THE MOON AND THE THAI STOCK MARKETS

BY

MR. WILLIAM KYAWTHAN

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE
(ACCOUNTING AND FINANCIAL MANAGEMENT)
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was approved as partial fulfillment of the requirements for
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ABSTRACT

This study investigated the lunar effect on Thailand's financial market using date on Thai Lunar Calendar and Gregorian Lunar Calendar over the period between 4 September 1998 (where SET index cascaded to the rock bottom after the 1997 financial crisis) to 31 December 2020 in Thailand's stock market. SET and SET50 index are the sample. For the MAI index, the study period is between 2 September 2002 (inception of MAI index) to 31 December 2020 via paired T-tests methods assuming equal variances to find the existence of the lunar effect in SET and MAI.

There are little differences in result when using different calendar. The result showed that there is no overall the Lunar Effect in SET and MAI after the 1997 crisis even though the Lunar Effect used to occur 6 out of 23 years in SET and 2 out of 19 years in MAI, if data from dates upon lunar phases on Thai Lunar calendar are used. For Gregorian calendar, Lunar Effect used to occur in 4 out of 23 years in SET and 2 out of 19 years in MAI. There is significantly lower return on new moon day on average compare to other ordinary days in SET using dates on Thai Lunar calendar, while Gregorian Lunar calendar showed higher return on new moon day in MAI and lower return on full moon day in SET50 compare to other ordinary days.

Keywords: Lunar Effect, Stock markets return

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Lastly, I would like to express a gratitude to my advisor again for suggesting me a temple for ordination. I met a few sages and erudite monks from whom I learned many factual truths of life during my time as a monk there. After leaving monkhood, my view about this world changed and I am a lot happier since I taste the nectar of Dharma and know what real Buddhism is. I wish everyone would one day taste it as well.

Mr. William Kyawthan

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Symbols/Abbreviations	Terms
SET	Stock Exchange of Thailand
MAI	Market for Alternative Investment

CHAPTER 1
INTRODUCTION

1.1 Research Background

The Stock Exchange of Thailand is one of the most famous emerging markets in Asia. It is also a pioneer in the financial market of the Association of Southeast Asian Nations. Billions of dollars are being used to buy and sell stocks during weekdays, the stock market movements have long been based upon investors' action. We can see a tremendous development through the 45 years since the inception of the Stock Exchange of Thailand. On 21 June 1999, the Market for Alternative Investment was established in Thailand. This new investment market provides more opportunities for investors to buy good growth stock and helps the small and medium-sized firms access funds.

Behavioral finance is a study that focuses on the influence of investors' psychology that affects their decision making which is multifactorial that eventually leads to fluctuation in the returns. Not all investors tend to behave rationally, influences are both internal and external. The term "emotion" in behavioral finance means a decision that is being acted on by the state of current feeling, mood or instinct. Fear & emotion make investors behave differently from what they had planned. Harlow and Brown (1990) reported that investors are subjected to bias caused by moods. Loewenstein (2000) found that mood is an important factor when investors make decisions.

Most related behavioural finance theory to the Lunar Effect is a theory called "Herding Mentality" where investors are likely to follow what other investors are acting. Recall the Asian financial crisis in 1997 as examples, the crisis caused a cascading stock market crash in many Asian stock markets because everyone was heading to the exit door no matter how strong the company's fundamentals are. This shows that mood predominantly influenced stock market returns. Another example

is during the Dotcom Bubble where the price of technology stocks in the U.S. market skyrocketed (and finally crashed) due to irrational exuberance, these two examples were driven by herd mentality.

Astrology postulation indicates that the moon affects human's emotions even though the reason remains unknown. This suggests that moon phases are associated with stock market returns and investors' actions because investors are human living under the moon shade. Many studies have shown that there is a coincidental change between investors' behaviour, market returns and phases of the moon. The findings show some statistical reports that during the new moon, investors are prone to be more optimistic and the market return is significantly positive while a full moon coincides with lower market return. It means that mood affects investors and investors' action affects the market because investors are the one who drive stock price up or down.

If the market is efficient and everyone is rational enough, extraterrestrial power or planetary positions cannot create any seasonal returns in the financial market, neither affect investors' mood. Controversially, a study by Munyasia (2009) found out that the return on the full moon and new moon day is higher than other ordinary trading days. Many studies about the Lunar Effect confirm that the lunar phases affect investors' behaviour and there is a Lunar Effect on the financial sphere (Dichev & Janes, 2001; Yuan, 2001). In 1998, Christopher Carolan highlighted the occurrence of panics on the annual lunar calendar in his document called "Autumn Panics : A Calendar Phenomenon", he showed that the panic usually occurs during certain lunar phases. For example, Gao (2009) found that the Lunar Effect existed in two major Chinese stock markets. This kind of anomaly may sound unreasonable from an academic perspective, but in fact investors can profit from the market using this irrationality because of the existence of a relationship between lunar cycles (which affect investors' mood) and market returns. Another study related to behavioral finance by Bollen et al (2011) showed that inclusion of people's mood or herd psychology improves prediction of the market.

Even though we cannot prove that the moon does have any superstitious power in manipulating human's mood, the public mood during moon phases from new until full, does control the market outcomes.

1.2 Objective

The tenet of this study is to find out whether SET, SET50 and MAI index records give rise to contention on lunar effects. Time period of the examination is from 4 September 1998 to 31 December 2020, a total of 23 years for SET and SET50 index. For MAI, 2 September 2002 to 31 December 2020, a total of 19 years.

1.3 Problems

1. Is there Lunar Effect in SET and SET50?
2. Is there Lunar Effect in MAI?

1.4 Research Scope

Samples in this study are daily closing SET and SET50 index from 4 September 1998 (SET index low after the 1997 financial crisis) to 31 December 2020. For MAI, 2 September 2002 to 31 December 2020. Daily SET, SET50 and MAI indexes in this research are secondary data from Efin Stockpickup program.

1.5 Benefit from The Research

This study aims to investigate the lunar effect in Thailand’s two stock markets, SET and MAI, SET50 is subset of SET. The result of this study should have an important role on investor’s investment decision making regarding lunar phases in SET and MAI. Trading strategies can be created by analyzing patterns from lunar

phases. Investors, investment consultants, portfolio managers should make suitable investment strategies using the result of this research to obtain extra returns.

1.6 Definitions of Terms

SET stands for Stock Exchange of Thailand

MAI stands for Market for Alternative Investment

SET50 is an index that composed of top 50 biggest capitalized stocks in SET

Lunar calendar is a calendar that is based on moon phases, the lunation of the moon takes approximately 29.5 days per month in which there are 354 days a year

New moon period or Waning period is from full moon waning to new moon

Full moon period or Waxing period is from new moon waxing to full moon

Lunar Effect is when there is significant difference in market return between two moon phases (new moon and full moon)

CHAPTER 2
REVIEW OF LITERATURE

2.1 Related ideologies

We all have heard about natural phenomena of water tide. As the distance between the moon and the earth become closer, there will be high tides caused by gravitational power. Human body, too, contains a fluid substance like water which is called blood. So, during the full moon, circadian rhythms of blood change, blood pressure is likely to increase and make people emotionally hot-tempered and aggressive, this belief is rooted in astrology.

According to many Astrology doctrines, especially Vedic astrology from India, the full moon is vicious and unpleasant while the new moon is virtue and pleasant. Strangely, many major U.S. stock market crashes occur around the full moon and the first quarter, documented by McMinn (2012). Brahmana et al (2012) found a negative effect of full moon on investors' mood. The Vedic astrology claims that moon light is closely related to human behaviour, emotion and health.

2.2 Related researches

2.2.1 Behavioral Finance

Shiller (2003), the founder of a so-called “behavioral finance” recalled the egregious crashes and the catapult jumps of the market in the past are caused by human mood and action. Foible during the bad and ecstasy during the good. The 2008 Hamburger Crisis originated in the U.S. market but it caused a cascading stock market crash nearly worldwide due to big sell-off in international funds all over the world that unsurprisingly made retail investors stampede out of the market, no matter how fundamentally good the company they hold were. This is called Herd Mentality Bias, it shows that investors’ psychology is influenced by

emotions, mood, environment and instinct. We can see many of these kinds of examples during the booms and the busts of financial markets. For example, the admiral environment during Valentine day caused significant positive returns in the U.S. and the U.K. when Valentines is coming, but not significant in Germany and Japan where people are not interested much in this celebration (Chong, 2020). Gama and Viera (2013) explained that good moods tend to create more buying while bad moods tend to create more selling. If there is a positive announcement about the market such as dividend changes or shares repurchasing on the day preceding the holiday, investors react in a more up-beat way. These actions rooted in human mood created tides in the market.

2.2.2 The Lunar Effect

In SET, there are seasonal returns during Chinese New Year and Buddhist holidays (Khanthavit et al, 1996). Whereas Chinese New Year is not a market holiday in the U.S., Wu (2013) documented insignificant but positive returns 1 week prior to Chinese New Year in Chinese ADRs in the U.S. market. The results from these two studies have something in common, every Buddhist holiday is on a great Full Moon day, and every Chinese New Year is 1 day after the new moon day, we can spot seasonal return around moon phases. Floros and Tan (2013) found that the lunar effect is strongly associated with calendar anomalies.

A study of the Lunar Effect over the last 100 years in 25 markets by Dichev and Janes (2001) found that stock returns during full moon is significantly less than during new moon, again in 2003, they found that returns during new moon period are double of the full moon period, the results are in line with Yuan et al (2006) study, they concluded that positive returns are usually found during new moon. Another study by Kasilingam (2013) suggests that people might be more pessimistic during the full moon and opt to be more optimistic during the new moon, which leads to some seasonal returns during the holidays. This coincides with the returns during Chinese New Year and Buddhist holidays in Thailand, but the lunar influences cannot be solely explained as a reason for the market returns even when the moon cycle effect is found.

