How sensitive are IPOs to the fear of the COVID-19 pandemic in emerging markets?

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การเสนอขายหุ้นครั้งแรกของบริษัทมีความอ่อนไหวต่อความกลัวการระบาดของ COVID-19 ในตลาดเกิดใหม่อย่างไร?

น.ส.กวิสรา วจีไกรลาศ

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This study investigates the relationship between COVID-19-related pandemic fear and the short-term performance of initial public offerings in emerging markets. This paper investigates whether the short-term fear of COVID-19 continues to influence post-IPO performance. In doing so, the fundamental methodology is cross-sectional ordinary least squares (OLS) regression and numerous variables are included to the model as control variables.

The results show that whether looking at the first-day trading price of an IPO or the subsequent trading prices, the effect of pandemic fear (GFI, RCI and RDI) was positive. However, results were somewhat different for HighGFI, which was a dummy variable indicating severity of fear as they were negative in all cases. These results conclude that investors are not making IPO decisions in the first few days, but that over time the effect of high pandemic fear accumulates and suppresses subsequent trading prices.

Field of Study:	Finance	Student's Signature .....
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CHAPTER 1

INTRODUCTION

1.1 Research Background

Globally, the COVID-19 pandemic (named for its viral agent, Sars CoV-19, or ‘serious acute respiratory strain coronavirus 19’) has been one of the most disruptive events in recent history. At the time of writing, there have been an estimated 531.6 million cases worldwide, resulting in approximately 6.3 million deaths (World Health Organization, 2022). Public health response has been swift, with more than 11.8 billion vaccine doses administered. However, with new cases rising by 600,000 or more per day (World Health Organization, 2022), and new variants with higher transmissibility emerging every few months since the pandemic’s onset (Mahase, 2021), it is clear that COVID-19 will remain a significant factor for some time. This is particularly true since the delta variant, which is up to 60% more transmissible than the original strain of Sars CoV-19, has effectively placed herd immunity out of reach for the present (McLaughlin, 2021).

The effect of the COVID-19 pandemic has been severe. The pandemic has severely strained medical resources, capacity and staff around the world, with more than a year of pandemic resulting in 22% of nurses intending to leave their jobs (McLaughlin, 2021). The global shipping industry has also been impacted, with the cost of container shipping between Asia and the United States and Europe rising more than six times (McLaughlin, 2021). Other economic effects of the pandemic have included falling production in the manufacturing sector, which has been hobbled by staff shortages and working restrictions, a near-cessation of commercial travel and significant reduction of many tourism industries, and negative effects in economic sectors ranging from hospitality to entertainment, falling consumer spending and many other negative outcomes (Pat et al., 2020). Globally, gross domestic product (GDP) fell by 3.59% in 2020, making it the steepest global recession since 1961 (International Monetary Fund, 2021). Some recovery was expected in the short term,

with projected global growth of 6% in 2021 and 4.4% in 2022, but these years were still not expected to fully recover losses, particularly if the COVID-19 pandemic continued (International Monetary Fund, 2021). In fact world GDP grew by 6.1% in 2021, which was slightly better than anticipated; however, the continued effect of COVID-19, along with the effect of the Ukraine War, is expected to supress growth to 3.6% in 2022-2023 (International Monetary Fund, 2022). Thus, COVID-19, while it is not the only factor in the global economy, continues to have a negative impact on growth. However, this effect is not consistent worldwide. One report estimates that in emerging markets, cumulative per capita income losses (2020-2022) will reach 20% of 2019 GDP, compared to just 11% of 2019 GDP in developed economies (International Monetary Fund, 2021). Thus, emerging economies have suffered, and will continue to suffer, more from the effects of COVID-19 than developed economies. This warrants special attention to the effects of COVID-19 on economic conditions in developing economies.

1.2 Research Rationale

This research addresses a specific question: How sensitive are initial public offerings (IPOs) to the fear of the COVID-19 pandemic in emerging markets? Fear can be a powerful influence on investor behaviour (Economou, Hassapis, & Philippas, 2018). For example, Economou, et al. showed that investor fear was a factor in herding behaviour, exacerbating investor tendencies to 'move with the crowd' rather than respond to substantive market conditions. There is also evidence that investors respond strongly to news about the COVID-19 pandemic in a similar fashion, indicating a level of pandemic fear that is influencing consumer decisions (Shaikh & Huynh, 2021). Shaikh and Huynh's research illustrated that investor fear during the COVID-19 pandemic was stronger than the level of fear that could be observed during the 1987 stock market crash (so-called Black Monday and its consequences) and the 2007-2009 global financial crisis. They also illustrated that these heightened fear levels are influencing equity and commodity investment decisions (Shaikh & Huynh, 2021). Thus, there is already evidence that there is high levels of investor fear – potentially higher than at any point in modern economic history.

There has only been a small amount of research into the effect of COVID-19 related pandemic fear on the short-term performance of IPOs. One of these studies investigated IPOs on the New York Stock Exchange (NYSE), NASDAQ and AMEX stock markets in January to August, 2020 (Mazumder & Saha, 2021). The authors showed that fear of pandemics had a negative effect on IPO performance (although IPO performance was overall higher than average). The authors also showed that there was a persistent effect of fear on post-IPO performance. However, this study drew on only the first few months of the pandemic, and was situated in a single developed economy (the United States). A study in India suggests that while the effects of pandemic-related fear are negative, they may not be statistically significant (Goyal & Manu, 2021). Furthermore, there is evidence that IPOs during COVID-19 have experienced high levels of information uncertainty, which has resulted in more underpricing and more volatile returns (Baig & Chen, 2021). Thus, with limited research and the effects of information uncertainty affecting IPO outcomes, it is unclear from the existing research how COVID-19 pandemic fear would influence IPOs in the short term or long term in emerging markets. This is the research problem taken up by the proposed study, which will seek to fill this gap.

1.3 Research Aim and Objectives

The aim of this research is to investigate the relationship of COVID-19 related fear of pandemics and the short-term performance of IPOs in emerging markets. The objectives include:

1. Establishing the mechanisms through which COVID-19 related fear of pandemic would influence IPO performance in emerging markets.
2. Empirically evaluating how fear of COVID-19 influences short-term IPO performance in emerging markets; and
3. Examining whether the short-term fear of COVID-19 continues to influence post-IPO performance.

1.4 Scope of the Research

This research consists of an econometric analysis of how the COVID-19 pandemic has influenced IPO performance and post-IPO performance in a set of emerging markets. These markets, which included China, India, Indonesia, South Korea, Malaysia, Philippines, Taiwan, and Thailand, were selected from the MSCI Emerging Markets (EM) Asia Index. While this index also includes Pakistan (MSCI, 2021), limited data availability led to exclusion of the six firms headquartered in Pakistan from the study. Analysis was conducted at the daily periodicity. The independent variable of interest was the Global Fear Index (GFI), which is a subject-specific fear index that reflects pandemic news (Mazumder & Saha, 2021; Salisu & Akanni, 2020; Salisu, Akanni, & Raheem, 2020). This variable is a composite that includes two sub-indexes, including the Reported Cases Index (RCI) and Reported Deaths Index (RDI). Both the GFI and the RCI and RDI decomposed indices were investigated. The dependent variables included initial IPO performance (INIT_IPO) and subsequent IPO performance (SUB_IPO), representing the first-day and subsequent-day performance of IPOs. The analysis was conducted in the STATA analysis program, with an ordinary least squares (OLS) analysis approach. The full analysis approach is described in Chapter 3.

1.5 Significance of the Research

This research is mainly of academic significance, although it does have some possible academic importance. The phenomenon of widespread pandemic is a new one in the modern world, a fact which is reflected in the relatively small amount of research that has been conducted on fear of pandemics and IPOs or on the stock market generally. (This research is discussed in Chapter 2.) The COVID-19 pandemic has had widespread effects on global markets, which are still evolving. To date, there has been relatively little investigation of the effects of COVID-19 on IPOs. By investigating the effect of investor fear in detail, including specific fear of COVID-19 and the specific investment context of IPOs, the research can begin a preliminary assessment of how the pandemic has affected the IPO market and how it may change

in future, supporting later empirical or theoretical research. The study could also have some practical importance for investors and managers, though this may be less than the academic importance. Investors may benefit from evidence on the effect of investor fear in investments. Managers could use this information when making decisions such as whether to conduct an IPO and when to time it.

1.6 Overview of the Study

This research is structured in four additional chapters, which follow the aims and objectives set out in this chapter. Chapter 2 presents the literature review, which reviews the theoretical basis for the study and the empirical evidence for the effect of pandemic-specific fear on IPO performance. Chapter 3 describes the methodology used for the study, including the data collection and analysis techniques. In Chapter 4, the findings are presented. They are then discussed with the literature to identify the theoretical and empirical importance of the findings. Chapter 5 concludes the study by offering a summary of findings and critical reflection on the implications of the study's findings, the limitations of the study, and opportunities for further research.

CHAPTER 2

LITERATURE REVIEW

The literature review was conducted to establish a theoretical framework and identify the relevant empirical research and relationships. This literature review allowed the researcher to formulate hypotheses which represent the expected findings of the research. This chapter begins with an overview of the theoretical framework, including investor sentiment and investor fear. Empirical evidence for the general role of investor sentiment and investor fear on investment decisions is reviewed after the theoretical review. In the second section of the chapter, the research on fear of pandemics is reviewed, examining both effects on investor decisions generally and effect on IPO pricing and post-IPO performance of new firms. The hypotheses of the research are presented in this section.

