MINISTRY OF EDUCATION AND TRAINING
UNIVERSITY OF ECONOMICS HO CHI MINH CITY

LẠI CAO MAI PHƯƠNG

THE EFFECTS OF HOLIDAY, WEATHER, LUNAR CALENDAR ON THE RETURN OF VIETNAM STOCK MARKET

Major: Finance – Banking

Major code: 93 40201

DOCTORAL THESIS SUMMARY

HOCHIMINH CITY – 2019

The thesis is completed at:

University of Economics Ho Chi Minh City

Supervisor : Associate Professor. Ph.D Nguyen Thi Lien Hoa

Contradicteur 1: ……

……..

Contradicteur 2:……

……..

Contradicteur 3……

……..

The thesis will be defensed in front of the Academic Council convened by…….

At ……../….. /201….

This thesis can be found at the library: ……..

…….

…….

SOCIAL REPUBLIC OF VIETNAM
Independence – Freedom – Hanppiness

ABSTRACT OF THE THESIS

Thesis title: **"The effects of holiday, weather, lunar calendar on the return of Vietnam stock market"**

Major: Finance- Banking Code: 9340201
PhD Student: Lai Cao Mai Phuong Course: NCS2012
Thesis Instructor: Associate Prof, PhD. Nguyen Thi Lien Hoa
School: University of Economics Ho Chi Minh City

Keywords: Holidays, weather, lunar calender, mood, return, stock market

CHAPTER 1: INTRODUCTION TO THE STUDY OF THE THESIS

1.1 The necessity of the thesis

Psychological studies show that mood plays a role as same as information, as a spotlight, as a motivator and as common currency related to judgment and decision making in uncertain situations (Peters et al., 2006). In the stock market, stock prices correlate with investors' mood. In particular, the higher stock returns are positively related to better moods, whereas the decline in stock returns is related to the negative mood of investors (Shu, 2010). Even moods are unrelated to securities such as pre-holiday moods (Ariel, 1990), weather (Saunders, 1993), football results, beliefs and the lunar cycle (Edmans et al, 2007) can affect stock returns. Supporting this view, the prospect theory of Kahneman & Tversky (1979) argues that psychological factors cannot be overlooked when making decisions in uncertain situations, because utility levels do not always reflect the pure attitude with money, which can be affected by additional impact (like mood). The above studies show that decisions on the stock market may be affected by unrelated moods. However, researches on exploiting this topic in Vietnam stock market are very few, and this also shows the necessity of the thesis.

1.2 Research objectives of the thesis

The objective of the thesis is to study "*The efect of holiday, weather, lunar calendar on the return of Vietnam stock market*" with the basis of linking investor's mood theory and decision on stock investment and characteristics related to these three effects in Vietnam. Based on practical implications, research gaps and collected data, the author focuses on addressing the following specific objectives:

- Determine the existence of each effect (holiday, weather, lunar calendar) and excess return of Vietnam stock market with 10-year data. Do the factors that represent each of these effects affect the excess return of the Vietnamese stock market? The direction of impact of these factors is positive or negative? What are the specific points of Vietnam in relation to previous studies?

- Determining the existence of all three effects of holiday, weather, lunar calendar and excess return of Vietnam stock market with all 10-year data and when the short-term trend of each stock index is positive/negative. When combining all three effects in a general model, do the representative elements for each of these effects affect the return of Vietnam stock market? What is the relationship between these effects and the return of the industry studied in Vietnam?

When these relationships are verified, the thesis makes recommendations for investors, suggestions for issuers and authorities in Vietnam in order to limit the influence of mood caused by holiday, weather, and lunar calendar which can affect the return of Vietnam stock market.

CHAPTER 2. THEORY FRAMEWORK AND LITERATURE REVIEW

2.1 Moods and theories related to decision making

2.1.1 The role of mood on physiological basis for decisions in uncertain situations

The role of mood in decision making should not to be ignored. To protect this view psychologists (Loewenstein, Weber, Hsee, & Welch, 2001; Schwarz & Clore, 2003), economists (Elster, 1998; Loewenstein, 2000) and neurologists (Trepel, Fox, & Poldrack, 2005) have accumulated a lot of evidence to show that mood and cognitive bias affect various decisions.

Summary of typical studies on psychology, Peters et al. (2006) have listed four important functions of mood (mood as information, as a spotlight, as a motivator and as common currency) involves judgment and decision making.

In 1990, Schwarz developed mood theory as information. According to this theory, individuals use their emotional or mood states as information when selecting strategies to handle in most of their decisions. When mood plays a role as information, it guides the process of judgment or decision (Slovic et al., 2002), decision makers refer to their feelings before making decisions (Schwarz & Clore, 2003).

Model of risk as feeling was developed by Loewenstein et al. (2001) supported the mood theory as information that Schwarz (1990) proposed when the mood plays the role of the common currency in decisions. This model was developed by Loewenstein et al. (2001) based on a meta-analysis of more than 500 clinical and physiological studies of mood and individual decision making, confirming that every aspect of the decision-making process is affected by the individual's mood experiences at the time, and these experiences at the time of the decision affect their final decision. When the mood is a common monetary function, it allows the decision maker to compare different options (Cabanac, 1992). Accordingly, instead of trying to find a multitude of reasonable reasons, decision makers turn complex logical thoughts into simpler emotional assessments that can compare good and bad feelings to each other (Montague and Berns, 2002), from which to make decisions. The study by Loewenstein et al. (2001) also concluded that the reactions of moods to risky situations often contradict cognitive assessments of these risks. When such conflicts occur, the mood plays an important role in the risk-making decision process. The implication of Loewenstein et al. (2001) is that financial studies should include investor mood on the model, before making economic decisions.

When mood function is a spotlight in a two-step decision process, Schwarz (1990) argues that people tend to make decisions depending on their mood. Even the mood caused by unrelated factors (such as weather conditions) can affect economic decisions (such as buying or selling securities). Even mood influences decisions that are not related to the cause of mood and influence in this way is called misattribution. In the first step, the level (weak/strength) of mood or initial mood type affects the manipulation, making some of the knowledge stored more accessible. When storage information is more accessible, it has a greater impact on subsequent priorities. Leading to new information (not the initial mood) affected by the previous mood drives judgment or decision in step two (Nabi, 2003).

The functional mood as a motivator in decision-making is evident in the affect infusion model (AIM) proposed by Forgas (1995). In a psychophysical study published in 1987, Forgas & Bowe gave a view on the effects of mood on the formation of impression and memory in the human brain. The results show that both memory remembrance and memory recognition in the brain work better when the traits match the mood. Subjects spend more time learning about the mood-appropriate details, so they make judgments that fit the mood faster. Forgas & Bower (1987) discovered that subjects in a happy mood create better impressions and make positive assessments than subjects in a sad. Positive mood has more pronounced effect on judgment and memory compared to negative mood. Inheriting the research results of Forgas & Bower (1987), by 1995, Forgas proposed the AIM model to explain the psychological aspect in the most comprehensive way about the role of mood in the decision-making process of individuals. The AIM model of Forgas (1995) suggests that subjects in bad have a more pessimistic view of the world. Their perception in risky situations becomes more serious than reality, so they tend to choose safe decisions. But in a positive mood, subjects in the AIM model will promote risky behaviors because the happy evokes positive memories and leads to better environmental assessment (Forgas & Bower, 1987; Chou et al, 2007). Agreeing with the argument of Forgas & Bower (1987), Wright & Bower

(1992) affirmed that happy people tend to be optimistic, on the contrary, sad people tend to be pessimistic and these moods strongly influence strong to their decisions. Therefore, investors with optimistic mood expect a market to grow and they increase buying activity, people with pessimistic mood or anxiety tend to avoid risks and leave out the market (Wright & Bower, 1992). In addition, in complex and unforeseen situations, people with happy states may have to rely more on the process of processing information based on heuristics, which may contribute to counteracting applications are at risk (Forgas, 1998; Leith & Baumeister, 1996). Other studies supporting the AIM model also found a strong connection between mood and risk assumptions in studies of Yuen & Lee (2003), Kamstra, Kramer, & Levi (2003), Kuvaas & Kaufmann. (2004). Thus, the mood relates to the level of system handling and decision making (Forgas, 2000), which is related to the tendency to decide whether to approach or avoid (Chen & Bargh, 1999), promoting the decision. when they tend to maintain or achieve a positive mood (Isen, 2000).

2.1.2 Identify trends according to Dow-theory and investment mood based on short-term trend of securities

Dow theory is the fundamental theory for investors to use technical analysis to make decisions. The price movement of the stock market in trend shows the changing attitude of investors based on the general information (such as economy, politics) in both current and potential prices, which is one of the threads of Dow theory. In a market there are usually three trends. The primary trend shows the general trend of a long-term increase (decrease) in the market, which usually lasts over 9 months to several years. The secondary reaction represents the intermediate trend of the market, usually lasting over 3 weeks to 9 months, this is the period of interruption of the increase or decrease of the first-level trend. Daily fluctuation represents small fluctuations in the market, usually lasting from 1 to 3 weeks (Pring, 1980).

Compared to other indicators used in technical analysis to predict trends, the moving average (MA) indicator is commonly used (Taylor & Allen, 1992) and effective (Neftci, 1991, Brock et al, 1992; Sullivan et al, 1999). The MA trend forecast rule is based on the intersection of short-term MA versus long-term MA. The buy signal occurred when the short-term MA line cut the long-term MA line from below, showing that the current investment sentiment in the market has shifted to a more positive direction than before. On the contrary, a sell signal occurs when the short-term MA line crosses the long-term MA line from above, showing that the current sentiment has turned to a more pessimistic direction than before. The time frame of the MA line can range from 5-13 days to represent a very short trend, and from 100-200 days represents a medium and long-term trend (Achelis, 2001, p205).

