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Analyses of topical policy issues

COVID-19 pandemic effect on trading and returns: Evidence from the Chinese stock market

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Using a daily foreign and institution flows data, this paper studies how institutional and foreign investors respond to the COVID-19 pandemic events in China. The results indicate that during the COVID-19 crisis foreign investors play a market stabilization role showing significant negative feedback trading, whereas institution investors do not stabilize the market. And compared to the pre-COVID-19 period, foreign investors even exhibit stronger negative feedback trading. Further analyses confirm that foreign investors’ negative feedback is mainly driven by their response to negative returns. Moreover, both institutional and foreign investors’ trading show stronger forecastability of future returns during the pandemic period. And the negative returns after foreigners’ selling and positive returns after institutional buying are much stronger during the crisis period.

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1. Introduction

Institutional investors and foreign investors are important in stock market not only because of their large holdings of most public companies, but also because of their potential role in facilitating price discovery (Shive, 2012; Bae et al., 2012) and stabilizing the market (Huang, 2015; Burch et al., 2016). However, the extent research shows that investors are changing their trading behaviors when facing an unprecedented crisis (Choe et al., 1999; Hood et al., 2013; Giudice and Paltrinieri, 2017). The COVID-19 pandemic, a truly exogenous shock, has led to unexpected and huge impact on financial market. In the first quarter of 2020, almost all the major world indices suffer steep declines. And even the liquidity drought occurs in some markets, such as the Chinese markets and U.S. markets. Therefore, interesting questions naturally arise from this circumstance: Which kind of trading pattern do traders pursue during such a turbulent time? What role do they play? Does their trading have forecastability? These are important research questions with relevant practical and policy implications.

We address these questions by analyzing the flow-return relationship before and during the COVID-19 pandemic. Examining the role of institutional investors and foreign investors in an emerging market during such a turbulent time motivates this research. And these will have further important implications for Chinese stock market which is under the background of institutionalization and opening-up policy in recent years. Another motivation is the literature on

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the relationship between investors’ flows and returns. Due to data availability, the relevant empirical evidence has been confined to Korean market (Choe et al., 1999, 2005), Spain market (Porras and Ülkü, 2015), emerging Europe markets (Ülkü and Ikizlerli, 2012; Ülkü, 2015), and some other Asian emerging markets, such as Thailand market (Richards, 2005), Indonesia market (Dvořák, 2005), Sri Lanka market (Samarakoon, 2009), Vietnam market (Vo, 2017). However, for the Chinese markets, the topic remains unexplored.

Our main findings are as follows: First, foreign investors show significant negative feedback trading during the COVID-19 period, whereas their negative feedback trading is insignificant in the pre-COVID-19 period. However, the results for institutional investors are opposite. From the perspective of positive feedback trading in destabilizing the market (De Long et al., 1990; Jegadeesh and Titman, 2011), foreigners play the market stabilization role during the pandemic period, whereas institutional investors do not. The further analyses show that, during the COVID-19 crisis, foreigners’ stronger negative feedback trading is largely driven by their response to negative returns, whereas institutional weaker negative feedback trading is a result of their negligible feedback trading following positive returns. Second, both foreigners’ and institutional trading show stronger forecastability during the COVID-19 pandemic. The contemporaneous impact of net flows on returns is persistent and without any reversal subsequently supporting the information advantage hypothesis for two group investors. Furthermore, during the COVID-19 period, foreigners show better timing ability in selling, whereas institutions show better timing ability in buying.

This paper contributes to the literature in two ways. First, this is the first study, to my knowledge, that uses daily foreigners’ trading data in the literature about the interaction between investors’ flows and returns on Chinese market. The trading data via the Stock Connect Program measures foreigners’ flows directly. Second, we provide novel evidence about the stabilization role played by foreign investors during market crisis among emerging markets. These results show that the openness plays active role in promoting the healthy development of financial market. And the further opening measures, such as increasing the eligible stocks and relaxing the eligible investors, should be implemented. Besides, the gradual opening model for introducing foreign investors is worth learning for other emerging markets.

The remainder of this paper is organized as follows. Section 2 reviews the literature concerning the relationship between the trading of investors and returns. Section 3 describes the data and methodology used in the study. Empirical results are discussed in Section 4. Finally, Section 5 presents conclusions and policy implications.

