



Full length article

Fear from uncertainty: An event study of Khashoggi and stock market returns

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ARTICLE INFO

Article history:

Received 14 November 2018

Received in revised form 22 April 2019

Accepted 6 May 2019

Available online 10 May 2019

JEL classification:

G10

G14

G15

C22

Keywords:

Stock returns

Event-study methodology

Jamal Khashoggi

Financial risk

ABSTRACT

This study investigates whether uncertain events affect stock market outcomes. To perform a natural experiment, we measure the effect of the uncertain event of Jamal Khashoggi's disappearance on the Saudi Stock Exchange. We use traditional event-study methodologies to analyse the data. The findings indicate that this event supports a downward trend in cumulative abnormal returns across all companies, implying a negative effect of uncertainty on stock returns.

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1. Introduction

Stock market returns respond to major events. Previous studies have identified several major news or events that have affected stock market returns, for example, the September 11, 2001 terrorist attacks (Chen and Siems, 2004) and the Madrid and London train bombings of 2004 (Karolyi and Martell, 2010).

In an efficient market, stock prices are expected to adjust immediately, without any overreaction, and that the significance is expected to vanish if a certain type of event occurs repeatedly (Kolaric and Schiereck, 2016). For example, several studies have found a minimal effect of repeated terrorist attacks on financial markets (Barros and Gil-Alana, 2009; Gul et al., 2010). However, other studies suggest that financial markets are efficient and can completely absorb such events, making the effect of these events statistically insignificant (Johnston and Nedelescu, 2006).

The aim of this paper is to explore an unconventional event, specifically the effect of Jamal Khashoggi's uncertain disappearance on the Saudi Stock Exchange. Khashoggi was a Saudi journalist who held many positions of responsibility in different journals in the Kingdom of Saudi Arabia (KSA). In September 2017, Khashoggi left Saudi Arabia and began writing columns for the *Washington Post* that criticised the KSA government.

Fig. 1 summarises the principal events relating to Khashoggi's uncertain disappearance based on the BBC (2018) article titled 'Khashoggi death: How Saudi Arabia altered its account'. The figure shows that on 2 October 2018, Khashoggi entered the Saudi Consulate in Istanbul to arrange his new marriage documents, after which, his whereabouts became unknown. On 3 October, the Turkish authorities claimed that Khashoggi was inside the Saudi Consulate, but the Saudi authorities denied this statement, stating that Khashoggi had left the Saudi Consulate and that they had no involvement in his disappearance. On 20 October, Saudi Arabia's attorney general announced that preliminary investigations showed that Khashoggi died in the Saudi Consulate in Istanbul.

Political events may significantly affect stock market returns (Zach, 2003). Several studies suggest that negative political news are associated with negative abnormal returns in the post-event period (Dangol, 2008; He et al., 2017). The uncertain disappearance of Khashoggi has politically affected the investment and business environment in Saudi Arabia, and led to boycott of the Future Investment Initiative (FII) conference held by the Public Investment Fund in Riyadh from 23 to 25 October 2018.¹ JP Morgan and Ford cancelled their attendance to the FII conference, as did other Western political leaders, principal international bankers

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¹ A complete list of the companies and executives who announced they would cancel their plans to attend the FII can be found at <https://www.axios.com/companies-saudi-arabia-conference-khashoggi-disappearance-153deaec-1282-4723-91f2-2ea8998d5fe2.html>.

Table 1Descriptive statistics of abnormal returns ($AR_{i,t}$) using mean-adjusted returns and market model before and after Khashoggi uncertain disappearance.

