ELSEVIER

Diverse investor reactions to the COVID-19 Pandemic: Insights from an emerging market

Suman Neupane [a],[*], Zhebin Fan [a], Daniel Yanes Sanchez [b], Biwesh Neupane [c]

[a] *UQ Business School, The University of Queensland, Brisbane, Australia*
[b] *Shell Australia, Brisbane, Australia*
[c] *Strathclyde Business School, University of Strathclyde, The United Kingdom*

ARTICLE INFO

ABSTRACT

We examine the reaction of different investor categories to the COVID-19 pandemic in the Indian market throughout 2020. Using quarterly ownership data, we find significant differences across various investor categories during the crisis and post-crisis periods. We find that domestic institutional investors (DIIs) exhibit 'flight-to-quality' behavior, foreign institutional investors (FIIs) exhibit 'fire-sale' behavior, and retail investors (RIs) act as informed investors who provide liquidity during the crisis period. We observe conservative behavior from DIIs and FIIs throughout 2020, during which RIs initially increase their holdings in high-risk stocks but move to high-quality stocks in the final quarter of 2020. FIIs contribute the most to lower stock returns and higher volatility during the crisis period. Using daily FII trade-level data, we find that long-term FIIs start buying high-quality stocks before other categories in the post-crisis period, with short-term FIIs driving returns and volatility during the crisis period.

1. Introduction

The COVID-19 pandemic, which started in late 2019, had an unprecedented impact on global economic activity. The reaction of stock markets around the world to this unparalleled health emergency was abrupt and significant. Stock markets in developed and emerging economies plummeted with historically high levels of volatility. In the aftermath of these dramatic events, a growing body of literature is exploring the repercussions of COVID-19 on the behavior of firms and financial markets. For instance, Ramelli and Wagner (2020) investigate how the market responded to the COVID-19 outbreak in 2019, offering fresh perspectives on the influence of real shocks and financial policies on company values. Ashraf (2021) reveals that during the pandemic, investors in nations characterized by a high aversion to uncertainty resorted to panic selling, exacerbating the downturn in market returns. Additionally, Glossner et al. (2021) show that U.S. stocks with high institutional ownership performed significantly worse during the COVID-19 market downturn.[1]

We contribute to this growing literature by examining the behavior of different investor categories in response to this unique exogenous event in the context of an emerging market. More specifically, we explore the responses of insiders (also known as promoters, PRs), domestic institutional investors (DIIs), foreign institutional investors (FIIs), and retail investors (RIs) to the pandemic over the course of 2020 in the Indian market. We also aim to understand the impact of the behavior of these different investor

---

categories on stock returns and volatility.

The strand of literature most relevant to this paper is the one that explores investor behavior during periods of high market volatility.[2] In the context of institutional investors, previous research has classified them as either 'rational arbitrageurs,' contributing to market stability, or 'positive feedback' traders, potentially exacerbating market instability during crises (Stein, 2009; Shleifer & Vishny, 2011). Benkraiem et al. (2022) find evidence of a significant positive relationship between institutional ownership and the propensity for stock price collapses. Furthermore, their analysis indicates that the predominance of short-term institutional investors compels firms to pursue strategies with elevated risk profiles. Prior literature also looks at FIIs' role, especially in propagating or exacerbating financial market crises, with mixed evidence (Choe et al., 1999; Kim & Wei, 2002). Unlike DIIs, FIIs suffer from greater information asymmetry, which has implications for market volatility. Abou Tanos and Jimenez-Garcès (2022) demonstrate that FIIs gravitate towards familiar investments during crises. As for RIs, the long-standing notion has been to see them as noisy traders who increase volatility and destabilize markets (Barber and Odean, 2000; Kumar and Lee, 2006; Barber et al., 2009). However, some recent studies provide contrary evidence to this established notion (Ben-David et al., 2019).

It is also important to note that the COVID-19 pandemic was a unique and widespread event that differed from typical shocks (Ramelli & Wagner, 2020). Typical shocks, such as the Global Financial Crisis in 2008, are often caused by corporate decisions and have a known probability of occurring. They may also unfold slowly, giving parties time to react and making it difficult to identify their direct impacts. However, pandemics were not typically considered a significant risk before COVID-19, making it difficult for firms and investors to prepare for such an event (Loughran and McDonald, 2023). Therefore, the COVID-19 pandemic presents an ideal natural experiment to study the reaction of different investor categories to a significant market-moving event that firms or investors could not have predicted or acted preemptively.

Our primary sample comprises the top 1,500 firms listed on the Indian stock market by market capitalization as of December 2019. These firms account for more than 99 % of the total market capitalization. We perform our empirical analyses on investor behavior during the COVID-19 pandemic in two main segments. In the first segment, we explore changes in ownership levels for different investor categories (PRs, DIIs, FIIs, and RIs) using firm-level quarterly ownership data. For this analysis, following Ramelli and Wagner (2020), we consider Quarter 1, 2020 (Q1 2020) as the crisis period and the remaining quarters of 2020 as the post-crisis period.[3] As for quarterly ownership levels, PRs comprise the largest group, with an average holding of approximately 57 % as of Quarter 4, 2019, followed by RIs, with an average holding of around 20 %. The holdings of FIIs and DIIs are approximately 8 % and 7 %, respectively.[4]

During the crisis period (Q1 2020), we observe significant differences in ownership changes across various investor categories. There is a decrease in PR ownership and an increase in RI ownership at the end of Q1 2020, although these changes are not statistically significant. Interestingly, the two institutional investor categories exhibit diverse reactions. DIIs increase their stock ownership by 0.143 %, whereas FIIs decrease their stock ownership by −0.309 %, both statistically significant at the 1 % level.

We then examine the determinants of these changes and find that PRs reduce their ownership in large, high book-to-market, and illiquid firms. DIIs exhibit flight-to-quality, as they increase their ownership among large, low-risk, and cross-listed firms. In contrast, FIIs appear to display indiscriminate fire-sale behavior (Falkenstien, 1996; Choe et al., 1999; Li et al., 2017; Glossner et al., 2021) by reducing their ownership in high-quality firms (large, profitable, high book-to-market, and cross-listed firms). As FIIs are likely to hold high-quality stocks to begin with, their behavior during Q1 2020 suggests a tendency to sell everything, starting with the ones that are the easiest to sell during a crisis period. DIIs increasing their holdings in large firms provide liquidity to exiting FIIs. Consistent with some recent studies (Glossner et al., 2021; Welch, 2022), we find no significant selling by RIs during Q1 2020. Instead, they increase their holdings in high-risk (high-beta and low profitability) as well as high-quality firms (low-leverage and cross-listed), providing liquidity to other market participants such as DIIs and FIIs.

Our analysis of ownership changes during the post-crisis period reveals several interesting findings. We observe that DIIs decreased their holdings significantly in all the remaining quarters of 2020 while continuing to favor less risky companies. In contrast, FIIs reduce their holdings in Q2 and Q3 but increase them in Q4. Notably, unlike their fire-sale behavior at the beginning of the crisis, FIIs demonstrated a preference for quality (large and MSCI-index firms) for the remainder of 2020. Overall, FIIs appear to react faster, selling in Q1 and buying back in Q4, than DIIs during a crisis. As for RIs, they continue to increase their holdings in high-risk companies (high beta, high leverage) in Q2 and Q3. Surprisingly, RIs increased their holdings in large firms and reduced their holdings in high-beta stocks in Q4.[5] We do not observe any significant change among PRs after Q1.

Next, we investigate the impact of holdings by different investor categories on stock returns and volatility during the fever period. Our findings indicate that stocks with high PR ownership yield better returns, while those with a high proportion of institutional ownership experience a significant decline in their stock prices. Upon conducting a more detailed analysis of institutional ownership by separating it into DIIs and FIIs, we observe a significant negative relationship between fever return and FII ownership, while DII

---

[2] Section 2.1 provides an overview of studies that examine the behavior of different investor categories during period of crises and market volatility.

[3] Please see Section 3 for a detailed discussion of the impact of COVID-19 Pandemic in India and the rationale for using the same classification as in Ramelli and Wagner (2020).

[4] In our analysis, we also examine the behavior of Corporate Investors (CIs) whose average ownership is around 7%. Since their behavior is similar to DIIs, we do not discuss their results here in the introduction.

[5] Although we do not examine investment performance, the trading behaviour that we observe among retail investors in India indicates that aggregate returns for retail investors for the year 2020 is likely to be similar to those observed in Welch (2022) for Robinhood retail investors in the US context.

ownership does not show a significant impact. Given the evidence of indiscriminate selling, it is not surprising to discover that FIIs primarily contribute to the observed inferior stock returns during the fever period. Regarding the analysis of stock volatility, we do not find any discernible evidence of the impact of overall institutional ownership on stock volatility during the fever period. However, upon further breaking down institutional ownership into DIIs and FIIs, we find that stocks with higher FII ownership in Q4 2019 exhibit significantly more volatility during the fever period.

Due to the significant influence of FIIs on both stock prices and volatility, the second segment of our paper delves deeper into the trading behavior of FIIs by utilizing a daily trade-level granular trading dataset.[6] Following Ramelli and Wagner (2020), we classify the period from February 24 to March 20, 2020, as the fever period and from March 21 to March 31, 2020, as the post-fever period. The remaining three quarters of 2020 (Q2, Q3, and Q4) are classified as the post-crisis period. In addition to performing the analysis at the aggregate level, we also examine the behavior of large FIIs and those with different investment horizons (long, medium, and short-term FIIs).[7] Similar to the quarterly analysis, we observe significant net FII outflows during the fever period, at both the aggregate level and among all investor categories. Consistent with prior analysis, we observe significantly higher selling in easier-to-sell firms (large, MSCI-indexed, and cross-listed stocks), indicating a fire-sale behavior.

While we continue to observe significant outflows in the post-fever period at the aggregate level and among most investor categories, we find significant inflows among long-term FIIs. This is quite interesting as the aggregate measure masks an important divergence in behavior between long-term and other investor categories. Long-term FIIs turn into net buyers immediately after the fever period, while other investors continue to sell high-quality stocks. We observe similar heterogeneous behavior among different FII categories throughout 2020. Equity flows remain significantly negative in Q2 for short and medium-term investors, but they turn significantly positive for long and large investors. From Q3 onwards, we only observe positive equity flows among short and medium-term investors. We also examine the impact of holdings by different FII categories on stock price and volatility during the fever period. We find that long-term and large FIIs do not have any significant impact on fever returns, whereas short-term and medium-term investors negatively contribute to the stock price. Additionally, while stocks with higher FII holdings exhibit more volatility during the fever period, this appears to be predominantly driven by the presence of short-term FIIs.

Our results are robust to several additional tests. We re-run our analysis by restricting the sample to the top 1,000 companies by market capitalization. Moreover, we employ alternative measures of stock volatility, FII classification, and FII ownership to establish the robustness of our results. As in the main analyses, all the robustness tests incorporate industry and trading day fixed effects (FII trade-level analysis). In each case, our results consistently remain robust, providing further evidence that our findings are reliable and consistent.

Our paper makes several important contributions to the literature on investor behavior during economic crises. First, we provide a comprehensive analysis of how various investor categories respond to catastrophic events. Unlike previous studies that only focus on one or two investor categories (e.g., Ben-David et al., 2012; Barrot et al., 2016; Burch et al., 2016; Chen et al., 2019; Ramelli & Wagner, 2020; Hendershott et al., 2022), our examination includes multiple investor categories, such as PRs, DIIs, FIIs, and RIs. Investors may help to stabilize the market or exacerbate volatility during exogenous crisis events. Our contribution to this literature lies in shedding light on the complex and diverse ways in which different types of investors may impact the financial market during times of crisis.

Our paper also makes a valuable contribution in understanding the behavior of FIIs. Prior studies show conflicting results on the role of FIIs during crisis periods (Kim & Wei, 2002; Brennan & Cao, 1997; Brennan et al., 2005; Choe et al., 1999; Bowe & Domuta, 2004). The trading actions of FIIs play a crucial role in maintaining the extent and duration of periods characterized by financial crises (Bowe & Domuta, 2001; Cohen & Remolona, 2008). We contribute to this strand of literature by conducting a detailed analysis of FII crisis behavior across different categories based on their investment horizon and size. We find significant heterogeneity in trading behavior among different FII categories in their response to the pandemic. Our results provide a potential explanation for the conflicting results in prior studies. Markets dominated by long-term FIIs are likely to be stabilized during crisis periods, while those dominated by short-term FIIs may experience destabilization.

Furthermore, our study adds to the existing literature on the impact of the COVID-19 pandemic on financial markets (e.g., Ashraf, 2020; Baker et al., 2020; Ramelli & Wagner, 2020; Seven & Yilmaz, 2021; Ashraf, 2021; Glossner et al., 2021; Hendershott et al., 2022) by providing further insights into the relationship between trading and firm characteristics among various types of investors. By analyzing detailed data on investor ownership and FII daily trading, we offer evidence on investment behavior, preferences, and their impact on the market during the pandemic period for different types of investors. Our findings have important implications for market regulators, particularly in developing regulations to address information asymmetry, market volatility, and liquidity issues that emerged during the pandemic.

In terms of policy implications, our research into the behavior of various investor categories during the COVID-19 pandemic in the Indian market offers critical insights with substantial implications for market regulation. It underscores the importance of addressing information asymmetry, particularly for FIIs, who were observed to engage in indiscriminate selling possibly due to a relative informational disadvantage. Regulatory measures could focus on enhancing transparency and the timely disclosure of firm-specific information.

Our findings also highlight the complex dynamics of investor reactions contributing to market volatility. Encouraging stabilizing investment behaviors through mechanisms such as countercyclical buffer requirements for institutional investors and promoting

---

[6] This trade-level data is obtained from the National Securities Depository Limited (NSDL) database. Further information is provided in Section 4.

[7] Using actual holding periods, we identify long, medium, short-term FIIs investors. In addition, we also identify large investors using portfolio holdings data.

financial literacy among retail investors could mitigate volatility. Additionally, the diversity in investor responses underscores the role of a diversified investor base in sustaining market liquidity during crises. Incentives for long-term investments and policies aimed at diversifying the types of investors could enhance market stability. These insights suggest that tailored regulatory strategies addressing these specific challenges can contribute to building more resilient and stable financial markets in the face of future crises.

The remainder of this paper is structured as follows: Section 2 offers an extensive review of the literature relevant to our study. Section 3 delineates the background, detailing the COVID-19 pandemic's impact on India and setting the stage for our analysis. In Section 4, we describe our data set and provide a summary of the statistics. Section 5 details the empirical analysis. Finally, Section 6 synthesizes our findings and discusses their implications, concluding the paper.