2.1.3 Theory of the gaps and the superstitious beliefs of people in life

The book "*Magic, Science and Religion and Other Essays*" is a combination of published studies before the 1950s by the anthropologist Bronislaw Malinowski selected by Robert Redfield and first published in 1948 (Malinowski, 1914, 2014). Malinowski's research shows that human psychology tends to rely on unconfirmed beliefs but is maintained in society to reduce anxiety, especially in uncertain situations (Malinowski, 1954). "Theory of the gap" by Malinowski (1954) explained the existence of people's superstitious beliefs about the luck or risk of life. The social nature of humanity plays an important role in the existence and maintenance of superstitious beliefs (Henslin, 1967) and the processing of information related to this belief is unconscious (Jahoda, 1969, Jung, 1979). Malinowski (1954) argues that in an uncertain situation, the belief in luck / risk can fill the gap of what people do not know or things that humans cannot explain logically - science, so it has the function of reducing anxiety psychology. Agreeing with this view, Scheibe & Sarbin (1965) said that in some

repetitive events / situations, people did not know the nature of the incident but motivated the desire to explain to reduce anxiety in a strong enough community, they will somehow create it. Therefore, it is possible that individuals intentionally distorted the truth and logical reasoning to match their superstitious beliefs (Cohen et al., 1959). Because superstitious actions have a calming function for individuals involved by providing some sense of emotional support and a sense of control. Explaining the cause of this belief is due to the prevalence of cognitive errors (Singer & Benassi, 1981).

Besides, superstitious behavior can also occur independently of the belief in the effectiveness of that behavior, in order to achieve a sense of control (Rothbaum, Weisz & Snyder, 1982). Therefore, it can be considered that control is a fundamental psychological motive and an awareness of control comes from combining psychological outcomes with positive physicality (Case et al, 2004). Other studies that support this view suggest that the development of superstitious reactions occurs in an uncertain situation (Padgett & Jorgensen, 1982) that individuals rely heavily on superstitious beliefs when their control demands are threatened (Stavrova & Meckel, 2017). Even individuals who believe events that cannot be controlled by their actions, called skepticism or half-believe, often behave in accordance with superstitious beliefs (Campbell, 1996), even a large number of respondents said they would feel uncomfortable if they did not follow the superstitious rituals in situations where they thought the action was appropriate (Abercrombie et al., 1970).

Wiseman & Watt (2004) argues that any superstitious belief in society is divided into one of two categories: positive superstitious beliefs and negative superstitious beliefs. The countries in the East Asian tradition say that the lunar July is an unlucky month, so some things abstain from this month like big shopping, moving houses or buying new houses (Pooja, 2016); marriage (Lo, 2003); childbirth or surgery (Huang et al., 1997; Lin et al., 2006), traveling (Rittichainuwat, 2011).

Hernandez et al (2008) classified superstitious beliefs into two categories: active superstitious beliefs and passive superstition beliefs. Control illusions are defined as linking with fortunes to share the power of a larger force and to apply superstitious behaviors (Rothbaum et al., 1982). Accordingly, the illusion of control through the implementation of behaviors with the expectation of bringing luck, based on the classification of Wiseman & Watt (2004) is positive superstitious belief, and the implementation of these acts is a manifestation of passive superstitious beliefs. Besides, people actively avoid or delay doing some things during the taboo times (Friday 13th in Western countries and July lunar in Eastern countries) to avoid the consequences bad when its results are beyond their control can bring. According to the classification of Hernandez et al (2008), it is an active superstitious belief. The conclusion of all this is that people often use active superstitious beliefs to prevent possible bad results and a tendency to seek luck when implementing passive superstitious behaviors.

2.1.4 Prospect theory

Both Nobel Prize in economics related to behavioral finance, awarded to Professor Daniel Kahneman - Princeton University in 2002 and Professor Richard Thaler - University of Chicago in 2017, are based on the Prospects theory - the research of Professor Daniel Kahneman and Amos Tversky[1] was first published in 1979 (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). Behavioral finance and prospect theory recognize the assumptions of traditional finance empirically defective (Simon, 1987a, p221; Barberis & Thaler, 2003; Altman, 2010). Tversky & Kahneman (1974) argue that expected utility theory is based on subjective probabilities associated with prospects determined by rational people. However, the fact that with the same events different

[1] Amos Tversky died in 1996, before the Nobel Prize for Economic 2002

individuals with reference points and the same criteria will give subjective probabilities different. In addition, for risky options, the utility function must be "reserved" for psychological-related situations, because an individual's utility function does not always reflect the attitude. "pure" for money that may be affected by additional consequences related to specific amounts (Kahneman & Tversky, 1979, p278-279). So, gains and losses in prospect theory yield greater utility than the wealth (Benartzi & Thaler, 1995, p79). Therefore, when the reference point contradicts the gain and loss, measures based on utility levels become an important factor. This explains why in practice the utility theory expects the forecast to lack the correct behavior of choice under risk and uncertainty. Prospect theory has overcome the limitations of expected utility theory when using the sample average behavior in many empirical studies from which generalize it to the behavior of individuals or groups when making decide in an uncertain world. Therefore, prospect theory is proposed to replace the expected utility theory because reality shows prospect theory that describes and predicts more accurately than the behavior chosen under risk and uncertainty conditions (Altman, 2010).

Kahneman (2003) argues that there are three cognitive characteristics in prospect theory, and short-term emotions are considered important factors of choice behavior when evaluating economic outcomes. Three characteristics in prospect theory include: (i) Depending on the nature of the prospect of the possibility of a gain or loss, human selection sometimes presents risk aversion behavior, sometimes demonstrating risk-seeking behavior. . (ii) The assessment of human prospects depends on gain (loss) and loss (loss) compared to a reference point. Reference point is usually the current state. (iii) People are afraid of loss (loss) because of the psychological loss they suffer.

The value function in prospect theory has an S-shape in the form of a two-area function. The reference point divides the graph into two areas: The losses are on the left and the gains are on the right of the reference point. The vicinity of the reference point in both areas has the highest slope and gradually decreases when away from the reference point, indicating that the sensitivity for both areas decreases gradually when away from the reference point. When comparing the slope, the function of the value of the steeper looses reflects the psychology of being afraid of loss compared to the gain area. Loss aversion ratio has been estimated in some of Kahneman & Tversky's experiments and usually ranges from 1.5 to 2.5. In other words, in prospect theory the area hole has a stronger impact than the gain area, for example, if both losses and gains are $ 1, then the utility in the prospect theory will negatively lead to rejecting this prospect, but with the expected utility theory- this value is 0 (zero) so it may not be rejected. As a result of the concave function in the area gain (such as the utility function) and the convex in the area loss, the two areas are asymmetrical with a change in direction from the gain to area loss through the reference point, creating a value function S- shape (Kahneman & Tversky, 1979, Tversky & Kahneman 1992; Kahneman, 2003). An unexpected change in the value function curve shows the gain turned into a loss, because the loss aversion is too great even if the risk score actually affects the property is very small.

2.1.5 The mood, cognition and human behavior are inseparable

Psychologists (Ellis, 1991; Piaget, 1977) agree that in the interplay between people and situations / events through their behavior. In which the mood is the driving force of behaviors and perceptions are the structure of those behaviors. Goleman (1995) argues that the mood to engage in cognitive activity in two ways is the motivation to motivate or restrain a certain cognitive action. It is even more powerful than logical-math ability,

which we still recognize in experiments. Therefore, the thesis assumes that the behavior of stock investors expresses both the perception and reaction of mood (hereinafter referred to as "mood" or "effects of mood") for an event occur.

2.2 International empirical researches on holiday effects, weather, and lunar calendar to Vietnam's stock market return

Table 2.1: International researches related to holiday and stock markets

Mood related to the holiday	Experimental evidence of the return on stock market
Pre-holiday	***USA***
Positive mood before the holiday	Ariel (1990); Fabozzi et al. (1994); Kim & Park (1994); Lakonishok và Smidt (1988); Liano et al. (1992); Liano & White (1994); Pettengill (1989)
Ariel (1985); Coursey & Dyl (1986); Fields (1931, 1934); Frank Cross (1973); Kenneth French (1980); Keim & Stambaugh (1984); Lakonishok & Smidt (1987)	
Hypothesis maintains the mood	***European countries***
Pettengill (1989); Liano & White (1994)	Dodd & Gakhovich (2011); Dumitriu et al. (2011); Gama & Vieira (2013); Kim & Park (1994); Meneu & Pardo (2004)
Hypothesis house money effect	
Thaler & Johnson (1990); Ogden, (1990); Chia et al. (2015)	
The mood after the holiday affects the stock return is inconsistent	***Australia***
A negative return	Cao et al. (2009); Marrett & Worthington (2009)
Ariel (1990); Don et al. (2016); Gibbons & Hess (1981); Hirshleifer et al. (2016); Lakonishok & Maberly (1990); Lakonishok & Smidt (1988); Miller (1988); Osborne (1962) Rystrom & Benson (1989); Wang & Walker (2000)	***Asia countries***
	Bergsma & Jiang (2016); Chan, Khanthavit & Thomas (1996); Kim & Park (1994); McGuinness (2005)
A positive return	***The countries of Gulf Cooperation Council***
Kim & Park, 1994; Keim (1983); Lakonishok & Smidt, 1988; Fabozzi và cộng sự, 1994	Bley & Saad (2010)
Unaffected	***Emerging countries***
Ariel, 1990; Lakonishok & Smidt, 1988; Tonchev & Kim, 2004; Marrett & Worthington, 2009	Seif, Docherty & Shamsuddin (2017)

