財務管理硏究 第四十卷 第六號(2023. 12), 153~183

Stock Returns Behaviour and Liquidity around Corporate Bankruptcy During the Global Financial Crisis

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〈Abstract〉

This paper examines abnormal stock return behaviour and liquidity of financially failed firms around the Global Financial Crisis (GFC) period. Using the intraday data for the Australian stock market, we show that both failed and matched non-failed firms incurred substantial losses during the GFC. Returns of both groups of firms significantly diverge as early as 254 trading days prior to the bankruptcy announcements. We find that even during the GFC when conditions in general are illiquid and investors demonstrate a loss of confidence, the market perceives firm characteristics, for example: corporate governance and management team, as key roles for the survival of firms and it has the ability to discriminate among failed and non-failed firms as firm bankruptcy approaches, by widening bid-ask spreads of failed firms. The results are useful in assessing the adequacy of existing regulations regarding corporate disclosure around bankruptcy announcements in mitigating negative effects for investors during financial crisis periods.

Keywords : Abnormal Returns, Bankruptcy Announcement, Bid Ask Spreads, Global Financial Crisis, Market Behaviour, Stock Returns Behaviour

논문접수일 : 2023년 12월 08일 논문수정일 : 2023년 12월 18일 논문게재확정일 : 2022년 12월 23일

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Ⅰ. Introduction

Although prediction of firm failure has been widely researched, little attention has been paid to the analysis of market behaviour around bankruptcy announcements. Most existing studies employ accounting measures using data from corporate financial statements. These tend to be sluggish indicators, which have difficulty rapidly incorporating changing market conditions (see Dichev, 1998; Shumway, 2001). Employing market-based variables, we investigate the ability of the market to detect worsening financial situations for individual firms during the Global Financial Crisis (GFC), and particularly how the stock returns and stock liquidity may signal information asymmetries across market participants for companies which financially failed during the GFC. This topic is of particular interest to regulators, practitioners, academics and stakeholders of bankrupt firms due to significant costs of corporate failure that is more severe during the financial crisis.

Using the intraday trade and quote data of all failed and their matched non-failed Australian firms from June 2006 to December 2009, we compute a number of proxies for abnormal returns, and estimated percentage effective spreads and percentage realized spreads for each firm to examine market reaction in terms of stock returns and liquidity. Our analysis captures significant negative abnormal returns from both failed and matched non-failed firms during the GFC period, and the abnormal returns of failed firms significantly diverge from non-failed firms as early as 254 trading days before the bankruptcy announcement dates. Failed firms are also found to have higher effective spreads and realized spreads after we take into account trading volume, firm size, volatility and stock price. However, once controlling for firm-specific effects, we do not document any statistically significant difference in liquidity between the failed and matched non-failed firms. This indicates the market's ability to discriminate among failed and non-failed firms even under turbulent business conditions, which is shown in the discrepancy in their returns, resulting in wider bid-ask spreads for failed firms than non-failed firms. Once taking these determinants into account, the failed firms do not have unusually lower liquidity than non-failed firms.

Our study makes contributions to several lines of research. First, existing studies on prediction of firm bankruptcy, mainly using sluggish accounting measures, examine

market reactions during normal economic environments. We contribute to the literature of the corporate bankruptcy prediction by investigating market behaviour around bankruptcy announcements during the financial crisis. Our investigation is important as under corporate disclosure regulations the market should notice the impending collapse of firms long before they actually file for bankruptcy and announce the default publicly. This signal is potentially even more important and valuable during periods where market liquidity is severely lacking. We examine how quickly the market can learn about the potential default of firms through the firms' abnormal returns, liquidity and informational asymmetries during the GFC. The findings have practical importance in stimulating the discussion of the effectiveness of disclosure regulations in aiding with the recognition of such signals.

Second, the current literature on corporate bankruptcy largely considers either stock abnormal returns or firm accounting measures as proxies, but pays little attention to stock liquidity as a predictive signal of firm failure. Our paper contributes by utilizing different intraday measures of market quality in the Australian stock market to capture market reactions in terms of liquidity to firm failures. These measures provide more accurate results on market-based measures of behaviour than the use of daily data-based proxy, as is the case with Frino, Jones and Wong (2007). The bid-ask quoted spreads employed in Frino et al. (2007) can over- or under-state execution costs for liquidity demanding trades when trades can execute within or beyond the best prevailing quotes. Using intraday data, we can estimate effective spreads and realized spreads that are better proxies of liquidity since these measurements account for the fact that liquidity demanding trades do not always execute at the best quotes. Furthermore, our study extends the current bankruptcy literature by using an improved matched sample to control the potential effects of market microstructure behaviour on the prediction of firm failures. Given that liquidity is affected by firm characteristics, we implement a stock-fixed effect approach with time-clustered standard errors to examine the market signals.

Third, the literature on the GFC focuses on two streams including (1) how corporate management practices for accounting reports, auditing, corporate strategies change during the financial crisis (for example: Habib et al., 2013; Xu et al., 2011; Evans and Borders | 2014; Geiger et al., 2014; Beuselinck et al., 2015); (2) international contagion effects of

the financial crisis and the causes of this crisis (for example: Claessens et al., 2012; Mishkin, 2011; Johansson, 2011; Spiegel, 2011; Tong and Wei, 2011). Our study investigates another dimension arising from the GFC, whereby we examine how early and effectively investors can detect company financial difficulty through the differing stock return and stock liquidity. Thus, our study complements the GFC literature and further, tests the adequacy of current corporate disclosures requirements under financial crisis environment. Our results shed light on that the market perceives differences in firm characteristics, for example: corporate governance and management team, as key roles in the survival of firms during the GFC. Our findings suggest that regulators and stock exchange officials may wish to improve the continuous disclosure requirements to promote a more liquid and more transparent trading environment. This would aid investors to be able to detect firms in financial difficulty at early stages and facilitate liquidity, especially in financial crisis conditions.

The remainder of the paper is structured as follows. Section 2 presents an overview of the literature review regarding stock return behaviour, liquidity, and information asymmetry around the firms' bankruptcy announcements. Section 3 describes the data and the empirical approach employed. Section 4 reports empirical findings and section 5 concludes.

Ⅱ. Literature Review

1. Abnormal Returns Leading up to the Bankruptcy Announcements

Clark and Weinstein (1983) suggest that potentially bankrupt firms start to underperform well before their bankruptcy event, and that the announcement of bankruptcy tends to decrease the future value of stocks of the company. Therefore, a bankruptcy announcement is not a sudden surprise to the market; rather the market responds to information concerning the risk profile of the distressed firm and captures it in stock prices long before the formal bankruptcy filing (Frino et al., 2007). Likewise, if investors perceive a rising risk of financial distress, they will discount the value of the firm, and this effect will be captured in the excess returns leading up to the financial distress event. Aharony

et al. (1980) content that investors adjust continuously for the solvency deterioration of the bankrupt firms over time, and that rate of return would reflect the unexpected event of bankruptcy of the firm. More recently, Shumway (2001) argues that past excess returns should predict financial distress.