2. Literature review

This paper is related to two main related branches of research. The first is the growing body of literature on COVID-19. Its impact on economy (Makin and Layton, 2021; Yoshino et al., 2021; Yagi and Managi, 2021), government (Sharma et al., 2020; Tisdell, 2020; Park and Chung, 2021) and publics (Vally, 2020; Watkins and Maruthappu, 2020) have unfolded. Given greater availability of data, the research about the effect of COVID-19 on stock market is rich and can be categorized into following aspects: (a) the negative effect of COVID-19 on firm and industry performances (Gu et al., 2020; He et al., 2020a,b; lyke, 2020a; Qin et al., 2020; Xiong et al., 2020); (b) the increased stock return volatility due to the COVID-19 pandemic (Dai et al., 2021; Liu et al., 2020a, 2021; Nguyen et al., 2021; Phan and Narayan, 2020); (c) the fear sentiment because of the COVID-19 (Ahmed, 2020; Baig et al., 2020; Hoang and Syed, 2021); (d) the risk contagion as a result of the COVID-19 pandemic (Abuzayed et al., 2021; Akhtaruzzaman et al., 2020; Corbet et al., 2021; Jiang et al., 2020; Sharma, 2020; Zhang et al., 2021).

Besides, the emerging literature investigating the role of investor trading in the COVID-19 crisis is closely related to this research. Glossner et al. (2020) find that institutional ownership exacerbated the effects of the COVID-19 market crash by consuming the liquidity, and that, conversely, individual investors served as liquidity providers. Ortmann et al. (2020) show that retail investors significantly increase their trading activities as the COVID-19 pandemic unfolds, both at the extensive and at the intensive margin. Khanhatit (2020) finds that foreign investors are not positive-feedback-trading investors in the Stock Exchange of Thailand. Espinosa-Méndez and Arias (2021) show significantly increased herding behavior in European markets during the COVID-19 pandemic. Bing (2021) shows that the positive feedback trading following negative returns during the COVID-19 period is much stronger.

Another strand of literature is the relationship between investors’ flows and returns. On the issue of the impact of return on the flow of investors, namely investors’ feedback trading, the early research center on developed markets dominated by institutions, thus emphasize on exploring the trading of institutions. In most studies, the evidence of institutional positive feedback trading is reported in developed markets (Sias and Starks, 1997; Edelen and Warner, 2001; Griffin et al., 2003; Cai and Zheng, 2004). However, some research also shows no significant institutional feedback trading (Colwell et al., 2008).

With financial liberalization worldwide, many studies focus on foreign investors’ behavior. Brennan and Cao (1997) and Choe et al. (1999, 2005) are the seminal theoretical and empirical studies on foreign investors’ positive feedback trading as a result of their information disadvantage compared with domestic investors (Froot et al., 2001). In subsequent studies, foreign investors’ positive feedback trading is found in different markets at different data frequency, such as in Korea at the annual frequency (Jeon and Moffett, 2010), in Germany at a quarterly frequency (Baltzer et al., 2019), in Sweden at a monthly frequency (Dahlquist and Robertsson, 2004), in Japan at weekly data (Kamesaka et al., 2003) and

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1 Please see Padhan and Prabheesh (2021) and Sha and Sharma (2020) for more details.
in Vietnam at a daily frequency (Vo, 2017). However, some recent research documents that foreigners’ feedback trading could differ. For example, Porras and Ülkü (2015) document that in Spain positive feedback trading is visible in individual stocks, whereas negative feedback trading is observed at the marketwide level. Samarakoon (2009) finds that foreign investors exhibit positive (negative) feedback trading behavior in buying (selling) in Sri Lanka. Curcuru et al. (2011), Ülkü and Ikizlerli (2012), Porras and Ülkü (2015) and Ülkü (2015) report that negative feedback trading by foreigners is mainly confined to positive local returns.

Moreover, investors’ feedback trading during the crisis is also investigated, especially foreigners’ trading behavior because of their potential outflows and destabilizing influence on the emerging market. However, the results are not consistent. On the one hand, Stiglitz (1998) calls for greater regulation of capital flows, arguing that ‘developing countries are more vulnerable to vacillations in international flows than ever before’. On the other hand, the insignificant feedback trading of foreign investors during the Asian crisis is found in Korea (Choe et al., 1999) and in Indonesia (Bowe and Domuta, 2004). Expect for the financial crisis, investors’ trading behavior during catastrophic risk and events has also been investigated. For example, Burch et al. (2016) and Chen et al. (2019) find net institutional buying and retail investor selling amid the large market-wide crisis following 9/11. Hood et al. (2013) show that foreign investors’ positive feedback trading before the earthquake struck on March 11, 2011 reverse after the earthquake.