	Mean-adjusted returns $AR_{i,t}$				Market model $AR_{i,t}$			
	Mean	Median	Skewness	Kurtosis	Mean	Median	Skewness	Kurtosis
–10	–0.0120	–0.0106	0.5299	5.5754	–0.0161	–0.0143	0.6436	5.5752
–9	0.0081	0.0080	0.3088	2.0887	0.0108	0.0101	0.3618	2.1354
–8	0.0032	0.0028	1.5329	8.3705	0.0032	0.0024	1.4012	7.5173
–7	0.0078	0.0062	1.6580	5.9382	0.0089	0.0068	1.4477	4.7853
–6	–0.0005	–0.0019	1.5831	7.9186	–0.0003	–0.0019	1.3601	6.6342
–5	0.0047	0.0030	–0.2883	9.7034	0.0074	0.0056	–0.4675	8.3387
–4	0.0022	–0.0009	2.2404	6.7500	0.0009	–0.0022	2.2344	6.6970
–3	0.0024	0.0003	1.1931	2.9299	0.0016	–0.0005	1.1901	2.9958
–2	0.0061	0.0044	1.3776	7.1814	0.0076	0.0061	1.2276	5.8638
–1	0.0015	0.0008	1.3344	4.0330	0.0016	0.0001	1.2674	3.5126
0	–0.0040	–0.0051	2.3515	14.8518	–0.0062	–0.0076	2.4220	15.2481
+1	0.0028	0.0022	–1.5283	11.8979	0.0027	0.0020	–1.6948	13.1322
+2	0.0017	–0.0006	2.4363	12.1885	0.0006	–0.0013	2.4792	12.2761
+3	–0.0190	–0.0117	–11.5459	139.4469	–0.0222	–0.0154	–11.5605	139.7087
+4	0.0008	0.0011	–0.8942	4.1351	0.0011	0.0009	–0.7527	3.5943
+5	–0.0015	–0.0032	2.8479	15.6095	–0.0031	–0.0041	2.9274	16.1201
+6	–0.0031	–0.0054	2.7087	12.8827	–0.0056	–0.0079	2.7242	12.9521
+7	–0.0290	–0.0317	1.6450	7.6610	–0.0370	–0.0388	1.6570	7.4861
+8	–0.0623	–0.0679	1.6594	4.6396	–0.0682	–0.0733	1.7580	5.2097
+9	0.0341	0.0365	–10.7164	126.1453	0.0403	0.0429	–10.5829	124.0088
+10	–0.0097	–0.0164	1.2581	2.1500	–0.0070	–0.0141	1.1838	1.6018
+11	0.0149	0.0136	0.8419	2.4591	0.0135	0.0115	0.9008	2.5474
+12	0.0003	–0.0030	2.5790	10.7372	–0.0010	–0.0046	2.5799	10.5593
+13	–0.0155	–0.0194	1.6139	4.1742	–0.0155	–0.0194	1.5347	3.7399
+14	–0.0208	–0.0221	1.0521	3.5244	–0.0209	–0.0235	1.0597	3.4149
+15	0.0226	0.0268	–1.0380	3.4337	0.0182	0.0222	–1.0517	3.2859
+16	0.0150	0.0073	1.3512	1.8508	0.0126	0.0053	1.3454	1.8118
+17	0.0123	0.0099	–10.3942	120.9359	0.0200	0.0154	–10.0840	116.2279
+18	0.0154	0.0123	1.1537	2.7195	0.0130	0.0105	1.1547	2.7062
+19	0.0167	0.0109	1.7762	4.1875	0.0166	0.0107	1.7478	4.1117
+20	0.0070	0.0040	1.2818	6.1788	0.0057	0.0020	1.2724	6.3695

Table 2Descriptive statistics of cumulative abnormal returns ($CAR_{i,t}$) using mean-adjusted returns and market model before and after Khashoggi uncertain disappearance.