A study of the lunar effect in SET conducted by Dichev and Janes (2001) found no difference between returns during the full moon or the new moon period. But the result can vary across markets, the new moon never always give positive returns and the full moon never always give negative returns in every market. In China, the returns are higher on the days around a full moon than on the days around a new moon (Gao, 2009). Moreover, a study by Yousop et al (2014) found a reversal of the lunar effect after the financial crisis of 2008, where more returns are gained during the full moon in the emerging countries stock markets. Not only for the lunar effect, Holden, Thompson, and Ruangrit (2005) found the reversal pattern in the holiday effect in SET after the 1997 crisis, this means stock market behaviour might change after a crisis occured. Sivakumar (2009) found better but not significant return during the new moon and there is no significant evidence of the day-of-the week effects corresponding with moon phases while Lizinska (2017) found the bull, the bear month and the lunar effect have some relationship with each other whereas a study by Chandy et al (2007) shows that there is no evidence for seasonal return in the stock market indices from the moon.

2.3 Hypotheses

2.3.1 to 2.3.3 are for SET, 2.3.4 to 2.3.6 are for MAI, 2.3.7 to 2.3.9 are for SET50

2.3.1 Hypothesis 1

H0 = The return on SET index during new moon period is not different from full moon period

H1 = The return on SET Index during new moon period is higher than full moon period

2.3.2 Hypothesis 2

H0 = The SET index return on new moon day is not higher than ordinary days and the return on full moon day is not higher than ordinary days

H1 = The SET index return on new moon day is higher than ordinary days and the return on full moon day is higher than ordinary days

2.3.3 Hypothesis 3

H0 = There is no reversal of Lunar Effect in SET after the 2008 crisis

H1 = There is reversal of Lunar Effect in SET after the 2008 crisis

2.3.4 Hypothesis 4

H0 = The return on MAI index during new moon period is not different from full moon period

H1 = The return on MAI index during new moon period is higher than full moon period

2.3.5 Hypothesis 5

H0 = The MAI index return on new moon day is not higher than ordinary days and the return on full moon day is not higher than ordinary days

H1 = The MAI index return on new moon day is higher than ordinary days and the return on full moon day is higher than ordinary days

2.3.6 Hypothesis 6

H0 = There is no reversal of Lunar Effect in MAI after the 2008 crisis

H1 = There is reversal of Lunar Effect in MAI after the 2008 crisis

2.3.7 Hypothesis 7

H0 = The return on SET50 index during new moon period is not different from full moon period

H1 = The return on SET50 Index during new moon period is higher than full moon period

2.3.8 Hypothesis 8

H0 = The SET50 index return on new moon day is not higher than ordinary days and the return on full moon day is not higher than ordinary days

H1 = The SET50 index return on new moon day is higher than ordinary days and the return on full moon day is higher than ordinary days

2.3.9 Hypothesis 9

H0 = There is no reversal of Lunar Effect in SET50 after the 2008 crisis

H1 = There is reversal of Lunar Effect in SET50 after the 2008 crisis

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Samples

Daily closing SET and SET50 indexes from 4 September 1998 to 4 September 2020, and from 2 September 2002 to 2 September 2020 for MAI. For proving Lunar Effect in each year, extension of data is to 31 December 2020 for all samples. Data in this research are secondary data from the EfinStockpickup program. All calculations use current local time in Bangkok (GMT+7) to determine the dates of the lunar phases using Thai calendar. Dates on Thai Lunar Calendar are obtained from www.myhora.com, for Gregorian Lunar Calendar, dates are obtain from www.timeanddate.com.

3.2 Dependent Variable

R(t) = daily return of SET index on day t , every calculation method for SET data is the same for data from SET50, but use SET50 data instead of SET

It is calculated by $R(t)= \frac{SET(d)}{SET(d-1)} \times 100$

r(t) = daily return of MAI index on day t

It is calculated by $r(t)= \frac{MAI(d)}{MAI(d-1)} \times 100$

Where;

SET(d) = Closing value of index on that specific day

SET(d-1) = Closing value of index on preceding day

MAI(d) = Closing value of index on that specific day

MAI(d-1) = Closing value of index on preceding day

3.3 Independent Variable

Lunar phases

3.4 Controlled Variable

Time period of the study

3.5 Methodology

To prove whether there is Lunar Effect in Thai markets (hypothesis 1 and 4), the author first determine the actual daily closing return (day t) by

$$CG_i(t)= \frac{(R(t)-R(t-1))}{R(t-1)} \quad \text{..... For SET}$$

$$CG_i(t)= \frac{(r(t)-r(t-1))}{r(t-1)} \quad \text{..... For MAI}$$

Where;

CG_i = Capital gains/loss for index i at time t

R(t) = daily return of SET index on day t

R(t-1) = daily return of SET index on day t-1

r(t) = daily return of MAI index on day t

r(t-1) = daily return of MAI index on day t-1

Then calculate the mean returns for the new moon and full moon period.

Mean values was calculated by

$$Mean= \frac{1}{N} \sum_{i=1}^{N} X_i \quad \text{.....For both SET and MAI}$$

Where;

X_i = daily capital gains/loss of index i

N = Number of days in the study window

Then compare the results between the new moon and full moon period.

Proving Lunar Effect in each year is also considered using the same method as the aforementioned, but mean return calculation is not needed.

Calculating the daily capital gain for each year during new moon and full moon phases, then compare the result within each year.

To check whether there is a higher return on the new moon day than other ordinary days (hypothesis 2 and 5), the author compares the return on that day and average return pre and post new moon combined, with a time frame of 3 days and 5 days. The same method is applied to the full moon phase.

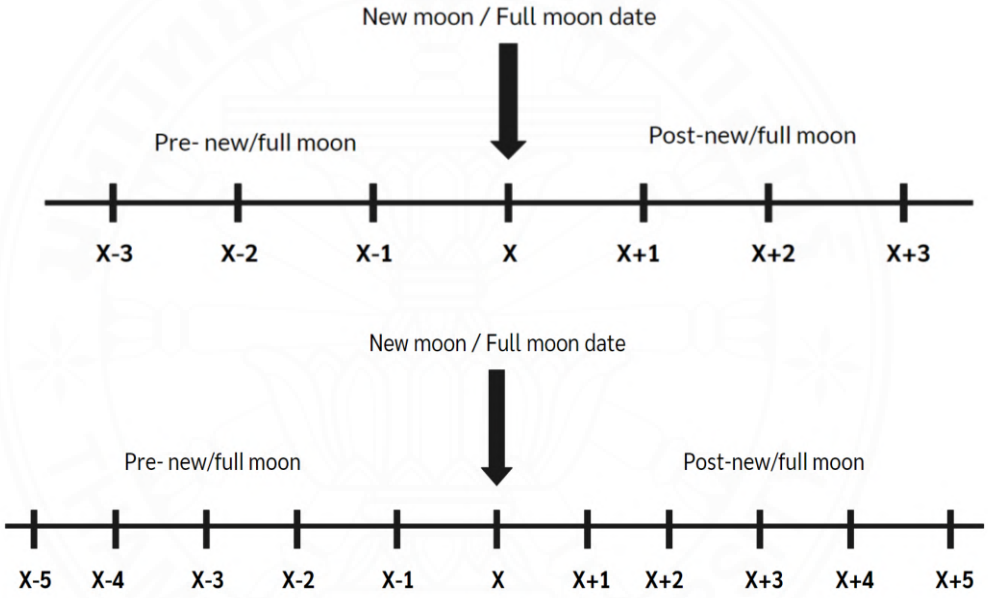

FIGURE 3.1 Calculation of hypotheses 2, 5 and 8

The calculation is the same for hypotheses 1, 4 and 7, but with a different N (from 14 days to 3 days and 5 days).

To examine the reversal of lunar effect in SET like what Yousop et al (2014) found in the Malaysian market.

The author separates data from the SET index into two categories : SET indexes from 1998 low after the 1997 (4 September 1998) crisis to 2008 low (26 November 2008) after the Hamburger crisis hit. Then the first day after 2008 low to

2020 low (23 March 2020) when the Covid virus spreaded in Thailand. For MAI index, the author uses data on 2 September 2002 as the first day to 2008 low and the second data set is from the first day after 2008 low to 2020 low.

FIGURE 3.2 Calculation of hypotheses 3, 6 and 9

Then calculate the daily returns between the new and full moon phases prior and post 2008 low, then compare the result.

The study employed paired T-tests assuming equal variances to examine the lunar effect in Thai stock market during moon phases at a significance level of 95%.

CHAPTER 4
RESULTS AND DISCUSSION

TABLE 4.1 to 4.12 are result using Thai Lunar Calendar and from there after are the result using Gregorian Lunar Calendar.

TABLE 4.1

SET New Moon and Full Moon period Descriptive Statistics

SET	N	New Moon period	Full Moon period	P Value one-tail	P Value two-tail
Mean	272	0.000268	0.000686	0.157166	0.314332
Variance	272	0.000025	0.000022		

Source: Research Findings

Result of Hypothesis 1 showed that the mean return during the new moon and full moon period is 0.0268% and 0.0686% respectively.

We can see that on the SET index, returns around the full moon period are about double of the new moon period, but because the P value is more than 0.05, hypothesis H0 is accepted and H1 is rejected. There is no Lunar Effect in SET in the period of the study (4 September 1998 to 4 September 2020).