2.1 Theoretical Background

2.1.1 Investor Sentiment

This research is fundamentally concerned with investor sentiment. Investor sentiment refers to the formation of beliefs on the part of investors about markets and investment instruments (Barberis, Shleifer, & Vishny, 1998). More specifically, it can be defined as "a belief about future cash flows and investment risks that is not justified by the facts at hand (Baker & Wurgler, 2007, p. 129)"

Investor sentiment is formed in response to external information (e.g. news and announcements), which the investor assesses using bounded rationality, meaning that the decisions based on this news are as rational as can be expected, but still subject to individual cognitive biases and heuristics (Shu & Chang, 2015). Thus, investor sentiment is beliefs which are not firmly grounded in factual analysis, even if investors believe they are being rational (Shu & Chang, 2015). To reflect this, investor sentiment can be decomposed into rational and irrational components, which are supported and unsupported by fundamentals respectively (Saade, 2015).

Investor sentiment influences investor decision-making, and on a large scale can cause underreaction or overreaction to market news (Barberis et al., 1998). Investor sentiment can cause herding behaviour, in which investors flock to or away from specific markets, instruments and so on without a strong underlying performance reason (Economou et al., 2018; Shu & Chang, 2015). It can also cause overpricing or underpricing of stocks, although this eventually corrects itself (Baker & Wurgler, 2007). This research looks at the effect of one specific kind of effect of investor sentiment: its influence in the pricing of IPOs.

2.1.2 'Clustering' of IPOs and the Possible Influence of Investor Sentiment

It is an empirical fact that IPOs tend to 'cluster', or occur together, rather than being normally distributed (Bouis, 2009). For example, the onset of financial crisis in 2008 coincided with the lowest level of IPOs in the US market since the 1970s (Bouis, 2009). However, exactly why this occurs is uncertain. This clustering of IPOs is only weakly connected to the availability of real opportunities, for example industry changes or other factors (Plotnicki & Szyszka, 2014). However, there are a variety of other possible causes that have been proposed.

One possible explanation is market timing, which holds that IPOs are deliberately offered by firms at times when the market seems to be supportive of issuance, or when the firm's leaders feel the price may be highest (Plotnicki & Szyszka, 2014). For the individual firm, this is theoretically an attempt to reach the optimal capital structure through reduction of equity costs as far as possible (Baker & Wurgler, 2002, 2007). Coupled with feedback from IPOs from other firms, this creates a herding effect, in which firms that are nearing an IPO may be influenced into (or away from) completing an IPO based on the performance of similar firms (Plotnicki & Szyszka, 2014). This may be only a short-term effect, but it is sufficient to create clusters of IPOs (Bouis, 2009). However, this explanation does not necessarily hold true in all markets; for example, an assessment of market timing in Turkey showed that there was no evidence of deliberate market timing (Celik & Akarim, 2013). Thus, while market timing is a possible factor in some IPO clusters, it is not a universal explanation.

A broader explanation for the phenomenon has to do with investor sentiment, particularly the unsupported component of investor sentiment. As Baker and Wurgler (2007) noted, regardless of whether investor sentiment is founded in objective fact, investors make decisions based on it; therefore, for a firm or investor to go against investor sentiment can be extremely risky. This phenomenon explains why firms may not be priced based on fundamentals, but rather on external factors (Baker & Wurgler, 2007). Investor sentiment is relevant to IPOs because it can affect whether IPOs are overpriced or underpriced at offer. For example, Saade's (Saade, 2015) analysis of United States-based IPOs (1992 to 2009) showed that those that floated at times of high irrational investor sentiment were fundamentally overpriced at issuance, and therefore showed lower aftermarket returns. However, the rational component showed no such effect. Therefore, this study investigates irrational investor sentiment.

2.1.3 Investor Fear

The specific investor sentiment the study examines is investor fear. Investor fear can be understood to be a special case of investor sentiment, representing negative beliefs about the performance of the market, investment instruments and so on (Smales, 2014, 2017). Furthermore, these negative beliefs are not strongly grounded in evident facts, but instead represent impressions that form following news and other events (Smales, 2014, 2017). Thus, investor fear can be characterized as one of the irrational components of investor sentiment (Baker & Wurgler, 2007), in that it is both based in bounded rationality and may not be firmly grounded in facts.

Investor fear is of interest here because it is associated with specific forms of irrational investor behaviour. One of these forms of behaviour is herding, in which a large number of investors make a nearly simultaneous movement in the market that does not appear to be founded in market fundamentals (Aharon, 2021; Economou et al., 2018; Gurdgiev & O'Loughlin, 2020). Herding behaviour can have various effects in the market, including creating bubbles (when investors herd toward a particular investment) and collapses (when they herd away) (Economou et al., 2018). Such behaviour has been observed in a range of investment markets in response to fear, including cryptocurrency markets (Gurdgiev & O'Loughlin, 2020) and stock markets (Economou et al., 2018; Gurdgiev & O'Loughlin, 2020). In cryptocurrency markets,

fear and uncertainty have also been associated with anchoring and recency biases, in which investors make decisions based on their partial knowledge rather than the actual fundamentals; for example, in anchoring investors may be reluctant to move away from their perceived price, while recency bias causes investors to place higher priority on recent news or developments than older ones (Gurdgiev & O'Loughlin, 2020) Thus, investor fear is important because of its potential to influence investor decisions outside of the fundamental performance of the investment asset.

Investor fear can be challenging to measure directly, but can be represented by enduring proxy measures (Baker & Wurgler, 2007). Among these measures, one of most commonly used proxies is the Chicago Board of Options (CBOE) Market Volatility Index (VIX), commonly known as the 'investor fear gauge' (Whaley, 2000). The VIX is an implied volatility index, which measures expected future volatility; therefore, a higher VIX indicates higher investor fear levels (Whaley, 2000). The VIX has also been shown to react asymmetrically to negative news items, indicating that it does respond to increased investor concern (Smales, 2014). Therefore, this is the standard approach to measuring investor fear. However, as VIX does not address a specific issue (in this case the COVID-19 pandemic), the VIX may not be as useful in this research. Instead, a fear index constructed specifically for pandemic fear (Mazumder & Saha, 2021; Salisu & Akanni, 2020; Salisu et al., 2020) is adopted. This measure, which is discussed below, specifically addresses the current investor sentiment regarding COVID-19 news (including cases and deaths), isolating the specific investor fear of pandemic from broader investor uncertainty.

2.1.4 Investor Fear in Emerging Markets

It is worth considering briefly whether investor fear influences emerging markets in the same way as developed markets, and whether it can be measured in the same fashion. Evidence on investor fear in emerging markets is limited, with most studies focusing on developed markets (especially the United States) (Shaikh & Padhi, 2015). There has also been limited research into the use of proxies like VIX in emerging markets, with again most studies focusing on American equity markets (Sarwar, 2012). Thus, this is very much an open question whether later researchers after Sarwar and Shaikh and Padhi have not fully resolved. However, since their

studies both showed that implied volatility indices, including the VIX itself (Sarwar, 2012) and domestic implied volatility indices (Shaikh & Padhi, 2015), do predict market movements in BRIC countries (including Brazil, Russia, India and China), it can be inferred that investor fear and its measurement may be similar in emerging markets. At the same time, a second study in BRIC countries showed a high level of variability of market responses to VIX (Owusu Junior et al., 2021). However, this is an incomplete representation, which has underlain efforts to develop market-specific fear indexes such as the China volatility index, to better represent investor fear in emerging markets (Long, Zhao, & Tang, 2021).

Research on investor sentiment more broadly also supports that it is influential in the investment decisions of emerging market investors, although this could be more nuanced in emerging markets. For example, one study compared investor sentiment and market liquidity in 12 emerging markets (Debata, Dash, & Mahakud, 2018). These authors showed that investor sentiment was positively associated with liquidity in the market. At the same time, they showed differential effects of foreign and domestic investor sentiment, with foreign investor sentiment having an unexpectedly strong influence on liquidity (Debata et al., 2018). A study in Eastern European emerging markets also showed some high variability between markets, although it was also shown to influence stock returns (Corredor Casado, Ferrer Zubiate, & Santamaría Aquilué, 2015). Like Debata et al. (2018), these authors also showed that foreign investor sentiment was a significant determinant of returns. Therefore, there is a high level of certainty that investor sentiment does have an influence on stock returns in emerging markets, even if this is not exactly the same as it is in developed markets. Since investor fear is an aspect of investor sentiment (Smales, 2017), this relationship is expected to be translated to investor fear.

The lack of evidence and ambiguity on investor fear in emerging markets offers this study an opportunity to contribute to the literature, as it is focused on Asian emerging markets. While this research proceeds under the assumption that investor fear is relevant to investors in emerging markets, it does not assume that the effects of investor fear will be exactly as observed in developed markets.

2.2 Investor Fear, Pandemics, and IPOs

The empirical question this research addresses relates to a specific source of investor fear: the fear of the COVID-19 pandemic and its effects on financial markets, especially IPOs. While there has been some effort in the literature to investigate fear of pandemics generally, prior to the COVID-19 pandemic this was limited. Since the COVID-19 pandemic, there have been several studies conducted that have investigated investor fear and its stock market effects, but relatively few of these have focused on IPOs.

