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The impact of the Russia-Ukraine crisis on the stock market: Evidence from Australia

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ABSTRACT

This paper investigates the effect of the Russia–Ukraine crisis on the Australian stock market. Using the event study methodology, we find significantly negative abnormal returns on the event date (i.e., the first trading day after Russia recognized the two Ukrainian states as autonomous regions) in the Australian stock market. However, this negative stock market reaction mostly disappeared in the post-event period. We also find that small and medium-sized firms were adversely affected during the pre-event and event periods. Interestingly, the magnitude and the direction of the abnormal returns vary across industries. We also find that high-growth, illiquid and export-oriented firms are more exposed to the Russia–Ukraine crisis.

1. Introduction

Russia's recognition of Ukraine's Donetsk and Luhansk regions as independent states on February 21, 2022 has been dubbed the start of the war by world leaders. As a result, western countries, like the United States (US), the United Kingdom (UK) and the members of the European Union (EU), started to impose a slew of economic sanctions on Russia. In line with the US, the UK, the EU members and other governments around the world, Australia also severely condemned 'Russia's unlawful moves on eastern Ukraine.'[1] In response to this political tension, the global stock market plunged. For example, the US S&P 500 declined by 1%, European equities (STOXX) dropped by 1.3%, the Australian S&P/ASX 200 fell by 1.4% and the Shanghai Composite index lost 1.2%.[2,3] In this study, we examine Australian equity investors' reaction to the recognition of Ukraine's Donetsk and Luhansk regions as independent states (hereafter the

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[1] https://www.foreignminister.gov.au/minister/marise-payne/media-release/australia-condemns-russias-unlawful-moves-eastern-ukraine

[2] See https://www.nytimes.com/2022/02/22/business/russia-ukraine-stock-markets.htmlhttps://apnews.com/article/russia-ukraine-joe-biden-coronavirus-pandemic-health-business-281f62598d89f1b1f6a7dd06a1c319c0https://www.reuters.com/markets/europe/global-markets-wrapup-1-pix-2022-02-21/

[3] Global stocks plunged further on February 24 when President Vladimir Putin launched an invasion of Ukraine. This is evidenced by a 1.2% fall in the S&P 500 on Wall Street, a 1.8% drop in Japan's Nikkei, a 3.2% drop in the Hang Seng Index and a 4% slump in Germany's DAX in Europe. (https://edition.cnn.com/2022/02/23/investing/dow-futures-global-markets-russia-operation-intl-hnk/index.html).

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Russia–Ukraine crisis). We also investigate whether Australian investors' reactions to this crisis differ depending on firm- and industry-level heterogeneity.[4]

Prior studies investigating the link between political uncertainty and financial market outcome show that fear of political instability significantly and negatively affects both stock market returns and financial assets' risk profiles (see, e.g., Gemmill, 1992; Nippani and Medlin, 2002; Mei and Guo, 2004; Li and Born, 2006; Jones and Banning, 2008; Dimic et al., 2015; Kapar and Buigut, 2020; Boungou and Yatié, 2022). Using a number of international political crises, Berkman et al. (2011) highlight the importance of political crises in explaining both the mean and the volatility of stock market returns around the world. With data from 49 emerging nations, Lehkonen and Heimonen (2015) also report an inverse relationship between political risk and stock returns.

Among the recent major political risk events, Smales (2017) documents a significantly positive relationship between political risk (the Brexit referendum) and financial market uncertainty. He et al. (2017) examine the economic cost of non-violent diplomatic disputes between mainland China and Taiwan and show that political tension is related to a significant decline in stock market returns. They also find that anticipated future tension levels are linked to reductions in current stock returns. Kapar and Buigut (2020) find that diplomatic and economic blockades on Qatar resulted in a substantial impact on the stock market volatility in Qatar. Furthermore, Buigut and Kapar (2020) demonstrate that the blockade of Qatar has had a considerable impact on the stock markets in the Gulf Cooperation Council countries, with varied effects for different industries and countries. Finally, Bash and Alsaifi (2019) show that the disappearance of Jamal Khashoggi has had a severe negative influence on the Saudi Stock Exchange's stock returns.

A few recent studies analyze the impact of the Russia–Ukraine crisis on financial markets in several contexts. For example, Boungou and Yatié (2022) reveal that the Russia–Ukraine crisis has had a significant adverse effect on the performance of global stock market indices. Boubaker et al. (2022) show that stock market indices of developed markets have been more heavily and adversely affected than emerging market indices. Ahmed et al. (2022) also find that Russia's recognition of the two Ukrainian states as autonomous regions has had a significant negative impact on the European stock markets. Fang and Shao (2022) show that the Russia–Ukraine conflict has affected commodity markets through both economic and financial channels. In this study, we extend the literature by examining the Australian stock market's reaction to the Russia–Ukraine crisis.

Building on both economic and behavioral arguments, we predict that the Russia–Ukraine crisis has had a significant negative impact on the Australian stock market. The economic argument for stock price reactions to the Russia–Ukraine crisis is premised on the observation that this crisis has had various adverse impacts on trade, investment and consumer confidence, resulting in increased economic uncertainty (Fang and Shao, 2022). Thus, this crisis might cause decreased consumer spending and reduced investment, leading to lower corporate earnings and a decrease in stock prices. Additionally, the crisis could affect international trade and investment, particularly because of the sanctions imposed and/or the disruption in the supply of goods and resources[5] (Ahmed et al., 2022). These could result in higher costs for businesses and decreased competitiveness, also potentially leading to a decrease in stock prices. In this regard, prior studies indicate that political conflicts and economic uncertainty in a certain area may result in financial contagion that spreads financial market stress or instability from one market to another (e.g., Akhtaruzzaman et al., 2021). This can occur due to interconnections and interdependencies between financial markets and institutions such that a shock in one market or institution can quickly spread and amplify across markets and institutions, leading to a broader financial crisis. Kaminsky et al. (2003) argue that financial contagion is explained by trade and financial links, including cross-border capital flows, optimal portfolio allocation and common creditors as well as investor behavior.

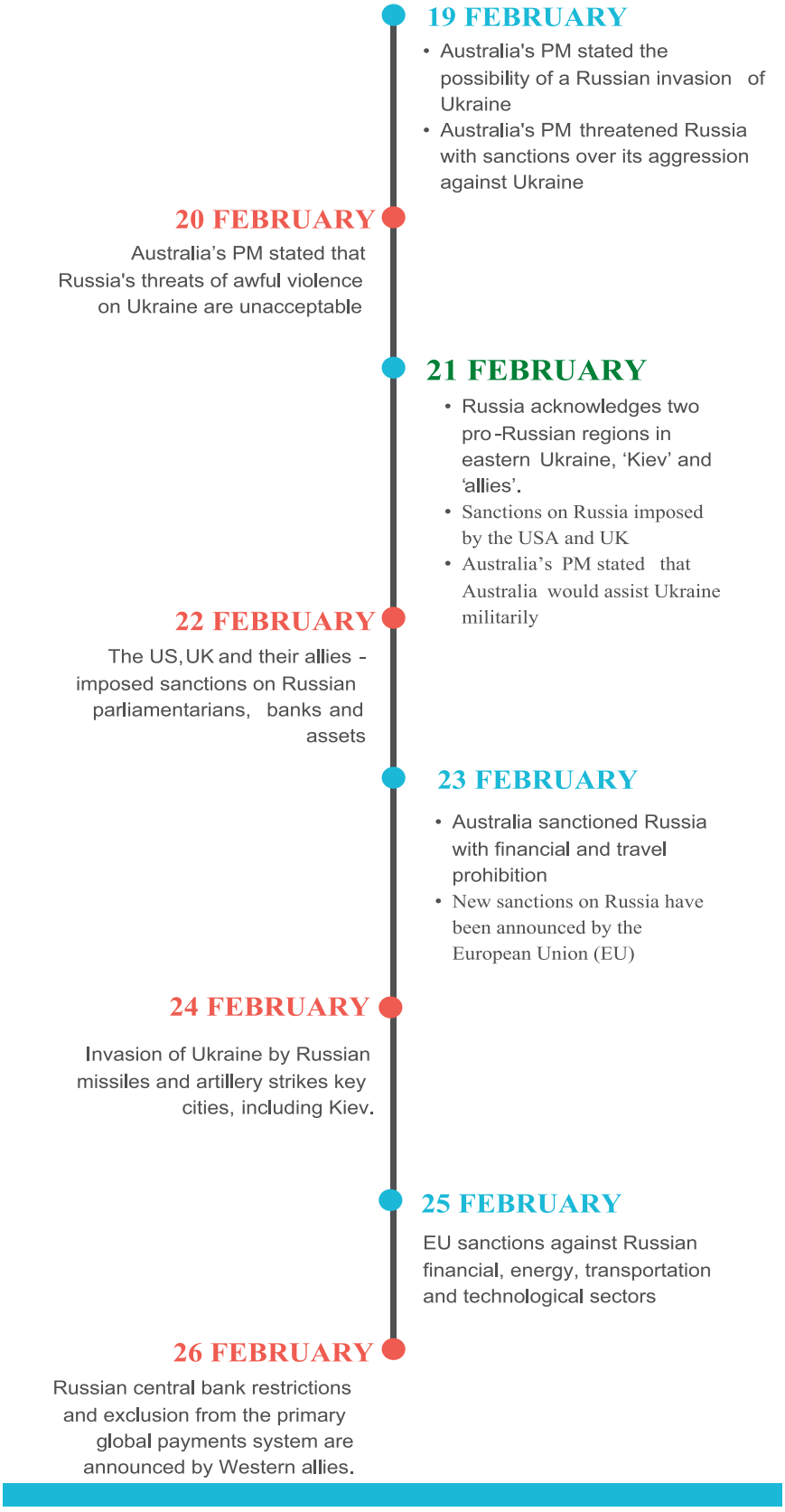
Furthermore, the behavioral argument for the stock price reactions to the Russia–Ukraine crisis is premised on the thesis that individual investors and market participants are influenced by psychological and emotional factors in addition to rational considerations such as risk and return when making financial decisions. This hypothesis suggests that market behavior may not always be driven solely by rational calculations and can instead be influenced by various cognitive biases, emotions and social and cultural factors (Jacobs, 2016).

The above economic and behavioral theories indicate that there are several reasons why the Australian stock market could be negatively affected by the Russia–Ukraine crisis. First, Russia and Ukraine are important trading partners for Australia, and any disruptions to trade as a result of political tensions and economic sanctions can have a negative impact on Australian companies that engage in business with these countries. For example, Russia is Australia's 16th largest trading partner, with total two-way trade between the two countries worth AUD 1.5 billion in 2020. Likewise, the total two-way trade between Ukraine and Australia was worth AUD 450 million in 2020. Overall, because Russia and Ukraine are important trading partners for Australia, any disruptions to trade as a result of the Russia–Ukraine crisis could have a negative impact on Australian companies and the Australian economy, thus negatively affecting the Australian stock market.

Second, the economic sanctions imposed by Australia and other countries on Russia could harm the economies of those targeted and negatively affect international trade, leading to a decrease in economic growth and corporate profits. Furthermore, in support of Ukraine, Australia has provided military and technical support (see Fig. 1 for a detailed timeline of the Russia–Ukraine crisis), increasing the risk and uncertainty. Moreover, supply chain disruptions as a result of the crisis could decrease productivity and increase costs for Australian companies, with a flow of adverse impacts on the profitability and stock price of Australian companies. Third, the financial contagion risk arising from energy supply contraction, inflation, food shortages and global supply chain disruption

[4] The recent Russia–Ukraine crisis was exacerbated on February 21, 2022, when Russia recognized Ukraine's Donetsk and Luhansk regions as independent states and mobilized Russian troops inside Ukraine. However, since the Australian stock market was closed at the time of the announcement, we choose the first trading day following the announcement, i.e., February 22, as our event date.

[5] Russia supplies 27% of the crude oil, 46.7% of the solid fuel and 41.1% of the natural gas imported by the EU (Eurostat, 2022).



(caption on next page)

Fig. 1. Timeline of the Russia–Ukraine crisis.

might prompt investors to become more risk averse and thus move their investments to safer assets, leading to a decrease in the demand for stocks. Finally, as the Russia–Ukraine crisis continued to escalate, it was featured heavily in the electronic and print media. The above-mentioned crisis and related sanctions' repercussions are likely to have heightened geopolitical risk, pessimism and fear among investors. Thus, based on the behavioral hypothesis, we argue that the Russia–Ukraine crisis might give rise to pessimistic sentiment within markets, leading to a decline in stock prices due to investors' herding behavior expressed through panic selling.