	Mean-adjusted returns $CAR_{i,t}$				Market model $CAR_{i,t}$			
	Mean	Median	Skewness	Kurtosis	Mean	Median	Skewness	Kurtosis
–10	–0.0119	–0.0103	0.5195	5.5840	–0.0161	–0.0143	0.6436	5.5752
–9	–0.0039	–0.0032	–0.8140	4.3036	–0.0053	–0.0032	–0.9453	4.4553
–8	–0.0007	0.0009	–0.6798	4.0834	–0.0021	–0.0017	–0.8774	4.1182
–7	0.0070	0.0067	–0.2026	3.4681	0.0068	0.0067	–0.4281	3.0959
–6	0.0065	0.0057	–0.5909	4.2147	0.0065	0.0055	–0.8061	3.6368
–5	0.0111	0.0114	–0.8306	3.6624	0.0140	0.0117	–0.8402	3.0679
–4	0.0133	0.0107	–0.1590	1.3407	0.0149	0.0101	–0.2715	1.2124
–3	0.0157	0.0149	0.0528	0.9084	0.0165	0.0150	–0.1263	0.9071
–2	0.0217	0.0195	–0.0650	0.7478	0.0241	0.0202	–0.0906	0.5868
–1	0.0232	0.0222	–0.0890	1.1440	0.0257	0.0226	–0.0459	1.0222
0	0.0192	0.0152	–0.0682	0.7358	0.0195	0.0148	–0.1642	0.7658
+1	0.0220	0.0205	–0.4569	1.8224	0.0222	0.0181	–0.5975	2.8008
+2	0.0238	0.0221	–0.0275	1.0578	0.0227	0.0182	–0.2746	1.1338
+3	0.0049	0.0090	–6.8324	69.9043	0.0005	0.0015	–6.5360	65.4618
+4	0.0057	0.0108	–6.4920	64.1049	0.0016	0.0021	–6.0942	59.0627
+5	0.0042	0.0100	–6.1356	60.8536	–0.0014	0.0015	–5.9759	58.3728
+6	0.0011	0.0081	–5.1071	51.5933	–0.0069	–0.0053	–5.1235	50.5909
+7	–0.0275	–0.0230	–3.6639	39.5632	–0.0437	–0.0386	–3.8325	40.2644
+8	–0.0889	–0.0834	–1.5625	21.5384	–0.1114	–0.1106	–1.6418	21.6431
+9	–0.0552	–0.0438	–3.0852	24.8398	–0.0713	–0.0608	–3.3241	25.7038
+10	–0.0647	–0.0594	–2.3834	21.0255	–0.0783	–0.0746	–2.5835	21.1249
+11	–0.0501	–0.0423	–2.1702	23.1218	–0.0650	–0.0660	–2.4611	23.4279
+12	–0.0498	–0.0475	–1.6244	22.5920	–0.0659	–0.0623	–1.9173	22.4733
+13	–0.0650	–0.0649	–0.6596	19.2412	–0.0813	–0.0824	–0.9592	18.5088
+14	–0.0854	–0.0915	0.0258	19.3499	–0.1019	–0.1145	–0.2709	18.2375
+15	–0.0632	–0.0664	0.2462	23.8768	–0.0839	–0.0892	–0.0838	23.0612
+16	–0.0485	–0.0470	0.6333	27.9185	–0.0714	–0.0759	0.3024	27.9724
+17	–0.0365	–0.0316	–0.5719	20.9725	–0.0517	–0.0568	–0.9328	19.7616
+18	–0.0215	–0.0216	–0.6154	22.1157	–0.0389	–0.0424	–1.0100	21.5364
+19	–0.0052	–0.0026	–0.8101	21.0563	–0.0226	–0.0214	–1.2400	21.2899
+20	0.0017	0.0082	–1.1643	19.4808	–0.0170	–0.0176	–1.6151	20.5916

and highest-level executives (Renshaw, 2018). This threat of boycott can have significant effect on stock market returns. For

example, Heilmann (2016) finds that the Japanese stock market is affected by Chinese boycotts in the short run. Further, Heilmann

Oct. 2	•Khashoggi entered the Saudi Consulate in Istanbul and did not leave
Oct. 3	•KSA denied its involvement in Khashoggi's disappearance
Oct. 5	•KSA denied the rumours in the news about the murder of Khashoggi
Oct. 7	•KSA denied the rumours about the murder of Khashoggi
Oct. 12	•An agreement was reached between Turkey and KSA to investigate the issue jointly
Oct. 14	•KSA said that it will take a greater action against any punishment set by the US following Trump's comments
Oct. 20	•KSA announced that Khashoggi was killed in its Saudi Consulate in Istanbul by mistake following a heated debate

Fig. 1. Main events relating to Khashoggi's uncertain disappearance.

(2014) suggests that the economic response to boycotts is not homogenous across countries, and may differ from country to country.

The principal novelty of the present study is the examination of the effect of the uncertain events on stock market returns. Specifically, the disappearance of Khashoggi. As stated, Khashoggi disappeared on 2 October 2018, and the announcement that he had been killed in the Saudi Consulate by mistake came 18 days later (20 October 2018). To investigate the effect of this uncertain event, our empirical examination employs an event-study approach, which is the primary means of demonstrating how the market reacts to a signal. Abnormal returns are usually used in such event studies. Our results provide evidence of a downward trend in cumulative abnormal returns across all companies on the Saudi Stock Exchange over the period of Khashoggi's disappearance, implying a negative effect of the uncertainty surrounding his disappearance on stock returns.

