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[Research Note]
The Announcement Effect of Bilateral Trade Agreements on Share Prices: An analysis of the Economic Partnership Agreement between EU and Japan

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Contents

1 Introduction

Over the past three decades, efforts have been undertaken to reduce and remove barriers to trade around the world. As such, a large empirical literature has examined the impact of these developments on trade liberalization. For example, studies have estimated the trade liberalization impact of the 1996 US-Canada softwood lumber agreement, as well as on firm exit and entry and firm-level profits (for example Malhotra and Gulati, 1997; Trefler, 2004; Breinlich, 2015).

Fama (1969) published a paper in which he describes the theory of efficient capital markets. Since then, a substantial amount of literature has been published in the area. The primary concept of the hypothesis is "that security prices at any time 'fully reflect' all available information". In other words, when new information is made available in financial markets, it will immediately be reflected in current prices. In addition, he suggests that a price which "fully reflects" new information comes in three forms. First, a financial market that only is reflected by its past prices or return history is referred to as the 'weak form' efficiency. Second, if the market also has taken other publicly available information (i.e. announcements within the market) into account, then we have the case of 'semi-strong form' efficiency. Lastly, market participants that possess monopolistic access to vital information that has an impact on price leads to what he refers to as 'strong form' efficiency.

However, markets sometimes may not react as efficiently to new information as Fama (1970) suggests. For example, evidence from experimental psychology suggests that people in general tend to "overreact" to events that are dramatic and unanticipated (De Bondt and Thaler, 1985). Nevertheless, the behavior has also been identified at a market and financial level. For instance, according to Shiller (2003), investors tend to underreact or overreact to new information, a view which supports that of De Bondt and Thaler (1985). Similarly, Merrill (1984) studied American stock market reactions to events related to illness or death of the President. The author found that following the announcement of presidential illness or death, the Wall Street stock market instantly reacted negatively. However, the market tended to recover from the prior announcement-day decline, a phenomenon the author attributed to market overreaction. Specifically, he noted that a price reaction that is followed by an almost instant correction may be assumed to be evidence that overreaction to events do occur. Overall, the evidence provided by Shiller (2003), De Bondt and Thaler (1985) and Merrill (1984) that stock market tends to overreact or underreact to certain events challenge Fama's theory of efficient markets.

In the specific case of the information content of announcements relating to trade agreements, a significant body of evidence exists. Thompson (1993) investigated investors' expectations about the October 1987 Canada and United States (US) Free Trade Agreement for manufacturing industries in Canada on the stock market. The author finds evidence of jointly significant abnormal returns at the industry-level, and also evidence to suggest that substantial firm profits and losses occurred during the period of adjustment to free trade. Similarly, Parsons (2005) examined the impact of the 1986 US-Japan Semiconductor Trade Agreement (STA) and antidumping actions by the US on Japanese firms. The author uses an event study methodology on the daily returns of eight large electronics firms over two years. They found that the STA had a positive effect on the daily returns while the antidumping rulings were found to be insignificant. These results are consistent with some authors' views that the STA policy may be a benefit to not only US but also Japanese firms.

Other studies include Moser and Rose (2013) who analyzed the price reactions following announcements of 200 Regional Trade Agreements (RTA's) in 80 countries over a period of 20 years. The authors found that the stock markets reacted positively and significantly to formation of RTA's, especially between countries that were good trade partners at that time. They also found evidence of a more significant positive market reaction in developing countries, relative to their developed country counterParts, following the announcement of a RTA.

The purpose in this study is to reveal the impact of the economic partnership agreement of EU and Japan on the stock market and to consider the relation between EU and Japan. We confirm whether this good agreement news brings a positive effect on stock market as follow as previous studies about free trade agreement. There are some previous studies related to the free trade agreement but there are only a few studies about free trade agreement between EU and Japan. In addition, these previous studies are about past economic agreement thus we analyze the recent economic agreement.

Recently in July 2017, an agreement in principle was reached for an Economic Partnership Agreement (EPA) between EU and Japan. Negotiations for the agreement began in March 2013. In this paper, we examine the announcement effects of the EPA by tracking key events and announcements over the period of negotiations to final agreement in principle. We apply an event study framework to address the following questions: Did announcements about the EPA increase (decrease) the stock price of firms in industries likely to benefit (hurt) from the trade agreement, as perceived by investors in the stock market? How much impact, if any, did these have on the value of firms? What was the speed of

reaction of the market to the perceived change in the affected firms' future prospects?

This analysis indicates that the announcement of events has an impact on Japanese stock market but these impact does not affect the EU so much. The most clearly effect by the announcement of EPA is around the day which is held on the last ministerial level meeting and European commissioner comments "It will be soon." In this event, Japanese Automobile and Machinery industries have a significant positive impact but EU's Food and Machinery industry have a significant negative impact. These results suggest that the announcements of the key event dates related to the EU-Japan EPA had some information content that were priced by the markets. And these events have both positive and negative impacts on the stock ma. Thus, economic agreement may expect not only trading benefits but also to get the good partnership for global leader.
The rest of the paper is structured as follows: Section two presents an overview of the EPA agreement between EU and Japan. Section three outlines the methodology. Section four describes sample and data. Section five presents the results and Section six concludes.

2 Background and Overview of the Economic Partnership Agreement (EPA) between EU and Japan

At the EU-Japan Summit of 28 May 2011, the EU and Japan agreed to work together to explore the possibility of a bilateral free trade agreement. In pursuant to the conclusions reached at the Summit, a joint scoping exercise was conducted to define the scope and scale of a future free trade agreement, such as the number of Non-tariff barriers to trade that the EU considers as inhibiting their access to the Japanese market. In July 2012 following the successful completion of the scoping exercise, recommendations were passed to launch formal negotiations for a free trade agreement between the EU and Japan. The first round of negotiations took place in Brussels in April 2013. Over the next one year (April 2014), the fifth round of negotiations took place. Between July 2014 and April 2017, further rounds of negotiations, specifically the 6th to 18th rounds, took place, rotating between Tokyo, Japan and Brussels, Belgium. In between these negotiations, on June 23 2016, an important event occurred: the 'Brexit', when the United Kingdom (an important EU member-country) voted to leave the EU.

At the summit between Japan and the EU (European Union) held on 6th July 2017, EU-Japan EPA agreement reached a large frame of negotiations. They will agree within the year on issues that have been left behind and aim for the entry into force in 2019. Japan and the EU are important global partners which share fundamental values such as

democracy, rule of law, and basic human rights. The main purpose of the agreement is to remove the trade barriers. And it is also to help shaping global trade rules in line with their standards and shared values and to send a powerful signal that two of the world's biggest economics reject protectionism as a strategic relation.

The EU-Japan trade agreement is expected to bring many benefits to both area's exporters and consumers. For EU, the European Commission reports that EU exports to Japan of processed Food could rise by up to 180% and EU exports to Japan of Chemicals could rise by over 20% in the reports in the site [1]. They also report that there are some opportunities. Because Japan is particularly good market for the kind of high quality, high tech products and services that Europe is good at supplying. An ambitious trade deal could provide opportunities for the EU in particular is sectors such as pharmaceuticals, medical devices, agriculture-Foods, motor vehicles and transport equipment. There is also a major producer of distinctive regional Food and drink products such as Parmesan cheese and Irish whiskey which is called "Geographical Indication" that is special quality or reputation. It allows European producers to earn a premium for the quality of their produce. The EU wants Japan to recognize 205 European Geographical Indications so that only products with this status will be allowed to be sold in Japan under the corresponding name. The EU's main areas of interest are improvement of Market Access on agricultural products and to cope with Non-Tariff Measures on automobiles, chemicals, electrical machinery, food safety, processed food, medical devices, and pharmaceuticals and so on.

Japan is the EU's second biggest trading partner in Asia after China and sixth most important trading partner worldwide. The EU is Japan's major trading and investment partner which contributes to approximately 12% of Japan's total trade volumes. Japan's main areas of interest are elimination of high tariffs products, for example, motor cars' 10% and Electrical Machinery's 14%. And they want to Improve the regulatory issues facing Japanese companies in Europe on Non-Tariff Measures.

In the context of difficult negotiations may be expected in liberalization of trade in agricultural products which is among priorities of EU negotiators. Japan remains one of the most important export markets for the EU producers. The EU exports agricultural and processed agricultural products as the 5th export country in this industry. However, the Japanese Food and agricultural products market has been strongly protected. The agricultural highly restrictions policy on import of agricultural and Food products make the Japanese internal system one of the most protected in the world. The most protected products group is dairy products with an average applied tariff at 76.3%. Among strongly protected products are also cereals and preparations, sugars and confectionery, Beverages

[1] http://trade.ec.europa.eu/doclib/docs/2017/july/tradoc_155684.pdf

Table1: Main trade partners of the EU and Japan (% of total trade)

EU				JAPAN			
Import		Export		Import		Export	
China	20.1	USA	20.8	China	25.8	USA	20.2
USA	14.6	China	9.7	EU-28	12.3	China	17.6
Switzerland	7.1	Switzerland	8.1	USA	11.1	EU-28	11.4
Russia	6.9	Turkey	4.5	Australia	5	South Korea	7.2
Turkey	3.9	Russia	4.1	South Korea	4.1	Taiwan	6.1
JAPAN	3.9	JAPAN	3.3	Taiwan	3.8	Hong Kong	5.2
Norway	3.7	Norway	2.8	Thailand	3.3	Thailand	4.2
South Korea	2.4	UAE	2.6	Saudi Arabia	3.2	Singapore	3.1
India	2.3	South Korea	2.6	UAE	2.9	Australia	2.2
Vietnam	1.9	India	2.2	Malaysia	2.9	Malaysia	1.9

Source; EU commission and Japan Foreign Trade Concil

and tobacco, animal products as well as coffee and tea. But there are also non-tariff barriers for the EU products by Japan.

One of the most important issues in the agenda of negotiations for the EU-Japan EPA is trade in Automobiles and automotive components. There are world-scale car producers with worldly recognized brands for both parties. The European Union is the 2nd biggest producer of motor vehicles and Japan ranks at the 4th position in the world in 2016. Regarding trade in Automobiles between the EU and Japan, there is a noticeable imbalance in trade. The EU market is more attractive for Japanese car manufacturers than the other components. Deloitte (2012) reports that the Japanese market is not a strategic market for EU car producers and its shrinking tendency and traditional “inward looking” character do not bring promising future prospects for EU exporters. The European Automobile manufacturers are skeptical about the benefits of EU-Japan EPA.
A number of reports by EU Trade Insights indicate that the main interests for the EU during the negotiations were in the area of agriculture, Food, railroad equipment, geographical indicators and non-tariff measures (NTMs) . On the other hand, the main Japanese interests were in the Automobile industry and tariff elimination on car Parts, other vehicles (motorcycles) and rubber products various.

The Ministry of Foreign Affairs of Japan[2] reports After the agreement, Japan will eliminate tariffs on 91% of imports from the EU and it will be 99% in the 15 years. The EU

[2]http://www.mofa.go.jp/mofaj/

abolished tariffs on 75% of imports from Japan. For example, the wine (the current low tariff rate is 15%) was promised to abolish at the time the agreement will be enforced. Pasta (spaghetti macaroni) and Cheese were agreed to reduce gradually to 0. In the cheese (current tariff rate is from 22.4% to 40.0%), which is the biggest issue for negotiation, it is promised to eliminate tariffs in 16th years step by step. However, the non-tariff barriers remain one of the blocks thus it has to continue to discuss about that. For industrial products, Japan has no tariff at 77.3% of the imports from the EU, but the tariff will be eliminated at 96.2% level. For the EU, 38.5% of imports from Japan are now no tariff, but the no-tariff rate will be 81.7% at the time the agreement comes into enforcement. The tariff of cars which is widely noticed will abolish in 18th years.

In Benz and Yalcin (2015), the authors examined that the growth effect for these areas are increasing by 0.86 % in Japan and by 0.2 % in EU. And Japan and the EU will take a significant increase in productivity around 0.5 % for Japan and 0.1 % in the EU. Then their simulations predict a higher gain for Japan compared to the EU.

According to media reports, the EPA will cover over a third (about 37 percent) of the world's trade and also cover up to 28 percent of the world's GDP, making it one of the world's largest trade agreements. [3]

3 Methodology

In this paper, we use the market model which estimate the expected return of securities. For any security i the market model is

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{1}$$
$$\mathrm{E}[\varepsilon_{it}] = 0, \quad \mathrm{Var}[\varepsilon_{it}] = \sigma^2_{\varepsilon_i}.$$

where R_{it} and R_{mt} are the period t returns on security i and the market portfolio and ϵ_{it} is zero mean disturbance term. α_i, β_i and $\sigma^2_{\epsilon_i}$ are the parameters of the market model. With this model, we estimate the normal return in the estimation window L_1, from T_o to T_1 . This study adopts a 250 daily return observation for the estimation window for each firm.