2. Related literature

2.1. Investor behavior during market uncertainty

The literature that aligns closely with the focus of this paper investigates how investors behave during times of high market volatility. When it comes to institutional investors, prior research portrays them in two lights - as 'rational arbitrageurs' or as 'positive feedback' traders. Consequently, they are seen as either stabilizing forces or as entities that can disrupt markets in times of crisis (Stein, 2009; Shleifer & Vishny, 2011). For example, Ben-David et al. (2012) show that hedge funds significantly reduced their equity holdings during the Global Financial Crisis (GFC), which may have contributed to market destabilization. Conversely, Burch et al. (2016) and Chen et al. (2019) present evidence of institutions having a stabilizing effect on prices following market crashes, such as the 9/11 attacks. In the context of the COVID-19 crisis, Glossner et al. (2021) report that firms with greater institutional ownership experienced higher price declines, suggesting that institutions destabilize markets. Recently, Benkraiem et al. (2022) show a positive correlation between institutional ownership and the risk of stock price crashes. They also demonstrate that the presence of short-term institutional investors induces corporations to engage in riskier behavior.

There is a significant body of literature that examines FIIs' and their role in propagating or exacerbating financial market crises with mixed evidence (Choe et al., 1999; Kim & Wei, 2002). FII behavior bears particular scrutiny from market participants and regulators, with significant concern that they may increase volatility and contribute to market panic (Samal, 1997; Furman et al., 1998). Schuppli and Bohl (2010) present findings indicating that the presence of foreign institutional investors exerts a stabilizing influence and facilitates enhanced market efficiency. Existing evidence suggests that FIIs suffer from greater information asymmetry during market downturns and high volatility periods (Ferreira et al., 2017) and engage in positive feedback trading that moves prices away from fundamentals (Brennan & Cao, 1997; Brennan et al., 2005). In a comparison of the relative performance of the two institutional investor categories, Ferreira et al. (2017) demonstrated that DIIs perform significantly better than FIIs in volatile periods due to their informational advantage. Additionally, Abou Tanos and Jimenez-Garcès (2022) provide empirical support for the idea that during periods of crisis, FIIs tend to shift their investments towards familiar assets or holdings.

As for RIs, the long-standing notion has been to see them as noisy traders who increase volatility and destabilize markets (Barber and Odean, 2000; Kumar and Lee, 2006; Barber et al., 2009). Studies consistently show that individual investors increase market volatility (Shleifer and Summers, 1990), especially during crisis periods like the COVID-19 pandemic. However, recent research also offers a different perspective on these investors, with studies demonstrating that RIs can act as informed traders, generating absolute performance (e.g., Berkman, Koch, Westerholm, 2014, Ben-David, Birru, Rossi, 2019, Ding, Hou, 2015, Kelley, Tetlock, 2013, Kaniel, Liu, Saar, Titman, 2012; Welch, 2022), and reduce volatility by providing market liquidity (Barber et al., 2009; Dorn et al., 2008, Kaniel et al., 2008, Barrot, et al., 2016).[8]

2.2. The COVID-19 pandemic on global equity markets

The COVID-19 pandemic, unlike typical shocks like the 2008 Global Financial Crisis which are often predictable and gradual, was an unforeseen and rapid event, catching firms and investors unprepared for its impacts (Ramelli & Wagner, 2020; Loughran & McDonald, 2023). Existing research shows that the impact of the COVID-19 pandemic on global equity markets was diverse and significant. For instance, Angosto-Fernandez and Ferrandez-Serrano (2022) document the substantial negative impact on equity markets, most pronounced around the declaration of the pandemic, along with an inverse relationship between COVID-19 case growth and index returns. Ashraf (2020) documents the dual effect of government social distancing measures on stock market returns: direct negatively impact due to hampering economic activity, and indirect positive through impact through reduced COVID-19 cases, with government announcements on public awareness and support measures leading to positive market returns. Ashraf (2021) shows that investors in countries with high uncertainty aversion engaged in panic selling during the pandemic, resulting in greater negative market returns.

Furthermore, Baker et al. (2020) show that government restrictions and voluntary social distancing significantly impacted the U.S.

---

[8] When discussing different investor categories, it is worth noting their varying preference for stocks. FIIs have a higher preference for stocks with large capitalization, low book-to-market ratios (Ko et al., 2007) as well as for those paying lower dividends (Dahlquist & Robertsson, 2001; Ferreira & Matos, 2008), relative to DIIs. Not surprisingly, FIIs also prefer firms that are cross-listed and are constituents of the MSCI index. RIs, on the other hand, exhibit behavioral biases [e.g. over-confidence (Barber & Odean, 2001); sensation seeking (Grinblatt & Keloharju, 2009) or skewed preference (Kumar, 2009)] resulting in stock selection and investment patterns that are different from those of institutional investors.

stock market, more so than in previous pandemics, due to the U.S.'s service-oriented economy. Heyden and Heyden (2021) find that stock markets react negatively to both the announcement of the first COVID-19 death and country-specific fiscal policy measures, while monetary policies appear to stabilize markets. Seven and Yılmaz (2021) highlight a strong positive correlation between fiscal stimulus supports and stock market recovery, suggesting the efficacy of targeted fiscal supports for real sector firms, and also note the negative association of outbreak severity and reliance on natural resources and tourism with market recovery. Ramelli & Wagner (2020) provide evidence that firms with greater exposure to international trade, particularly with China, experienced substantially lower stock returns during the Incubation and Outbreak periods of COVID-19, highlighting the disruption of global trade as an early impact on the real economy.

Closer to our area of investigation, Glossner et al. (2021) document how institutional investors intensified the COVID-19 market crash by concurrently withdrawing capital and rebalancing their portfolios towards firms less affected by the pandemic, revealing a preference for 'quality' firms characterized by resilience post-crisis. Conversely, Schuppli & Bohl (2010) show a stabilizing effect of foreign institutional investors on Chinese stock markets. We extend this line of literature by examining the reactions of different investor categories to the COVID-19 pandemic in the Indian market during 2020. Our aim is to understand their responses to the pandemic's unique challenges, particularly in terms of ownership changes, stock returns, and market volatility.

3. The COVID-19 pandemic and India

In this section, we provide a brief overview of the impact of the COVID-19 pandemic in India. The spread of COVID-19 into India was delayed by several weeks relative to the U.S. The first cases were recorded on January 30th, from flights returning from China. Travel advisory restrictions, including a 14-days quarantine and visa restrictions for other countries, were imposed on 3rd March, as more cases were recorded from overseas travel, with social distancing restrictions soon following on 16th March. On 24th March, India entered its first phase of lockdown (21 days initially), which was later sequentially extended until 31st May. Fig. 1 shows the timeline of COVID-19 infections and restrictions in India. Initially, India had fewer reported cases than the U.S., but the two countries' case counts converged in the second half of 2020. As the virus spread in the U.S. and India, the infection rate was consistently lower in India.

Nonetheless, despite the different situations concerning cases and restrictions, market returns during the pandemic period, as shown in Fig. 2, were highly correlated between the U.S. and Indian indices. As with most emerging markets, Indian equities fell more strongly than the U.S. and recovered more slowly. For this reason, we use the same periods of COVID-19 as identified by Ramelli and Wagner (2020).[9] For the ownership analysis, we consider the first quarter of 2020 as the crisis period and the remaining other three quarters of 2020 as the post-crisis period. For the analysis using trade-level FII data, we align with Ramelli and Wagner (2020) in organizing the COVID-19 shock into three distinct periods, defined by trading days: Pre-Crisis (January 2 – February 21), Fever Period (February 24 – March 20), and Post-Fever Period (March 24- March 31). We also separately analyze quarters 2——4 of 2020 using the FII dataset.

4. Data and summary statistics

Our data is drawn from two main sources. We collect firm-level and quarterly shareholding data from the ProwessDX database, maintained by the Centre for Monitoring Indian Economy (CMIE). Prowess provides quarterly shareholding data for different investor categories, including promoters, domestic and foreign institutional investors, retail investors, as well as for different domestic institutional investors such as banks and financial institutions, mutual funds, and insurance companies.

The trade-level FII trading data comes from the NSDL's FPI Monitor database, an entity affiliated with the Securities and Exchange Board of India (SEBI)[10] This publicly available online database provides data on all FII trades from January 2003 onwards and has been used in several prior studies (Neupane et al., 2017; Neupane et al., 2021). The database provides information on the transaction date, type of trade (buy or sell), quantity, and value (in Indian Rupees). Although the identity of the FII is masked, each trade is linked to an FII registration code that can be tracked over time.[11] There are over 15.6 million individual trades over the 2003–2020 period, with over 1.48 million transactions in 2020 alone. More than 1,700 individual FIIs traded in the Indian market over the course of 2020.

We restrict our sample to the top 1,500 firms by market capitalization as of December 2019, which accounts for more than 99 % of the total market capitalization.[12] The average (median) market capitalization of the top 1,500 firms and all the remaining firms are INR 102,075 (7,442) million and INR 221 (164) million, respectively.[13] Our main variable of interest for the tests on ownership levels is the net change in investor ownership, which is calculated as the difference in investor ownership *(i)* between the current *(t)* and the

---

COVID-19 Timeline

Fig. 1. COVID-19 pandemic timeline in India (January – April 2020). Fig. 1 depicts a timeline of the COVID-19 pandemic, specifically for India, covering events from January to April 2020.

Fig. 2. Market Indices Cumulative Returns (June 2019 – June 2020). Fig. 2 provides a graphical representation of market indices cumulative returns from June 2019 to June 2020. It compares the performance of the S&P 500, a stock market index that measures the stock performance of 500 large companies listed on stock exchanges in the United States, with the NIFTY, which is the National Stock Exchange of India's benchmark broad-based stock market index for the Indian equity market.

previous quarter *(t-1)*. The equation for calculating the net change in investor ownership is as follows:

$$\Delta Ownership_{i,t} = Ownership_{i,t} - Ownership_{i,t-1} \tag{1}$$

Panel A in Table 1 shows the summary statistics relating to ownership levels of different investor categories as of the end of December 2019 (quarter 4, 2019). As mentioned before, our database provides ownership for different investor categories, including PR, DIIs, FIIs, CIs, and RIs. PRs are the largest group of shareholders with a mean (median) ownership of 57.44 % (59.97 %). As has been shown before (Jameson et al., 2014), RIs are the second largest group whose mean (median) ownership is 19.60 % (17.83 %), In addition, the average (median) holdings of DIIs and FIIs are comparable, with 6.95 % (3.46 %) and 7.89 % (4.11 %), respectively. CIs

account for an average (median) ownership of 7.13 % (3.84 %).

To understand investor preferences during the crises and the post-crisis period, we include several firm and market-level variables in our analyses. Panel B in Table 1 provides the summary statistics of these variables at the end of Q4, 2019. Our firm-level characteristic variables follow the study by Glossner et al. (2021). Fever return is calculated using the natural logarithm of the daily closing price at the end of the current day divided by the adjusted daily closing price at the end of the previous day from February 24 through March 20, 2020. Ln(Mkt Cap) stands for the natural logarithm of equity market capitalization as of each quarter's end. Market beta is the stock beta collected from the Prowessdx database. Cash Holding is the ratio of the cash and cash equivalents over the total assets. Profitability is measured by return on assets and is defined as net income over total assets.

Stock Illiquidity follows the measure proposed by Amihud (2002), which is the ratio of absolute daily return to daily trading volumes in INR millions, averaged over all trading days of each quarter. Leverage is the long-term debt plus the debt in current liabilities divided by the total asset. Book-to-Market refers to the book value of equity over market value. We also identify firms that included in the MSCI index as well as those that are cross-listed. These firms are considered to have better corporate governance practices and a higher information environment (Ferreira and Matos, 2008; Neupane et al., 2021).[14] As expected, the average return during the crisis period was negative, approximately −0.021. Cash Holding has an average value of 0.030, and the mean value of profitability is 0.046. The average natural logarithm of market capitalization is INR 9.63 million. Furthermore, approximately 5.9 % of the companies in our sample are components of the MSCI World Index, and 6.3 % of the firms are listed on other exchanges (cross-listed).

5. Empirical results

The empirical analysis in this study utilizes multivariate regression techniques applied to panel data. This approach is designed to explore various facets of investor behavior and their influence on financial markets. By employing multivariate regressions, we are able to investigate the complex interplay among diverse factors, types of investors, and characteristics specific to individual firms. This allows us to uncover the fundamental mechanisms driving financial market dynamics. Our investigation primarily focuses on key financial phenomena such as shifts in stock ownership, variations in stock returns, and changes in market volatility. We pay special attention to the periods during and following financial crises, as these are critical times for understanding market behaviors and trends.

5.1. Change in quarterly ownership

5.1.1. The crisis period (Quarter 1, 2020)

We begin by analyzing the quarterly change in ownership level of different investor categories (PRs, DIIs, FIIs, CIs, and RIs) at the end of 2020 Q1. As mentioned previously, we consider the first quarter of 2020 as the crisis period for the analysis involving quarterly data. Fig. 3 and Panel A in Table 2 show the net change in investor ownership following Equation (1). As shown, we observe significant variation in the change in ownership among different investor categories. Strikingly, we find a significant increase in ownership among DIIs and a significant decrease in ownership among FIIs. Stock ownership increases by 0.143 % (t-stat = 2.442) for DIIs, while it decreases by −0.309 % (t-stat = -7.171) for FIIs, both statistically significant at the less than 1 % level. Our preliminary findings lend support to the argument that domestic institutional investors help in stabilizing market prices while FIIs behave as net sellers (Choe et al., 1999) and destabilize markets during crisis periods. Although not statistically significant, we observe that RIs and CIs increased their ownership, and PRs decreased their ownership at the end of Q1 2020.

Following an overview of the aggregate changes in ownership among different investor categories, we next explore the determinants of the change in ownership among the different investor categories. To provide some descriptive context, Fig. 3 depicts the change in ownership in Q1 of 2020 for various firm-level variables. We include these variables to capture stock and fundamental traits that have been shown to influence investor ownership. The variables discussed in the data section above include size, risk (beta), cash holdings, illiquidity, leverage, profitability, and book-to-market, MSCI index and cross-listed, measured as of December 2019. The quarterly change in ownership for various investor categories for Q1, 2020 are shown in Fig. 3(a) to 3(h), where we categorize firms into five quintiles (very low, low, medium, high, and very high) for each firm-level variable.