When we repeated the tests using a sample of the top ten Saudi companies with the largest foreign ownership, we found an insignificant reaction to the event of Khashoggi's disappearance. These further tests suggest that the stock market's negative reaction was principally driven by local investors.

2. Data and methodology

We use the data of companies listed on the Saudi Stock Exchange obtained from Bloomberg. Daily returns are based on closing stock prices and are calculated as simple arithmetic returns. For each day in the event window, including the event day (2 October 2018), we calculate daily abnormal returns ($AR_{i,t}$) and the cumulative abnormal returns ($CAR_{i,t}$) for every stock using two methodologies: (1) mean-adjusted returns; (2) market model.

2.1. Mean-adjusted returns

We employ the standard mean-adjusted returns event-study methodology as originally described by Brown and Warner (1985) to calculate the abnormal return ($AR_{i,t}$) for stock i during at day t :

$$AR_{i,t} = R_{i,t} - \bar{R}_i, \quad (1)$$

$$\bar{R}_i = \frac{1}{239} = \sum_{t=-250}^{-11} R_{i,t}, \quad (2)$$

where $R_{i,t}$ is the return of stock i at day t , and \bar{R}_i is the average return of stock i 's daily returns during the estimation period $(-250, -11)$.

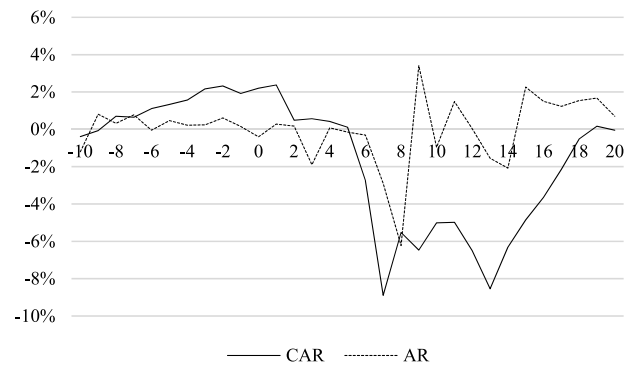


Fig. 2. Mean-adjusted returns: $AR_{i,t}$ and $CAR_{i,t}$ surrounding Khashoggi uncertain disappearance.

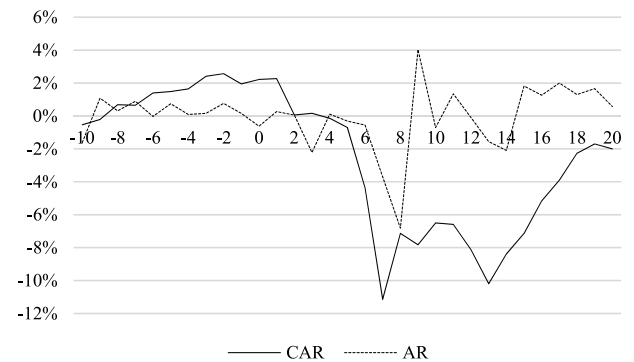


Fig. 3. Market model: $AR_{i,t}$ and $CAR_{i,t}$ surrounding Khashoggi uncertain disappearance.

2.2. Market model

We also employ market-model event-study methodology as originally described by Dodd and Warner (1983) and Brown and Warner (1985) to calculate abnormal returns as follows:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t}), \quad (3)$$

where $R_{i,t}$ is the return of stock i at day t , $R_{m,t}$ is the return of the Saudi Morgan Stanley Capital International (MSCI) index, and α_i and β_i are the regression estimates from an ordinary least squares (OLS) estimation applied during the estimation period $(-250, -11)$.

3. Results

Fig. 2 presents the results of the mean-adjusted returns methodology for $AR_{i,t}$ and $CAR_{i,t}$ of the 157 stocks listed on the Saudi Stock Exchange surrounding the uncertain event of Khashoggi's disappearance on 2 October 2018 to the announcement of his death on 20 October 2018. Fig. 3 presents the results of the market-model methodology for $AR_{i,t}$ and $CAR_{i,t}$ of the same 157 stocks during the same uncertain-event period. Both Figs. 2 and 3 indicate a downward trend in $AR_{i,t}$ and $CAR_{i,t}$.