We define that $\widehat{AR}_{i\tau}$, $\tau = T_1 + 1, \ldots, T_2$, is abnormal returns for firm i in the event window.
The abnormal return is

$$\widehat{AR}_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau}. \tag{2}$$

[3] https://www3.nhk.or.jp/nhkworld/en/news/20171208_35/;

Define $\widehat{CAR_i}(\tau_1, \tau_2)$ as the sample cumulative abnormal return (CAR) from τ_1 to τ_2. The CAR is the sum of the included abnormal returns,

$$\widehat{CAR_i}(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR}_{i\tau}. \tag{3}$$

The individual securities' abnormal returns can be aggregated using AR from equation for each event period, $\tau = T_1 + 1, \ldots, T_2$. Given N firms, sample aggregated abnormal returns for period τ is

$$AAR_\tau = \frac{1}{N} \sum_{i=1}^{N} \widehat{AR}_{i\tau}, \tag{4}$$

and its variance is

$$\mathrm{Var}(AAR_\tau) = \frac{1}{N^2} \sum_{i=1}^{N} s^2. \tag{5}$$

where s is a residual variance given by,

$$s = \sqrt{\frac{1}{L_1 - 2} \sum_{i=1}^{N} (R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt})^2} \tag{6}$$

The average abnormal returns can then be aggregated over the event window using the same approach as that used to calculate the cumulative abnormal return for each security i is

$$CAAR(\tau_1, \tau_2) = \frac{1}{N} \sum_{i=1}^{N} \widehat{CAR_i}(\tau_1, \tau_2), \tag{7}$$

$$\mathrm{Var}(CAAR(\tau_1, \tau_2)) = \frac{1}{N^2} \sum_{i=1}^{N} \sigma_i^2(\tau_1, \tau_2). \tag{8}$$

to test the null hypothesis.
Now we use the Cross-Sectional Test and any abnormal returns are zero under the market efficient hypothesis.

Hence, the null hypothesis (H_0) is that any abnormal returns are zero. Under the condition of null hypothesis, AAR and CAAR follow this distribution.

$$AAR_\tau \sim N[0, var(AAR_\tau)]$$

$$CAAR(\tau_1, \tau_2) \sim N[0, var(CAAR(\tau_1, \tau_2))]$$

thus, H_0 can be tested by

$$\theta = \frac{AAR_\tau}{var(AAR_\tau)^{1/2}} \sim N(0,1)$$

$$\theta = \frac{CAAR(\tau_1, \tau_2)}{var(CAAR(\tau_1, \tau_2))^{1/2}} \sim N(0,1)$$

If we find that AAR and CAAR are statistically significant, we would then reject the null hypothesis that event dose not change the stock returns. In other words, when H_0 accept, there is nothing effect on the stock returns by the EPA events.

4 Data description

The Japanese stock market data used in this paper are daily returns from Nikkei225 index and the European date are obtained from STOXX600 index. The market rate of returns are from the TOPIX index and also STOXX600. These series span from January, 2012 until July, 2017. In index, they are divided into some components depend on the industries and we focus on the Automobile industry for Japanese stock and the Food $\&$ Beverage for EU. Moreover, we picked up the top 3 exporting industries to each area to confirm the effect widely. The top3 exporting industries are shown by Figure2. We discuss these industries as a Japanese and EU's industries. The Japanese industries are Automobile, Machinery and Electrical Machinery. The EU's industries are Food $\&$ Beverage, Chemical, Machinery and Automobile. The source of the data is drawn from Yahoo Finance [4]

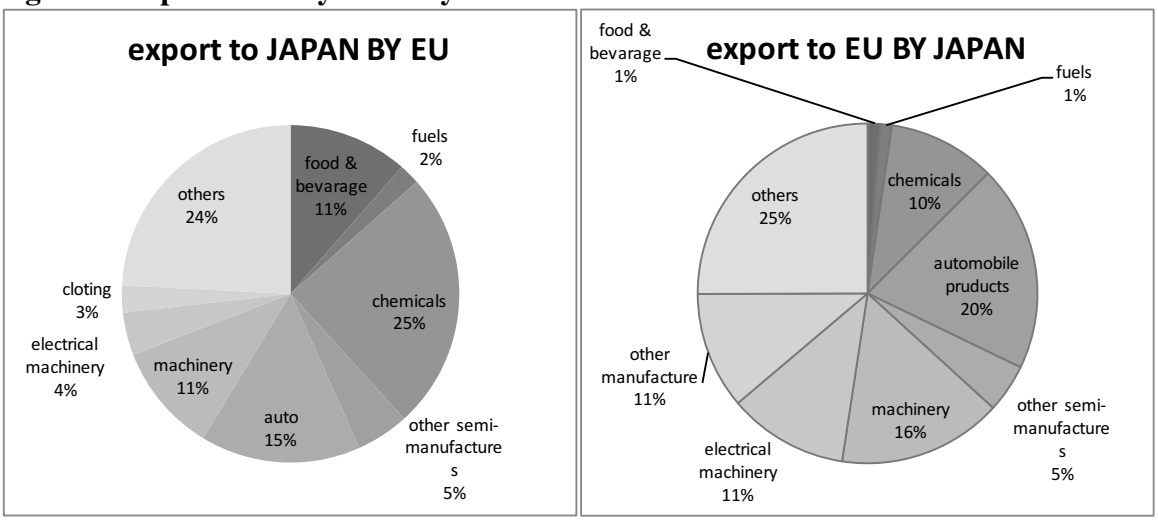
4.1 Event Calendar

A search is conducted for pertinent announcements and news in the site of ministry of Foreign Affairs of Japan[5], $Nihon\ Keizai\ Shimbun$ and $Le\ monde$ which are the major newspaper in Japan and France. If there was no trading on the stock market on the announcement day, the next trading day was chosen. In May 2011, Japanese leader and EU's leader agreed to start the Scoping Exercise to define the outline of the EPA negotiation at the EU-Japan summit. The first important day to the negotiation of EPA is that summit leaders decided to launch negotiations of the EU-Japan EPA on the 25 March 2013. After some meetings, the second important thing occurred when United Kingdom decide to leave from EU by voting on 23 June 2016. Most investors think that this decision effect

[4]https://finance.yahoo.com

[5]http://www.mofa.go.jp/mofaj/gaiko/page6_000042.html

Figure1: Export ratio by indsutry



on the stock prices of many industries. The negotiation seemed to be a stagnant however it progressed well with this leaving. Event 3 is the announcement day that the First Meeting amongst Main Ministers was held on 17th that date to make a decision to set up the Task-force on the EU-Japan EPA. Event 4 is about joint statement between the leaders not regularly. Before that day, there were many times leaders's meeting which are regular meeting not only for the EPA. The Event 4 day was meeting for the agreement. Until Event 4, they were announced by the official site of ministry of Foreign Affairs and newspaper. From Event 5 to Event 7 are the news and comments from newspapers because the investors want to get the news faster than official announcement.

Table: Event Calendar

Event	Date	Description
1	03/25/2013	Summit leaders decided to launch negotiations of the EU-Japan EPA
2	06/23/2016	UK votes to leave from EU
3	11/18 /2016	Ministerial level meeting
4	05/26/2017	the EU-Japan leaders' meeting not regularly
5	06/16/2017	the leaders of Japan comments "as early as possible"
6	06/28/2017	European Commissioner for trade comments '"it will be soon" and Ministerial level meeting
7	07/04/2017	the newspaper reports "will be held on ministerial level meeting to launch at 5th"

5 Results

This section reports the event study results corresponding to the observed abnormal return of each industry generated around the key announcement dates leading up to the EPA. These are presented in Table 3 to Table 10.

Column 1 of the table shows the days around the event window and day "0" is the announcement day. Columns 2 to 8 represent separate events around the EPA, and report the observed abnormal return around the announcement day for each event. For each abnormal return, the t-value associated with the null hypothesis that the average abnormal return and the cumulative abnormal return are equal to zero, is reported in parentheses.

Table 3 shows the average abnormal returns of Japanese Automobile industry for the period five days prior to and following the date of announcement. For Event 1, day -2 to day 1, except for the day-1, show significant negative returns. It also can be seen that day-5 has significant negative AR(-0.0175) and between day 5 and day 10 it has gone significant negative return, -0.0116 to -0.0151 except for the day 5 and day 7, 0.0205 and 0.0138. The results by CAAR also reports the negative impact on the CAAR(-5,10) and CAAR(0,10), of -0.0808 and -0.0453 respectively.

Overall, we can see the price swings but it is unlikely that the observed price reactions are directly related to Event 1. The reason is simple: The event in question which occurred on March 25th 2013 was related to the decision to launch negotiations of the EPA between EU and Japan. This followed the adoption, earlier in November 2012, of the mandate of the Scoping exercise. As such, it is possible that the announcement, in March 2013,

of the decision to formally launch negotiations could lack significant information content perhaps because investors may have anticipated the it already, or deemed it 'unsurprising' (since the Foreign Affairs Council of the EU had already announced its decision to adopt the mandate of the Scoping exercise earlier in November 2012).

Event 2 shows a big and rational impact, largely because the United Kingdom's (UK's) decision to leave the EU was largely unforeseen and hugely unexpected. Until the announcement day of the Brexit, the AR of day-5, -2 and -1 are significant positive. However, after the announcement day which is day1, day2, day5 and day8 there are significant and negative impacts. In addition to the 'surprise' factor, we can consider that the significant negative impacts are because the Japanese companies have many manufacturing plants to export to the EU. And because of the huge importance of the UK to the EU, the investors would have been shrouded in uncertainty about the future of the EU as a whole after the Brexit. Going by the observed CAARs, it appears that the negative post-announcement impacts are equally strong: the CAAR(-5,10), CAAR(0,3), CAAR(0,5) and CAAR(0,10) are significantly negative at level 0.05 and 0.001. In other words, the announcement effects of the Brexit vote during the negotiations of the EPA generated significant and persistent negative effects on the returns of Japanese Automobile firms.

The reactions of Event 3 are statistically significant but after the day-1 to day5 they move with high volatilities, ranging from -0.0159 to 0.0198. Thus it is difficult to determine clearly whether its impact is positive or negative. Events 4 and 5 have no significant abnormal returns except for a few days. However, there is significant positive impact after the announcement for Event 6 and Event 7. Event 6 shows the statistically significant after day0. After day0, the abnormal returns are significant positive on day2, day4, day5 and day7, consistent with Moser and Rose (2013). Hence only CAAR(-5,10), CAAR(0,5) and CAAR(0,10) are significant positive at level 0.001 and this impact continue to day10. Event 7 reports day-3, day-1, day1, day2, day4 are positive effects however, estimation window of Event 7 include the event window of Event 6 thus it seems unclear which day is effective for Event 7. And the abnormal return of day-3, day-2 are similar results with day2 and day4 of Event 6.

Table 4 reports the average abnormal returns of EU's Food & Beverage industry. In this industry, only a few statistically significant price impacts were observed. For the Event 2, none of the event days witnessed significant abnormal returns but CAAR(0,10) has significant positive returns at level 0.01. For Event 4, only day1 has significant negative impact, -0.0406 while the CAAR(-5,10), CAAR(0,3), CAAR(0,5) and CAAR(0,10) are significant negative returns at level 0.05 and 0.001. In the case of Event6, there are no

significant abnormal returns on each day, except for CAAR(-5,10) where we can observe a significant negative effect only. The other Events, Event1, Event3, Event5 and Event7, do not have abnormal returns. We can see negative reactions by the EPA for the EU's Food & Beverage industry except for the Event2.

For further comparison, we estimate other 5 industries shown in Table5 to Table9, Japanese Machinery, Japanese Electrical Machinery, Machinery of EU, Automobile of EU and Chemical of EU, which is related with EPA. First, we examined two Japanese industries, namely Machinery and Electrical Machinery. For Event 1 of Japanese Machinery, day-4, day-1 has significant positive impacts and day1 has significant negative impact. There are significant negative abnormal returns after day6 and CAAR(-5,10), CAAR(0,3) and CAAR(0,10) are also significant negative impacts, which is quite similar with the observed reaction for Japanese Automobile industry. Furthermore, Event2 shows some statistically significant effect and CAAR(-5,10), CAAR(0,3), CAAR(0,5) and CAAR(0,10) have negative effects. Day-1 and day1 has negative abnormal return but day0 does not appear to show a statistically impact on the Event 3. Regarding the CAARs, we observe no statistically significant price effects. Event 6 which has impact on Automobile industry has also statistically significant positive abnormal returns on Machinery. Day-3, day2, day4 and day5 have significant positive impacts, possible because some investors may have interpreted the agreement as good news. The results of CAAR(0,5) and CAAR(0,10) which has significant positive at level 0.05, suggests that the reaction of investors to announcement of the agreements and the speed of price adjustment is probably not so fast. In the case of Japanese electric Machinery firms, we also observed statistically significant negative abnormal returns on the Event 1 and Event 2, similar to the other two Japanese industries. Although these reactions appear similar to the others, the impact of Event 6 doesn't appear in this industry. On the other hand, the other industries for the EU don't have so much impact. For Event 2, the results show that the Automobile industry and Machinery industry have negative impact on the CAAR(-5,10) and CAAR(0,10). However, for Event 6 and Event 7, the reaction of these industries is quite different. There are not significantly impact each day on the Automobile but CAAR(-5,10) and CAAR(0,10) are significant positive returns at level 0.05. For the Machinery industry, it is only day0 and day1 that have negative returns significantly on the Event 6. It seems that the investors react immediately and the speed of price adjustment seems fast (no abnormal price effects are observed after day1). Finally, for Chemical industry of EU, we observe CAAR(0,10) of Event 3 and Event 4.

