



Faculty of Economics and Business

**EFFECTS OF 2011 SOUTHEAST ASIA FLOOD ON
AGRICULTURE STOCKS IN THAILAND, MALAYSIA
AND THE UNITED STATES**

Tang Yoke Man

Bachelor of Finance (Honours)
2015

**EFFECTS OF 2011 SOUTHEAST ASIA FLOOD ON AGRICULTURE
STOCKS IN THAILAND, MALAYSIA AND THE UNITED STATES**

TANG YOKE MAN

This project is submitted in partial fulfillment of
the requirements for the degree of Bachelor of Finance (Honours)

Faculty of Economics and Business
UNIVERSITI MALAYSIA SARAWAK

2015

Statement of Originality

The work described in this Final Year Project, entitled
**“Effects of 2011 Southeast Asia Flood on Agriculture Stocks in
Thailand, Malaysia and the United States”**
is to the best of the author’s knowledge that of the author except
where due reference is made.

Date Submitted

Tang Yoke Man
39085

ABSTRACT

EFFECTS OF 2011 SOUTHEAST ASIAN FLOOD ON AGRICULTURE STOCK RETURNS IN THAILAND, MALAYSIA AND THE UNITED STATES

By

Tang Yoke Man

The main objective for this study is to deliberate the effects of natural disasters on the sources of food by studying on the impacts of 2011 Southeast Asian Flood on agriculture stocks in Thailand, Malaysia and the United States. 2011 Southeast Asian Flood that started in Thailand is the recent most serious tragedy and it had become the headlights in whole world. Thailand has always been in close relationship with Malaysia and so as United States of America. Event study methodology is applied to examine whether floods do significantly affect the performance of agriculture stocks in the selected countries. The results found that agriculture stocks in Thailand, Malaysia and the United States are not significantly affected by the negative event. The results also indicated that the stock markets in all the countries are considered efficient as significant negative abnormal returns are absent. However, stock market in the United State is the most efficient while stock market in Thailand is the least efficient when comes into comparison. Anyhow, it is good to include agriculture stocks in the portfolio for diversification purpose. The companies in agribusiness should be getting involved in other kinds of business to offset damages. The limitation is the small sample size and abnormal returns are observed from sample companies only in food industry to reflect the performance of agriculture sector which decrease the accuracy of results. A longer event period and estimation period are recommended for getting a more reliable and clear result.

ABSTRAK

KESAN 2011 BANJIR ASIA TENGGARA KEPADA PULANGAN SAHAM-SAHAM PERTANIAN DI THAILAND, MALAYSIA DAN AMERIKA SYARIKAT

Oleh

Tang Yoke Man

Objektif utama kajian ini adalah untuk membincangkan kesan bencana alam kepada sumber makanan dengan mengkaji tentang kesan 2011 Banjir Asia Tenggara dalam saham-saham pertanian di Thailand, Malaysia dan Amerika Syarikat. 2011 Banjir Asia Tenggara yang bermula di Thailand ialah tragedi yang paling serius dan peristiwa ini telah menjadi kebimbangan utama di seluruh dunia. Thailand mempunyai hubungan yang rapat dengan Malaysia dan Amerika. Metodologi kajian acara telah digunakan untuk menyiasatkan keadaan 2011 Banjir Asia Tenggara dan prestasi saham-saham pertanian di Malaysia, Thailand dan Amerika sebelum dan selepas peristiwa itu. Keputusan mendapati bahawa saham-saham pertanian di Thailand, Malaysia dan Amerika tidak terjejas oleh peristiwa itu. Keputusan juga menunjukkan bahawa pasaran saham di Thailand, Malaysia dan USA dianggap berkesan kerana pulangan tidak normal yang ketara negatif tidak dapat ditunjukkan. Pasaran saham di Amerika Syarikat adalah yang paling berkesan manakala pasaran saham di Thailand adalah yang paling berkesan dalam perbandingan. Syarikat-syarikat dalam perniagaan tani perlu melibatkan diri dalam jenis-jenis perniagaan lain untuk mengimbangi kerosakan. Had ini adalah saiz sampel yang kecil dan pulangan tidak normal yang diperhatikan hanya syarikat-syarikat sampel dalam industri makanan. Tempoh acara dan tempoh anggaran juga adalah perlu dilanjutkan untuk mendapatkan keputusan yang lebih dipercayai dan jelas.

ACKNOWLEDGEMENT

I wish to express my most sincere thanks to my supervisor, Professor Dr. Abu Hassan Md. Isa for providing and supporting me with all the necessary facilities for this Final Year Project. I am truly grateful and obligated to him for sharing expertise and providing professional guidance and encouragement extended to me. He was the one who inspired me when I was having difficulties in selecting topic for research at the first time and he then came up with some useful thesis for me to take as references when I was facing the most difficult times in progressing this Final Year Project. Not only that, he gave me ultimate moral support and the freedom I needed to move on. Without his continuous encouragement and kindness, my Final Year Project cannot be done.

