

The confidence interval analysis for stocks with “Unusual Market Activity”

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ABSTRACT

In order to protect investors, the capital market authorities actively monitor stock price movements. Unusual movements have resulted in the capital market authorities announcing unusual market activity (UMA). This study uses firms that obtain UMA status in the announcement period from March to April 2023. To analyze UMA, the study uses confidence interval estimation. The results of this study indicate that UMA status tends to be proven by paying attention to the classification of critical values and the range of data.

Keywords: UMA; prices; information; unusual activity

JEL Classification: G10; G11; G14

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1. Introduction

Unusual market activity (UMA) is a phenomenon that often occurs in capital market trading activities. According to Kurniawan (2017), UMA tends to be defined as unusual stock movements and trading within a certain period of time. In general, the purpose of announcing the status of UMA by the Indonesia Stock Exchange is so that investors can more carefully consider their investment decisions regarding the financial performance of a firm and the economic information that influences it.

Furthermore, Anas and Nugroho (2017), and Kurniawan (2017) explain that UMA tends to be associated with the short-term goals of investors to obtain abnormal returns. The finding of Permatasari and Tambun (2021) implies that UMA tends to be caused by potential information asymmetries from insiders to outsiders that might occur in the future.

The purpose of this study is to analyze the stock price movements of issuers with UMA status.

2. Literature review

Lye et al. (2021) emphasize that the announcement of UMA by the capital market authorities is an effective market intervention mechanism in order to increase investment certainty and information efficiency. However, Lye et al. (2021) also explain that the announcement of UMA will only reduce information uncertainty and not reduce information asymmetry. Sayidah (2012) explains that information asymmetry is part of agency theory which emphasizes the existence of moral hazard between principals and agents. According to Sayidah (2012), dan Sirat (2017), information asymmetry is a condition in which a party does not transparently fully disclose the information to other parties

with the aim of obtaining benefits. Muslim and Widyastuti (2019) emphasize that investors tend to avoid information asymmetry, especially regarding profit information.

According to Perwira and Darsono (2015), increasing in information asymmetry tends to increase the cost of equity even though this condition is not significant in the capital market. But, the findings of Irdawati et al. (2021) imply that information asymmetry which tends to be high will actually make investors increase their expected returns. However, Jasman (2016), and Wijaya and Herwiyanti (2023) also find that information asymmetry has negative relationship with the cost of equity to investors. In addition, Junaidi (2018), Dasmaran and Odeh (2020), Feronika et al. (2021), Putra et al. (2021), and Wijaya and Herwiyanti (2023) prove that information asymmetry tends to increase the earnings management practices.

3. Research method

The sample of this study is the listed firms on the Indonesia Stock Exchange with UMA announcement in period of

March to April 2023. This study uses the daily closing price as data for the period December 31 2022 or at the time of the initial public offering (IPO) until the UMA status is announced. In term to analyze the UMA for stock prices, this study uses the formula of confidence interval (CI) estimation as follows.

$$\bar{X} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \leq \mu \leq \bar{X} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$\bar{X}$ is mean for the stock price, Z is the critical value (90%, 95%, and 99%), and the σ is standard deviation. If the μ (or the stock price at cut off point) is out the range (less than lower or over the upper limits) then it is called UMA.

4. Result and discussion

Table 1 shows that the UMA status mostly dominated by unusual increases and unusual patterns. In addition, the standard deviation (SD) of several stocks such as CHIP, CUAN, and KONI tends to be high, indicating that these stocks are more volatile in the capital market.