TABLE 4.2

SET yearly Descriptive Statistics

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1998	39, 41	0.008838	0.005751	0.331373	0.662745
Variance		0.00127	0.000731		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1999	121, 124	0.002885	0.000115	0.166345	0.332691
Variance		0.000564	0.000435		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2000	123, 123	-0.00316	-0.00081	0.163152	0.326305
Variance		0.000349	0.000353		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2001	117, 128	-0.00183	0.002879	0.012997	0.025994
Variance		0.000309	0.000234		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2002	121, 124	0.002189	-0.00068	0.040564	0.081128
Variance		0.000156	0.000173		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2003	121, 126	0.001437	0.004912	0.013368	0.026736
Variance		0.000135	0.000164		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2004	119, 126	-0.00088	-0.00009	0.345243	0.690486
Variance		0.000203	0.000267		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2005	122, 123	0.001507	-0.00088	0.018122	0.036243
Variance		0.000075	0.000082		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2006	114, 129	-0.00198	0.001605	0.037005	0.074011
Variance		0.000303	0.000186		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2007	120, 125	0.001781	0.000302	0.174654	0.349308
Variance		0.000158	0.000146		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2008	126, 121	-0.00334	-0.0014	0.235338	0.470677
Variance		0.000374	0.000515		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2009	118, 125	0.001568	0.002688	0.291633	0.583267
Variance		0.000284	0.000222		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2010	124, 118	0.002314	0.000588	0.116749	0.233498
Variance		0.000109	0.000144		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2011	122, 122	-0.00041	0.000555	0.297558	0.595116
Variance		0.00019	0.000214		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2012	119, 126	0.001635	0.000946	0.25119	0.502399
Variance		0.000071	0.000058		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2013	125, 120	-0.00145	0.001114	0.063794	0.127588
Variance		0.000144	0.000203		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2014	120, 125	0.000279	0.000939	0.264375	0.52875
Variance		0.000062	0.000072		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2015	119, 124	-0.00034	-0.00082	0.333771	0.667542
Variance		0.000067	0.000084		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2016	124, 120	0.000912	0.000644	0.407915	0.815831
Variance		0.00005	0.00011		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2017	116, 128	0.000566	0.000504	0.452644	0.905289
Variance		0.000019	0.000015		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2018	125, 120	0.000134	-0.00104	0.114843	0.229686
Variance		0.000054	0.000062		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2019	122, 122	0.000861	-0.00074	0.017188	0.034376
Variance		0.000035	0.000034		

TABLE 4.2

SET yearly Descriptive Statistics (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2020	116, 126	-0.00133	0.000899	0.179144	0.358287
Variance		0.000457	0.000262		

Source: Research Findings

The outcomes in the yearly perspective of 23 years showed as follows.

In 1998, the data of the last quarter were used (4 September 1998 to 31 December 1998) and the result showed that mean return during new moon and full moon period are 0.8838% and 0.5751% respectively, but there was no Lunar Effect in SET year 1998 because P value is more than 0.05.

In 1999, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.2885% and 0.0115% respectively, but there was no Lunar Effect in SET year 1999 because P value is more than 0.05.

In 2000, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.316% and -0.081% respectively, but there was no Lunar Effect in SET year 2000 because P value is more than 0.05.

In 2001, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.183% and 0.2879% respectively, the result showed that there was Lunar Effect in SET year 2001 because both one-tailed and two-tailed P value are less than 0.05.

In 2002, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.2189% and -0.068% respectively, the result showed that there was Lunar Effect in SET year 2002 because one-tailed P value is less than 0.05.

In 2003, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1437% and 0.4912% respectively, the result showed that there was Lunar Effect in SET year 2003 because both one-tailed and two-tailed P value are less than 0.05.

In 2004, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.088% and 0.009% respectively, but there was no Lunar Effect in SET year 2004 because P value is more than 0.05.

In 2005, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1507% and -0.088% respectively, the result showed that there was Lunar Effect in SET year 2005 because both one-tailed and two-tailed P value are less than 0.05.

In 2006, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.198% and 0.1605% respectively, the result showed that there was Lunar Effect in SET year 2006 because one-tailed P value is less than 0.05.

In 2007, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1781% and 0.0302% respectively, but there was no Lunar Effect in SET year 2007 because P value is more than 0.05.

In 2008, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.334% and -0.14% respectively, but there was no Lunar Effect in SET year 2008 because P value is more than 0.05.

In 2009, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1568% and 0.2688%

respectively, but there was no Lunar Effect in SET year 2009 because P value is more than 0.05.

In 2010, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.2314% and 0.0588% respectively, but there was no Lunar Effect in SET year 2010 because P value is more than 0.05.

In 2011, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.041% and 0.0555% respectively, but there was no Lunar Effect in SET year 2011 because P value is more than 0.05.

In 2012, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1635% and 0.0946% respectively, but there was no Lunar Effect in SET year 2012 because P value is more than 0.05.

In 2013, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.145% and 0.1114% respectively, but there was no Lunar Effect in SET year 2013 because P value is more than 0.05.

In 2014, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0279% and 0.0939% respectively, but there was no Lunar Effect in SET year 2014 because P value is more than 0.05.

In 2015, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.034% and -0.082% respectively, but there was no Lunar Effect in SET year 2015 because P value is more than 0.05.

In 2016, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0912% and 0.0644% respectively, but there was no Lunar Effect in SET year 2016 because P value is more than 0.05.

In 2017, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.05658% and 0.0504% respectively, but there was no Lunar Effect in SET year 2017 because P value is more than 0.05.

In 2018, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0134% and -0.104% respectively, but there was no Lunar Effect in SET year 2018 because P value is more than 0.05.

In 2019, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.0861% and -0.074% respectively, the result showed that there was Lunar Effect in SET year 2019 because both one-tailed and two-tailed P value are less than 0.05.

In 2020, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.133% and 0.0899% respectively, but there was no Lunar Effect in SET year 2020 because P value is more than 0.05.

TABLE 4.3

Comparison between New Moon day, Full Moon day and average returns around that day of SET

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	183	-0.00151	0.000304	0.027068	0.054136
average pre & post 3 days	183	0.000304	0.000041		

TABLE 4.3

Comparison between New Moon day, Full Moon day and average returns around that day of SET (cont.)

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	183	-0.00151	0.000304	0.057294	0.114587
average pre & post 5 days	183	0.00060	0.000022		

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	141	0.000576	0.00022	0.323994	0.647989
average pre & post 3 days	141	0.001211	0.000053		

TABLE 4.3

Comparison between New Moon day, Full Moon day and average returns around that day of SET (cont.)

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	141	0.000576	0.00022	0.421634	0.843269
average pre & post 5 days	141	0.000838	0.000028		

Source: Research Findings

The new moon results show mean return -0.151% on the new moon day compared to the average return of 0.1145%, 3 days before and after the new moon day. The result shows that the return on new moon day is significantly lower than ordinary days in the study with P value of 0.027068 and 0.054136 for one-tailed and two-tailed respectively. Take another look at the 5 days window before and after new moon day, the average ordinary day return is 0.06%, which is also not significantly higher than the return on new moon day because the P value is more than 0.05.

For full moon results, the outcomes show a mean return of 0.0576% on the full moon day. An ordinary 3 and 5 days window have average return of 0.1211% and 0.0838% respectively, which are not significantly different from return on the full moon day at a significance level of 95%. Both 3 and 5 days window average return P value are more than 0.05

TABLE 4.4

Reversal of Lunar Effect in SET

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon period (pre 2008)	1232	0.000113	0.000299	0.202212	0.404423
Full Moon period (pre 2008)	1280	0.000675	0.000272		
New Moon period (post 2008)	1376	0.000339	0.000127	0.375556	0.751112
Full Moon period (post 2008)	1387	0.000473	0.000118		

Source: Research Findings

The finding of hypothesis 1 showed that there was no Lunar Effect in SET since the low of 1998 in long term perspective (23 years). Which means there is no Reversal of Lunar Effect either, because there is no Lunar Effect in the first place. So the outcome of this examination "Reversal of Lunar Effect" would be to find whether there is any change in behaviour of return during moon phases after the 2008 crisis. Pre 2008 crisis new moon period return is 0.0113%. Post 2008 crisis new moon period return is 0.0339%. Pre 2008 crisis full moon period return is 0.0675%. Post 2008 crisis full moon return is 0.0473%.

The returns between new moon and full moon period pre 2008 crisis are not significantly different, nor the post 2008 crisis.

TABLE 4.5

MAI New Moon and Full Moon period Descriptive Statistics

MAI	N	New Moon period	Full Moon period	P Value one-tail	P Value two-tail
Mean	223	0.000206	0.000437	0.308641	0.617283
Variance		0.000023	0.000025		

Source: Research Findings

Result of Hypothesis 4 showed that the mean return during the new moon and full moon period is 0.0206% and 0.0437% respectively. We can see that on the MAI index, returns around the full moon period are about double of the new moon period, but because the P value is more than 0.05, hypothesis H0 is accepted and H1 is rejected. There is no Lunar Effect in MAI in the period of the study.