2.2.1 Pre-COVID Research on Investor Fear of Pandemics and Financial Markets

While studies of fear of pandemics were relatively uncommon prior to the COVID-19 pandemic, there have been a few studies that have investigated the role of some earlier pandemics in financial markets. One study investigated the effect of the SARS outbreak in Taiwan on the stock prices of hotel companies in the country (Chen, Jang, & Kim, 2007). This study showed that there were significant negative cumulative abnormal returns (CAA) in the periods following the SARS outbreak. The authors investigated one-month and two-month subsequent earnings from a set time period, finding a CAR of up to -7.56% (depending on the analysis techniques). This was higher than any of the other sectors tested, which were not directly involved in the outbreak. This analysis is limited, particularly in that there was only a small number of listed hotels included in the analysis. Furthermore, in comparison to the current study, there was only a single event, rather than an ongoing event. Regardless, Chen et al. (2007) study does support the idea that pandemics themselves (if not fear of pandemics) does affect subsequent returns of existing stocks. However, there is also some contradictory evidence. Earlier research that was conducted in limited pandemics such as SARS (serious acute respiratory syndrome, occurring in China and four surrounding countries in 2003) and MERS (Middle Eastern respiratory syndrome, which was first identified in Saudi Arabia in 2012), suggested that the stock market may benefit from pandemics (despite their broader effect on society) (Donadelli, Kizys, & Riedel, 2017). Thus, in addition to being limited in scale and

scope, earlier studies on pandemics had contradictory and ambiguous findings. Despite the relatively new occurrence of COVID-19, there is already more evidence stemming from this specific event that shows a much wider effect compared to earlier pandemics.

2.2.2 COVID-related research on investor fear of pandemics and financial markets

2.2.2.1 COVID-related fear of pandemics and the financial market

Several authors have previously investigated the fear of COVID-19 and its effect on stock market performance, as well as other aspects of financial performance. These studies have routinely found that investor fear and other investor sentiment measures do have a significant effect on financial markets.

Some studies have investigated the effects of pandemic fear on a wide-ranging set of investments. An analysis of the first 100 days of the COVID-19 pandemic, which was characterised by extremely high uncertainty and fear, showed that investors flocked toward certain investments (including gold and American, British and German sovereign bonds) and away from other, riskier investments (Kinateder, Campbell, & Choudhury, 2021). Another study investigated the effect of investor fear during the COVID-19 pandemic on specific types of investment instruments (Shaikh & Huynh, 2021). The authors found that there was a marked overreaction of American equity, commodity and foreign exchange markets, which was stronger than previous crisis periods. As expected, increased VIX led to lower stock returns (Shaikh & Huynh, 2021). It is possible that investor fear is causing contagion effects between investment markets, as shown in an investigation of Chinese stock and bond markets (Mezghani, Boujelbène, & Elbayar, 2021). However, there has been limited investigation of this point.

Other studies have investigated effects of investor fear on specific commodity markets or investment instruments. One of these studies showed that both components of investor sentiment had a significant negative effect on oil markets during the first half of 2020 (the earliest stage of the pandemic) (Shaikh, 2021b). However, another study showed that COVID-19 related fear had a positive effect on

the 10-year sovereign bond yield in the G-7 countries (Paule-Vianez, Orden-Cruz, & Escamilla-Solano, 2021).

The effect of investor fear on market returns has also been examined. An investigation of regional stock market indices also found that investor fear during the pandemic had a negative effect on returns, as predicted (Szczygielski, Bwanya, Charteris, & Brzeszczyński, 2021). The authors also showed that COVID-19 related uncertainty (as proxied by search data) was negatively associated with market performance, and that Asian markets were more resilient than those in other regions (Szczygielski et al., 2021). Another study, investigating global equity markets, also found that investor sentiment negatively affected outcomes (Shaikh, 2021a). Furthermore, according to another study, this effect was persistent over several days (Subramaniam & Chakraborty, 2021). Several other studies have also been conducted using an event study approach that have found a negative effect of the COVID-19 pandemic outbreak itself on global stock markets (Khatatbeh, Hani, & Abu-Alfoul, 2020; Panyagometh, 2020; Sayed & Eledum, 2021; Sun, Wu, Zeng, & Peng, 2021). Thus, these studies provide strong evidence for COVID-19 related fear of pandemic influencing stock markets.

There is some variation between studies. For example, there may be a cultural component to the effect of COVID-19 related investment uncertainty, as authors have found effects are higher in countries with lower individualism (collectivist societies) and higher uncertainty avoidance (Fernandez-Perez, Gilbert, Indriawan, & Nguyen, 2021). A regional study, which was based on six World Health Organization (WHO) regions, showed that while all regions had effects, the Western Pacific region was more strongly negatively affected (Al-Qudah & Houcine, 2021). An analysis of major global markets showed different co-movements in China than other countries as well (Louhichi, Ftiti, & Ameur, 2021). There is also temporal variation, with one analysis suggesting herding behaviour occurred more at the start of the pandemic and has lessened as it has gone on (Kim, 2021), having potentially been mitigated by government responses (Kizys, Tzouvanas, & Donadelli, 2021).

In summary, there is strong evidence that investor fear of the COVID-19 pandemic specifically is having a negative effect on global financial markets. These studies do support the current research in several ways, including supporting

the effects of pandemic events on stock prices generally and establishing that these effects take place over the long term. Though this does not specifically address the question of pandemic fear, it does support the idea that pandemic events will influence stock prices in the longer time. While the ongoing nature of the COVID-19 pandemic is the reason for rejecting the event study approach in this case (the methodology is designed for windows around single events (Sitthipongpanich, 2011), these findings are nonetheless helpful, especially for supporting the effect of subsequent effects.

In summary, there has already been comprehensive research that shows that COVID-19 related fear, especially coupled with information uncertainty, has a negative effect on market performance in the general case of equity and commodity markets. This research focuses on a specific aspect of financial performance, which is IPO performance.

2.2.2.2 COVID-related fear of pandemics and IPOs

There has been somewhat less research that has addressed the effect of COVID-19 related investor fear on IPOs specifically, but the evidence that does exist suggests that the same relationship exists, at least in the short term. One of the complicating factors, especially in early research, is that the first several weeks of the COVID-19 pandemic were characterised by a sharp drop in IPO activity as firms chose to delay their IPO due to uncertainty (Halling, Yu, & Zechner, 2020). While this had accelerated again by late 2020, it would have made analysis of the impact of investor fear on IPOs challenging in some markets. Thus, the reason for the lack of evidence to date is not that this is an uninteresting question, but simply that there has been limited time to collect information on the topic.

There have been a few studies that have addressed the effect of COVID-19 related fear on IPOs, but the situation is unclear. As one group of authors noted, early evidence suggested that the COVID-19 pandemic had a positive effect on the IPO market, contrary to expectations (Baig & Chen, 2021). However, this can be explained relatively straightforwardly, because a combination of information uncertainty and a high rate of IPOs from technology and medical companies, which were more positively viewed than other firms during this time (Baig & Chen, 2021).

A second study investigated the effect of COVID-19 pandemic fear on IPOs in the US stock market (including the NYSE, NASDAQ and AMEX exchanges) (Mazumder & Saha, 2021). Like Baig and Chen, Mazumder and Saha also observed that IPO performance in this period was higher on average than the period 1980-2019. However, they also observed a negative effect of pandemic fear (calculated based on reported cases and deaths, rather than the VIX index of general investor fear) on initial and subsequent returns of IPO stocks. Therefore, Mazumder and Saha's research shows that fear of the COVID-19 pandemic did have a significant negative effect on IPO performance, even in the face of seemingly higher performance than previously. However, this research is limited in that it only draws on the US market, which as noted above may not be representative. Another limitation is that the authors used only a single day as the subsequent trading period from the first-day returns. The event study approach to investigating the effect of news events on stock prices has shown much longer effects in some cases, although these effects are highly varied (Sitthipongpanich, 2011). Therefore, such a short window to investigate the effects may be insufficient. To address this limitation, the present study will use longer windows for subsequent performance as discussed in the methodology chapter.

Evidence from emerging markets is limited, although a study in India has investigated the question (Goyal & Manu, 2021). These authors had contrary findings. They found that IPOs performed well compared to previous years. Furthermore, they found that performance of newly listed companies did not have a significant negative relationship to COVID-19 pandemic fear, although there was a very weak relationship to COVID-19 deaths (Goyal & Manu, 2021).

In summary, the evidence on the effect of investor fear of the COVID-19 pandemic is as yet limited, inconsistent and inconclusive. However, the studies have suggested that the effect of COVID-19 fear on IPOs may be significant and negative on the initial valuation of IPOs. Furthermore, there is some evidence that fear of the COVID-19 pandemic could also have an effect on the subsequent returns of IPO stocks, although this is a complex question that has not been tested directly. In general, there is evidence that negative events can have an effect on the stock price of firms, suggesting that there could also be a negative effect here. Thus, there is both theoretical and empirical support for investor fear of COVID-19 having an immediate

negative effect on first-day returns, and potentially a negative effect on subsequent returns. Therefore, the central hypotheses of this research are:

Hypothesis 1: Investor fear of the COVID-19 pandemic has a significant negative effect on initial return of IPO stocks.

Hypothesis 2: Investor fear of the COVID-19 pandemic has a significant negative effect on subsequent return of IPO stocks.