Table 1 presents the descriptive statistics of ($AR_{i,t}$) using both the mean-adjusted returns and the market-model methodologies during the period of the uncertain event of Khashoggi's disappearance. Table 1 demonstrates that ($AR_{i,t}$) distribution is negatively skewed during several days after the uncertain event under both methodologies, indicating the presence of negative outliers. It can also be seen that ($AR_{i,t}$) distribution is leptokurtic

Table 3Mean and median equality tests for $(CAR_{i,t})$ using mean-adjusted returns.

Panel A: Mean equality tests				
Event window	Before	After	After–Before	t-test
[–1,1]	0.0222	0.0205	–0.0017	–0.2148
[–3,3]	0.0149	0.0090	–0.0060	–1.2679
[–5,5]	0.0114	0.0100	–0.0014	–0.5595
[–10,10]	–0.0103	–0.0594	–0.0491	–6.2598***
[–10,15]	–0.0103	–0.0664	–0.0560	–6.0900***
[–10,20]	–0.0103	0.0082	0.0185	3.4540***
Panel B: Median equality tests				
Event window	Before	After	After–Before	W/M
[–1,1]	0.0257	0.0222	–0.0035	–0.5899
[–3,3]	0.0165	0.0005	–0.0160	–1.9253*
[–5,5]	0.0140	–0.0014	–0.0154	–1.8110*
[–10,10]	–0.0161	–0.0783	–0.0622	–5.1066***
[–10,15]	–0.0161	–0.0839	–0.0678	–4.8822***
[–10,20]	–0.0161	–0.0170	–0.0009	–0.0621

Note. The t-test refers to a standard test for equality of Satterthwaite–Welch; W/M refers to the Wilcoxon–Mann–Whitney signed-rank median test; *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

for most of the days after the event, implying extreme values under both methodologies. A similar conclusion can be derived from Table 2, which presents the descriptive statistics of $(CAR_{i,t})$ using both the methodologies of mean-adjusted returns and the market model after the uncertain event of Khashoggi's disappearance.

Table 3 presents the results of the event-study mean and median equality tests for the total sample using the methodology of mean-adjusted returns. The results of the mean equality tests in Panel A of Table 3 show a highly significant negative market reaction to the event on the event day (2 October 2018) and during the [–10; + 10] and [–10; + 15] day event windows. The results of the median equality tests in Panel B of Table 3 show a highly significant negative market reaction to the event on the event day and during the [–3; + 3], [–5; + 5], [–10; + 10], [–10; + 15] day event windows.

Table 4 presents the results of the event-study mean and median equality tests for the total sample using the market-model methodology. The results of the mean equality tests in Panel A of Table 4 show a highly significant negative market reaction to the event on the event day (2 October 2018) and during the [–3; + 3], [–5; + 5], [–10; + 10] and [–10; + 15] day event windows. A similar conclusion can be derived from the results of the median equality tests in Panel B of Table 4. These results strongly indicate that the Saudi Stock Exchange returns reacted negatively to the uncertain event of Khashoggi's disappearance.

4. Further tests

According to Dudley (2018), foreign holdings of Saudi stocks dropped by 7% in the weeks following the death of Khashoggi. Foreign investors sold \$1.9 billion more shares than what they bought during the period 7 October to 8 November 2018 (Dudley, 2018). Thus, to investigate the effect of this event on foreign investors, we perform further tests on the top ten companies in Saudi Arabia with the foreign ownership—according to the Saudi Arabia reclassification report issued by FTSE Russell (2018) (see Table 5).

Table 6 presents the results of the event-study mean and median equality tests for the top ten companies with largest foreign ownership in Saudi Arabia using mean-adjusted returns. The results of both the mean and median equality tests in Panels A and B of Table 6 show an insignificant reaction of these stocks to the event during all the event-day windows. Similar conclusion is obtained for the market-model methodology as shown in Table 7.

Table 4Mean and median equality tests for $(CAR_{i,t})$ using market model.