As with overall ownership levels, we find significant heterogeneity in investor behavior across different firm-level factors. Interestingly, DIIs appear to increase their holdings while FIIs decrease their holdings in large firms. Furthermore, FIIs appear to reduce their holdings in firms across all risk categories (Fig. 3(b)), while DIIs increase their holdings in low beta and reduce their holdings in high-beta stocks. We observe a similar pattern for profitability (Fig. 3(c)) and leverage (Fig. 3(e)). As for cash holdings (Fig. 3(d)), DIIs increase their holdings more in firms with high-cash holdings, while FIIs reduce their holdings more in high-cash holding firms. Furthermore, DIIs increase their holdings and FIIs reduce their holdings significantly more in cross-listed firms and those that are in the MSCI index (Fig. 3(h)) Overall, our evidence tends to suggest that DIIs are more discriminate and FIIs are more indiscriminate in their trading behavior during Q1 2020. The graphical presentation suggests that FIIs reduce their holdings in firms that are easier to sell (large, high-cash holdings, and low illiquidity). DIIs, on the other hand, appear to favor strong fundamentals. Finally, we observe that RIs exhibit risk-taking behavior by increasing their ownership in stocks with high-beta, low-profitability, and low-cash holdings.

Next, we conduct a multivariate regression analysis to examine the preferences of various investor categories, as shown in Equation

---

[14] We obtain the list of cross-listed firms from https://www.adrbnymellon.com/directory/dr-directory (maintained by The Bank of New York Mellon).

Table 1

Descriptive Statistics. illustrates the descriptive statistics. We restrict our sample to the top 1,500 firms by market capitalization as of December 2019. Panel A shows the summary statistics relating to ownership levels of different investor categories. Panel B provides the summary statistics of the firm and market-level variables in our analyses. All these firm and market-level variables are winsorized at 1% level in each tail. Appendix A provides definitions of all the variables.

Panel A: Ownership-level summary statistics (2019 Q4)					
VARIABLES	(1)	(2)	(3)	(4)	(5)
	Mean	25th pctl	Median	75th pctl	Standard Deviation
Ownership of (%)					
PRs	57.44	48.25	59.97	70.98	16.78
DIIs	6.952	0.139	3.456	11.62	8.761
FIIs	7.897	0.586	4.111	11.84	9.842
CIs	7.132	1.678	3.838	8.922	8.766
RIs	19.60	9.400	17.83	26.29	13.10
Panel B: Firm-level and market-level summary statistics					
VARIABLES	(1)	(2)	(3)	(4)	(5)
	Mean	25th pctl	Median	75th pctl	Standard Deviation
Fever Return	−0.019	−0.025	−0.018	−0.012	0.010
Volatility	0.026	0.020	0.025	0.032	0.008
Cash Holding	0.030	0.004	0.013	0.036	0.050
profitability	0.046	0.012	0.042	0.085	0.082
Illiquidity	2.611	0.011	0.069	0.431	7.992
Leverage	0.109	0.000	0.044	0.162	0.148
Ln(MktCap)	9.626	8.244	9.338	10.70	1.687
Book-to-Market	0.940	0.282	0.600	1.248	2.326
Market beta	1.298	0.945	1.293	1.663	0.491
MSCI	0.059	0	0	0	0.234
Cross-Listed	0.063	0	0	0	0.243

(2), using ordinary least squares (OLS) regressions where the dependent variable is the quarterly change in ownership.

$$\Delta Ownership_{i,t} = \alpha + \beta \times FirmCharacteristics_{i,t-1} + \gamma \times Ownership_{i,t-1} + IndustryFE + \varepsilon_{i,t} \tag{2}$$

Our independent variables, measured as of December 2019, include the following firm-level characteristics: Ln(Mkt Cap), Market beta, Profitability, Book-to-Market, Illiquidity, Leverage, Cash Holding, and Ownership. We also include two dummy variables - Cross Listed and MSCI, which refer to stocks that are cross-listed and part of the MSCI World Index, respectively. In addition, we include ownership for the respective category at the end of the last quarter and industry fixed effects. Standard errors are corrected at the firm level for heteroskedasticity.

Regression results in Panel B of Table 2 highlight the significance of firm characteristics as investors rebalance their portfolios in the first quarter of 2020. Notably, consistent with the graphical presentation, we find significant heterogeneity among different investor categories in their response to the COVID-19 crisis. In Specification (1), we find that PRs appear to reduce their ownership in larger, high book-to-market, and less liquid stocks. In Specifications (2) and (3), we examine the investment preferences of DIIs and FIIs, respectively. Consistent with the idea that institutional investors prefer high-quality stocks (Falkenstien, 1996; Li et al., 2017), we find that DIIs increase their ownership among large-capitalization and low-risk (beta) stocks. The positive coefficient on the Cross-Listed variable further highlights DIIs' preference for high-quality stocks. Overall, our findings indicate a 'flight-to-quality' behavior by DIIs in response to the COVID-19 crisis.

In contrast, we find that FIIs' change in ownership is negatively associated with variables measuring quality, such as market capitalization, profitability, value, and cross-listing status. These results, which are consistent with Fig. 3a, are indicative of indiscriminate 'fire-sale' behavior and align with prior research showing FIIs as net sellers during crisis periods (Choe et al., 1999). It is worth noting that our model has the highest explanatory power for FIIs' change in ownership. Interestingly, we observe that our results are not consistent with Bing and Ma (2021), who show that foreign investors play a market-stabilizing role during the pandemic period in the Chinese financial market.

We present the determinants of CIs and RIs in Specifications (4) and (5), respectively. Specifications (4) and (5) report higher ownership by non-institutional investors, with exposure to high market beta and cross-listed stocks. Specifically, we find positive relationships between changes in ownership of CIs and the following terms: Market Beta, Profitability, Book-to-Market, Illiquidity, and Cross-Listed. This indicates that CIs increased their ownership of high-value stocks and showed a willingness to invest in riskier, illiquid companies. Our results for RIs are similar to those reported by Glossner et al. (2021), who exhibited a strong preference for firms with low profitability and high risk in 2020 Q1. We also observe that RIs increase their ownership in high book-to-market, low-leverage, and cross-listed firms, and they seem to provide liquidity to institutional investors.

5.1.2. The Post-Crisis period (Quarters 2–4, 2020)

Fig. 4 and Panel A of Table 3 display the change in ownership levels among investors in the remaining quarters of 2020. Unlike in Q1, DIIs significantly decrease their holdings throughout the rest of the year, with a decline of −0.12 % in Q2, −0.28 % in Q3, and
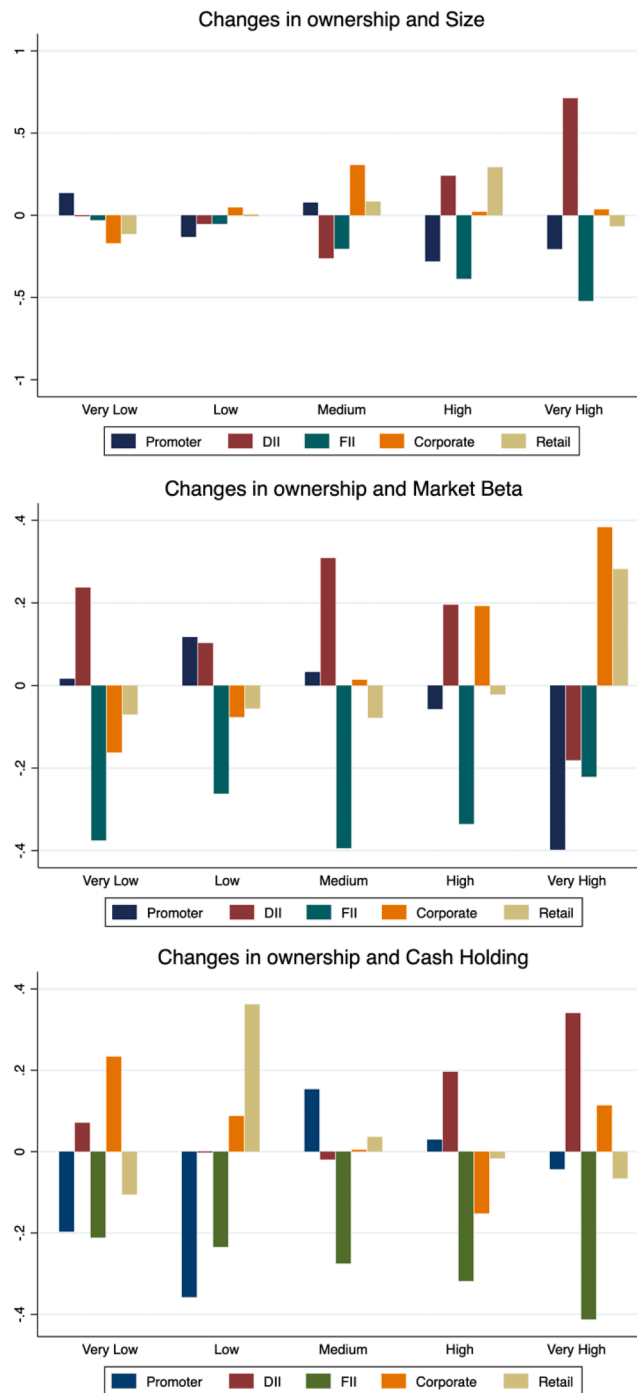
Fig. 3. Determinants of Changes in Investor Ownership in 2020Q1. illustrates the quarterly change in ownership for various investor categories (PRs, DIIs, FIIs, and RIs) for Q1, 2020. Fig. 3a shows how ownership stakes by different investor types correlate with the size of companies, as measured by market capitalization. Fig. 3b illustrates how different investor types' of ownership stakes relate to market beta. Fig. 3c shows the relationship between investor ownership and companies' cash holdings. Fig. 3d indicates how different investor groups are associated with company stock liquidity. Fig. 3e represents the correlation between investor ownership and company leverage. Fig. 3f shows the association between investor ownership and the profitability of companies. Fig. 3g shows the relationship between investor ownership and the book-to-market ratio. Fig. 3h illustrates how investor ownership varies with whether a company is indexed by MSCI and whether it is cross-listed on multiple stock exchanges. We categorize firms into five quintiles (very low, low, medium, high, and very high) for each firm-level variable.

Changes in ownership and Illiquidity

Changes in ownership and Leverage

Changes in ownership and Profitability
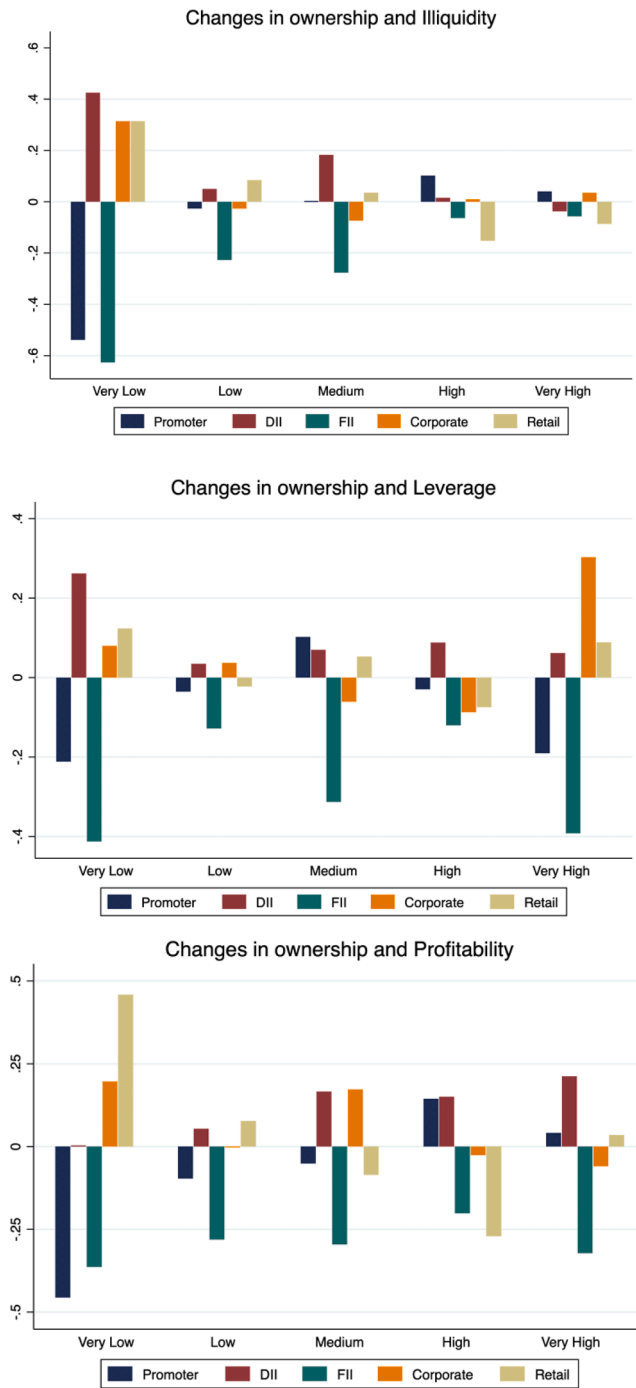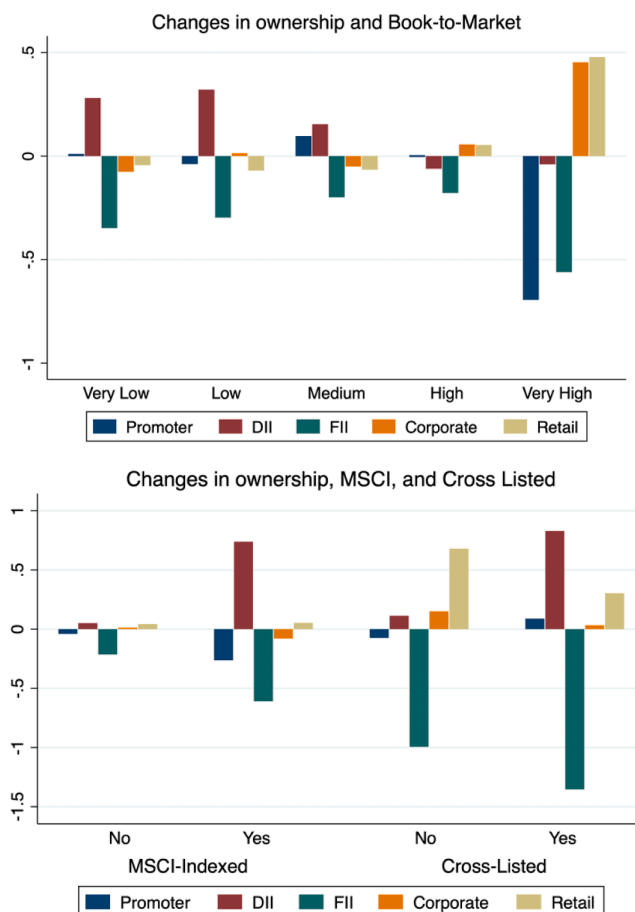
Fig. 3. (*continued*).