We use the S&P/ASX 300 index to conduct an event study to examine the short-term market reactions of investors in listed Australian companies on February 22, 2022, the first trading day after Russia recognized the two Ukrainian states as autonomous regions. We find a negative and significant average abnormal return on the event day. Importantly, the event day witnessed the largest decrease in stock prices (− 0.94%) during the event window, implying that investors in the Australian stock markets reacted negatively to Russia's recognition of the Donetsk and Luhansk regions of eastern Ukraine as two autonomous states. Moreover, we observe mixed average abnormal return (AAR) values during the pre-event window, reflecting Australian investors' apprehension regarding the potential Russia–Ukraine crisis. However, the negative stock market reactions to the Russia–Ukraine crisis mostly disappeared during the post-event period, illustrating the fading of Australian investors' initial fear and uncertainty. We observe similar negative and significant cumulative abnormal returns (CARs) around the event and pre-event days but reversal during the post-event period.

We also investigate whether the stock market reactions to the Russia–Ukraine crisis varied by firm size. We find that small and medium-sized firms experienced a clear negative and significant return AAR on the event day, whereas large firms remained unaffected, as evidenced by their positive but insignificant returns. We continue to observe a similar size-based variation in stock market reactions to the crisis when using the CAR in the analysis.

Further, we observe considerable industry-level variation in the stock price reactions to the crisis in Australia. For example, we discover that industries such as the consumer discretionary, industrial, real estate, and information and communication technology industries experienced negative and significant AARs on the event day. Interestingly, we find that the energy and utility industries experienced a positive and significant AAR on the event day. We observe consistent significant industry-level variation when the CAR is used in the analysis.

When examining the growth-based variation, we observe that firms in the high- and medium-growth portfolios were adversely affected on and around the event day, whereas low-growth firms remained unaffected. We also notice that firms in portfolios with top and medium illiquidity experienced a negative and significant AAR on the event day. We find similar illiquidity-based variation in stock market reactions to the crisis when using the CAR in the analysis. Finally, we investigate whether the stock market reactions to the Russia–Ukraine crisis varied by the export orientation of the firms. We find that firms with the top and middle export orientation experienced a clear negative and significant AAR on the event day, whereas firms with the bottom export orientation remained unaffected, as evidenced by their negative but insignificant returns. We continue to observe similar export orientation-based variation in stock market reactions to the crisis when using the CAR in the analysis.

Our study contributes to the literature that examines the effect of geopolitical uncertainty on stock markets. Prior studies show that political events and the associated uncertainty have a considerable impact on stock returns and volatility (He et al., 2017; Smales, 2017; Bash and Alsaifi, 2019; Hillier and Loncan, 2019; Buigut and Kapar, 2020; Kapar and Buigut, 2020; Ahmed et al., 2022; Boubaker et al., 2022). Some studies document that negative stock market reactions to political uncertainty persist in the post-event period (He et al., 2017). We contribute to this growing body of knowledge by examining Australian investors' reaction to Russia's recognition of two Ukrainian states as autonomous regions and showing that Australian stocks experienced significant negative abnormal returns on the event date. Our research also contributes to the literature on financial contagion, which considers how an event in one place might have an impact on another region because of interconnections and interdependencies (Akhtaruzzaman et al., 2021). To the best of our knowledge, our study is the first attempt to determine how the ongoing Russia–Ukraine crisis is affecting investor behavior in the Australian market.

Our study also complements the extant literature demonstrating that the sensitivity of stock prices to crises differs across firm sizes (Dimson and Marsh, 1986; Josev et al., 2004; Afik et al., 2019). We show that, while small and medium-sized firms are adversely affected by the Russia–Ukraine crisis, large firms remain essentially unaffected. Further, our finding of considerable industry-level heterogeneity in the stock price reactions to the Russia–Ukraine crisis on the Australian stock market extends the related literature (Boutchkova et al., 2012; Buigut and Kapar, 2020). Finally, we extend the literature by showing that stock market reactions to the Russia–Ukraine crisis vary considerably based on the growth, liquidity and export orientation of firms. Our findings may guide policymakers, managers and other key stakeholders in developing effective policies to mitigate the negative impacts of political uncertainty on the stock markets.

The rest of this paper is structured as follows. The data, as well as the empirical methodologies, are presented in Section 2. The results are discussed in Section 3. Finally, Section 4 summarizes the study and provides future research directions.

2. Data and methodology

2.1. Data

Our study investigates the effect of the Russia–Ukraine crisis on the performance of publicly traded firms on the Australian Securities Exchange (ASX). We collect a list of 295 constituent stocks of the ASX 300 index and their Global Industry Classification

Standard (GICS) sector names from Bloomberg as of March 18, 2022. The index represents around 82% of Australia's equity market as of January 2022[6] and provides broad exposure to all ASX 200 companies and approximately 100 smaller-cap shares. For our sample firms, the daily stock prices, market values, market-to-book ratio and turnover (i.e., volume) are obtained from Thomson Reuters DataStream. Because of the lack of available required data, we drop 12 firms from our initial sample to ensure consistency throughout the study. Therefore, our final analysis contains 283 stocks listed publicly on the ASX 300 index. Appendix Table A.1 presents the industry distribution of our sample.

Following a related study (Ahmed et al., 2022), we use February 22, 2022 as the event date. The build-up of Russian troops near the Ukrainian border had attracted media coverage about a possible Russian invasion of Ukraine for months. The fear of an invasion materialized when Russia recognized the Donetsk and Luhansk regions as independent states on February 21, 2022. The Russian president signed the executive order recognizing these two states following his televised speech at 22:35 (UTC + 3).[7,8] As the Australian stock market was closed at the time of the announcement, we choose the first trading day following the announcement, that is, February 22, as our event date.

2.2. Methodology

We use the event study approach proposed by Fama et al. (1969) to examine the impact of the Russia–Ukraine crisis on Australian stock returns. Our event window ranges from 25 trading days prior to February 22, 2022—the event date—to 25 days following the event. This long event window allows us to determine whether the short-term effect of the event reversed once the initial shock of the invasion had subsided.

We start our analysis by estimating the parameters in the following market model for each stock in our sample:

$$R_{i,t} = \widehat{\alpha}_{i,t} + \widehat{\beta}_{i,t} R_{M,t} + \varepsilon_{i,t} \tag{1}$$

where $R_{i,\,t}$ is the logarithmic daily returns of security i on day t and $R_{M,\,t}$ is the market return on day t. We use the ASX 300 index as our proxy for the market index. The market model parameters $\widehat{\alpha}_i$ and $\widehat{\beta}_i$ are estimated through OLS regression using a 250-day estimation window. We drop 41 days before the event day to control for the effect of the information leakage prior to the event. As a result, our estimation window extends from December 29, 2020 to December 20, 2021. Using the estimated parameter from the above equation, we calculate the abnormal return over the event window:

$$AR_{i,t} = R_{i,t} - \left(\widehat{\alpha}_i + \widehat{\beta}_i R_{m,t}\right) \tag{2}$$

where $AR_{i,\,t}$ is the daily abnormal return for firm i on day t. From the estimated $AR_{i,\,t}$, we calculate the cumulative abnormal return (CAR_i) by summing the daily abnormal return of firm i over the period [τ1, τ2].

$$CAR_i = \sum_{t=\tau 1}^{\tau 2} AR_{i,t} \tag{3}$$

Following Naidu and Ranjeeni (2021), who study the effect of COVID fear on the Australian stock market, we utilize the standardized cross-sectional test of Boehmer et al. (1991) (henceforth the BMP test) to test the significance of the average AR and CAR. For this purpose, first, we standardize the AR_i and CAR_i using the estimation window standard deviation. In accordance with Campbell et al. (2012), we correct the variance for forecasting error. Then, a t-test is applied to the cross-sectional standardized daily abnormal returns (SARs) and standardized cumulative abnormal returns (SCARs) for individual and multiple event days, respectively.

Maynes and Rumsey (1993) show that parametric tests yield erroneous results in numerous marketplaces as the stock distribution violates the normality assumptions. Moreover, Corrado and Truong (2008) report that non-parametric tests have higher power for Asia-Pacific stock markets than parametric tests. Consequently, we supplement our parametric tests with the non-parametric Wilcoxon signed-rank test to determine whether the median of the abnormal cross-sectional return is statistically significant.

3. Empirical findings

3.1. Abnormal returns around the event day

3.1.1. Evidence from the average abnormal return (AAR)

Table 1 presents the average abnormal return (AAR) of the ASX 300 index's 283 constituent stocks in our selected seven-day event

[6] https://www.marketindex.com.au/asx300

[7] https://web.archive.org/web/20220221215128/http://en.kremlin.ru/events/president/news/67828

[8] Since markets capture forward-looking information, investors are more likely to price the effect of the upcoming war on the announcement of the recognition of two states in eastern Ukraine rather than on the formal announcement of the war (see, e.g., Schoar and Zuo, 2016). Therefore, in our main analysis, we do not use the actual invasion date as our event day. This estimation approach is also consistent with the literature that investigates the market reaction to CEOs' and board members' appointment announcement and not the actual day when they occupy the office (see, e.g., Borokhovich et al., 1996; Shivdasani and Yermack, 1999). Nonetheless, in Section 3.7, we use February 24, 2022 as the event day.

window. In Fig. 2, we also graphically display the AAR over the course of our seven-day window. We observe a negative and highly significant ($p < 0.01$) AAR value on the event day (day = 0), implying that investors in the Australian stock markets reacted negatively to Russia's recognition of the Donetsk and Luhansk regions of eastern Ukraine as two autonomous states. Notably, the event day witnessed the largest decrease in stock prices (= −0.94%) during the entire seven days of our selected event window. Overall, the negative stock market reaction to the event is consistent with our economic and behavioral arguments that the Russia–Ukraine political crisis had an adverse impact on trade and corporate profitability and that the crisis accentuated fear and pessimistic sentiment within the market, leading to a large decline in the stock prices in the Australian market.

During the pre-event window (−3 to −1), we observe mixed AAR values, which suggest investors' uncertainty about the possible Russia–Ukraine crisis. Importantly, we find that the negative AAR values increased in the days preceding the event date and were especially significant and larger (= −0.68%) on the day prior to the event date (i.e., day = −1). This finding aligns with previous studies showing that important news announcements also demonstrate a comparable trend of increased market reaction in the period preceding the event. As an illustration, Lucca and Moench (2015) found substantial evidence of an excess return in the S&P500 index 24 h before the Federal Open Market Committee announcements, which make up approximately 80% of the annual returns. Furthermore, prior to our selected event day, the Australian Prime Minister alluded to a potential Russian assault and warned that economic sanctions would be placed on Russia if one occurred (see the timeline in Fig. 1).[9] Consequently, investors' perceptions of a potential political crisis are likely to have been altered, leading to an undesirable reaction on the stock market. Our findings are nearly identical to those of Ahmed et al. (2022), who find that European stock markets displayed the biggest unfavorable reaction on the day of Russia's recognition, February 21. Additionally, they discovered less negative and less significant AAR values on the day prior to the incident.

However, unlike the pre-event and event days, the post-event period exhibits a positive and significant AAR (i.e., day = 1 and 3). This finding suggests that the initial fear and uncertainty experienced by Australian investors during the event and pre-event windows dissipated and experienced a reversal during the post-event period. The finding in the post-event window is also consistent with the thesis that, in an efficient market, publicly available information is quickly incorporated into share prices and the impact of a single occurrence fades over time (Fama, 1970; Kolaric and Schiereck, 2016). Our findings in the post-event period are consistent with previous research (e.g., Salisu et al., 2022) showing that geopolitical threats (e.g., military build-ups, threats of war and terrorism) have a greater adverse effect on stock returns than geopolitical acts (i.e., the actual occurrence of adverse events). Overall, we observe a negative reaction from Australian investors in the days leading up to and on the day of the event but a return reversal in the post-event period.

In Table A.2, we provide the AAR for an extended period surrounding the event day ([−25, +25]). We find that negative and significant AARs predominated during the pre-event period, with 11 negative and significant AARs compared with 6 positive and significant AARs. We observe similar dominance in the post-event period (9 negative and significant AARs and 8 positive and significant AARs). Interestingly, the Australian stock markets experienced the most positive and significant AAR (= 1.21%) on day −16 and the most negative and significant AAR (= −1.30%) on day −13. Overall, we observe that the Russia–Ukraine crisis caused volatility and uncertainty in the Australian stock market.

3.1.2. Evidence from the cumulative abnormal returns (CARs)

To present additional insights, we estimate the cumulative abnormal return (CAR) of the listed stocks of the ASX 300 index for a defined period surrounding the event day. Table 2 presents the findings of this investigation. We find negative and significant CARs around the event day, before the event period and after the event period.

With respect to the impact of the Russia–Ukraine crisis on the Australian stock market around the event day, we notice that the majority of the CAR values are negative and statistically significant using both parametric and non-parametric tests (e.g., the [−1,1]; [−5, 5]; [−10,10]; [−15, 15]; [−20,20]; [−25, 25] windows). This provides strong evidence of the detrimental effect of the Russia–Ukraine crisis on the Australian stock market. We notice that all of these negative CAR values for longer periods are highly significant for both of the statistical tests, indicating that the Russia–Ukraine crisis had a more pronounced effect on the Australian market for longer window periods. This finding is evidenced by the fact that the most negative and significant CAR (=−4.86%) is observed over the 51 days around the event day (i.e., [−25, +25]).

