency (CNY) depreciation will induce herding and this phenomenon is mainly manifested in down markets. Moreover, the herding level of the highest idiosyncratic volatility quintile portfolio is twice that of the lowest quintile portfolio which we consider evidence of intentional herding. This result is consistent with those of previous studies, which report that retail investors prefer and overweigh lottery-type stocks. Finally, we investigate the effects of monetary policy announcements and extreme exchange rate volatility on herding because these events elicit considerable public attention and may trigger collective behavior in the aggregate market.

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## 1. Introduction

Interest rate and foreign exchange rate are two important macroeconomic variables in open economics that significantly affect the stock market. Interest rate represents the stance of the central bank on monetary policy; it affects stock prices through discount rate channels, expected future dividends, and equity premium (Bernanke & Kuttner, 2005). In particular, the worldwide low interest rate environment plays a significant role in improving the global stock market after the subprime crisis. Meanwhile, movements in exchange rates affect stock prices because of their influences on the cash flow and international competitiveness of firms, as well as on capital flows in and out of a country. Numerous studies have investigated the effects of interest rate variation or monetary policy shocks on stock returns (Thorbecke, 1997; Bjørnland & Leitemo, 2009). Other studies have explored the relationship between exchange rate and stock returns (Hau & Rey, 2006; Cho, Choi, Kim & Kim, 2016). However, to the best of our knowledge, few studies have considered the effects of variations in interest and exchange rates on investor behavior at the micro-level. In this study, we address this gap and examine the effects of variations in interest and exchange rates on herding behavior in the stock market. Herding in financial markets refers to a behavioral pattern in which investors suppress their own beliefs and base their investment decisions solely on the collective actions of the market (Christie & Huang, 1995). Existing empirical studies have documented herding behavior in different countries, particularly in emerging markets due to considerable

information asymmetry and the lack of maturity in these markets (Chang, Cheng & Khorana, 2000; Chiang & Zheng, 2010). As an important emerging market that is primarily dominated by unsophisticated retail investors, the Chinese stock market provides an interesting setting to analyze herding behavior. Moreover, the recent uncertainty in the economic development of China has resulted in increased fluctuations in interest and exchange rates, as well as in the intensive response of the stock market to these variations. In this context, this study aims to answer the following questions: (1) Do interest and exchange rates induce herding behavior in the Chinese stock market? (2) Under what market conditions will investors respond intensively to variations in interest and exchange rates, and what types of stocks are most affected? (3) Do monetary policy announcements and extreme exchange rate volatility induce herding?

This study distinguishes itself from previous research and contributes to literature in the following aspects. First, this study is the first to examine the effects of variations in interest and exchange rates on herding behavior in the stock market. Our results indicate that interest rate increase and Chinese currency (hereafter CNY) depreciation will induce herding. This phenomenon is mainly manifested in down markets, thereby suggesting that investors respond intensively to bad news. Bikhchandani and Sharma (2000) distinguish between “spurious herding” (fundamental herding), in which investors facing similar decision problems and information sets make similar decisions, and “intentional herding” (non-fundamental herding), which indicates an obvious intent of investors to follow the behavior of others. These researchers suggest that spurious herding may increase the efficiency of financial markets, whereas intentional herding is expected to result in excess volatility and even financial instability. In this study, interest and exchange

\* Corresponding author.

E-mail addresses: gongpu@hust.edu.cn (P. Gong), Daijun@hust.edu.cn (J. Dai).

rates are public information that appears to lead to spurious herding. Nonetheless, the response to these fundamental changes by investors may unnecessarily improve the efficiency of the market, particularly under extreme interest rate or exchange rate volatility, because investors may overreact to unexpected information changes (Bondt & Thaler, 1985). Thus, this study investigates whether variations in interest and exchange rates can induce herding rather than overemphasize the pricing efficiency of fundamental herding.

Second, we propose a method to detect the occurrence of intentional herding in the aggregate market. Macro information, such as interest rate and exchange rate, may induce spurious herding in the stock market; hence, questioning whether intentional herding occurs in this market is natural. With respect to this question, Holmes, Kallinterakis, and Ferreira (2013) analyze herding under different market conditions in Portugal and find that institutional herding is intentional driven by reputational reasons and/or informational cascades. Galariotis, Rong and Spyrou (2015) use the Fama-French three factors and the momentum factor to reflect common risk factors in stock valuation and decompose cross-sectional absolute deviation into fundamental and non-fundamental information parts. Unlike in previous studies, we determine the occurrence of intentional herding by examining whether investors herd on the idiosyncratic risk of stocks. Idiosyncratic volatility (IVOL) measures the idiosyncratic risk of a firm that does not arise from the systematic risk factors. Therefore, the occurrence of significantly varied herding coefficients among different IVOL portfolios comes from idiosyncratic risks rather than from fundamental changes that affect the entire market. Consequently, this phenomenon can be attributed to intentional herding. Consistent with our predictions, we find that the herding level of the highest IVOL quintile portfolio is twice that of the lowest quintile portfolio, which proves the occurrence of intentional herding in the Chinese stock market. After controlling for institutional ownership or number of institutions, the herding levels of the two highest IVOL quintiles weaken, thereby indicating that retail investors play an important role in reinforcing herding with the highest IVOL stocks.