5.1 Robustness check

Patell test

To ascertain the robustness of the test, we examine the standardized residual test which is called Patell test. He suggests to standardized each AR_i before calculating the test statistic by forecast-error corrected standard deviation.

$$SAR_{i,\tau} = \frac{AR_{i,\tau}}{S(AR_i)}. \tag{9}$$

As the event-window abnormal returns are out-of-sample predictions, Patell adjusts the standard error by the forecast-error,

$$S(AR_i) = \hat{\sigma}_{\varepsilon_i} \sqrt{1 + \frac{1}{L_1} + \frac{(R_{m,\tau} - \bar{R}_m)^2}{\sum_{\tau=\tau_1}^{\tau_2} (R_{m,\tau} - \bar{R}_m)^2}}, \tag{10}$$

with $\bar{R}_m$ as the mean of the market returns in the estimation window.
Test statistic for testing null hypothesis that cumulative average abnormal return is given by

$$Z_{Patell} = \frac{1}{\sqrt{N}} \sum_{i=1}^{N} \frac{CSAR_i}{S_{CSAR_i}}, \tag{11}$$

with $CSAR$ as the cumulative standardized abnormal returns

$$CSAR_i = \sum_{t=T_1+1}^{T_2} SAR_{i,t} \tag{12}$$

with expectation zero and variance

$$S^2_{CSAR_i} = L_2 \frac{L_1 - 2}{L_1 - 4} \tag{13}$$

Under the assumption of cross-sectional independence, Z_{Patell} is standard normal distribution.

As seen in table 10, we show the results of Patell test and t-test. There are some difference and it seems that these values are smaller than cross-sectional test. But this additional test for robustness checks show mostly very close in results at statistically significant level.

Capital Asset Pricing Model (CAPM) model

In addition to the market model (1), we calculated in other model, Capital Asset Pricing Model (CAPM). The CAPM is a model that describes the relationship between systematic risk and expected return for assets and the formula for calculating the expected return of an asset given its risk is as follows.

$$(R_{i,t} - r_{f,t}) = \alpha_i + \beta(R_{m,t} - r_{f,t}) + \varepsilon_{i,t}, \tag{14}$$
$$\mathrm{E}[\varepsilon_{i,t}] = 0, \quad \mathrm{VAR}[\varepsilon_{i,t}] = \sigma^2_{\varepsilon,i}.$$

where $r_{f,t}$ is risk free rate, R_{it} and R_{mt} are the period t returns on security i and the market portfolio. We use the rate of 10-year Japanese Government Bonds yield and German Government Bonds as a risk free rate of Japanese and EU.

As the results in Table 11 to 17, using different model for normal returns the baseline results are very similar to market model. There are only exception that CAAR(0,3), CAAR(0,5) and CAAR(0,10) of Japanese Electric Machinery have significant negative impact. Although there are differences in significant level and abnormal returns, increasing and decreasing of abnormal returns on a day that is effective have nearly the same result. Thus, different normal return models yield almost identical results.
With these robustness check, again, a negative impact appeared on Event 2, and a positive value appeared in Event 6. From this, it is thought that there is an effect here.

6 Discussion

For the Japanese industries, some events affect the stock returns. However, the day which United Kingdom voted to leave the EU (Event 2) and the day the European commissioner commented that the agreement in principle "will be soon" (Event 6) clearly display significant price effects. This is especially true in the case of Event 6, where we observe significant positive return on the industries of Automobile & Foods and Machinery.

On the other hand, we observe mostly negative impacts through the events except for the EU industries. However, there are only few statistically significant impacts. Thus, we are inclined to conclude that EU industries exhibit little negative or no significant reaction to the announcement of the EPA. This result is consistent with the Benz and Yalcin's (2015) suggestion that the gains of an EU-Japan FTA will be higher for Japan compared to the EU. As we can see the results, the event which UK leaves from EU affects had a negative effect on both areas especially in the industrial industry as common parts.

In addition, it was effective impact in the Automobile industry and the Machinery industry, but it was ineffective in the Electrical Machinery industry. This may be because attention to this industry was lower than others on this announcement.

Also, when comparing Japan and the EU's Machinery industry, Japanese are positive and EU's firms are negative. This may be a not good news for EU's Industry that the Japanese firms enter the EU. However, for Automobile industries, both sides gained positive impact. The Automobile industry is the only positive for the EU's CAAR. It seems that both brand competition is expected to increase the exportation.

On the other hand, the EU Food & Beverage industry react negatively at the leader's meeting (Event 4).This is because the main discussion at this summit talks about FOOD and that discussion is retrogressive.

In fact, according to article of JETRO, $le\ monde$ reports that government and industry suggest generally successful, but also note that the EU-Japan EPA is almost unrecognized among the general public. With the result of our research, it is reasonable to consider that Japan might expect economic benefits in trade than EU because of market size and situation. Japan will have access to EU market with population of 500 million and regional GDP of 16.4 trillion dollars after the agreement. Especially for EU, they expect not only economic benefits but also stronger relationship with Japan. Hence the economic potential of the EU-Japan FTA undoubtedly makes it one of the most important trade frameworks

between developed countries.

Furthermore, this research is an effect only around the announcements, so the situation is different from other previous studies that measure the actual effect of the FTA. We can consider that the price impact in the case of EU firms may have been limited because the agreement is expected to come into force in 2 or 3 years, and not immediately. In this case, it is possible that we may observe significant price reactions just before the enforcement. Overall, based on our results, the effects of the announcement of the trade agreement may have been gradually priced in over the period of the extended and lengthy negotiations, which has spanned nearly 5 years. As such, the price effects of the key announcements about the trade agreement (especially for EU firms) may not have had as much information content as it would have, were the negotiations shorter and the key announcements unanticipated.

7 Conclusion

In this paper, we examine the impact of the announcement of EU-Japan Economic Partnership Agreement (EPA) on the stock market returns. Actually, there is not much previous literature to consider the effect around the announcements about the EU and Japan, so here we tried the research and revealed the effect as a new attempt. We conducted an event study methodology and examined daily excess return on the stock market price around the announcements. We chose the 3 industries on the Japanese market and 4 industries on the EU. This paper finds that the announcement of events leading to the EPA has an impact on Japanese stock market but these impacts do not affect the EU so much. It is considered that the effects on the stock market of the announcement of key events related to the EPA depend on the situation of market. The most visible effect of the announcement of the EPA is around the day when the last ministerial level meeting was held and European commissioner's comments that the agreement in principle "will be soon."

Future research

Future research might investigate with others models like three factor model, matching model or Stocks and Bonds model to calculate abnormal return well. Moreover, it has analyze taking into consideration the trading volume or firm revel on each firm. In addition, it might be interesting to examine all other industry and compare the effect by industry.

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Table3: Abnormal returns of Japanese Automobile

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	-0.0175***	0.0166***	-0.0061	0.0016	0.0026	0.0009	0.0007
	(-3.1824)	(3.1752)	(-1.0909)	(0.344)	(0.5751)	(0.210)	(0.1686)
-4	-0.0073	-0.0052	0.0081	-0.0012	-0.0032	-0.0007	0.0004
	(-1.3237)	(-0.9854)	(1.4576)	(-0.255)	(-0.7145)	(-0.160)	(0.0991)
-3	0.0014	-0.0024	-0.0016	-0.0059	-0.0042	0.0048	0.0092**
	(0.2484)	(-0.4515)	(-0.2941)	(-1.297)	(-0.9392)	(1.134)	(2.1913)
-2	-0.0171***	0.0094*	0.0038	-0.0018	0.0007	0.0008	-0.0045
	(-3.1247)	(1.7912)	(0.6853)	(-0.395)	(0.1506)	(0.182)	(-1.0711)
-1	0.0050	0.0111**	-0.0096*	-0.0030	-0.0053	0.0005	0.0096**
	(0.9154)	(2.1257)	(-1.7300)	(-0.655)	(-1.1817)	(0.115)	(2.2866)
0	-0.0094*	0.0045	0.0155***	-0.0002	-0.0028	0.0092**	-0.0015
	(-1.7188)	(0.8672)	(2.7967)	(-0.055)	(-0.6127)	(2.194)	(-0.3645)
1	-0.0137*	-0.0517***	-0.0157***	-0.0016	-0.0071	-0.0044	0.0172***
	(-2.4895)	(-9.8830)	(-2.8254)	(-0.343)	(-1.5785)	(-1.049)	(4.1076)
2	0.0005	-0.0263***	-0.0159***	-0.0018	0.0002	0.0096**	0.0073*
	(0.0901)	(-5.0203)	(-2.8660)	(-0.388)	(0.0388)	(2.286)	(1.7558)
3	-0.0077	-0.0001	0.0198***	0.0025	0.0007	-0.0015	-0.0038
	(-1.4059)	(-0.0208)	(3.5632)	(0.545)	(0.1532)	(-0.348)	(-0.9190)
4	0.0021	0.0004	0.0177***	-0.0033	-0.0006	0.0172***	0.0094**
	(0.3801)	(0.0764)	(3.1974)	(-0.738)	(-0.1433)	(4.102)	(2.2590)
5	0.0205***	-0.0102*	-0.0124**	0.0073	0.0049	0.0074*	-0.0021
	(3.7437)	(-1.9410)	(-2.2438)	(1.604)	(1.0883)	(1.766)	(-0.4967)
6	-0.0126 **	0.0018	-0.0071	-0.0193***	0.0009	-0.0038	-0.0096**
	(-2.2986)	(0.3381)	(-1.2809)	(-4.264)	(0.1984)	(-0.902)	(-2.3005)
7	0.0138 ***	-0.0049	0.0004	-0.0005	0.0009	0.0095**	0.0059
	(2.5099)	(-0.9291)	(0.0648)	(-0.115)	(0.2003)	(2.260)	(1.4073)
8	-0.0122 **	-0.0131**	0.0082	0.0043	0.0091**	-0.0020	-0.0017
	(-2.2181)	(-2.5122)	(1.4823)	(0.944)	(2.0173)	(-0.477)	(-0.4132)
9	-0.0116 **	0.0057	0.0019	-0.0052	-0.0038	-0.0095**	0.0024
	(-2.1065)	(1.0838)	(0.3495)	(-1.137)	(-0.8556)	(-2.272)	(0.5755)
10	-0.0151***	0.0099	0.0046	0.0023	0.0091**	0.0059	-0.0069
	(-2.7478)	(1.8837)	(0.8350)	(0.512)	(2.0218)	(1.413)	(-1.6563)
CAAR(-5,10)	-0.0808***	-0.0544**	0.0117	-0.0258	0.0019	0.0439***	0.0319*
	(-3.6820)	(-2.6005)	(0.5252)	(-1.4232)	(0.1046)	(2.6142)	(1.9074)
CAAR(-5,-1)	-0.0355	0.0296	-0.0054	-0.0102	-0.0095	0.0062	0.0154
	(-1.6167)	(1.4138)	(-0.2430)	(-0.5646)	(-0.5274)	(0.3707)	(0.9186)
CAAR(0,3)	-0.0303	-0.0735***	0.0037	-0.0011	-0.0090	0.0129	0.0191
	(-1.6656)	(-4.2383)	(0.2016)	(-0.0725)	(-0.6028)	(0.9299)	(1.3809)
CAAR(0,5)	-0.0077	-0.0833***	0.0090	0.0028	-0.0047	0.0376***	0.0265*
	(-0.4222)	(-4.8005)	(0.4891)	(0.1886)	(-0.3178)	(2.6993)	(1.9122)
CAAR(0,10)	-0.0453**	-0.0840***	0.0170	-0.0156	0.0114	0.0377***	0.0165
	(-2.4909)	(-4.8414)	(0.9265)	(-1.0354)	(0.7622)	(2.7057)	(1.1925)

Notes. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table4: Abnormal returns of EU Food & Beverage