When we examine the CAR values during the pre-event period, we find that they are negative and statistically significant during the [−25, −1]; [−20,−1]; [−10,−1] windows. The most negative CAR (= − 2.71%] is observed in the [−25, −1] window.

Regarding the impact of the Russia–Ukraine crisis on the Australian stock market during the post-event period, we notice a mixed reaction. We observe positive and significant CARs in the [1,3] and [0, 5] windows but negative and significant CARs in the [0,10]; [0, 15]; [0,20]; and [0. 25] windows. The most negative and significant CAR (= −2.31%) is observed in the [0, 10] window. Importantly, the number of negative CARs exceeds that of positive CARs, suggesting that the Australian stock market was adversely affected by the Ukrainian crisis even during the post-event period. Interestingly, when looking at the extended post-event window, we find that the CAR value is still negative and statistically significant in the 21-day [0, +20] and 26-day [0, +25] windows, indicating that the Australian stock market had not recovered and had continued to suffer for a longer period of time because of the Russia–Ukraine crisis.

Overall, the findings from the CAR analysis suggest that the Australian stock market experienced significant negative market reactions in the windows surrounding the event date. Importantly, this reaction persisted in the long horizon, as evidenced by the negative CARs during the post-event window.

[9] https://www.pm.gov.au/media/press-conference-8

Table 1
Average abnormal return (AAR) over the event window.

Event window	AAR	BMP	Wrank	Obs
−3	−0.36	−1.23	−2.43**	283
−2	0.36	2.06**	2.95***	283
−1	−0.68	−1.90*	−3.34***	283
0	−0.94	−4.49***	−5.88***	283
1	0.58	2.85***	3.76***	283
2	−0.45	−0.67	−1.42	283
3	0.85	2.57**	4.98***	283

Note. This table presents the average daily abnormal return (AAR) of 283 stocks belonging to the ASX 300 index for each day in the event window. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

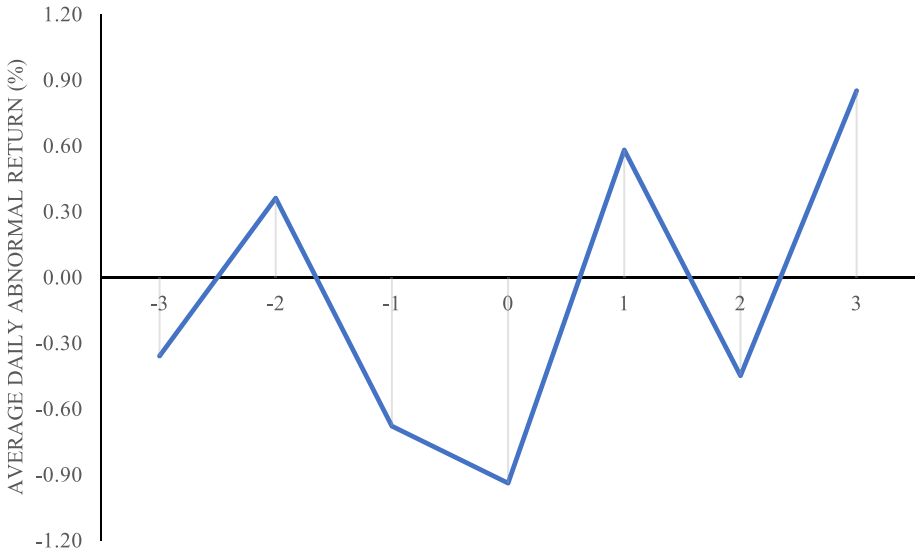


Fig. 2. Average daily abnormal return (AAR) from 3 days before the event to 3 days after.

3.2. Size-based abnormal returns

We now consider whether Australian investors' reaction to the Russia–Ukraine crisis varied depending on the firm size. The S&P/ASX 300 index provides exposure to Australia's large-, mid- and small-cap equities. We use the average market value denominated in the Australian dollar over the estimation period to form the size-based tercile portfolio. On the one hand, it is possible that large firms have a larger resource base, are more actively involved in diversification and hedging activities and benefit more from economies of scale and scope (Naidu and Ranjeeni, 2021; Ahmed et al., 2022). Therefore, large firms are less severely affected by the Russia–Ukraine crisis than small and medium firms. On the other hand, one may argue that large firms are more involved in international trade, making these firms more susceptible to political events than small and medium-sized firms.

3.2.1. Evidence from the average abnormal return (AAR)

Table 3 exhibits the average daily abnormal return (AAR) for small-, mid- and large-cap portfolios for each day (−3 to +3) surrounding the event day. We observe that small-cap and mid-cap firms experienced a clear negative AAR on the event day, as evidenced by the AARs of −1.26% and −1.53% (both significant at the 1% level) for small-cap and mid-cap portfolios, respectively. Interestingly, large-cap firms also experienced a negative but insignificant AAR on the event day.

When we look at the AARs during the pre-event window, we see that small-cap firms had a negative and significant AAR on the day before the event (day = −1), whereas mid-cap firms had a negative and significant AAR three days before the event day (day = −3). Again, for the whole pre-event window (−3 to −1), the large-cap group did not experience a negative AAR. Finally, the negative stock market reaction to the Russia and Ukraine crisis largely disappeared during the post-event window, indicating that the stock market had recovered.[10] We present the size-based stock market reactions over the whole event window (−3,3) in Fig. 3.

[10] Only small-cap companies incurred significant losses (−1.55%) on the second post-event day (+2) but otherwise received positive and significant returns on the remaining days. One possible reason for this observation is that Russia invaded Ukraine on that day, which had a significant impact on the small-cap firms.

Table 2
Cumulative abnormal return (CAR) around the event days.

Event windows	CAR	BMP	Wrank	Obs
Around the event days				
[−1,1]	−1.03	−2.38**	−3.29***	283
[−2,2]	−1.11	−1.25	−2.29**	283
[−3,3]	−0.62	−0.35	−0.94	283
[−5,5]	0.74	1.86*	1.78*	283
[−10,10]	−4.17	−4.88***	−4.84***	283
[−15,15]	−3.28	−2.42**	−2.75***	283
[−20,20]	−3.97	−3.45***	−3.3***	283
[−25,25]	−4.86	−3.92***	−3.52***	283
Before the event period				
[−25,-1]	−2.71	−2.17**	−2.37**	283
[−20,-1]	−2.41	−1.84*	−2.57**	283
[−15,-1]	−1.41	−0.98	−1.83*	283
[−10,-1]	−1.86	−2.54**	−3.73***	283
[−5,-1]	−0.14	1.28	−0.27	283
[−3,-1]	−0.67	−0.83	−2.12**	283
[−2,-1]	−0.31	−0.18	−0.64	283
After the event period				
[0,1]	−0.35	−1.54	−2.33**	283
[0,2]	−0.80	−1.41	−2.61***	283
[0,3]	0.05	0.18	−0.01	283
[1,2]	0.13	0.85	1.46	283
[1,3]	0.99	2.43**	4.27***	283
[0,5]	0.88	1.33	2.16**	283
[0,10]	−2.31	−4.31***	−3.77***	283
[0,15]	−1.86	−2.5**	−2.61***	283
[0,20]	−1.56	−3.05***	−2.67***	283
[0,25]	−2.15	−3.69***	−3.16***	283

Note. This table presents the average cumulative abnormal return (CAR) of 283 stocks belonging to the ASX 300 index over different event windows. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 3
Size-based average abnormal return (AAR) over the window slides.

Event window		Pre-event days			Event day	Post-event days		
		−3	−2	−1	0	1	2	3
Large Cap	AAR	−0.20	0.23	0.10	−0.01	0.00	0.69	0.26
	BMP	−0.61	0.51	0.69	−0.08	0.12	1.89*	0.73
	Wrank	−0.43	1.54	0.24	−1.04	0.54	1.31	1.57
	Obs	94	94	94	94	94	94	94
Mid Cap	AAR	−0.69	0.43	−0.95	−1.53	0.91	−0.49	1.36
	BMP	−1.20	2.05**	−1.19	−4.9***	2.53**	−0.77	3.31***
	Wrank	−2.82***	2.23**	−1.44	−5.16***	2.59***	−0.84	4.04***
	Obs	95	95	95	95	95	95	95
Small Cap	AAR	−0.18	0.44	−1.18	−1.26	0.84	−1.55	0.94
	BMP	−0.33	1.44	−3.21***	−3.11***	3.14***	−2.19**	0.97
	Wrank	−0.91	1.29	−4.01***	−3.63***	3.29***	−2.57**	2.78***
	Obs	94	94	94	94	94	94	94

Note. This table presents the average daily abnormal return (AAR) of a size-based tercile portfolios formed using the average market value over the estimation period. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Our finding that small and medium (large) firms are more (less) negatively affected by the Russia–Ukraine crisis is consistent with the prior finding that small and medium-sized firms are more adversely affected by crises (Miyajima and Yafeh, 2007; Naidu and Ranjeeni, 2021). For example, Naidu and Ranjeeni (2021) show that coronavirus fear had a significant negative impact on the stock returns of medium-sized and small Australian firms, while it had the least negative impact on large Australian firms.

3.2.2. Evidence from the cumulative abnormal returns (CARs)

Table 4 shows the cumulative abnormal returns (CARs) for size-based tercile portfolios surrounding the event day. A few observations are worth mentioning: (i) both small and medium-sized firms had a significant negative CAR around the event day (−1, 1 and − 2, 2) and on post-event days (0, 1 and 0, 2); (ii) only small firms experienced a significant negative stock market reaction during the

pre-event period; and (iii) large firms exhibit resilience during all three event widows.

In Table A.3 of the appendix, we present the size-based findings for the CARs over an extended period. We observe that both mid-cap and small-cap firms experienced significantly negative CARs during the post-event period (i.e., in the [0, +10], [0, +20] and [0, +25] windows), whereas large-cap firms experienced mild negative CARs on the [0, +25] post-event day.

Overall, we find varied degrees of size-based portfolio-wide variation in the AARs and CARs surrounding the event period, underlining the importance of size-based portfolio-level study to comprehend the true stock market reactions to the Russia–Ukraine conflict in the Australian market.

3.3. Industry-based abnormal returns

This section examines the industry-level variation in Australian investors' reactions to Russia's declaration of the recognition of two independent states in eastern Ukraine. We use the Global Industry Classification Standard (GICS) sector names from Bloomberg to group firms into different industries.[11]

3.3.1. Evidence from the average abnormal return (AAR)

Table 5 presents the industry-wise AARs, which explain how stocks of different industries listed on the ASX 300 index reacted to the Russia–Ukraine crisis. We find that, on the event day, four out of nine industry groups (viz., consumer discretionary, industrials, real estate, and communication service and information technology (combined)) experienced negative and significant average abnormal returns. The worst AAR (−3.15%) on the event day was recorded by the combined industries of communication and information technology. Importantly, the only industry group that gained positive and significant ($p < 0.05$) average abnormal returns is energy and utility (combined). The energy sector's positive and significant market reaction on the event day is not surprising given that Australia is a net energy exporter and that Australian energy firms are enjoying the benefits arising from the supply shortage and the unusually high spike in energy prices caused by the Russia–Ukraine crisis. When investigating the industry-wise pre-event stock price reactions, we observe that firms in the consumer discretionary, health care, and information and communication technology (combined) industries were more adversely affected, while firms in the consumer staples, financial, industrial, real estate and energy industries were mostly unaffected. It is interesting to note that the pre-event phase for the materials firms had mixed outcomes because it contained a positive and highly significant return (+1.41%) two days prior to the event but a negative and significant return (−0.94%) the day before the event.

Finally, a close look at the industry-wise post-event stock price reactions reveals that the financial, health care, industrial, material, real estate, energy and utility industries exhibit either no effect or positive significant average abnormal returns. The industries that show a negative and significant stock price reaction on the second post-event day (day = +2), the day on which Russia directly invaded Ukraine, include consumer discretionary, consumer staples, and information and communication technology. Intriguingly, the consumer staples business experienced mildly unfavorable effects on the second (day = +2) and third (day = +3) days following the event date. Despite a widespread belief that the consumer staples industry is relatively immune to economic downturns (Landier and Thesmar, 2020), our results are in line with other evidence suggesting that Russia's invasion of Ukraine has disrupted global supply systems, increasing worries about food security, production prices and delivery times.[12] Ahmed et al. (2022) report similar results, stating that the consumer staples sector has been adversely affected in the European market as a result of the Russia–Ukraine crisis. Our findings are also in line with other research showing that incidents involving food safety have a short-term detrimental effect on the consumer staples industry (e.g., Seo et al., 2013).

Interestingly, on the third post-event day (day = +3), the consumer discretionary and communication and information technology (combined) sectors exhibited positive and significant returns. Similarly, the industrial and real estate sectors both experienced positive and significant returns on the third post-event day.