The relevance of abnormal stock returns in predicting the risk of financial distress of firms has been rigorously examined (Aharony et al., 1980; Swary, 1986; Rose-Green and Dawkins, 2000; Chava and Jarrow, 2004; Frino et al., 2007; Campbell et al., 2008; Gharghori et al., 2009; Kim and Partington, 2015). Aharony et al. (1980) study the characteristics of bankrupt and non-bankrupt firms prior to bankruptcy and find a significant negative cumulative differential return (measured as abnormal returns) between the two groups dating four years prior to bankruptcy. The mean return on the bankrupt firms is substantially less than that on the control firms, whose mean weekly difference widens and becomes increasingly negative leading up to the bankruptcy event. Swary (1986) examines the stock market behaviour around the Continental Illinois crisis and uses Fama's (1976) model to estimate the realized abnormal returns of bank shareholders in the weeks around the deteriorating solvency of the banks. He finds that a majority of investors in bank stocks with questionable solvency bear significantly negative abnormal returns around the crisis event. Rose-Green and Dawkins (2000) observe the stock market's reaction to bankruptcy filings to investigate whether there's a significant difference in the abnormal returns surrounding the time of bankruptcy filing between subsequently liquidated firms and subsequently reorganised firms. Their results show that liquidated firms incur significantly larger abnormal returns than reorganised firm in the period surrounding the bankruptcy filing, and also find that liquidated firms have significantly larger price declines in the year prior to bankruptcy filings, relative to reorganised firms. Their empirical evidence suggests that the size of abnormal returns around bankruptcy filing can serve an indicative proxy to detect the bankruptcy outcome.

Chava and Jarrow (2004) find a negative relation between the bankruptcy probability and the abnormal returns and conclude that the increasing abnormal return indicates a lower chance of bankruptcy. Campbell et al. (2008) report anomalously low returns of financially distressed stocks, which is consistent with Beneish and Press (1995) and Rose-Green and Dawkins (2000) that demonstrate an inverse relationship between the

intensity of financial distress and the pre-event abnormal returns.

For Australian listed companies, Gharghori et al. (2009) test the relationship between default risk and equity returns using the option-based model to derive the default probability, and find that firms with a higher default risk have lower realized returns. Kim and Partington (2015) examine the predictability of abnormal returns in forecasting the risk of financial distress of Australian firms and report significantly negative returns of failed firms, about 50% lower returns than that of non-failed firms. In particular, Frino et al. (2007) take the approach of event study around the bankruptcy announcement dates, and examine the market behaviour of failed firms before 2005 over the 425 trading days prior to the announcement. They document significant negative abnormal returns of financially distressed firms leading up to bankruptcy announcements, consistent with the argument of Shumway (2001).

Whilst a majority of the bankruptcy literature has employed annual and monthly stock market data in order to forecast the likelihood of financial distress of firms on a yearly basis, there is a scant number of studies that have provided micro-level analysis on the failed firms' behaviour prior to bankruptcy announcements. Using intraday data for a time period covering the GFC, we aim to provide evidence on how early and how effectively the market can detect the differing return behaviour of distressed firms from that of non-failed firms.

2. The Presence of Information Asymmetry around the Firm's Failure Announcements

Transaction costs and liquidity provider earnings are all important aspects of equity market microstructure since these measure market quality for individual stocks regarding liquidity and information asymmetry. Chakrabarty and Zhang (2012) take the case of Lehman Brother's bankruptcy and investigate how it affects other firms' abnormal changes in liquidity that have disclosed their exposure to Lehman. Using an effective spread as a proxy to capture the difference between the fair price of the security and its actual trading price, they find that firms with a higher exposure to Lehman exhibit greater decreases in liquidity and greater increases in information asymmetry. In the studies

upon the Korean stock market, Yang (2010) finds a statistically significant and negative association between the market liquidity and the default risk, which is evidenced with the wider percentage bid-ask spread (i.e. deteriorated liquidity) following the increase in the default premium. In a similar context, An, Bae and Cho (2019) report a negative effect of the market liquidity risk on a firm's credit rating, which indicates that firms with higher liquidity risk bear lower credit ratings.

While the liquidity accounts for the idiosyncratic stock behaviour, other studies have also found the nexus between market liquidity and the macroeconomic condition of the market. Joo and Eom (2015) role of market liquidity as a leading indicator for the macroeconomic conditions. Joo and Eom (2015) presents that the liquidity proxies including the relative bid-ask spread can serve as a leading indicator of one-quarter posterior real GDP growth and economic condition in Korea given that investors tend to be risk averse and shift their investment portfolio to more liquid and safer assets when facing the economic downturn. Similarly, Kim (2021) reports that a deteriorating market liquidity in the Korean stock market is observed in the wake or oil price drops given that the decrease of oil price signals the imminent economic recession.

Compared to the extensive market analysis around earnings announcements and dividend announcements, market behaviour around bankruptcy announcements has been much less explored. For Australian listed companies, Frino et al. (2007) examine this aspect of the data, albeit using the daily bid-ask spread. They document the presence of information asymmetries for financially distressed firms with a substantial increase of the bid-ask spread up to 7 months prior to the failure announcement. They attribute a significant level of information asymmetry to the evidence of "extreme paucity of public financial disclosure provided by many distressed firms leading up to failure" (Frino et al., 2007). For the sample period of 1990 and 2005, they find failing firms have a lead time of more than 12 months between the date of the previous financial report and the failure announcement, consistent with the 11.2 and 10.4 months for the periods of 1996 to 2000 and 2001 to 2003, respectively in an earlier Australian study of Jones and Hensher (2004). More recently, Frino, Jones, Lepone and Wong (2014) examine institutional investors' trading behaviour and holding patterns around bankruptcy announcements of Australian listed firms from 1995 to 2006. Frino, et al. (2014) also document a significant difference

in bid-ask spreads between bankrupt firms and healthy control firms in the period leading up to bankruptcy announcements. They find significantly higher bid-ask spreads for non-disclosing failed firms than for disclosing failed firms. These findings imply the existence of significant information asymmetries across investors in failed companies in Australia before the GFC. Our study further examines whether this phenomenon is persistent during the GFC and if so, at what level the information asymmetries exist during the GFC.

Ⅲ. Data Descriptions and Research Methods

1. Data

The intraday data for the Australian stock market used in this study is provided by Securities Industry Research Centre of Asia-Pacific (SIRCA). The data include trade and quote records for the failed firms and corresponding matched companies during the period June 2006 to December 2009. The trade data records price and volume for each transaction. The quote data provides the best bid and the best ask during the continuous trading sections for each stock.

The firm failure samples are extracted from DatAnalysis (Morningstar) databases for Australian firms delisted during the period June 2006 to December 2009. The daily closing price data are obtained from both DatAnalysis and Securities Industry Research Centre of Asia-Pacific (SIRCA) to compute the abnormal stock returns. Following Frino et al. (2007) and Kim and Partington (2015), only firms that meet the legal definition of failure and have been trading for two years before the bankruptcy are included in the samples. Firms' failure events and the date and time of their release to the market are documented using ASX's Signal G announcements with access through SIRCA and are further verified with the published announcement documents provided in Signal G. Resulting from this, 35 failed firms are identified with available stock price data. Subsequently, a matched control sample of 35 firms is selected following the approach of Davies and Kim (2009) and Beber and Pagano (2013), measuring the shortest distance (*DD*) between a failed firm and a healthy firm at the time immediately before the investigation

period.