On the issue of the impact of investors’ net flows on returns, the previous research focus on two points: the contemporaneous impact and the long-horizon impact. Most studies support the positive contemporaneous impact, which has been named price impact (Edelen and Warner, 2001; Richards, 2005; Colwell et al., 2008; Ülkü and Weber, 2013). If the positive impact is reversed subsequently, it is attributed to price pressure, and if permanent it is interpreted as investors’ marginal information advantage, which shows their forecastability (Froot and Ramadorai, 2001). Therefore, the core is how much information investors get. Compared with the clear result that institutions have an information advantage over individuals (Kamesaka et al., 2003; Li et al., 2017; Agudelo et al., 2019), whether foreign investors have an information advantage over domestic investors is ambiguous. On the one hand, the significant impact of foreign investors’ trading on prices, a symptom of well timing ability, is shown in Japan (Kamesaka et al., 2003), in Vietnam (Vo, 2017). On the other hand, Porras and Ülkü (2015) argue that the contemporaneous relation between foreign flows and returns is reversed providing evidence of price pressure. And Samarakoon (2009) reports that the trading of foreign investors does not forecast future returns.

Except for the above significant impact, some studies also argue that there is no evidence about the impact of institutional investor’s trading on returns. For example, Griffin et al. (2003) show no evidence that investors’ trade imbalances predict return movements at the daily frequency. Ng and Wu (2007) report that institutional investor trades do not have return predictability, which is probably due to the speculative nature of Chinese equity markets. Foster et al. (2011) show that institutional trading is not correlated with contemporaneous returns.

During the crisis, the results support the foreigners’ and institutional information advantage over individuals. For example, Choe et al. (1999) find that significantly positive returns on days with large net foreign buying are maintained during the Korean crisis, and Chen et al. (2019) show that institutions’ net buying can positively predict future returns during 9/11. However, Giudice and Paltrinieri (2017) suggest that the irrational withdrawals of retail investors during the Ebola and the Arab Spring events damage the managers’ ability to generate extra-performance.

3. Data and methods

3.1. Data

Data for this study are collected from the WIND database, which has been used in prior literature. Our data set on investors’ order flow includes the daily total purchases and sales for foreign investors and institutions. And the data for two groups can be divided into two independent parts. First, for the flows of institutions, as the database provides four categories of order according to the order’s transaction amount; small order (less than 40 thousand RMB), medium order (greater than 40 thousand RMB and less than 200 thousand RMB), large order (greater than 200 thousand RMB and less than 1 million RMB), extra-large order (greater than 1 million RMB), the large order and extra-large order are regarded as the trades from institutions. In the robustness tests, we will use the extra-large order as a proxy of the trading for institutions.

Second, for foreign investors in A-share market, they trade mainly via two channels: QFII scheme and the Stock Connect Program (SCP). The QFII scheme is launched in November 2002, and by the end of 2019, 327 international financial institutions have QFII status in China. The SCP, including Shanghai-Hong Kong Stock Connect launched in 17 November 2014 and Shenzhen-Hong Kong Stock Connect launched in 5 December 2016, allows international and Mainland Chinese investors to trade securities in each other’s market through the trading and clearing facilities of their home exchange. Due to the flexibility in capital requirements, management and approval, the SCP has been the main channel for foreign investors to trade in A-share market, especially for the new incremental money (Fig. 1). Since the data of QFII are only available at quarterly frequency, while the Stock Connect discloses the actual flows at daily frequency, we here use the northbound of the Connect Program to represent the foreign investors.

As the main objective of this research is to analyze the impact of COVID-19 pandemic on the relationship between investors’ flows and returns in China, the extant literature exploring the flow-return relationship in Sri Lanka (Samarakoon,
Table 1
The definitions and abbreviations of the main variables.

| Variable | Definition |
|----------|------------|
| NBV_EL   | The purchases of extra-large (EL) orders minus those of sales, namely net buy volume (NBV) of EL orders. |
| NBV_LI   | The difference between institutional investors and foreign investors |
| NBV.Inst | The purchases of EL and L orders minus those of sales. |
| NBV_North| The purchases of foreigners via Stock Connect (North) minus those of sales. |
| NBV_HGT  | The purchases of foreigners via Shanghai-Hong Kong Stock Connect (HGT) minus those of sales. |
| NBV_SGT  | The purchases of foreigners via Shenzhen-Hong Kong Stock Connect (SGT) minus those of sales. |
| RetZZQZ  | The return of CSI All Share\(^a\) (ZZQZ). |
| RetSZZZ  | The return of Shanghai stock composite prices index (SZZZ). |
| RetSZCZ  | The return of Shenzhen stock composite prices index (SZCZ). |
| RetHS300 | The return of CSI 300 Index\(^b\) (HS300). |
| RetZZ800 | The return of CSI 800 Index\(^c\) (ZZ800). |

\(^a\)The CSI All Share Index is compiled by China Securities Index Company Limited (CSI). And the CSI All Share includes all the A-shares except ST stocks and *ST stocks, the stocks which has been listed less than three months. [http://www.csindex.com.cn/en/indices/index-detail/000985.](http://www.csindex.com.cn/en/indices/index-detail/000985.)