CHAPTER 3

RESEARCH METHODOLOGY

The research methodology drew on previous studies byMazumder and Saha (2021); Salisu and Akanni (2020), which have laid the groundwork in developing a COVID-19 specific fear index and testing the initial application of this fear index to IPO pricing. This makes these three studies the most comprehensive to date to have investigated the relationship of investor COVID-19 fear and IPO pricing. Additional aspects of the research design included known aspects of IPO pricing and performance, as developed from the work of other authors. The analysis approach included descriptive statistics, OLS regression and panel data regression. Here, the planned population and sample, data collection and analysis approaches of the study are described.

3.1 Data Set

The research addressed IPOs in emerging markets. The MSCI Emerging Markets (EM) Asia Index will be used to select the markets to be included in the study. This index includes nine leading emerging markets (China, India, Indonesia, South Korea, Malaysia, Pakistan, the Philippines, Taiwan and Thailand) (MSCI, 2021).

The sample will be restricted to IPOs that occurred from January 2020 to July 2021.The initial search found that there was a total of 812 companies that issued an IPO during the period, of which the majority were in China. Table 1 summarises the IPOs by market. Some sample was excluded from the sample, due to lack of data that was needed for other aspects of the study leading to a sample size of n = 604 firms.

Table 1 Summary of IPOs in MSCI EM Asia Markets

Market	Number of IPOs	Percent of Sample
China	266	44.04%
India	57	9.44%
Indonesia	59	9.77%
Korea	124	20.53%
Malaysia	27	4.47%
Pakistan	5	0.83%
Philippines	4	0.66%
Taiwan	39	6.46%
Thailand	23	3.81%
Total	604	

3.2 Variables and Data Collection

Table 2 summarizes variables and data sources. The GFI variable (the main predictor variable for the study) was calculated using the approach described by Salisu and Akanni (2020). This approach is a composite index of the Reported Cases Index (RCI) and Reported Deaths Index (RDI) (Salisu & Akanni, 2020). This data was sourced from national statistics offices of the countries involved in the research. There were some variables that were used by Mazumder and Saha (2021), such as venture capital and underwriter reputation, that were excluded from the analysis plan, primarily because this data is not typically available for developing markets in general and specifically could not be sourced for several of the countries within the study. Therefore, these could not be calculated accurately.

3.2.1 Dependent Variables

Dependent variables included IPO_INIT (for Hypothesis 1) and IPO_SUB (for Hypothesis 2), representing the initial and subsequent daily returns (market adjusted). IPO_INIT measured the initial return of the stock, while IPO_SUB measured subsequent daily return. These variables were extracted from national stock

exchanges. IPO_INIT was measured using the daily return (Mazumder & Saha, 2021). This measure reflects the first-day trading performance of the IPO, as reflected in the close-of-day trading (after any adjustments made) (Mazumder & Saha, 2021).

IPO_SUB is the subsequent day return, based on "the difference between today's and yesterday's price scaled by yesterday's price" (Mazumder & Saha, 2021, p. 7). In effect, therefore, the IPO_SUB price as calculated by Mazumder and Saha (2021) represents the change in daily return in the day following the IPO (the 1-day change). However, there is evidence that prices continue to change well beyond the 1-day price performance of an IPO. Studies on IPO underpricing have found abnormal price effects from the initial IPO up to a year later (Sahoo & Rajib, 2010; Vong & Trigueiros, 2010).

This research was not exactly investigating the effects of the initial IPO price; instead, it focuses on what is fundamentally an event (the current situation of COVID-19 at the time of IPO). Therefore, this study adopted an event study approach for investigating performance, going beyond Mazumder and Saha (2021) to also measure IPO_SUB at subsequent intervals, including day 7 (indicating first-week trading performance) and day 30 (indicating first-month trading performance). Event studies, which are typically used to investigate the effect of news and events on stock price performance, use different post-event windows, such as one-day, one-week and one-month, though the exact window width varies (Sitthipongpanich, 2011). These measures are called IPO_SUB1, IPO_SUB7 and IPO_SUB30 respectively. This extension of Mazumder and Saha's (Mazumder & Saha, 2021) first-day performance test was conducted, as explained in the prior chapter, in order to determine whether there is any subsequent change in price that incorporates the COVID-19 fear index. However, after day 30, it is likely that the offered stock will have additional news and may be trading on substantive performance measures (Sitthipongpanich, 2011); therefore, extending the analysis beyond day 30 is unlikely to be relevant.

3.2.2 Independent Variables

The fear index (global fear index or GFI) was constructed following previous authors, who constructed two separate fear indices and then combined these indices using an unweighted average (Mazumder & Saha, 2021; Salisu & Akanni, 2020;

Salisu et al., 2020). The GFI was constructed based on earlier indices that addressed panic and fear, typically associated with media panics (Salisu & Akanni, 2020). The GFI is distinct from the CBOE implied volatility index, typically used as a general fear index, because it measures fear associated with specific events (Salisu & Akanni, 2020). Therefore, the COVID-19 fear index as constructed initially by Salisu and Akanni (2020) is appropriate for investigating a specific source of fear that could affect stock performance, distinguishing them from broader sources of market stress or fear. While at least one author had developed a COVID-19 fear index, the alternative model was based on Google Trends data, representing the concern level rather than substantive news (Subramaniam & Chakraborty, 2021). This approach has not been selected by other authors, and therefore it was not considered here.

The GFI is made up of an unweighted average of two component indices (Salisu & Akanni, 2020; Salisu et al., 2020). The first component is the reported case index (RCI), which "Measures how far people's expectations on reported cases in the preceding 14-days period veered from the present day's reported case (Salisu et al., 2020, p. 6)." In other words, the RCI does not measure reported cases *as such*, but instead how much better (worse) reported cases are on a given day compared to two weeks previous (Salisu & Akanni, 2020). This assesses, in short, whether the pandemic is decelerating, accelerating or staying the same in the short term.

Mazumder and Saha's (Mazumder & Saha, 2021) formula for the RCI is:

$$RCI_t = \frac{Reported\ cases_t}{Reported\ cases_t + Reported\ cases_{t-14}}$$

This formula assumes that *t* is a given day, with the incubation period being a 14-day period (Mazumder & Saha, 2021).

The second component of the fear index is the reported death index (RDI), which is essentially defined in the same way as the RCI, but using the reported deaths as the metric (rather than reported total cases) (Mazumder & Saha, 2021; Salisu & Akanni, 2020; Salisu et al., 2020). Once again, this represents whether the pandemic

is accelerating or decelerating, using the more serious measure of reported deaths. RDI is measured in Mazumder and Saha's (Mazumder & Saha, 2021) fear index as:

$$RDI_t = \frac{Reported\ deaths_t}{Reported\ deaths_t + Reported\ deaths_{t-14}}$$

Where *t* is a given day, and assuming a 14-day incubation period.

The two measures are then averaged as mentioned above to create a global fear index (GFI) (Mazumder & Saha, 2021; Salisu & Akanni, 2020; Salisu et al., 2020):

$$GFI_t = \frac{RCI_t + RDI_t}{2}$$

This analysis used essentially the same approach as previous authors, defining the RCI and RDI as well as an averaged FEAR (or GFI measure) that reflects both of these measures. However, it was not assumed that IPO investment and pricing decisions will all be made on day *t*. This is because first-day IPO investment, unlike other types of investment, is typically made by hand-selected institutional and other large investors, who have already reviewed the IPO prospectus and other information (Anderson & Huang, 2017; Gregoriou, 2006).

3.2.3 Control Variables

Control variables were used to reduce the amount of unexplained variance in the model, reducing the effect of confounding and exogenous variables on the relationship of the independent and dependent variable(s) (Wooldridge, 2013). The majority of control variables were adapted from Mazumder and Saha (2021), but there are some additional variables that have been used in other studies that have also been used. (HITECH, ROA, and CHINA)

There are two dummy variables that represent industries that are known to have performed particularly well during the pandemic. The first of these is HI-TECH,

representing firms in the computer hardware, software, and services sector and other high-technology industries (Mazumder & Saha, 2021). This dummy variable was extracted from national stock exchange data. The second control variable, ROA, is a measure of financial performance (return on assets), which is commonly included as control variables in financial econometrics studies that are conducted at the firm level. The third control variable, CHINA, represented whether the firm was headquartered in China.

Table 2 *S*ummary of Variables and Data Sources

Variable	**Definition**	**Data Sources**
Independent Variable(s)		
Reported Cases Index (RCI)	$RCI_t = \frac{Reported\ cases_t}{Reported\ cases_t + Reported\ cases_{t-14}}$	National statistics offices
Reported Death Index (RDI)	$RDI_t = \frac{Reported\ deaths_t}{Reported\ deaths_t + Reported\ deaths_{t-14}}$	
Global Fear Index (GFI)	$GFI_t = [0.5(RCI_t + RDI_t)]$	
HIGHFear	Dummy variable: 1 if GFI > median (GFI)	
Dependent Variables		
IPO_INIT	Initial return T=0	Bloomberg
IPO_SUB1	Subsequent return T=1	
IPO_SUB7	Subsequent return T=7 (indicating first-week trading performance)	
IPO_SUB30	Subsequent return T=30 (indicating first-month trading performance)	

Variable	Definition	Data Sources
Control Variables		
HI-TECH	Dummy: 1 = Company is a high-tech firm (Loughran and Ritter, 2004)	Bloomberg
CHINA	Dummy: 1 = Chinese Company	
ROA	Income-to-asset ratio (Expectation: Higher ROA, Higher return (Mazumder and Saha,2021))	
FDVOL	log of first-day trading volume (Expectation: High volume, High return(Hon-Wei Leow, Wee-Yeap Lau,2020))	
TRI	Stock market Return (Expectation: High market return, High IPO return (Hanley, 1993))	Data streaming

3.3 Analysis

3.3.1 Analysis Tool

The analysis was conducted in Stata, a standard econometric analysis package. Stata was selected because of its flexibility and the range of potential analysis tools that can be used (Boffelli & Urga, 2016). Stata was also selected because is a standard tool for financial econometrics (Boffelli & Urga, 2016; Wooldridge, 2013), making it useful for this study.