Fig. 3. (*continued*).

−0.17 % in Q4 (all statistically significant at the 1 % level). FIIs continue their selling trend from Q1 and further decrease their holdings in Q2 and Q3 by −0.36 % and −0.15 %, respectively. However, there is a noticeable increase in FIIs holdings in Q4 of 2020, by 0.23 %. This, combined with the results from Q1, suggests that FIIs react much quicker (selling in Q1 and buying in Q4) during strong market events compared to DIIs.

In contrast to DIIs and FIIs, RIs consistently increase their holdings throughout 2020, showing particularly strong buying in Q2 and Q3. Their ownership increases in these quarters are 0.415 % and 0.705 % respectively, which are statistically significant at less than 1 % level. The results in the Indian context are comparable to those found by Glossner et al. (2021) in the U.S. market. PRs do not show any significant change in ownership for the rest of 2020, and CIs behave similarly to DIIs.

We employ the model as described in Equation (3) to conduct a multivariate regression analysis, examining the preferences of various investor categories in Q2, Q3, and Q4 of 2020. The results are presented in Panel B, Table 3, with industry-fixed effects included, and standard errors corrected at the firm level for heteroskedasticity.

At an aggregate level, we observe that PRs of large firms continue to offload their holdings in Q2 (Specification (1)). Although the coefficient of market capitalization is negative for Q3 and Q4 regarding changes in PRs' holdings, these coefficients are not statistically significant (Specification (6) and (11)). This suggests that insider selling may have slowed down after Q2 among these firms.

While PRs reduce their aggregate ownership after Q1, 2020, we still observe that DIIs continue to prefer investing in less risky companies (large market capitalization and low betas) throughout 2020. Additionally, we find a significant increase in DIIs' ownership among firms included in the MSCI World Index, particularly in Q2 and Q3 (Specifications (2) and (7), respectively). This behavior aligns with their flight-to-quality behavior shown in Q1.

On the other hand, after exhibiting indiscriminate 'fire-sale' behavior in Q1, FIIs displayed more sensible behavior in the remaining quarters of 2020 by demonstrating a preference for quality. In Specification (3), we document a significant negative coefficient for market beta and a significant positive coefficient on MSCI, indicating that FIIs increased their ownership in lower-risk companies in Q2, 2020. We find that FIIs show a strong preference for cash holdings in Q3 and large market capitalization companies in Q3 and Q4. The increase in FIIs' ownership in Q4 appears to be driven by inflows into larger and lower-risk companies; we do not observe any appetite for risk-taking among FIIs during the second half of 2020.

Table 2

Change in Quarterly Ownership: The Crisis Period.

Panel A: Summary statistics shows the net change in investor ownership in the crisis period of 2020 (i.e., $\Delta Ownership_{I,t} = Ownership_{I,t} - Ownership_{I,t-1}$). We restrict our sample to the top 1500 firms by market capitalization as of December 2019. Panel A shows the change of ownership-level summary statistics in 2020 Q1. Appendix A provides definitions of all the variables.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Mean	25th pctl	Median	75th pctl	Standard Deviation	t-stat
△Ownership of (%)						
PRs	−0.083	0.000	0.000	0.000	1.962	−1.587
DIIs	0.143	−0.118	−0.007	0.234	2.129	2.442[**]
FIIs	−0.309	−0.439	−0.025	0.017	1.417	−7.171[***]
CIs	0.051	−0.221	−0.022	0.107	2.015	0.942
RIs	0.042	−0.260	0.010	0.340	1.926	0.836

Panel B: Determinants Analysis. Panel B of Table 2 shows the determinants of change in investors ownership for 2020 Q1. All specifications include industry fixed effects. Standard errors are clustered at the firm level. Appendix A provides definitions of all the variables. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Δ Ownership of:	(1)	(2)	(3)	(4)	(5)
	PRs	DIIs	FIIs	CIs	RIs
Ln(Mkt Cap)	−0.0942[**]	0.1385[***]	−0.0766[*]	0.0573	0.0470
	(-2.12)	(3.65)	(-1.94)	(1.15)	(1.17)
Market beta	−0.1769	−0.1694[*]	−0.0141	0.3743[**]	0.2266[**]
	(-1.44)	(-1.77)	(-0.14)	(2.45)	(2.05)
Profitability	−0.3079	0.5557	−1.5181[**]	2.3508[*]	−1.8780[**]
	(-0.25)	(0.69)	(-1.96)	(1.88)	(-2.00)
Book-to-Market	−0.0014[**]	−0.0001	−0.0007[***]	0.0011[***]	0.0003[***]
	(-2.17)	(-1.38)	(-3.31)	(5.97)	(2.58)
Illiquidity	−3.3047[**]	0.6024	−4.1262	6.6403[*]	3.5916
	(-1.97)	(0.19)	(-0.77)	(1.79)	(0.98)
Leverage	0.3161	0.5282	−0.3508	0.2506	−1.0621[***]
	(0.42)	(1.50)	(-1.02)	(0.50)	(-2.62)
Cash Holding	1.3212	0.1093	−1.1329	−0.3371	−0.3238
	(1.41)	(0.11)	(-1.19)	(-0.22)	(-0.29)
MSCI	0.6211	0.1615	0.1887	−0.3689	−0.2427
	(1.45)	(0.83)	(0.82)	(-1.27)	(-0.96)
Cross-Listed	−1.5198	0.7051[***]	−0.6051[**]	0.5837[**]	0.5279[**]
	(-1.61)	(3.46)	(-2.26)	(2.07)	(2.16)
Ownership 2019 Q4	−0.0007	−0.0150[***]	−0.0337[***]	−0.0060	−0.0110[**]
	(-0.21)	(-2.70)	(-4.56)	(-0.80)	(-2.29)
Constant	0.9527[**]	−0.3888[*]	0.7098[***]	−1.0276[***]	−0.1824
	(2.10)	(-1.69)	(2.69)	(-2.85)	(-0.61)
Number of Firms	1,281	1,211	1,052	1,246	1,186
R²	0.1460	0.1004	0.2110	0.0982	0.0765
Industry FE	Yes	Yes	Yes	Yes	Yes

Specifications (5), (10), and (15) reveal the investment preferences of RIs for Q2, Q3, and Q4, respectively. RIs continue to favor high-risk companies, as they increase their ownership in firms with high betas in Q2 and Q3, and in firms with high leverage in Q2. However, in Q4, the results show a surprising change in behavior, with a negative coefficient on market beta and a positive coefficient on profitability. This suggests a slowdown in risk-taking appetite among RIs in Q4. Nevertheless, RIs appear to provide liquidity to institutional investors by increasing their ownership in firms with high book-to-market ratios and reducing their ownership in firms included in the MSCI index. The behavior of CIs mirrors that of DIIs throughout the remaining quarters of 2020.

5.1.3. The fever Period: The impact on stock returns and volatility

In this section, we investigate the impact of holdings by different investor categories on stock returns and stock volatility during the fever period, which occurred from February 24, 2020, to March 20, 2020. Equation (3) regresses fever returns and volatility on investor ownership and firm-level control variables as of the end of 2019, with industry-fixed effects.

$$FeverReturn/Volatility = \alpha + \beta \times InvestorOwnership_{i,2019Q4}$$

$$+ \gamma \times FirmCharacteristics_{i,2019Q4} + IndustryFE + \varepsilon_{i,t} \qquad (3)$$

To calculate stock fever returns, we utilize the logarithmic return, determined by taking the natural logarithm of the daily closing price at the end of the current day divided by the daily closing price at the end of the previous day. This calculation is specific to the
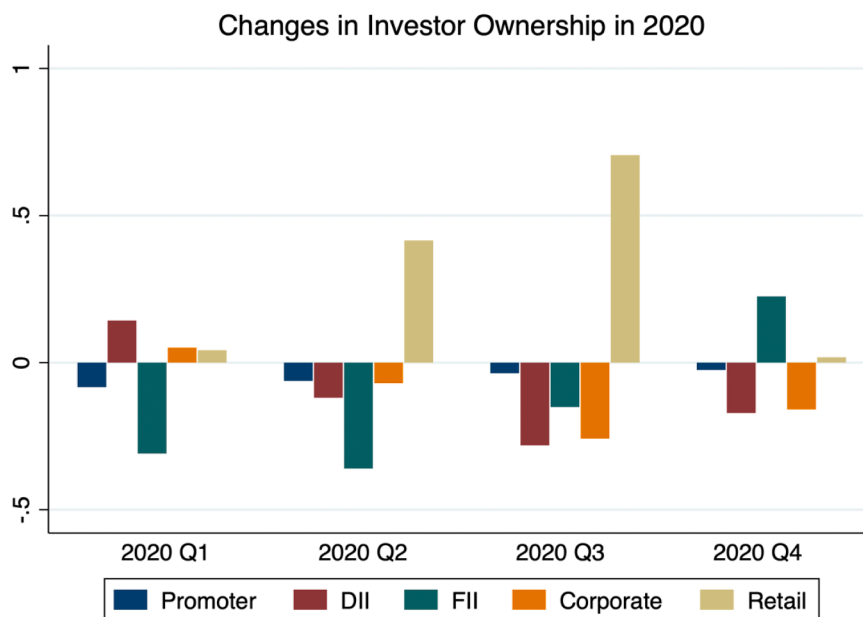
Fig. 4. Changes in Investor Ownership in 2020. displays the change in ownership levels among investors (PRs, DIIs, FIIs, and RIs) in the remaining quarters of 2020.

period from February 24 through March 20, 2020. Following the methodology of Chen et al. (2013), we measure firm-level stock return volatility as the standard deviation of daily stock returns during the COVID-19 fever period.[15] Our primary variable of interest is the ownership by different investor categories at the end of 2019 Q4. We include all firm-level characteristics discussed previously [Ln (Mkt Cap), Market beta, Profitability, Book-to-Market, Illiquidity, Leverage, Cash Holding, MSCI, and Cross-listed]. The results of this analysis are presented in Table 4.

In Specifications (1) through (3), we investigate the impact of three main investor categories on stock prices (returns): Promoters (PR), institutional investors, and non-institutional investors. Specification (1) reveals that companies with higher PR (insider) ownership at the end of 2019 Q4 have better stock returns than those with lower PR ownership. Our findings regarding institutional ownership align with Glossner et al. (2021), who demonstrated that firms with high institutional ownership experienced worse stock price declines than those with low institutional ownership during the COVID-19 fever period. There is no evidence of non-institutional ownership impacting stock returns during the fever period.

In Specification (4), we further investigate the stock price effects of different types of investors, including PRs, DIIs, FIIs, CIs, and RIs. We find that firms with higher FII ownership experienced significantly lower returns during the fever period. Although the co-efficients on the other investor categories are negative, none of them are statistically significant. Our analysis also shows that stock returns during the fever period are positively correlated with size (market capitalization), profitability, and inclusion in the MSCI index, and negatively correlated with market beta. These findings are consistent with prior research in the area and highlight the important role that firm-specific factors play in determining the stock price performance of firms during times of crisis.

Specifications (5) through (8) in Table 4 examine the impact of ownership on stock volatility among various investor classes. In Specifications (5), (6), and (7), we do not find any statistically significant relationship between investor ownership and stock volatility, although the coefficient on institutional ownership (Specification (6)) is positive and marginally insignificant. As with stock returns, we separate institutional ownership into DII and FII and non-institutional ownership into CI and RI. As shown in Specification (8), only FII ownership has a significant positive impact on stock volatility, indicating that stocks with higher FII ownership in 2019 Q4 are more volatile during the crisis period. We obtain consistent results when using the average logarithm of squared daily returns as the measure of volatility (Bae et al., 2004; Li et al., 2011). Additionally, we observe that stocks with high beta contributed positively to stock volatility, while book-to-market and illiquidity contributed negatively to stock volatility during the COVID-19 fever period.

5.2. FII trading

Given the influential and destabilizing role of FIIs depicted above, in this section, we conduct a comprehensive analysis of FIIs' trading activity during the pandemic using granular trade-level data, as described in Section 3. We examine both aggregate trading and

---

[15] Our results are similar if we extend the estimation window until the end of Q1, 2020.

Table 3

Change in Quarterly Ownership: 2020 Q2 - Q4.

Panel A: Summary statistics. Table 3 shows the net change in investor ownership in Q2, Q3, and Q4 of 2020 (i.e., $\Delta Ownership_{I,t} = Ownership_{I,t} - Ownership_{I,t-1}$). We restrict our sample to the top 1500 firms by market capitalization as of December 2019. Panel A shows the change of ownership-level summary statistics. Appendix A provides definitions of all the variables.