TABLE 4.6

MAI yearly Descriptive Statistics

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2002	39, 41	0.001634	0.005207	0.259057	0.518114
Variance		0.000547	0.000661		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2003	121, 126	0.004492	0.004001	0.42753	0.855059
Variance		0.000457	0.000432		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2004	119, 126	-0.00127	-0.00256	0.380261	0.760522
Variance		0.002040	0.000203		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2005	122, 123	-0.000031	-0.001318	0.089769	0.179539
Variance		0.000046	0.000065		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2006	114, 129	-0.00092	0.002497	0.010033	0.020065
Variance		0.000169	0.000094		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2007	120, 125	0.00149	0.001422	0.4804	0.9608
Variance		0.000102	0.000128		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2008	126, 121	-0.00173	-0.00224	0.386996	0.773992
Variance		0.000145	0.000249		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2009	118, 125	0.001771	0.000678	0.221202	0.442404
Variance		0.000138	0.000108		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2010	124, 118	0.001297	0.000709	0.284798	0.569596
Variance		0.000067	0.000062		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2011	122, 122	-0.0011	0.000998	0.099964	0.199928
Variance		0.000169	0.000155		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2012	119, 126	0.00217	0.001626	0.316145	0.63229
Variance		0.000087	0.000071		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2013	125, 120	-0.00217	0.001322	0.066801	0.133601
Variance		0.000226	0.000435		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2014	120, 125	0.002324	0.003309	0.260648	0.521295
Variance		0.000119	0.000168		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2015	119, 124	-0.00033	-0.00187	0.183641	0.367283
Variance		0.000154	0.000196		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2016	124, 120	0.001593	-0.00013	0.13043	0.260859
Variance		0.000085	0.000201		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2017	116, 128	-0.00094	-0.00014	0.179313	0.358626
Variance		0.000058	0.000035		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2018	125, 120	-0.00081	-0.00257	0.030416	0.060832
Variance		0.000057	0.00005		

TABLE 4.6

MAI yearly Descriptive Statistics (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2019	122, 122	-0.00018	-0.00093	0.191299	0.382598
Variance		0.000046	0.000042		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2020	116, 126	-0.00071	0.001502	0.114511	0.229022
Variance		0.000219	0.000187		

Source: Research Findings

In 2002, the data of the last quarter were used (2 September 2002 to 31 December 2002) and the result showed that mean return during new moon and full moon period are 0.1634% and 0.5207% respectively, but there was no Lunar Effect in MAI year 2002 because P value is more than 0.05.

In 2003, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.4492% and 0.4001%

respectively, the result showed that there was no Lunar Effect in MAI year 2003 because P value is not less than 0.05.

In 2004, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.2043% and -0.256% respectively, the result showed that there was no Lunar Effect in MAI year 2004 because P value is not less than 0.05.

In 2005, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.0031% and -0.1318% respectively, the result showed that there was no Lunar Effect in MAI year 2005 because P value is not less than 0.05.

In 2006, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.092% and 0.2497% respectively, the result showed that there was Lunar Effect in MAI year 2006 because both one-tailed and two-tailed P value are less than 0.05.

In 2007, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.149% and 0.1422% respectively, the result showed that there was no Lunar Effect in MAI year 2007 because P value is not less than 0.05.

In 2008, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.173% and -0.224% respectively, the result showed that there was no Lunar Effect in MAI year 2008 because P value is not less than 0.05.

In 2009, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1771% and 0.0678% respectively, the result showed that there was no Lunar Effect in MAI year 2009 because P value is not less than 0.05.

In 2010, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1297% and 0.0709% respectively, the result showed that there was no Lunar Effect in MAI year 2010 because P value is not less than 0.05.

In 2011, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.11% and 0.0998% respectively, the result showed that there was no Lunar Effect in MAI year 2011 because P value is not less than 0.05.

In 2012, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.217% and 0.1626% respectively, the result showed that there was no Lunar Effect in MAI year 2012 because P value is not less than 0.05.

In 2013, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.217% and 0.1322% respectively, the result showed that there was no Lunar Effect in MAI year 2013 because P value is not less than 0.05.

In 2014, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.2324% and 0.3309% respectively, the result showed that there was no Lunar Effect in MAI year 2014 because P value is not less than 0.05.

In 2015, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.033% and -0.187% respectively, the result showed that there was no Lunar Effect in MAI year 2015 because P value is not less than 0.05.

In 2016, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1593% and -0.013% respectively, but there was no Lunar Effect in SET year 2016 because P value is not less than 0.05.

In 2017, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.094% and -0.014% respectively, but there was no Lunar Effect in SET year 2017 because P value is not less than 0.05.

In 2018, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.081% and -0.257%

respectively, the result showed that there was Lunar Effect in MAI year 2018 because one-tailed P value is less than 0.05.

In 2019, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.018% and -0.093% respectively, but there was no Lunar Effect in MAI year 2019 because P value is not less than 0.05.

In 2020, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.071% and 0.1502% respectively, but there was no Lunar Effect in MAI year 2020 because P value is not less than 0.05.

TABLE 4.7

Comparison between New Moon day, Full Moon day and average returns around that day of MAI

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	150	0.000222	0.000192	0.394845	0.789690
average pre & post 3 days	150	0.000551	0.000035		

TABLE 4.7

Comparison between New Moon day, Full Moon day and average returns around that day of MAI (cont.)

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	150	0.000222	0.000192	0.445052	0.890104
average pre & post 5 days	150	0.000388	0.000024		

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	111	0.002891	0.00025	0.148058	0.296115
average pre & post 3 days	111	0.001199	0.00004		

TABLE 4.7

Comparison between New Moon day, Full Moon day and average returns around that day of MAI (cont.)

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	111	0.002891	0.00025	0.076238	0.152477
average pre & post 5 days	111	0.000645	0.00002		

Source: Research Findings

The new moon results show mean return of 0.0222% on the new moon day compared to the average return of 0.0551%, 3 days before and after the new moon day. Take another look at the 5 days window before and after new moon day, the average ordinary day return is 0.0388% ,which is also not significantly low than the return on new moon day at significance level of 95%.

For full moon results, the outcomes show a mean return of 0.2891% on the full moon day. An ordinary 3 and 5 days window have average return of 0.1199% and 0.0645% respectively, which are not significantly different from return on the full moon day at a significance level of 95%.

TABLE 4.8

Reversal of Lunar Effect in MAI

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon period (pre 2008)	750	0.000398	0.000500	0.436740	0.873479
Full Moon period (pre 2008)	780	0.000552	0.000225		
New Moon period (post 2008)	1376	0.000145	0.000120	0.443089	0.886178
Full Moon period (post 2008)	1387	0.000208	0.000145		

Source: Research Findings

The finding of hypothesis 4 showed that there was no Lunar Effect in MAI since its index inception in 2002 (19 years). Which means there is no Reversal of Lunar Effect either, because there is no Lunar Effect in the first place. So the outcome of this examination "Reversal of Lunar Effect" would be to find whether there is any change in behaviour of return during moon phases after the 2008 crisis. Pre 2008 crisis new moon period return is 0.0398%. Post 2008 crisis new moon period return is 0.0145%. Pre 2008 crisis full moon period return is 0.0552%. Post 2008 crisis full moon return is 0.0208%.

The returns between new moon and full moon period pre 2008 crisis are not significantly different, nor the post 2008 crisis.

TABLE 4.9

SET50 New Moon and Full Moon period Descriptive Statistics

SET50	N	New Moon period	Full Moon period	P Value one-tail	P Value two-tail
Mean	272	0.000313	0.000700	0.196815	0.39363
Variance	272	0.000029	0.000027		

Source: Research Findings

Result of Hypothesis 7 showed that the mean return during the new moon and full moon period is 0.0313% and 0.0700% respectively.

We can see that on the SET50 index, returns around the full moon period are about double of the new moon period, but because the P value is more than 0.05, hypothesis H0 is accepted and H1 is rejected. There is no Lunar Effect in SET50 in the period of the study (4 September 1998 to 4 September 2020).

TABLE 4.10

SET50 yearly Descriptive Statistics

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1998	39, 41	0.008838	0.005751	0.331373	0.662745
Variance		0.00127	0.000731		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1999	121, 124	0.002885	0.000115	0.166345	0.332691
Variance		0.000564	0.000435		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2000	123, 124	-0.003420	-0.001170	0.206465	0.412930
Variance		0.000443	0.000486		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2001	117, 128	-0.002110	0.002691	0.019595	0.03919
Variance		0.000360	0.000297		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2002	121, 124	0.002426	-0.000970	0.037685	0.07537
Variance		0.000209	0.000233		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2003	121, 126	0.001336	0.005278	0.013105	0.026210
Variance		0.000179	0.000204		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2004	119, 126	-0.000720	0.000278	0.313520	0.627040
Variance		0.000223	0.000294		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2005	122, 123	0.001811	-0.00112	0.012283	0.024566
Variance		0.000101	0.000105		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2006	114, 129	-0.002030	0.001609	0.048694	0.097388
Variance		0.000354	0.000234		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2007	120, 125	0.002097	0.000482	0.187524	0.375048
Variance		0.000212	0.000193		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2008	126, 121	-0.003780	-0.001150	0.198489	0.396977
Variance		0.000501	0.000691		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2009	118, 125	0.001439	0.002945	0.258365	0.516730
Variance		0.000363	0.000292		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2010	124, 118	0.002398	0.000393	0.108900	0.217800
Variance		0.000146	0.000173		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2011	122, 122	-0.000310	0.000535	0.336940	0.673880
Variance		0.000224	0.000269		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2012	119, 126	0.001606	0.000742	0.227216	0.454432
Variance		0.000090	0.000074		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2013	125, 120	-0.001410	0.001090	0.076865	0.153730
Variance		0.000158	0.000216		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2014	120, 125	0.000126	0.000959	0.235228	0.470456
Variance		0.000075	0.000088		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2015	119, 124	-0.000540	-0.001050	0.346093	0.692187
Variance		0.000088	0.000011		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2016	124, 120	0.000685	0.000828	0.458163	0.916325
Variance		0.000082	0.000145		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2017	116, 128	0.000848	0.000523	0.295956	0.591912
Variance		0.000025	0.000021		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2018	125, 120	0.000183	-0.000810	0.184250	0.368500
Variance		0.000068	0.000080		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2019	122, 122	0.000992	-0.000760	0.019524	0.039048
Variance		0.000044	0.000044		

TABLE 4.10

SET50 yearly Descriptive Statistics (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2020	117, 126	-0.000950	0.000456	0.307020	0.614040
Variance		0.000623	0.000327		

Source: Research Findings

The outcomes in the yearly perspective of 23 years showed as follows.