Panel A: Mean equality tests				
Event window	Before	After	After–Before	t-test
[–1,1]	0.0257	0.0222	–0.0035	–0.5899
[–3,3]	0.0165	0.0005	–0.0160	–1.9253*
[–5,5]	0.0140	–0.0014	–0.0154	–1.8110*
[–10,10]	–0.0161	–0.0783	–0.0622	–5.1066***
[–10,15]	–0.0161	–0.0839	–0.0678	–4.8822***
[–10,20]	–0.0161	–0.0170	–0.0009	–0.0621
Panel B: Median equality tests				
Event window	Before	After	After–Before	W/M
[–1,1]	0.0226	0.0181	–0.0045	–0.5611
[–3,3]	0.0150	0.0015	–0.0136	–2.3680**
[–5,5]	0.0117	0.0015	–0.0102	–2.4448**
[–10,10]	–0.0143	–0.0746	–0.0603	–7.1104***
[–10,15]	–0.0143	–0.0892	–0.0748	–7.0079***
[–10,20]	–0.0143	–0.0176	–0.0032	–0.0544

Note. The t-test refers to a standard test for equality of Satterthwaite–Welch; W/M refers to the Wilcoxon–Mann–Whitney signed-rank median test; *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 5

Top ten Saudi companies with largest foreign ownership.

Source: Saudi Arabia reclassification (FTSE Russell, 2018).

Company	Foreign ownership (%)
BUFA Arabia	41.8
Met Life AIG ANB	40.8
Saudi Arabia British Bank	40.8
Alawwal	40.6
Arab National Bank	40.6
Rabigh Refining & Petrochemical	38.1
Allianz Saudi Fransi Cooperative	33.1
Chubb	32.6
Arabia Insurance Cooperative Co.	32.1
Alinma Tokio Marine	29.4

Table 6Companies with largest foreign ownership: Mean and median equality tests for $(CAR_{i,t})$ using mean-adjusted returns.

Panel A: Mean equality tests				
Event window	Before	After	After–Before	t-test
[–1,1]	0.0213	0.0214	0.0001	0.0036
[–3,3]	0.0184	0.0089	–0.0095	–0.5653
[–5,5]	0.0094	0.0130	0.0036	0.2296
[–10,10]	–0.0178	–0.0532	–0.0354	–1.1795
[–10,15]	–0.0178	–0.0661	–0.0483	–1.5903
[–10,20]	–0.0178	0.0044	0.0222	0.7582
Panel B: Median equality tests				
Event window	Before	After	After–Before	W/M
[–1,1]	0.0145	0.0170	0.0025	0.1767
[–3,3]	0.0010	0.0044	0.0034	0.5962
[–5,5]	0.0045	0.0149	0.0105	0.0000
[–10,10]	–0.0171	–0.0629	–0.0458	–0.5981
[–10,15]	–0.0171	–0.0669	–0.0498	–1.1479
[–10,20]	–0.0171	0.0121	0.0292	0.7064

Note. The t-test refers to a standard test for equality of the Satterthwaite–Welch; W/M refers to the Wilcoxon–Mann–Whitney signed-rank median test; *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

These results strongly indicate that the negative reaction of the stock market to the uncertain event of Khashoggi's disappearance is driven by local investors.

5. Conclusion

Analysing all the listed stocks on the Saudi Stock Exchange surrounding the uncertain event of Khashoggi's disappearance,

Table 7

Companies with largest foreign ownership: Mean and median equality tests for ($CAR_{i,t}$) using market model.

Panel A: Mean equality tests				
Event window	Before	After	After–Before	t-test
[–1,1]	0.0301	0.0292	–0.0009	–0.4296
[–3,3]	0.0244	0.0138	–0.0106	–0.5783
[–5,5]	0.0160	0.0180	0.0020	0.1159
[–10,10]	–0.0211	–0.0523	–0.0312	–0.9274
[–10,15]	–0.0211	–0.0690	–0.0479	–1.4652
[–10,20]	–0.0211	0.0061	0.0272	1.0378
Panel B: Median equality tests				
Event window	Before	After	After–Before	W/M
[–1,1]	0.0242	0.0179	–0.0063	0.0000
[–3,3]	0.0157	0.0150	–0.0007	–0.4415
[–5,5]	–0.0004	0.0342	0.0347	0.0000
[–10,10]	–0.0217	–0.0735	–0.0518	–0.3532
[–10,15]	–0.0217	–0.0963	–0.0746	–0.5962
[–10,20]	–0.0217	0.0501	0.0718	0.9713

Note. The t-test refers to a standard test for equality of the Satterthwaite–Welch; W/M refers to the Wilcoxon–Mann–Whitney signed-rank median test; *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

we find that this uncertain event had a very strong negative effect on Saudi stock returns. Our further tests suggest that this negative reaction is principally driven by local investors.

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