VARIABLES	(1)	(2)	(3)
	2020Q2	2020Q3	2020Q4
△Ownership of (%)			
PRs	−0.062	−0.036	−0.025
	(-1.229)	(-0.398)	(-0.290)
DIIs	−0.119***	−0.281***	−0.171***
	(-2.625)	(-4.416)	(-0.290)
FIIs	−0.360***	−0.151**	0.225***
	(-8.109)	(-2.380)	(3.509)
CIs	−0.070	−0.258***	−0.159**
	(-1.199)	(-3.502)	(-2.050)
RIs	0.415***	0.705***	0.018
	(9.783)	(13.076)	(0.367)

Panel B: Determinants Analysis. Panel B of Table 3 shows the firm characteristics and the changes in investors ownership through 2020 Q2 to Q4. All Specifications include industry fixed effects. Standard errors are clustered at the firm level. Appendix A provides definitions of all the variables. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively

Dependent Variable: Δ Ownership

	2020 Q2					2020 Q3					2020 Q4				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	PRs	DIIs	FIIs	CIs	RIs	PRs	DIIs	FIIs	CIs	RIs	PRs	DIIs	FIIs	CIs	RIs
Ln(Mkt Cap)	−0.1135**	0.1533***	−0.0424	0.0630	0.1191***	−0.0877	0.0213	0.1430**	0.0124	−0.1521	−0.1351	0.1855*	0.2215***	0.0927	−0.0323
	(-2.01)	(3.24)	(-0.87)	(1.05)	(3.26)	(-1.04)	(0.35)	(2.28)	(0.18)	(-0.97)	(-1.39)	(1.88)	(3.02)	(1.17)	(-0.60)
Market beta	0.0671	−0.0718	−0.3134**	−0.1665	0.2315**	0.3909	−0.3103*	−0.0511	−0.4541**	0.1699***	0.1759	1.3306	−0.5545	0.2445	−1.9217*
	(0.56)	(-0.62)	(-2.13)	(-0.91)	(2.32)	(1.16)	(-1.89)	(-0.29)	(-2.20)	(2.93)	(0.08)	(1.22)	(-0.36)	(0.13)	(-1.70)
Profitability	1.5476	−0.0964	0.1487	−1.8793	−0.2163	2.5317	1.0253	−0.3007	−3.3185**	−2.5629**	−0.2056	0.0128	−0.0374	0.1754***	0.0683***
	(0.90)	(-0.11)	(0.18)	(-1.37)	(-0.28)	(1.50)	(1.02)	(-0.23)	(-2.12)	(-2.54)	(-1.13)	(0.48)	(-1.17)	(4.19)	(2.67)
Book-to-Market	−0.0008	−0.0490*	−0.0178	0.0071	0.0854**	−0.2477	−0.0419	0.0127	0.1251***	0.1465**	−0.7513	0.3343	6.4986	6.8596	−1.0826
	(-0.01)	(-1.88)	(-0.90)	(0.23)	(2.18)	(-1.23)	(-1.35)	(0.48)	(3.55)	(2.17)	(-0.20)	(0.28)	(0.73)	(1.12)	(-0.29)
Illiquidity	1.3608	−1.9024	1.2876	−0.5644	−2.3036	10.4048	0.9908	4.7597	−7.0289	−6.6792	−0.1893	1.0366*	−0.4984	−0.0142	−0.2902
	(0.74)	(-0.59)	(0.62)	(-0.12)	(-1.13)	(1.52)	(0.30)	(0.62)	(-1.37)	(-0.90)	(-0.31)	(1.67)	(-0.83)	(-0.02)	(-0.62)
Leverage	0.2058	−0.0641	−0.5415	−0.8425	0.7981**	−0.3665	−0.3249	0.8071	−0.2226	0.2610	1.4432	−1.5301	−0.8411	2.0836	−2.3163
	(0.31)	(-0.15)	(-1.55)	(-1.46)	(1.99)	(-0.56)	(-0.49)	(1.60)	(-0.34)	(0.50)	(0.36)	(-1.29)	(-0.43)	(0.86)	(-1.54)
Cash Holding	1.3924	1.0753	−0.8854	−0.5438	−1.0425	−5.2196**	−0.6674	4.0251**	−0.1015	1.0788	0.5332	−0.2683	−0.0708	−0.2071	−0.2650*
	(1.52)	(0.81)	(-0.53)	(-0.30)	(-1.13)	(-2.11)	(-0.36)	(2.39)	(-0.05)	(0.83)	(1.41)	(-1.47)	(-0.36)	(-0.86)	(-1.86)
MSCI	0.5756	0.3945*	0.7369***	−0.7895**	−0.9096***	0.8522**	0.5663**	0.5033*	−0.4722	−0.7859***	0.9219***	−0.2784	0.3182	−0.1999	−0.5898**
	(1.35)	(1.82)	(2.96)	(-2.24)	(-4.52)	(2.17)	(1.97)	(1.76)	(-1.19)	(-4.30)	(2.75)	(-1.12)	(0.96)	(-0.43)	(-2.07)
Cross-Listed	−0.9149	−0.0300	−0.3131	1.2547***	0.5819	−0.8813	−0.3470	−0.0557	0.8419**	0.5405*	−0.6569	−0.2506	0.3341	0.3553	0.1739
	(-1.00)	(-0.09)	(-1.13)	(3.51)	(1.45)	(-1.37)	(-1.22)	(-0.19)	(2.08)	(1.70)	(-1.38)	(-0.92)	(0.98)	(0.75)	(0.59)
Ownership q-1	−0.0104	−0.0352***	−0.0512***	−0.0334***	−0.0055	−0.0151	−0.0232	−0.0624***	−0.0543***	0.0211**	−0.0082	−0.0793*	−0.0261**	−0.0564***	−0.0139**
	(-1.22)	(-4.16)	(-4.84)	(-3.61)	(-0.97)	(-0.72)	(-0.94)	(-6.52)	(-5.28)	(2.54)	(-0.66)	(-1.95)	(-2.29)	(-4.66)	(-2.45)
Constant	0.8893	−0.4753*	0.6845*	0.2680	−0.5230*	1.0317	0.2680	−0.7368*	0.7651	−0.4184	0.6627	−0.3509	−0.6037	−0.2908	1.0038**
	(1.23)	(-1.88)	(1.74)	(0.61)	(-1.71)	(0.71)	(0.88)	(-1.66)	(1.55)	(-0.94)	(0.84)	(-1.12)	(-1.18)	(-0.50)	(2.57)
Number of Firms	1,147	985	858	1,108	1,058	1,145	972	849	1,104	1,057	1,145	938	839	1,101	1,055
R²	0.1060	0.1255	0.1907	0.1052	0.1140	0.0833	0.0758	0.1224	0.0942	0.1074	0.0614	0.1716	0.0618	0.0736	0.0868
Industry FE	Yes	**Yes**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4

The impact of investor ownership (IO) on Stock returns and Volatility. shows the impact of investor ownership on stock returns and stock volatility during the fever period. All Specifications include industry fixed effects. Standard errors are clustered at the firm level. Appendix A provides definitions of all the variables. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively. Investor ownerships are expressed in decimal forms.

Dependent Variable:	Fever Return (Feb24 – Mar20, 2020)				Fever Volatility (Feb24 – Mar20, 2020)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PRs	0.0047**			−0.0076	−0.0000			0.0002
	(2.28)			(-0.82)	(-0.10)			(1.13)
Institutional Ownership		−0.0079***				0.0001		
		(-2.87)				(1.58)		
Non-Institutional Ownership			−0.0014				−0.0000	
			(-0.57)				(-0.83)	
DIIs				−0.0091				0.0001
				(-0.89)				(0.64)
FIIs				−0.0225**				0.0004**
				(-2.22)				(2.30)
CIs				−0.0103				0.0001
				(-1.00)				(0.58)
RIs				−0.0083				0.0002
				(-0.81)				(1.12)
Ln(Mkt Cap)	0.0000	0.0005*	−0.0000	0.0008***	−0.0003	−0.0007*	−0.0004	−0.0008
	(0.14)	(1.79)	(-0.11)	(2.76)	(-1.02)	(-1.65)	(-1.19)	(-1.60)
Market beta	−0.0058***	−0.0061***	−0.0059***	−0.0054***	0.0081***	0.0082***	0.0082***	0.0088***
	(-8.61)	(-8.85)	(-8.59)	(-7.23)	(7.73)	(7.83)	(7.84)	(6.86)
Profitability	0.0083*	0.0072	0.0085*	0.0129**	0.0191**	0.0200**	0.0189**	0.0186*
	(1.65)	(1.40)	(1.67)	(2.57)	(2.05)	(2.13)	(2.03)	(1.73)
Book-to-Market	−0.0002	−0.0002	−0.0002	−0.0001	−0.0000**	−0.0000***	−0.0000**	−0.0000***
	(-1.17)	(-1.12)	(-1.34)	(-0.77)	(-2.42)	(-2.61)	(-2.39)	(-2.62)
Illiquidity	0.0227***	0.0231***	0.0238***	0.0000	−0.0527**	−0.0512**	−0.0549**	−0.0952*
	(3.10)	(3.15)	(3.26)	(0.00)	(-2.20)	(-2.12)	(-2.31)	(-1.78)
Leverage	0.0012	0.0011	0.0009	0.0014	−0.0005	−0.0005	−0.0005	−0.0010
	(0.51)	(0.49)	(0.39)	(0.64)	(-0.12)	(-0.14)	(-0.12)	(-0.23)
Cash Holding	−0.0066	−0.0067	−0.0059	−0.0030	0.0219**	0.0227**	0.0226**	0.0202
	(-1.15)	(-1.18)	(-1.03)	(-0.48)	(1.99)	(2.06)	(2.07)	(1.61)
MSCI	0.0033***	0.0031**	0.0030**	0.0026*	0.0008	0.0001	0.0007	0.0000
	(2.63)	(2.52)	(2.36)	(1.84)	(0.47)	(0.09)	(0.40)	(0.01)
Cross-Listed	−0.0016	−0.0019	−0.0020	−0.0021	0.0004	−0.0002	0.0004	0.0007
	(-0.85)	(-1.00)	(-1.06)	(-1.36)	(0.21)	(-0.09)	(0.23)	(0.39)
Constant	−0.0169***	−0.0167***	−0.0131***	−0.0139	0.0353***	0.0359***	0.0365***	0.0208
	(-6.15)	(-6.60)	(-4.50)	(-1.49)	(11.41)	(13.69)	(11.69)	(1.51)
Number of Firms	1,069	1,073	1,142	1,052	1,122	1,127	1,235	1,088
R²	0.2229	0.2245	0.2187	0.2695	0.1453	0.1460	0.1442	0.1944
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

the trading patterns of various categories of FII investors. In total, there were 1,709 individual FIIs between 2019 Q4 and 2020 Q4. Since we can track the investments of individual FIIs over time, we classify them into short-term, medium-term, and long-term investors based on the actual holding period of their investments from 2017 to 2019. We determine the holding period by calculating the number of days between a purchase and a sale of equity by an FII. For estimating holding periods, we employ the first-in-first-out (FIFO) method, although similar results are obtained when using the last-in-first-out (LIFO) approach. We exclude transactions that do not have a corresponding buy or sell within our sample period. In our primary analysis, we estimate the annual average holding period for an FII by calculating the average of all individual holding periods for transactions that were closed between 2017 and 2019.[16]

We divide investors' average holding periods into tertiles, classifying the top third as long-term investors, the bottom third as short-term investors, and the middle third as medium-term investors. Additionally, recognizing the significance of large investors in the market (Ben-David et al., 2021), we identify such investors based on the total value of their aggregate holdings at the end of 2019. Specifically, we designate the top 10 % of FIIs, based on their aggregate holdings, as large institutional investors.

$$NetTradingValue_{i,t} = Valueofsharesbought_{i,t} - Valueofsharessold_{i,t} \qquad (4)$$

Our main variable for the analysis involving FIIs is net trading value, which, as shown in Equation (4), is the difference between the value of shares bought and the value of shares sold. We construct this measure of trading on a daily basis at the firm level by aggregating all individual trades.

---

[16] For robustness purposes, we employ an alternative approach by classifying investors into the three categories using data solely from the year 2019. The results remain qualitatively similar.

Table 5

FII Trading: The Pre-Crisis, and Crisis Periods.

Panel A: Summary statistics. Panel A of Table 5 presents summary statistics relating to FII trading. Panel A shows the mean and median net trading values for the four periods beginning in quarter 4, 2019. Long, Medium, and Short are dummy variables that represent the FII horizon. We divide investors' average holding periods into tertiles, classifying the top third as long-term investors, the bottom third as short-term investors, and the middle third as medium-term investors. Additionally, recognizing the significance of large investors in the market (Ben-David et al., 2021), we identify such investors based on the total value of their aggregate holdings at the end of 2019. Specifically, we designate the top 10 % of FIIs, based on their aggregate holdings, as large institutional investors.

| | | Type of Investors | | | | |
| | | (1) | (2) | (3) | (4) | (5) |
Period	Mean & Median	Total N = 1,709	Long N = 570	Short N = 569	Medium N = 570	Large N = 169
2019 Q4	Mean	4.319***	−2.796***	13.112***	−2.309***	65.060***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	−0.054	−0.424***	0.694***	−0.744***	12.88***
	p-value	(0.170)	(0.000)	(0.000)	(0.000)	(0.000)
2020 Q1	Mean	−4.141***	1.952***	−4.521***	−5.762***	−7.029***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	−0.293***	−0.199	−0.254***	−0.369***	−1.938***
	p-value	(0.000)	(0.535)	(0.000)	(0.000)	(0.000)
Fever Period	Mean	−11.439***	−11.137***	−11.523***	−9.243***	−24.605***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	−0.682***	−0.564***	−0.465***	−0.664***	−0.877***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Post-Fever Period	Mean	−4.076***	4.330***	−4.082***	−7.110***	−6.862***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	−0.377***	0.541	−0.453***	−0.148***	−1.314***
	p-value	(0.000)	(0.919)	(0.000)	(0.000)	(0.002)

Panel B: Determinants Analysis – Aggregate trading. Panel B of Table 5 shows the determinants of FII net trading value. Specification (1) presents the relationship between FII net trading value and firm characteristics during pre-crisis period (Jan 1 – Feb 21). Specification (2) provides this relationship as of the (fever) crisis period (Feb 24 – Mar 20). Specifications (3) shows the results for the post-fever period (Mar 24 – Mar31). Descriptions of the control variables are provided in Appendix A. All Specifications include industry and trading day fixed effects. Standard errors are clustered at the firm level. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively

Dependent Variable: Net Trading Value	(1)	(2)	(3)
	Before Crisis Jan 1–Feb 21	Fever Period Feb 24-Mar 20	Post-Fever Mar24-Mar31
Ln(Mkt Cap)	0.0000	−0.0340***	−0.0131**
	(0.02)	(-6.17)	(-2.06)
Market beta	0.0020	−0.0120*	0.0047
	(1.39)	(-1.74)	(0.28)
Profitability	−0.0156	−0.0534	0.0525
	(-1.41)	(-0.35)	(0.42)
Book-to-Market	−0.0006**	−0.0158***	−0.0065
	(-2.45)	(-3.71)	(-1.05)
Illiquidity	0.0000**	−0.0000***	−0.0000
	(2.41)	(-4.75)	(-0.22)
Leverage	−0.0006	0.0582*	−0.0592
	(-0.11)	(1.97)	(-1.12)
Cash Holding	−0.0186	0.0394	0.3445**
	(-1.29)	(0.56)	(2.51)
MSCI	0.0079***	−0.2089***	−0.0837***
	(4.54)	(-5.72)	(-3.93)
Cross-Listed	−0.0016	−0.1233***	0.0245
	(-0.69)	(-5.00)	(1.08)
Constant	−0.0020	0.3756***	0.1199
	(-0.22)	(4.79)	(1.52)
Number of Firm-day	10,723	8,220	2,412
R^2	0.0307	0.1506	0.0665
Industry FE	Yes	Yes	Yes
Day FE	Yes	Yes	Yes

Table 5 (*continued*)

Panel C: Determinants Analysis – Different Investor Categories - Fever and Post-Fever periods. Panel C of Table 5 shows the determinants of FII net trading value for different categories during the fever crisis and the post-fever period. Specifications (1) - (4) and (5) - (8) provide the results of fever crisis and post-fever periods, respectively. Descriptions of the control variables are provided in Appendix A. All Specifications include industry and trading day fixed effects. Standard errors are clustered at the firm level. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Net Trading Value