A matched control sample of firms is selected where the matched firm survives the period under investigation. Davies and Kim (2009) show that the best matching practice to test for the difference in transaction costs is to match firms one-on-one based on market capitalization and stock prices without replacement. In order to select the match, a distance metric DD is estimated as follows:

$$DD_i = \frac{MCap_i - MCap_j|}{|MCap_i + MCap_j|} + \frac{|P_i - P_j|}{|P_i + P_j|}$$

where $MCap_i$ is market capitalization of the failure stock i in the sample; and P_i is daily closing trade price of stock i. Using non-replacement matching method, each stock for a failed firm i is matched with a non-failed stock j that is listed on the Australian Securities Exchange before the investigated period for each stock i, and has the smallest distance, DD_i , measure. The distance measure is estimated based on daily market value and daily stock price at the beginning of the sample period following Davies and Kim (2009) and Beber and Pagano (2013).[1] <Table 1> characterizes the quality of the matching procedure by presenting the descriptive statistics for matching variables of the failed and control groups. Given that the average market capitalization of all listed firms (including around 1,920 domestic and 80 foreign firms) on the Australian Securities Exchange, during the study period between June 2006 and December 2009, was $649,213,173 (with minimum of $49,489 and maximum of $163,441,168,903) and an average closing price was $1.75 (with minimum of $0.01 and maximum of $174.65), the average market capitalization and closing price of 35 failed (non-failed matched) firms are relatively smaller as in $199,032,374 ($213,177,041) and $1.31 ($0.91), respectively. To detect the presence of non-normality, the Shapiro-Wilk test is implemented. Tests for normality of the market capitalization and daily closing price are given for both the failed and control groups. The null hypothesis of normality is rejected (with p-values of less than 0.05). Consequently, the Mann-Whitney U-statistics is used to test the significance of median difference

1) We include only stocks which trade every month during the investigated period.

between the two groups, instead of a t-test. The nonparametric test results show no statistically significant difference between the market capitalizations and stock prices of the failed and the matched sample. Thus, it is reasonable to assume that the movements of returns and liquidity between the two groups are identical in the same period, and any difference between the two groups in returns and liquidity would be recognized as market signals leading to the firm bankruptcy.

<Table 1> Matching Statistics of Market Capitalization and Closing Price of Failed Group and the Matched Control Group

This table presents the summary statistics and tests for differences between the failed firms and the matched control firms based on market capitalizations and closing prices of stocks at the beginning of the sample period. *P-values* of the tests for normality and tests for median difference between groups are reported in parentheses.

	Market Capitalization ($)	Closing price ($)
Panel A: Summary statistics		
Failed group		
Mean	199,032,374	1.31
Median	33,139,513	0.22
Standard Deviation	486,484,822	3.20
Min	1,532,605	0.02
Max	2,652,996,028	17.61
Control group		
Mean	213,177,041	0.91
Median	36,202,628	0.23
Standard Deviation	517,504,161	1.52
Min	1,173,232	0.02
Max	2,750,153,161	5.98
Panel B: Tests for normality		
Failed group		
Shapiro-Wilk test	0.439 (p<0.0001)	0.432 (p<0.0001)
Control group		
Shapiro-Wilk test	0.446 (p<0.0001)	0.618 (p<0.0001)
Panel C: Tests for median difference between groups		
Mann-Whitney U-Statistics	0.0207 (p=0.8855)	0.0013 (p=0.9713)

2. Methodology

To examine the return behaviour of stocks around the bankruptcy announcement day, we calculate the cumulative average return (CAR), abnormal performance index (API)

and weighted geometric index (WGI) to proxy for abnormal returns from trading day −425[2] to 0, following the approach of Clark and Weinstein (1983) and Frino et al. (2007). For each firm, event day 0 is the day the failed firm announced its bankruptcy to the market or the day the firm is permanently suspended from the exchange without ever being reinstated, whichever comes first. The abnormal returns are observed over the reasonably long period of the 425 trading days leading up to the failure announcement. Both CAR and API represent cumulative return measures, but are based on differing assumptions; CAR allows for fund inflows and outflows during the stock holding period to maintain the initial investment, whereas API does not. Therefore, the CAR does not have a lower bound and may become less than −1, whereas APIs are bounded below at −1 (equivalent to −100%). Further details on these measures may be found in Clark and Weinstein (1983).

Both indices are calculated using average returns (ARs). The ARs are a simple average of the raw returns for firms in each sample group calculated on event day t:

$$AR_t = \frac{1}{N_t}\sum_{i=1}^{N_t} R_{i,t} \tag{1}$$

The CARs on event day T, CAR_T, are the sum of the ARs at event day t, where t moves from trading day −425 to event day T[3]:

$$CAR_T = \sum_{t=-425}^{T} AR_t \tag{2}$$

Our alternative cumulative measure, API on event day T, is computed as follows:

$$API_T = \prod_{t=-425}^{T}(1+AR_t) - 1 \tag{3}$$

2) This time horizon is selected consistently with the literature on distressed firms.

3) Following the convention of Clark and Weinstein (1983), it is noted that the AR represents an average return and CAR represents a cumulative average return in our study as well.

Although the API approximates the returns on a buy and hold portfolio strategy, it implicitly assumes that the stock portfolio is periodically rebalanced. To avoid this assumption, the WGI is measured using weighted average returns (WARs). WAR on event day t can be written as:

$$WAR_t = \sum_{i=1}^{N_t} w_{i,t} R_{i,t} \tag{4}$$

where i stands for a firm from each sample group, t is any event day from -425 to 0, N_t shows the number of firms on event day t in each sample group, and $R_{i,t}$ is the raw return of firm i on event day t. The weight variable, $w_{i,t}$, is the value weight of firm i on event day t, which can be expressed as follows:

$$w_{i,t} = \frac{\prod_{m=-425}^{t-1}(1+R_{i,m})}{\sum_{i=1}^{N_t}\prod_{m=-425}^{t-1}(1+R_{i,m})} \tag{5}$$

where $w_{i,t}$ represents a ratio between the value of investment in firm i on event day t and the sum of the value of investment across all firms in the group on event day t. Using the estimated WAR on event day t, the WGI can be computed as follows:

$$WGI_T = \prod_{t=-425}^{T}(1+WAR_t) - 1 \tag{6}$$

Both API and WGI approximate the returns on a buy-and-hold portfolio and have a lower bound of -1. The daily abnormal returns including CARs, APIs and WGIs from day -425 to day 0 are graphically represented in [Figure 1], [Figure 2] and [Figure 3;.