Table 1. Descriptive statistics

	Cut-off point	Announcement	Description	N	Mean	SD	SE Mean
BHAT	8-Mar-23	21-Mar-23	Unusual pattern	47	829.89	24.66	3.60
BMSR	13-Apr-23	18-Apr-23	Unusual decrease	70	678.63	63.08	7.54
BOGA	9-Mar-23	20-Mar-23	Unusual pattern	48	1254.27	19.07	2.75
CHIP	8-Feb-23	3-Mar-23	Unusual increase	17	333.50	122.40	29.70
CMNT	7-Mar-23	24-Mar-23	Unusual pattern	46	904.57	16.63	2.45
CUAN	7-Mar-23	15-Mar-23	Unusual increase	5	446.40	153.00	68.40
FWCT	14-Mar-23	17-Mar-23	Unusual decrease	29	122.21	12.80	2.38
GOOD	14-Mar-23	21-Mar-23	Unusual pattern	51	479.22	16.51	2.31
HALO	8-Mar-23	4-Apr-23	Unusual increase	20	116.50	5.40	1.21
KONI	10-Apr-23	10-Apr-23	Unusual decrease	58	2540.90	347.90	45.70
MASA	9-Feb-23	1-Mar-23	Unusual increase	28	2218.90	79.50	15.00
MKTR	6-Mar-23	6-Mar-23	Unusual increase	36	146.31	16.94	2.82
NATO	10-Mar-23	20-Mar-23	Unusual pattern	49	487.49	10.81	1.54
SAGE	7-Mar-23	4-Apr-23	Unusual increase	17	187.70	77.50	18.80
SFAN	7-Mar-23	24-Mar-23	Unusual pattern	46	1837.61	28.92	4.26
WINE	5-Apr-23	5-Apr-23	Unusual increase	49	310.49	37.17	5.31

In the next step, this study tests the confidence interval estimation. Table 2 shows that BHAT has an unusual pattern where the first three days have a price

above the upper limit and the stock price in the last six days is less than the lower limit of the confidence interval (at level 90%, 95%, and 99%).

Table 2. Confidence interval estimation of BHAT

Date	μ	90%	95%	99%	Conclusion
		$823.86 \leq \mu \leq 835.93$	$822.65 \leq \mu \leq 837.13$	$820.23 \leq \mu \leq 839.56$	
20230308	845	Over upper limit	Over upper limit	Over upper limit	Unusual
20230309	850	Over upper limit	Over upper limit	Over upper limit	Unusual
20230310	845	Over upper limit	Over upper limit	Over upper limit	Unusual
20230313	835	Normal	Normal	Normal	Normal
20230314	815	Less lower limit	Less lower limit	Less lower limit	Unusual
20230315	815	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	790	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	790	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	785	Less lower limit	Less lower limit	Less lower limit	Unusual
20230321	775	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 3 shows that the BMSR share prices are less than the lower bound of the confidence interval at the 90% level. Similar results are also obtained at the

levels of 95% and 99%. These results show that the share prices of BMSR are unusually decreasing.

Table 3. Confidence interval estimation of BMSR

Date	μ	90%	95%	99%	Conclusion
		$666.06 \leq \mu \leq 691.20$	$663.59 \leq \mu \leq 693.67$	$658.66 \leq \mu \leq 698.60$	
20230413	480	Less lower limit	Less lower limit	Less lower limit	Unusual
20230414	462	Less lower limit	Less lower limit	Less lower limit	Unusual
20230417	452	Less lower limit	Less lower limit	Less lower limit	Unusual
20230418	428	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 4 shows that BOGA's share prices are less than lower limits at confidence levels of 90%, 95%, and 99%. These results indicate that BOGA stock

prices tend to experience an unusual decrease rather than an unusual pattern as stated in the UMA status.

Table 4. Confidence interval estimation of BOGA

Date	μ	90%	95%	99%	Conclusion
		$1249.65 \leq \mu \leq 1258.89$	$1248.73 \leq \mu \leq 1259.81$	$1246.88 \leq \mu \leq 1261.66$	
20230309	1215	Less lower limit	Less lower limit	Less lower limit	Unusual
20230310	1225	Less lower limit	Less lower limit	Less lower limit	Unusual
20230313	1215	Less lower limit	Less lower limit	Less lower limit	Unusual
20230314	1210	Less lower limit	Less lower limit	Less lower limit	Unusual
20230315	1210	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	1215	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	1230	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	1230	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 5 shows that the stock prices of CHIP in the first six days are less than the lower limit and over the upper limit in the last five days. This condition indicates that the stock prices of CHIP tend to be an unusual pattern rather than unusual

increase as stated in the UMA status. In addition, the stock prices on 16 February 2023 (or 20230216) and 24 February 2023 (or 20230224) tend to remain in confidence interval, especially at of 99%.