3.3.2. Evidence from the cumulative abnormal returns (CARs)

Table 6 presents the industry-specific cumulative abnormal returns (CARs) surrounding the event windows. We observe that industries such as consumer discretionary, materials, real estate, and communication and information technology experienced significant negative CARs around the event day, while the rest of the industries (except the energy sector) exhibit relatively mild or no effects. Consistent with our finding in Table 5, the energy and utility industries experienced positive and significant CARs around the event day.

During the pre-event period, on the one hand, industries such as consumer discretionary, health care, and the combination of the communication and information industries experienced significant negative CARs. On the other hand, the consumer staples, industrials, materials and real estate sectors experienced weak significant positive returns during some of the pre-event period. When looking at the post-event period, we observe that consumer discretionary, real estate, and information and communication technology experienced significant negative CARs. Interestingly, while the consumer discretionary and information and communication technology (combined) industries exhibit consistent significant negative CARs in all three event windows, the material industry shows a recovery in the post-event window. Moreover, the energy and utility industries registered positive and significant CARs around the event day and in the post-event period. We illustrate the industry-specific CARs for the short event window [−3, +3] in Fig. 4.

[11] To generate test results, the Wilcoxon signed-rank test requires a minimum of 16 observations. We combine the energy and utility industries due to the small number of samples for the utility industry (3 firms). Because of the same sample issue, we also merge the communication and information industries.

[12] https://www.nytimes.com/2022/03/01/business/economy/ukraine-russia-supply-chains.html

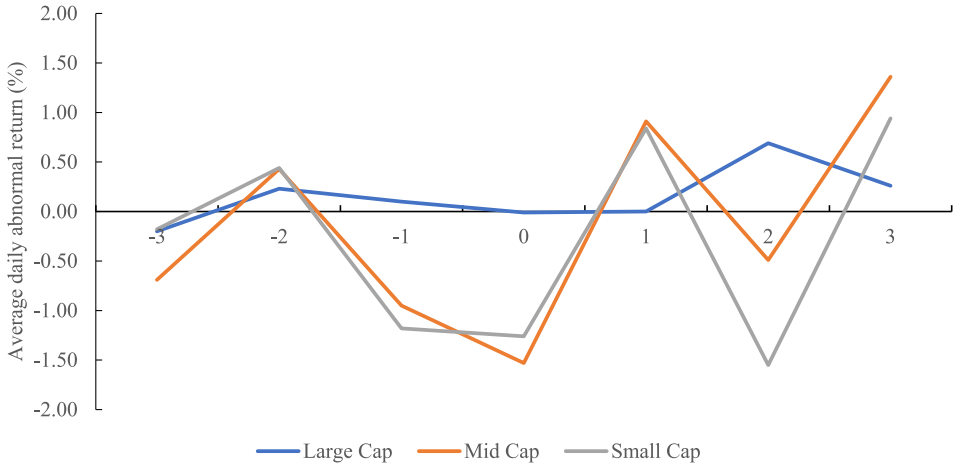


Fig. 3. Size-based Average Abnormal Return (AAR) from 3 days before the event to 3 days after.

Table 4
Size-based cumulative abnormal return (CAR) around the event days.

	Event windows	Around the event days			Before the event period		After the event period				
		[−1,1]	[−2,2]	[−3,3]	[−3,-1]	[−2,-1]	[0,1]	[0,2]	[0,3]	[1,2]	[1,3]
Large Cap	CAR	0.09	1.00	1.06	0.13	0.33	−0.01	0.68	0.93	0.68	0.94
	BMP	0.39	1.48	1.41	0.27	0.87	0.03	1.23	1.51	1.61	1.85*
	Wrank	0.21	0.99	1.25	−0.05	0.88	0.03	0.77	1.34	1.90*	2.3**
	Obs	94	94	94	94	94	94	94	94	94	94
Mid Cap	CAR	−1.57	−1.64	−0.97	−1.21	−0.52	−0.63	−1.12	0.24	0.42	1.78
	BMP	−2.2**	−1.53	−0.46	−0.69	−0.12	−1.94*	−1.82*	0.01	0.75	2.42**
	Wrank	−2.36**	−1.48	−0.76	−1.11	0.34	−2.09**	−2.05**	−0.10	1.07	3.13***
	Obs	95	95	95	95	95	95	95	95	95	95
Small Cap	CAR	−1.6	−2.70	−1.94	−0.91	−0.74	−0.42	−1.97	−1.03	−0.71	0.23
	BMP	−2.71***	−2.38**	−1.60	−1.09	−1.21	−1.03	−2.28**	−1.33	−1.08	0.00
	Wrank	−3.46***	−3.12***	−1.93*	−2.3**	−1.98**	−1.86*	−2.97***	−1.19	−0.48	1.79*
	Obs	94	94	94	94	94	94	94	94	94	94

Note. This table presents the cumulative abnormal return (CAR) of a size-based tercile portfolio formed using the average market value over the estimation period. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table A.4 of the appendix presents the industry-specific CARs for an extended window surrounding the event day ([−25, +25]). We observe that the consumer discretionary and communication and information technology (combined) sectors experienced a profoundly unfavorable reaction throughout the course of the extended time, particularly after the first five days following the event. While the healthcare industries were significantly and negatively affected on or around the event day ([−10, + 10], [−15, + 15], [−20, + 20] and [−25, + 25]) and in the pre-event period ([−25, − 1], [−20, −1], [−15, −1] and [−10, −1]), this effect largely weakened in the extended post-event period. Moreover, the financial sectors were mostly affected during the extended post-event period. Furthermore, the energy equities generated positive and significant returns during the extended around the event day and in the post-event period. Since energy companies gained from the spike in oil and gas prices that followed Russia's invasion of Ukraine, this outcome is not surprising.

Overall, the findings from the industry-based abnormal returns indicate industry-wide variation in the AARs and CARs surrounding the event period, highlighting the significance of an industry-level analysis to comprehend fully the true stock market reaction to the Russia–Ukraine crisis in the Australian market.

3.4. Growth-based abnormal returns

In this section, we investigate whether firms' growth affects the Australian stock market's response to the Russia and Ukraine crisis. We form three portfolios based on the average book-to-market ratio over the estimation period. Following Fama and French (1993), we use the bottom 30%, middle 40% and top 30% breakpoints to form the low-, medium- and high-growth portfolios.

Table 5
Industry-based average abnormal return (AAR) over the window slides.

Event window		Pre–event days			Evant day	Post–event days		
		−3	−2	−1	0	1	2	3
Consumer Discretionary	AAR	−1.20	0.29	−1.81	−1.39	0.25	−2.18	1.84
	BMP	−2.15**	1.51	−3.59***	−2.98***	0.23	−1.96*	3.8***
	Wrank	−2.69***	1.23	−3.53***	−3.22***	1.56	−3.47***	3.96***
	Obs	36	36	36	36	36	36	36
Consumer Staples	AAR	0.19	−0.4	1.59	0.77	0.02	−1.78	−3.08
	BMP	0.44	−1.32	2.81**	1.57	0.50	−1.88*	−1.69
	Wrank	0.78	−0.88	2.69***	0.72	1.24	−2.02**	−1.81*
	Obs	16	16	16	16	16	16	16
Financials	AAR	0.06	0.67	0.37	−0.29	0.31	−0.16	−0.04
	BMP	0.27	0.76	1.73*	−1.29	0.89	−0.56	−0.84
	Wrank	−0.26	1.17	1.33	−1.38	0.51	0.04	0.10
	Obs	33	33	33	33	33	33	33
Health Care	AAR	−0.85	−0.39	−1.94	−0.54	0.7	−1.05	0.18
	BMP	−0.72	−1.34	−3.73***	0.27	1.77*	−0.26	−0.41
	Wrank	−1.70*	−1.46	−3.04***	0.06	1.03	−0.21	0.33
	Obs	23	23	23	23	23	23	23
Industrials	AAR	0.83	0.82	0.05	−1.14	1.11	0.64	1.92
	BMP	1.54	1.53	0.76	−2.01*	2.42**	0.59	3.56***
	Wrank	1.04	1.35	0.5	−2.77***	2.29**	−1.14	3.22***
	Obs	30	30	30	30	30	30	30
Materials	AAR	0.04	1.41	−0.94	−0.59	0.27	1.5	0.05
	BMP	0.72	4.86***	−2.11**	−0.65	−0.35	3.39***	−0.46
	Wrank	0.14	4.67***	−2.49**	−0.95	−0.22	2.75***	0.00
	Obs	56	56	56	56	56	56	56
Real Estate	AAR	0.23	0.13	0.13	−0.97	−0.26	0.11	1.31
	BMP	1.26	0.71	1.15	−3.38***	−1.17	0.43	5.75***
	Wrank	1.97**	0.54	0.62	−3.81***	−1.44	0.40	4.44***
	Obs	33	33	33	33	33	33	33
	AAR	−0.46	0.19	−0.72	1.02	1.09	0.98	0.42
	BMP	−0.61	−0.19	−0.26	2.11*	1.03	2.11*	0.03
	Wrank	−0.92	0.73	−1.44	1.92*	1.59	1.87*	0.12
Energy & Utilities	Obs	17	17	17	17	17	17	17
	AAR	−1.81	−0.64	−1.54	−3.15	1.82	−2.93	2.85
	BMP	−4.43***	−1.78*	−0.84	−7.08***	4.31***	−2.44**	3.57***
	Wrank	−3.8***	−1.51	−1.8*	−5.19***	4.16***	−3.43***	4.28***
Communication Services and Information Technology	Obs	39	39	39	39	39	39	39

Note. This table presents the industry-specific average daily abnormal return (AAR) of sample stocks based on their GICS sector classification. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test, which tests whether the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

3.4.1. Evidence from the average abnormal return (AAR)

Table 7 presents the growth (i.e., book-to-market equity ratio)-based AAR over the window slides in the Australian stock markets in response to the Russia–Ukraine crisis. The high-growth firms had the highest negative AAR (−1.91%), followed by the medium-growth firms (−0.78%), on the event day. Interestingly, the AAR was negative (−0.17%) but insignificant for low-growth portfolios on the event day. In addition, while low-growth equities registered positive and significant AAR values throughout the pre-event windows, high- and medium-growth stocks experienced significant negative AARs. Finally, when we examine the results for the post-event period, we discover that high- and medium-growth firms recovered significantly and experienced positive and significant AARs on days +1 and + 3 after the event day. However, high-growth firms encountered a significant negative AAR on day +2 (−2.25%), which coincides with the day when Russia actually invaded Ukraine. Fig. 5 depicts the trajectory of growth-based portfolios' AARs in response to the Russia–Ukraine crisis for the short event window [−3, +3].

3.4.2. Evidence from the cumulative abnormal return (CAR)

We present growth-based portfolios' CARs in Table 8. In line with the findings for the AARs, we notice that, while high-growth firms were most severely affected by the Russia–Ukraine crisis around the event day, low-growth firms experienced positive and significant CARs. Thus, we observe stronger but opposite market reactions for the low and high growth during the pre-event window. However, it appears that both high- and medium-growth firms recovered from those shocks during the post-event window slides. Additionally, our findings of positive and significant CAR values around the event day as well as in the pre-event period suggest that the Russia–Ukraine crisis had little or no effect on low-growth equities.

Table A.5 in the appendix reports the findings for the CARs over a longer time period. When examining the CARs around the event day, we observe that both high- and medium-growth firms experienced negative and significant CARs in the majority of the chosen post-event windows (e.g., [−10, +10], [−15, +15], [−20, +20] and [−25, +25]), while low-growth firms experienced significant positive CARs in all the chosen windows around the event. These findings hold for the pre-event period with the notable exception that

Table 6
Industry-based cumulative abnormal return (CAR) around the event days.