	Fever Period				Post - Fever Period			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Long	Short	Medium	Large	Long	Short	Medium	Large
Ln(Mkt Cap)	−0.0256***	−0.0092***	−0.0140***	−0.0141***	0.0144**	−0.0028**	−0.0166***	−0.0074
	(−6.74)	(−4.54)	(−6.55)	(−2.80)	(2.37)	(−2.13)	(−2.80)	(−1.01)
Market beta	−0.0025	−0.0059*	−0.0059	−0.0096	0.0100	0.0084	−0.0250*	−0.0025
	(−0.33)	(−1.68)	(−1.37)	(−0.71)	(0.99)	(0.54)	(−1.86)	(−0.08)
Profitability	−0.1589*	−0.0192	−0.0760*	−0.2466***	0.1763*	−0.0100	−0.1214**	0.1377
	(−1.81)	(−0.55)	(−1.91)	(−3.13)	(1.96)	(−0.10)	(−2.25)	(0.72)
Book-to-Market	−0.0144***	−0.0076**	−0.0073***	−0.0147*	0.0108***	−0.0030	−0.0059*	0.0105
	(−3.69)	(−2.88)	(−3.54)	(−1.85)	(3.27)	(−0.47)	(−2.00)	(0.63)
Illiquidity	−0.0565***	−0.0251**	−0.0325***	0.0657	−0.0000	0.0000	−0.0001*	−0.0001**
	(−3.42)	(−2.37)	(−2.64)	(1.47)	(−0.06)	(0.11)	(−1.87)	(−2.19)
Leverage	−0.0133	0.0145	−0.0110	−0.0471	0.0414	−0.0816*	−0.0195	−0.1638**
	(−0.51)	(0.95)	(−0.73)	(−1.16)	(1.37)	(−1.73)	(−0.58)	(−2.13)
Cash Holding	0.0805	0.0127	0.0587	0.0439	0.1072	0.4033***	0.1855**	0.3258*
	(1.07)	(0.27)	(1.08)	(0.47)	(0.75)	(3.25)	(2.67)	(1.90)
MSCI	−0.0700***	−0.0339***	−0.0287***	−0.0430***	−0.0092	−0.0604***	0.0017	−0.0012
	(−6.33)	(−5.09)	(−4.77)	(−3.37)	(−0.66)	(−3.29)	(0.14)	(−0.06)
Cross-Listed	−0.0502***	−0.0083	−0.0221***	−0.0216	−0.0360	0.0631	0.0172	−0.0320
	(−3.05)	(−0.77)	(−2.70)	(−1.34)	(−0.85)	(1.47)	(0.75)	(−1.02)
Constant	0.2920***	0.1103***	0.1665***	0.2000***	−0.2007***	0.0109	0.2170***	0.0706
	(6.11)	(4.57)	(6.49)	(3.28)	(−2.75)	(0.15)	(2.78)	(0.66)
Number of Firm-day	7,865	9,897	6,015	3,270	1,190	1,997	1,571	807
R²	0.2376	0.0521	0.0896	0.1297	0.0794	0.0605	0.0692	0.1245
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

5.2.1. The crisis period

Panel A in Table 5 presents the mean and median net trading values for the two quarters beginning in Q4, 2019. We also examine trading during the fever period (Feb 24 - Mar 20, 2020) and the post-fever period (Mar 21 – Mar 31, 2020) in Q1. Overall, the net trading value is positive during Q4, 2019. However, we observe that the value is negative for long-term and medium-term investors and positive for short-term and large investors. For the overall Q1, 2020 period, we find that net trading is significantly negative for all investor categories except long-term investors. Nevertheless, we find that net trading turns economically and statistically significantly negative during the fever period for all investor categories, confirming the negative change in ownership observed among FIIs in the previous section. Interestingly, while the net trading value remains significantly negative in the post-fever period for all investor categories, it turns sharply positive for long-term investors, demonstrating heterogeneous behavior among different FII categories.

$$NetTradingValue_{i,t} = \alpha + \beta \times FirmCharacteristics_{i,t-1} + IndustryFE + DayFE + \varepsilon_{i,t} \qquad (5)$$

In Table 5, Panel B presents the results of the determinants analysis using Equation (5). We employ the same firm-level control variables as in Equation (2), along with industry and trading day fixed effects. The trading day fixed effects enable us to control for variables that remain constant across stocks but vary over time, such as daily market returns, foreign exchange rates, U.S. market returns, and market volatility. Standard errors are clustered at the stock level.

Specification (1) presents the results for the pre-pandemic period (Jan 1, 2020 - Feb 21, 2020). These results align with prior studies (Ferreira and Matos, 2008), showing a significant positive relationship between the MSCI term and FII net trading value. Specification (2) examines the factors influencing FII net trading during the fever period (Feb 24, 2020 - Mar 20, 2020). Consistent with the results in Section 4.1, we observe a significant negative association between net trading value and the Ln(Mkt Cap) term. Additionally, we find statistically significant negative coefficients for the MSCI and Cross-Listed terms. These results are consistent with our earlier findings, indicating that FIIs may have reduced their stock holdings in the Indian market by selling their portfolios, starting with the easiest-to-sell stocks. Furthermore, we document a negative correlation between net trading value and market beta, book-to-market ratio, and stock illiquidity, suggesting a systematic pattern of reducing their holdings. This aligns with the evidence of COVID-19-induced fire-sale externalities in other financial markets (Falato et al., 2021; Haddad et al., 2021). Our findings suggest a similar behavior by FIIs in the Indian equity markets, possibly due to their positive feedback trading and herding behavior (Dennis & Strickland, 2002; Kim & Wei, 2002). Specification (3) examines the investment changes of FIIs for the week after the fever period. Similar to the fever period, we observe a negative relationship between net trading value and Ln(Mkt Cap) and the MSCI term. Interestingly, the negative relationship between trading and cross-listing flips from negative to positive in the post-fever period. We also observe a statistically

Table 6
FII Trading: 2020 Q2 - Q4.

Panel A: Summary statistics. Panel A of Table 6 presents summary statistics relating to FII Trading. Panel A shows the mean and median net trading values for Q2, Q3, and Q4 of 2020. Long, Medium, and Short are dummy variables that represent the FII horizon. We divide FIIs into tertiles according to their average holding periods, classifying the top third as long-term investors (i.e., Long = 1), the bottom third as short-term investors (i.e., Short = 1), and the remaining third as medium-term investors (i.e., Medium = 1). We use year-end equity holding as the standard for measuring large FIIs. FIIs that comprise the top 10 % of portfolio value are classified as large investors (i.e., Large = 1).

Period	Mean & Median	Type of Investors				
		(1)	(2)	(3)	(4)	(5)
		Total N = 1,709	Long N = 570	Short N = 569	Medium N = 570	Large N = 169
2020 Q2	Mean	−0.097***	5.729***	−0.211***	−1.106***	8.488***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	−0.314***	−0.335	−0.518***	−0.188***	−0.200***
	p-value	(0.000)	(0.150)	(0.000)	(0.000)	(0.002)
2020 Q3	Mean	5.167***	0.648***	8.068***	4.180***	−1.124***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	0.004***	0.000	0.039***	−0.027	0.054
	p-value	(0.000)	(0.277)	(0.000)	(0.231)	(0.121)
2020 Q4	Mean	2.544***	7.088***	−0.615***	5.401***	6.714***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	Median	0.845***	0.551***	0.855***	0.924***	1.124***
	p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Determinants Analysis. Panel B of Table 6 shows the determinants of FII net trading value. Specifications (1) through (3) illustrate the relationship between FII net trading value and firm characteristics for 2020 Q2, Q3, and Q4, respectively. Descriptions of the control variables are provided in Appendix A. All Specifications include industry and trading day fixed effects. Standard errors are clustered at the firm level. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively

	(1)	(2)	(3)
Dependent Variable: Net Trading Value	2020 Q2	2020 Q3	2020 Q4
Ln(Mkt Cap)	−0.0034**	−0.0066	0.0152***
	(-2.26)	(-1.35)	(2.94)
Market beta	0.0034	−0.0014	0.0017
	(0.85)	(-0.19)	(0.13)
Profitability	−0.0246	0.0488	0.0886
	(-0.84)	(0.61)	(0.88)
Book-to-Market	−0.0014	−0.0017	0.0052
	(-0.86)	(-0.43)	(0.93)
Illiquidity	−0.0000	−0.0000	0.0000
	(-0.37)	(-0.86)	(0.83)
Leverage	−0.0209*	−0.0296	−0.0333
	(-1.73)	(-1.04)	(-0.81)
Cash Holding	0.0375	−0.0001	−0.2166**
	(1.10)	(-0.00)	(-2.01)
MSCI	−0.0065	0.0627**	0.2413***
	(-1.31)	(2.39)	(14.42)
Cross-Listed	0.0216***	0.0031	0.0492**
	(3.83)	(0.12)	(2.57)
Constant	0.0319*	0.0737	−0.1551**
	(1.70)	(1.21)	(-2.43)
Number of Firm-day	30,534	24,239	15,366
R^2	0.0171	0.0210	0.0895

Table 6 (*continued*)

Panel B: Determinants Analysis. Panel B of Table 6 shows the determinants of FII net trading value. Specifications (1) through (3) illustrate the relationship between FII net trading value and firm characteristics for 2020 Q2, Q3, and Q4, respectively. Descriptions of the control variables are provided in Appendix A. All Specifications include industry and trading day fixed effects. Standard errors are clustered at the firm level. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively

	(1)	(2)	(3)
Dependent Variable: Net Trading Value	**2020 Q2**	**2020 Q3**	**2020 Q4**
Industry FE	Yes	Yes	Yes
Day FE	Yes	Yes	Yes

Panel C: Determinants of change among different FIIs. Panel C of Table 6 shows the determinants of FII net trading value for different categories from 2020 Q2 to 2020 Q4. Specifications (1) - (4), (5) - (8), and (9) – (12) provide the results of 2020 Q2, Q3, and Q4, respectively. Descriptions of the control variables are provided in Appendix A. All Specifications include industry and trading day fixed effects. Standard errors are clustered at the firm level. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Net Trading Value

	2020 Q2				2020 Q3				2020 Q4			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Long	Short	Medium	Large	Long	Short	Medium	Large	Long	Short	Medium	Large
Ln(Mkt Cap)	0.0007	−0.0079***	−0.0060***	−0.0018	0.0025	0.0103**	−0.0074	0.0095**	0.0012	0.0127***	0.0126**	−0.0021
	(0.89)	(-6.07)	(-3.40)	(-0.99)	(0.71)	(2.48)	(-1.41)	(2.00)	(0.41)	(3.10)	(2.23)	(-1.09)
Market beta	0.0009	−0.0041	−0.0008	0.0016	0.0080	0.0132	−0.0062	0.0125	−0.0083	0.0071	0.0102	−0.0033
	(0.41)	(-1.18)	(-0.24)	(0.29)	(1.35)	(1.30)	(-0.78)	(1.02)	(-1.03)	(0.89)	(0.87)	(-1.20)
Profitability	−0.0033	−0.0745***	−0.1010*	0.0254	0.0266	0.0360	0.0853	−0.0737	−0.0291	0.0095	−0.0079	0.0571
	(-0.26)	(-3.20)	(-1.83)	(0.81)	(0.52)	(0.51)	(0.96)	(-0.81)	(-0.53)	(0.21)	(-0.16)	(1.49)
Book-to-Market	−0.0006	−0.0042**	−0.0060**	−0.0030	−0.0002	0.0070	−0.0020	−0.0101	−0.0012	0.0049	−0.0043	−0.0049
	(-0.76)	(-1.98)	(-2.41)	(-0.80)	(-0.05)	(0.93)	(-0.30)	(-1.13)	(-0.23)	(1.24)	(-0.58)	(-1.65)
Illiquidity	0.0000	−0.0000	−0.0000	−0.0000	−0.0000	0.0001*	−0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
	(0.00)	(-1.51)	(-1.47)	(-0.66)	(-0.45)	(1.70)	(-1.31)	(1.08)	(0.94)	(1.42)	(0.83)	(1.44)
Leverage	−0.0087	−0.0101	−0.0089	0.0123	−0.0426**	−0.0253	−0.0312	0.0026	0.0023	0.0031	−0.0025	0.0252**
	(-1.40)	(-1.03)	(-0.69)	(0.89)	(-2.00)	(-0.91)	(-1.12)	(0.07)	(0.10)	(0.09)	(-0.05)	(2.14)
Cash Holding	0.0290*	0.0116	0.0214	0.0720*	0.0557	0.0516	−0.0122	0.0746	−0.1290**	−0.1494*	−0.1783	−0.0806**
	(1.68)	(0.37)	(0.72)	(1.83)	(0.64)	(0.38)	(-0.14)	(0.71)	(-2.00)	(-1.88)	(-1.21)	(-2.26)
MSCI	−0.0026	0.0054	−0.0010	0.0154***	0.0377***	0.0457***	0.0444***	0.0261**	0.0430***	0.0631***	0.0885***	0.0375***
	(-1.12)	(1.47)	(-0.21)	(3.20)	(3.72)	(4.58)	(3.15)	(2.01)	(5.09)	(5.80)	(5.00)	(2.95)
Cross-Listed	0.0050**	0.0009	0.0034	−0.0023	0.0093	0.0234	−0.0078	0.0348**	0.0189**	0.0251	0.0023	0.0163***
	(1.97)	(0.24)	(0.85)	(-0.48)	(0.76)	(1.45)	(-0.54)	(2.25)	(1.96)	(1.62)	(0.11)	(3.14)
Constant	−0.0088	0.0977***	0.0774***	0.0114	−0.0324	−0.1308**	0.0866	−0.1053*	0.0065	−0.1416***	−0.1330*	0.0216
	(-0.95)	(6.04)	(3.20)	(0.51)	(-0.71)	(-2.31)	(1.26)	(-1.73)	(0.17)	(-3.00)	(-1.92)	(0.78)
Number of Firm-day	14,029	25,200	23,940	9,400	13,479	21,165	17,075	5,156	7,521	13,413	13,211	7,131
R^2	0.0254	0.0138	0.0223	0.0231	0.0621	0.0236	0.0231	0.0957	0.0265	0.0382	0.0591	0.0646
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

significant positive relationship between trading and cash holdings in the post-fever period.

Panel C presents the results of the analysis of the determinants for different investor categories during the fever and post-fever periods using Equation (5). In the interest of space, we do not show the results for the pre-crisis period, but the results for the different investor categories are broadly similar to the overall results shown in Specification (1) of Table 2, Panel B. Specifications (1) – (4) show the results of the analysis of the determinants for long-term, short-term, medium-term, and large investors, respectively, for the fever period. During the fever period, we find that the behavior of all investor categories is very similar. As before, we observe significant negative correlations between net trading value and market capitalization, book-to-market, and the MSCI term among all groups of investors. This indicates the aforementioned 'fire sale' behavior during the fever period, prompting FIIs to exit the market.