Table 5. Confidence interval estimation of CHIP

Date	μ	90%	95%	99%	Conclusion
		$281.6 \leq \mu \leq 385.3$	$270.5 \leq \mu \leq 396.4$	$246.8 \leq \mu \leq 420.2$	
20230208	176	Less lower limit	Less lower limit	Less lower limit	Unusual
20230209	193	Less lower limit	Less lower limit	Less lower limit	Unusual
20230210	212	Less lower limit	Less lower limit	Less lower limit	Unusual
20230213	232	Less lower limit	Less lower limit	Less lower limit	Unusual
20230214	230	Less lower limit	Less lower limit	Less lower limit	Unusual
20230215	238	Less lower limit	Less lower limit	Less lower limit	Unusual
20230216	260	Less lower limit	Less lower limit	Normal	Ambiguous
20230217	286	Normal	Normal	Normal	Normal
20230220	314	Normal	Normal	Normal	Normal
20230221	344	Normal	Normal	Normal	Normal
20230222	378	Normal	Normal	Normal	Normal
20230223	366	Normal	Normal	Normal	Normal
20230224	402	Over upper limit	Over upper limit	Normal	Ambiguous
20230227	442	Over upper limit	Over upper limit	Over upper limit	Unusual
20230228	486	Over upper limit	Over upper limit	Over upper limit	Unusual
20230301	530	Over upper limit	Over upper limit	Over upper limit	Unusual
20230302	580	Over upper limit	Over upper limit	Over upper limit	Unusual
20230303	620	Over upper limit	Over upper limit	Over upper limit	Unusual

Table 6 shows that the stock price of CMNT on the first day still in confidence interval, especially at levels of 95% and 99%, but is less than lower limit at the level of 90%. Subsequent share prices tend to be less than the lower limit at levels of

90%, 95%, and 99%. Those results indicate that the stock prices tend to experience unusual decrease rather than an unusual pattern as stated in UMA status.

Table 6. Confidence interval estimation of CMNT

Date	μ	90%	95%	99%	Conclusion
		$900.45 \leq \mu \leq 908.68$	$899.63 \leq \mu \leq 909.50$	$897.97 \leq \mu \leq 911.16$	
20230307	900	Less lower limit	Normal	Normal	Ambiguous
20230308	850	Less lower limit	Less lower limit	Less lower limit	Unusual
20230309	820	Less lower limit	Less lower limit	Less lower limit	Unusual
20230310	795	Less lower limit	Less lower limit	Less lower limit	Unusual
20230313	780	Less lower limit	Less lower limit	Less lower limit	Unusual
20230314	780	Less lower limit	Less lower limit	Less lower limit	Unusual
20230315	815	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	830	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	835	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	835	Less lower limit	Less lower limit	Less lower limit	Unusual
20230321	845	Less lower limit	Less lower limit	Less lower limit	Unusual
20230324	885	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 7 shows that the stock price of CUAN at the first day still in the

confidence interval, especially at levels of 95% and 99%, but is less than lower limit

at the level of 90%. On 8 March 2023 (or 20230308) to 13 March 2023 (or 20230313), the stock prices are at normal. The last day, the stock price is over the upper limit even though on the previous day the stock price tended to be normal at

the level of 99%. Based on these results, share prices from CUAN tend to experience an unusual increase as stated in UMA status.

Table 7. Confidence interval estimation of CUAN

Date	μ	90%	95%	99%	Conclusion
		$300.5 \leq \mu \leq 592.3$	$256.4 \leq \mu \leq 636.4$	$131.3 \leq \mu \leq 761.5$	
20230308	274	Less lower limit	Normal	Normal	Ambiguous
20230309	342	Normal	Normal	Normal	Normal
20230310	426	Normal	Normal	Normal	Normal
20230313	530	Normal	Normal	Normal	Normal
20230314	660	Over upper limit	Over upper limit	Normal	Ambiguous
20230315	825	Over upper limit	Over upper limit	Over upper limit	Unusual

Table 8 shows that the stock prices of FWCT move beyond the confidence interval. At the levels of 90%, 95%, and 99%, the stock prices of FWCT are

indicated to experience an unusual decrease.