	Event windows	Around the event days			Before the event period		After the event period				
		[−1,1]	[−2,2]	[−3,3]	[−3,-1]	[−2,-1]	[0,1]	[0,2]	[0,3]	[1,2]	[1,3]
Consumer Discretionary	CAR	−2.95	−4.85	−4.21	−2.73	−1.53	−1.14	−3.32	−1.48	−1.94	−0.1
	BMP	−3.46***	−3.46***	−3.05***	−3.59***	−2.95***	−1.65	−2.43**	−1.26	−1.56	−0.17
	Wrank	−3.3***	−3.61***	−3.05***	−3.85***	−2.29**	−1.78*	−3.27***	−1.9*	−2.22**	0.69
	Obs	36	36	36	36	36	36	36	36	36	36
Consumer Staples	CAR	2.38	0.2	−2.69	1.39	1.19	0.79	−0.99	−4.07	−1.76	−4.84
	BMP	3.04***	0.47	−0.9	1.55	1.55	1.62	−0.12	−1.28	−1.01	−1.86*
	Wrank	3.15***	−0.21	−0.62	1.5	1.71*	0.88	−0.88	−1.45	−1.34	−1.76*
	Obs	16	16	16	16	16	16	16	16	16	16
Financials	CAR	0.39	0.89	0.91	1.1	1.04	0.02	−0.15	−0.19	0.15	0.11
	BMP	0.65	0.66	0.27	1.46	1.63	−0.08	−0.34	−0.8	0.27	−0.37
	Wrank	0.54	0.83	0.6	1.06	1.53	−0.28	−0.19	−0.71	0.31	0.04
	Obs	33	33	33	33	33	33	33	33	33	33
Health Care	CAR	−1.78	−3.22	−3.89	−3.19	−2.34	0.16	−0.89	−0.7	−0.35	−0.17
	BMP	−0.66	−0.96	−1.25	−3.67***	−3.6***	0.9	0.59	0.4	0.71	0.36
	Wrank	−1.98**	−1.61	−1.67*	−2.77***	−2.71***	0.36	0	−0.64	0.52	0.27
	Obs	23	23	23	23	23	23	23	23	23	23
Industrials	CAR	0.02	1.48	4.23	1.7	0.87	−0.03	0.61	2.54	1.75	3.67
	BMP	0.11	0.9	2.45**	2.22**	1.56	−0.16	0.38	1.63	1.4	2.81***
	Wrank	0.2	0.28	1.9*	1.41	0.96	−0.46	−0.94	1.06	1.1	3.03***
	Obs	30	30	30	30	30	30	30	30	30	30
Materials	CAR	−1.26	1.64	1.74	0.52	0.47	−0.33	1.17	1.22	1.76	1.81
	BMP	−2.06**	2.56**	2.29**	1.65	2.09**	−0.94	2.19**	1.74*	3.3***	2.21**
	Wrank	−2.01**	1.48	1.71*	0.7	1.92*	−1.11	1.14	1.85*	3.04***	2.36**
	Obs	56	56	56	56	56	56	56	56	56	56
Real Estate	CAR	−1.1	−0.86	0.68	0.49	0.26	−1.23	−1.12	0.19	−0.15	1.16
	BMP	−2.51**	−1.09	1.36	1.71*	1.31	−3.65***	−2.4**	0.25	−0.49	3.01***
	Wrank	−2.31**	−1.46	1.3	1.83*	0.94	−3.44***	−2.42**	−0.1	−0.58	2.64***
	Obs	33	33	33	33	33	33	33	33	33	33
Energy & Utilities	CAR	1.38	2.56	2.51	−0.99	−0.53	2.1	3.09	3.51	2.07	2.49
	BMP	1.79*	2.27**	1.79*	−0.52	−0.34	2.48**	3.82***	3.35***	3.52***	2.42**
	Wrank	1.68*	1.73*	1.73*	−1.11	−0.54	2.49**	3.1***	2.82***	2.34**	1.96**
	Obs	17	17	17	17	17	17	17	17	17	17
Communication Services & Information Technology	CAR	−2.86	−6.43	−5.39	−3.98	−2.17	−1.33	−4.26	−1.41	−1.11	1.74
	BMP	−1.89*	−3.18***	−3.53***	−3.12***	−1.4	−2.3**	−3.31***	−1.21	−0.71	2.01*
	Wrank	−2.5**	−3.68***	−3.5***	−3.41***	−2.19**	−2.46**	−3.71***	−1.03	−0.25	2.48**
	Obs	39	39	39	39	39	39	39	39	39	39

Note. This table presents the industry-specific cumulative daily abnormal return (CAR) of the sample stocks based on their GICS sector classification. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

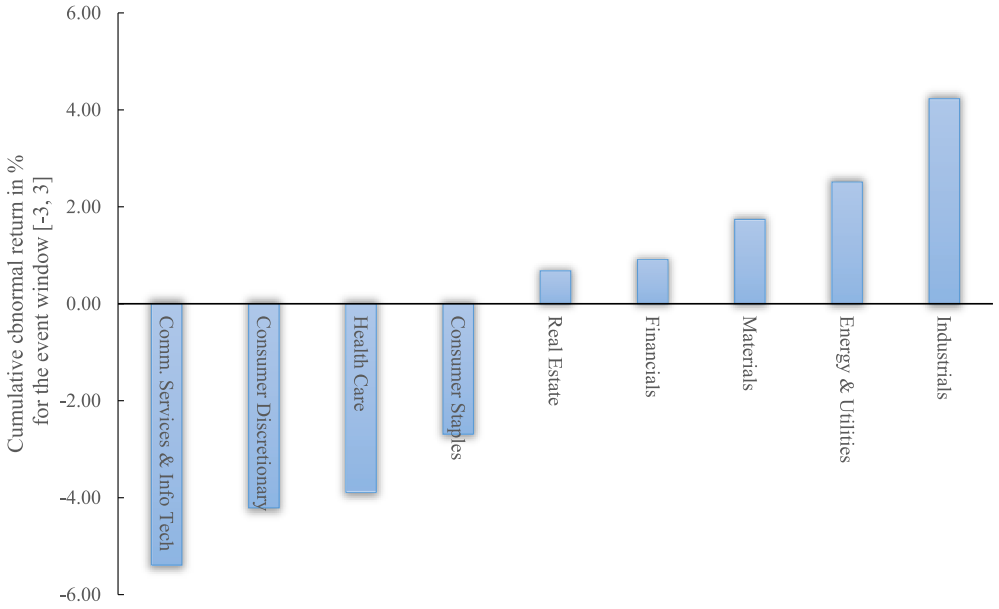


Fig. 4. Industry-based cumulative abnormal return (CAR) over the event window [−3,3].

Table 7
Growth-based average abnormal return (AAR) over the window slides.

Event window		Pre-event days			Event day	Post-event days		
		−3	−2	−1	0	1	2	3
High	AAR	−1.64	0.01	−1.78	−1.91	1.16	−2.25	2.13
	BMP	−4.41***	−0.18	−3.03***	−3.30***	2.84***	−2.27**	3.66***
	Wrank	−5.2***	−0.79	−4.54***	−4.63***	3.76***	−4.86***	4.63***
	Obs	85	85	85	85	85	85	85
Medium	AAR	−0.17	0.5	−0.61	−0.78	0.51	−0.14	0.61
	BMP	−0.37	1.80*	−1.74*	−3.34***	2.00**	0.08	0.98
	Wrank	−1.45	2.49**	−2.05**	−3.71***	2.11**	0.14	2.73***
	Obs	113	113	113	113	113	113	113
Low	AAR	0.68	0.54	0.34	−0.17	0.1	0.93	−0.09
	BMP	3.39***	1.92*	2.22**	−0.83	−0.31	2.50**	0.05
	Wrank	3.59***	3.37***	1.43	−1.56	0.23	2.82***	0.80
	Obs	85	85	85	85	85	85	85

Note. This table presents the average daily abnormal return (AAR) of three book-to-market equity groups based on the breakpoints for the bottom 30% (Low), middle 40% (Medium), and top 30% (High) of the ranked values of the average book-to-market ratio over the estimation period. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test, which tests whether the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

medium-growth firms were mostly unaffected during this extended pre-event window. When we examine the extended post-event period findings, we discover that medium- and high-growth firms experienced significant negative CARs in the majority of the chosen around the event periods, such as [0, +10], [0, +15], [0, +20] and [0, +25], while low-growth firms experienced insignificant positive CARs on all the days, with the exception of the [0, +15] post-event windows. During the prolonged post-event phases, high-growth companies were far more vulnerable than medium-growth companies, whereas low-growth companies reaped significant positive returns.

3.5. Illiquidity and abnormal returns

This section explores how illiquidity influences the Australian stock market responses to the Russia and Ukraine crisis. We use the absolute daily stock return divided by its trading volume to measure firm-specific illiquidity, which captures the extent to which trading moves the price (see, e.g., Amihud, 2002; Ali et al., 2021). We form illiquidity-based tercile portfolios using the average daily illiquidity over the estimation period.

3.5.1. Evidence from the average abnormal return (AAR)

Table 9 displays the average abnormal return (AAR) of illiquidity-based tercile groups over the selected short window slides [−3,

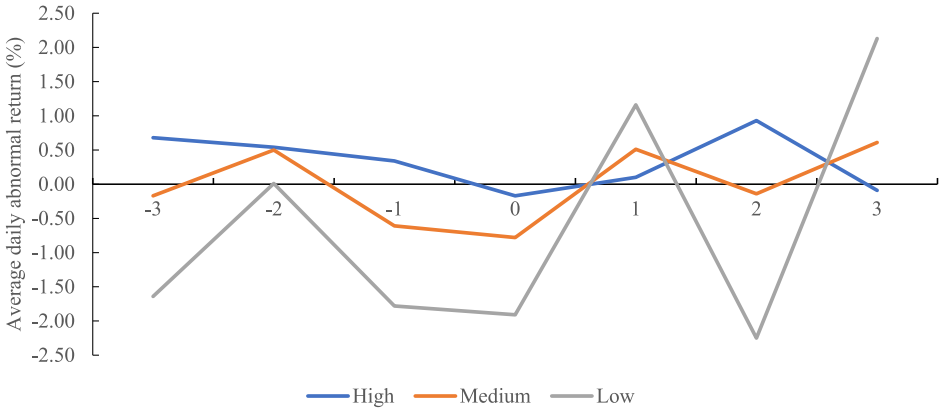


Fig. 5. Book-to-market equity ratio based Average Abnormal Return (AAR) from 3 days before the event to 3 days after.

+3]. The results from the event day reveal that the firms with highest illiquidity had the worst ARR, followed by the middle- and lowest-illiquidity tercile firms. The negative AAR values range from −1.63% for the most illiquid firms to −0.62% for the middle and − 0.56% for the least illiquid firms. Our findings from pre-event windows show that, while the most illiquid companies experienced significant negative AARs, the middle-and low-illiquid firms were generally unaffected throughout the pre-event windows. Finally, the results from post-event windows demonstrate that the least-illiquid firms experienced a significant positive AAR on day +2 (0.99%), whereas the most- and middle-illiquid firms experienced significant positive AARs on days +1 and + 3. Overall, we observe that the firms with the highest (lowest) illiquidity were the most (least) heavily affected during the event and pre-event windows. Fig. 6 depicts the AARs of illiquidity-based terciles in response to the Russia–Ukraine crisis over the short event window [−3, +3].

3.5.2. Evidence from the cumulative abnormal returns (CARs)

In Table 10, we report the CARs of three illiquidity-based portfolios on and around the event day. In line with the findings from the AARs, we note that the firms included in the top-illiquidity portfolio were hit hardest by the Russia–Ukraine crisis, as evidenced by the negative and significant CARs during and around the event period, pre-event period and post-event period. Conversely, firms included in the medium-illiquidity portfolio experienced negative and significant CARs only on the [−2,2] days. Finally, firms included in the bottom-illiquidity portfolio were unaffected during the event period, pre-event period and post-event period. We present the CARs of three illiquidity-based portfolios over the extended period in Table A.6 of the supplementary materials. The outcomes for this extended period mirror our previous short-period results. Overall, our evidence that stock market reactions to the Russia–Ukraine crisis varied significantly across illiquidity-based portfolios highlight the importance of a portfolio-level analysis in our study.

3.6. Export orientation and abnormal returns

Finally, we consider whether Australian stock market responses to the Russia and Ukraine crisis varied based on firms' export orientation. For this analysis, we collect data on our sample firms' total exports and revenue for the year 2021 from the Bloomberg database. Using these data, we calculate the total export-to-revenue ratio, which is our proxy for a firm's export orientation. A high score indicates a firm's higher level of involvement in the international market. As most of the firms report income from Australia, New Zealand, and the Australasian region together, we define income from these regions as domestic income. Thus, our measure of export orientation reflects a firm's proportion of income from other continents. Out of our sample of 283 firms, we obtain valid export income data for 110 firms and formed tercile portfolios based on these firms.

3.6.1. Evidence from the average abnormal returns (AARs)

Table 11 exhibits the AARs of export-orientation-based portfolios over the selected short window slides [−3, +3]. The results from the event day reveal that firms with the top export orientation had the worst ARRs, followed by the middle export orientation group. Interestingly, firms with zero exporting also suffered significant negative AARs on the event day. Our results from pre-event windows show that, while the top export orientation group suffered negative and significant AARs during pre-event windows ([−3] and [−1] days), the middle and bottom export orientation groups were generally unaffected. Finally, the results from the post-event windows demonstrate that the top export orientation group experienced significant positive AARs on days +1 (1.26%) and + 3 (1.21%), while the other groups experienced a significant positive AAR on day +3 only. Overall, we observe that the firms with the highest export orientation were the most heavily affected during the event and pre-event windows.

3.6.2. Evidence from the cumulative abnormal return (CAR)

In Table 12, we report the CARs of export-orientation-based portfolios on and around the event day. Consistent with the findings from the AARs, the firms included in the top export orientation portfolio were hit hardest by the Russia–Ukraine crisis, as evidenced by the negative and significant CARs around the event period, in the pre-event period [−1, 1] and post-event period [−2, 2] and in the pre-event period [−3,−1]. On the other hand, firms included in the middle and low export orientation portfolios experienced

insignificant AARs during and around the event period and pre-event period. Finally, while firms included in the top and middle portfolios were unaffected during the post-event period, low export orientation firms experienced positive and significant CARs on the [1, 3] days. We present the CARs of export orientation-based portfolios over the extended period in Table A.7 of the supplementary materials.