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	0.0053	-0.0045	-0.0324	0.0010	0.0042	-0.0047	0.0041
	(0.3249)	(-0.2393)	(-1.6601)	(0.0510)	(0.1927)	(-0.2195)	(0.1921)
-4	-0.0009	-0.0098	-0.0085	0.0016	0.0049	0.0096	-0.0034
	(-0.0524)	(-0.5199)	(-0.4476)	(0.0835)	(0.2271)	(0.4472)	(-0.1558)
-3	0.0080	0.0023	-0.0010	0.0053	-0.0022	-0.0037	-0.0104
	(0.4870)	(0.1239)	(-0.0525)	(0.2773)	(-0.1013)	(-0.1697)	(-0.4808)
-2	-0.0047	0.0044	0.0017	0.0024	0.0029	-0.0059	-0.0020
	(-0.2873)	(0.2342)	(0.0898)	(0.1276)	(0.1315)	(-0.2744)	(-0.0944)
-1	-0.0003	-0.0068	0.0059	-0.0051	-0.0021	-0.0083	-0.0057
	(-0.0181)	(-0.3616)	(0.3131)	(-0.2676)	(-0.0957)	(-0.3848)	(-0.2650)
0	0.0011	-0.0028	0.0001	-0.0003	-0.0046	0.0042	-0.0021
	(0.0684)	(-0.1505)	(0.0045)	(-0.0151)	(-0.2136)	(0.1966)	(-0.0954)
1	-0.0004	0.0140	0.0016	-0.0406**	0.0006	-0.0036	-0.0036
	(-0.0259)	(0.7469)	(0.0845)	(-2.1427)	(0.0279)	(-0.1677)	(-0.1685)
2	-0.0007	-0.0168	-0.0102	-0.0132	-0.0047	-0.0104	-0.0018
	(-0.0444)	(-0.8945)	(-0.5390)	(-0.6947)	(-0.2149)	(-0.4820)	(-0.0825)
3	0.0125	0.0004	0.0038	0.0026	-0.0015	-0.0025	-0.0061
	(0.7628)	(0.0187)	(0.1981)	(0.1351)	(-0.0691)	(-0.1141)	(-0.2806)
4	0.0051	0.0030	-0.0104	-0.0056	0.0058	-0.0058	0.0045
	(0.3144)	(0.1588)	(-0.5489)	(-0.2979)	(0.2687)	(-0.2704)	(0.2087)
5	-0.0001	0.0162	0.0077	0.0030	0.0058	-0.0017	-0.0008
	(-0.0049)	(0.8643)	(0.4047)	(0.1598)	(0.2680)	(-0.0811)	(-0.0366)
6	-0.0055	0.0067	0.0084	-0.0032	0.0009	-0.0037	-0.0041
	(-0.3372)	(0.3554)	(0.4442)	(-0.1687)	(0.0410)	(-0.1732)	(-0.1903)
7	-0.0080	-0.0004	-0.0002	-0.0033	0.0045	-0.0017	-0.0005
	(-0.4918)	(-0.0217)	(-0.0110)	(-0.1719)	(0.2066)	(-0.0807)	(-0.0226)
8	-0.0030	-0.0035	-0.0046	-0.0024	0.0027	-0.0063	0.0063
	(-0.1862)	(-0.1885)	(-0.2452)	(-0.1245)	(0.1259)	(-0.2907)	(0.2918)
9	-0.0066	-0.0030	0.0034	0.0144	-0.0096	0.0045	0.0007
	(-0.4063)	(-0.1571)	(0.1811)	(0.7598)	(-0.4396)	(0.2070)	(0.0332)
10	-0.0006	0.0143	0.0038	0.0018	-0.0040	-0.0007	0.0013
	(-0.0389)	(0.7621)	(0.2025)	(0.0926)	(-0.1859)	(-0.0319)	(0.0598)
CAAR(-5,10)	0.0010	0.0137	-0.0309	-0.0416**	0.0037	-0.0408**	-0.0234
	(0.0653)	(0.6894)	(-1.5051)	(-2.0380)	(0.1612)	(-1.9492)	(-1.1280)
CAAR(-5,-1)	0.0074	-0.0143	-0.0342	0.0052	0.0077	-0.0130	-0.0173
	(0.4649)	(-0.7191)	(-1.6672)	(0.2524)	(0.3369)	(-0.6202)	(-0.8341)
CAAR(0,3)	0.0124	-0.0052	-0.0048	-0.0515***	-0.0102	-0.0122	-0.0135
	(0.9397)	(-0.3177)	(-0.2802)	(-3.0414)	(-0.5384)	(-0.7056)	(-0.7847)
CAAR(0,5)	0.0175	0.0140	-0.0075	-0.0541***	0.0015	-0.0198	-0.0098
	(1.3219)	(0.8457)	(-0.4406)	(-3.1959)	(0.0769)	(-1.1429)	(-0.5695)
CAAR(0,10)	-0.0064	0.0280*	0.0033	-0.0468***	-0.0040	-0.0278	-0.0061
	(-0.4820)	(1.6987)	(0.1954)	(-2.7624)	(-0.2119)	(-1.6028)	(-0.3544)

Notes. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table5: Abnormal returns of Japanese Electric Machinery

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	0.0010	0.0075*	-0.0048	0.0025	-0.0001	0.0014	0.0038
	(0.2341)	(1.8834)	(-0.7769)	(0.4383)	(-0.0203)	(0.2502)	(0.6658)
-4	0.0019	0.0060	0.0091	-0.0010	-0.0107*	-0.0029	0.0036
	(0.4564)	(1.4987)	(1.4640)	(-0.1705)	(-1.8603)	(-0.4997)	(0.6440)
-3	0.0015	-0.0017	-0.0045	-0.0038	-0.0013	-0.0018	-0.0049
	(0.3670)	(-0.4255)	(-0.7282)	(-0.6573)	(-0.2220)	(-0.3124)	(-0.8693)
-2	-0.0080*	-0.0038	-0.0042	0.0021	-0.0038	0.0038	-0.0012
	(-1.9269)	(-0.9413)	(-0.6740)	(0.3659)	(-0.6652)	(0.6641)	(-0.2197)
-1	0.0037	0.0019	-0.0009	-0.0007	-0.0062	0.0037	-0.0011
	(0.8921)	(0.4743)	(-0.1466)	(-0.1280)	(-1.0789)	(0.6456)	(-0.1990)
0	0.0068	-0.0141***	0.0068	0.0020	-0.0001	-0.0049	-0.0022
	(1.6300)	(-3.5322)	(1.0973)	(0.3530)	(-0.0164)	(-0.8603)	(-0.3930)
1	-0.0054	-0.0253***	-0.0062	-0.0036	0.0001	-0.0012	-0.0028
	(-1.2910)	(-6.3339)	(-0.9940)	(-0.6328)	(0.0095)	(-0.2087)	(-0.4995)
2	-0.0022	-0.0008	-0.0088	-0.0023	0.0007	-0.0011	-0.0007
	(-0.5240)	(-0.1913)	(-1.4104)	(-0.3908)	(0.1182)	(-0.2001)	(-0.1261)
3	-0.0119***	0.0104***	0.0042	0.0027	0.0014	-0.0022	-0.0033
	(-2.8487)	(2.5945)	(0.6715)	(0.4678)	(0.2513)	(-0.3844)	(-0.5743)
4	-0.0039	0.0045	0.0064	-0.0057	-0.0028	-0.0028	0.0007
	(-0.9458)	(1.1384)	(1.0347)	(-0.9802)	(-0.4899)	(-0.4939)	(0.1214)
5	0.0305***	-0.0081	-0.0100	0.0064	-0.0017	-0.0007	0.0091
	(7.3284)	(-2.0306)	(-1.6035)	(1.1101)	(-0.3019)	(-0.1164)	(1.6001)
6	-0.0059	-0.0010	0.0001	-0.0017	0.0038	-0.0032	-0.0000
	(-1.4112)	(-0.2525)	(0.0231)	(-0.2945)	(0.6685)	(-0.5671)	(-0.0024)
7	-0.0178***	-0.0062	-0.0023	0.0010	0.0038	0.0007	0.0011
	(-4.2791)	(-1.5464)	(-0.3764)	(0.1720)	(0.6556)	(0.1194)	(0.1914)
8	-0.0190***	-0.0117***	0.0042	0.0029	-0.0049	0.0091	-0.0004
	(-4.5726)	(-2.9430)	(0.6703)	(0.5012)	(-0.8515)	(1.5942)	(-0.0651)
9	-0.0313***	-0.0006	-0.0006	0.0044	-0.0011	0.0000	0.0015
	(-7.5279)	(-0.1448)	(-0.0949)	(0.7662)	(-0.1910)	(0.0076)	(0.26774)
10	-0.0144***	0.0082**	0.0015	-0.0001	-0.0012	0.0011	0.0033
	(-3.4632)	(2.0668)	(0.2355)	(-0.0246)	(-0.2021)	(0.1892)	(0.5753)
CAAR(-5,10)	-0.0747***	-0.0363**	-0.0129	0.0066	-0.0288	-0.0045	0.0021
	(-4.4858)	(-2.2770)	(-0.5189)	(0.2869)	(-1.2521)	(-0.1986)	(0.0914)
CAAR(-5,-1)	-0.0016	0.0123	-0.0070	-0.0030	-0.0249	0.0038	-0.0032
	(-0.0959)	(0.7693)	(-0.2833)	(-0.1281)	(-1.0817)	(0.1677)	(-0.1408)
CAAR(0,3)	-0.0159	-0.0528***	0.0041	-0.0047	0.0003	-0.0074	-0.0026
	(-0.9122)	(-2.7418)	(0.2047)	(-0.2947)	(0.0174)	(-0.4775)	(-0.1703)
CAAR(0,5)	0.0154	-0.0606***	0.0051	-0.0059	0.0045	-0.0079	0.0055
	(0.8866)	(-3.1455)	(0.2570)	(-0.3691)	(0.2820)	(-0.5048)	(0.3548)
CAAR(0,10)	-0.0736***	-0.0817***	0.0102	-0.0152	0.0058	0.0037	0.0085
	(-4.2267)	(-4.2409)	(0.5111)	(-0.9450)	(0.3660)	(0.2371)	(0.5530)

Notes. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table6: Abnormal returns of Japanese Machinery

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	-0.0038	0.0194***	0.0185***	-0.0000	0.0054	-0.0050	-0.0034
	(-0.8712)	(4.2845)	(4.1594)	(-0.0057)	(1.36075)	(-1.2908)	(-0.8680)
-4	0.0109***	0.0028	0.0026	0.0066	-0.0022	-0.0045	0.0041
	(2.5235)	(0.6107)	(0.5759)	(1.6701)	(-0.54205)	(-1.1600)	(1.0700)
-3	-0.0008	-0.0082*	0.0024	-0.0049	0.0037	0.0068*	0.0038
	(-0.1846)	(-1.8180)	(0.5430)	(-1.2269)	(0.93086)	(1.7656)	(0.9725)
-2	-0.0059	-0.0037	-0.0023	0.0024	0.0028	-0.0034	0.0023
	(-1.3677)	(-0.8088)	(-0.5277)	(0.6080)	(0.69425)	(-0.8664)	(0.5985)
-1	0.0132***	0.0090*	-0.0124***	-0.0043	-0.0106**	0.0042	0.0107***
	(3.0589)	(1.9901)	(-2.7899)	(-1.0773)	(-2.66439)	(1.0712)	(2.7716)
0	-0.0054	-0.0030	0.0057	-0.0041	0.0053	0.0037	0.0024
	(-1.2402)	(-0.6689)	(1.2827)	(-1.0432)	(1.34520)	(0.9652)	(0.6319)
1	-0.0128***	-0.0425***	-0.0091**	-0.0009	-0.0009	0.0023	0.0125***
	(-2.9713)	(-9.3652)	(-2.0547)	(-0.2212)	(-0.21751)	(0.6031)	(3.2465)
2	-0.0006	-0.0057	-0.0025	0.0005	0.0003	0.0107***	0.0078***
	(-0.1353)	(-1.2522)	(-0.5568)	(0.1310)	(0.07972)	(2.7538)	(2.0235)
3	-0.0010	-0.0011	0.0090 **	-0.0054	-0.0051	0.0024	-0.0076*
	(-0.2273)	(-0.2482)	(2.0297)	(-1.3506)	(-1.28082)	(0.6309)	(-1.9710)
4	0.0056	0.0089**	0.0074*	0.0009	-0.0044	0.0125***	0.0046
	(1.2895)	(1.9686)	(1.6654)	(0.2146)	(-1.10325)	(3.2332)	(1.1933)
5	0.0281***	-0.0031	-0.0111**	0.0108***	0.0071*	0.0078 **	-0.0018
	(6.5002)	(-0.6936)	(-2.5066)	(2.7109)	(1.77609)	(2.0238)	(-0.4557)
6	-0.0123***	-0.0044	-0.0044	-0.0169***	-0.0032	-0.0076**	-0.0022
	(-2.8424)	(-0.9750)	(-0.9805)	(-4.2567)	(-0.79388)	(-1.9695)	(-0.5579)
7	-0.0256***	-0.0139	0.0008	-0.0054	0.0046	0.0046	0.0044
	(-5.9300)	(-3.0733)	(0.1823)	(-1.3551)	(1.16299)	(1.1825)	(1.1285)
8	-0.0253***	-0.0120***	0.0137***	0.0053	0.0037	-0.0017	-0.0064*
	(-5.8702)	(-2.6410)	(3.0768)	(1.3273)	(0.93277)	(-0.4493)	(-1.6657)
9	-0.0024	0.0033	0.0005	0.0046	0.0029	-0.0021	0.0066*
	(-0.5449)	(0.7247)	(0.1139)	(1.1538)	(0.73789)	(-0.5488)	(1.7062)
10	-0.0192***	0.0100**	0.0082*	0.0054	0.0103**	0.0043	-0.0084**
	(-4.4374)	(2.2117)	(1.8393)	(1.3537)	(2.59550)	(1.1184)	(-2.1811)
CAAR(-5,10)	-0.0619***	-0.0299 *	0.0149	-0.0024	0.0058	0.0206	0.0204
	(-3.5852)	(-1.6479)	(0.8400)	(-0.1525)	(0.3625)	(1.3278)	(1.3210)
CAAR(-5,-1)	0.0136	0.0179	0.0029	-0.0030	-0.0057	-0.0070	0.0093
	(0.7878)	(0.9896)	(0.1647)	(-0.1911)	(-0.3591)	(-0.4526)	(0.6004)
CAAR(0,3)	-0.0283*	-0.0581 ***	0.0013	-0.0097	0.0021	0.0166	0.0149
	(-1.7059)	(-3.2959)	(0.0756)	(-0.6439)	(0.1360)	(1.1166)	(1.0044)
CAAR(0,5)	0.0114	-0.0557 ***	-0.0031	0.0055	0.0046	0.0375**	0.0179
	(0.6887)	(-3.1609)	(-0.1796)	(0.3651)	(0.3040)	(2.5221)	(1.2078)
CAAR(0,10)	-0.0846***	-0.0748***	0.0161	0.0017	0.0173	0.0350**	0.0143
	(-5.1024)	(-4.2471)	(0.9442)	(0.1130)	(1.1432)	(2.3535)	(0.9605)