Table 8. Confidence interval estimation of FWCT

Date	μ	90%	95%	99%	Conclusion
		$118.16 \leq \mu \leq 126.25$	$117.34 \leq \mu \leq 127.08$	$115.64 \leq \mu \leq 128.77$	
20230314	99	Less lower limit	Less lower limit	Less lower limit	Unusual
20230315	100	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	94	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	92	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 9 shows that the movement of the stock prices of GOOD tends to be outside the confidence interval. The results at the levels of 90%, 95%, and 99% show that stock prices are less than lower limit,

thus indicating unusual decrease rather than unusual pattern as stated in UMA status.

Table 9. Confidence interval estimation of GOOD

Date	μ	90%	95%	99%	Conclusion
		$475.34 \leq \mu \leq 483.09$	$474.57 \leq \mu \leq 483.86$	$473.03 \leq \mu \leq 485.41$	
20230314	472	Less lower limit	Less lower limit	Less lower limit	Unusual
20230315	472	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	472	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	470	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	466	Less lower limit	Less lower limit	Less lower limit	Unusual
20230321	468	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 10 shows that the movement of HALO stock prices is mostly over the upper limit. The levels of 90%, 95%, and 99% show similar results, indicating that

HALO's stock prices are experiencing an unusual increase.

Table 10. Confidence interval estimation of HALO

Date	μ	90%	95%	99%	Conclusion
		$114.41 \leq \mu \leq 118.59$	$113.97 \leq \mu \leq 119.03$	$113.04 \leq \mu \leq 119.96$	
20230308	116	Normal	Normal	Normal	Normal
20230309	120	Over upper limit	Over upper limit	Over upper limit	Unusual
20230310	118	Normal	Normal	Normal	Normal
20230313	120	Over upper limit	Over upper limit	Over upper limit	Unusual
20230314	117	Normal	Normal	Normal	Normal
20230315	123	Over upper limit	Over upper limit	Over upper limit	Unusual
20230316	166	Over upper limit	Over upper limit	Over upper limit	Unusual
20230317	220	Over upper limit	Over upper limit	Over upper limit	Unusual
20230320	224	Over upper limit	Over upper limit	Over upper limit	Unusual
20230321	210	Over upper limit	Over upper limit	Over upper limit	Unusual
20230324	196	Over upper limit	Over upper limit	Over upper limit	Unusual
20230327	193	Over upper limit	Over upper limit	Over upper limit	Unusual
20230328	202	Over upper limit	Over upper limit	Over upper limit	Unusual
20230329	204	Over upper limit	Over upper limit	Over upper limit	Unusual
20230330	206	Over upper limit	Over upper limit	Over upper limit	Unusual
20230331	212	Over upper limit	Over upper limit	Over upper limit	Unusual
20230403	220	Over upper limit	Over upper limit	Over upper limit	Unusual
20230404	260	Over upper limit	Over upper limit	Over upper limit	Unusual

Table 11 shows that the confidence interval estimation has similar results at levels of 90%, 95%, and 99%. These results indicate that the share prices of

KONI tend to experience an unusual decrease.

Table 11. Confidence interval estimation of KONI

Date	μ	90%	95%	99%	Conclusion
		$2464.6 \leq \mu \leq 2617.3$	$2449.5 \leq \mu \leq 2632.4$	$2419.2 \leq \mu \leq 2662.7$	
20230327	2290	Less lower limit	Less lower limit	Less lower limit	Unusual
20230328	2240	Less lower limit	Less lower limit	Less lower limit	Unusual
20230329	2090	Less lower limit	Less lower limit	Less lower limit	Unusual
20230330	1945	Less lower limit	Less lower limit	Less lower limit	Unusual
20230331	1935	Less lower limit	Less lower limit	Less lower limit	Unusual
20230403	1800	Less lower limit	Less lower limit	Less lower limit	Unusual
20230404	1675	Less lower limit	Less lower limit	Less lower limit	Unusual
20230405	1560	Less lower limit	Less lower limit	Less lower limit	Unusual
20230406	1485	Less lower limit	Less lower limit	Less lower limit	Unusual
20230410	1395	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 12 shows that the share prices of MASA are over the upper limit at the levels of 90% and 95%. However, stock prices in the first two days indicated normal movement, especially at the level

of 99%. Overall, if we take stock prices on the last few days, the stock prices of MASA will experience an unusual increase.