Using the intraday data, we estimate a number of spreads to measure liquidity: percentage effective spreads and percentage realized spreads scaled by traded value. Effective spreads measure the execution cost of a roundtrip liquidity demanding trade. The absolute measurement is estimated as twice the absolute difference between the execution price and the midpoint price prevailing just before the trade, where midpoint price is the average of the best bid and best ask price just before the trade. The percentage effective spread

is the absolute effective spread scaled by the prevailing midpoint price at the trade. We also estimate a temporary component of effective spread, measured by realized spreads. This proxy captures how much profit the liquidity suppliers could make on the trade. We estimate the absolute realized spreads as twice the distance between the execution price of trades and the midpoint prices prevailing 30 minutes later. The relative realized spread is computed as the absolute proxy divided by the initial midpoint price, consistent with Boehmer (2005). These measures are estimated for each trade and we use the daily traded value weighted average to derive the proxies at the stock-day level.

We examine whether there is any difference in the transaction costs and realized spreads between the failed firms and their matches using the following model:

$$Y_{it} = \alpha_i + \beta D_{it} + \gamma X_{it} + \varepsilon_{it},\ Y_{it} = \alpha_i + \beta D_{it} + \gamma X_{it} + \epsilon_{it} \quad (7)$$

where Y_{it} is an alternative measure of effective spreads and realized spreads for the failed firm's shares and the matched company's shares in time period t. D_{it} is an indicator *Fail_Dummy* variable set equal to zero for the matched firm and one for failed firms. X_{it} is a set of control variables including daily volume (TRADE_VOLUME), market capitalization (MARKET CAPITALIZATION), price volatility (VOLATILITY), and the daily close share price (CLOSE PRICE).

Ⅳ. Results

1. Signals of Returns of Failed Companies

<Table 2> presents the daily average returns (AR), cumulative average returns (CAR) and abnormal performance index returns (API) for the failed group and the matched control group. The table shows that investors of both failed and matched healthy firms suffer significant return losses up until the event dates regardless of the return measures. This is an expected outcome since the investigated period covers the time leading up to and through the GFC, and the two samples include small firms whose stocks are perceived as higher risks, with less liquidity and vulnerable to financial shocks.

<Table 2> Daily Average Returns (AR), Cumulative Average Returns (CAR) and Abnormal Performance Index Returns (API)

This table reports the daily average returns (AR), cumulative average returns (CAR) and abnormal performance index returns (API) for the failed group and the matched control group during the time approaching to failed firm bankruptcy. For each firm, event day 0 is the day the failed firm announced its bankruptcy to the market or the day the firm is permanently suspended from the exchange without ever being reinstated, whichever comes first.

	Failed Group			Control Group		
Event day	AR	CAR	API	AR	CAR	API
-425	0.00343	0.00343	0.00343	0.00048	0.00048	0.00048
-400	0.00307	0.01423	0.01413	0.00021	-0.01944	-0.01942
-350	-0.00806	-0.04667	-0.04670	-0.00981	-0.03639	-0.03685
-300	-0.00208	-0.07691	-0.07662	0.01249	-0.03223	-0.03504
-250	-0.00863	-0.22005	-0.20140	-0.00230	-0.17107	-0.16172
-200	-0.00276	-0.33713	-0.29167	0.01158	-0.08695	-0.08954
-150	-0.00671	-0.52757	-0.41697	0.00074	-0.05538	-0.06177
-100	-0.02716	-0.76229	-0.54160	0.02255	-0.02146	-0.03117
-50	0.01596	-1.09463	-0.67402	-0.01648	-0.13425	-0.13633
-25	0.00182	-1.35083	-0.74925	-0.00013	-0.09950	-0.10754
-20	-0.02801	-1.40729	-0.76319	-0.01478	-0.10962	-0.11696
-19	-0.04450	-1.45179	-0.77372	0.02274	-0.08688	-0.09688
-18	-0.02309	-1.47488	-0.77895	-0.01619	-0.10307	-0.11151
-17	-0.02821	-1.50309	-0.78518	0.00252	-0.10055	-0.10927
-16	-0.03765	-1.54074	-0.79327	0.01501	-0.08555	-0.09590
-15	-0.02204	-1.56278	-0.79783	-0.01046	-0.09601	-0.10536
-14	-0.00134	-1.56412	-0.79810	0.03056	-0.06545	-0.07802
-13	-0.01264	-1.57675	-0.80065	-0.01712	-0.08256	-0.09380
-12	-0.03173	-1.60849	-0.80698	-0.00994	-0.09250	-0.10280
-11	-0.03150	-1.63999	-0.81306	-0.00135	-0.09385	-0.10401
-10	-0.06415	-1.70414	-0.82505	0.00540	-0.08845	-0.09917
-9	-0.00323	-1.70737	-0.82561	0.00103	-0.08742	-0.09824
-8	-0.01479	-1.72216	-0.82819	-0.01466	-0.10207	-0.11146
-7	-0.03045	-1.75261	-0.83342	-0.01005	-0.11213	-0.12040
-6	-0.01498	-1.76758	-0.83592	-0.02949	-0.14162	-0.14634
-5	0.01058	-1.75700	-0.83418	0.00638	-0.13524	-0.14089
-4	0.02416	-1.73284	-0.83018	0.01032	-0.12492	-0.13203
-3	-0.03984	-1.77268	-0.83694	-0.00085	-0.12577	-0.13276
-2	-0.02069	-1.79337	-0.84032	0.01900	-0.10676	-0.11628
-1	-0.08437	-1.87774	-0.85379	0.01059	-0.09618	-0.10692
0	-0.06967	-1.94740	-0.86397	-0.01310	-0.10928	-0.11863

On the announcement dates, the failed firms have the daily AR of -6.9 per cent, CAR of -1.94 and API of -86.4 per cent. These figures are substantially higher than the losses reported in Frino et al. (2007) and Clark and Weinstein (1983) who examine the return

losses for Australian firms and United States firms during non-crisis periods. Since the investigated period includes the GFC, it is possible that the higher return losses reported on the announcement dates are driven by factors other than insolvency. Thus, we compare the stock returns behaviour of failed firms with that of matched healthy firms. <Table 2> reports remarkably lower losses in all return measures for investors of the control group compared with those of the failed group. Specifically, the AR indicates a loss of just 1.3 per cent; the CAR indicates a loss of 11 per cent; and the API indicates a loss of 11.8 per cent on the announcement dates.

Looking at a longer horizon leading up to the bankruptcy dates, we document that investors of both failed and the matched healthy firms experience total return losses over the -350 days prior to the announcement event date, which are shown by the negative CAR and API for both groups. This indicates that stock returns of all firms are negatively affected during the financial crisis, regardless of the contemporary financial situations of the firms. However, we document the considerable differences between the returns of failed firms and their non-failing matches in terms of both the size and patterns of the losses.