3.7. Sensitivity analysis: Alternative event day

As discussed in Section 2.1, following prior studies (e.g., Ahmed et al., 2022), we use February 22, 2022 as the event date to examine the impact of the Russia–Ukraine crisis on Australian stock returns. One may argue that the start of the war itself is more important than the recognition of the break-away regions. To check the sensitivity of our analysis, in this section, we use the actual invasion date (i.e., February 24, 2022) as our event day. This event day is consistent with earlier studies (e.g., Boubaker et al., 2022). We use the same research methods as used for our main empirical estimation.

Table A.8 presents the AAR of the ASX 300 index's 283 constituent stocks over the selected event window. We observe a negative but insignificant AAR value on the event day (day = 0). This finding is consistent with the argument that stock markets capture forward-looking information and therefore investors tended to price the effect of the upcoming war on the announcement of the recognition of the two states in eastern Ukraine rather than on the formal announcement of the war (see, e.g., Schoar and Zuo, 2016). This finding is also consistent with Boubaker et al. (2022), who show that, on the event day (i.e., February 24), the US market was positively affected and Asian markets were unaffected. The negative and significant AARs during the pre-event windows (e.g., −3 day and − 2 day) also provide support for this conjecture. Furthermore, the positive and significant AARs during the post-event windows (e.g., +1 day and + 3 day) suggest that the temporary negative impact fades away during the post-event window.

Table A.9 presents the CARs of the stocks listed on the ASX 300 index for a defined period surrounding the event day of February 24, 2022. We observe positive and significant CARs on the [−1, 1] day while noting negative and statistically significant CARs on other days around the event day (e.g., the [−5, 5]; [−10, 10]; [−15, 15]; [−20, 20]; [−25, 25] windows). When we examine the CAR values during the pre-event period, we find that they are negative and significant during most of the pre-event window (e.g., [−25, −1]; [−15, −1]; [−10, −1]; [−5, −1]; [−3, −1]; [−2,−1]). Finally, we observe a mixed reaction during the post-event window, as evidenced by positive and significant CARs in the [0,1]; [0,3]; [1,2] and [1, 3] windows but negative and significant CARs in the [0, 10]; [0, 15]; [0, 20]; and [0. 25] windows.

Overall, when we use the actual invasion date (i.e., February 24, 2022) as our event day, we observe that both AAR and CAR values are significantly more pronounced during the pre-event window than during the event and post-event windows.

4. Concluding remarks and future research agenda

This study investigates how shareholders in the Australian stock market reacted to Russia's recognition of the Donetsk and Luhansk regions of eastern Ukraine as two autonomous states on February 21, 2022. Building on the economic and behavioral explanations, we predict that the Australian stock market is likely to have responded negatively to this crisis.

We employ the S&P/ASX 300 index constituents as our sample. Using an event study methodology, we find a negative and significant AAR in the event window. Importantly, we observe a 0.94% negative AAR on the event day, the largest drop in stock prices during the event window. However, the AAR exhibits a reversal in the post-event period. We also find a negative and significant CAR around the event day, providing evidence of the negative impact of the Russia–Ukraine crisis on the Australian stock market. When we consider whether the negative stock price reactions to the event vary for firms of different sizes, we find that only small and medium-sized firms are negatively affected on the event day. Regarding the industry-level variation in stock price reactions to the crisis, we observe a considerable industry-wide variation in the AARs and CARs surrounding the event period. For example, while firms in the

Table 8
Growth-based cumulative abnormal return (CAR) around the event days.

	Event windows	Around the event days			Before the event period		After the event period				
		[−1,1]	[−2,2]	[−3,3]	[−3,-1]	[−2,-1]	[0,1]	[0,2]	[0,3]	[1,2]	[1,3]
High	CAR	−2.54	−4.78	−4.28	−3.4	−1.77	−0.75	−3.01	−0.88	−1.1	1.03
	BMP	−2.17**	−2.81***	−2.9***	−4.35***	−2.45**	−0.6	−2.02**	−0.53	−0.87	0.97
	Wrank	−3.81***	−4.5***	−4.3***	−4.97***	−3.56***	−2.02**	−4.31***	−1.9*	−1.84*	1.6
	Obs	85	85	85	85	85	85	85	85	85	85
Medium	CAR	−0.88	−0.51	−0.08	−0.29	−0.11	−0.27	−0.4	0.21	0.38	0.99
	BMP	−1.99**	−0.82	−0.23	−0.48	−0.33	−1.26	−0.8	0.07	1.33	1.69*
	Wrank	−1.98**	−1.19	−0.1	−1.56	−0.31	−1.5	−1	0.5	1.56	3.38***
	Obs	113	113	113	113	113	113	113	113	113	113
Low	CAR	0.28	1.75	2.34	1.56	0.88	−0.06	0.87	0.77	1.04	0.94
	BMP	0.75	2.86***	3.53***	4.64***	3.48***	−0.87	1.2	1.09	2.12**	1.69*
	Wrank	0.75	2.64***	3.52***	4***	3.55***	−0.41	1.31	1.51	2.94***	2.37**
	Obs	85	85	85	85	85	85	85	85	85	85

Note. This table presents the cumulative daily abnormal return (CAR) of three growth-based portfolios. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 9
Illiquidity-based average abnormal return (AAR) over the window slides.

Event windows		Pre-event days			Event day	Post-event days		
		−3	−2	−1	0	1	2	3
Top	AAR	−1.02	0.24	−0.79	−1.63	0.79	−1.6	1.6
	BMP	−3.07***	1.00	−2.22**	−3.84***	2.31**	−1.99**	2.30**
	Wrank	−4.00***	−0.18	−3.43***	−5.04***	3.3***	−3.91***	5.51***
	Obs	94	94	94	94	94	94	94
Middle	AAR	−0.08	0.27	−0.83	−0.62	0.75	−0.74	0.77
	BMP	−0.14	0.51	−1.54	−2.66***	2.38**	−1.56	2.49**
	Wrank	−1.30	1.67*	−1.61	−2.78***	2.82***	−1.63	3.04***
	Obs	95	95	95	95	95	95	95
Bottom	AAR	0.03	0.58	−0.40	−0.56	0.20	0.99	0.19
	BMP	0.65	1.95*	0.54	−1.17	0.39	4.06***	−0.33
	Wrank	1.25	3.66***	−0.47	−2.12**	0.33	3.36***	0.12
	Obs	94	94	94	94	94	94	94

Note. This table presents the average daily abnormal return (AAR) of illiquidity-based tercile portfolios. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test, which tests whether the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

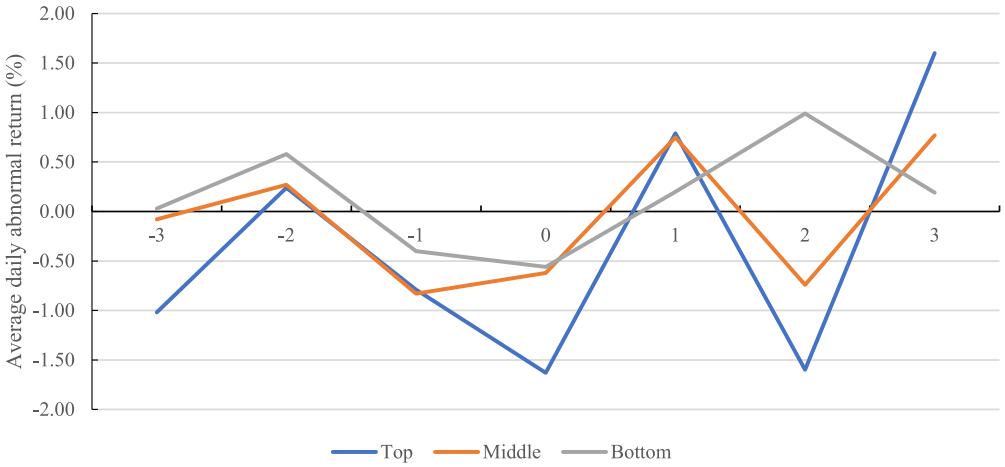


Fig. 6. Illiquidity-based Average Abnormal Return (AAR) from 3 days before the event to 3 days after.

consumer discretionary, industrials, real estate, and information and communication technology industries are negatively affected on the event day, firms in the energy and utility industries enjoy a positive stock market reaction on the event day. We also observe that firms with high growth, illiquidity and export orientation are more exposed to the crisis.

Our study indicates that, in general, Australian investors have taken the Russia–Ukraine crisis very seriously, especially on the event day and on the day when Russia actually invaded Ukraine in our post-event window slides. However, this reaction faded away in the post-event period, as evidenced by the price reversal. This finding suggests that the initial reaction to Russia's recognition of the Donetsk and Luhansk regions of eastern Ukraine as two autonomous states is consistent with the behavioral hypothesis of investor overreaction to political uncertainty.

We admit some potential limitations of our study. Although our study provides insights into how Australia's stock market responded differently to the Russia-Ukraine crisis based on the export orientation of the firms, we cannot carry out a similar analysis for firms' import orientation due to data limitations. We suggest that future studies could utilize industry-specific import and export data to provide a more detailed examination of cross-industry effects. Additionally, it would be useful for future research to investigate the extent to which different industries are directly impacted by Russia-Ukraine and neighboring European countries (such as Germany, Poland, Romania, and the Baltic nations) through trade or investment.

CRediT authorship contribution statement

Md Rajib Kamal: Conceptualization, Data curation, Methodology, Formal analysis, Writing – review & editing. **Shaker Ahmed:** Conceptualization, Data curation, Methodology, Formal analysis, Writing – review & editing. **Mostafa Monzur Hasan:** Conceptualization, Methodology, Validation, Supervision, Writing – review & editing.

Table 10
Illiquidity-based cumulative abnormal return (CAR) around the event days.

	Event windows	Around the event days			Before the event period		After the event period				
		[−1,1]	[−2,2]	[−3,3]	[−3,-1]	[−2,-1]	[0,1]	[0,2]	[0,3]	[1,2]	[1,3]
Top	CAR	−1.63	−2.98	−2.40	−1.57	−0.55	−0.84	−2.44	−0.84	−0.81	0.80
	BMP	−2.27**	−2.24**	−1.72*	−2.20**	−0.76	−1.38	−2.24**	−0.76	−0.81	0.78
	Wrank	−3.63***	−3.57***	−2.74***	−3.44***	−2.16**	−2.51**	−4.23***	−1.70*	−1.40	2.12**
	Obs	94	94	94	94	94	94	94	94	94	94
Middle	CAR	−0.7	−1.17	−0.48	−0.64	−0.56	0.13	−0.61	0.16	0.01	0.78
	BMP	−1.55	−1.93*	−0.70	−0.94	−1.17	−0.58	−1.58	−0.03	−0.17	1.38
	Wrank	−0.48	−1.61	−0.37	−1.27	−0.27	−0.06	−1.27	0.71	0.66	2.35**
	Obs	95	95	95	95	95	95	95	95	95	95
Bottom	CAR	−0.75	0.82	1.03	0.21	0.18	−0.35	0.64	0.82	1.19	1.38
	BMP	−0.19	2.52**	2.35**	1.76*	1.85*	−0.59	1.84*	1.57	3.64***	2.65***
	Wrank	−1.16	1.69*	1.86*	1.04	1.54	−1.30	1.30	1.00	3.40***	2.84***
	Obs	94	94	94	94	94	94	94	94	94	94

Note. This table presents the cumulative daily abnormal return (CAR) for illiquidity-based tercile portfolios. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 11
Firm export orientation and abnormal return (AAR) over the window slides.

Export orientation	Event day	−3	−2	−1	0	1	2	3
Top	AR	−0.87	0.58	−1.31	−1.22	1.26	−0.88	1.21
	BMP	−1.09	1.29	−3.11***	−2.14**	3.07***	−0.33	1.72*
	Wrank	−1.94*	1.85*	−3.79***	−2.62***	2.62***	−2.1**	2.3**
	Obs	37	37	37	37	37	37	37
Middle	AR	−0.07	−0.2	0.11	−0.91	−0.15	−0.55	0.85
	BMP	0.29	−0.83	0.81	−1.22	−0.59	−0.73	0.75
	Wrank	0.06	−0.11	0.3	−2.06**	0.38	−1.24	2.04**
	Obs	36	36	36	36	36	36	36
Bottom	AR	−0.27	−0.21	−0.36	−0.38	0.59	0.06	0.56
	BMP	−0.73	−0.53	−0.45	−0.71	1.2	0.24	1.87*
	Wrank	−1.08	0.55	0.55	−1.49	1.98**	0.31	2**
	Obs	37	37	37	37	37	37	37

Note. This table presents the firm-specific daily abnormal return (AAR) based on our sample firms' export orientation. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 12
Firm export orientation and cumulative abnormal return (CAR) around the event days.