In 1998, the data of the last quarter were used (4 September 1998 to 31 December 1998) and the result showed that mean return during new moon and full moon period are 1.1454% and 0.5858% respectively, but there was no Lunar Effect in SET year 1998 because P value is more than 0.05.

In 1999, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.3411% and 0.028% respectively, but there was no Lunar Effect in SET year 1999 because P value is more than 0.05.

In 2000, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.342% and -0.117% respectively, but there was no Lunar Effect in SET year 2000 because P value is more than 0.05.

In 2001, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.211% and 0.2691% respectively, the result showed that there was Lunar Effect in SET year 2001 because both one-tailed and two-tailed P value are less than 0.05.

In 2002, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.2426% and -0.097% respectively, the result showed that there was Lunar Effect in SET year 2002 because one-tailed P value is less than 0.05.

In 2003, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1336% and 0.5278% respectively, the result showed that there was Lunar Effect in SET year 2003 because both one-tailed and two-tailed P value are less than 0.05.

In 2004, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.072% and 0.0278% respectively, but there was no Lunar Effect in SET year 2004 because P value is more than 0.05.

In 2005, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1811% and -0.112% respectively, the result showed that there was Lunar Effect in SET year 2005 because both one-tailed and two-tailed P value are less than 0.05.

In 2006, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.203% and 0.1609% respectively, the result showed that there was Lunar Effect in SET year 2006 because one-tailed P value is less than 0.05.

In 2007, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.2097% and 0.0482% respectively, but there was no Lunar Effect in SET year 2007 because P value is more than 0.05.

In 2008, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.378% and -0.115% respectively, but there was no Lunar Effect in SET year 2008 because P value is more than 0.05.

In 2009, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1439% and 0.2945%

respectively, but there was no Lunar Effect in SET year 2009 because P value is more than 0.05.

In 2010, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.2398% and 0.0393% respectively, but there was no Lunar Effect in SET year 2010 because P value is more than 0.05.

In 2011, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.031% and 0.0535% respectively, but there was no Lunar Effect in SET year 2011 because P value is more than 0.05.

In 2012, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1606% and 0.0742% respectively, but there was no Lunar Effect in SET year 2012 because P value is more than 0.05.

In 2013, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.141% and 0.109% respectively, but there was no Lunar Effect in SET year 2013 because P value is more than 0.05.

In 2014, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0126% and 0.0959% respectively, but there was no Lunar Effect in SET year 2014 because P value is more than 0.05.

In 2015, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.054% and -0.105% respectively, but there was no Lunar Effect in SET year 2015 because P value is more than 0.05.

In 2016, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0685% and 0.0828% respectively, but there was no Lunar Effect in SET year 2016 because P value is more than 0.05.

In 2017, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0848% and 0.0523% respectively, but there was no Lunar Effect in SET year 2017 because P value is more than 0.05.

In 2018, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0183% and -0.081% respectively, but there was no Lunar Effect in SET year 2018 because P value is more than 0.05.

In 2019, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.0992% and -0.076% respectively, the result showed that there was Lunar Effect in SET year 2019 because both one-tailed and two-tailed P value are less than 0.05.

In 2020, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.095% and 0.0456% respectively, but there was no Lunar Effect in SET year 2020 because P value is more than 0.05.

TABLE 4.11

Comparison between New Moon day, Full Moon day and average returns around that day of SET50

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	183	-0.00179	0.000369	0.021862	0.043724
average pre & post 3 days	183	0.001276	0.000052		

TABLE 4.11

Comparison between New Moon day, Full Moon day and average returns around that day of SET50 (cont.)

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	183	-0.00179	0.000369	0.047558	0.095117
average pre & post 5 days	183	0.000666	0.000026		

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	141	0.000225	0.000277	0.231500	0.463000
average pre & post 3 days	141	0.001372	0.000066		

TABLE 4.11

Comparison between New Moon day, Full Moon day and average returns around that day of SET50 (cont.)

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	141	0.000225	0.000277	0.324153	0.648306
average pre & post 5 days	141	0.000904	0.000035		

Source: Research Findings

The new moon results show mean return -0.179% on the new moon day compared to the average return of 0.1276%, 3 days before and after the new moon day. The result shows that the return on new moon day is significantly lower than ordinary days in the study with P value of 0.021862 and 0.043724 for one-tailed and two-tailed respectively. Take another look at the 5 days window before and after new moon day, the average ordinary day return is 0.0666%, which is also significantly higher than the return on new moon day because the one-tailed P value is less than 0.05.

For full moon results, the outcomes show a mean return of 0.0225% on the full moon day. An ordinary 3 and 5 days window have average return of 0.1372% and 0.0904% respectively, which are not significantly different from return on the full moon day at a significance level of 95%. Both 3 and 5 days window average return P value are more than 0.05

TABLE 4.12

Reversal of Lunar Effect in SET50

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon period (pre 2008)	1232	0.000238	0.000387	0.284870	0.569741
Full Moon period (pre 2008)	1280	0.000673	0.000349		
New Moon period (post 2008)	1376	0.000326	0.000159	0.367813	0.735627
Full Moon period (post 2008)	1387	0.000485	0.000147		

Source: Research Findings

The finding of hypothesis 7 showed that there was no Lunar Effect in SET since the low of 1998 in long term perspective (23 years). Which means there is no Reversal of Lunar Effect either, because there is no Lunar Effect in the first place. So the outcome of this examination "Reversal of Lunar Effect" would be to find whether there is any change in behaviour of return during moon phases after the 2008 crisis. Pre 2008 crisis new moon period return is 0.0238%. Post 2008 crisis new moon period return is 0.0326%. Pre 2008 crisis full moon period return is 0.0673%. Post 2008 crisis full moon return is 0.0485%.

The returns between new moon and full moon period pre 2008 crisis are not significantly different, nor the post 2008 crisis.

From here on, data were analyzed using dates from Gregorian Lunar Calendar.

TABLE 4.13

SET New Moon and Full Moon period Descriptive Statistics using Gregorian Lunar Calendar

SET	N	New Moon period	Full Moon period	P Value one-tail	P Value two-tail
Mean	272	0.000463	0.000508	0.457882	0.915764
Variance	272	0.000024	0.000023		

Source: Research Findings

Result of Hypothesis 1 using dates from Gregorian Lunar Calendar showed that the mean return during the new moon and full moon period is 0.0463% and 0.0508% respectively.

We can see that on the SET index, returns around the full moon period are about double of the new moon period, but because the P value is more than 0.05, hypothesis H0 is accepted and H1 is rejected. There is no Lunar Effect in SET in the period of the study (4 September 1998 to 4 September 2020).

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1998	39, 41	0.009965	0.003896	0.190608	0.381216
Variance		0.001269	0.000679		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1999	123, 124	0.003399	-0.000300	0.096754	0.193507
Variance		0.000580	0.000415		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2000	127, 120	-0.003090	-0.001210	0.217708	0.435416
Variance		0.000368	0.000349		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2001	119, 126	-0.001140	0.002308	0.051593	0.103186
Variance		0.000328	0.000220		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2002	123, 122	0.001963	-0.000500	0.067359	0.134717
Variance		0.000143	0.000187		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2003	127, 120	0.001588	0.004926	0.016712	0.033424
Variance		0.000134	0.000167		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2004	124, 126	-0.000160	-0.000750	0.378308	0.756616
Variance		0.000213	0.000251		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2005	125, 120	0.001529	-0.000960	0.014431	0.028862
Variance		0.000075	0.000082		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2006	119, 124	-0.001190	0.000991	0.138719	0.277437
Variance		0.000402	0.000091		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2007	121, 124	0.001620	0.000447	0.229039	0.458077
Variance		0.000154	0.000151		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2008	126, 121	-0.003050	-0.001690	0.306012	0.612025
Variance		0.000368	0.000523		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2009	121, 122	0.001817	0.002468	0.374799	0.749598
Variance		0.000282	0.000223		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2010	126, 116	0.002396	0.000468	0.091673	0.183347
Variance		0.000111	0.000143		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2011	125, 119	-0.000190	0.000349	0.383104	0.766208
Variance		0.000195	0.000210		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2012	120, 125	0.001156	0.001400	0.406290	0.812579
Variance		0.000072	0.000058		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2013	127, 118	-0.001760	0.001482	0.027255	0.054510
Variance		0.000142	0.000204		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2014	122, 123	0.000378	0.000851	0.325900	0.651800
Variance		0.000059	0.000075		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2015	121, 122	-0.000190	-0.000970	0.240743	0.481485
Variance		0.000059	0.000092		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2016	125, 119	0.000716	0.000848	0.454353	0.908706
Variance		0.000054	0.000109		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2017	118, 126	0.000716	0.000326	0.248626	0.497252
Variance		0.000018	0.000015		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2018	128, 117	0.000217	-0.001160	0.079243	0.158486
Variance		0.000050	0.000067		

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2019	126, 118	0.000737	-0.000660	0.032476	0.064953
Variance		0.000036	0.000034		

TABLE 4.14

SET yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2020	118, 125	-0.000330	-0.000023	0.448897	0.897794
Variance		0.000403	0.000314		

Source: Research Findings

The outcomes in the yearly perspective of 23 years showed as follows.

In 1998, the data of the last quarter were used (4 September 1998 to 31 December 1998) and the result showed that mean return during new moon and full moon period are 0.9965% and 0.3896% respectively, but there was no Lunar Effect in SET year 1998 because P value is more than 0.05.