\(^b\)CSI 300 Index consists of the 300 largest and most liquid A-share stocks. [http://www.csindex.com.cn/en/indices/index-detail/000300.](http://www.csindex.com.cn/en/indices/index-detail/000300.)

\(^c\)CSI 800 Index consists of all the constituents of CSI 300 Index and CSI 500 Index, including the 800 largest and most liquid A-share stocks. [http://www.csindex.com.cn/en/indices/index-detail/000906.](http://www.csindex.com.cn/en/indices/index-detail/000906.)

As shown in the above literature, the return is calculated using the market index. In this research, the return is obtained using CSI All Share Index, which is a representative index for the whole market. Then in the robustness tests, we will choose the corresponding index to explore the relation for specific kind of investors or markets. Table 1 gives the definitions of the variables used in this study.

The data in this paper cover the period from 1 January 2019 to 31 March 2020. To avoid the impact from the continuous net foreigners’ inflow (Bekaert et al., 2002) in the first years after the implementation of Stock Connect Program and the further opening measures proposed in 2018, we choose 1 January 2019 as the start of the sample period. In addition, as the comparison of the investors’ behavior before and during the COVID-19 pandemic is one focus of this paper, we include the data after the COVID-19 outbreak started on 31 December 2019 when the first case of pneumonia of unknown etiology was identified by the WHO China Country Office and from then the number of infected cases has been published on a daily basis. The prior research about the effects of epidemic disease outbreaks on financial performance using event study method have chosen the date that the diseases became known to the media (Kim et al., 2020; Ramelli and Wagner, 2020; Ding et al., 2020). Thus we select 31 December 2019 as the cut-off point of the pre- and during the COVID-19 sample.

2009), Spain (Porras and Ülkü, 2015), emerging Europe (Ülkü, 2015) and Vietnam (Vo, 2017) could be the reference in determining the main variables. The net flows, defined as the purchases minus sales for every type of investor, is the direct measure of investors’ trading and will be used in our study, in line with Samarakoon (2009) and Vo (2017). What is really needed to demonstrate that we cannot divide the foreign flows from that of institutions, namely in the paper the institutional flows are the whole trading of institutions in market. In fact, as the net flows of foreigners fluctuates in the range of one tenth of net flows of institutions in size, hence the results with net flows of institutions mostly reflect the domestic institutions’ behavior. This can be confirmed by a rough analysis about the domestic institutions (net institutional flows – net foreigners’ flows). The results are shown in the robust tests.

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\[\text{QFII\, SCP\, Whole\, Ratio\, of\, SCP\, to\, whole\, (Right)}\]

![Fig. 1. The foreign holding of Chinese equities. The value is expressed in billions Renminbi (RMB).](image-url)
The authors investigate investors’ flows before and during the COVID-19 pandemic. To save space, the results are not shown here, and they are available on request from the authors.

**Table 2**

Summary statistics.

| Variable | Before the COVID-19 outbreak | During the COVID-19 pandemic |
|----------|-----------------------------|------------------------------|
|          | Mean | St.Dev. | Min | Max | N | Mean | St.Dev. | Min | Max | N |
| NBV_EL   | −4.532 | 10.671 | −40.140 | 24.693 | 233 | −12.103 | 18.766 | −69.730 | 19.070 | 59 |
| NBV_LI   | −17.823 | 17.405 | −79.580 | 24.043 | 233 | −30.567 | 27.111 | −108.747 | 16.561 | 59 |
| NBV_Inst | −16.313 | 18.742 | −80.807 | 30.989 | 233 | −30.873 | 30.866 | −118.6 | 22.32 | 59 |
| NBV_North| 1.510 | 3.796 | −10.900 | 21.430 | 233 | −0.306 | 6.354 | −14.73 | 18.19 | 59 |
| NBV_HGT  | 0.673 | 2.323 | −7.516 | 10.875 | 233 | −0.303 | 3.919 | −10.55 | 13.59 | 59 |
| NBV_SGT  | 0.837 | 1.756 | −3.737 | 10.555 | 233 | −0.004 | 2.906 | −7.352 | 5.136 | 59 |
| RetZZQZ  | 0.001 | 0.013 | −0.067 | 0.056 | 233 | −0.001 | 0.020 | −0.082 | 0.036 | 59 |
| RetSZZZ  | 0.001 | 0.011 | −0.056 | 0.056 | 233 | −0.002 | 0.018 | −0.077 | 0.031 | 59 |
| RetSSZC  | 0.001 | 0.014 | −0.076 | 0.056 | 233 | −0.000 | 0.023 | −0.084 | 0.037 | 59 |
| RetHS300 | 0.001 | 0.012 | −0.058 | 0.059 | 233 | −0.002 | 0.019 | −0.079 | 0.033 | 59 |
| RetZZ800 | 0.001 | 0.012 | −0.062 | 0.059 | 233 | −0.001 | 0.020 | −0.081 | 0.034 | 59 |

The value of net flows is expressed in billions Renminbi (RMB).