(Source: Author summarizes from researches)

Table 2.1: International researches related to weather effects and stock markets

Affects people's mood and behavior	Experimental evidence of the return on stock market
Weather conditions	***Temperature***
Bassi et al. (2013); Damasio (2000); Edelman (2006); Keller et al. (2005);	Cao & Wei (2005); Chang,

Sinclair, Mark & Clore (1994); Watson (2000)	Nieh, Yang & Yang (2006); Dowling & Lucey (2008); Floros (2008); Kang et al. (2010); Keef & Roush (2002, 2005); Gerlach (2007); Yoon & Kang (2009)
Temperature	
High temperatures negatively affect human physiology and behavior	
Allen & Fischer (1978); Anderson et al. (2000); Anderson (2001); Baron & Bell (1976); Cunningham (1979); Howarth & Hoffman (1984); Kenrick & MacFarlane (1986); Page, Hajat & Kovats (2007); Vrij et al. (1994)	
Factors that reduce negative effects of high temperatures	
Baron & Bell (1976); Kenrick & MacFarlane (1986)	***Average precipitation***
Humidity	Dowling & Lucey (2005); Gerlach (2007); Hirshleifer & Shumway (2003)
Amr & Volpe (2012); Cunningham (1979); Dexter (1904); Howarth & Hoffman (1984); Mawson & Smith (1981)	
Geomagnetic activity	
Babayev & Allahveriyeva (2007); Mulligan et al. (2010); Nastos et al. (2006)	***Geomagnetic activity***
Other factors	Krivelyova & Robotti (2003)
Dexter (1904); Cunningham (1979); Cooke et al. (2000); Repetti (1993)	

(Source: Author summarizes from researches)

Table 2.3: International researches related to lunar calendar effect and stock market

Tác động đến tâm sinh lý, hành vi của con người			
Behavior	**Author**	**Reason**	**Author**
Childbirth	Criss & Marcum (1981)	Due to 'biological tide' or hormonal imbalance	Zimecki (2006)
Menstrual cycle	Jongbloet (1983); Law (1986)	Metabolism in the nervous system	Lieber & Sherin (1972)
Help behavior, behavior of customers	Cunningham (1979)	affect people's sleep; human full moon phase more sensitive to noise.	Cajochen et al. (2013); Smith et al. (2014); Croy & Waye (2014)
Abnormal behavior in children	Russell & Bernal (1977)	Superstitious beliefs, ancient rituals from ancient times, maintained to this day	Laycock (1843); Gale (1980); Katzeff (1981); Lieber & Agel (1978)
Traffic accidents	Lieber (1978)	Affect mild behavior	Garzino (1981)
		People are not affected	Nogueira (1982); Rotton & Kelly (1985)
Belief in events occurs according to the lunar calendar cycle		**The taboo in the lunar July**	
Believe in unusual things happening around the full moon	Kelly, Rotton & Culver, (1996)	No big shopping, no moving house, no house buying	Pooja (2016), He et al. (2018)

days			
Student	Rotton & Kelly (1985)	Delayed marriage	Lo (2003)
Nurses take care of mental patients	Angus (1973)	Avoid giving birth or avoiding surgery Do not travel	Huang et al. (1997); Lin et al. (2006); Chiu et al. (2018) Rittichainuwat (2011)
Experimental evidence of the return on stock market			
Lunar calendar cycle: Negative correlation with the full moon period: Dichev & Janes (2003), Yuan, Zheng & Zhu (2006); Floros & Tan (2013). - Positive affect on the first day of the lunar month: Floros & Tan, 2013; Borowski (2015) - Unaffected: Hammami & Abaoub (2010)			**July lunar calendar** Negative influence in the lunar July Almonte (2016)

(Source: Author summarizes from researches)

2.3 Domestic empirical researches on the holiday effect, weather, lunar calendar to return of Vietnam stock market

Table 2.4: Domestic empirical researches on the holiday effect, weather, and lunar calendar to return of Vietnam stock market

Effects	Author
Holiday effect	
Truong Dong Loc (2012); Luu Tien Chung et al. (2016)	OLS estimation method. Tuesday is a negative day for VNIndex return and Friday is a positive day for this index return.
Trương Đông Lộc et al. (2017)	Methods: OLS and GARCH show that the return of the VNIndex increased preholiday, the level of return volatility in the trading days preholiday tends to decrease.
Le Thi Hong Minh & Truong Ngoc Son (2018)	Using ARMA (1,1) and GARCH (1,1) shows that stock returns increase before the Lunar New Year in Vietnam, Malaysia and Japan; High stock returns after the Lunar New Year exist in Hong Kong and Taiwan.
Lai Cao Mai Phuong (2018)	Return of the VNIndex and HNXIndex before the holidays are usually higher than other days. In which, both VNIndex and HNXIndex were also affected by the Lunar New Year holiday, VNIndex suffered before the Victory day, HNXIndex was affected before the National holiday.
Weather	
Friday & Hoang (2015)	Using descriptive statistics and t-tests, OLS, suggests that the average monthly rainfall in the rainy season can affect return of VNIndex.
Lai Cao Mai Phuong (2017)	Using OLS and logit regression, after the trading days Geomagnetic activity ap> 29 positively affects the return of VNIndex.
Lịch âm	
Lai Cao Mai Phuong (2012)	Using OLS, the time frame N = 0 and N = 3 days gives conflicting results with P-value <0.1

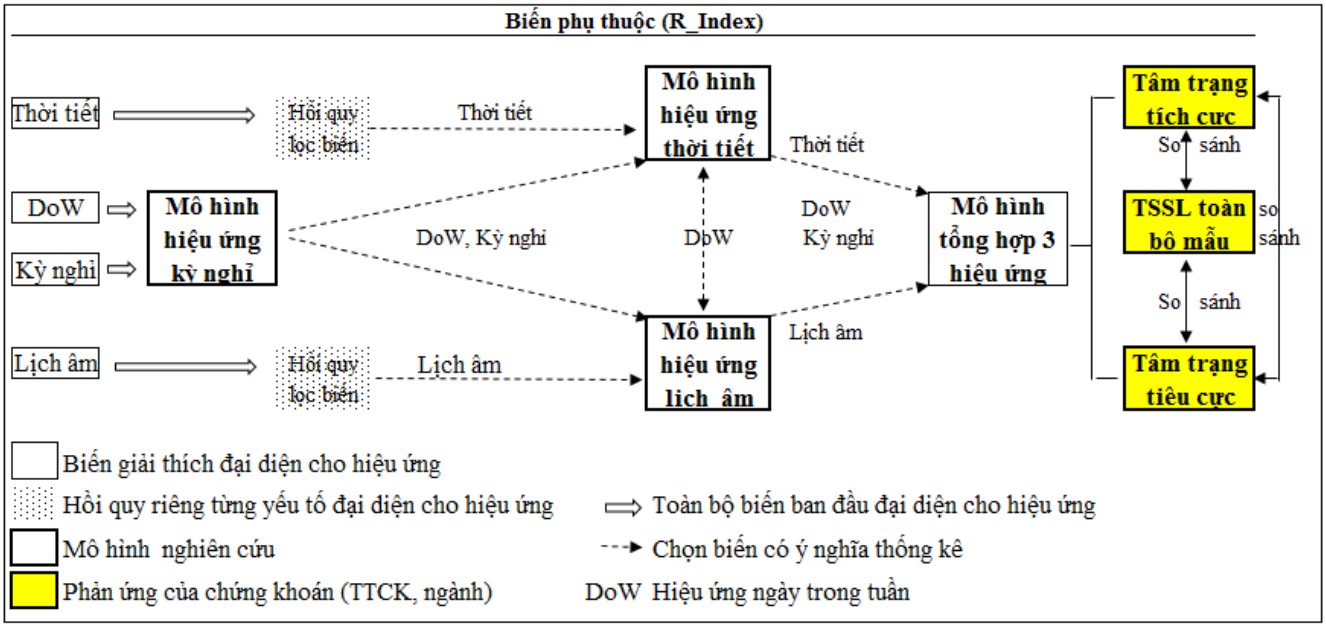
Nguyễn Văn Diệp et al. (2014); Nguyễn Văn Diệp (2016).	Using descriptive statistics and t-tests, there is no difference in return between the first days of the new moon and the full moon days. Using the IGARCH model, the first two days of the lunar calendar positively affected return securities; a day around the full moon negatively affects return of stocks.
Nguyễn Văn Diệp (2017).	GARCH-M (1,1) is suitable to study super moon phenomenon and return stocks, super moon phenomenon negatively affects return of stocks.
Lê Thị Hồng Minh & Trương Ngọc Sơn (2018)	Using the ARMA (1,1), GARCH (1,1) estimation method, the VNIndex increased before the Lunar New Year holiday but was not affected after this holiday.
Lai Cao Mai Phuong (2018)	Using OLS, the last three trading days before the Lunar New Year holidays have positive effects on the return of VNIndex and HNXIndex when controlling the day of weak effect and other holidays in the year.