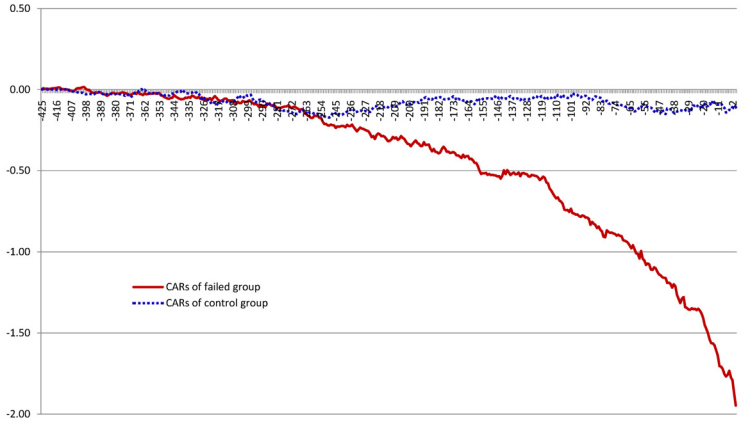
The CAR and the API of bankrupt firms show increasing losses in returns over the time to the bankruptcy, while the control group enjoyed modest gains intermittently over the same period. We find that in the two days before bankruptcy, investors of failed firms suffer further return losses with a CAR of -179 per cent and -187 per cent respectively. The API also indicates return losses of 84 per cent on the -2 trading day with a higher loss of 86 per cent on the day before the suspension. Our finding that higher average return losses occur on the day before bankruptcy and on the event day itself is consistent with Clark and Weinstein (1983) for the US market, but in contrast to Frino et al. (2007) who documented a modest gain on the day immediately prior to the event dates for the Australian market in a non-crisis period. Our documented trend for failed firms is also different from that of the control group. We observe a slight improvement in returns of the matched healthy stocks on the two days before the bankruptcy of its matches.

In terms of the size of the return losses, the failed firms' shareholders suffered more than 80 per cent API losses on the day close to bankruptcy announcement or suspension

while this figure is just -11.9 percent for the non-failed firms'. [Figure 1] provides a graphical representation of the comparison and shows that the CARs for both healthy and failed firms follow similar patterns before the -254 trading days but that they depart after that. The difference between the two groups is increasingly pronounced approaching event day, with a plunging CAR for failed firms compared with a stable CAR for the matched firms.

[Figure 1] Cumulative Average Returns (CARs)

This figure presents cumulative average returns (CARs) for the failed group and the matched control group during the 425 trading day sample period leading up to bankruptcy announcement.



The results for the two samples using daily weighted average returns (WAR) and weighted geometric returns (WGI) for the failed group and the matched control group reported in <Table 3> and [Figure 2] and [Figure 3] present the same story. Overall, our findings suggest that investors react in a different manner to the bankruptcy announcement during the non-crisis and crisis periods. The additional losses in short period leading to the event dates in our study suggest a huge loss of confidence of investors for the financially distressed firms when market conditions deteriorate.

To examine whether the documented difference in the return measures are statistically different, we implement non-parametric Mann-Whitney tests and parametric t-tests for each return proxy. Tests for normality Cramer-von Mises are carried out with a rejection of the null hypothesis of normality. Thus, we report the test results for the

daily return measures using Mann-Whitney tests only. <Table 4> presents descriptive statistics of five daily return measurements in Panel A, the tests for normality results in Panel B and the results of Mann-Whitney tests for median difference between groups in Panel C.

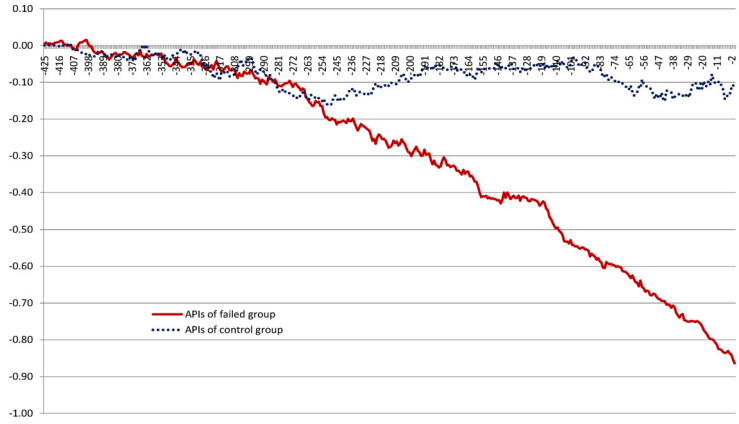
<Table 3> Daily Weighted Average Returns (WAR) And Weighted Geometric INDEX RETURNS (WGI)

This table reports the daily weighted average returns (WAR) and weighted geometric index returns (WGI) for the failed group and the matched control group during the time approaching to failed firm bankruptcy. For each firm, event day 0 is the day the failed firm announced its bankruptcy to the market or the day the firm is permanently suspended from the exchange without ever being reinstated, whichever comes first.

Event day	Failed Group		Control Group	
	WAR	WGI	WAR	WGI
-425	0.00341	0.00341	0.00058	0.00058
-400	0.00245	0.01076	0.00093	-0.01787
-350	-0.00898	-0.05559	-0.00757	-0.02542
-300	-0.00151	-0.06832	0.01235	-0.02978
-250	-0.00416	-0.17661	-0.00283	-0.14677
-200	0.00083	-0.24173	-0.00133	-0.14915
-150	-0.00030	-0.38679	-0.00112	-0.15043
-100	-0.03355	-0.51448	0.01390	-0.06676
-50	-0.00560	-0.63274	-0.00898	-0.15083
-25	0.01076	-0.70120	0.00934	-0.03885
-20	-0.02536	-0.71437	-0.02172	-0.04758
-19	-0.05271	-0.72942	0.01530	-0.03301
-18	-0.00498	-0.73077	-0.03586	-0.06768
-17	-0.03350	-0.73979	-0.02416	-0.09021
-16	-0.02846	-0.74719	-0.01375	-0.10272
-15	-0.01983	-0.75221	-0.02137	-0.12189
-14	-0.00892	-0.75442	0.06107	-0.06827
-13	0.00152	-0.75404	-0.00488	-0.07282
-12	0.00574	-0.75263	-0.01288	-0.08476
-11	-0.03302	-0.76080	0.00203	-0.08291
-10	-0.03346	-0.76880	-0.00666	-0.08902
-9	0.01146	-0.76615	-0.00860	-0.09685
-8	-0.00359	-0.76699	-0.00891	-0.10490
-7	-0.03331	-0.77475	-0.01031	-0.11413
-6	-0.01737	-0.77867	-0.04804	-0.15668
-5	0.01813	-0.77465	-0.01032	-0.16538
-4	0.00624	-0.77325	0.02089	-0.14795
-3	-0.06382	-0.78772	-0.01855	-0.16375
-2	-0.03794	-0.79577	0.02583	-0.14215
-1	-0.05546	-0.80710	0.00504	-0.13783
0	-0.19118	-0.84398	-0.02105	-0.15597

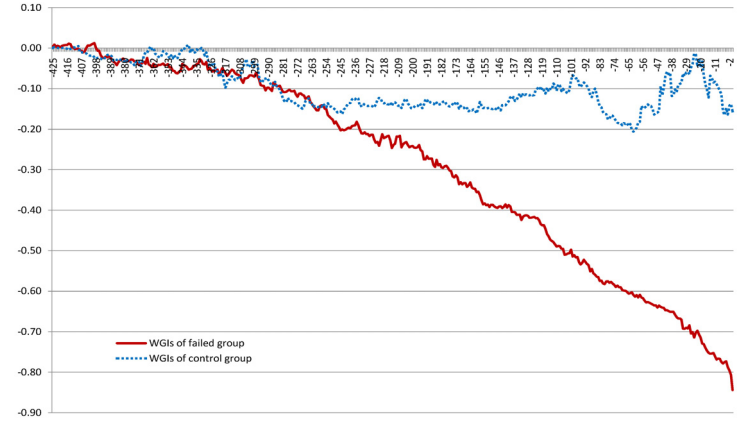
[Figure 2] Abnormal Performance Index Returns (APIs)

This figure presents abnormal performance index returns (APIs) for the failed group and the matched control group during the 425 trading day sample period leading up to bankruptcy announcement.