Table 12. Confidence interval estimation of MASA

Date	μ	90%	95%	99%	Conclusion
		$2193.4 \leq \mu \leq 2244.5$	$2188.1 \leq \mu \leq 2249.7$	$2177.3 \leq \mu \leq 2260.5$	
20230209	2250	Over upper limit	Over upper limit	Normal	Ambiguous
20230210	2250	Over upper limit	Over upper limit	Normal	Ambiguous
20230213	2430	Over upper limit	Over upper limit	Over upper limit	Unusual
20230214	2440	Over upper limit	Over upper limit	Over upper limit	Unusual
20230215	2440	Over upper limit	Over upper limit	Over upper limit	Unusual
20230216	2450	Over upper limit	Over upper limit	Over upper limit	Unusual
20230217	2360	Over upper limit	Over upper limit	Over upper limit	Unusual
20230220	2430	Over upper limit	Over upper limit	Over upper limit	Unusual
20230221	2480	Over upper limit	Over upper limit	Over upper limit	Unusual
20230222	2550	Over upper limit	Over upper limit	Over upper limit	Unusual
20230223	2600	Over upper limit	Over upper limit	Over upper limit	Unusual
20230224	2600	Over upper limit	Over upper limit	Over upper limit	Unusual
20230227	2900	Over upper limit	Over upper limit	Over upper limit	Unusual
20230228	3620	Over upper limit	Over upper limit	Over upper limit	Unusual
20230301	4520	Over upper limit	Over upper limit	Over upper limit	Unusual

Table 13 shows that the movement of stock prices of MKTR in the last four days tends to experience an unusual increase. At levels of 90%, 95% and 99%, confidence interval estimation shows similar results.

In addition, the movement of stock prices in the first six days is indicated to be in normal conditions or still within the confidence interval.

Table 13. Confidence interval estimation of MKTR

Date	μ	90%	95%	99%	Conclusion
		$141.54 \leq \mu \leq 151.07$	$140.58 \leq \mu \leq 152.04$	$138.62 \leq \mu \leq 153.99$	
20230221	150	Normal	Normal	Normal	Normal
20230222	146	Normal	Normal	Normal	Normal
20230223	149	Normal	Normal	Normal	Normal
20230224	146	Normal	Normal	Normal	Normal
20230227	145	Normal	Normal	Normal	Normal
20230228	145	Normal	Normal	Normal	Normal
20230301	162	Over upper limit	Over upper limit	Over upper limit	Unusual
20230302	159	Over upper limit	Over upper limit	Over upper limit	Unusual
20230303	202	Over upper limit	Over upper limit	Over upper limit	Unusual
20230306	218	Over upper limit	Over upper limit	Over upper limit	Unusual

Table 14 shows that stock prices from NATO tend to move unstable. This is indicated by the movement which is above the upper limit on the first two days and then experiencing an unusual decrease on

the next days. These results indicate that the movement of stock prices from NATO tends to take the form of an unusual pattern.

Table 14. Confidence interval estimation of NATO

Date	μ	90%	95%	99%	Conclusion
		$484.90 \leq \mu \leq 490.08$	$484.39 \leq \mu \leq 490.59$	$483.35 \leq \mu \leq 491.63$	
20230310	496	Over upper limit	Over upper limit	Over upper limit	Unusual
20230313	496	Over upper limit	Over upper limit	Over upper limit	Unusual
20230314	484	Less lower limit	Less lower limit	Normal	Ambiguous
20230315	476	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	470	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	474	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	476	Less lower limit	Less lower limit	Less lower limit	Unusual

Table 15 shows that the confidence interval estimation of SAGE has varied results. SAGE stock prices in the last six days tended to experience an unusual increase even though the previous days were in normal conditions or had less than

lower limits. Overall, these results show that stock prices from SAGE tend to experience an unusual pattern, but if it is based on the last days, there will be indications of an unusual increase.