(Source: Author summarizes from researches)

CHAPTER 3: RESEARCH METHOD

3.1 Research process

Figure 3.1: Process of studying the effect of holidays, weather and lunar calendar on return of Vietnam stock market



(Source: Construction author)

3.2 Research models

3.2.1 Effect of holiday, weather, and lunar calendar to the stock market return

3.2.1.1 Establish investment mood based on short-term trend of securities

Psychological studies of Isen et al (1978) and (Schwarz, 1990; Mackie & Worth, 1991; Schwarz & Bless, 1991) show that people are in a positive / optimistic mood or in a negative mood / pessimistic (Johnson & Tversky,

1983), they can allow seemingly unrelated information to affect their decisions. Since then the thesis hypothesizes: When the short-term trend of securities is positive / negative, the return of Vietnam stock market is not affected by holiday effects, weather, and lunar calendar. To test this hypothesis, the thesis establishes two moving averages for the return of each dependent variable, the 200-day long-term moving average (MA200) and the 10-day short-term moving average (MA10). Meanwhile, the short-term trend of the stock is positive when the MA10 is above the MA200. Conversely, when the MA10 is below the MA200, the short-term trend of the stock is negative. This way of determination is similar to Dowling & Lucey (2005) on the Irish stock market. Accordingly, all data used in the General Model - equation 3.1 will be split into two groups of data. Data group 1: When the MA10 is above the MA200, the short-term trend of the stock market is positive. Data group 2: When the MA10 is below MA200, the short-term trend of the stock market is negative. Then, each group of data is regression according to the General Model - Equation 3.1, which variables are statistically significant to reveal the effect that the variable represents on the return of Vietnamese stock.

3.2.1.2 General research model

Profits on Vietnam stock market are affected by securities profits in some stock markets such as Indonesia, Philippines, Thailand and Singapore (Lai Cao Mai Phuong, 2017). Therefore, in order to quantify the effects of internal (local) factors on Vietnamese stock market, the thesis calculates the local daily return of Vietnamese securities is the difference between the daily stock index returns in Vietnam stock market and daily return of MSCI Emerging Markets Asia Index. The method of calculating local daily return has been used by Dowling & Lucey (2005) on the ISEQ index for the Irish stock market. This excess return represents the local component of the country, which is reasonable to calculate the local component that affects stocks for the country of study, and the investor's mood is likely to affect this difference return (Dowling & Lucey, 2005). Accordingly, the general research model of holiday effects, weather, and lunar calendar to return of Vietnam stock market has the form:

$$R_Index_t = \alpha_0 + \sum\beta_t^j DoW_t^j + \sum\gamma_t^k Holiday_t^k + \sum\theta_t^m Weather_t^m + \sum\delta_t^n Lunar_t^n + \varepsilon_t \qquad \text{General research model (3.1)}$$

(ε_t is the error of the regression model)

Where: *R_Index*: Is the daily return difference (excess return) between the return of Vietnam stock index and the return of MSCI index on emerging markets in Asia (later referred to as excess return-a kind of returns). Return at day t is calculated by 100 times the natural logarithm of day t and day (t-1).

R-Index is implemented with 8 dependent variables including VNIndex, HNXIndex and 6-sector stock index. Six sector indexes includes: Real Estate, Industry, Oil and Gas, Consumer Services, Banks, Materials.

3.2.1.3 Method of estimation

Similar to Dowling & Lucey (2005), the thesis uses the main estimation method is OLS and uses Least Absolute Deviation (LAD) estimation to check the robustness to the general models of return of Vietnam stock market.

3.2.2 Holiday effect on return of Vietnam stock market

The holiday effect model to return of Vietnam stock market in the thesis is:

$$R_Index_t = \alpha_0 + \sum_{i=Mon,Tue}^{Wed,Fri}\beta_t^j DoW_t^j + \sum_{k=prec,postc}^{prel,pre30c,pre9c}\gamma_t^k Holiday_t^k + \varepsilon_t \qquad \text{Model 1 (3.8)}$$

(ε_t is the error of the regression model)

Table 3.1: Independent variables representing the holiday effect to return of Vietnam stock market

	Variable name	Variable code	Expected sign	Research
Holiday effect				Lai Cao Mai Phuong (2018). Previous researches mainly focused on the Lunar New Year holiday (Bergsma & Jiang, 2016); Le Thi Hong Minh & Truong Ngoc Son, 2018), or aggregate holidays (Luu Tien Chung & partners, 2016; Seif et al, 2017; Truong Dong Loc, 2012; Truong Dong Loc et al, 2017) .
3.2	Before the New Year	*prec*	+	
3.3	After the New Year	*postc*	+/-	
3.4	Before the Lunar New Year	*prel*	+	
3.5	After the Lunar New Year	*postl*	+/-	
3.6	Before the Victory day	*pre30c*	+	
3.7	Before the independence day	*pre9c*	+	

(Source: Author reference from researches and construction)

3.2.3 Weather effect on return of Vietnam stock market

3.2.3.2 Determine the region of the weather studied in Vietnam and identify variables that represent weather effects included in the research model

- ***Determine the region of the weather studied in Vietnam***

By analyzing the general characteristics of investors, the proportion of investors in Vietnam stock market is most concentrated in two big cities, Hanoi capital and Ho Chi Minh City, compared to other provinces. Analyzing the listing conditions of public companies and the rules of calculating indexes on two Vietnamese stock exchanges found that in an industry, due to the higher market capitalization, the listed companies on the HSX have a greater influence on the overall industry index than those in the same industry listed on the HNX. Besides, according to the roadmap for consolidating the two Stock Exchanges (HSX and HNX), the Ministry of Finance proposed in the direction of an organized stock trading market in Ho Chi Minh City (Ministry of Finance, 2017, p27). This proposal comes from many factors including the development history, listing standards on the HSX and HNX and the role of investors in Ho Chi Minh City on the Vietnam stock market. The thesis assumes that the correlation of mood due to weather factors with most investors in Ho Chi Minh City is strong enough to affect the return of Vietnam stock market. From the above analysis, the author used weather elements in Ho Chi Minh City to represent the weather effect of impact on return of Vietnamese securities in the period from September 28, 2007 to September 29, 2017.

- ***Identify variables that represent weather effects included in the research model***

All variables representing the weather effects used in the research models are calculated from 7:00 to 15:00 on trading days from September 28, 2007 to September 29, 2017. The method of measuring weather variables focusing on trading time of securities as in thesis reflects more accurately than the average daily value (because two thirds of the whole day is non -trading time) used in the studies of Hirshleifer & Shumway (2003), Kamstra et al. (2003, 2012), Dowling & Lucey (2005) and Gerlach (2007).

For temperature factors, there are two variables: average temperature in the trading period (*temp*) and temperature above 34 degrees Celsius (Ministry of Health, 2016) on the last three days of the month (*temp34*). The variable *temp34* is a dummy variable representing the impact of extreme heat pressure on the health and behavior of investors calculated as follows:

temp34= { If the trading day does not rain, the highest temperature in the meteorological tent is (3.9)

over 34 degrees C after the 28th day of the solar calendar

Other trading days

Days with moderate rainfall and / or heavy rain during the trading time are calculated as follows:

$$hrain = \begin{cases} 1, \text{If the rainfall during the trading time on day t from 16mm to 50mm} \\ 0, \text{Other trading days} \end{cases} \quad (3.12)$$

Dummy variables involving two humidity thresholds include:

$$humov72 = \begin{cases} 1, \text{If the average humidity in the trading time is from 72\% or more} \\ 0, \text{Other trading days} \end{cases} \quad (3.15)$$

$$humun52 = \begin{cases} 1, \text{If the average humidity in the trading time is from 49\% to 69\%} \\ 0, \text{Other trading days} \end{cases} \quad (3.16)$$

In order to quantify the impact of geographic activity from return to stock, the thesis uses variable ap

$$ap = \begin{cases} 1, \text{with the date of Ap> 29 and 5 trading days later.} \\ 0, \text{Other trading days} \end{cases} \quad (3.19)$$

Table 3.6: Independent variables representing the weather effect on return of Vietnam stock market

	Variable name	Variable code	Expected sign	Research
Weather effect				
	Average temperature	*temp*	+	Kamstra et al (2003; 2012)
3.9	The temperature is ≥35 degrees Celsius and does not rain at the end of the calendar month	*temp34*	-	The author builds on the characteristics of Vietnam (Ministry of Health, 2016)
	The average rainfall	*rain*	+	Hirshleifer & Shumway 2003); Gerlach (2007). Kamstra et al (2012)
3.12	The average rainfall is from 16mm to 50mm	*hrain*	+	The author builds on the characteristics of Vietnam (General Department of Water Resources, 2010)
	Average humidity		+	Kang et al (2010); Yoon & Kang (2009)
3.15	Average humidity ≥ 72%	*humov72*	+	The author builds on Dowling & Lucey (2005)
3.16	Average humidity ≤ 52%	*humun52*	-	
3.19	Geomagnetic activity	*Ap*	+	Anna & Cesare (2003); Dimitrova et al (2004); Dowling & Lucey (2005); Kamstra et al (2003), Lai Cao Mai Phuong (2017)

(Source: Author reference from researches and construction)

3.2.3.2 Model of research on the weather effect to return of Vietnam stock market

Based on previous studies related to weather effects on the stock market, weather characteristics in Ho Chi Minh City, the weather effect model to return of Vietnam stock market in the thesis is:

$$R_Index_t = \alpha_0 + \sum \beta_t^j DoW_t^j + \sum \gamma_t^k Holiday_t^k + \sum_t^m \theta_t^m Weather_t^m + \varepsilon_t \quad \text{Model 2}$$