3.3.2 Ordinary Least Squares (OLS) Regression (Hypothesis 1)

The initial returns (Hypothesis 1) were investigated using cross-sectional ordinary least squares (OLS) regression (Wooldridge, 2013), using the equation:

$$IPO\_INIT_i = \beta_0 + \beta_1 GFI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

In this equation, the GFI and *HighFear* variables represented the previous day, while the control variables β_3 were for the previous period.

3.3.3 Subsequent Returns (Hypothesis 2)

The subsequent returns (Hypothesis 2) were also investigated using OLS regression. This approach was appropriate because the data was cross-sectional, using an event methodology (Sitthipongpanich, 2011).

The regression equation, as patterned on Mazumder and Saha (2021); (Salisu & Akanni, 2020; Salisu et al., 2020), was:

$$IPO\_SUB_i = \beta_0 + \beta_1 GFI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

The same regression formula is used for IPO_SUB1, IPO_SUB7 and IPO_SUB30. However, the dependent variable is different, being the mid return on trading day 1, 7, and 30 post-IPO respectively. These variables were treated in the same way as the first day returns and came from the same sources.

3.3.4 Aggregate and Decomposed Fear Index Tests

The fear index (Mazumder & Saha, 2021; Salisu & Akanni, 2020; Salisu et al., 2020) is a newly constructed index that has not been employed in many contexts. Therefore, part of the empirical value of this research is testing the components and averaged index to examine whether IPO prices are more sensitive to one of these fear indices. To address this need, the analysis procedure included three OLS regression tests for each hypothesis, including the RCI, RDI and GFI (our averaged measure) as the independent variable of interest for each test. This approach assisted in testing of the sensitivity of the IPO initial and subsequent returns to investor fear based on different formulations. Therefore, the regression model was changed slightly from the model used by Mazumder and Saha (2021). For the current analysis, the basic regression models were formulated as:

(Regressions for initial performance):

$$IPO\_INIT_i = \beta_0 + \beta_1 GFI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

$$IPO\_INIT_i = \beta_0 + \beta_1 RCI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

$$IPO\_INIT_i = \beta_0 + \beta_1 RDI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

(Regressions for subsequent returns):

$$IPO\_SUB_i = \beta_0 + \beta_1 GFI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

$$IPO\_SUB_i = \beta_0 + \beta_1 RCI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

$$IPO\_SUB_i = \beta_0 + \beta_1 RDI_{d-1} + \beta_2 HighFear_{d-1} + \beta_3 X_{i,t-1} + \varepsilon_i$$

3.4 Summary Statistic

3.4.1 IPO Return

Table 3 presents the summary statistics of the initial and subsequent return for IPOs from January-2020 to July-2021which summarizes the distribution by year. The sample consists of 604 firms. Initial return is the ratio of the difference between the closing price on the first day of trading and the offer price divided by the offer price. Subsequent return including day 1 (first-day trading performance), day 7 (first-week trading performance) and day 30 (first-month trading performance. The mean initial return is 42% in 2020, as opposed to 86.4% in 2021 while the mean subsequent return is 44.7% in 2020, as opposed to 80.3% in 2021. Table 4 shows the mean of initial and subsequent return by their countries. The mean initial return and first-day trading performance of China is highest among all other countries whereas Pakistan is the lowest. For the first-week and first-month trading performance, India has the highest mean return while Pakistan has the least mean return.

Table 3 Summary statistics: IPO return

	N	Mean	Std. Dev	Min	Max
Year: 2020					
Initial Return	383	0.420	0.810	-1	7.073
Subsequent Return (1 day)	383	0.447	1.103	-1	12.02
Subsequent return (7 day)	383	0.410	1.056	-1	7.213

	N	Mean	Std. Dev	Min	Max
Subsequent return (30 day)	383	0.389	1.055	-1	7.942
Year: 2021					
Initial Return	221	0.864	1.244	-1	8.750
Subsequent Return (1 day)	221	0.803	1.634	-1	19.542
Subsequent return (7 day)	221	0.512	1.322	-1	12.500
Subsequent return (30 day)	221	0.826	2.118	-1	18.642

Table 4 Summary statistics: mean of IPO return by countries

Countries	Initial Return	Subsequent Return (1 day)	Subsequent return (7 day)	Subsequent return (30 day)	# IPOs
China	0.934	0.904	0.615	0.710	266
India	0.301	0.484	0.968	1.412	57
Indonesia	0.038	0.004	-0.113	0.014	59
South Korea	0.321	0.307	0.248	0.200	124
Malaysia	0.455	0.375	0.320	0.468	27
Pakistan	-0.024	-0.029	-0.052	-0.388	5
Philippines	0.082	0.241	0.378	0.339	4
Taiwan	0.436	0.444	0.295	0.331	39
Thailand	0.647	0.611	0.256	0.429	23

3.4.2 Descriptive statistic

The table provides descriptive statistics for all variables. The average of reported cases and death cases were similarly at 0.51. The maximum changed in initial IPO return was 1,274% with average of 77%. The results also showed that

performance in the first-day trading given highest return among other time horizon at 1,954% with average of 76%.

Table 5 Descriptive statistics

	N	Mean	Std. Dev	Min	Max
RCI	812	0.511	0.112	0.130	1
RDI	812	0.516	0.115	0.011	0.986
GFI	812	0.514	0.103	0.070	0.993
HIGHGFI	812	0.479	0.499	0	1
IPO_INIT	812	0.771	1.281	-1	12.739
IPO_SUB1	812	0.763	1.492	-1	19.542
IPO_SUB7	812	0.655	1.398	-1	13.560
IPO_SUB30	812	0.734	1.630	-1	18.642
HITECH	812	0.107	0.309	0	1
CHINA	812	0.501	0.500	0	1
ROA	812	3.784	17.175	-199.367	93.434
FDVOL	604	15.976	2.673	4.605	21.321
TRI	812	0.001	0.019	4.605	0.215

CHAPTER 4

RESULTS AND DISCUSSION

The first research objective, 1) to establish a theoretical mechanism by which COVID-related fear of pandemic could affect IPO performance in developing countries, was accomplished in Chapter 2. This chapter presents and discusses the results of the analysis conducted to investigate the second and third research objectives. These objectives include: 2) to empirically evaluate how fear of COVID-19 influences short-term IPO performance in emerging markets and 3) examining whether short-term fear of COVID-19 continues to influence post-IPO performance. The methodology used to achieve these objectives was explained in Chapter 3.

This chapter begins with presentation of the empirical results, which included six estimates, for the first-day effect and the subsequent performance effect of the GFI and its two components of RCI and RDI. The second half of the chapter discusses the results with the literature review, to evaluate how well the theoretical mechanism of investor fear explained IPO performance.

4.1 Results

The initial population size was 812 observations, based on the data in Table 1. Afterward, a total of 208 observations were removed from the sample due to the unavailability of some or all of the data. This left a total of 604 observations, all of which were used within the tests. Therefore, the final sample size represented 74.4% of the available population size.

The hypotheses were tested using ordinary least squares (OLS) regression. Each hypothesis was tested three times, first with the composite fear index (GFI) and then with the two decomposed indices (RCI and RDI). Overall, this led to a total of 12 regression tests, including three tests each for offer-day returns (IPO_INIT), first day post-IPO (IPO_SUB1), seven days post-IPO (IPO_SUB7), and thirty days post-IPO (IPO_SUB30).

The results are arranged by the hypothesis they were associated with. Significance is assessed at confidence levels of 10% or below ($p < .01$) for main predictors and control variables. Additional measures reported include F-test, r-square and adjusted r-square, and root mean square error (RMSE). However, these measures do not strongly influence the reliability of outcomes in an OLS model (Wooldridge, 2013). Therefore, they are not discussed extensively.

4.1.1 COVID-related Fear of Pandemic and Initial IPO Returns (Hypothesis 1)

The first hypothesis was stated in Chapter 2 as:

Hypothesis 1: Investor fear of the COVID-19 pandemic has a significant negative effect on initial return of IPO stocks.

This hypothesis was tested three times, using the pre-IPO day's calculated Global Fear Index (GFI) (Model 1), the Reported Case Index (RCI) (Model 2), and the Reported Death Index (RDI) (Model 3). Results are summarized in Table 6. These results are surprising, given the predicted outcomes from the literature review.

Model 1 (GFI). Model 1's results showed a positive and significant ($p < .01$) effect of GFI on IPO_INIT. Other significant effects included CHINA and ROA. Other relationships, including HighGFI, TRI, HITECH, and FDVOL were not significant. This result suggests that the previous day's fear index had a positive effect on the initial IPO price, rather than a negative effect as predicted.