Specifications (5) – (8) in Panel C (Table 5) show the results of the analysis of the determinants for long-term, short-term, medium-term, and large investors, respectively, for the one-week post-fever period. It's noteworthy that flows for long-term FIIs turned sharply positive during this period (Column (2), Panel A of Table 5). In Specification (5), we find that the coefficient on Ln(Mkt Cap), Profitability, and Cross-Listed are all positive and statistically significant for long-term FIIs, suggesting that these investors piled back into quality assets immediately following the end of the fever period. Thus, the positive coefficient on Cash Holdings and Cross-Listed observed for the post-fever period for the overall FIIs (Specification (3), Panel B Table 5) is driven by the behavior of long-term investors. Short and medium-term investors continue to sell quality assets (large capitalization, profitability, MSCI index) during this period. We also do not observe any significant movement among large investors.

5.2.2. The Post-Crises period

In this section, we investigate the behavior of FIIs, including their different categories, in Q2, Q3, and Q4 of 2020. Table 6, Panel A, presents the mean and median net trading values for the remaining quarters of 2020. At an aggregate level, we observe that FII flows (both mean and median values) remained negative for Q2, before turning positive in Q3 and Q4. However, as seen in the post-fever periods, we find significant positive inflows by long-term investors in Q2, which continue for the rest of the quarters. Net trading values are also positive for large investors in Q2 and Q4. As for short-term and medium-term investors, net trading values only turn positive in Q3, and this positive trend is sustained in Q4, at least among medium-term investors. The overall evidence here is consistent with the notion of heterogeneous behavior among different investor categories. Long-term and large investors, likely to be more sophisticated and rational (Grinblatt & Keloharju, 2000; Fong et al., 2022), initiate investments in high-quality companies and rebalance their portfolios at an earlier stage compared to other investor categories.

Panel B, Table 6 presents the results of the determinants analysis using Equation (5) at the aggregate level. Specifications (1) – (3) show the results for Q2, Q3, and Q4, respectively. Specification (1) and (2) shows that at an aggregate level FIIs continue to sell large capitalization, and highly levered firms in Q2 and Q3. The coefficient on MSCI becomes insignificant in Q2 and positive and significant in Q3, which suggests a wider reversal of inflows among FIIs. The Cross-Listed variable retains its positive and significant relationship with net traded value for Q2 as well (it is positive but insignificant in Q3). As overall flows become positive in Q3 and Q4, we find that FIIs increase their exposure to large firms (Q4), MSCI index firms (Q3 & Q4) and cross-listed firms. The coefficient on MSCI index firms grows from 0.0627 in Q3 to 0.2413 in Q4 (statistically significant at the less than 1 % level), indicating the strong demand of these shares among FIIs. Interestingly, we find the coefficient on cash holdings negative for Q4, perhaps finally indicating some appetite for risk-taking among these investors.

Panel C, Table 6 presents the results of the determinants analysis using Equation (5) for the different investor categories for the remaining quarters of 2020. Specifications (1) to (4), (5) to (8), and (9) to (12) present results for Q2, Q3, and Q4 of 2020, respectively. As before, we include industry fixed effects and trading day fixed effects to control the heterogeneity across different industries and days. The results relating to Q2 are a continuation of the evidence from the post-fever period: long-term FIIs continue to invest in quality firms (High cash holding and Cross-Listed), while short-term and medium-term FIIs continue reducing their positions in quality assets (Ln(Mkt Cap), Profitability). We also find that large investors increasing their exposure through MSCI index firms.

We find short-term and medium-term investors, who finally show net inflows in Q3, increasing their exposure in large capitalization and MSCI firms. Long-term and large investors continue their positive inflows with a greater allocation to quality firms in Q3 as well. This overall trend continues in Q4 as well, with all investors increasing their exposure to high-quality firms. We document statistically significant positive relationships between the MSCI terms and FII net trading values in Specifications (9) to (12). In addition to finding that FIIs prefer MSCI-indexed companies, we also find that long-term and large FIIs prefer cross-listed firms, while short-term and medium-term FIIs tend to invest in stocks with large market capitalizations. Interestingly, we find that the coefficients for the Cash Holding terms are negative for long-term investors and large investors (see Specifications (9) and (12)). Both coefficients are statistically significant at the 5 % level, suggesting that after their early exposure to quality assets, and they begin to take some additional risks in the market.

5.2.3. The fever Period: The impact on stock returns and volatility

In this section, we aim to examine which category of FIIs contributed the most to stock returns and volatility during the fever period, building upon the findings in Section 4.1 where we established that FIIs, as an investor category, had the most significant

Table 7

FII Ownership, Stock returns and Volatility during the fever period. shows the impact of FII ownership on stock returns and stock volatility during the fever period. Specifications (1) through (6) show the results relating to stock return and specifications (7) through (12) show the results relating to volatility. Descriptions of the control variables are provided in Appendix A. All Specifications include industry fixed effects. Standard errors are clustered at the firm level. t-statistics based on robust standard errors are shown in parentheses. ***, **, and * suggest that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Dependent Variables:	Fever Return (Feb24 – Mar20, 2020)						Fever Volatility (Feb24 – Mar20, 2020)					
	(1) Overall	(2) Long	(3) Short	(4) Medium	(5) Large	(6) All	(7) Overall	(8) Long	(9) Short	(10) Medium	(11) Large	(12) All
Overall FIIs	−0.0003***						0.0002**					
	(−4.30)						(2.23)					
Long-term FIIs		−0.0005				−0.0000		0.0002*				−0.0000
		(−1.25)				(−1.06)		(1.69)				(−0.01)
Short-term FIIs			−0.0004***			−0.0003***			0.0002**			0.0003**
			(−2.72)			(−2.83)			(2.33)			(2.22)
Medium-term FIIs				−0.0003**		−0.0004**				0.0002**		0.0004
				(−2.63)		(−2.07)				(2.09)		(1.11)
Large FIIs					−0.0002	0.0001					0.0002**	−0.0002
					(−0.66)	(0.25)					(2.05)	(−0.38)
Ln(Mkt Cap)	0.0023***	0.0023***	0.0024***	0.0024***	0.0032***	0.0023***	−0.0003	−0.0013	−0.0009	−0.0009	−0.0018**	−0.0041*
	(6.36)	(5.19)	(5.71)	(5.42)	(6.76)	(5.80)	(−0.49)	(−1.61)	(−1.44)	(−1.23)	(−2.17)	(−1.98)
Market beta	−0.0055***	−0.0057***	−0.0051***	−0.0053***	−0.0047***	−0.0055***	0.0103***	0.0102***	0.0101***	0.0103***	0.0102***	0.0119***
	(−4.58)	(−4.59)	(−4.31)	(−4.19)	(−4.01)	(−5.06)	(4.79)	(3.99)	(5.37)	(4.40)	(4.53)	(2.79)
Profitability	0.0101	0.0095	0.0136	0.0089	0.0208**	0.0101	−0.0168	0.0025	0.0028	0.0020	0.0060	0.0094
	(0.82)	(1.00)	(1.57)	(0.86)	(2.30)	(1.12)	(−0.91)	(0.18)	(0.20)	(0.12)	(0.36)	(0.56)
Book-to-Market	0.0005	0.0008	0.0007	0.0003	0.0006	0.0005	−0.0015	−0.0020	−0.0019**	−0.0018*	−0.0024**	−0.0023
	(0.67)	(1.22)	(1.01)	(0.51)	(0.66)	(0.75)	(−1.15)	(−1.48)	(−2.26)	(−1.87)	(−2.26)	(−0.92)
Illiquidity	0.0000***	0.0000***	0.0000	0.0000***	0.0000**	0.0000***	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000
	(3.03)	(2.70)	(1.63)	(3.00)	(2.16)	(2.75)	(−1.48)	(−1.30)	(−1.38)	(−0.50)	(−1.36)	(−1.25)
Leverage	−0.0042	−0.0044	−0.0066	−0.0030	−0.0052	−0.0042	0.0081	0.0025	0.0090	0.0071	0.0024	−0.0010
	(−0.93)	(−1.11)	(−1.65)	(−0.77)	(−1.24)	(−1.13)	(1.23)	(0.29)	(1.33)	(0.93)	(0.27)	(−0.07)
Cash Holding	−0.0127	−0.0177*	−0.0120	−0.0102	−0.0057	−0.0127	0.0085	−0.0087	−0.0000	−0.0011	0.0026	−0.0192
	(−1.04)	(−1.76)	(−1.23)	(−1.05)	(−0.51)	(−1.35)	(0.59)	(−0.48)	(−0.00)	(−0.07)	(0.15)	(−0.64)
MSCI	−0.0019	−0.0018	−0.0023*	−0.0017	−0.0045***	−0.0019	0.0031	0.0042*	0.0036*	0.0041**	0.0057**	0.0088**
	(−1.56)	(−1.24)	(−1.72)	(−1.24)	(−2.94)	(−1.42)	(1.45)	(1.75)	(1.81)	(2.05)	(2.17)	(2.35)
Cross-Listed	−0.0037**	−0.0033**	−0.0041***	−0.0040**	−0.0023	−0.0037**	0.0004	0.0017	0.0017	0.0015	0.0015	0.0019
	(−2.61)	(−2.17)	(−2.96)	(−2.56)	(−1.57)	(−2.53)	(0.17)	(0.70)	(0.80)	(0.66)	(0.57)	(0.60)
Constant	−0.0391***	−0.0389***	−0.0404***	−0.0398***	−0.0505***	−0.0391***	0.0362***	0.0472***	0.0415***	0.0414***	0.0523***	0.0794**
	(−8.02)	(−6.88)	(−7.41)	(−7.57)	(−9.06)	(−8.00)	(4.92)	(4.27)	(5.34)	(4.48)	(4.60)	(2.69)
Number of Firms	24,660	10,422	18,649	15,150	4,908	4,540	24,336	10,298	18,462	14,865	4,836	4,456
R²	0.4672	0.4344	0.4405	0.4425	0.5427	0.4664	0.3198	0.3426	0.2846	0.3009	0.3287	0.4978
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

impact on negative stock returns and volatility during the fever period.

We employ the same specification and measures as Equation (5) to regress fever returns and volatility on FII ownership. Our primary variable of interest is the ownership or holdings by different FII categories prior to the beginning of the fever period. To construct the ownership measure, we estimate cumulative net holdings by aggregating all buy and sell trades for each firm at the individual FII level from August 1, 2017, to February 20, 2020.[17] We use the cumulative value as of February 20th as the ownership or holdings of each individual FII in a given firm.[18] We then aggregate the holdings of investors classified as long, short, medium, or large investors to construct the ownership of these different FII categories at the firm level.

The regression results of this analysis are presented in Table 7, where Specifications (1) - (6) show the results relating to stock return, and Specifications (7) – (12) show the results relating to volatility. Our regression analysis reveals a significant negative relationship between fever stock prices (returns) and FII holdings at the aggregate level (Specification (1)). This validates our previous analysis using FII quarterly holdings in Section 4.1, suggesting that stocks with higher FII holdings before the crisis performed worse during the fever period.

In Specifications (2) through (5), we further examine the effect of FII ownership on the price of fever stocks across long-term, short-term, medium-term, and large FIIs. Our analysis suggests that long-term FII holdings do not have a significant effect on the stock price. However, short-term and medium-term FII holdings have a significant negative impact on stock returns. This evidence is particularly strong for short-term FIIs, as demonstrated in Specification (6) of our regression results, indicating that the negative impact of FII holdings on stock prices is primarily driven by short-term FIIs.

Specification (7) of our regression results illustrates that stocks with higher FII holdings exhibit more volatility during the fever period. Specifications (8) through (11) exhibit the relationship between FII ownership across different FII categories. As expected and consistent with the previous findings regarding the impact on stock price, long-term FIIs demonstrate minimal impact on stock volatility. However, the coefficients of short-term and medium-term FII holdings are positive and significant at the 5 % level. This indicates that short-term and medium-term FIIs contribute positively to stock market volatility. An important result from our analysis is that the coefficient for short-term FII holdings in Specification (12) is both positive and statistically significant. This suggests that stocks with a high concentration of short-term FII holdings experienced the most significant fluctuations during the fever period.

6. Conclusion

Building on existing literature, this study introduces novel insights into the nuanced behaviors of diverse investor categories during economic crises, particularly emphasizing the differentiated impact of investor types, such as PRs, DIIs, FIIs, and RIs, on market stability and volatility. The study examines the reactions by these different investor categories (PRs, DIIs, FIIs, and RIs) to the COVID-19 pandemic over the course of 2020 in the Indian market. The unique exogenous nature of the pandemic presents an ideal natural experiment to study investor reaction as firms or investors could not have predicted or acted pre-emptively to this significant market-moving event. Analyzing data from the top 1,500 firms, the study reveals significant ownership changes during the crisis. DIIs increase their holdings, favoring safer investments, while FIIs reduce their stakes, resembling a "fire-sale" approach. RIs increase their holdings in both risky and safe firms, providing liquidity to the financial market.

Given the influential and destabilizing role of FIIs, in the second segment, we examine FIIs' trading activity using granular trade-level data. Through a meticulous analysis of FII trading behavior segmented by investment horizon and size, we uncover patterns that reconcile previous conflicting findings, demonstrating how long-term versus short-term FIIs influence financial market dynamics during crises. As with the quarterly analysis, we find significant net FII outflows during the fever period, both at the aggregate level and among all investor categories. While we continue to observe significant outflows in the post-fever period at the aggregate level and among most investor categories, we document significant inflows among long-term FIIs. Finally, we find that the impact of higher FII holdings on stock returns and volatility during the fever period appears to be predominantly driven by the presence of short-term FIIs.

The relevance of our study extends to multiple stakeholders. For policymakers and market regulators, understanding these investor behaviors is vital in crafting responsive regulations and measures to stabilize markets during crises. Institutional investors are able to benefit from these insights to strategize and mitigate risks in similar future events. Additionally, individual investors can learn from these patterns to make informed decisions in turbulent markets. This study thus provides a comprehensive view of market dynamics during an unforeseen global crisis, making it relevant to a broad spectrum of the financial community. It emphasizes the need for regulatory improvements to address information asymmetry and enhance market stability, thereby reducing volatility and ensuring resilience during crises. This points towards targeted regulatory reforms to support informed and stable investment environments.

---

[17] We begin constructing the FII ownership using trade-level data from August 2017 as NSDL (the database provider) changed the FII identification code in July 2017. As a result, we are unable to match FII investment before and after August 2017. We acknowledge that some of the sell trades in the post August 2017 period could be related to buys prior to this period. To minimize errors, we remove all sell transaction from our calculations for which we do not have a corresponding buy transaction in the post July 2017 period.