(ε_t is the error of the regression model) (3.21)

3.2.4 Lunar calendar effect on return of Vietnam stock market

Dummy variables *clunar, lun6new, lun6full* are defined by:

$$clunar = \cos(2\pi d/29{,}53) \quad (3.22)$$

Where: d is the number of days from the full moon of the previous month. The variable clunar then takes the value of 1 on the 15th day of the lunar month; Get a value of -1 on the 1st day of the lunar month.

$$lun6new = \begin{cases} 1, \text{ Day 1 of the lunar calendar, before and after the first lunar calendar} \\ 0, \text{ Other trading days} \end{cases} \quad (3.23)$$

$$lun6full = \begin{cases} 1, \text{ On the 15th day of the lunar calendar, before and after the third day of the 15th lunar month} \\ 0, \text{ Other trading days} \end{cases} \quad (3.24)$$

To quantify the psychological impact of investors on the first trading days of the lunar July (*lun7new*) and the trading days in the lunar July (*lun7mon),* two dummy variables will be set in the lunar calendar effect model to the stock return. Specifically:

$$lun7new = \begin{cases} 1, \text{ Maximum of the first 3 trading days is in the lunar calendar from 1st -5th July every year.} \\ 0, \text{ Other trading days} \end{cases} \quad (3.25)$$

$$lun7mon = \begin{cases} 1, \text{ If the trading day is in lunar July} \\ 0, \text{ Other trading days} \end{cases} \quad (3.26)$$

3.2.4.2 Model of research on the lunar calendar effect to return of Vietnam stock market

The lunar calendar effect model to return of Vietnam stock market in the thesis is:

$$R_Index_t = \alpha_0 + \sum \beta_t^j DoW_t^j + \sum \gamma_t^k Holiday_t^k + \sum_{n=a1l,a73l}^{a157l,a715l} \delta_t^n Lunar_t^n + \varepsilon_t \quad \text{Model 3}$$

(ε_t is the error of the regression model) (3.30)

Table 3.7: Independent variables representing lunar calendar effect on return of Vietnam stock market

	Variable name	Variable code	Expected sign	Research
Lunar calendar effect				
3.26	Lunar cycle	*clunar*		Dowling & Lucey (2005); Lai Cao Mai Phuong (2012); Nguyen Van Diep (2014); Nguyen Van Diep et al (2016)
3.27	Close to the first day of the lunar month	*lun6new*	+	
3.28	Close to the 15th day of the lunar month	*lun6full*	-	
3.29	Three trading days in the beginning of the seventh lunar month	*lun7new*	-	Construction author
3.30	Transactions in the seventh lunar month	*lun7mon*	-	Almonte (2016)

(Source: Author reference from researches and construction)

CHAPTER 4: RESULTS AND DISCUSSION ON THE HOLIDAY EFFECTS, WEATHER, AND LUNAR CALENDAR TO RETURN OF VIETNAM STOCK MARKET

4.1 Statistical analysis and stationary test

4.2 Regression results of each effect to return of Vietnam stock market

4.3 Results and discussion on the holiday effects, weather, and lunar calendar to return of Vietnam stock market

4.3.1 Results on the holiday effects, weather, and lunar calendar to return of Vietnam stock market

The regression results of the aggregate model to return of Vietnam stock market when the short-term trend of stock index is positive (MA10> MA200) or negative (MA10< MA200) according to the two estimation methods OLS and LAD are shown in Table 4.14 and Table 4.15 respectively.

Holiday effects: With P-value <0.1, three trading days before the Lunar New Year affects 7/8 stock indexes when MA10> MA200 and 5/8 stock indexes when MA10 <MA200. Before the Victory day and before the holiday National Day affected return of stock indices with MA10 <MA200 more than MA10> MA200. When MA10 <MA200, trading before the day of Victory affects 6/8 stock indexes (except for Industry and Consumer Services sector), before the National Day, the positive impact on the stock index of 4 stock indexes (HNXIndex, Industry, Oil and Gas, Consumer Services) was positive. When MA10> MA200, before the day of Victory, the positive impact on return of 2 stock indexes (HNXIndex, Raw materials industry); before the Lunar New Year, there was a positive impact on the Real Estate sector, before the National Day holiday did not affect the return of 8 research indexes.

Weather effect: The number of variables representing the weather effect affecting the return of Vietnam stock market in two groups of data is not too different. When MA10> MA200: Humidity below 52% (*humun52*) affects return of 3 stock indexes (Real Estate, Industry, Petroleum), high temperature at the end of the calendar month (*temp34*) affects return Industry index, geomagnetic activity (*ap*) affects the return of consumer service sector index. When MA10 <MA200: Humidity below 52% (*humun52*) affects VNIndex return, Banking and Materials sector; High temperatures at the end of the calendar month (*temp34*) affect the return of real estate and Oil and gas sector; geomagnetic activity (*ap*) affects return to Industry and Banking sector.

Lunar calendar effect: The first three days of the lunar July only affect the return of VNIndex when MA10 <MA200. When MA10> MA200, transactions in the lunar July only affect the return of HNXIndex.

Table 4.14: Regression aggregate model results for three effects affect to return of Vietnam stock market (MA10> MA200)

	rvnindex		rhnxindex		rrealestate		rindustry	
Variable	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**
Fri	0.083	0.036	0.113	-0.037	0.093	0.165*	0.115	0.067
Prec	0.093	0.037	0.221	0.068	0.590*	0.644*	0.077	-0.082
Prel	0.744**	0.536*	0.764*	0.647**	1.055***	1.163***	1.185***	1.011*
Postl	-0.457	-0.492	-0.372	-0.107	0.096	0.558	-0.136	-0.269
pre30c	0.295	0.499	0.462	0.648***	0.070	0.219	0.582	0.946***
pre9c	-0.289	0.049	0.127	0.219	0.316	-0.027	0.143	0.326
lun7new	-0.022	0.429	-0.595	-0.493	-0.025	-0.281	-0.572	-0.258
lun7mon	0.164	0.108	0.501**	0.381*	0.126	0.142	0.351	0.043
temp34	0.072	-0.104			-0.054	-0.560	-0.686	-1.093***
humun52	-0.176	-0.108			-0.297**	-0.341***	-0.241*	-0.216*
Ap	0.023	0.013			-0.003	-0.024	-0.074	0.013
_cons	0.257***	0.208***	0.185***	0.168***	0.346***	0.280***	0.361***	0.322***
N	1270	1270	1316	1316	1230	1230	1284	1284
r2	0.009		0.008		0.010		0.012	
Ramsey	0.2914		0.8948		0.1745		0.2578	

linktest	0.659	0.999	0.845	0.392	0.489	0.999	0.616	0.989
VIF	<1,3		<1,3		<1,3		<1,3	
	roil		**rconsumerSe**		**rbanks**		**rmaterials**	
Variable	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**
Fri	-0.086	-0.115	-0.048	0.028	0.099	0.083	0.027	-0.077
Prec	0.399	0.185	-0.386	-0.326*	0.326	0.266	-0.078	-0.191
Prel	1.048**	1.075**	-0.035	0.196	0.681	0.739*	0.513	0.691*
Postl	0.120	-0.424	-0.286	-0.157	-0.056	-0.492	-0.695*	-0.563
pre30c	0.063	0.672**	0.585	0.359	-0.065	-0.072	0.763***	0.899***
pre9c	-0.830	-0.607	0.066	0.380	-0.729	-0.440	-0.651*	-0.416
lun7new	-0.853	-0.579	-0.608	-0.538**	-0.812	-0.205	-0.551	-0.236
lun7mon	0.310	0.198	0.208	0.019	0.611	0.344	0.087	0.005
temp34	-0.616	-0.370	-0.734	-1.065	-0.360	-0.280	-0.404	-0.663
humun52	-0.291	-0.299**	-0.106	-0.045	-0.239	-0.201	-0.160	-0.136
Ap	0.306	0.078	0.188	0.103	-0.286	-0.117	0.045	0.079
_cons	0.426***	0.327***	0.349***	0.263***	0.394***	0.246***	0.325***	0.314***
N	1223	1223	1232	1232	1149	1149	1264	1264
r2	0.010		0.007		0.010		0.010	
Ramsey	0.2431		0.2608		0.2456		0.8040	
linktest	0.950	0.993	0.562	0.979	0.299	0.490	0.864	0.998
VIF	<1,3		<1,3		<1,3		<1,3	

(Source: Author handles data from statistical software)

(Note: Regression equation $R_Index_t = \alpha_0 + \sum\beta_t^j DoW_t^j + \sum\gamma_t^k Holiday_t^k + \sum\theta_t^m Weather_t^m + \sum\delta_t^n Lunar_t^n + \varepsilon_t$ *(Composite model) by OLS method and LAD. *, **, *** represent statistical significance at 10%, 5%, 1% respectively)*