**Table 3**

Results of unit root tests.

| Variable | Before the COVID-19 outbreak | During the COVID-19 pandemic |
|----------|-----------------------------|------------------------------|
|          | ADF | DF-GLS | PP | ADF | DF-GLS | PP |
| NBV_EL   | −12.432*** | −12.355*** | −12.419*** | −8.843*** | −8.298*** | −8.747*** |
| NBV_LI   | −10.681*** | −5.278*** | −11.456*** | −7.772*** | −2.447*** | −7.802*** |
| NBV_Inst | −11.577*** | −11.147*** | −11.776*** | −8.396*** | −2.631*** | −8.356*** |
| NBV_North| −7.149*** | −6.833*** | −11.361*** | −5.869*** | −5.917*** | −6.180*** |
| NBV_HGT  | −7.103*** | −7.115*** | −12.307*** | −6.555*** | −6.069*** | −6.777*** |
| NBV_SGT  | −0.791*** | −6.206*** | −10.267*** | −3.113*** | −3.128*** | −5.915*** |
| RetZZQZ  | −14.261*** | −4.083*** | −14.274*** | −7.583*** | −7.502*** | −7.583*** |
| RetSZZZ  | −14.346*** | −2.102*** | −14.374*** | −7.575*** | −7.479*** | −7.576*** |
| RetSSZC  | −14.235*** | −3.695*** | −14.217*** | −7.899*** | −7.760*** | −7.900*** |
| RetHS300 | −14.490*** | −1.871686 | −14.484*** | −7.876*** | −7.766*** | −7.871*** |
| RetZZ800 | −14.397*** | −2.063*** | −14.397*** | −7.880*** | −7.780*** | −7.882*** |

*Indicate statistical significance at the 0.10 level.
**Indicate statistical significance at the 0.05 level.
***Indicate statistical significance at the 0.01 level.

Further, the U.S. benchmark stock market index, S&P 500, experiences the unprecedented declines on March 2020, which reflects the concern of foreign investors about the global economy and also affects their position in Chinese equity markets. Meanwhile, the workers from Wuhan with qualified nucleic acid test could go back to their original position in other provinces, which indicates that the COVID-19 in China has been under control and the Chinese economy is returning to normal. Therefore, we choose 31 March 2020 as the end of the COVID-19 crisis, and explore investors’ behavior in the crisis from 31 December 2019 to 31 March 2020. **Table 2** presents the summary statistics of the variables in two periods. To evaluate the stationarity of all series, the augmented Dickey–Fuller (ADF), DF-GLS and Phillips–Perron (PP) unit root tests are used. The results in **Table 3** suggest that all the flow and return series are stationary.

### 3.2. Methodology

The main objective of this research is to analyze the interaction between the returns and the trading of institutional and foreign investors during the COVID-19 pandemic. The relationship between investors’ trading and returns has been the main undertaking in the microstructure literature. On the one hand, the trading of investors, especially the foreigners and domestic institutional investors, has a strong impact on the returns due to their large volume, which has been named the price impact (Edelen and Warner, 2001; Richards, 2005; Ülkü and Weber, 2013). Meanwhile, these two types of traders are known as the sophisticated investors. The price impact may be permanent as a result of their potential information advantage (Froot and Ramadorai, 2001; Ülkü, 2015). On the other hand, the positive feedback trading of institutional traders has been found because of information diffusion (Hong and Stein, 1999) or career concerns (Scharfstein and Stein, 1990). For foreign investors, their feedback trading could be explained by the information disadvantage hypothesis.

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1 We also test the differences of the mean of the main variables before and during the COVID-19 pandemic. The results show that investors’ net flows during the COVID-19 period are significantly less than that before the COVID-19 outbreak. This is to say, there exists a structural break for investors’ flows before and during the COVID-19 pandemic. To save space the results are not shown here, and they are available on request from the authors.
The COVID-19 pandemic has resulted in an unprecedented decline in global economic activity. Therefore, emerging economies experienced significant capital outflows (Padhan and Prabheesh, 2021). And the outbreak of the COVID-19 pandemic has increased global financial risks, thereby adversely affecting the global financial markets. The aforementioned studies lay a solid groundwork for us to investigate the trading of foreign investors and institutional investors during the COVID-19 pandemic.