Export orientation	Event day	Around the event			Before the event		After the event				
		[−1,1]	[−2,2]	[−3,3]	[−3,-1]	[−2,-1]	[0,1]	[0,2]	[0,3]	[1,2]	[1,3]
High	CAR	−1.27	−1.57	−1.23	−1.6	−0.73	0.04	−0.84	0.38	0.39	1.6
	BMP	−2.19**	−0.88	−0.61	−2.23**	−1.6	0.15	−0.23	0.43	0.53	1.25
	Wrank	−1.91*	−2.18**	−1.24	−2.3**	−1.4	0.48	−1.53	0.05	0.05	1.52
	Obs	37	37	37	37	37	37	37	37	37	37
Middle	CAR	−0.95	−1.7	−0.92	−0.16	−0.09	−1.06	−1.61	−0.76	−0.7	0.15
	BMP	−0.69	−1.24	−0.63	0.07	−0.13	−1.31	−1.28	−0.72	−0.87	−0.31
	Wrank	−0.88	−1.4	−0.47	−0.09	0.71	−1.23	−1.65*	−0.36	−0.63	0.33
	Obs	36	36	36	36	36	36	36	36	36	36
Low	CAR	−0.15	−0.29	0	−0.84	−0.57	0.21	0.27	0.84	0.65	1.21
	BMP	−0.17	−0.24	−0.05	−1	−0.73	0.08	0.16	0.94	1.02	2.39**
	Wrank	−0.07	−0.87	−0.45	−0.88	−0.52	−0.25	−0.17	0.23	1.2	2.21**
	Obs	37	37	37	37	37	37	37	37	37	37

Note. This table presents the firm-specific cumulative abnormal return (CAR) based on our sample firms' export orientation. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

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Appendix A

Appendix A.1
Sample distribution by industry.

Industry name	No. of obs.
Communication Services	13
Consumer Discretion	36
Consumer Staples	16
Energy	14
Financials	33
Health Care	23
Industrials	30
Information Technology	26
Materials	56
Real Estate	33
Utilities	3
Total	283

Note. This table presents the industry distribution of the 283 firms in our sample based on the GICS sector classification.

Appendix A.2

Average abnormal return (AAR) for the extended period.

Event day	AAR	BMP	Wrank	Obs
−25	0.21	2.50**	1.59	283
−24	0.25	1.48	1.00	283
−23	−0.03	0.27	0.66	283
−22	−0.15	−3.51***	−3.38***	283
−21	−0.57	−3.44***	−3.67***	283
−20	−1.07	−4.05***	−5.43***	283
−19	−0.51	−3.15***	−4.10***	283
−18	−0.63	−3.40***	−3.35***	283
−17	0.00	0.70	−0.13	283
−16	1.21	6.16***	7.94***	283
−15	1.09	8.63***	8.49***	283
−14	0.22	1.32	1.40	283
−13	−1.30	−5.89***	−7.32***	283
−12	0.12	0.84	1.69*	283
−11	0.31	1.59	2.31**	283
−10	−0.32	−2.13**	−2.58***	283
−9	0.69	4.43***	5.82***	283
−8	−0.17	−2.15**	−2.80***	283
−7	−1.17	−9.50***	−9.16***	283
−6	−0.76	−3.46***	−5.04***	283
−5	−0.18	0.13	−1.15	283
−4	0.71	4.37***	5.01***	283
−3	−0.36	−1.23	−2.43**	283
−2	0.36	2.06**	2.95***	283
−1	−0.68	−1.90*	−3.34***	283
0	−0.94	−4.49***	−5.88***	283
1	0.58	2.85***	3.76***	283
2	−0.45	−0.67	−1.42	283
3	0.85	2.57**	4.98***	283
4	−0.30	−1.33	−2.06**	283
5	1.12	4.44***	5.62***	283
6	−1.05	−7.52***	−6.91***	283
7	−0.34	−3.02***	−3.82***	283
8	−0.71	−4.26***	−5.03***	283
9	−0.74	−4.78***	−4.88***	283
10	−0.35	−1.85*	−1.95*	283
11	0.66	4.21***	4.67***	283
12	0.54	4.80***	4.90***	283
13	−0.42	−4.42***	−3.89***	283
14	−0.22	1.45	−0.25	283
15	−0.11	1.55	0.51	283
16	−0.12	−0.93	−1.82*	283
17	0.67	3.02***	2.69***	283
18	0.14	−0.42	0.16	283
19	−0.05	−1.28	−0.56	283
20	−0.34	−3.98***	−3.81***	283
21	0.27	0.68	1.00	283
22	−0.60	−4.97***	−5.8***	283
23	0.08	1.79*	1.63	283
24	−0.84	−6.39***	−6.4***	283
25	0.50	3.82***	3.81***	283

Note. This table presents the average daily abnormal return (AAR) of 283 stocks belonging to the ASX 300 index for each day in the event window. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.3

Size-based cumulative abnormal return (CAR) for the extended period.

	Event windows	Around the event days					Before the event period					After the event period				
		[−5,5]	[−10,10]	[−15,15]	[−20,20]	[−25,25]	[−25,-1]	[−20,−1]	[−15,-1]	[−10,−1]	[−5,-1]	[0,5]	[0,10]	[0,15]	[0,20]	[0,25]
Large Cap	CAR	1.67	−1.12	−0.83	−1.88	−2.03	−0.93	−0.90	−0.26	−0.42	0.93	0.74	−0.69	−0.57	−0.97	−1.10
	BMP	1.99**	−1.34	−0.37	−1.51	−1.52	−0.68	−0.53	0.07	−0.21	1.92*	0.90	−1.42	−0.61	−1.63	−1.71*
	Wrank	2.01**	−1.19	−0.65	−1.14	−1.03	−0.65	−0.62	−0.43	−1.01	1.47	0.58	−1.17	−0.97	−1.57	−1.21
	Obs	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
	CAR	0.45	−5.45	−4.24	−4.60	−6.16	−3.34	−2.66	−2.62	−2.91	−0.64	1.09	−2.53	−1.62	−1.94	−2.82
	BMP	1.03	−4.3***	−1.86*	−2.13**	−2.87***	−1.14	−0.53	−1.13	−2.54**	0.63	0.67	−3.75***	−1.69*	−2.58**	−3.19***
	Wrank	0.66	−4.38***	−2.46**	−2.29**	−2.81***	−1.25	−1.11	−1.7*	−2.96***	−0.19	1.12	−3.16***	−1.85*	−2.08**	−2.62***
Mid Cap	Obs	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	CAR	0.10	−5.92	−4.76	−5.42	−6.38	−3.85	−3.66	−1.34	−2.22	−0.70	0.80	−3.70	−3.42	−1.77	−2.54
	BMP	0.23	−3.03***	−1.89*	−2.31**	−2.51**	−2.12**	−2.43**	−0.72	−2.14**	−0.70	0.71	−2.62**	−1.94*	−1.27	−1.68*
	Wrank	0.37	−2.73***	−1.56	−2.11**	−2.18**	−2.21**	−2.75***	−1.02	−2.44**	−1.65*	1.8*	−2.16**	−1.68*	−1.01	−1.56
Small Cap	Obs	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94

Note. This table presents the cumulative abnormal return (CAR) of a size-based tercile portfolio formed using the average market value over the estimation period. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.4

Industry-based cumulative abnormal return (CAR) for the extended period.

	Event windows	Around the event days					Before the evnt period					After the event period				
		[−5,5]	[−10,10]	[−15,15]	[−20,20]	[−25,25]	[−25,-1]	[−20,-1]	[−15,-1]	[−10,-1]	[−5,-1]	[0,5]	[0,10]	[0,15]	[0,20]	[0,25]
Consumer Discretionary	CAR	−2.04	−12.92	−9.25	−9.50	−10.38	−2.7	−2.17	−2.1	−4.76	−1.29	−0.75	−8.16	−7.15	−7.33	−7.68
	BMP	−1.64	−6.28***	−3.85***	−3.86***	−3.15***	−0.32	−0.49	−1.18	−3.44***	−1.69	−0.8	−5.22***	−4.25***	−5.39***	−4.93***
	Wrank	−1.73*	−4.89***	−3.6***	−3.22***	−3.02***	−0.9	−0.86	−1.45	−3.22***	−1.51	−0.47	−4.46***	−4.26***	−4.38***	−4.3***
	Obs	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Consumer Staples	CAR	−0.73	−4.42	−1.66	−2.57	−1.91	3.91	3.84	4.41	1.54	2.73	−3.46	−5.96	−6.08	−6.41	−5.82
	BMP	−0.11	−1.12	−0.22	−0.59	−0.50	2.62**	3.1***	4.51***	1.01	2.56**	−1.03	−1.48	−1.25	−1.60	−1.46
	Wrank	0.36	−1.03	0.05	−0.16	−0.26	2.22**	2.64***	3.21***	0.62	2.07**	−0.88	−1.60	−1.40	−1.50	−1.45
	Obs	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Financials	CAR	−0.47	−6.50	−2.00	−3.12	−4.46	1.01	1.66	1.92	1.21	0.53	−1.00	−7.70	−3.92	−4.77	−5.47
	BMP	−1.14	−3.88***	−0.22	−1.17	−1.82*	0.57	1.29	1.88*	1.26	0.57	−1.88*	−6.67***	−2.55**	−3.73***	−4.49***
	Wrank	−0.8	−3.21***	−0.28	−0.94	−1.33	0.6	0.81	1.49	0.62	0.12	−2.08**	−3.87***	−2.67***	−3.53***	−3.62***
	Obs	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Health Care	CAR	0.29	−10.40	−8.83	−11.66	−15.16	−11.48	−9.64	−7.00	−5.39	−1.20	1.49	−5.01	−1.83	−2.02	−3.68
	BMP	0.74	−3.14***	−2.2**	−2.9***	−3.59***	−4.82***	−4.48***	−4.69***	−4.57***	−0.78	1.37	−1.62	−0.07	−0.38	−1.06
	Wrank	0.24	−2.98***	−2.34**	−2.71***	−3.13***	−3.71***	−3.68***	−3.44***	−3.71***	−0.85	1.06	−2.04**	−0.82	−0.94	−1.13
	Obs	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Industrials	CAR	6.08	−1.24	0.93	2.03	−0.32	−1.22	−0.31	−0.49	−0.42	2.46	3.61	−0.82	1.42	2.33	0.90
	BMP	3.28***	−0.46	0.35	0.20	−0.42	−0.56	−0.15	−0.16	−0.09	2.69**	2.22**	−0.52	0.56	0.37	−0.15
	Wrank	2.66***	−0.83	0.52	0.32	−0.15	−0.11	0.07	−0.38	−0.89	1.82*	1.94*	−1.16	0.26	0.13	−0.61
	Obs	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Materials	CAR	2.06	5.53	2.64	0.35	1.51	−0.65	−2.59	1.47	0.09	0.28	1.79	5.44	1.17	2.93	2.16
	BMP	1.88*	2.54**	1.32	0.45	1.07	0.57	−0.69	1.46	0.21	0.94	1.85*	3.86***	0.64	1.54	1.05
	Wrank	1.84*	2.48**	1.14	0.28	0.76	−0.10	−1.20	1.04	−0.04	0.31	2.19**	3.78***	0.78	2.17**	1.4
	Obs	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Real Estate	CAR	2.45	−1.54	−0.21	−1.09	−2.89	−1.59	−0.28	−0.57	0.26	1.99	0.47	−1.79	0.36	−0.81	−1.30
	BMP	3.61***	−1.42	0.34	−0.42	−1.76*	−1	0.32	−0.31	0.98	3.71***	0.74	−3.68***	0.93	−1.03	−1.63
	Wrank	2.85***	−1.46	−0.06	−0.33	−1.46	−1.49	−0.19	−0.72	0.35	2.97***	0.63	−2.96***	0.46	−0.90	−1.44
	Obs	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Energy & Utilities	CAR	2.51	6.60	6.03	7.52	9.27	0.98	−0.13	−0.84	−3.02	−3.60	6.10	9.63	6.87	7.64	8.29
	BMP	0.65	2.32**	2.09*	2.87**	2.86**	0.52	0.41	−0.21	−1.53	−2.06*	3.17***	3.46***	2.7**	2.5**	3.44***
	Wrank	1.25	2.06**	1.78*	2.15**	2.11**	0.78	0.54	−0.36	−1.44	−2.06**	2.72***	2.77***	2.63***	2.44**	2.72***
	Obs	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Communication Services & Information Technology	CAR	−3.03	−13.44	−14.62	−13.88	−15.71	−10.04	−8.54	−8.50	−6.27	−3.08	0.04	−7.16	−6.12	−5.35	−5.66
	BMP	−1.31	−5.19***	−4.64***	−4.01***	−4.25***	−3.76***	−3.57***	−3.69***	−3.44***	−2.19**	0.16	−3.81***	−2.6**	−2.21**	−2.39**
	Wrank	−1.21	−4.48***	−4.23***	−3.59***	−3.52***	−3.38***	−3.35***	−3.56***	−3.27***	−2.32**	0.5	−3.45***	−2.5**	−2.11**	−2.05**
	Obs	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39

Note. This table presents the industry-specific cumulative daily abnormal return (CAR) of sampel stocks based on their GICS sector classification. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.5

Growth-based cumulative abnormal return (CAR) for the extended period.