Notes. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table7: Abnormal returns of EU auto

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	0.0074	0.0008	0.0057	0.0035	0.0046	0.0039	-0.0009
	(0.3118)	(0.0270)	(0.2425)	(0.1652)	(0.2217)	(0.1880)	(-0.0428)
-4	-0.0104	0.0009	0.0195	-0.0017	0.0144	0.0125	-0.0013
	(-0.4343)	(0.0308)	(0.8276)	(-0.0782)	(0.6907)	(0.6076)	(-0.0618)
-3	-0.0088	0.0039	-0.0055	-0.0052	-0.0030	-0.0050	-0.0011
	(-0.3712)	(0.1380)	(-0.2313)	(-0.2441)	(-0.1435)	(-0.2418)	(-0.0531)
-2	-0.0124	-0.0126	0.0047	-0.0055	-0.0042	-0.0011	-0.0015
	(-0.5194)	(-0.4453)	(0.2001)	(-0.2557)	(-0.2029)	(-0.0542)	(-0.0736)
-1	0.0030	-0.0075	-0.0012	0.0018	-0.0065	-0.0009	-0.0014
	(0.1266)	(-0.2634)	(-0.0524)	(0.0834)	(-0.3123)	(-0.0456)	(-0.0683)
0	-0.0103	0.0088	-0.0019	-0.0042	-0.0027	-0.0011	0.0084
	(-0.4339)	(0.3099)	(-0.0828)	(-0.1949)	(-0.1306)	(-0.0557)	(0.4106)
1	-0.0037	-0.0127	0.0042	-0.0040	-0.0055	-0.0009	0.0037
	(-0.1556)	(-0.4492)	(0.1783)	(-0.1853)	(-0.2642)	(-0.0440)	(0.1797)
2	-0.0053	-0.0138	-0.0059	0.0006	0.0037	-0.0013	-0.0069
	(-0.2248)	(-0.4871)	(-0.2518)	(0.0299)	(0.1785)	(-0.0632)	(-0.3368)
3	-0.0087	-0.0085	-0.0036	-0.0117	0.0039	0.0078	0.0147
	(-0.3648)	(-0.2995)	(-0.1547)	(-0.5499)	(0.1882)	(0.3797)	(0.7160)
4	-0.0147	-0.0318	-0.0049	0.0140	0.0125	0.0038	0.0020
	(-0.6165)	(-1.1251)	(-0.2076)	(0.6556)	(0.5980)	(0.1823)	(0.0957)
5	0.0110	-0.0091	-0.0035	0.0060	-0.0049	-0.0070	-0.0014
	(0.4604)	(-0.3205)	(-0.1509)	(0.2818)	(-0.2341)	(-0.3423)	(-0.0661)
6	0.0085	0.0270	-0.0039	-0.0017	-0.0013	0.0149	0.0144
	(0.3568)	(0.9543)	(-0.1663)	(-0.0792)	(-0.0634)	(0.7244)	(0.7014)
7	0.0030	-0.0113	0.0181	-0.0053	-0.0006	0.0019	-0.0060
	(0.1264)	(-0.3994)	(0.7679)	(-0.2460)	(-0.0299)	(0.0935)	(-0.2911)
8	-0.0029	-0.0158	-0.0025	-0.0007	-0.0011	-0.0016	0.0055
	(-0.1233)	(-0.5594)	(-0.1052)	(-0.0330)	(-0.0550)	(-0.0787)	(0.2699)
9	-0.0007	0.0100	0.0169	-0.0059	-0.0003	0.0146	0.0008
	(-0.0300)	(0.3531)	(0.7183)	(-0.2751)	(-0.0157)	(0.7096)	(0.0411)
10	0.0023	-0.0108	-0.0281	0.0050	-0.0012	-0.0068	0.0014
	(0.0957)	(-0.3812)	(-1.1938)	(0.2352)	(-0.0564)	(-0.3288)	(0.0703)
CAAR(-5,10)	-0.0428*	-0.0825***	0.0079	-0.0148	0.0077	0.0336 **	0.0305*
	(-1.8724)	(-3.2125)	(0.3969)	(-0.8572)	(0.4634)	(2.0755)	(1.9077)
CAAR(-5,-1)	-0.0211	-0.0145	0.0232	-0.0070	0.0053	0.0093	-0.0062
	(-0.9240)	(-0.5646)	(1.1586)	(-0.4090)	(0.3186)	(0.5777)	(-0.3852)
CAAR(0,3)	-0.0266	-0.0355*	-0.0062	-0.0204	-0.0014	0.0113	0.0205
	(-1.3457)	(-1.8612)	(-0.3746)	(-1.4065)	(-0.1003)	(0.8260)	(1.5132)
CAAR(0,5)	-0.0279	-0.0684***	-0.0111	-0.0018	0.0048	0.0084	0.0216
	(-1.4105)	(-3.5851)	(-0.6681)	(-0.1223)	(0.3393)	(0.6151)	(1.5926)
CAAR(0,10)	-0.0216	-0.0693***	-0.0020	-0.0064	0.0037	0.0289**	0.0334**
	(-1.0903)	(-3.6325)	(-0.1206)	(-0.4416)	(0.2657)	(2.1100)	(2.4564)

Notes. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table8: Abnormal returns of EU Machinery

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	-0.0051	-0.0074	0.0187***	0.0110***	-0.0016	-0.0018	-0.0040
	(-0.7452)	(-0.9669)	(2.6866)	(2.2296)	(-0.3448)	(-0.3809)	(-0.8563)
-4	0.0041	0.0022	0.0022	0.0072	-0.0053	0.0003	-0.0097**
	(0.5934)	(0.2905)	(0.3105)	(1.4602)	(-1.1155)	(0.0693)	(-2.0895)
-3	-0.0026	-0.0047	-0.0081	0.0028	0.0055	-0.0037	-0.0131***
	(-0.3834)	(-0.6139)	(-1.1626)	(0.5773)	(1.1661)	(-0.7790)	(-2.8028)
-2	-0.0144	-0.0140	-0.0015	0.0018	0.0063	-0.0007	-0.0019
	(-2.1047)	(-1.8435)	(-0.2195)	(0.3575)	(1.3213)	(-0.1460)	(-0.4178)
-1	-0.0067	-0.0043	-0.0011	-0.0001	-0.0047	-0.0037	0.0035
	(-0.9706)	(-0.5693)	(-0.1550)	(-0.0197)	(-0.9957)	(-0.7876)	(0.7460)
0	0.0058	-0.0006	-0.0012	0.0086	0.0036	-0.0107**	-0.0047
	(0.8477)	(-0.0777)	(-0.1706)	(1.7432)	(0.7595)	(-2.2699)	(-1.0069)
1	-0.0050	-0.0085	-0.0031	-0.0009	0.0089*	-0.0133***	0.0045
	(-0.7235)	(-1.1097)	(-0.4495)	(-0.1799)	(1.8704)	(-2.8276)	(0.9635)
2	0.0005	0.0008	-0.0015	-0.0003	0.0061	-0.0007	0.0054
	(0.0771)	(0.1023)	(-0.2204)	(-0.0672)	(1.2768)	(-0.1423)	(1.1651)
3	0.0029	-0.0032	-0.0023	0.0027	-0.0038	0.0013	-0.0002
	(0.4275)	(-0.4147)	(-0.3322)	(0.5540)	(-0.7898)	(0.2809)	(-0.0450)
4	-0.0093	-0.0057	-0.0041	0.0005	0.0011	-0.0031	-0.0023
	(-1.3525)	(-0.7441)	(-0.5859)	(0.0961)	(0.2248)	(-0.6612)	(-0.4849)
5	-0.0015	-0.0041	0.0032	0.0053	-0.0024	0.0049	0.0013
	(-0.2140)	(-0.5358)	(0.4665)	(1.0849)	(-0.5086)	(1.0489)	(0.2801)
6	-0.0029	-0.0074	-0.0024	-0.0027	-0.0019	0.0037	0.0009
	(-0.4215)	(-0.9777)	(-0.3513)	(-0.5425)	(-0.4061)	(0.7877)	(0.1871)
7	-0.0020	-0.0047	-0.0031	-0.0034	-0.0032	-0.0008	0.0063
	(-0.2949)	(-0.6203)	(-0.4431)	(-0.6818)	(-0.6762)	(-0.1664)	(1.3612)
8	-0.0058	-0.0052	-0.0052	-0.0010	-0.0117**	-0.0007	0.0043
	(-0.8417)	(-0.6833)	(-0.7512)	(-0.2036)	(-2.4718)	(-0.1491)	(0.9202)
9	0.0065	0.0056	-0.0001	-0.0021	-0.0106**	0.0037	-0.0028
	(0.9474)	(0.7317)	(-0.0091)	(-0.4164)	(-2.2296)	(0.7962)	(-0.5935)
10	-0.0086	-0.0035	-0.0193***	-0.0016	-0.0007	-0.0018	0.0062
	(-1.2534)	(-0.4531)	(-2.7675)	(-0.3217)	(-0.1470)	(-0.3815)	(1.3281)
CAAR (-5,10)	-0.0440	-0.0646**	-0.0289	0.0279	-0.0146	-0.0269	-0.0063
	(-1.6031)	(-2.1215)	(-1.0387)	(1.4176)	(-0.7666)	(-1.4272)	(-0.3363)
CAAR (-5,-1)	-0.0248	-0.0282	0.0102	0.0227	0.0001	-0.0095	-0.0253
	(-0.9026)	(-0.9258)	(0.3650)	(1.1513)	(0.0079)	(-0.5061)	(-1.3551)
CAAR (0,3)	0.0059	-0.0127	-0.0126	0.0124	0.0157	-0.0215	0.0065
	(0.2249)	(-0.4360)	(-0.4742)	(0.6714)	(0.8828)	(-1.2172)	(0.3745)
CAAR (0,5)	-0.0055	-0.0230	-0.0107	0.0188	0.0139	-0.0171	0.0026
	(-0.2112)	(-0.7912)	(-0.4051)	(1.0138)	(0.7793)	(-0.9659)	(0.1506)
CAAR (0,10)	-0.0110	-0.0321	-0.0480*	0.0106	-0.0123	-0.0137	0.0187
	(-0.4241)	(-1.1069)	(-1.8119)	(0.5732)	(-0.6920)	(-0.7774)	(1.0730)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table9: Abnormal returns of EU Chemical

AAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
-5	0.0042	0.0037	0.0133	0.0027	0.0135	0.0015	-0.0008
	(0.4621)	(0.3753)	(1.5186)	(0.3187)	(1.6067)	(0.1834)	(-0.0948)
-4	-0.0003	-0.0013	-0.0012	-0.0012	0.0069	-0.0085	-0.0072
	(-0.0326)	(-0.1343)	(-0.1349)	(-0.1476)	(0.8214)	(-1.0190)	(-0.8655)
-3	0.0013	0.0019	-0.0039	0.0029	-0.0007	-0.0054	0.0008
	(0.1434)	(0.1915)	(-0.4455)	(0.3468)	(-0.0860)	(-0.6393)	(0.0977)
-2	-0.0048	-0.0064	0.0015	-0.0015	0.0022	-0.0041	0.0018
	(-0.5240)	(-0.6512)	(0.1769)	(-0.1755)	(0.2576)	(-0.4865)	(0.2184)
-1	-0.0033	-0.0037	0.0042	0.0006	-0.0053	-0.0009	0.0070
	(-0.3567)	(-0.3778)	(0.4823)	(0.0761)	(-0.6355)	(-0.1103)	(0.8323)
0	-0.0028	-0.0035	-0.0070	0.0012	0.0027	-0.0073	-0.0010
	(-0.3049)	(-0.3558)	(-0.8058)	(0.1426)	(0.3191)	(-0.8663)	(-0.1185)
1	0.0050	0.0053	-0.0045	0.0058	0.0060	0.0006	-0.0043
	(0.5469)	(0.5380)	(-0.5190)	(0.6856)	(0.7142)	(0.0723)	(-0.5100)
2	-0.0010	-0.0021	0.0020	-0.0045	0.0009	0.0018	-0.0047
	(-0.1121)	(-0.2142)	(0.2231)	(-0.5380)	(0.1120)	(0.2097)	(-0.5642)
3	-0.0011	-0.0002	-0.0094	-0.0075	0.0010	0.0071	-0.0026
	(-0.1180)	(-0.0174)	(-1.0727)	(-0.8866)	(0.1195)	(0.8457)	(-0.3158)
4	-0.0006	0.0018	-0.0032	0.0073	-0.0082	-0.0011	0.0024
	(-0.0653)	(0.1812)	(-0.3606)	(0.8709)	(-0.9767)	(-0.1255)	(0.2828)
5	0.0046	0.0025	-0.0030	0.0092	-0.0059	-0.0043	0.0051
	(0.5025)	(0.2598)	(-0.3383)	(1.0941)	(-0.6983)	(-0.5080)	(0.6052)
6	0.0032	0.0008	-0.0001	-0.0045	-0.0045	-0.0048	-0.0032
	(0.3498)	(0.0843)	(-0.0086)	(-0.5321)	(-0.5369)	(-0.5764)	(-0.3869)
7	-0.0018	-0.0051	-0.0004	-0.0047	-0.0003	-0.0027	0.0061
	(-0.3918)	(-0.3412)	(-0.6890)	(-0.0150)	(-0.8697)	(0.2861)	(0.9398)
8	-0.0036	-0.0033	-0.0060	-0.0001	-0.0073	0.0024	0.0079
	(-0.3918)	(-0.3412)	(-0.6890)	(-0.0150)	(-0.8697)	(0.2861)	(0.9398)
9	-0.0026	-0.0023	0.0069	0.0114	0.0014	0.0050	0.0001
	(-0.2837)	(-0.2324)	(0.7897)	(1.3597)	(0.1616)	(0.5901)	(0.0089)
10	-0.0027	0.0008	-0.0103	0.0062	0.0008	-0.0030	-0.0054
	(-0.2981)	(0.0786)	(-1.1729)	(0.7374)	(0.0920)	(-0.3627)	(-0.6439)
CAAR (-5,10)	-0.0062	-0.0111	-0.0210	0.0234	0.0031	-0.0237	0.0018
	(-0.1690)	(-0.2837)	(-0.5985)	(0.6930)	(0.0911)	(-0.7036)	(0.0539)
CAAR (-5,-1)	-0.0028	-0.0058	0.0140	0.0035	0.0165	-0.0174	0.0016
	(-0.0767)	(-0.1488)	(0.3980)	(0.1042)	(0.4892)	(-0.5160)	(0.0469)
CAAR (0,3)	0.0032	-0.0031	-0.0116	-0.0025	0.0149	-0.0087	-0.0087
	(0.0095)	(0.0038)	(-1.4323)	(-0.4686)	(0.6369)	(0.5408)	(-1.1375)
CAAR (0,5)	0.0091	0.0009	-0.0171	0.0124	0.0081	-0.0172	-0.0060
	(0.0754)	(0.1127)	(-1.6686)	(0.9902)	(-0.5236)	(-0.0034)	(-0.0064)
CAAR (0,10)	-0.0120	-0.0196	-0.0210**	0.0133**	-0.0113	-0.0194	-0.0042
	(-0.2292)	(-0.3216)	(-2.4841)	(2.0686)	(-1.2114)	(0.2346)	(0.3131)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively. Event 1; decided to launch negotiations, Event2; UK votes to leave the EU, Event 3; Ministerial level meeting, Event 4; leaders' meeting, Event 5; Japan's leader said "as early as possible", Event 6; EU commissioner said "will be soon", Event 7; newspaper repots that "will be held."

Table10: Patell test of CAAR

CAAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
Japanese Automobile							
CAAR(-5,10)	-0.0808	-0.0544	0.0117	-0.0258	0.0019	0.0439	0.0319
t-test	(-3.6820)***	(-2.6005)**	(0.5252)	(-1.4232)	(0.1046)	(2.6142) ***	(1.9074)*
Patell test	(-3.4563)***	(-3.3091)***	(0.5511)	(-1.1119)	(0.3218)	(2.5648)**	(1.8972)*
CAAR(-5,-1)	-0.0355	0.0296	-0.0054	-0.0102	-0.0095	0.0062	0.0154
t-test	(-1.6167)	(1.4138)	(-0.2430)	(-0.5646)	(-0.5274)	(0.3707)	(0.9186)
Patell test	(-1.5559)	(1.5040)	(-0.0339)	(-0.4735)	(-0.4516)	(0.3555)	(1.0664)
CAAR(0,3)	-0.0303	-0.0735	0.0037	-0.0011	-0.0090	0.0129	0.0191
t-test	(-1.6656)	(-4.2383) ***	(0.2016)	(-0.0725)	(-0.6028)	(0.9299)	(1.3809)
Patell test	(-1.1704)	(-2.4661)**	(0.0710)	(-0.4321)	(-0.4226)	(0.7648)	(1.3048)
CAAR(0,5)	-0.0077	-0.0833	0.0090	0.0028	-0.0047	0.0376	0.0265
t-test	(-0.4222)	(-4.8005)***	(0.4891)	(0.1886)	(-0.3178)	(2.6993)***	(1.9122)*
Patell test	(-0.1621)	(-2.7869)***	(0.1353)	(-0.1099)	(-0.1868)	(1.9220)*	(1.6866)
CAAR(0,10)	-0.0453	-0.0840	0.0170	-0.0156	0.0114	0.0377	0.0165
t-test	(-2.4909)**	(-4.8414)***	(0.9265)	(-1.0354)	(0.7622)	(2.7057) ***	(1.1925)
Patell test	(-1.3496)	(-2.5749)**	(0.4404)	(-1.1392)	(0.5618)	(2.4121)**	(1.3116)
EU Food							
CAAR(-5,10)	0.0010	0.0137	-0.0309	-0.0416	0.0037	-0.0408	-0.0234
t-test	(0.0653)	(0.6894)	(-1.5051)	(-2.0380)**	(0.1612)**	(-1.9492)	(-1.1280)
Patell test	(0.6537)	(0.6465)	(-1.7803)	(-2.2087)**	(-0.3309)	(-3.1046)***	(-1.6857)
CAAR(-5,-1)	0.0074	-0.0143	-0.0342	0.0052	0.0077	-0.0130	-0.0173
t-test	(0.4649)	(-0.7191)	(-1.6672)	(0.2524)	(0.3369)	(-0.6202)	(-0.8341)
Patell test	(0.9922)	(-1.3206)	(-1.8200)*	(0.1375)	(0.3908)	(-0.9061)	(-1.5812)
CAAR(0,3)	0.0124	-0.0052	-0.0048	-0.0515	-0.0102	-0.0122	-0.0135
t-test	(0.9397)	(-0.3177)	(-0.2802)	(-3.0414)***	(-0.5384)	(-0.7056)	(-0.7847)
Patell test	(0.6221)	(0.0650)	(-0.5329)	(-1.6946)*	(-0.1805)	(-0.7628)	(-0.6830)
CAAR(0,5)	0.0175	0.0140	-0.0075	-0.0541	0.0015	-0.0198	-0.0098
t-test	(1.3219)	(0.8457)	(-0.4406)	(-3.1959)***	(0.0769)	(-1.1429)	(-0.5695)
Patell test	(0.7130)	(0.9149)	(-0.6209)	(-1.7957)*	(0.3296)	(-1.1463)	(-0.4403)
CAAR(0,10)	-0.0064	0.0280	0.0033	-0.0468	-0.0040	-0.0278	-0.0061
t-test	(-0.4820)	(1.6987) *	(0.1954)	(-2.7624)***	(-0.2119)	(-1.6028)	(-0.3544)
Patell test	(-0.3619)	(1.5715)	(-0.2313)	(-1.4544)	(-0.1014)	(-1.5499)	(-0.1584)

$Notes$. The table shows the result of test of cross-sectional test and Patell test. In this table, we regard t-test as cross-sectional test. Figures in brackets are test value based on the t-test and Patell test. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

CAAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
Japanese Electrical Machinery							
CAAR(-5,10)	-0.0747	-0.0363	-0.0129	0.0066	-0.0288	-0.0045	0.0021
t-test	(-4.4858)***	(-2.2770) **	(-0.5189)	(0.2869)	(-1.2521)	(-0.1986)	(0.0914)
Patell test	(-5.7893)***	(-2.2495)**	(-0.4053)	(1.2021)	(-1.5753)	(-0.2372)	(0.7791)
CAAR(-5,-1)	-0.0016	0.0123	-0.0070	-0.0030	-0.0249	0.0038	-0.0032
t-test	(-0.0959)	(0.7693)	(-0.2833)	(-0.1281)	(-1.0817)	(0.1677)	(-0.1408)
Patell test	(-0.2182)	(1.1875)	(-0.1501)	(-0.2690)	(-1.7572)*	(0.2003)	(-0.3596)
CAAR(0,3)	-0.0159	-0.0528	0.0041	-0.0047	0.0003	-0.0074	-0.0026
t-test	(-0.9122)	(-2.7418) ***	(0.2047)	(-0.2947)	(0.0174)	(-0.4775)	(-0.1703)
Patell test	(-0.6002)	(-1.7871) *	(-0.1671)	(-0.1750)	(-0.0286)	(-0.4394)	(-0.1998)
CAAR(0,5)	0.0154	-0.0606	0.0051	-0.0059	0.0045	-0.0079	0.0055
t-test	(0.8866)	(-3.1455) ***	(0.2570)	(-0.3691)	(0.2820)	(-0.5048)	(0.3548)
Patell test	(0.5850)	(-1.7353)*	(-0.1269)	(-0.1287)	(0.1194)	(-0.4811)	(0.0779)
CAAR(0,10)	-0.0736	-0.0817	0.0102	-0.0152	0.0058	0.0037	0.0085
t-test	(-4.2267)***	(-4.2409) ***	(0.5111)	(-0.9450)	(0.3660)	(0.2371)	(0.5530)
Patell test	(-3.0103)***	(-1.9822)**	(0.2300)	(-0.6181)	(0.0234)	(-0.0516)	(0.2502)
Japanese Machinery							
CAAR(-5,10)	-0.0619	-0.0299	0.0149	-0.0024	0.0058	0.0206	0.0204
t-test	(-3.5852) ***	(-1.6479) *	(0.8400)	(-0.1525)	(0.3625)	(1.3278)	(1.3210)
Patell test	(-3.0255)***	(-1.2037)	(0.7649)	(0.2022)	(1.5209)	(2.2182)**	(2.2382)**
CAAR(-5,-1)	0.0136	0.0179	0.0029	-0.0030	-0.0057	-0.0070	0.0093
t-test	(0.7878)	(0.9896)	(0.1647)	(-0.1911)	(-0.3591)	(-0.4526)	(0.6004)
Patell test	(1.2842)	(1.1699)	(-0.0545)	(0.2851)	(0.2103)	(-0.5223)	(1.2642)
CAAR(0,3)	-0.0283	-0.0581	0.0013	-0.0097	0.0021	0.0166	0.0149
t-test	(-1.7059) *	(-3.2959) ***	(0.0756)	(-0.6439)	(0.1360)	(1.1166)	(1.0044)
Patell test	(-0.7855)	(-1.5224)	(-0.2222)	(-0.4564)	(0.0272)	(0.6795)	(0.7013)
CAAR(0,5)	0.0114	-0.0557	-0.0031	0.0055	0.0046	0.0375	0.0179
t-test	(0.6887)	(-3.1609) ***	(-0.1796)	(0.3651)	(0.3040)	(2.5221) **	(1.2078)
Patell test	(-0.1895)	(-1.4988)	(-0.5402)	(-0.4017)	(-0.0230)	(1.7642) *	(0.9433)
CAAR(0,10)	-0.0846	-0.0748	0.0161	0.0017	0.0173	0.0350	0.0143
t-test	(-5.1024) ***	(-4.2471) ***	(0.9442)	(0.1130)	(1.1432)	(2.3535) **	(0.9605)
Patell test	(-3.1822)***	(-2.0360)**	(0.1869)	(0.1359)	(0.5501)	(1.5025)	(0.6136)