[Figure 3] Weighted Geometric Index Returns (WGIs)

This figure presents weighted geometric index returns (WGIs) for the failed group and the matched control group during the 425 trading day sample period leading up to bankruptcy announcement.



The descriptive statistics (Panel A, <Table 4>) are consistent with the results presented in <Table 2> and <Table 3>. All five return measures indicate that, on average, shareholders in firms that ultimately declared bankruptcy suffered four to ten times larger losses than those in firms that survived through the crisis. The medians of the losses tell a similar story and these large differences in all return measures between the failed

and the control groups are statistically significant as reported in Panel C. By definition, the API represents the returns on a given portfolio rebalancing at the start of each holding period so that equal amounts are invested in N_t stocks in the portfolio. A comparable return measure of API but with no implicit assumption that the portfolio is periodically rebalanced is WGI, which provides an approximation to the realized rate of return on an investment of one dollar in each bankrupt stock at the start of an event period and held until the end of event period. In contrast to Clark and Weinstein (1983)'s study

<Table 4> Descriptive Statistics of Daily Returns Including AR, CAR, API, WAR AND WGI

This table presents the summary statistics and tests for differences for various measures of daily returns between the failed firms and the matched control firms based on market capitalizations and closing prices of stocks at the beginning of the sample period. The daily returns are measured by daily average returns (AR), cumulative average returns (CAR); abnormal performance index returns (API); daily weighted average returns (WAR) and weighted geometric index returns (WGI). *P-values* of the tests for normality and tests for median difference between groups are reported in parentheses.

	AR	CAR	API	WAR	WGI
Panel A: Summary statistics					
Failed group					
Number of observations	9,693	9,693	9,693	9,693	9,693
Mean	-0.0046	-0.4451	-0.3036	-0.0042	-0.2886
Standard Deviation	0.0141	0.4659	0.2562	0.0151	0.2409
3rd quartile	0.0026	-0.0597	-0.0597	0.0025	-0.0581
Median	-0.0035	-0.2964	-0.2619	-0.0017	-0.2316
1st quartile	-0.0109	-0.7052	-0.5141	-0.0087	-0.4956
Control group					
Number of observations	7,732	7,732	7,732	7,732	7,732
Mean	-0.0003	-0.0731	-0.0756	-0.0003	-0.0959
Standard Deviation	0.0089	0.0444	0.0431	0.0113	0.0558
3rd quartile	0.0048	-0.0379	-0.0418	0.0051	-0.0408
Median	-0.0006	-0.0646	-0.0691	-0.0006	-0.1119
1st quartile	-0.0056	-0.1092	-0.1122	-0.0057	-0.1423
Panel B: Tests for normality					
Failed group					
Cramer-von Mises statistics	1.0529 (p<0.005)	3.5397 (p<0.005)	1.7750 (p<0.005)	3.6207 (p<0.005)	2.032 (p<0.005)
Control group					
Cramer-von Mises statistics	0.1766 (p=0.0106)	0.7652 (p<0.005)	0.6052 (p<0.005)	1.1391 (p<0.005)	2.2043 (p<0.005)
Panel C: Tests for median difference between groups					
Mann-Whitney U-statistics	24.0289 (p<0.0001)	157.0754 (p<0.0001)	145.5225 (p<0.0001)	14.1825 (p=0.0002)	116.1247 (p<0.0001)

on the US stocks, <Table 4> shows that for the Australian failed firms, the averages and the medians of API are higher than those of WGI. The reverse holds for the control firms. This indicates that stock returns of some failed firms experienced remarkably greater losses compared with other bankrupt firms in the time leading to the bankruptcy dates and this deviation between survived firms is lesser. This prediction is also consistent with high standard deviation of mean returns reported for failed companies compared with the statistics reported for healthy firms. These findings suggest that investors of a portfolio of all later bankrupt stocks seem to be better off with a buy-and-hold strategy than a portfolio rebalancing strategy during the financial crisis.

2. Liquidity Signals of Failed Firms

<Table 5> reports the summary statistics for daily value-weighted average percentage effective spreads (PES) and percentage realized spreads (PRS) for failed and matched firms. Tests for normality of these variables are reported in Panel B which suggests a rejection of a null hypothesis of a normal distribution for these variables. Thus, we utilize the Mann-Whitney test to examine the difference in medians of each liquidity proxy between the two groups. The test results reported in Panel C indicate that there are statistically significant differences in all liquidity measures between failed firms and the matches. Failed firms have significantly higher median percentage effective spreads (0.03) than those of the matched healthy firms (0.018). This indicates that the transaction costs of failed firms are higher than the matched firms during the period leading up to bankruptcy day.

The median percentage realized spreads of failed firms are higher than those of the control group by 0.16 basis points. The difference is statistically significant at 0.01% based on Mann-Whitney test. This finding suggests that the compensation for liquidity providers for stocks of failed firms is higher than for those of the matched firms, indicating that there are a smaller number of liquidity providers for failed firms′ stocks than their peers. Overall, the results on spreads show that, assessed at the median, the liquidity of failed firms is worse than that of the control group during the financial crisis, perhaps due to a lack of willingness by the market to provide liquidity for stocks of these financially distressed firms.

<Table 5> Descriptive Statistics Of Daily Value-Weighted Average Spreads Including Percentage Effective Spreads (PES) and Percentage Realized Spreads (PRS)

This table shows the summary statistics and tests for differences for liquidity between the failed firms and the matched control firms based on market capitalizations and closing prices of stocks at the beginning of the sample period. Liquidity is measured by percentage effective spreads (PES) and percentage realized spreads (PRS). *P-values* of the tests for normality and tests for median difference between groups are reported in parentheses.