Considering the bilateral interaction between flows and returns, the vector autoregression (VAR) model has been a standard in this line of research, following Hasbrouck (1991). The extent research shows that the contemporaneous impact from flows on returns has been the consensus (Edelen and Warner, 2001; Richards, 2005; Ülkü and Weber, 2013), while the contemporaneous impact from flows on returns is ambiguous. For example, Ülkü (2015) and Porras and Ülkü (2015) find the contemporaneous feedback trading of foreign investors, while Lee et al. (2010) find returns do not respond to shocks from institutional net flows in Chinese market. Thus in this paper we employ the structural VAR (SVAR) model (Eq. (1)) and assume the contemporaneous impact from net flows on returns to solve the identification problem, namely in Eq. (1) $a_{21} = 0$ and $a_{21} \neq 0$.

$$
\begin{bmatrix}
1 & a_{12} \\
/a_{21} & 1
\end{bmatrix}
\begin{bmatrix}
Flow_t \\
Ret_t
\end{bmatrix}
= 
\begin{bmatrix}
k_1 \\
k_2
\end{bmatrix}
+ 
\begin{bmatrix}
b_{11}(L) & b_{12}(L) \\
b_{21}(L) & b_{22}(L)
\end{bmatrix}
\begin{bmatrix}
Flow_t \\
Ret_t
\end{bmatrix}
+ 
\begin{bmatrix}
e_{1,t} \\
e_{2,t}
\end{bmatrix}
(1)
$$

where $Flow_t$ is the net flow of two investor groups in day $t$; $Ret_t$ is the stock return in day $t$; $k_1$ and $k_2$ are constants; $b_{ij}(L)$ are polynomials of order $p$ in lag coefficients; $e_{1,t}$ and $e_{2,t}$ are the SVAR innovations. A generous uniform lag order of four is determined after examining the Akaike Information Criterion (AIC).

The most effective way of showing SVAR results is by analyzing cumulative impulse response functions (IRF), which shows the contemporaneous relation and the lagged responses of a variable to another variable’s shock in the system. And by quantifying the cumulative effects, it is easy to distinguish the temporary and permanent effects. As the focus of this study is the comparison of the relation between returns and investors’ flows before and after the outbreak of COVID-19, we combine the IRFs of two sample periods into one graph. And when investigating flows’ response to positive and negative returns or the returns’ response to investors’ purchases and sales, we will put them into one graph.

4. Results

4.1. Investors’ feedback trading behavior with respect to returns

Fig. 2 shows the cumulative IRFs of net flows to a shock in returns from the SVAR model in Eq. (1). The first graph in Fig. 2 shows that foreign investors display significant negative feedback trading (from day 1 to day 6) with the daily frequency during the COVID-19 pandemic, whereas their negative feedback trading is not significant before the outbreak of the COVID-19. During the pandemic period, the amplitude of the negative feedback trading is about three times larger than that in the pre-COVID-19 period. Given the potential destabilizing effect of positive feedback trading (De Long et al., 1990; Jegadeesh and Titman, 2011), the result indicates that foreign investors act as market stabilizers in China’s stock market during the COVID-19 crisis. This is a new evidence about the foreign investors’ stabilizing role in emerging market, especially during the crisis period. Besides, though the negative feedback trading has been confirmed in European emerging markets and some Asian markets, such as Korea, Taiwan and Thailand, with the monthly frequency (Ülkü, 2015), it is new for Chinese market with the daily frequency.

The second graph shows that the significant negative feedback trading of institutional investors in the pre-COVID-19 period becomes insignificant during the COVID-19. And the amplitude of the negative response during the COVID-19 is weaker than that in the pre-COVID-19 period. These suggest that compared with the market stabilization role played by institutional investors before the COVID-19 outbreak, institutional investors do not play an important role in stabilizing market during the crisis.
4.2. The difference of feedback trading behavior following positive and negative returns

In this subsection, we further investigate foreigners' and institutional negative feedback trading by comparing their trading behavior following positive and negative returns. To explore the difference in investors’ response to the sign of returns, the sample is partitioned by positive and negative returns via dummy variables, Rpos_t and Rneg_t, where

\[ \text{Rpos}_t = R_t \cdot I_t, \quad \text{Rneg}_t = R_t \cdot (1 - I_t), \quad I_t = \begin{cases} 1, & \text{if } R_t > 0, \\ 0, & \text{otherwise} \end{cases} \] (Porras and Ülkü, 2015).

The difference is investigated by replacing \( R_t \) in Eq. (1) with \( \text{Rpos}_t \) and \( \text{Rneg}_t \), respectively. Fig. 3 depicts net flows’ response to positive and negative returns.