Third, we emphasize the effects of monetary policy announcements and extreme exchange rate volatility on herding behavior given that such events elicit considerable public attention and are likely to affect public behavior. The empirical results indicate that a contractionary monetary policy shock (raising the benchmark deposit rate) induces herding, whereas an easy monetary policy shock (cutting the benchmark deposit rate or cutting the deposit reserve ratio) induces the aggregate market to undergo “anti-herding”. Furthermore, a 1% CNY depreciation level during extreme exchange rate volatility will induce herding, whereas a 1% CNY appreciation level will not.

The remainder of the paper is organized as follows. Section 2 reviews the literature on the effects of monetary policy and exchange rate on stock returns and herding behavior in financial markets. Section 3 introduces the methodology and data used in this study. Section 4 presents the empirical results, and Section 5 concludes the study.

## 2. Literature review

This section provides a short review of the effects of monetary policy and exchange rate on stock returns and herding behavior in financial markets, supporting the hypothesis in this study that variations in interest and exchange rates may induce herding in the stock market.

### 2.1. Monetary policy, exchange rate, and stock returns

Thorbecke (1997) investigates how stock returns respond to monetary policy shocks measured by innovations in the federal funds rate and non-borrowed reserves. The results indicate that expansionary monetary policy prompts stock prices in short time horizons and exerts considerable effects on small firms. Bernanke and Kuttner (2005) adopt “event study” to investigate the impact of change in monetary

policy on equity prices; they find that an unanticipated 25-basis-point cut in the federal funds rate target leads to a 1% increase in stock indexes. Bjørnland and Leitemo (2009) propose a structural vector autoregression model that combines short-run and long-run restrictions to solve the simultaneity problem in identifying monetary policy and stock price shock; they determine that stock prices fall immediately by 7% to 9% due to an unanticipated 100-basis-point increase. In general, monetary policy plays an important role in stock price movements. An unanticipated interest rate increase leads to a decline in stock prices given its influence on discount rate channels, expected future dividends and equity premium.

By contrast, the relationship between exchange rate and stock returns varies. Dornbusch and Fischer (1980) focus on the current account and assert that stock prices are beneficial to depreciation of local currency because of the increased international competitiveness of local firms and their profits. Hau and Rey (2006) develop a theoretical model in which investors face incomplete hedging of foreign exchange rate risk and are required to rebalance the foreign equity portfolio following a gain. Such an approach leads to the depreciation of relevant foreign currency, and a negative relationship between stock returns and currency return appears. Cho et al. (2016) argue that the correlation between currency and stock returns differs between emerging markets and developed markets due to capital flows in and out of these markets along with global stock market conditions. When the global stock market is down, capital tends to move out of emerging markets and into developed countries, thereby generating a positive correlation between currency and stock returns in emerging markets and a negative correlation in developed markets. The same correlations remain in global up markets. Lin (2012) examines the co-movement between exchange rate and stock returns across different industries in emerging Asian markets. The findings show that co-movement is not stronger within export-oriented industries, implying that the relationship between exchange rates and stock returns is mainly driven by capital account, which supports the view of capital flows. Emerging markets generally benefit from local currency appreciation due to capital flows into these markets, whereas local currency depreciation is regarded as “bad” news in these stock markets.

### 2.2. Herding behavior in financial markets

Empirical studies have focused on the herding behavior of institutional investors and financial analysts in financial markets (Sias, 2004; Choi & Sias, 2009; Huang, Wu & Lin, 2016; Bernhardt, Campello & Kutsoati, 2006). By contrast, the focus of the current study is to investigate herding in the aggregate market. Christie and Huang (1995) first use the cross-sectional standard deviation of stock returns to capture herding towards market consensus. They find a relatively high return dispersion at times of large price movements, which is considered evidence against herding behavior. Chang et al. (2000) use the cross-sectional absolute deviation to measure return dispersion and apply a non-linear model to detect herding behavior in their study. Their empirical results show that significant evidence of herding is recorded in South Korea and Taiwan, partial evidence is observed in Japan, and no evidence is found in the US and Hong Kong. Hwang and Salmon (2004) propose an alternative method to measure herding based on the cross-sectional dispersion of asset sensitivity to various fundamental factors. They find significant movements and persistence of herding in the US and South Korea. Chiang and Zheng (2010) modify the method proposed by Chang et al. (2000) and examine herding behavior in global stock markets. Their empirical results provide evidence of herding in advanced stock markets and Asian markets, except for the US. Huang, Lin, and Yang (2015) examine herding patterns under various IVOL portfolios in Taiwan stock market, which inspires us to detect intentional herding by comparing herding coefficients in different IVOL portfolios.

With regard to herding studies in the Chinese stock market, Demirer and Kutan (2006) use the method proposed by Christie and Huang

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