	PES	PRS
Panel A: Summary statistics		
Failed group		
Number of observations	9,693	7,176
Mean	0.0519	0.0108
Standard Deviation	0.0770	0.0188
3rd quartile	0.0571	0.0112
Median	0.0301	0.0063
1st quartile	0.0132	0.0031
Control group		
Number of observations	7,732	6,229
Mean	0.0293	0.0064
Standard Deviation	0.0398	0.0067
3rd quartile	0.0367	0.0084
Median	0.0182	0.0047
1st quartile	0.0066	0.0026
Panel B: Tests for normality		
Failed group		
Cramer-von Mises statistics	207.56 (p<0.005)	203.84 (p<0.005)
Control group		
Cramer-von Mises statistics	128.41 (p<0.005)	74.29 (p<0.005)
Panel C: Tests for median difference between groups		
Mann-Whitney U-statistics	788.3863 (p<0.0001)	285.7649 (p<0.0001)

<Table 6> presents daily effective spreads and realized spreads in percentage measures for the two groups to show the patterns of behaviour over the -425 trading day period prior to bankruptcy. The Mann-Whitney tests are employed to measure median differences in the two relative spreads measures across the failed and control group samples. The daily percentage effective spreads for the failed firms are statistically significantly higher than those for the control firms over the investigated period. The difference becomes pronounced from the -200 trading day, when relative effective spreads of failed firms

are three times larger than those of the control group. The discrepancy increases as the event day approaches, since the relative effective spreads increase over this time while this measure for the control group is fairly constant. On the event day, the median effective spread for the failed firms is 9.3 per cent, roughly 7 per cent higher than its matched healthy firms. The highest increase in the percentage effective spreads occurs in the last days prior to bankruptcy announcement, from approximate 8.3 per cent on the trading day -1 to 9.3 per cent on the event day. This increase is opposite to the change for the control group that show a fall in effective spreads from trading day -1 (3.2 per cent) to the event day (2.4 per cent). These results are consistent with the hypothesis that the transaction costs for failed firms are higher than the control group in the lead up to bankruptcy or suspension.

Interestingly, it is noticeable that the bid-ask spreads for both failed and control groups presented in our study period (2006 to 2009) are considerably lower compared to those reported in Frino et al. (2007) whose investigation period covers from 1990 to 2005. For example, while the bid-ask spreads of a failed group in Frino et al. (2007) vary from 7.1% to 36.5%, our study shows a smaller range of bid-ask spreads of a failed group between 1.6% and 9.9%. This substantial decrease in bid-ask spreads can be attributed to several contributing factors including ongoing development of electronic trading system in ASX followed by enhancement of technological infrastructure since 2000, and the growing size of the market along with the increased supply of capital to the Australian stock market due to compulsory superannuation (Gizycki and Lowe, 2000). According to the Research Discussion Paper published by Reserve Bank of Australia (2019), the Australian stock market had increased to around 150% of Gross Domestic Product by 2009, whereas the aggregated market capitalization accounted for less than 50% of GDP before 2000.

The daily realized spreads for the failed and control groups in the second column in <Table 6> provide similar patterns in behaviour relative to those noted for the effective spreads. We observe significant differences in the percentage realized spreads for stocks of the failed firms and their matches from the trading day -200. The realized spreads are volatile in the range of 0.7 per cent to 1.6 per cent in the period between the trading day -15 and the event day. On the trading day -1, the realized spreads fall from 1.4

per cent to 1.1 per cent and then increase to 1.6 per cent on the event day. The control group shows an identical pattern but with significantly lower magnitude. The daily realized spreads results are consistent with the median analysis in <Table 4>, indicating higher

<Table 6> Daily Effective BID-ASK Spreads (PES) and Realized BID-ASK Spreads (PRS)

This table presents the median values of daily percentage effective spread (PES) and percentage realized spread (PRS) for the failed and its matched control groups from day -425 to day 0. To test the median difference of each spread between the groups, the Mann-Whitney U-statistics are used. ***, **, and * denotes the statistical significance at the 1%, 5% and 10%, respectively.

	PES			PRS		
Event day	Failed	Control	Mann-Whitney	Failed	Control	Mann-Whitney
-425	0.02086	0.01297	0.3048	0.00391	0.00297	1.0076
-400	0.01599	0.01560	0.0012	0.00355	0.00324	0.2737
-350	0.02002	0.01987	0.0037	0.00499	0.00374	0.1553
-300	0.01674	0.01489	0.4913	0.00388	0.00544	0.4602
-250	0.02799	0.01472	1.6888	0.00443	0.00430	0.7078
-200	0.03175	0.01251	4.9598**	0.00615	0.00355	2.7489*
-150	0.03153	0.01533	2.3374	0.00704	0.00366	5.2663**
-100	0.04065	0.02532	6.3897**	0.00685	0.00457	3.2019*
-50	0.05128	0.01597	13.3841***	0.01304	0.00539	8.7908***
-25	0.04082	0.02351	4.4649**	0.00903	0.00728	2.5025
-20	0.06360	0.02363	11.5253***	0.00829	0.00573	1.5429
-19	0.04651	0.02494	10.4611***	0.01154	0.00427	5.2196**
-18	0.07090	0.02494	12.1132***	0.01165	0.00414	5.1579**
-17	0.09189	0.02232	13.1960***	0.00929	0.00616	2.7937*
-16	0.07072	0.02076	13.2948***	0.01163	0.00746	2.0053
-15	0.06061	0.02023	10.8255***	0.00979	0.00540	5.9943**
-14	0.04878	0.01695	8.1236***	0.00940	0.00563	2.2250
-13	0.04335	0.02200	11.4758***	0.00986	0.00619	4.2589**
-12	0.04005	0.02343	9.1800***	0.00989	0.00572	4.8508**
-11	0.05201	0.03054	8.9752***	0.00713	0.00666	0.5722
-10	0.05820	0.02397	10.2158***	0.01697	0.00610	3.7822*
-9	0.05400	0.02278	9.3478***	0.01137	0.00727	1.9505
-8	0.05297	0.02813	7.3147***	0.00817	0.00556	2.9250*
-7	0.07846	0.02858	10.1661***	0.01185	0.00659	2.3141
-6	0.07319	0.02645	6.8754***	0.00933	0.00554	1.7401
-5	0.09719	0.02797	8.4559***	0.00949	0.00664	2.3390
-4	0.09850	0.03030	12.9471***	0.01091	0.00883	2.6631
-3	0.08431	0.02307	13.4491***	0.00960	0.00701	1.6386
-2	0.06897	0.02060	11.8729***	0.01357	0.00695	5.4602**
-1	0.08252	0.03217	11.1420***	0.01114	0.00550	5.8870**
0	0.09305	0.02367	12.5149***	0.01601	0.00491	12.0706***

revenues for liquidity providers of the failed firms' stocks, which suggests deterioration in liquidity for these failed firms during the crisis.

Since the literature suggests that spreads are affected by trade volume, price level, volatility and market capitalization, we implement multivariate analysis that includes the determinants of spreads as control variables to find out whether there is a difference in spreads between the failed firms and the control firms during the crisis, as given by Equation (7) in the methodology section. <Table 7> and <Table 8> report the regression results for the percentage effective and realized spreads measurements using Ordinary Least Squares (OLS) without and with stock-fixed effects, respectively. In <Table 8>, we report time-clustered standard errors to account for the changing conditions associated with the GFC.

<Table 7> Regression Parameter Estimates Using Ordinary Least Squares (OLS)

This table presents the parameter estimates of the ordinary least squares (OLS) regression model (shown in Equation 7 in text) for all spread measures, including percentage effective spread (PES) and percentage realized spread (PRS). *Fail_dummy* is an indicator variable which is set to one for a failed firm and zero for the matched control firm. *Trade_volume* and *market_capitalization* take the logarithm values of a daily volume and a firm size. *Volatility* is measured as log (High/Low) and *close_price* is the closing price of the stock for the day.