In 1999, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.3399% and -0.03% respectively, but there was no Lunar Effect in SET year 1999 because P value is more than 0.05.

In 2000, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.309% and -0.121% respectively, but there was no Lunar Effect in SET year 2000 because P value is more than 0.05.

In 2001, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.114% and 0.2308% respectively, but there was no Lunar Effect in SET year 2001 because P value is more than 0.05.

In 2002, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1963% and -0.05% respectively, but there was no Lunar Effect in SET year 2001 because P value is more than 0.05.

In 2003, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1588% and 0.4926% respectively, the result showed that there was Lunar Effect in SET year 2003 because both one-tailed and two-tailed P value are less than 0.05.

In 2004, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.016% and -0.075% respectively, but there was no Lunar Effect in SET year 2004 because P value is more than 0.05.

In 2005, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1529% and -0.096% respectively, the result showed that there was Lunar Effect in SET year 2005 because both one-tailed and two-tailed P value are less than 0.05.

In 2006, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.119% and 0.0991% respectively, but there was no Lunar Effect in SET year 2006 because P value is more than 0.05.

In 2007, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.162% and 0.0447% respectively, but there was no Lunar Effect in SET year 2007 because P value is more than 0.05.

In 2008, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.305% and -0.169% respectively, but there was no Lunar Effect in SET year 2008 because P value is more than 0.05.

In 2009, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1817% and 0.2468%

respectively, but there was no Lunar Effect in SET year 2009 because P value is more than 0.05.

In 2010, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.2396% and 0.0468% respectively, but there was no Lunar Effect in SET year 2010 because P value is more than 0.05.

In 2011, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.019% and 0.0349% respectively, but there was no Lunar Effect in SET year 2011 because P value is more than 0.05.

In 2012, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1156% and 0.14% respectively, but there was no Lunar Effect in SET year 2012 because P value is more than 0.05.

In 2013, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.176% and 0.1482% respectively, the result showed that there was Lunar Effect in SET year 2005 because both one-tailed is less than 0.05.

In 2014, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0378% and 0.0851% respectively, but there was no Lunar Effect in SET year 2014 because P value is more than 0.05.

In 2015, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.019% and -0.097% respectively, but there was no Lunar Effect in SET year 2015 because P value is more than 0.05.

In 2016, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0716% and 0.0848% respectively, but there was no Lunar Effect in SET year 2016 because P value is more than 0.05.

In 2017, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0716% and 0.0362% respectively, but there was no Lunar Effect in SET year 2017 because P value is more than 0.05.

In 2018, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0217% and -0.116% respectively, but there was no Lunar Effect in SET year 2018 because P value is more than 0.05.

In 2019, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.0737% and -0.066% respectively, the result showed that there was Lunar Effect in SET year 2019 because both one-tailed is less than 0.05.

In 2020, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.033% and -0.0023% respectively, but there was no Lunar Effect in SET year 2020 because P value is more than 0.05.

TABLE 4.15

Comparison between New Moon day, Full Moon day and average returns around that day of SET using Gregorian Lunar Calendar

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	184	0.002267	0.000304	0.150685	0.30137
average pre & post 3 days	184	0.000848	0.000042		

TABLE 4.15

Comparison between New Moon day, Full Moon day and average returns around that day of SET using Gregorian Lunar Calendar (cont.)

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	184	0.002267	0.000304	0.078076	0.156153
average pre & post 5 days	184	0.000369	0.000024		

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	159	-0.000540	0.000199	0.071778	0.143556
average pre & post 3 days	159	0.001282	0.000047		

TABLE 4.15

Comparison between New Moon day, Full Moon day and average returns around that day of SET using Gregorian Lunar Calendar (cont.)

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	159	-0.000540	0.000199	0.108907	0.217814
average pre & post 5 days	159	0.000930	0.000026		

Source: Research Findings

The new moon results show mean return 0.2267% on the new moon day compared to the average return of 0.0848%, 3 days before and after the new moon day. For the 5 days window before and after new moon day, the average ordinary day return is 0.0369%, but both P value are more than 0.05, this shows that return on new moon day is significantly different from other ordinary day.

For full moon results, the outcomes show a mean return of -0.054% on the full moon day. An ordinary 3 and 5 days window have average return of 0.1282% and 0.093% respectively, which are not significantly different from return on the full moon day at a significance level of 95%. Both 3 and 5 days window average return P value are more than 0.05.

TABLE 4.16

Reversal of Lunar Effect in SET using Gregorian Lunar Calendar

SET	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon period (pre 2008)	1264	0.000431	0.000313	0.462464	0.924928
Full Moon period (pre 2008)	1248	0.000368	0.000258		
New Moon period (post 2008)	1398	0.000384	0.000121	0.457412	0.914824
Full Moon period (post 2008)	1365	0.000429	0.000124		

Source: Research Findings

The finding of hypothesis 1 showed that there was no Lunar Effect in SET since the low of 1998 in long term perspective (23 years). Which means there is no Reversal of Lunar Effect either, because there is no Lunar Effect in the first place. So the outcome of this examination "Reversal of Lunar Effect" would be to find whether there is any change in behaviour of return during moon phases after the 2008 crisis. Pre 2008 crisis new moon period return is 0.0431%. Post 2008 crisis new moon period return is 0.0384%. Pre 2008 crisis full moon period return is 0.0368%. Post 2008 crisis full moon return is 0.0429%.

Even though the return between two major moon phases are not significantly different, but there was more return during new moon period than full moon period pre 2008 crisis, the relationship converted after the 2008 crisis, full moon period gained more return.

TABLE 4.17

MAI New Moon and Full Moon period Descriptive Statistics using Gregorian Lunar Calendar

MAI	N	New Moon period	Full Moon period	P Value one-tail	P Value two-tail
Mean	223	0.000247	0.000364	0.398234	0.796468
Variance		0.000021	0.000025		

Source: Research Findings

Result of Hypothesis 4 showed that the mean return during the new moon and full moon period is 0.0247% and 0.0364% respectively. We can see that on the MAI index, returns around the full moon period are about double of the new moon period, but because the P value is more than 0.05, hypothesis H0 is accepted and H1 is rejected. There is no Lunar Effect in MAI using dates on in the period of the study.

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2002	38, 42	0.002969	0.003914	0.432280	0.864561
Variance		0.000461	0.000742		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2003	127, 126	0.004612	0.003248	0.302686	0.605372
Variance		0.000438	0.000442		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2004	124, 121	-0.000680	-0.003230	0.273524	0.547048
Variance		0.001963	0.000206		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2005	125, 120	-0.000008	-0.001370	0.077306	0.154612
Variance		0.000042	0.000071		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2006	119, 124	-0.000180	0.001925	0.076269	0.152538
Variance		0.000229	0.000037		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2007	121, 124	0.001323	0.001584	0.424811	0.849622
Variance		0.000100	0.000130		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2008	126, 121	-0.00134	-0.00264	0.233520	0.467039
Variance		0.000136	0.000258		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2009	121, 122	0.001464	0.000956	0.360585	0.721170
Variance		0.000141	0.000104		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2010	126, 116	0.001259	0.000741	0.308296	0.616591
Variance		0.000066	0.000063		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2011	125, 119	-0.000880	0.000823	0.149027	0.298055
Variance		0.000173	0.000151		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2012	120, 125	0.001690	0.002083	0.364797	0.729595
Variance		0.000093	0.000065		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2013	127, 118	-0.002550	0.001797	0.030564	0.061128
Variance		0.000215	0.000447		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2014	122, 123	0.002470	0.003180	0.322000	0.644001
Variance		0.000122	0.000166		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2015	121, 122	-0.000480	-0.001740	0.230730	0.461461
Variance		0.000133	0.000218		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2016	125, 119	0.001591	-0.00014	0.129072	0.258144
Variance		0.000084	0.000203		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2017	116, 128	-0.000450	-0.000580	0.441779	0.883558
Variance		0.000054	0.000039		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2018	128, 117	-0.000640	-0.002800	0.010261	0.020523
Variance		0.000054	0.000052		

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2019	126, 118	-0.000210	-0.000920	0.200629	0.401258
Variance		0.000043	0.000045		

TABLE 4.18

MAI yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

MAI	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2020	109, 124	-0.000650	0.001493	0.129064	0.258128
Variance		0.000222	0.000195		

Source: Research Findings

In 2002, the data of the last quarter were used (2 September 2002 to 31 December 2002) and the result showed that mean return during new moon and full moon period are 0.2969% and 0.3914% respectively, but there was no Lunar Effect in MAI year 2002 because P value is more than 0.05.

In 2003, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.4612% and 0.3248% respectively, the result showed that there was no Lunar Effect in MAI year 2003 because P value is not less than 0.05.

In 2004, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.068% and -0.323% respectively, the result showed that there was no Lunar Effect in MAI year 2004 because P value is not less than 0.05.

In 2005, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.0008% and -0.137% respectively, the result showed that there was no Lunar Effect in MAI year 2005 because P value is not less than 0.05.

In 2006, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.018% and 0.1925% respectively, the result showed that there was no Lunar Effect in MAI year 2006 because P value is not less than 0.05.

In 2007, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1323% and 0.1584% respectively, the result showed that there was no Lunar Effect in MAI year 2007 because P value is not less than 0.05.

In 2008, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.134% and -0.264% respectively, the result showed that there was no Lunar Effect in MAI year 2008 because P value is not less than 0.05.

In 2009, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1464% and 0.0956% respectively, the result showed that there was no Lunar Effect in MAI year 2009 because P value is not less than 0.05.

In 2010, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1259% and 0.0741% respectively, the result showed that there was no Lunar Effect in MAI year 2010 because P value is not less than 0.05.