Model 2 (RCI). Model 2's results also showed that there was a positive and significant ($p < .05$) effect of RCI on IPO_INIT. Other significant factors in this model included CHINA and ROA. Other relationships were not significant, including HighGFI, TRI, HITECH, and FDVOL. Thus, this finding also confirms a positive RCI on IPO_INIT relationship.

Model 3 (RDI). Model 3's results confirmed the result of Models 1 and 2. This included a positive and significant ($p < .01$) effect of RDI on IPO_INIT. Model 3 also showed significant effects of CHINA and ROA. Furthermore, it showed non-significant effects of HighGFI, TRI, HITECH, and FDVOL.

Overall, these three models were consistent, showing a positive and significant effect of the COVID-19 pandemic fear indexes on IPO_INIT. These were accompanied by positive and significant effects of CHINA, and ROA, and non-significant effects of HighGFI, TRI, HITECH, and FDVOL. These findings mean that Hypothesis 1 cannot be supported. Rather than pandemic fear having a negative effect on the IPO outcomes, it showed a positive effect. Furthermore, the decomposed RCI and RDI variables did not show a significant difference in terms of effect within this model. Although the cumulative effect of GFI was higher than either, it was not twice as high, suggesting that the effects of RCI and RDI are interdependent.

Table 6 Hypothesis 1: Investor fear (GFI, RCI, RDI) → IPO_INIT

	GFI (Model 1)	**RCI (Model 2)**	**RDI (Model 3)**
GFI	1.496***	.	.
	(0.529)		
RCI	.	1.036**	.
		(0.479)	
RDI	.	.	1.123***
			(0.427)
HighGFI	-0.179	-0.115	-0.110
	(0.114)	(0.112)	(0.101)
TRI	-0.704	-0.902	-0.230
	(1.960)	(1.981)	(1.955)
HITECH	0.150	0.148	0.161
	(0.119)	(0.119)	(0.119)
CHINA	0.574***	0.573***	0.578***
	(0.085)	(0.085)	(0.085)
ROA	0.006**	0.006**	0.006***
	(0.002)	(0.002)	(0.002)
FDVOL	0.017	0.016	0.0017
	(0.015)	(0.015)	(0.015)
Const	-0.684	-0.458	-0.532

	GFI (Model 1)	RCI (Model 2)	RDI (Model 3)
	(0.350)	(0.330)	(0.324)

Notes: * p < .10 ** p < .05 *** p < .01

4.1.2 COVID-related Fear of Pandemic and Subsequent IPO Returns (Hypothesis 2)

Hypothesis 2 was stated in the literature review as:

Hypothesis 2: Investor fear of the COVID-19 pandemic has a significant negative effect on subsequent return of IPO stocks.

This hypothesis was tested a total of nine times, including one test each for the variable sets including: independent variable (GFI, RCI, RDI) x dependent variable (IPO_SUB1, IPO_SUB7, IPO_SUB30). Results are presented by independent variable.

4.1.2.1 GFI → IPO_SUB

Table 7 summarizes the results which were generated using the Global Fear Index (GFI) composite variable as the predictor. Each of the three models had a different outcome variable, representing a different time from the event (the IPO).

Model 1 (IPO_SUB1). In Model 1, the relationship of GFI on IPO_SUB1 was positive and significant (p < .01). The only other significant relationship was CHINA. Other relationships were non-significant, including HighGFI, TRI, HITECH, ROA and FDVOL**.**

Model 2 (IPO_SUB7). In Model 2, the result showed that the effect of GFI on IPO_SUB7 was also positive and significant (p < .05). Other significant relationships included HIGHgfi, CHINA and FDVOL. Non-significant relationships included TRI, HITECH, and ROA**.**

Model 3 (IPO_SUB30). In Model 3 GFI had positive and significant (p < .05) on IPO_SUB30. Other significant relationships included HIGHgfi, CHINA and FDVOL. Non-significant relationships included TRI, HITECH, and ROA**.**

These models did show some level of variance. However, it was consistent that the effect of GFI on IPO_SUB1,7,30 were positive and significant at $p < .05$ or lower. In Model 3, which used a 7 and 30-day time horizon, HighGFI was significant and negative. From this outcome, Hypothesis 2 cannot be supported, since GFI has a positive, rather than negative, outcome. However, the result for HighGFI in Model 2 and 3 suggests that particularly high periods of fear could be associated with lower subsequent returns.

4.1.2.2 RCI → IPO_SUB

The second set of tests (Table 7) used the Reported Case Index (RCI) decomposed variable. These tests were conducted in the same way as the previous tests otherwise. Results are reported by model.

Model 1 (IPO_SUB1). In Model 1, relationship of RCI on IPO_SUB1 was positive, and significant at $p < .10$. The only other significant relationship was CHINA, while other relationships were non-significant, including HighGFI, TRI, HITECH, ROA and FDVOL. These results were very similar to the reported outcomes for the same model using the GFI index.

Model 2 (IPO_SUB7). In Model 2, RCI has positive impact on IPO SUB7 and significant at $p < .10$. Other significant relationships included CHINA and FDVOL. Non-significant relationships included HighGFI, TRI, HITECH, and ROA.

Model 3 (IPO_SUB30). In Model 3, the relationship of RCI on IPO SUB30 was positive and significant ($p < .05$). Other significant variables included HighGFI, CHINA and FDVOL. Non-significant variables included TRI, HITECH, and ROA. These results are once again very similar to the corresponding GFI models.

These findings again do not provide support for Hypothesis 2. All of the tests, the effect of RCI on IPO_SUB was positive and significant at $p < .10$ or lower. However, in all three cases the effect of HighGFI was negative, though it was only significant for IPO_SUB30. Taken together with the findings for GFI, this suggests that it is particularly high fear, rather than RCI itself, that has a negative influence on the outcomes.

4.1.2.3 RDI → IPO_SUB

The third set of tests investigated the RDI index and its effect on IPO_SUB1,7,30. Results are summarized below, and presented in Table 7.

Model 1 (IPO_SUB1). In Model 1, RDI has positive impact on IPO SUB1 which significant at p < .01. The only significant coefficients were CHINA, other relationships were non-significant, including HighGFI, TRI, HITECH, FDVOL, and ROA. These results are similar to GFI and RCI.

Model 2 (IPO_SUB7). In Model 2, the relationship of RDI and IPO SUB7 was also positive and significant (p < .05). Other significant relationships included CHINA and FDVOL. Non-significant relationships included HighGFI, TRI, HITECH, and ROA. Once again, the results for RDI Model 2 were very similar to the effects for GFI Model 2 and RCI Model 2.

Model 3 (IPO_SUB30). In Model 3, RDI had positive relationship with IPO SUB30 but not significant. However, the effect of HighGFI was significant (p < .05). Other significant variables included CHINA and FDVOL. Non-significant variables included HighGFI, TRI, HITECH, and ROA.

These results are once again very similar to the corresponding GFI models, and followed the same pattern as the GFI model as well. Once again, H2 is not supported, but the effect of HighGFI is very interesting as a clear pattern has emerged. This raises an interesting possibility which is discussed in the next section.

Table 7 Hypothesis 2: RCI, RDI, GFI → IPO_SUB

	GFI			**RCI**			**RDI**		
	SUB1 (Model 1)	**SUB7 (Model 2)**	**SUB30 (Model 3)**	**SUB1 (Model 1)**	**SUB7 (Model 2)**	**SUB30 (Model 3)**	**SUB1 (Model 1)**	**SUB7 (Model 2)**	**SUB30 (Model 3)**
	2.01 ***	1.483**	2.026**	1.204*	1.031*	1.948**	1.655***	1.110 **	1.086
	(0.716)	(0.632)	(0.837)	(0.650)	(0.572)	(0.756)	(0.578)	(0.510)	(0.677)
HighGFI	-0.211	-0.259*	-.497***	-0.094	-0.197	-	-0.141	-0.191	-0.339**
	(0.155)	(0.137)	(0.181)	(0.152)	(0.134)	0.501***	(0.137)	(0.121)	(0.160)
						(0.177)			
TRI	-1.311	-3.127	-2.334	-1.462	-3.326	-2.939	-0.672	-2.658	-1.704
	(2.655)	(2.341)	(3.102)	(2.686)	(2.365)	(3.125)	(2.645)	(2.335)	(3.100)
HITECH	0.146	0.027	0.168	0.147	0.0255	0.005	0.160	0.038	0.032
	(0.161)	(0.142)	(0.188)	(0.162)	(0.142)	(0.188)	(0.161)	(0.142)	(0.189)
CHINA	0.613***	0.406***	0.484***	0.612***	0.404***	0.479***	0.619***	0.410***	0.488***

	GFI			RCI			RDI		
	SUB1 (Model 1)	**SUB7 (Model 2)**	**SUB30 (Model 3)**	**SUB1 (Model 1)**	**SUB7 (Model 2)**	**SUB30 (Model 3)**	**SUB1 (Model 1)**	**SUB7 (Model 2)**	**SUB30 (Model 3)**
	(0.115)	(0.102)	(0.135)	(0.116)	(0.102)	(0.135)	(0.115)	(0.102)	(0.135)
ROA	-0.002	-0.002	0.005	-0.001	-0.002	0.005	-0.002	-0.002	0.005
	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)
FDVOL	-0.016	-.053***	-.102***	-0.017	-.054***	-	-0.015	-.053***	-
	(0.022)	(0.019)	(0.025)	(0.021)	(0.019)	0.103***	(0.021)	(0.019)	0.102***
						(0.025)			(0.025)
Const	-0.390	0.480	1.137	0.006	0.702	1.203	-0.256	0.632	1.54
	(0.474)	(.418)	(0.554)	(0.448)	(0.394)	(0.521)	(0.439)	(0.388)	(0.514)

Notes: * p < .10 ** p < .05 *** p < .01

4.1.3 Model separately for China

4.1.3.1 COVID-related fear of pandemic and initial IPO returns (Hypothesis 1)

Model 1 (GFI). Model 1's results showed a positive and significant (p < .01) effect of GFI on IPO_INIT with a negative and significant (p < .05) effect of HighGFI. Other relationships, including TRI, HITECH, ROA and FDVOL were not significant. This result also suggests that the previous day's fear index had a positive effect on the initial IPO price.