Table 15. Confidence interval estimation of SAGE

Date	μ	90%	95%	99%	Conclusion
		$154.9 \leq \mu \leq 220.5$	$147.9 \leq \mu \leq 227.5$	$132.8 \leq \mu \leq 242.6$	
20230308	135	Less lower limit	Less lower limit	Normal	Ambiguous
20230309	173	Normal	Normal	Normal	Normal
20230310	161	Normal	Normal	Normal	Normal
20230313	150	Less lower limit	Normal	Normal	Ambiguous
20230314	140	Less lower limit	Less lower limit	Normal	Ambiguous
20230315	131	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	122	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	114	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	116	Less lower limit	Less lower limit	Less lower limit	Unusual
20230321	113	Less lower limit	Less lower limit	Less lower limit	Unusual
20230324	152	Less lower limit	Normal	Normal	Ambiguous
20230327	204	Normal	Normal	Normal	Normal
20230328	254	Over upper limit	Over upper limit	Over upper limit	Unusual
20230329	316	Over upper limit	Over upper limit	Over upper limit	Unusual
20230330	294	Over upper limit	Over upper limit	Over upper limit	Unusual
20230331	274	Over upper limit	Over upper limit	Over upper limit	Unusual
20230403	342	Over upper limit	Over upper limit	Over upper limit	Unusual
20230404	426	Over upper limit	Over upper limit	Over upper limit	Unusual

Table 16 shows that most of the stock prices from SFAN are less than lower limit, indicating the occurrence of an unusual decrease rather than unusual pattern. However, the share price on

March 24, 2023 (or 20230324) is indicated to be within the confidence interval, especially at the 95% and 99% levels.

Table 16. Confidence interval estimation of SFAN

Date	μ	90%	95%	99%	Conclusion
		$1830.45 \leq \mu \leq 1844.77$	$1829.02 \leq \mu \leq 1846.20$	$1826.14 \leq \mu \leq 1849.08$	
20230307	1815	Less lower limit	Less lower limit	Less lower limit	Unusual
20230308	1810	Less lower limit	Less lower limit	Less lower limit	Unusual
20230309	1825	Less lower limit	Less lower limit	Less lower limit	Unusual
20230310	1820	Less lower limit	Less lower limit	Less lower limit	Unusual
20230313	1825	Less lower limit	Less lower limit	Less lower limit	Unusual
20230314	1820	Less lower limit	Less lower limit	Less lower limit	Unusual
20230315	1825	Less lower limit	Less lower limit	Less lower limit	Unusual
20230316	1815	Less lower limit	Less lower limit	Less lower limit	Unusual
20230317	1825	Less lower limit	Less lower limit	Less lower limit	Unusual
20230320	1815	Less lower limit	Less lower limit	Less lower limit	Unusual
20230321	1820	Less lower limit	Less lower limit	Less lower limit	Unusual
20230324	1830	Less lower limit	Normal	Normal	Ambiguous

Table 17 shows that the stock prices of WINE in the first two days are still within the confidence range. However, the stock prices are then above the upper limit at

levels of 90%, 95%, and 99%. Based on those results, the stock prices of WINE are unusually increasing.

Table 17. Confidence interval estimation of WINE

Date	μ	90%	95%	99%	Conclusion
		$301.58 \leq \mu \leq 319.40$	$299.81 \leq \mu \leq 321.17$	$296.25 \leq \mu \leq 324.73$	
20230321	302	Normal	Normal	Normal	Normal
20230324	314	Normal	Normal	Normal	Normal
20230327	338	Over upper limit	Over upper limit	Over upper limit	Unusual
20230328	336	Over upper limit	Over upper limit	Over upper limit	Unusual
20230329	420	Over upper limit	Over upper limit	Over upper limit	Unusual
20230330	525	Over upper limit	Over upper limit	Over upper limit	Unusual
20230331	550	Over upper limit	Over upper limit	Over upper limit	Unusual
20230403	585	Over upper limit	Over upper limit	Over upper limit	Unusual
20230404	565	Over upper limit	Over upper limit	Over upper limit	Unusual
20230405	705	Over upper limit	Over upper limit	Over upper limit	Unusual

5. Conclusion

In order to protect the investors, the capital market authority actively monitors stock price movements. One of the results of supervision by capital market authority is publishing the UMA status publicly. UMA status is given to firms that have unusual movements in stock prices so as to provide an opportunity for investors to rearrange their portfolios. This study contributes as a reference to the public regarding UMA including methods for analyzing UMA. This study proves that confidence interval estimation is able to detect unusual trends in stock prices during the March to April 2023 announcements. In addition, this study also finds that the classification of critical values and consideration of data ranges are crucial factors in justifying UMA.

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