	Coefficient	Standard error	t-value	p-value
Panel A: Percentage Effective Spread				
Intercept	0.1176	0.0027	42.98	<.0001
Fail_dummy	0.0080	0.0009	9.04	<.0001
Trade_volume	-0.0018	0.0003	-6.51	<.0001
Market_capitalization	-0.0173	0.0004	-49.03	<.0001
Volatility	0.2560	0.0075	34.38	<.0001
Close_price	0.0028	0.0003	10.41	<.0001
Number of observations	16,209			
Adjusted R^2	0.3186			
Panel B: Percentage Realized Spread				
Intercept	0.0168	0.0009	18.97	<.0001
Fail_dummy	0.0008	0.0002	3.51	0.0005
Trade_volume	-0.0001	0.0001	-0.83	<.0001
Market_capitalization	-0.0031	0.0001	-32.19	<.0001
Volatility	0.1049	0.0019	55.73	<.0001
Close_price	0.0008	0.0001	11.11	0.4046
Number of observations	12,423			
Adjusted R^2	0.3809			

The coefficients of the *Fail_dummy* variable in <Table 7> in Panels A and B are positive and statistically significant at the 1% level, suggesting that the percentage effective spread and the percentage realized spread of the failed firms' stocks are higher than the matched healthy stocks after controlling for other spread determinants. These results are consistent with Frino et al. (2007), who find higher bid-ask spreads associated with failed firms in their pooled regressions.

However, when we control for firm-specific effects and clustered standard errors, these discrepancies in spreads between the failed firms and the control groups no longer exist systematically. For all regression results presented in <Table 8>, the signs of all other control variables are as expected, and consistent with the literature. Yet, there

<Table 8> Regression Parameter Estimates Using Ordinary Least Squares (OLS) with Firm Fixed Effects

This table presents the parameter estimates of the ordinary least squares (OLS) regression model (shown in Equation 7 in text) with firm fixed effects for all spread measures, including percentage effective spread (PES) and percentage realized spread (PRS). *Fail_dummy* is an indicator variable which is set to one for a failed firm and zero for the matched control firm. *Trade_volume* and *market_capitalization* take the logarithm values of a daily volume and a firm size. *Volatility* is measured as log (High/Low) and *close_price* is the closing price of the stock for the day.

	Coefficient	Clustered Standard error	t-value	p-value
Panel A: Percentage Effective Spread				
Intercept	0.1507	0.0060	25.22	<.0001
Fail_dummy	-0.0025	0.0034	-0.75	0.4514
Trade_volume	-0.0045	0.0005	-8.50	<.0001
Market_capitalization	-0.0178	0.0010	-18.49	<.0001
Volatility	0.2180	0.0188	11.59	<.0001
Close_price	-0.0011	0.0007	-1.56	0.1196
Number of observations	16,209			
Adjusted R^2	0.4581			
Panel B: Percentage Realized Spread				
Intercept	0.0229	0.0019	11.82	<.0001
Fail_dummy	-0.0018	0.0010	-1.81	0.0708
Trade_volume	-0.0008	0.0002	-3.90	0.0001
Market_capitalization	-0.0023	0.0003	-7.92	<.0001
Volatility	0.0947	0.0095	9.93	<.0001
Close_price	-0.0006	0.0002	-3.12	0.0019
Number of observations	12,423			
Adjusted R^2	0.4693			

is no statistically significant difference in the relative effective and realized spreads between the bankrupt firms and the healthy firms once controlling for firm-specific characteristics and clustered standard errors. This is evidenced by the insignificant coefficients of *Fail_Dummy* in Panels A and B of <Table 8>. The findings suggest that the documented variations between effective and realized spreads in the univariate analysis and the OLS regressions are driven by the firm characteristics and the spreads determinants. Once these factors are controlled, there is no statistically significant difference in liquidity associated with the failed and the matched healthy firms during the crisis. These findings suggest that the documented differences in spreads between bankrupt firms and the matched firms can be explained by underlying market-driven actions such as volume, volatility and market capitalization. It shows that the market does understand and that its ability to discriminate among failing and non-failing firms shows-up in returns, volatility and volume, which then results in wider spreads as well. The fixed-effect regression results in <Table 8> affirm that the spreads are not unusually high given what is going on with the firm.

Ⅴ. Conclusions

Our study investigates whether there is significant discrimination of abnormal stock returns between failed and non-failed firms during the GFC and whether there is any signal of information asymmetries across market participants in the period leading up to the announcement date of firm failures during the GFC.

Our analysis shows that both failed and matched healthy firms incurred big losses (negative abnormal returns) during the GFC. However, we find that returns of both firm groups move together up to the trading day -254, and become disparate following that day. This indicates that the market was able to detect the firm failure as early as 254 trading days (approximately 1 year) before the bankruptcy announcement dates. Our findings are consistent with Swary (1986) who examines the stock market reaction in the Continental Illinois crisis. In addition, the differing results obtained from API and WGI indicate that some failed firms incurred substantially greater losses than other bankrupt firms during the time leading up to the bankruptcy dates, and suggest that

investors of a portfolio of bankrupt stocks seem to be better off with a buy-and-hold strategy than a portfolio rebalancing strategy during the financial crisis period.

We also find that higher effective spreads and higher realized spreads are associated with the failed firms during the GFC, and the discrepancy is substantial compared with those of the matched healthy firms in this period. However, these differences disappear when we control for trade volume, market capitalization, daily volatility and firm-specific characteristics. Our findings suggest that as bankruptcy approaches, failed firms differ on volume and volatility and as their price declines, they are also differing on market capitalization, resulting in a wider spread. The regression results also indicate that specific firm characteristics such as industry and corporate governance mechanisms may play an important role in the bankruptcy of these firms. Our study provides evidence that the market can predict firm failure even during the global financial crisis when conditions in general are illiquid and investors demonstrate a loss of confidence.

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THE KOREAN JOURNAL OF FINANCIAL MANAGEMENT
Volume 40, Number 6, December 2023

글로벌 금융위기 당시 기업 파산에 따른 주식 수익률과 유동성 추이

김마리아*

〈요 약〉

본 논문은 글로벌 금융위기(GFC) 기간 동안 재무적으로 실패한 기업들의 비정상적인 주식 수익률과 유동성을 조사한다. 매칭 기법을 사용하여 호주 주식 시장에서의 실패한 기업과 매칭된 비실패 기업 모두 GFC 기간 동안 상당한 손실을 입었음을 보여준다. 두 그룹의 기업 수익률은 파산 발표 254 거래일 전부터 큰 차이를 보인다. 전반적으로 유동성이 부족하고 투자자들이 신뢰를 잃은 GFC 기간에도 시장은 기업 지배구조와 경영진과 같은 기업 특성을 기업 생존의 핵심 요소로 인식하며, 기업 파산이 가까워질수록 실패한 기업의 스프레드가 확대되어 실패한 기업과 그렇지 않은 기업을 구별할 수 있는 능력이 있음이 발견된다. 이 결과는 금융 위기 기간 중 투자자의 부정적 영향을 완화하기 위해 파산 공시에 관한 기업 공시 관련 현행 규제의 적정성을 평가하는데 유용하게 활용될 수 있다.

주제어 : 비정상 수익률, 기업 파산 공시, 호가 스프레드, 글로벌 금융 위기, 시장 행동, 주식 수익률 행동

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