$Notes$. The table shows the result of test of cross-sectional test and Patell test. In this table, we regard t-test as cross-sectional test. Figures in brackets are test value based on the t-test and Patell test. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

CAAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
EU Automobile							
CAAR(-5,10)	-0.0428	-0.0825	0.0079	-0.0148	0.0077	0.0336	0.0305
t-test	(-1.8724) *	(-3.2125) ***	(0.3969)	(-0.8572)	(0.4634)	(2.0755)**	(1.9077)*
Patell test	(-2.5996)***	(-4.8099)***	(1.1393)	(-1.1804)	(0.2454)	(2.3363)**	(1.8286)*
CAAR(-5,-1)	-0.0211	-0.0145	0.0232	-0.0070	0.0053	0.0093	-0.0062
t-test	(-0.9240)	(-0.5646)	(1.1586)	(-0.4090)	(0.3186)	(0.5777)	(-0.3852)
Patell test	(-0.9999)	(-0.8419)	(1.6718)	(-0.7356)	(0.3780)	(0.5365)	(-0.6690)
CAAR(0,3)	-0.0266	-0.0355	-0.0062	-0.0204	-0.0014	0.0113	0.0205
t-test	(-1.3457)	(-1.8612) *	(-0.3746)	(-1.4065)	(-0.1003)	(0.8260)	(1.5132)
Patell test	(-0.9453)	(-1.6972)*	(-0.3151)	(-1.2168)	(-0.1048)	(0.4549)	(1.1910)
CAAR(0,5)	-0.0279	-0.0684	-0.0111	-0.0018	0.0048	0.0084	0.0216
t-test	(-1.4105)	(-3.5851) ***	(-0.6681)	(-0.1223)	(0.3393)	(0.6151)	(1.5926)
Patell test	(-0.6696)	(-1.9350)**	(-0.6919)	(-0.3979)	(0.2137)	(1.2405)	(2.0288)**
CAAR(0,10)	-0.0216	-0.0693	-0.0020	-0.0064	0.0037	0.0289	0.0334
t-test	(-1.0903)	(-3.6325) ***	(-0.1206)	(-0.4416)	(0.2657)	(2.1100) **	(2.4564)**
Patell test	(-0.6884)	(-2.5865)***	(-0.3310)	(-0.5631)	(0.3035)	(1.6133)	(2.0197)**
EU Machinery							
CAAR (-5,10)	-0.0440	-0.0646	-0.0289	0.0279	-0.0146	-0.0269	-0.0063
t-test	(-1.6031)	(-2.1215) **	(-1.0387)	(1.4176)	(-0.7666)	(-1.4272)	(-0.3363)
Patell test	(-1.1188)	(-3.6536)***	(-1.2893)	(2.1294)**	(-1.1559)	(-1.8880)*	(-0.3912)
CAAR (-5,-1)	-0.0248	-0.0282	0.0102	0.0227	0.0001	-0.0095	-0.0253
t-test	(-0.9026)	(-0.9258)	(0.3650)	(1.1513)	(0.0079)	(-0.5061)	(-1.3551)
Patell test	(-0.9685)	(-1.3992)	(0.1390)	(1.3996)	(-0.0969)	(-1.5554)	(-2.0026)**
CAAR (0,3)	0.0059	-0.0127	-0.0126	0.0124	0.0157	-0.0215	0.0065
t-test	(0.2249)	(-0.4360)	(-0.4742)	(0.6714)	(0.8828)	(-1.2172)	(0.3745)
Patell test	(0.4220)	(-0.3566)	(-0.4421)	(0.4392)	(0.7193)	(-0.8901)	(0.1490)
CAAR (0,5)	-0.0055	-0.0230	-0.0107	0.0188	0.0139	-0.0171	0.0026
t-test	(-0.2112)	(-0.7912)	(-0.4051)	(1.0138)	(0.7793)	(-0.9659)	(0.1506)
Patell test	(-0.0043)	(-0.6759)	(-0.5138)	(0.6740)	(0.5966)	(-0.7774)	(0.0580)
CAAR (0,10)	-0.0110	-0.0321	-0.0480	0.0106	-0.0123	-0.0137	0.0187
t-test	(-0.4241)	(-1.1069)	(-1.8119)*	(0.5732)	(-0.6920)	(-0.7774)	(1.0730)
Patell test	(-0.1523)	(-0.9869)	(-1.4915)	(0.4048)	(-0.4986)	(-0.6722)	(0.6459)

$Notes$. The table shows the result of test of cross-sectional test and Patell test. In this table, we regard t-test as cross-sectional test. Figures in brackets are test value based on the t-test and Patell test. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

CAAR	Event1	Event2	Event3	Event4	Event5	Event6	Event7
EU Chemical							
CAAR (-5,10)	-0.0062	-0.0111	-0.0210	0.0234	0.0031	-0.0237	0.0018
t-test	(-0.1690)	(-0.2837)	(-0.5985)	(0.6930)	(0.0911)	(-0.7036)	(0.0539)
Patell test	(-0.8309)	(-0.5928)	(-0.8994)	(1.3071)	(0.3467)	(-2.0715)	(0.5851)
CAAR (-5,-1)	-0.0028	-0.0058	0.0140	0.0035	0.0165	-0.0174	0.0016
t-test	(-0.0767)	(-0.1488)	(0.3980)	(0.1042)	(0.4892)	(-0.5160)	(0.0469)
Patell test	(-0.6163)	(-0.5451)	(1.0571)	(0.2350)	(1.4255)	(-1.7602)	(0.0408)
CAAR (0,3)	0.0032	-0.0031	-0.0116	-0.0025	0.0149	-0.0087	-0.0087
t-test	(0.0095)	(0.0038)	(-1.4323)	(-0.4686)	(0.6369)	(0.5408)	(-1.1375)
Patell test	(-0.4902)	(-0.1923)	(-1.3472)	(-0.3825)	(0.6204)	(0.3321)	(-0.9079)
CAAR (0,5)	0.0091	0.0009	-0.0171	0.0124	0.0081	-0.0172	-0.0060
t-test	(0.0754)	(0.1127)	(-1.6686)	(0.9902)	(-0.5236)	(-0.0034)	(-0.0064)
Patell test	(-0.4838)	(0.1559)	(-1.7318)*	(0.9000)	(-0.3848)	(-0.1143)	(-0.0353)
CAAR (0,10)	-0.0120	-0.0196	-0.0210	0.0133	-0.0113	-0.0194	-0.0042
t-test	(-0.2292)	(-0.3216)	(-2.4841)**	(2.0686)**	(-1.2114)	(0.2346)	(0.3131)
Patell test	(-1.0183)	(-0.4303)	(-2.4975)**	(1.8280)*	(-1.0819)	(0.0690)	(0.3616)