In 2011, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.088% and 0.0823% respectively, the result showed that there was no Lunar Effect in MAI year 2011 because P value is not less than 0.05.

In 2012, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.169% and 0.2083% respectively, the result showed that there was no Lunar Effect in MAI year 2012 because P value is not less than 0.05.

In 2013, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.255% and 0.1797%

respectively, the result showed that there was Lunar Effect in MAI year 2013 because both one-tailed is less than 0.05.

In 2014, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.247% and 0.318% respectively, the result showed that there was no Lunar Effect in MAI year 2014 because P value is not less than 0.05.

In 2015, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.048% and -0.174% respectively, the result showed that there was no Lunar Effect in MAI year 2015 because P value is not less than 0.05.

In 2016, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1591% and -0.014% respectively, but there was no Lunar Effect in SET year 2016 because P value is not less than 0.05.

In 2017, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.045% and -0.058% respectively, but there was no Lunar Effect in SET year 2017 because P value is not less than 0.05.

In 2018, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.064% and -0.28% respectively, the result showed that there was Lunar Effect in MAI year 2018 because both one-tailed and two-tailed P value are less than 0.05.

In 2019, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.021% and -0.092% respectively, but there was no Lunar Effect in MAI year 2019 because P value is not less than 0.05.

In 2020, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.065% and 0.1493% respectively, but there was no Lunar Effect in MAI year 2020 because P value is not less than 0.05.

TABLE 4.19

Comparison between New Moon day, Full Moon day and average returns around that day of MAI using Gregorian Lunar Calendar

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	187	0.001545	0.000141	0.099421	0.198841
average pre & post 3 days	187	0.000310	0.000031		

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	187	0.001545	0.000141	0.047766	0.095532
average pre & post 5 days	187	-0.000009	0.000021		

TABLE 4.19

Comparison between New Moon day, Full Moon day and average returns around that day of MAI using Gregorian Lunar Calendar (cont.)

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	130	-0.000044	0.000238	0.358380	0.716760
average pre & post 3 days	130	0.000511	0.000066		

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	130	-0.000044	0.000238	0.270184	0.540368
average pre & post 5 days	130	0.000830	0.000027		

Source: Research Findings

The new moon results show mean return of 0.1545% on the new moon day compared to the average return of 0.031%, 3 days before and after the new moon day, the returns between these two data are not significantly different. Take another look at the 5 days window before and after new moon day, the average ordinary day return is -0.0009%, the one-tailed P value shows that there is significantly different at a significance level of 95% in the return between new moon day and ordinary days with a window of 5 days.

For full moon results, the outcomes show a mean return of -0.0044% on the full moon day. An ordinary 3 and 5 days window have average return of 0.0511% and 0.083% respectively, which are not significantly different from return on the full moon day at a significance level of 95%.

TABLE 4.20

Reversal of Lunar Effect in MAI using Gregorian Lunar Calendar

MAI	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon period (pre 2008)	769	0.000745	0.000491	0.288794	0.577587
Full Moon period (pre 2008)	761	0.000205	0.000227		
New Moon period (post 2008)	1398	0.000139	0.000117	0.431503	0.863007
Full Moon period (post 2008)	1365	0.000215	0.000150		

Source: Research Findings

The finding of hypothesis 4 showed that there was no Lunar Effect in MAI since its index inception in 2002 (19 years). Which means there is no Reversal of Lunar Effect either, because there is no Lunar Effect in the first place. So the outcome of this examination “Reversal of Lunar Effect” would be to find whether there is any change

in behaviour of return during moon phases after the 2008 crisis. Pre 2008 crisis new moon period return is 0.0745%. Post 2008 crisis new moon period return is 0.0139%. Pre 2008 crisis full moon period return is 0.0205%. Post 2008 crisis full moon return is 0.0215%.

There was more return during new moon period than full moon period pre 2008 crisis. After the 2008 crisis, full moon period a little gained more return whereas return during new moon period plummeted about 5 folds and became lower than return during full moon period.

TABLE 4.21

SET50 New Moon and Full Moon period Descriptive Statistics using Gregorian Lunar Calendar

SET50	N	New Moon period	Full Moon period	P Value one-tail	P Value two-tail
Mean	272	0.000529	0.000493	0.468709	0.937417
Variance	272	0.000029	0.000028		

Source: Research Findings

Result of Hypothesis 7 showed that the mean return during the new moon and full moon period is 0.0529% and 0.0493% respectively.

We can see that on the SET50 index, returns around the full moon period are about double of the new moon period, but because the P value is more than 0.05, hypothesis H0 is accepted and H1 is rejected. There is no Lunar Effect in SET50 in the period of the study (4 September 1998 to 4 September 2020).

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1998	41, 39	0.01258	0.004386	0.170565	0.341130
Variance		0.001874	0.000103		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
1999	123, 122	0.004004	-0.000940	0.061743	0.123486
Variance		0.000737	0.000516		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2000	127, 120	-0.003310	-0.001210	0.222766	0.445533
Variance		0.000469	0.000459		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2001	119, 126	-0.001360	0.002059	0.071292	0.142583
Variance		0.000384	0.000280		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2002	123, 122	0.002116	-0.000710	0.069521	0.139043
Variance		0.000191	0.000254		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2003	127, 120	0.001558	0.005240	0.018972	0.037944
Variance		0.000174	0.000211		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2004	124, 121	0.000126	-0.000550	0.371083	0.742166
Variance		0.000235	0.000285		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2005	125, 120	0.001820	-0.001200	0.010238	0.020475
Variance		0.000100	0.000106		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2006	119, 124	-0.001210	0.000967	0.160790	0.321579
Variance		0.000471	0.000121		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2007	121, 124	0.001896	0.000666	0.249551	0.499103
Variance		0.000206	0.000199		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2008	126, 121	-0.003490	-0.001440	0.254635	0.509270
Variance		0.000495	0.000699		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2009	121, 122	0.001764	0.002660	0.349808	0.699615
Variance		0.000359	0.000295		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2010	126, 116	0.002445	0.000370	0.094513	0.189027
Variance		0.000147	0.000172		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2011	125, 119	-0.00063	0.000295	0.429448	0.858895
Variance		0.000229	0.000265		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2012	120, 125	0.001057	0.001262	0.429374	0.858749
Variance		0.000090	0.000073		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2013	127, 118	-0.001680	0.001427	0.037773	0.075546
Variance		0.000155	0.000218		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2014	122, 123	0.000264	0.000836	0.310216	0.620432
Variance		0.000072	0.000091		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2015	121, 122	-0.000370	-0.001230	0.250077	0.500155
Variance		0.000078	0.000121		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2016	125, 119	0.000365	0.001165	0.278403	0.556807
Variance		0.000085	0.000142		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2017	118, 126	0.000978	0.000396	0.168523	0.337047
Variance		0.000024	0.000021		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2018	128, 117	0.000221	-0.000870	0.160032	0.320065
Variance		0.000065	0.000083		

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2019	126, 118	0.000833	-0.000650	0.040620	0.081241
Variance		0.000044	0.000044		

TABLE 4.22

SET50 yearly Descriptive Statistics using Gregorian Lunar Calendar (cont.)

SET50	N (New Moon period, Full Moon period)	Mean New Moon period	Mean Full Moon period	P Value one-tail	P Value two-tail
2020	118, 125	-0.000150	0.000290	0.480105	0.960209
Variance		0.000538	0.000406		

Source: Research Findings

The outcomes in the yearly perspective of 23 years showed as follows.

In 1998, the data of the last quarter were used (4 September 1998 to 31 December 1998) and the result showed that mean return during new moon and full moon period are 1.258% and 0.4386% respectively, but there was no Lunar Effect in SET year 1998 because P value is more than 0.05.

In 1999, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.4004% and -0.0094% respectively, but there was no Lunar Effect in SET year 1999 because P value is more than 0.05.

In 2000, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.331% and -0.121% respectively, but there was no Lunar Effect in SET year 2000 because P value is more than 0.05.

In 2001, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.136% and 0.2059% respectively, the result showed that there was Lunar Effect in SET year 2001 because both one-tailed and two-tailed P value are less than 0.05.

In 2002, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.2116% and -0.071% respectively, the result showed that there was Lunar Effect in SET year 2002 because one-tailed P value is less than 0.05.

In 2003, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1558% and 0.524% respectively, the result showed that there was Lunar Effect in SET year 2003 because both one-tailed and two-tailed P value are less than 0.05.

In 2004, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.0126% and -0.055% respectively, but there was no Lunar Effect in SET year 2004 because P value is more than 0.05.

In 2005, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.182% and -0.12% respectively, the result showed that there was Lunar Effect in SET year 2005 because both one-tailed and two-tailed P value are less than 0.05.

In 2006, the data of the whole year were used and the result showed that mean return during new moon and full moon period are -0.121% and 0.0967% respectively, but there was no Lunar Effect in SET year 2006 because P value is more than 0.05.

In 2007, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.1896% and 0.0666% respectively, but there was no Lunar Effect in SET year 2007 because P value is more than 0.05.

In 2008, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.349% and -0.144% respectively, but there was no Lunar Effect in SET year 2008 because P value is more than 0.05.

In 2009, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1764% and 0.266%

respectively, but there was no Lunar Effect in SET year 2009 because P value is more than 0.05.

In 2010, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.2445% and 0.0307% respectively, but there was no Lunar Effect in SET year 2010 because P value is more than 0.05.

In 2011, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.0063% and 0.0295% respectively, but there was no Lunar Effect in SET year 2011 because P value is more than 0.05.

In 2012, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.1057% and 0.1262% respectively, but there was no Lunar Effect in SET year 2012 because P value is more than 0.05.