Model 2 (RCI). Model 2's results also showed that there was a positive and significant (p < .01) effect of RCI on IPO_INIT with a negative and significant (p < .10) effect of HighGFI. Other relationships were not significant, including TRI, HITECH, ROA and FDVOL.

Model 3 (RDI). Model 3's results confirmed the result of Models 1 and 2. This included a positive and significant (p < .01) effect of RDI on IPO_INIT with a negative and significant (p < .05) effect of HighGFI. Furthermore, it showed non-significant effects of TRI, HITECH, ROA and FDVOL.

Overall, these three models were consistent, showing a positive and significant effects of the COVID-19 pandemic fear indexes in China on IPO_INIT. These were accompanied by negative and significant effect of HighGFI, and non-significant effects of TRI, HITECH, ROA and FDVOL.

Table 8 Hypothesis 1: Investor fear (GFI, RCI, RDI) China → IPO_INIT

	GFI (Model 1)	**RCI (Model 2)**	**RDI (Model 3)**
GFI	5.327***	.	.
	(1.384)		
RCI	.	4.049***	.
		(1.248)	
RDI	.	.	4.272***
			(1.215)
HighGFI	-0.645**	-0.481*	-0.470**
	(0.256)	(0.247)	(0.233)
TRI	3.611	1.358	6.066
	(5.455)	(5.549)	(5.518)
HITECH	0.359	0.038	0.734
	(0.229)	(0.231)	(0.229)
ROA	0.006	0.006	0.006
	(0.005)	(0.005)	(0.005)
FDVOL	-0.068	-0.081	-0.073
	(0.056)	(0.057)	(0.057)
Const	-0.392	0.391	0.152
	(1.260)	(1.209)	(1.215)

Notes: * p < .10 ** p < .05 *** p < .01

4.1.3.2 COVID-related fear of pandemic and subsequent IPO returns (Hypothesis 2)

Table 9 summarizes the results were similarly in all three models with positive and significant at p < .05 or lower. In most of the cases, the effects of HighGFI and FDVOL were negative and significant. Non-significant variables included TRI, HITECH, and ROA despite the result on the effect of TRI to IPO SUB30 showed the positive and significant at p < .10.

Table 9 Hypothesis 2: RCI, RDI, GFI (China) → IPO_SUB

	GFI			RCI			RDI		
	SUB1 (Model 1)	**SUB7 (Model 2)**	**SUB30 (Model 3)**	**SUB1 (Model 1)**	**SUB7 (Model 2)**	**SUB30 (Model 3)**	**SUB1 (Model 1)**	**SUB7 (Model 2)**	**SUB30 (Model 3)**
	6.40 ***	4.73***	6.833***	4.169**	3.368**	5.411***	5.802***	4.014 ***	5.273***
	(1.926)	(1.514)	(1.407)	(1.740)	(1.364)	(1.271)	(1.681)	(1.325)	(1.242)
HighGFI	-0.739**	-0.635**	-.953***	-0.436	-0.455*	-0.775***	-0.621*	-0.510**	-0.698***
	(0.357)	(0.280)	(0.260)	(0.344)	(0.270)	(0.251)	(0.323)	(0.254)	(0.238)
TRI	2.686	-5.740	7.960	0.396	-7.604	4.940	5.993	-3.442	10.999*
	(7.591)	(5.967)	(5.545)	(7.737)	(6.063)	(5.650)	(7.632)	(6.015)	(5.639)
HITECH	-0.060	-0.208	0.173	-0.043	-0.201	0.171	-0.023	-0.177	0.224
	(0.319)	(0.251)	(0.233)	(0.323)	(0.253)	(0.236)	(0.318)	(0.250)	(0.234)
ROA	-0.006	-0.003	0.006	-0.006	-0.003	0.006	-0.006	-0.002	0.006
	(0.006)	(0.005)	(0.004)	(0.006)	(0.005)	(0.004)	(0.006)	(0.005)	(0.004)
FDVOL	-0.156**	-0.086	-.141**	-0.017**	-0.098	-0.156***	-0.156**	-0.088	-0.149**
	(0.079)	(0.062)	(0.057)	(0.079)	(0.062)	(0.058)	(0.079)	(0.062)	(0.058)
Const	0.635	-0.018	-0.020	1.966	0.805	0.863	0.901	0.338	0.800
	(1.754)	(1.378)	(1.281)	(1.687)	(1.322)	(1.232)	(1.680)	(1.324)	(1.242)

Notes: * p < .10 ** p < .05 *** p < .01

4.2 Discussion

The hypothesis tests showed an interesting pattern. Whether looking at the first-day trading price of an IPO or the subsequent trading prices, the effect of pandemic fear (GFI, RCI and RDI) was positive. This was contrary to what was expected from the small amount of information in the literature, and it led to the rejection of both Hypothesis 1 and Hypothesis 2. However, results were somewhat different for HighGFI, which was a dummy variable indicating whether the GFI_{i-1} on the initial day of trading was higher than the median. This variable was negative in all cases. In the IPO_INIT test for Hypothesis 1, it was significant for all three fear variables. This pattern of outcomes was not expected given the literature but nonetheless can be understood in the context of investor sentiment and especially investor fear. Investor sentiment is a bounded rationality effect, meaning that investors make decisions that they consider to be rational, but which is limited by

information asymmetries and cognitive biases (Shu & Chang, 2015). This research's hypotheses were based on the assumption that recency bias, in which individuals place more emphasis on the newest information they have on making decisions (Simon, 1990), was the most likely bias that would influence investor fear of pandemics. However, it appears that instead the most likely bias is an anchoring bias, in which individuals are acting from an accumulation of information (Shu and Chang, 2015). In other words, an accumulation of negative news (high global fear), rather than immediate news, influences decisions more than the immediate results of the previous day. In intuitive terms, it could be considered that investors are making decisions not based on their immediate assessment of the COVID-19 situation, but on the accumulation of bad news about the pandemic. This fits with the definition of investor fear as being part of the irrational component of investor sentiment (Saade, 2015), which is not based on market fundamentals, but on feelings based on the assessment of the overall situation.

Another possibility is that the increasing negative effects of pandemic fear on post-IPO prices is that there is some herding behaviour occurring, in which investors make decisions based on the actions of others rather than market fundamentals (Aharon, 2021; Economou et al., 2018; Gurdgiev & O'Loughlin, 2020; Shu & Chang, 2015). This effect has already been observed in other IPO situations, where it is known that herding behaviour can influence IPO performance (Plotnicki & Szyszka, 2014). Herding has also been observed in response to pandemic news in other contexts including cryptocurrency trading and stock markets (Gurdgiev & O'Loughlin, 2020; Kim, 2021; Kizys et al., 2021). This research was not designed to look for herding effects, and in fact there have not been any studies that could be identified that have examined the effect of herding behaviour due to COVID-19 related pandemic fear on IPOs. Thus, this is an area that would be useful to research further.

The literature did show some conflicting evidence on the effect of pandemic fear on IPOs specifically. One study did show that there was a negative effect of pandemic fear on IPO pricing and subsequent performance (Mazumder & Saha, 2021), which was used to formulate the hypotheses for this research. However, other studies have had contradictory findings. One of these studies found that the COVID-

19 pandemic had a positive effect on IPO pricing, though they noted a high proportion of technology and medical IPOs during this time (Baig & Chen, 2021). Another study also found a positive effect of pandemic fear on recent IPOs (Goyal and Manu, 2021). There are four possible reasons for this discrepancy.

The first possibility relates to the market context. Notably, the COVID-19 pandemic's effects on stock returns fluctuate depending on the nation. According to Sansa (2020), from March 1, 2020, to March 25, 2020, there was a considerable positive correlation between the COVID-19 and the financial markets (Shanghai Stock Exchange and New York Dow Jones) in China and the USA. Alam, Sammonds, and Ahmed (2020) also looked into the effects of the COVID-19-caused lockdown period on the Indian stock market, and their findings show that the market responded favorably with noticeably positive average abnormal returns. Additional research by Brueckner and Vespignani (2021) revealed that COVID-19 infections in Australia and the USA had a positive impact on the performance of their respective stock markets. The Shenzhen Stock Exchange's stock prices were positively impacted, according to He, Sun, Zhang, and Li (2020). This is an area for further research, since it could be very interesting.