[18] As an additional robustness test, we employ proportional holdings measure instead of the aggregate net cumulative value measure. Specifically, we compute the equity holding percentage of each FII category by dividing the net cumulative value of each category by the total net cumulative value of all the FIIs in the firm. Our results remain robust to this alternative approach.

CRediT authorship contribution statement

Suman Neupane: Writing – review & editing, Writing – original draft, Supervision, Formal analysis, Data curation, Conceptualization. **Zhebin Fan:** Writing – review & editing, Supervision, Methodology, Formal analysis, Conceptualization. **Daniel Yanes Sanchez:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Data curation, Conceptualization. **Biwesh Neupane:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

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.

Data availability

The authors do not have permission to share data.

Appendix A. – Variable definition

Fever return	*Fever return* is determined by taking the natural logarithm of the daily closing price at the end of the current day divided by the daily closing price at the end of the previous day. This calculation is specific to the period from February 24 through March 20, 2020.
Fever volatility	*Fever volatility* is the standard deviation of average daily stock returns (the same measurement as Fever return) from February 24 through March 20, 2020.
Cash Holding	*Cash Holding* is the ratio of the cash and cash equivalents over the total assets at the end of the quarter.
Profitability	*Profitability* is measured by the return on assets and is defined as net income over total assets at the end of the quarter.
Stock Illiquidity	*Stock Illiquidity* follows the measure proposed by Amihud (2002), which is the ratio of absolute daily return to daily trading volumes in INR millions, averaged over all trading days at end of the quarter.
Leverage	The *leverage* ratio is the long-term debt plus the debt in current liabilities divided by the total asset at end of the quarter.
Ln (Mkt Cap)	*Ln (Mkt Cap)* stands for the natural logarithm of equity market capitalization at the end of the quarter.
Book-to-Market	*Book-to-Market* refers to the book value of equity over market value at end of the quarter.
Market beta	*Market beta* is computed based on regressions of daily excess returns from 2017 to the end of 2019 on a constant and the daily market factor. The market excess return and the return on the riskless asset (3 Month Treasury Bill Rate) are on the SEBI website.
MSCI	*MSCI* refers to the stocks that are on the Morgan Stanley Capital International World Index.
Cross-Listed	*Cross-Listed* refers to the stocks that are cross-listed (i.e., on a different exchange than its primary and original stock exchange)
Ownership	*Ownership* is the percentage of common stocks held by investors as of each quarter of 2020.
Net trading value (Net value)	*Net trading value (Net value)* is the difference between the value of shares bought and the value of shares sold. We construct this measure of trading on a daily basis at the firm level by aggregating all individual trades.
Promoters (PRs)	SEBI describes a *promoter* as "the person or persons who are in control of the company, directly or indirectly, whether as shareholder, director or otherwise; or person or persons named as promoters in any document of offer of securities to the public or existing shareholders or in the shareholding pattern, disclosed by the company under the provisions of the Listing Agreement".
Institutional Investors	*Institutional Investors* are registered with SEBI and defined as financial institutions, including mutual funds, banks, insurance companies, foreign institutional investors and venture capital funds, and governments.
Non-Institutional Investors	*Non-Institutional Investors* are investors not classified as institutions. These are corporate bodies (investors) and individual (retail) investors.
Domestic Institutional Investors (DIIs)	*DIIs* are defined as financial institutions, including mutual funds, banks, insurance companies, and venture capital funds, and governments in India.
Foreign Institutional Investors (FIIs)	*FIIs* means an institution established or incorporated outside India which proposes to make investment in India in securities.
Corporate Investors (CIs)	*CIs* refer to organizations or group of persons that act as an entity. For example: associations, trusts, partnerships, or any other type of entity.
Retail Investors (RIs)	*RIs* (Individuals) means a person who is a shareholder.
FII Ownership (Holding)	To construct the ownership measure, we first sum all buys trades and subtract all sell trades for each firm at the individual FII level from 1 August 2017 to 20 February 2020. We use this net value as of 20 February as the ownership or holdings of the individual FII in a given firm.
Long/Medium/Short term FIIs	FII horizons are classified based on the actual holding periods of their investment over the 2017 –2019 period. We divide investors' holding periods into tertiles according to their average holding periods, classifying the top/medium/bottom third as Long/Medium/Short term investors.

References

Abou Tanos, B., Jimenez-Garcès, S., 2022. Foreign investments during financial crises: Institutional investors' informational skills create value when familiarity does not. J. Int. Finan. Markets. Inst. Money 79, 101585.

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. J. Financ. Mark. 5 (1), 31–56.

Angosto-Fernández, P.L., Ferrández-Serrano, V., 2022. World capital markets facing the first wave of COVID-19: Traditional event study versus sensitivity to new cases. Economics and Business Review 8 (4), 5–38.

Ashraf, B.N., 2020. Economic impact of government interventions during the COVID-19 pandemic: International evidence from financial markets. J. Behav. Exp. Financ. 27, 100371.

Ashraf, B.N., 2021. Stock markets' reaction to Covid-19: Moderating role of national culture. Financ. Res. Lett. 41, 101857.

Bae, K.-H., Chan, K., Ng, A., 2004. Investibility and return volatility. J. Financ. Econ. 71 (2), 239–263.

Baker, S.R., Bloom, N., Davis, S.J., Kost, K., Sammon, M., Viratyosin, T., 2020. The unprecedented stock market reaction to COVID-19. Rev Asset Pric Stud 10 (4), 742–758.

Barber, B.M., Odean, T., 2000. Trading is hazardous to your wealth: The common stock investment performance of individual investors. J. Financ. 55 (2), 773–806.

Barber, B.M., Odean, T., Zhu, N., 2009. Do retail trades move markets? Rev. Financ. Stud. 22 (1), 151–186.

Barrot, J.-N., Kaniel, R., Sraer, D., 2016. Are retail traders compensated for providing liquidity? J. Financ. Econ. 120 (1), 146–168.

Ben-David, I., Franzoni, F., Moussawi, R., 2012. Hedge fund stock trading in the financial crisis of 2007–2009. Rev. Financ. Stud. 25 (1), 1–54.

Ben-David, I., Birru, J., Rossi, A., 2019. Industry familiarity and trading: Evidence from the personal portfolios of industry insiders. J. Financ. Econ. 132 (1), 49–75.

Ben-David, I., Franzoni, F., Moussawi, R., Sedunov, J., 2021. The granular nature of large institutional investors. Manag. Sci. 67 (11), 6629–6659.

Benkraiem, R., Goutte, S., Saadi, S., Zhu, H., Zhu, S., 2022. Investor heterogeneity and negative skewness in stock returns: Evidence from institutional investors. J. Int. Finan. Markets. Inst. Money 81, 101690.

Berkman, H., Koch, P.D., Westerholm, P.J., 2014. Informed trading through the accounts of children. J. Financ. 69 (1), 363–404.

Bing, T., Ma, H., 2021. COVID-19 pandemic effect on trading and returns: Evidence from the Chinese stock market. Economic Analysis and Policy 71, 384–396.

Bowe, M., Domuta, D., 2001. Foreign investor behaviour and the Asian financial crisis. J. Int. Finan. Markets. Inst. Money 11 (3), 395–422.

Bowe, M., Domuta, D., 2004. Investor herding during financial crisis: A clinical study of the Jakarta Stock Exchange. Pac. Basin Financ. J. 12 (4), 387–418.

Brennan, M.J., Cao, H.H., 1997. International portfolio investment flows. J. Financ. 52 (5), 1851–1880.

Brennan, M.J., Henry Cao, H., Strong, N., Xu, X., 2005. The dynamics of international equity market expectations. J. Financ. Econ. 77 (2), 257–288.

Burch, T.R., Emery, D.R., Fuerst, M.E., 2016. Who moves markets in a sudden marketwide crisis? evidence from 9/11. J. Financ. Quant. Anal. 51 (2), 463–487.

Chen, Z., Du, J., Li, D., Ouyang, R., 2013. Does foreign institutional ownership increase return volatility? Evidence from China. J. Bank. Financ. 37 (2), 660–669.

Chen, Y., Hu, G., Yu, D.B., Zhao, J., 2019. Catastrophic risk and institutional investors: Evidence from institutional trading around 9/11. Pac. Basin Financ. J. 56, 211–233.

Choe, H., Kho, B.-C., Stulz, R.M., 1999. Do foreign investors destabilize stock markets? The Korean experience in 1997. J. Financ. Econ. 54 (2), 227–264.

Cohen, B.H., Remolona, E.M., 2008. Information flows during the Asian crisis: Evidence from closed-end funds. J. Int. Money Financ. 27 (4), 636–653.

Dahlquist, M., Robertsson, G., 2001. Direct foreign ownership, institutional investors, and firm characteristics. J. Financ. Econ. 59 (3), 413–440.

Dennis, P.J., Strickland, D., 2002. Who blinks in volatile markets, individuals or institutions? J. Financ. 57 (5), 1923–1949.

Ding, R., Hou, W., 2015. Retail investor attention and stock liquidity. J. Int. Finan. Markets. Inst. Money 37, 12–26.

Dorn, D., Huberman, G., Sengmueller, P., 2008. Correlated trading and returns. *The Journal of Finance* 63 (2), 885–920.

Falato, A., Hortaçsu, A., Li, D., Shin, C., 2021. Fire-sale spillovers in debt markets. J. Financ. 76 (6), 3055–3102.

Falkenstein, E.G., 1996. Preferences for stock characteristics as revealed by mutual fund portfolio holdings. J. Financ. 51 (1), 111–135.

Ferreira, M.A., Matos, P., 2008. The colors of investors' money: The role of institutional investors around the world. J. Financ. Econ. 88 (3), 499–533.

Ferreira, M.A., Matos, P., Pereira, J.P., Pires, P., 2017. Do locals know better? A comparison of the performance of local and foreign institutional investors. J. Bank. Financ. 82, 151–164.

Fong, T.P.W., Sze, A.K.W., Ho, E.H.C., 2022. Do long-term institutional investors contribute to financial stability? – Evidence from equity investment in Hong Kong and international markets. J. Int. Finan. Markets. Inst. Money 77, 101521.

Furman, J., Stiglitz, J.E., Bosworth, B.P., Radelet, S., 1998. Economic crises: Evidence and insights from east asia. Brook. Pap. Econ. Act. 1998 (2), 1–135.

Glossner, S., Matos, P., Ramelli, S. & Wagner, A., (2021). Do Institutional Investors Stabilize Equity markets in Crisis Periods? Evidence from COVID-19. *ECGI Working Paper Series in Finance.*

Grinblatt, M., Keloharju, M., 2000. The investment behavior and performance of various investor types: a study of Finland's unique data set. J. Financ. Econ. 55 (1), 43–67.

Grinblatt, M., Keloharju, M., 2009. Sensation seeking, overconfidence, and trading activity. J. Financ. 64 (2), 549–578.

Haddad, V., Moreira, A., Muir, T., 2021. When selling becomes viral: Disruptions in debt markets in the COVID-19 crisis and the fed's response. Rev. Financ. Stud. 34 (11), 5309–5351.

Hendershott, T., Menkveld, A.J., Praz, R., Seasholes, M., 2022. Asset price dynamics with limited attention. Rev. Financ. Stud. 35 (2), 962–1008.

Heyden, K.J., Heyden, T., 2021. Market reactions to the arrival and containment of COVID-19: An event study. Financ. Res. Lett. 38, 101745.

Jameson, M., Prevost, A., Puthenpurackal, J., 2014. Controlling shareholders, board structure, and firm performance: Evidence from India. Finance 27, 1–20.

Kaniel, R., Saar, G., Titman, S., 2008. Individual investor trading and stock returns. *The Journal of Finance* 63 (1), 273–310.

Kaniel, R., Liu, S., Saar, G., Titman, S., 2012. Individual investor trading and return patterns around earnings announcements. J. Financ. 67 (2), 639–680.

Kelley, E.K., Tetlock, P.C., 2013. How wise are crowds? insights from retail orders and stock returns. J. Financ. 68 (3), 1229–1265.

Kim, W., Wei, S.-J., 2002. Foreign portfolio investors before and during a crisis. J. Int. Econ. 56 (1), 77–96.

Ko, K., Kim, K., Cho, S.H., 2007. Characteristics and performance of institutional and foreign investors in Japanese and Korean stock markets. Journal of the Japanese and International Economies 21 (2), 195–213.

Kumar, A., 2009. Who gambles in the stock market? J. Financ. 64 (4), 1889–1933.

Kumar, A., Lee, C.M.C., 2006. Retail investor sentiment and return comovements. J. Financ. 61 (5), 2451–2486.

Li, D., Nguyen, Q.N., Pham, P.K., Wei, S.X., 2011. Large foreign ownership and firm-level stock return volatility in emerging markets. J. Financ. Quant. Anal. 46 (4), 1127–1155.

Li, W., Rhee, G., Wang, S.S., 2017. Differences in herding: Individual vs. institutional investors. Pac. Basin Financ. J. 45, 174–185.

Loughran, T., McDonald, B., 2023. Management disclosure of risk factors and COVID-19. Financial Innovation 9 (1), 53.

Neupane, S., Marshall, A., Paudyal, K., Thapa, C., 2017. Do investors flip less in bookbuilding than in auction IPOs? Finance 47, 253–268.

Neupane, B., Thapa, C., Marshall, A., Neupane, S., 2021. Mimicking insider trades. Finance 68, 101940.

Ramelli, S., Wagner, A.F., 2020. Feverish stock price reactions to COVID-19. The Review of Corporate Finance Studies 9 (3), 622–655.

Samal, K., 1997. Emerging equity market in india: Role of foreign institutional investors. Econ. Pol. Wkly 32 (42), 2729–2732.

Schuppli, M., Bohl, M.T., 2010. Do foreign institutional investors destabilize China's A-share markets? J. Int. Finan. Markets. Inst. Money 20 (1), 36–50.

Seven, Ü., Yılmaz, F., 2021. World equity markets and COVID-19: Immediate response and recovery prospects. Res. Int. Bus. Financ. 56, 101349.

Shleifer, A., Summers, L.H., 1990. The noise trader approach to finance. J. Econ. Perspect. 4 (2), 19–33.

Shleifer, A., Vishny, R., 2011. Fire sales in finance and macroeconomics. J. Econ. Perspect. 25 (1), 29–48.

Stein, J.C., 2009. Presidential address: Sophisticated investors and market efficiency. J. Financ. 64 (4), 1517–1548.

Welch, I., 2022. The wisdom of the robinhood crowd. J. Financ. 77 (3), 1489–1527.