In 2013, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.168% and 0.1427% respectively, there was Lunar Effect in SET year 2013 because one-tailed P value is less than 0.05.

In 2014, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0264% and 0.0836% respectively, but there was no Lunar Effect in SET year 2014 because P value is more than 0.05.

In 2015, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.037% and -0.123% respectively, but there was no Lunar Effect in SET year 2015 because P value is more than 0.05.

In 2016, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0365% and 0.1165% respectively, but there was no Lunar Effect in SET year 2016 because P value is more than 0.05.

In 2017, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0978% and 0.0396% respectively, but there was no Lunar Effect in SET year 2017 because P value is more than 0.05.

In 2018, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are 0.0221% and -0.087% respectively, but there was no Lunar Effect in SET year 2018 because P value is more than 0.05.

In 2019, the data of the whole year were used and the result showed that mean return during new moon and full moon period are 0.0833% and -0.065% respectively, the result showed that there was Lunar Effect in SET year 2019 because one-tailed P value are less than 0.05.

In 2020, the data of the whole year were used and the result showed that mean return during the new moon and full moon period are -0.015% and -0.029% respectively, but there was no Lunar Effect in SET year 2020 because P value is more than 0.05.

TABLE 4.23

Comparison between New Moon day, Full Moon day and average returns around that day of SET50 using Gregorian Lunar Calendar

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	184	0.002282	0.000378	0.206382	0.412763
average pre & post 3 days	184	0.001025	0.000054		

TABLE 4.23

Comparison between New Moon day, Full Moon day and average returns around that day of SET50 using Gregorian Lunar Calendar (cont.)

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon day	184	0.002282	0.000378	0.108871	0.217742
average pre & post 5 days	184	0.000444	0.000030		

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	159	-0.00083	0.000255	0.049280	0.098560
average pre & post 3 days	159	0.001372	0.000066		

TABLE 4.23

Comparison between New Moon day, Full Moon day and average returns around that day of SET50 using Gregorian Lunar Calendar (cont.)

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
Full Moon day	159	-0.00083	0.000255	0.089769	0.179537
average pre & post 5 days	159	0.000982	0.000033		

Source: Research Findings

The new moon results show mean return 0.2282% on the new moon day compared to the average return of 0.1025%, 3 days before and after the new moon day. Take another look at the 5 days window before and after new moon day, the average ordinary day return is 0.0444%. Return on new moon day is not significantly different from other ordinary days in the study because of more than 0.05 P value.

For full moon results, the outcomes show a mean return of -0.083% on the full moon day. An ordinary 3 and 5 days window have average return of 0.1502% and 0.0982% respectively, only return on 3 days window is significantly higher than return on the full moon day because P value is less than 0.05.

TABLE 4.24

Reversal of Lunar Effect in SET50 using Gregorian Lunar Calendar

SET50	N	Mean	Variance	P Value one-tail	P Value two-tail
New Moon period (pre 2008)	1264	0.000585	0.000402	0.370513	0.741026
Full Moon period (pre 2008)	1248	0.000332	0.000333		
New Moon period (post 2008)	1398	0.000369	0.000152	0.437197	0.874394
Full Moon period (post 2008)	1365	0.000443	0.000154		

Source: Research Findings

The finding of hypothesis 7 showed that there was no Lunar Effect in SET since the low of 1998 in long term perspective (23 years). Which means there is no Reversal of Lunar Effect either, because there is no Lunar Effect in the first place. So the outcome of this examination "Reversal of Lunar Effect" would be to find whether there is any change in behaviour of return during moon phases after the 2008 crisis. Pre 2008 crisis new moon period return is 0.0585%. Post 2008 crisis new moon period return is 0.0369%. Pre 2008 crisis full moon period return is 0.0332%. Post 2008 crisis full moon return is 0.0443%. Return during new moon period pre 2008 crisis declined

after the crisis occurred, while return during full moon period gained some more return after the crisis.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study investigated the relationship between Thailand stock markets return and lunar cycle. The researcher used data of SET index from the low after the 1997 crisis (4 September 1998) to 31 December 2020, for MAI index, data starting from 2 September 2002 (inception of MAI index) to 31 December 2020 were used. Index return data of SET and MAI were collected from the EfinStockpickup program. The researcher also used the lunar calendar to identify dates of the return along with lunar phases. The purposes of this study are

1) To find whether there is Lunar Effect in Thai stock markets
2) To find significant different in the return on the new and full moon day compared to other ordinary day particularly 3 and 5 days before and after the new and full moon day
3) To find out whether behaviour of Lunar Effect change after the 2008 crisis

The researcher used paired T-tests assuming equal variance to find out the result at the significance level of 95%.

From the results of the study, there was no Lunar Effect in SET and MAI after the 1997 crisis in a long term view of 23 and 19 years respectively, but taken yearly view using daily return, there was Lunar Effect in both SET and MAI. For SET and SET50, the Lunar Effect occurred in 2001, 2002, 2003, 2005, 2006 and again 2019. In 2001, 2003, 2006 SET and SET50 index during the full moon period gained significantly more return than during the new moon period, whereas in 2002, 2005 and 2019, the returns were significantly more during the new moon period.

This suggests that there is likelihood that the upcoming Lunar Effect in SET will show more return during the full moon period.

TABLE 5.1

Statistic return when Lunar Effect occurred in SET and SET50 using Thai Lunar Calendar

Year	New Moon period return	Full Moon period return
2001	Lower	Higher
2002	Higher	Lower
2003	Lower	Higher
2005	Higher	Lower
2006	Lower	Higher
2019	Higher	Lower

Source: Research Findings

For MAI, there was the Lunar Effect in 2006 and 2018 where the full moon period had significantly much more return than during the new moon period, the average return during the full moon period was positive, but a little negative during the new moon period. In 2018, MAI index return was negative, but significantly less negative during the new moon period.

The SET returns on full moon day are not significantly different from ordinary days. For new moon day in SET, it was not like that, the returns on new moon day were significantly lower compared to 3 days before and after new moon day. This does not happened in the 5 days pre and post window, but for SET50, return on new moon day is significantly lower than 3 and 5 days window. No significant difference in return between new or full moon day and other ordinary days in MAI market. This suggests that investors are better off avoiding investing on new moon day in SET.

Moreover, this study also investigated Lunar Effect using lunar cycles upon Gregorian calendar, which count lunar cycles differently from the local Thai Lunar calendar. The results are a little dissimilar.

There were no Lunar Effect in a long term view for SET, MAI and SET50, but it used to exist in 2003, 2005, 2013, 2019 for SET and SET50. In 2013 and 2018, Lunar Effect existed in MAI. During 2003 and 2013, more returns were gained in full moon period and opposed to what happened in 2005 and 2019 where returns were more in the new moon period for SET and SET50. In 2013, MAI market, positive return was much more prominent in the full moon period, but in 2018, overall return was in a bad, but return was less negative in the new moon period compare to full moon period.

Return on new moon day was significantly higher compare to ordinary day return using 5 days window in MAI. For SET50, return on ordinary day using 3 days window is significantly higher than return on the full moon day.

As the result showed that there is no Lunar Effect in Thai markets in the long term view both using Thai Lunar calendar and Gregorian Lunar calendar, so there is no reversal of Lunar Effect here. The researcher examined the change of returns behaviour upon lunar phases, comparing returns upon lunar phases pre 2008 crisis with the post 2008 crisis, but because the calculation using paired t-test method is not appropriate enough to prove the reversal of Lunar Effect, the result of this examination is just for observation purpose only. It is observed that if we test the return using Thai Lunar calendar, more returns upon lunar phases during the new moon period in SET and SET50 after the 2008 crisis where returns during the full moon started to become lower after the 2008 crisis as opposed to return behaviour upon lunar phases before 2008 crisis began. For MAI, returns behaviour upon lunar phases remained the same before and after the 2008 crisis, return during the new moon periods were still lower than the full moon period. Switching to results using dates lunar phases from Gregorian Lunar calendar, return on SET and SET50 during new moon pre 2008 crisis were higher than itself after the 2008 crisis where full moon period gained higher return after the

2008 crisis. For MAI, the return during new moon period pre 2008 crisis where not significant, but about 5 times higher than itself post 2008 crisis. The full moon period return behaviour in MAI remained the same with a little higher return after the 2008 crisis.

5.2 Conclusion

This study investigated data of SET, SET50 and MAI from 1998 to 2020, no Lunar Effect was found in Thai markets. The result of this study supports the study by Dichev and Janes (2001) where they did not find any Lunar Effect in SET from 1975 to 2020. Their study investigated SET only using new moon and full moon dates from www.lunaroutreach.org, this study explored more to MAI and SET50 using both Thai Lunar calendar, which is local Thai calendar and Gregorian Lunar calendar.

Furthermore, it is better to insulate any investment in SET on new moon day because the returns are lower using dates from Thai Lunar calendar. For investors who preferred using Gregorian Lunar calendar, investment should be avoid on full moon day in any SET50 stocks. Munyasia (2009) found higher return around the new moon dates in Kenya market, this study also found that new moon day in MAI is a good day to invest in the market because of significantly high return.

Not only from moon light and mood, there are factors that likely to contributed to the existence of Lunar Effect, also when it does not occur in Thai stock markets. The differences result regarding the Lunar Effect in Thai markets between using Thai Lunar calendar and Gregorian Lunar calendar are partially caused by returns among lunar phases and dates.

5.3 Recommendations

For further study, volatility and trading volume should be taken into account. In order to dedicatedly understand more about the Lunar Effect in Thai stock markets, one should examine the daily Lunar Effect in every business sector of SET

after the 1998 crisis. Behaviour of participants in Thai market should also worth examining for finding the reason behind occurrence of the Lunar Effect in Thai market.

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