$Notes$. The table shows the result of test of cross-sectional test and Patell test. In this table, we regard t-test as cross-sectional test. Figures in brackets are test value based on the t-test and Patell test. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table11: abnormal returns of Japanese Automobile by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR(-5,10)	-0.0587***	-0.0523***	0.0314	-0.0239	-0.0222	0.0470***	0.0401**
	(-2.6504)	(-2.6118)	(1.4393)	(-1.0903)	(-1.1773)	(2.8145)	(2.4223)
CAAR(-5,-1)	-0.0351	0.0427**	0.0082	0.0068	-0.0050	0.0058	0.0170
	(-1.5847)	(2.1323)	(0.3752)	(0.3081)	(-0.2671)	(0.3493)	(1.0279)
CAAR(0,3)	-0.0678***	-0.0366**	0.0213	-0.0106	-0.0089	0.0197	0.0400**
	(-2.6257)	(-2.1053)	(-0.0803)	(-0.2720)	(-0.5006)	(1.1771)	(2.5478)
CAAR(0,5)	-0.0539**	-0.0445**	0.0197	-0.0170	-0.0216	0.0488 ***	0.0470***
	(-2.4316)	(-2.2232)	(0.9057)	(-0.7761)	(-1.1470)	(2.9242)	(2.8370)
CAAR(0,10)	-0.0598***	-0.0643***	0.0311	-0.0188	-0.0170	0.0488***	0.0443***
	(-2.7002)	(-3.2102)	(1.4293)	(-0.8586)	(-0.9046)	(2.9249)	(2.6758)
Maket model							
CAAR(-5,10)	-0.0808***	-0.0544**	0.0117	-0.0258	0.0019	0.0439***	0.0319*
	(-3.6820)	(-2.6005)	(0.5252)	(-1.4232)	(0.1046)	(2.6142)	(1.9074)
CAAR(-5,-1)	-0.0355	0.0296	-0.0054	-0.0102	-0.0095	0.0062	0.0154
	(-1.6167)	(1.4138)	(-0.2430)	(-0.5646)	(-0.5274)	(0.3707)	(0.9186)
CAAR(0,3)	-0.0303	-0.0735***	0.0037	-0.0011	-0.0090	0.0129	0.0191
	(-1.6656)	(-4.2383)	(0.2016)	(-0.0725)	(-0.6028)	(0.9299)	(1.3809)
CAAR(0,5)	-0.0077	-0.0833***	0.0090	0.0028	-0.0047	0.0376***	0.0265*
	(-0.4222)	(-4.8005)	(0.4891)	(0.1886)	(-0.3178)	(2.6993)	(1.9122)
CAAR(0,10)	-0.0453**	-0.0840***	0.0170	-0.0156	0.0114	0.0377***	0.0165
	(-2.4909)	(-4.8414)	(0.9265)	(-1.0354)	(0.7622)	(2.7057)	(1.1925)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table12: abnormal returns of EU Food & Beverage by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR(-5,10)	0.0024	0.0177	-0.0209	-0.0169*	0.0059*	-0.0258*	-0.0166
	(0.0599)	(0.9894)	(-1.3051)	(-1.9220)	(0.1298)	(-1.7921)	(-1.0381)
CAAR(-5,-1)	0.0011	-0.0145	-0.0232	0.0053	0.0070	-0.0290	-0.0193
	(0.1697)	(-0.6875)	(-1.5286)	(0.2034)	(0.3113)	(-0.7456)	(-0.7011)
CAAR(0,3)	0.0054	-0.0092	-0.0108	-0.0419***	-0.0092	-0.0151	-0.0112
	(0.8415)	(-0.2887)	(-0.4014)	(-2.9461)	(-0.4681)	(-0.6175)	(-0.5479)
CAAR(0,5)	0.0155	0.0126	-0.0032	-0.0493***	0.0022	-0.0125	-0.0101
	(1.2397)	(-0.4145)	(-0.1723)	(-2.8813)	(-0.8434)	(-0.9092)	(-0.8437)
CAAR(0,10)	-0.0034	0.0237	0.0023	-0.0442	-0.0106	-0.0378	-0.091
	(-0.6202)	(1.398)	(0.1542)	(-2.453)	(-0.187)	(-1.443)	(-0.7544)
Market model							
CAAR(-5,10)	0.0010	0.0137	-0.0309	-0.0416**	0.0037	-0.0408**	-0.0234
	(0.0653)	(0.6894)	(-1.5051)	(-2.0380)	(0.1612)	(-1.9492)	(-1.1280)
CAAR(-5,-1)	0.0074	-0.0143	-0.0342	0.0052	0.0077	-0.0130	-0.0173
	(0.4649)	(-0.7191)	(-1.6672)	(0.2524)	(0.3369)	(-0.6202)	(-0.8341)
CAAR(0,3)	0.0124	-0.0052	-0.0048	-0.0515***	-0.0102	-0.0122	-0.0135
	(0.9397)	(-0.3177)	(-0.2802)	(-3.0414)	(-0.5384)	(-0.7056)	(-0.7847)
CAAR(0,5)	0.0175	0.0140	-0.0075	-0.0541***	0.0015	-0.0198	-0.0098
	(1.3219)	(0.8457)	(-0.4406)	(-3.1959)	(0.0769)	(-1.1429)	(-0.5695)
CAAR(0,10)	-0.0064	0.0280*	0.0033	-0.0468***	-0.0040	-0.0278	-0.0061
	(-0.4820)	(1.6987)	(0.1954)	(-2.7624)	(-0.2119)	(-1.6028)	(-0.3544)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table13: abnormal returns of Japanese Machinery by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR(-5,10)	0.0447**	-0.0388*	0.0130	-0.0102	-0.0044	0.0258	0.0187
	(2.0453)	(-1.6959)	(0.2456)	(-0.1956)	(-0.0836)	(1.2072)	(0.3595)
CAAR(-5,-1)	0.0240	0.0187	0.0032	-0.0096	0.0021	-0.0110	0.0083
	(1.0953)	(0.8156)	(0.0612)	(-0.1841)	(0.0406)	(-0.2113)	(0.1595)
CAAR(0,3)	0.0024	-0.0385**	-0.0002	-0.0084	-0.0051	0.0188	0.0103
	(0.1472)	(-2.2294)	(-0.0043)	(-0.2135)	(-0.1304)	(1.2504)	(0.2632)
CAAR(0,5)	0.0102	-0.0348**	0.0011	-0.0054	0.0036	0.0360**	0.0098
	(0.6202)	(-2.0159)	(0.0269)	(-0.1386)	(0.0924)	(2.0628)	(0.2505)
CAAR(0,10)	0.0057	-0.0370**	0.0205	-0.0101	0.0129	0.0323**	0.0060
	(0.3493)	(-2.1434)	(0.5167)	(-0.2585)	(0.3273)	(1.9672)	(0.1523)
Market model							
CAAR(-5,10)	-0.0619***	-0.0299 *	0.0149	-0.0024	0.0058	0.0206	0.0204
	(-3.5852)	(-1.6479)	(0.8400)	(-0.1525)	(0.3625)	(1.3278)	(1.3210)
CAAR(-5,-1)	0.0136	0.0179	0.0029	-0.0030	-0.0057	-0.0070	0.0093
	(0.7878)	(0.9896)	(0.1647)	(-0.1911)	(-0.3591)	(-0.4526)	(0.6004)
CAAR(0,3)	-0.0283*	-0.0581 ***	0.0013	-0.0097	0.0021	0.0166	0.0149
	(-1.7059)	(-3.2959)	(0.0756)	(-0.6439)	(0.1360)	(1.1166)	(1.0044)
CAAR(0,5)	0.0114	-0.0557 ***	-0.0031	0.0055	0.0046	0.0375**	0.0179
	(0.6887)	(-3.1609)	(-0.1796)	(0.3651)	(0.3040)	(2.5221)	(1.2078)
CAAR(0,10)	-0.0846***	-0.0748***	0.0161	0.0017	0.0173	0.0350**	0.0143
	(-5.1024)	(-4.2471)	(0.9442)	(0.1130)	(1.1432)	(2.3535)	(0.9605)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table14: abnormal returns of Japanese Electric Machinery by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR(-5,10)	-0.0357 **	-0.0398*	0.0308	-0.0074	-0.0298	-0.0057	0.0080
	(-2.5176)	(-1.9780)	(0.6893)	(-0.4757)	(-0.6089)	(0.2023)	(-0.3053)
CAAR(-5,-1)	-0.0119	0.0135	0.0173	-0.0103	-0.0127	0.0039	-0.0046
	(-0.2481)	(0.9854)	(1.2246)	(-0.3438)	(-1.4277)	(-0.2994)	(0.5246)
CAAR(0,3)	-0.0003	-0.0435 **	0.0080	-0.0432 ***	-0.0139	0.0019	-0.0124
	(-0.0148)	(-2.1822)	(0.3930)	(-2.4878)	(-0.7288)	(0.1026)	(-0.6938)
CAAR(0,5)	0.0084	-0.0424 **	0.0085	-0.0470 ***	-0.0048	0.0005	-0.0086
	(0.4424)	(-2.1280)	(0.4158)	(-2.7109)	(-0.2509)	(0.0282)	(-0.4824)
CAAR(0,10)	-0.0540 **	-0.0404**	0.0274	-0.0495 ***	0.0205	-0.0022	-0.0118
	(-2.2672)	(-2.0268)	(1.3490)	(-2.8542)	(1.0768)	(-0.1176)	(-0.6601)
Maket model							
CAAR(-5,10)	-0.0747***	-0.0363**	-0.0129	0.0066	-0.0288	-0.0045	0.0021
	(-4.4858)	(-2.2770)	(-0.5189)	(0.2869)	(-1.2521)	(-0.1986)	(0.0914)
CAAR(-5,-1)	-0.0016	0.0123	-0.0070	-0.0030	-0.0249	0.0038	-0.0032
	(-0.0959)	(0.7693)	(-0.2833)	(-0.1281)	(-1.0817)	(0.1677)	(-0.1408)
CAAR(0,3)	-0.0159	-0.0528***	0.0041	-0.0047	0.0003	-0.0074	-0.0026
	(-0.9122)	(-2.7418)	(0.2047)	(-0.2947)	(0.0174)	(-0.4775)	(-0.1703)
CAAR(0,5)	0.0154	-0.0606***	0.0051	-0.0059	0.0045	-0.0079	0.0055
	(0.8866)	(-3.1455)	(0.2570)	(-0.3691)	(0.2820)	(-0.5048)	(0.3548)
CAAR(0,10)	-0.0736***	-0.0817***	0.0102	-0.0152	0.0058	0.0037	0.0085
	(-4.2267)	(-4.2409)	(0.5111)	(-0.9450)	(0.3660)	(0.2371)	(0.5530)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table15: abnormal returns of EU Automobile & Parts by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR(-5,10)	-0.0384	-0.1035 ***	0.0226	-0.0141	0.0105	0.0247	0.0153
	(-1.4334)	(-3.4090)	(0.6480)	(-1.0021)	(0.5605)	(1.2758)	(0.8515)
CAAR(-5,-1)	-0.0254	-0.0114	0.0304	0.0035	0.0058	0.0096	-0.0128
	(-1.2012)	(-0.3753)	(1.1065)	(0.1695)	(0.2995)	(0.6088)	(-0.2437)
CAAR(0,3)	0.0059	-0.0327	-0.0126	0.0124	0.0157	-0.0215	0.0065
	(0.2249)	(-1.4360)	(-0.4742)	(0.6714)	(0.8828)	(-1.2172)	(0.3745)
CAAR(0,5)	-0.0055	-0.0430*	-0.0107	0.0188	0.0139	-0.0171	0.0026
	(-0.2112)	(-1.7912)	(-0.4051)	(1.0138)	(0.7793)	(-0.9659)	(0.1506)
CAAR(0,10)	-0.0110	-0.0521 **	-0.0480*	0.0106	-0.0123	-0.0137	0.0187
	(-0.4241)	(-2.1069)	(-1.8119)	(0.5732)	(-0.6920)	(-0.7774)	(1.0730)
Market model							
CAAR(-5,10)	-0.0428 *	-0.0825***	0.0079	-0.0148	0.0077	0.0336 **	0.0305 *
	(-1.8724)	(-3.2125)	(0.3969)	(-0.8572)	(0.4634)	(2.0755)	(1.9077)
CAAR(-5,-1)	-0.0211	-0.0145	0.0232	-0.0070	0.0053	0.0093	-0.0062
	(-0.9240)	(-0.5646)	(1.1586)	(-0.4090)	(0.3186)	(0.5777)	(-0.3852)
CAAR(0,3)	-0.0266	-0.0355*	-0.0062	-0.0204	-0.0014	0.0113	0.0205
	(-1.3457)	(-1.8612)	(-0.3746)	(-1.4065)	(-0.1003)	(0.8260)	(1.5132)
CAAR(0,5)	-0.0279	-0.0684***	-0.0111	-0.0018	0.0048	0.0084	0.0216
	(-1.4105)	(-3.5851)	(-0.6681)	(-0.1223)	(0.3393)	(0.6151)	(1.5926)
CAAR(0,10)	-0.0216	-0.0693***	-0.0020	-0.0064	0.0037	0.0289	0.0334
	(-1.0903)	(-3.6325)	(-0.1206)	(-0.4416)	(0.2657)	(2.1100)**	(2.4564)**

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table16: abnormal returns of EU Machinery by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR (-5,10)	-0.0358	-0.0447*	-0.0313	0.0299	-0.0166	-0.0351	-0.0093
	(-1.2731)	(-1.8455)	(-1.362)	(1.6153)	(-0.8116)	(-1.2268)	(-0.4351)
CAAR (-5,-1)	-0.0398	-0.311	0.0115	0.0222	0.0043	-0.0105	-0.0311
	(-1.3026)	(-0.9416)	(0.4055)	(1.1357)	(0.0391)	(-0.6145)	(-1.2511)
CAAR (0,3)	0.0078	-0.0155	-0.0118	0.0255	0.0113	-0.0256	0.0051
	(0.4459)	(-0.3360)	(-0.4412)	(1.1912)	(0.8928)	(-1.0172)	(0.2245)
CAAR (0,5)	-0.0048	-0.0301	-0.0134	0.0145	0.0356	-0.0195	0.0023
	(-0.4112)	(-0.6241)	(-0.561)	(0.9138)	(1.2193)	(-1.0053)	(0.1116)
CAAR (0,10)	-0.0110	-0.0521	-0.0254 *	0.0168	-0.0201	-0.0151	0.0161
	(-0.9241)	(-1.4069)	(-1.1945)	(0.8732)	(-0.5520)	(-0.8914)	(0.9018)
Market model							
CAAR (-5,10)	-0.0440	-0.0646**	-0.0289	0.0279	-0.0146	-0.0269	-0.0063
	(-1.6031)	(-2.1215)	(-1.0387)	(1.4176)	(-0.7666)	(-1.4272)	(-0.3363)
CAAR (-5,-1)	-0.0248	-0.0282	0.0102	0.0227	0.0001	-0.0095	-0.0253
	(-0.9026)	(-0.9258)	(0.3650)	(1.1513)	(0.0079)	(-0.5061)	(-1.3551)
CAAR (0,3)	0.0059	-0.0127	-0.0126	0.0124	0.0157	-0.0215	0.0065
	(0.2249)	(-0.4360)	(-0.4742)	(0.6714)	(0.8828)	(-1.2172)	(0.3745)
CAAR (0,5)	-0.0055	-0.0230	-0.0107	0.0188	0.0139	-0.0171	0.0026
	(-0.2112)	(-0.7912)	(-0.4051)	(1.0138)	(0.7793)	(-0.9659)	(0.1506)
CAAR (0,10)	-0.0110	-0.0321	-0.0480	0.0106*	-0.0123	-0.0137	0.0187
	(-0.4241)	(-1.1069)	(-1.8119)	(0.5732)	(-0.6920)	(-0.7774)	(1.0730)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

Table17: abnormal returns of EU Chemical by CAPM model and Market model

	Event1	Event2	Event3	Event4	Event5	Event6	Event7
CAPM							
CAAR(-5,10)	-0.0166	-0.0136	0.0025	0.0206	0.0190	-0.0223	-0.0032
	(-0.6785)	(-0.7085)	(0.1281)	(1.4683)	(1.3786)	(-1.5518)	(-0.2392)
CAAR(-5,-1)	-0.0088	-0.0198	-0.0037	-0.0034	0.0188	-0.0088	-0.0151
	(-0.6357)	(-0.7199)	(-0.1414)	(-0.1936)	(1.5094)	(-1.1526)	(-0.5719)
CAAR(0,3)	-0.0021	0.0085	-0.0069	-0.0026	0.0069	0.0004	-0.0072
	(-0.1647)	(0.5518)	(-0.6641)	(-0.2735)	(0.7404)	(0.0400)	(-0.7935)
CAAR(0,5)	-0.0008	0.0086	-0.0072	0.0101	-0.0030	-0.0038	0.0004
	(-0.0625)	(0.5589)	(-0.6881)	(1.0570)	(-0.3239)	(-0.4137)	(0.0480)
CAAR(0,10)	-0.0096	0.0036	-0.0141	0.0260***	-0.0095	-0.0025	0.0068
	(-0.7452)	(0.2346)	(-1.3591)	(2.7077)	(-1.0278)	(-0.2723)	(0.7504)
Market model							
CAAR (-5,10)	-0.0062	-0.0111	-0.0210	0.0234	0.0031	-0.0237	0.0018
	(-0.1690)	(-0.2837)	(-0.5985)	(0.6930)	(0.0911)	(-0.7036)	(0.0539)
CAAR (-5,-1)	-0.0028	-0.0058	0.0140	0.0035	0.0165	-0.0174	0.0016
	(-0.0767)	(-0.1488)	(0.3980)	(0.1042)	(0.4892)	(-0.5160)	(0.0469)
CAAR (0,3)	0.0032	-0.0031	-0.0116	-0.0025	0.0149	-0.0087	-0.0087
	(0.0095)	(0.0038)	(-1.4323)	(-0.4686)	(0.6369)	(0.5408)	(-1.1375)
CAAR (0,5)	0.0091	0.0009	-0.0171	0.0124	0.0081	-0.0172	-0.0060
	(0.0754)	(0.1127)	(-1.6686)	(0.9902)	(-0.5236)	(-0.0034)	(-0.0064)
CAAR (0,10)	-0.0120	-0.0196	-0.0210**	0.0133**	-0.0113	-0.0194	-0.0042
	(-0.2292)	(-0.3216)	(-2.4841)	(2.0686)	(-1.2114)	(0.2346)	(0.3131)

$Notes$. The table shows the result of test of abnormal returns and t-statistics. *,**, and *** denote statistical significance at level 10%, 5% and 1% level, respectively.

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