For foreign investors’ negative feedback trading, there exists significant asymmetry in the pre-COVID-19 period: negative feedback trading only follows positive returns (significantly after day 3), whereas positive feedback trading following negative returns occurs (insignificant). This is consistent with the finding of significant negative selling and insignificant positive buying to past returns for US investors in emerging markets in Cururu et al. (2011) and the finding of negative feedback trading asymmetry in emerging markets which is attributed to the disposition effect in Ülkü (2015). During the crisis, foreign investors display strong negative feedback trading to return shocks without any difference, except for the significant response to negative returns in day 1. Therefore, there exists clear difference for their flows’ response to negative return shock between two periods. And the foreign investors’ stronger and significant negative feedback trading during the COVID-19 crisis is largely driven by their response to negative returns. This may be a result of foreign investors’ rebalancing on Chinese stock market to the short-term shock caused by the COVID-19 outbreak.

For institutional trading, there is no asymmetry for the negative feedback trading both before and during the COVID-19 pandemic. In the pre-COVID-19 period, their negative feedback trading to positive and negative return shocks is significant, and the response to positive returns is greater. During the COVID-19, the negative feedback trading following positive and negative returns is insignificant, and the response to negative returns is greater than that to positive returns, which is negligible and even positive from day 1 to 4. Overall, there exists clear difference for institutional flows’ response to positive return shock between two periods. And the institutional weaker negative feedback trading during the COVID-19 is a result of their negligible feedback trading following positive returns.

4.3. The impact of net flows on local returns

Fig. 4 depicts the impulse responses of returns to net flows. Firstly, both before and during the COVID-19 pandemic, the net flows of foreign investors and institutions significantly and positively forecast future returns. The contemporaneous relations are positive, and the relations are persistent and not reversed subsequently (over the next 20 days), which supports the information advantage hypothesis for foreign investors and institutions, instead of the price pressure hypothesis. Specifically, the positive relation is much stronger during the COVID-19 period. And the cumulative market returns following the foreign investors’ flows over the next 20 days are higher than those of institutions during the crisis, which shows a marginal information advantage or a sophisticated response to new information for foreign investors. In fact, foreign investors’ trading behavior is evolving in Chinese stock market by taking the unique features of Chinese market into account (Korkeamäki et al., 2019). Combining the strong information acquiring ability, global experience and rapidly risk coping ability of foreign investors (Bae et al., 2012), their better forecastability should be no surprise.
Fig. 3. Cumulative impulse responses of foreigners’ (first row) and institutional (second row) flows to positive and negative returns. The first graph in row one and two is before the COVID-19 outbreak, and the second graph in each row is during the COVID-19 crisis. Rpos and Rneg refer to estimations when returns are positive and negative, respectively.

Fig. 4. Cumulative impulse responses of returns to foreigners’ (left) and institutional (right) net flows.

4.4. The difference of return’s response to buying and selling

In this subsection, we further investigate the potential difference in return’s response to investors' buying and selling. The results are shown in Fig. 5. The first row in Fig. 5 suggests significant asymmetry for return’s response to foreign buying and selling during the COVID-19 crisis. Compared with the positive returns after buying (in first 11 days) and negative returns after selling before the COVID-19 outbreak, negative returns after foreign sales exist (significant in day 3 to 7) during the COVID-19, whereas foreign purchases have a negligible impact on returns. The stronger forecastability of foreign investors during the crisis period in Section 4.3 seems to be largely driven by their better timing in sales.

For return’s response to institutional buying and selling, there also exists significant asymmetry. In the pre-COVID-19 period, the contemporaneous and the subsequent relation between returns and the institutional purchases and sales are both significantly positive. It is interesting that the returns after institutional selling are positive in the next 20 days (significant in day 0 to 2). This indicates institutional bad timing in selling. During the COVID-19, institutional buying
Fig. 5. Cumulative impulse responses of returns to foreigners’ (first row) and institutional (second row) buying and selling. The first graph in row one and two is before the COVID-19 outbreak, and the second graph in each row is during the COVID-19 crisis. FXXy denotes the flow of XX type investors, and y can be b (buying) or s (selling).

positively forecast contemporaneous and future returns (significant in day 0 to 4), whereas negligible returns after their selling occurs. Therefore, institutional better buying timing provides forecastability in both periods, and the stronger institutional forecastability after the COVID-19 outbreak is a result of their improve in timing of sales.

Although there is no significant difference for the impact of net flows of foreigners and institutions on returns, the return’s response to buying and selling for these two groups is different. In the pre-COVID-19 period, the positive returns after the buying of foreigners and institutions suggest nothing for the timing ability in buying or the information advantage of the two groups. However, compared with the negligible return after the foreigners’ buying during the COVID-19 period, the returns after institutional buying are still positive, which reflects the good timing ability in buying of institutions. To some extent, this suggests that institutions have the information advantage over the foreigners, and it is more reflected during crisis periods. Moreover, compared with the negligible returns after institutional selling in both periods in the long-horizon (even significant positive in first 2 days in pre-COVID-19 period), the returns after foreigners’ selling are both negative and significant during the COVID-19 crisis, which shows their better risk coping ability.