	Event windows	Around the event days					Before the event period					After the event period				
		[−5,5]	[−10,10]	[−15,15]	[−20,20]	[−25,25]	[−25,-1]	[−20,-1]	[−15,-1]	[−10,-1]	[−5,-1]	[0,5]	[0,10]	[0,15]	[0,20]	[0,25]
High	CAR	−0.93	−12.53	−13.91	−14.8	−18.08	−10.76	−9.3	−7.59	−6.38	−2.02	1.1	−6.16	−6.32	−5.5	−7.33
	BMP	−0.16	−6.57***	−6.41***	−6.87***	−7.1***	−6.16***	−6.02***	−5.68***	−5.91***	−1.76*	0.98	−3.88***	−3.5***	−3.48***	−4.48***
	Wrank	−0.57	−6.04***	−5.97***	−6.15***	−6.08***	−5.53***	−5.52***	−5.18***	−5.62***	−2.85***	1.47	−4.14***	−4.13***	−3.72***	−4.28***
	Obs	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Medium	CAR	0.68	−3.3	−1.98	−2.39	−2.68	−1.34	−1.44	−0.54	−1.34	0.09	0.59	−1.96	−1.44	−0.95	−1.34
	BMP	0.49	−3.55***	−1.88*	−2.35**	−2.32**	−0.85	−1.07	−0.46	−1.98**	0.48	0.23	−3.09***	−2.08**	−2.2**	−2.48**
	Wrank	0.65	−3.21***	−1.54	−1.64	−1.6	−0.57	−1.03	−0.64	−2.14**	−0.14	0.48	−2.38**	−2.04**	−1.86*	−2.09**
	Obs	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113
Low	CAR	2.48	3.05	5.63	4.75	5.47	3.53	3.18	3.61	1.97	1.44	1.04	1.08	2.03	1.57	1.93
	BMP	3.33***	1.84*	4.78***	3.6***	3.4***	3.73***	4.15***	4.81***	3.26***	3.53***	1.17	−0.24	2.07**	0.73	0.95
	Wrank	3.07***	1.78*	4.06***	3.5***	3.28***	3.52***	3.6***	4.19***	2.46**	2.89***	1.88*	0.24	2.36**	1.29	1.37
	Obs	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85

Note. This table presents the cumulative abnormal return (CAR) of three growth-based portfolios. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test, which tests whether the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.6

Illiquidity-based cumulative abnormal return (CAR) for the extended period.

	Event windows	Around the event days					Before the event period					After the event period				
		[−5,5]	[−10,10]	[−15,15]	[−20,20]	[−25,25]	[−25,-1]	[−20,-1]	[−15,-1]	[−10,-1]	[−5,-1]	[0,5]	[0,10]	[0,15]	[0,20]	[0,25]
	CAR	−0.57	−10.04	−9.61	−9.22	−11.10	−5.23	−4.23	−3.69	−3.10	−0.66	0.09	−6.94	−5.92	−4.99	−5.87
	BMP	0.02	−5.83***	−4.56***	−4.38***	−4.69***	−3.03***	−2.78***	−2.8***	−3.23***	−0.28	0.19	−4.9***	−3.6***	−3.34***	−3.71***
	Wrank	−0.10	−5.99***	−4.99***	−4.75***	−4.63***	−3.3***	−3.2***	−3.16***	−3.83***	−1.89*	0.53	−5.1***	−4.27***	−3.97***	−4.01***
Top	Obs	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
	CAR	1.38	−3.40	−1.96	−2.04	−2.77	−2.41	−1.80	−1.43	−2.17	−0.26	1.63	−1.23	−0.53	−0.24	−0.36
	BMP	1.31	−3.35***	−1.55	−1.65	−2.14**	−1.72*	−1.23	−1.32	−2.64***	0.14	1.65	−2.43**	−0.95	−1.18	−1.47
	Wrank	1.21	−2.76***	−1.43	−1.11	−1.61	−1.19	−0.97	−1.1	−2.78***	0.06	2.58***	−1.71*	−0.92	−0.79	−0.84
Middle	Obs	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	CAR	1.40	0.93	1.72	−0.67	−0.73	−0.48	−1.21	0.89	−0.31	0.50	0.90	1.24	0.84	0.54	−0.25
	BMP	2.38**	0.70	2.45**	0.48	0.37	1.24	0.85	2.28**	1.00	2.16**	0.86	0.05	1.15	−0.28	−0.85
	Wrank	2.03**	0.91	2.22**	0.82	0.88	0.77	−0.08	1.3	−0.01	1.45	0.44	0.48	1.10	0.43	−0.33
Bottom	Obs	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94

Note. This table presents the cumulative daily abnormal return (CAR) for illiquidity-based tercile portfolios. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.7

Export orientation and cumulative abnormal return (CAR) around the event days.

Export orientation	Event day	Around the event					Before the event						After the event			
		[−5,5]	[−10,10]	[−15,15]	[−20,20]	[−25,25]	[−25,-1]	[−20,-1]	[−15,-1]	[−10,-1]	[−5,-1]	[0,5]	[0,10]	[0,15]	[0,20]	[0,25]
High	CAR	1.88	−4.2	−3.57	−4.38	−6.39	−5.94	−4.85	−3.65	−3.43	−0.27	2.15	−0.77	0.08	0.47	−0.45
	BMP	1.08	−1.39	−0.65	−1.05	−1.33	−1.68	−1.56	−1.31	−2*	0.25	1.33	−0.54	0.19	−0.04	−0.42
	Wrank	0.66	−2.01**	−1.34	−1.7*	−1.61	−1.73*	−1.83*	−1.67*	−2.41**	−0.34	1.2	−0.81	−0.45	−0.26	−0.85
	Obs	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Middle	CAR	−0.33	−4.32	−1.17	−0.9	−0.2	1.5	1	1.86	−0.65	1.04	−1.38	−3.67	−3.03	−1.9	−1.7
	BMP	−0.16	−1.68	−0.34	−0.47	−0.18	0.9	0.78	1.33	−0.02	1.47	−1.43	−2.12**	−2.01*	−1.31	−1.19
	Wrank	−0.06	−2.12**	−0.71	−0.55	0.06	0.88	0.66	1.29	0.08	1.12	−1.34	−2**	−2.14**	−1.82*	−1.34
	Obs	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Low	CAR	0.62	−4.83	−3.13	−2.39	−2.72	1.25	0.92	−1.1	−2.22	−0.77	1.39	−2.61	−2.03	−3.32	−3.97
	BMP	0.39	−3.08***	−1.87*	−1.25	−1.43	0.91	1.15	−0.82	−1.84*	−0.58	1.28	−2.51**	−1.95*	−3.05***	−3.08***
	Wrank	0.1	−2.72***	−2.23**	−1.03	−1.26	0.88	1.14	−1.02	−2.13**	−0.85	1.08	−2.36**	−1.94*	−2.48**	−2.41**
	Obs	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

Note. This table presents the firm-specific cumulative abnormal return (CAR) based on our sample firms' export orientation. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.8
Average abnormal return (AAR) using February 24 as the event day.

Event day	AR	BMP	KP	Wrank	Obs
−25	−0.03	0.24	0.09	0.64	283
−24	−0.15	−3.52***	−1.31	−3.37***	283
−23	−0.58	−3.5***	−1.3	−3.7***	283
−22	−1.07	−4.07***	−1.51	−5.43***	283
−21	−0.52	−3.2***	−1.19	−4.15***	283
−20	−0.64	−3.43***	−1.27	−3.38***	283
−19	0.01	0.76	0.28	−0.09	283
−18	1.21	6.2***	2.3**	7.95***	283
−17	1.09	8.68***	3.23***	8.54***	283
−16	0.23	1.37	0.51	1.46	283
−15	−1.30	−5.88***	−2.18**	−7.32***	283
−14	0.12	0.88	0.33	1.7*	283
−13	0.31	1.6	0.59	2.31**	283
−12	−0.32	−2.08**	−0.77	−2.57**	283
−11	0.70	4.48***	1.66*	5.88***	283
−10	−0.16	−2.14**	−0.8	−2.77***	283
−9	−1.18	−9.53***	−3.54***	−9.16***	283
−8	−0.75	−3.44***	−1.28	−5.03***	283
−7	−0.18	0.12	0.04	−1.16	283
−6	0.72	4.4***	1.64	5.04***	283
−5	−0.36	−1.22	−0.45	−2.43**	283
−4	0.36	2.06**	0.77	2.93***	283
−3	−0.67	−1.88*	−0.7	−3.34***	283
−2	−0.94	−4.52***	−1.68*	−5.89***	283
−1	0.59	2.87***	1.07	3.78***	283
0	−0.46	−0.71	−0.26	−1.46	283
1	0.86	2.6***	0.97	4.98***	283
2	−0.29	−1.3	−0.48	−2.04**	283
3	1.13	4.47***	1.66*	5.64***	283
4	−1.04	−7.52***	−2.8***	−6.9***	283
5	−0.34	−3***	−1.12	−3.81***	283
6	−0.71	−4.27***	−1.59	−5.05***	283
7	−0.74	−4.78***	−1.78*	−4.89***	283
8	−0.36	−1.87*	−0.69	−1.97**	283
9	0.66	4.25***	1.58	4.7***	283
10	0.54	4.83***	1.8*	4.93***	283
11	−0.42	−4.43***	−1.65	−3.9***	283
12	−0.21	1.48	0.55	−0.22	283
13	−0.12	1.55	0.58	0.5	283
14	−0.11	−0.9	−0.34	−1.78*	283
15	0.68	3.05***	1.13	2.71***	283
16	0.14	−0.4	−0.15	0.19	283
17	−0.05	−1.29	−0.48	−0.56	283
18	−0.34	−3.95***	−1.47	−3.77***	283
19	0.28	0.71	0.26	1.03	283
20	−0.60	−4.97***	−1.85*	−5.8***	283
21	0.08	1.8*	0.67	1.63	283
22	−0.84	−6.39***	−2.37**	−6.4***	283
23	0.50	3.85***	1.43	3.86***	283
24	−0.02	0.03	0.01	−0.81	283
25	−0.21	−2.93***	−1.09	−3.2***	283

Note. This table presents the average daily abnormal return (AAR) of 283 stocks belonging to the ASX 300 index for each day in the event window. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized daily abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the AAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Appendix A.9
Cumulative abnormal return (CAR) using February 24 as the event day.

Event window	CAR	BMP	KP	Wrank	Obs
[−1,1]	0.98	2.42**	0.9	4.25***	283
[−2,2]	−0.25	−0.36	−0.14	−1.12	283
[−3,3]	0.20	0.55	0.21	0.76	283
[−5,5]	−1.17	−2.16**	−0.8	−2.14**	283
[−10,10]	−3.34	−4.04***	−1.5	−4.18***	283
[−15,15]	−4.01	−3.74***	−1.39	−3.81***	283
[−20,20]	−2.68	−2.62***	−0.97	−2.5**	283

(*continued on next page*)

Appendix A.9 (*continued*)

Event window	CAR	BMP	KP	Wrank	Obs
[−25,25]	−5.51	−4.79***	−1.78*	−4.25***	283
Before the event					
[−25,-1]	−3.51	−3.15***	−1.17	−3.12***	283
[−20,-1]	−1.16	−0.49	−0.18	−1.07	283
[−15,-1]	−3.06	−3.62***	−1.35	−4.15***	283
[−10,-1]	−2.58	−4.01***	−1.49	−4.96***	283
[−5,-1]	−1.02	−1.56	−0.58	−2.32**	283
[−3,−1]	−1.03	−2.38**	−0.88	−3.29***	283
[−2,−1]	−0.35	−1.55	−0.58	−2.32**	283
After the event					
[0,1]	0.40	1.31	0.49	3.18***	283
[0,2]	0.10	0.56	0.21	0.77	283
[0,3]	1.23	2.56**	0.95	4.86***	283
[1,2]	0.56	1.5	0.56	2.57**	283
[1,3]	1.69	3.66***	1.36	5.41***	283
[0,5]	−0.15	−1.52	−0.57	−0.41	283
[0,10]	−0.76	−2.06**	−0.77	−1.76*	283
[0,15]	−0.94	−1.64	−0.61	−1.99**	283
[0,20]	−1.51	−3.29***	−1.22	−2.85***	283
[0,25]	−2.00	−3.83***	−1.42	−3.38***	283

Note. This table presents the average cumulative abnormal return (CAR) of 283 stocks belonging to the ASX 300 index over different event windows. BMP is the standardized cross-sectional test of Boehmer et al. (1991) using standardized cumulative abnormal returns. WRank is the Wilcoxon signed-rank test for the null that the CAR has a zero median. ***, ** and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

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