The second possibility relates to certain industry sectors. It is clear that some of these occurrences have had a significant influence on particular business sectors while having a little effect on others. For example, the impact of SARS on Taiwan's economy revealed that the tourist sector was negatively impacted relative to other sectors (Chen et al., 2007). According to Chen et al. (2007), equities in the hospitality industry were sensitive to SARS, although Taiwanese biotech companies had positive stock returns during the SARS outbreak. The COVID-19 pandemic has a significant influence on enduring industries including mining, transportation, and energy. On the other hand, it has opened doors for high-tech industries. As a result of the epidemic, other industries like manufacturing, information technology, education, and health have reacted positively.

The third possibility relates to investor sentiment. Similar findings from numerous studies have been found that the stock exchange rate and stock price exchanges are positively impacted by COVID-19 (Iqbal et al., 2019; Nwosa, 2021). Malaysia, Vietnam, and Thailand are the Southeast Asian nations having the strongest

financial linkages to China, according to (Iqbal et al., 2019). Investor sentiment has a significant impact on stock markets in countries where overreaction and herd-like behavior are more common (Anser et al., 2020) or in countries with little institutional participation.

The fourth possibility relates to the role of financial advisors. Initial public interest in IPOs is common, especially when well-known brands are made broadly accessible to investors for the first time. According to Grinblatt and Hwang (1989), high-quality financial advisors initially sell a small portion of their equity capital at a low price during the IPO and then sell their remaining equity capital at a high price in the secondary market, which results in a positive return on the first and following trading day. This suggests that businesses with high short-term returns on a small portion of their equity capital typically perform better over the long term.

In summary, even though the hypotheses of the research were not supported, they do have some interesting implications. In Chapter 5, these findings are summarized into a final conclusion.

CHAPTER 5

CONCLUSION

This chapter provides a conclusion to the paper. It builds on the previous chapters, including the background and objectives (Chapter 1), literature review (Chapter 2), methodology (Chapter 3) and findings and discussion (Chapter 4). It begins with a conclusion which states what the key findings were in relation to the research questions. It then discusses the implications of the findings for academics and application. Next, it considers the limitations of the study. Finally, opportunities for future research are discussed.

5.1 Conclusion

This research set out to achieve three objectives, which were:

1. Establishing the mechanisms through which COVID-19 related fear of pandemic would influence IPO performance in emerging markets.
2. Empirically evaluating how fear of COVID-19 influences short-term IPO performance in emerging markets; and
3. Examining whether the short-term fear of COVID-19 continues to influence post-IPO performance.

To achieve objective 1, the literature review (Chapter 2) examined theories and empirical evidence. The mechanism of investor sentiment, particularly investor fear, was identified as a possible explanation. Based on previous studies, it was hypothesized that fear of COVID-19 would have a negative effect on the short-run IPO performance and post-IPO performance.

To achieve objectives 2 and 3, empirical research was conducted following an event study approach. This research included IPOs (n = 527) from the MSCI Emerging Markets (EM) Asia Index, which included firms from China, India, Indonesia, South Korea, Malaysia, the Philippines, Taiwan and Thailand. The analysis was based on ordinary least squares (OLS) regression. The independent variable was

the Global Fear Index (GFI), along with its decomposed dimensions of Reported Case Index (RCI) and Reported Deaths Index (RDI), which were constructed following Mazumder and Saha (2021) and Salisu and Akanni (2020). The dependent variables included IPO_INIT, which represented the daily return on the initial day of trading for the IPO, and $IPO\_SUB_{i + (1, 7, 30)}$, representing the daily return on days 1, 7, and 30 after the initial trading day. Additionally, a HighGFI dummy, indicating the previous day's GFI was higher than the median was included, along with several control variables.

The findings of the empirical research were surprising, but not out of line with the literature. The finding showed that GFI and its RCI and RDI components actually had a significant positive effect on IPO market returns, including the initial price and the post-IPO prices at days 1, 7, and 30. Thus, this contradicted the expected findings and led to rejection of both of the study's hypotheses. However, there were nonetheless some interesting findings. In particular, the effect of HighGFI was negative, and in the long run (30 days post-IPO) it was statistically significant. This suggests several issues, as noted in the discussion. Of these, the most important may be that the effect of pandemic fear is not a single event, as modelled in this and previous studies, but instead accumulates over time and may become embedded in investor decision making.

In conclusion, the results of this study have achieved the research objectives effectively. Despite the rejection of the hypotheses, the findings were not completely out of line with the literature. There have only been a few studies conducted on this question to date, and results have been variable. While this research fails to resolve this ambiguity entirely, it does provide some possible mechanisms for the ambiguous findings.

5.2 Implications

There are some academic and practical implications of this research. The most important academic implication is that more attention should be paid to the effect of specific sources of systemic risk and investor fear in investment decisions. This research has contributed to the body of research in this area by conducting an early

study of investor fear of pandemics in IPOs in emerging markets, which addressed several research gaps at the same time. The findings showed desire to synthesize short term benefits and over optimism among the retail investors, as it may encourage investors to pay a higher price for IPOs. Similar to this, a study conducted in India offers compelling evidence that the epidemic played a role in the rise in the number of enterprises going public and increased levels of underpricing. In the post-pandemic era, a drastic change in retail investor behavior has an impact on higher than typical listing gains and bigger than usual issue sizes.

The practical implications of this study are limited, simply because there is a lack of predictability of COVID-19 pandemic progress within the time horizon of an IPO. The findings do suggest that firms should not time their IPOs to occur in the growth of a pandemic wave, in order to protect their long-run post-IPO returns. However, such conditions could be particularly difficult to predict, especially since the timing of an IPO needs to be made weeks or even months in advance. Thus, the implication of this research is that IPOs may be affected in the long run by IPO pricing, and managers should be aware of that.

5.3 Limitations

The most obvious limitation of this study is the measurement of covid sentiment. There is no accepted method of measuring COVID19 that can incorporate all of the important factors, such as reported cases, deaths, and recoveries, into a single score. In this case, only reported cases and death cases were considered for the most part in the fear index because there was limitation to access the vaccination statistics. It could develop a new fear index to be more precise since vaccination has a positive effect on how people perceive the pandemic. A second limitation of the study is that only firm-specific effects were considered for the most part in the control variables. This is an important limitation because there has been research suggesting that government response, market conditions and other factors could have affected IPO outcomes. For instance, MEDICAL, which could be added based on the observation of Baig and Chen (2021) that medical firms also benefited from the COVID-19 information asymmetry effect. The other clusters of control variables

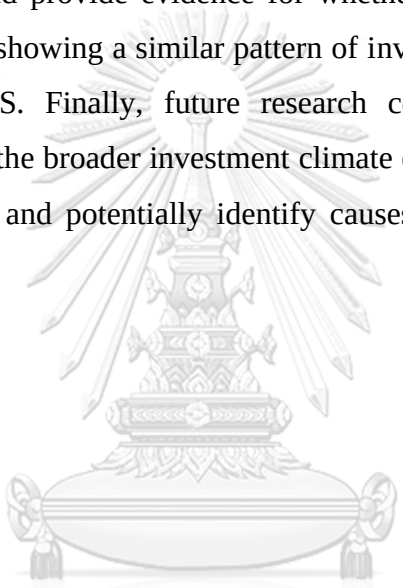
relate to firm structure and performance. Firm structure variables, including AGE, BOARDIND, and CEOF, relate to the firm's age and its governance and management at the time of IPO (Dolvin & Kirby, 2016; Mazumder & Saha, 2021). Variables including LEV relate to the firm's financial management practices (Linton, 2019). Finally, variables including OFFER and PRICE are related to the fundamentals of the IPO itself, including its offer price and total offer size, all of which are expected to influence the firm's IPO performance (Mazumder & Saha, 2021).

5.4 Future Research Opportunities

There are several opportunities for future research, which revolve around both the outcomes of the discussion and the limitations of this study. One of these opportunities is investigation of how pandemic-specific investor fear can best be represented. However, it is obvious that these measures are not equivalent, and are measuring different aspects and perceptions of pandemic fear. This raises the question of whether these measures can be reconciled or whether another approach can be developed that offers a better representation of pandemic fear. It can be Development of new index by using principle component analysis in order to generate better representation of pandemic fear. As a result, it mixes the input data in a particular method before eliminating the "least important" variables while keeping the most valuable components, like the total number of vaccines. Additional theory-building research should be conducted to investigate this question, in order to develop a better measure for this construct. Such theory-building research could also be expanded to other specific investor fears (for example, war and political instability), which acknowledges that although investor fears are not always based in objective analysis, they are influenced by the current environment. A second question that arose from the discussion is whether it is the immediate fear (represented in this study by GFI, RCI and RDI) or the accumulation of fear over time (represented in this study by HighGFI) that is relevant to investor decisions. This could be investigated during development of a better fear index, the opportunity discussed above. Furthermore, comparative research could be conducted that examines developed and developing markets together, in order to find out whether developing markets have different

investor fear measures or responses. Studies could also investigate whether there is evidence of pandemic fear-related herding in IPO pricing, which this study suggests but was not designed to prove.

The limitations of the study also offered some suggestions for future research. One of these opportunities is to repeat the research later, in order to include more evidence of IPOs during the pandemic. This could also include measures that reflect the amount of time the pandemic has continued, to determine whether investors have undergone an adjustment effect. Comparison to other pandemics could also be conducted, which would provide evidence for whether the COVID-19 pandemic is unique or whether it is showing a similar pattern of investor fear as earlier pandemics like SARS and MERS. Finally, future research could include country-specific variables which reflect the broader investment climate of IPOs, which could make the findings more specific and potentially identify causes of ambiguous or conflicting results.



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