5. Robustness tests

To ensure the robustness of our key findings between flows and returns, we conduct additional analyses in this section. As Lee and Radhakrishna (2000) suggest that the likelihood of misclassifications for institutional and individual investors can be reduced using a buffer zone of medium-sized trades, we will use the extreme single transaction amount order to construct the institutional flows, namely extra-large order instead of the sum of medium and extra-large order.

For foreign flows, we cannot find an alternative data limited by the data availability. We test the robustness of the relation between foreigners’ flows and returns by two aspects. First, the foreign flows can be exactly divided into two groups according to the exchanges, HGT and SGT, where HGT denotes the net flows in Shanghai Stock Exchange (SSE) and SGT denotes the net flows in Shenzhen Stock Exchange (SZSE). We will investigate the above relation in the two exchanges. Correspondingly, the whole market index ZZQZ used to compute the return is replaced by the main index of the two markets, namely Shanghai stock composite prices index (SZZZ) in SSE and Shenzhen stock composite prices index (SZCZ) in SZSE, respectively. Second, as foreign investors prefer to blue chip companies, we select the CSI 300 Index and CSI 800 Index instead of ZZQZ to further explore the relation between foreigners’ flows and returns. In fact, by 2019, the
ratio of foreign holding of CSI 300 Index constituents and CSI 800 Index constituents to their total holding via SCP is 83% and 94%, respectively. Therefore, it is appropriate to further test the robustness within the two indexes.

Besides, according to the former Chair of CSRC, Gang Xiao, most of the foreigners in A-share market, especially the investors via the SCP, are value institutions. As the foreign flows are disclosed by Hong Kong Exchanges accurately, thus we can estimate the local institutions’ flows (LI) by subtracting foreign flows from the whole institutional flows to investigate the relation between local institutions and returns.

To better compare the results, we present all the results with the same order in Section 4. The results are shown in online appendix A. Overall, all the results are consistent with those in Section 4 in terms of significance, amplitude and sign of IRFs, which suggest the above results are robust. And the results about institutions in Section 4 are consistent with those for local institutions, thus the behavior of institutions could be interpreted as the local institutions investors.

Moreover, the two different exchanges in China, SSE and SZSE, provide us a natural environment to explore whether the above relations exist in the two exchanges. We present the results in online appendix B with the same order in Section 4, which can also be a robust test for the above results. Overall, the results are consistent with those in Section 4.

6. Conclusions and policy recommendations

This paper provides empirical evidence on the interaction between institutional and foreigners’ trading and market returns in the context of the COVID-19 crisis and the increasing opening-up and institutionalization of Chinese stock market, the largest emerging markets.

Compared to the pre-COVID-19 period, foreign investors display significant and stronger negative feedback trading during the COVID-19 crisis. However, the significant negative feedback trading of institution investors becomes weaker and insignificant. Therefore, during the pandemic period, foreign investors play the market stabilization role, whereas institutional investors do not stabilize the market. The further analyses show that foreigners’ stronger negative feedback trading during the crisis is largely driven by their response to negative returns, and institutional weaker negative feedback trading is a result of their negligible feedback trading following positive returns.

For the forecastability of the trading, both foreigners’ and institutional trading show stronger forecastability during the COVID-19 pandemic. And the results that the contemporaneous relations between their net flows and returns are persistent and without any reversal subsequently support the information advantage hypothesis for two group investors. Moreover, the negative returns after foreigners’ selling and positive returns after institutional buying are much stronger during the pandemic period. Comparing with the forecastability of their buying and selling in the pre-COVID-19 period, foreigners’ ability to forecast future returns may be derived from their expertise in global risk coping ability, whereas institutional forecastability may be a result of their local information advantage.

As the opening of financial market may bring great uncertainty to financial system stability of developing countries, the gradual and steady opening model has been adopted in Chinese financial market. And the Stock Connect Program is one of the products of this model. The empirical results of this study show that the foreign investors play stabilization role during the market crisis. In other words, the openness of financial market helps to promote its healthy development. Therefore, after accumulating enough experience, the further opening measures, such as increasing the eligible stocks and relaxing the eligible investors, should be implemented. Besides, the results have important implications for the other emerging markets which are facing the financial liberalization. We suggest introducing foreign investors to promote the healthy development of these markets. And the gradual opening model is worth learning. The measures, such as the daily net trading volume limit, the eligible stocks and the eligible investors, could also be implemented in the early stage of the opening up. Then after examining the role of foreign investors in stabilizing the market, the further opening up measures could be discussed.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Availability of data and materials

The datasets will be provided on request.

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8 http://finance.ifeng.com/c/7o5FJNwBUOG.
Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.eap.2021.05.012.

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