Table 4.15: Regression aggregate model results for three effects affect to return of Vietnam stock market (MA10< MA200)

	rvnindex		**rhnxindex**		**rrealestate**		**rindustry**	
Variable	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**
Fri	0.188	0.149	0.255*	0.245*	0.081	0.180	0.293**	0.397***
Prec	0.024	-0.048	-0.044	-0.595	0.195	-0.051	0.500	0.376
Prel	0.725	1.438	0.580	0.451***	0.271	0.368***	0.784*	0.970***
Postl	-1.029	-2.610	-1.292	-2.364	-1.514**	-0.965	-0.521	-0.841
pre30c	0.845**	0.523***	0.583**	0.215	0.819**	0.726***	0.563	0.271
pre9c	0.529	-0.371	1.237*	0.758	0.879	0.315	0.919*	0.704
lun7new	-0.596	-0.776**	-0.521	-0.423	-0.628	-0.532	-0.387	-0.187
lun7mon	0.194	0.247	0.098	-0.005	0.004	-0.088	0.173	0.278
temp34	-0.288	-0.411			-1.011*	-1.061***	-0.364	-0.256
humun52	-0.278*	-0.250**			-0.237	-0.141	-0.152	-0.113
Ap	0.211	0.062			0.223	-0.116	0.515**	0.343**
_cons	-0.298***	-0.217***	-0.437***	-0.347***	-0.312***	-0.215***	-0.475***	-0.402***
N	1219	1219	1173	1173	1259	1259	1205	1205
r2	0.013		0.010		0.017		0.017	
Ramsey	0.6002		0.5958		0.5399		0.6871	
linktest	0.937	0.989	0.901	0.979	0.706	0.939	0.549	0.949
VIF	<1,3		<1,3		<1,3		<1,3	
	roil		**rconsumerSe**		**rbanks**		**rmaterials**	
Variable	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**
Fri	0.115	0.077	0.284**	0.314***	0.173	0.215*	0.161	0.267*
Prec	0.268	0.342	0.165	-0.499	-0.224	0.013	0.537	0.146
Prel	0.445	0.587	1.244**	0.793**	0.736	1.077	1.177**	0.667

Postl	-0.412	-0.143	-0.001	-0.825	-0.917*	-0.721***	-1.033	-0.227
pre30c	1.359***	0.877	0.379	0.114	0.614**	0.555***	0.675**	0.187
pre9c	1.210*	0.846	0.721*	0.657**	0.375	-0.198	0.787	0.167
lun7new	0.107	0.129	-0.229	0.235	-0.564	-0.544	-0.423	-0.986
lun7mon	-0.036	-0.078	0.174	-0.227	0.058	0.101	0.301	0.442
temp34	-1.290*	-1.545**	-0.127	-0.287	-0.455	-0.648***	-0.532	-0.812
humun52	-0.220	-0.264	-0.220	-0.141	-0.359**	-0.221*	-0.260*	-0.263*
Ap	0.090	-0.140	0.246	0.065	0.347*	0.228**	0.114	0.086
_cons	-0.460***	-0.362***	-0.433***	-0.289***	-0.311***	-0.337***	-0.329***	-0.245***
N	1266	1266	1257	1257	1340	1340	1225	1225
r2	0.013		0.013		0.014		0.014	
Ramsey	0.2318		0.4286		0.8860		0.1572	
linktest	0.800	0.420	0.491	0.739	0.702	0.512	0.817	0.854
VIF	<1,3		<1,3		<1,3		<1,3	

(Source: Author handles data from statistical software)

(Note: Regression equation $R_Index_t = \alpha_0 + \sum\beta_t^j DoW_t^j + \sum\gamma_t^k Holiday_t^k + \sum\theta_t^m Weather_t^m + \sum\delta_t^n Lunar_t^n + \varepsilon_t$ *(Composite model) by OLS method and LAD. *, **, *** represent statistical significance at 10%, 5%, 1% respectively)*

Table 4.16: Regression aggregate model results for three effects affect to return of Vietnam stock market (All data: 28Sep 2007-29Sep 2017)

	rvnindex		**rhnxindex**		**rrealestate**		**rindustry**	
Variable	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**
fri	0.147*	0.148**	0.194**	0.090	0.081	0.212***	0.188**	0.206**
prec	0.127	0.034	0.267	0.066	0.460	0.642	0.300	0.209
prel	0.869***	0.805**	0.813**	0.728*	0.947***	0.905**	1.067***	0.936**
postl	-0.316	-0.351	-0.319	-0.102	-0.229	-0.428	-0.229	-0.127
pre30c	0.622**	0.285**	0.436*	0.455	0.544*	0.430	0.379	0.056
pre9c	0.068	0.186	0.636*	0.526	0.535*	0.034	0.456	0.229
lun7new	-0.626*	-0.594	-0.742**	-0.689*	-0.754**	-0.698*	-0.724**	-0.344*
lun7mon	0.213	0.186*	0.247	0.129	0.130	0.214	0.307*	0.176*
temp34	-0.293	-0.498***			-0.790	-0.728**	-0.670**	-0.868***
humun52	-0.202**	-0.117			-0.279***	-0.237***	-0.210*	-0.149*
ap	0.149*	0.048			0.089	0.045	0.212*	0.167
_cons	-0.032	0.004	-0.114**	-0.039	0.017	0.017	-0.035	0.006
N	2490	2490	2490	2490	2490	2490	2490	2490
r2	0.009		0.007		0.011		0.012	
Ramsey test	0.2717		0.8573		0.3341		0.1670	
linktest	0.506	0.999	0.920	0.356	0.825	0.989	0.357	0.997
VIF	<1,3		<1,3		<1,3		<1,3	
	roil		**rconsumerSe**		**rbanks**		**rmaterials**	
Variable	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**	**OLS**	**LAD**
fri	0.018	-0.014	0.116	0.166**	0.128	0.223**	0.095	0.095
prec	0.523	0.525	-0.072	-0.069	0.246	0.361	0.251	0.054
prel	0.993**	1.246***	0.586	0.521*	0.831**	1.007**	0.825**	0.854*
postl	0.037	-0.228	0.007	0.073	-0.047	-0.700**	-0.555	-0.508
pre30c	0.824***	0.504*	0.281	0.029	0.382*	0.306***	0.619***	0.521**
pre9c	-0.004	-0.121	0.327	0.110	-0.105	-0.359	-0.037	-0.090
lun7new	-0.547	-0.371	-0.493	-0.341*	-0.802**	-0.703	-0.485*	-0.297
lun7mon	0.318*	0.148	0.248	0.091	0.215	0.124	0.224*	0.215*
temp34	-1.053**	-0.385	-0.394	-0.685***	-0.525	-0.787***	-0.422	-0.491***
humun52	-0.256**	-0.230**	-0.138	-0.112	-0.307***	-0.163*	-0.216**	-0.176**

ap	0.220	-0.055	0.211*	0.128	0.052	0.103	0.071	0.106
_cons	-0.041	-0.013	-0.054	-0.048	0.020	-0.091*	-0.003	0.008
N	2490	2490	2490	2490	2490	2490	2490	2490
r2	0.009		0.005		0.007		0.008	
Ramsey	0.5841		0.3437		0.8680		0.6132	
linktest	0.687	0.999	0.368	0.444	0.782	0.998	0.726	0.759
VIF	<1,3		<1,3		<1,3		<1,3	

(Source: Author handles data from statistical software)

(Note: Regression equation $R_Index_t = \alpha_0 + \sum\beta_t^j DoW_t^j + \sum\gamma_t^k Holiday_t^k + \sum\theta_t^m Weather_t^m + \sum\delta_t^n Lunar_t^n + \varepsilon_t$ *(Composite model) by OLS method and LAD. *, **, *** represent statistical significance at 10%, 5%, 1% respectively)*

The general regression model results for return of Vietnam stock market are shown in Table 4.16.

Holiday effect: Except for the Lunar New Year holiday, the transaction before the remaining three holidays all positively affected return of Vietnamese stock market for data in 10 years of research. With P-value <0.1 the transaction before the Lunar New Year holidays positively affects the return of 7/8 stock indexes (except Consumer services sector), return of Banking sector and Material sector negatively affected after the Lunar New Year. Trading before the day of Victory positively affects the return of 5/8 stock indexes (except for Industry, Consumer services and Banking). Transactions before National festival positively affected return HNXIndex and real estate sector.

Weather effects: Trading on days with humidity below 52% and high temperatures above 34 degrees Celsius at the end of the month calendar negatively impacted the return of most research stock indexes. Except Consumer service industry, the days with humidity below 52% affect 6/7 stock indexes. The days of high temperatures on the last days of the solar calendar negatively affected the return of 5/7 stock indexes, except for Consumer services. Geomagnetic activity positively affected return VNIndex and Industry.

Lunar Calendar Effect: Variables representing the negative calendar effect in the composite model all affect the return of Vietnamese stock. The first three days of the lunar July negatively affected the return of 5/8 stock indexes (except for Oil & Gas, Consumer services and Materials). In contrast, transactions in the whole lunar July affected positively to return VNIndex and three sectors (Industry, Oil & Gas, and Materials).

4.3 Discussion on the holiday effects, weather, and lunar calendar to return of Vietnam stock market

Holiday effect: In general, variables that represent holiday effects in research models affect return on securities in Vietnam. Transactions before the Lunar New Year holiday have the most impact on return of Vietnam stock market, next is before Victory Day, before National Day, before New Year's Day and after the Lunar New Year.

Lunar New Year: Before the Lunar New Year holiday, it affected on 7/8 return of securities, except Consumer services sector in all three individual models each effect (Table 4.4, Table 4.7, Table 4.10). When combining all three effects in the General Model, trading on the three days before the Lunar New Year positively affects the return of Vietnam stock market from September 28, 2007 to September 29, 2017 even when Short-term trend of stocks is increasing (mood of optimistic investment) or decresing (mood of investment is not optimistic). *When the short-term trend of stocks is positive*: VNIndex, HNXIndex and 5/6 sectors (except Consumer Services industry) continue to receive positive effects before the Lunar New Year holiday (Table 4.14). *When the short-term trend of stocks is negative* because the indexes are in short-term decline, positive

sentiment before the Lunar New Year holiday still creates a strong enough demand to support the short-term decline of return Securities especially on HNX (return HNXIndex) and 4/6 sectors including: Real Estate, Industry, Consumer Services and Materials (Table 4.15). Realizing that even if the short-term trend of securities is positive or negative the return of Vietnamese securities traded before the Lunar New Year holidays will receive positive effects.

This empirical evidence in the thesis supports the hypothesis when distinguishing / irrespective of short-term securities trends, investors are affected by unrelated factors (Ariel, 1990) as their positive mood before the Lunar New Year holiday. This result can be explained by investors' optimistic mood, house money effects and prospect theory. Before Lunar New Year is the time when people and investors generally hold the most cash in the year, this is the time when they receive the biggest bonuses in the year (Quynh Nhu, 2018) and prepare to step on holiday created an optimistic mood (Farber, 1953; Pecjak, 1970). Investing in stocks is similar to a decision in an uncertain situation, while bonuses before the Lunar New Year like "spotlight" on financing increase investment, motivating investors to increase the house money effect (Thaler & Johnson, 1990). Bên cạnh đó, tâm trạng lạc quan vào thời gian này như “thông tin”, khuyến khích các nhà đầu tư “tham khảo” tâm trạng của họ khi ra quyết định (Schwarz, 1990). Bởi vì trong các tình huống không chắc chắn, thay vì đi tìm những lý do hợp lý, các nhà đầu tư chuyển những phân tích phức tạp thành những đánh giá tâm trạng tích cực (tiêu cực) của mình khi ra quyết định (Montague và Berns, 2002). Therefore, optimistic mood before the Lunar New Year holiday affects investors’ decisions. The result is return of stock market rises at this time. This view is supported by the prospect theory of Kahneman & Tversky (1979, 1992) when in uncertain situations, investors' decisions do not always reflect pure money. In particular, sometimes the gain or loss brings greater utility than the wealth.

For 10-year data from September 28, 2007 to September 29, 2017, on two stock exchanges return is usually positive on three trading days *before the Lunar New Year holiday* for the majority of stocks (7/8 stock index) when estimating using OLS and LAD methods. Thus, the results from the general model for all three data samples (10 years, MA10> MA200, MA10 <MA200) demonstrate strong positive impact of the three trading days before the Lunar New Year holiday (prel) to return of Vietnam stock market. Realizing that during all research holidays, the Lunar New Year is the only traditional cultural holiday, which the holidays due to traditional cultural factors often affect the strong mood with the level of wider than other holidays in the year (Chan et al., 1996). This explains why before the biggest and most comprehensive Lunar New Year holiday on two stock exchanges compared to other holidays. *After the Lunar New Year holiday*, negative impacts on the return of materials sector and banking sector have been negatively affected by each effects models and general models. *For materials sector*: This result can be explained by the habit of Vietnamese people to avoid spending at the beginning of the lunar year so they often store enough materials for many days after the Lunar New Year holiday (Derk, 2015) and the rising stock prices of Materials sector before the Lunar New Year reflected this. *For the Banking sector:* A large amount of customer money has been withdrawn before the Lunar New Year, so to compete with each other, banks often spend a cost of offering incentives to attract customers deposit goods after this holiday. This may lead investors to be hesitant to buy high prices for share of Bank sector in the days after Tet holiday. Besides, the psychology of "*January is the best time for a tour*" also partly explains the decline in the return of Materials sector and Banking sector after the Lunar New Year holiday.

In the eight indexes, before the New Year holidays only affected the return of real estate sector when the short-term trend of this sector was increasing and in the holiday effect model. Compared to the National Holiday, trading on the day before the Victory effect is wider and more stable (statistical significance of the regression coefficient) than to return of Vietnam stock market. This is explained by the fact that before the Victory day, it positively affected return on two stock exchanges, while the positive effect on National Day was only meaningful for the Hanoi Stock Exchange. Positive Return of VNIndex and HNXIndex before the day of Victory is supported by the rise of the Oil and Gas sector, the Materials sector in 10 years for general models and individual regression models for each effect. In addition, before the Victory day, the return of Real Estate and Banking sector received positive influence when the short-term trend of these sectors decreasing but the impact does not significant when the short-term trend of these sectors increasing. This explains in part why the variable regression coefficient *pre30c* of the two sectors is not statistically significant in some individual effects models. The increasing of the HNXIndex before National Day was supported by the increasing of Real Estate, Industry and Consumer Services.

Research on holiday effects on TSSL of Vietnam stock market shows that before the Lunar New Year holiday, the strongest impact and maintaining a positive impact when distinguishing and irrespective of short-term trends of securities. When the short-term trend is declining, the optimistic spirit before the Victory Day still positively affects return VNIndex, the cheerful spirit before the holiday of Quoc Khanh positively affects return HNXIndex. The Real Estate is the only sector that affected before the New Year's holiday with a positive impact on return in the period of 10 years of research and the short-term mood of the sector is optimistic. After the Lunar New Year holiday affected negatively on the return of Banking sector and Materials sector with data of 10 years of research, when MA10> MA200 only negatively affected the return of Materials sector, when the MA10 <MA200 only negatively affected the return of Banking sector.

Lunar Calendar Effect:

The first three days of the lunar July negatively affected the return of 6/8 stock indexes except for Oil & Gas sector and Materials sector. In contrast, transactions in the whole lunar July affected positively to return VNIndex, Industry, Oil and Gas and Materials sector for all data in the research models, but only affected return. HNXIndex when MA10> MA200. This result shows that, except Consumer service sector, 7/8 stock indexes related to lunar July were affected. In which, return of Oil & Gas and Materials sector only got positive influence when trading in the whole lunar July, whereas, Real Estate and Banking sector only suffered negative impacts when trading on three the first day in the lunar July. Growth stocks following the economic growth cycle (Real Estate and Banking) are intimately related to the future prospects of the economy, and are more sensitive to changes in future prospects than with defensive stocks such as Oil & Gas and Materials sector (Conover et al 2005). Because investors have connected with a negative outlook for cyclical stocks on the first three days of the lunar July, return of real estate and banking stocks should be returned affected negatively when trading on these days. This empirical evidence supports the research of Pooja (2016) and He et al (2018) for the real estate industry in Singapore, adding knowledge about the impact of Vietnam stock market on the first three trading days in the lunar July. The slope in area loss of the value function in prospect theory is steeper than the area gain, expressed with the same value, psychological risk aversion in the area of loss larger than the area gain (Kahneman & Tversky, 1979, Tversky & Kahneman 1992). The value function of Kahneman & Tversky (1979)

and Tversky & Kahneman (1992) can explain investor sentiment fearing loss in the lunar July for stocks in Real Estate and Banking sector, resulting in regression coefficients of all three sectors are positive but not statistically significant when trading during the lunar July. The group of defensive stocks is often prioritized by investors when the cautious sentiment increases in the lunar July, in which the reason for the return of Oil & Gas industry and Material industry received positive influence during this time. This result does not support the results of Almonte (2016) on the Philippine Stock Exchange. This can be explained by investment psychology on Vietnam stock market. Accordingly, the habit of using the lunar July in the life together with the information before the date of lunar July may make the cautious psychology cover and dominate the decisions on buying / selling stocks on the first three trading days of the lunar July. After the first three trading days of the lunar July, however, the rest days of this month positively impacted the return of Vietnam stock market. Return of Industry sector suffers a negative impact on the first three days of the lunar July but receives a positive impact on transactions during the lunar July. The opposite direction of impact between the first three days of the seventh lunar month with the remaining days of the lunar July for Industry can be explained based on gaps theory of Malinowski (1954) aimed to actively control situations that could bring about bad results (Hernandez et al., 2008). In the Vietnamese style, people say, "*Be patient / forbeared for good*" on the first three days of the lunar July to be psychologically assured.

Weather effect:

Temperature: The average temperature from 7:00 to 15:00 in Ho Chi Minh City for 10 years of study is 32.1 degrees Celsius does not affect return of Vietnam stock market (has been excluded from the weather effect model when individual weather elements, Table 4.5). This result differs from the effect of temperature on return securities in research by Cao & Wei (2005), Floros (2008) and Keef & Roush (2002) because of Vietnam's geographical position is closer to the equator so the weather characteristics are different from most countries studied in the United States and Europe.

High temperature: In general, the days without rain, high temperature above 34 degrees Celsius at the end of the calendar month negatively affected return of VNIndex, Real Estate industry, Industry, Oil and Gas industry and Materials industry in the weather effect model, general model with all research data, when the short-term trend of securities is positive (Industry) or negative (Real estate, Oil and Gas). This is empirical evidence supporting the psychological research of Anderson (2001), Makaremi et al (2012), and the Ministry of Health's working conditions (2016). On high-temperature days above 34 degrees Celsius often negatively affects psychology, reduces alertness, reduce working efficiency and performance of investors (Anderson, 2001; Makaremi, 2012; Ministry of Health, 2016). Negative impacts on investor psychology and behavior caused by high temperatures are maintained during the day if there is no source / intermediate material - which acts to make the air more cool, or reduce discomfort from high temperatures on their bodies. Because research by Baron & Bell (1976) and Kenrick & MacFarlane (1986) confirmed that high temperatures negatively impact on psychology and human behavior is rapidly reduced, even disappear if there is an intermediate source / source that reduces the body's feeling of heat. The days of high temperatures above 34 degrees Celsius were studied in the thesis that on days without rain, the discomfort of the majority of investors in the temperature days over 34 degrees Celsius is maintained because there is no source that reduces the impact of air temperature by rain or other intermediate heat reduction sources. In hot weather, not only ordinary people are negatively affected by temperature

(Cunningham, 1979; Kenrick and MacFarlane, 1986; Anderson & et al., 2000), even those who do executive-related work when their results are based on deduction are also affected in a more negative direction by the impact of high temperature conditions (Vrij et al., 1994). Accordingly, investors under the psychological difficulty of maintaining the whole day due to high temperatures, adding with work pressure often increase in the last days of the month may have negative impacts on the stock market, is an explanation for Vietnam stock return phenomenon usually decrease on these days. Affect infusion model proposed by Forgas (1995) and prospect theory of Kahneman & Tversky (1979, 1992) predicted that in this situation, investors tend to aversion risks. That is, the uncomfortable mood on the days of working under high temperature conditions, investors become more cautious, investors' bid on the market is biased towards low prices, supply side in negative mood also accepted to sell at lower price than other days. As a result, return often decreases on the last days of the calendar month without rain and high temperature above 34 degrees C.

Low humidity: Average humidity from 7:00 to 15:00 on the trading day below 52% negatively affects return to 6/7 stock indexes, except Consumer services sector. This result is experimental evidence supporting the psychological research of Baron & Bell (1976). Accordingly, at low humidity in the condition that the average temperature of 7h00-15h00 from 32.2 degrees Celsius or more causes a feeling of difficulty in breathing, fatigue leads to reduced productivity and efficiency (Griffitt, 1970). Besides, Vietnam has a hot and humid climate so along with a temperature level, low humidity will increase the discomfort (Makaremi et al, 2012). It is the unpleasant feeling in low humidity conditions that "drives" investors to infusion their moods when placing stocks orders, leading to many stocks decreasing on these days.

Geomagnetic activities: Five days after the geomagnetic activities influence positively to return VNIndex, Industry and Banking sectors in weather effects model. In the general model: with all 10-year data, geomagnetic activity positively affected VNIndex return and Industry sector, when MA10> MA200 affected return to Consumer services sector, when MA10 <MA200 return of Industry sector and Banking sector are affected. This result concretizes the effect of geomagnetic activity to return VNIndex supported by the industry and support for the research of Lai Cao Mai Phuong (2012).

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 The findings of the thesis

Studies of physiological and empirical results show that the mood plays a certain role in securities investment decisions, even the mood comes from factors that are not related to securities (like holiday effects, weather, and lunar calendar) may also affect the stock return on the market. In order to determine the existence of this relationship, the thesis studies the holiday effect, weather, and lunar calendar to return of Vietnam stock market. Some findings of the thesis are based on empirical research results from research models for VNIndex, HNXIndex and index of six sectors in Vietnam stock market, including:

The holiday effect, weather, and lunar calendar all affect the return of Vietnam stock market when studying models with individual effects and when combining all three effects in a general model. This relationship exists with all research data from September 28, 2007 to September 29, 2017, and also exists when separating short-term data on the HSX (VNIndex), HNX (is HNXIndex), and the index of six sectors is positive (MA10> MA200) or negative (MA10 <MA200). The research results support the hypothesis when the short-

term trend of securities is positive / negative, or regardless of trends are affected by factors that are not related to stocks such as the mood around the holiday season, elements related to weather and lunar calendar.

For the holiday effect, three trading days before the holidays in Vietnam positively affect return many securities. Lunar New Year is the holiday season with the most influence and the strongest in the study holidays. Before the Victory day, it positively affected the return of VNIndex and HNXIndex, with partial support from the rise of the Oil and Gas sector and the Materials sector. Before National Day positively affected return HNXIndex with partial support from the rise of Industry sector and Consumer services sector. Explain that the pre-holiday increase may be due to the house money effect before the holidays, making investors more positive and optimistic about the market than other days.

For weather effects, return of most stock indexes are affected by weather effects in Ho Chi Minh City (not counted for HNXIndex). The average humidity from 7h00-15h00 is below 52% of the largest impact (except Consumer Services sector), geomagnetic activity affects return VNIndex and Industry with all data. Except for Banking and Consumer services sector, temperatures above 34 degrees Celsius at the end of the calendar month negatively affected return of the remaining stock indices.

For lunar calendar effect: Stock trading on the first three days of the lunar July negatively affected 5/8 stocks return indexes of research for the entire data and when the short-term trend was negative for VNIndex. This result is explained by gaps theory and superstitious beliefs in life. Lunar July has a positive influence on return of VNIndex and 3/6 industry indices (Industry, Oil and Gas, Materials). Lunar July positively affected return of HNXIndex when the short-term trend of this index was positive. Affecting return on the first three trading days of the seventh lunar month is contradictory to the whole July lunar calendar, indicating that the concern related to July only focused on the first three days of the stock market for the group cyclical stocks. Investment psychology has surpassed the anxiety the more positive reaction has been maintained on the remaining days of the lunar July, focusing on protective stocks.

Return of Real Estate sector is negatively affected when trading on the first three days of the lunar July, impact does not significant during this month, but received a positive influence immediately after the end of the lunar July is before the National Day holiday. This empirical evidence suggests that the return of Real Estate sector is most clearly influenced by the lunar July.

Stocks in Oil & Gas sector and Materials sector of defensive group attracted the attention of investors in the lunar July, the cause of pushing the return of these two sectors increased this month. However, after the Lunar New Year, only the return of Materials sector negatively affected after the Lunar New Year and the return of Oil and Gas sector is not affected can be explained by two reasons. Firstly, think about preparing materials before the Lunar New Year (reflected in the stock price before this holiday) to avoid buying on the days after the Lunar New Year and psychology "*January is the best time for a tour"* may have caused negative effects on the Materials sector. Secondly, the main product of the Oil and Gas sector is affected by the world market price more than Material sector.

5.2 The meaning of the thesis

The main contribution of the thesis is not to define a profitable trading strategy, but to determine whether investor moods due to holiday effects, weather, and lunar calendar may affect return on securities. The answer is yes, empirical evidence from research models confirms this claim. This implies that the variables are statistically

significant in the model of holiday, weather, and lunar effect models, which are a measure of the mood of the Vietnamese stock market.

Research in the thesis is based on the perspective of behavioral finance. Accordingly, the existence of holiday, weather, and lunar calender effects to stock return proves that the average decisions of investors of the Vietnam Stock Market are irrational. This is inconsistent with the point of view in normative theories. Since then, the results of the thesis contribute to the previous theoretical framework in explaining the decision to invest in securities, as a basis for expanding the research direction of non-financial factors in Vietnam.

5.3 Recommendation of the thesis

For investors

The research provides empirical evidence that investors' irrational actions related to holiday effects, weather, and negative calendars are reflected in the return of Vietnam stock market. This unreasonable action may be limited, even disappearing on the stock market when knowledge of these three effects is universal to many investors. For example, when university students are known about the impact of the weather that can affect their psychology, their actions are no longer affected by weather factors (Sinclair, Mark & Clore, 1994). In order not to be affected by these effects, in addition to the knowledge of these effects, investors actively train to think in a logical way to overcome the situation of using "mood as information" in decision on securities investment.

For issuers

Successful issuance of securities on the stock market depends on many factors, in which attention should be paid to the issuance time and psychological factors related to types of securities in defensive or cyclical groups. When other factors remain unchanged, if the avoidance of investors still exists on the first days of the lunar July on the Vietnam stock market, one of the times when stock issues in the cyclical group (such as Real Estate sector and Banking sector) are before the National holiday when the Lunar July is finished.

For policy managers

The existence of influences on the return of Vietnam stock market in the seventh lunar month supports the hypothesis that the mood is in favor of negative investors during this time. However, when investors know that factors affecting psychology may affect their behavior on the stock market, they tend to behave more appropriately from the point of view of normative theory (Sinclair, Mark & Clore, 1994).

The advancement of science and technology is increasingly developing managers should proactively provide logical scientific evidence to explain oral events / phenomena in society that the previous time did not have a satisfactory explanation. This is the most effective and quick form of communication for people in general and investors in particular.

5.4 Limitations of the thesis and the next research direction

Part of the thesis researches weather factors in Ho Chi Minh City and uses a method of separating short-term trends of stocks in accordance with the moving average for Vietnam stock market. Therefore, further studies can expand to study the impact of weather factors in many other areas in Vietnam and add other methods to determine the short-term trend of stocks to gives a more comprehensive review of holiday effects, weather, and lunar calendar to return of Vietnam stock market.

LIST OF THE SCIENTIFIC ARTICLES OF THE AUTHOR PUBLISHED

I. The papers

Lai Cao Mai Phuong., 2017. The correlation of geomanetic field to VNIndex return. *Banking Technology Review, vol1(9)*, 65-81.

Lai Cao Mai Phuong., 2018. Preholiday effects on VNIndex return and HNXIndex return. *Journal of Review of Finance*, Aug 2018, 76-79

II. Academic Research Project recognized by the University

Impact of geomanetic field to VNIndex return. Project manager: PhD student Lai Cao Mai Phuong, participant: Tu Thi Hoang Lan. Code: 052014. Ho Chi Minh City University of Industry.