My sincere thanks to my coursemates for always willing to read my Final Year Project and giving me comments and providing resources which are very useful for my Final Year Project. I really appreciate their valuable suggestions and useful comments. They really helped and taught me deeply. Furthermore, special thanks to my roommate who gives me mental and moral support all the time. She has been enlivening me emotionally through the rough road in order to finish this Final Year Project. Her unconditional support has always been my energy to move on.

I also bless my parents and my family for the eternal support and attention. My parents have been assisting me in everything possible especially the financial support. Their patience and devotedness to me are unbeatable. My parents and my family members, undeniably, are the main source of love, concern, fortitude and power in my life. Lastly, I would like to take this opportunity to express my gratitude to all the staffs in Faculty of Economics and Business for their help and support.

TABLE OF CONTENTS

	Page
List of Tables	xi
List of Figures	xiii
	Page
CHAPTER ONE INTRODUCTION	
1.0 Introduction	1
1.1 Background of the study.....	5
1.2 Problem Statement	13
1.3 Objective	16
1.3.1 General Objective	16
1.3.2 Specific Objectives	16
1.4 Significance and Contribution of the study	17
1.5 Scope of the research.....	20
CHAPTER TWO LITERATURE REVIEW	
2.0 Introduction	21
2.1 Chaos Theory	21
2.2 Efficient Market Hypothesis (EMH)	23

TABLE OF CONTENTS (Cont.)

	Page
2.3 Spillover Effects	24
2.4 Event Study Methodology	24
2.5 Natural Disasters	25
2.6 Impacts of Natural Disasters on Stock Market.....	26
2.7 Impacts of Floods	30
2.8 Agriculture.....	33
2.9 Agribusiness	34
 CHAPTER THREE DATA AND METHODOLOGY	
3.0 Introduction	36
3.1 Theoretical Framework	37
3.2 The Conceptual Framework	39
3.2.1 Definitions and Classifications of Terms.....	40
3.2.2 Spillover Effects	44
3.3 Data Source	45
3.4 Methodology	47
3.4.1 Event identification.....	47
3.4.2 Event Day	50

TABLE OF CONTENTS (Cont.)

	Page
3.4.3 Event Window and Estimation Window	51
3.5 Models of Event Study	51
3.5.1 Capital Asset Pricing Model (CAPM)	51
3.5.2 Market Model	52
3.5.3 Abnormal Return (AR) and Average Abnormal Return (AAR).....	53
3.6 Descriptions on Test Statistic	56
3.7 Hypothesis	58
CHAPTER FOUR EMPIRICAL RESULT	
4.0 Introduction	59
4.1 Descriptions on Methodology and Sample	61
4.2 Results and Interpretations	66
4.2.1. Thailand	66
4.2.2. Malaysia.....	73
4.2.3. The United States.....	80
4.3 Concluding Remarks	87
4.4 Conclusion.....	88

TABLE OF CONTENTS (Cont.)

Page

CHAPTER FIVE CONCLUSION

5.1 Introduction91

5.2 Review of Research Procedures91

5.3 Summary of Findings92

5.4 Policy Implication94

5.5 Limitations of Study96

5.6 Recommendation for future research97

5.7 Conclusion.....97

REFERENCES

APENDICES

Lists of Tables

	Page
Table 1: Types of Natural Disasters and Examples	2
Table 2: Types of Thailand's Rice Export in Year	
2007 to 2010	8
Table 3: Thailand's Jasmine Rice Export in Year	
2007 to 2010	10
Table 4: Estimates of Damages and Losses in Agriculture	
Sector during the 2011 Floods	12
Table 5: Classifications and Types of Damages	41
Table 6: Selected Important news regarding 2011 Southeast	
Asian Flood	48-49
Table 7: Final Sample of Listed Companies in Thailand	63
Table 8: Final Sample of Listed Companies in Malaysia	64
Table 9: Final Sample of Listed Companies in the United States.....	65
Table 10: AAR, CAAR and respective t-values across the event period.....	71
Table 11: Standard deviation, Average Cumulative Abnormal	

Lists of Tables (Cont.)

	Page
Returns and t-value for ACAR.....	72
Table 12: The AARs and CAARs with their respective t-values for the listed food companies in Malaysia across the event period	78
Table 13: Standard deviation, Average Cumulative Abnormal Returns and t-value for ACAR.....	79
Table 14: The AAR and CAAR and the respective t-values for the listed food companies in the United States.....	85
Table 15: Standard deviation, Average Cumulative Abnormal Returns and t-value for ACAR.....	86

Lists of Figures

	Page
Figure 1: Conceptual Framework of the Study	38
Figure 2: The AAR for the listed food companies in Thailand across the event period	68
Figure 3: The CAAR for the listed food companies in Thailand in the event period	69
Figure 4: The AAR for the listed food companies in Malaysia across the event period	75
Figure 5: The CAAR of the listed food companies Malaysia in the event period	76
Figure 6: The AAR for the listed food companies the United States in the event period	82
Figure 7: The CAAR for the listed food companies in the United States across event period	83

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Natural catastrophes such as floods, storms, heat waves, earthquakes, mitigation, tsunamis, volcano and the others are the major opposing events that resulted from natural manners of the Earth. As the population continues to grow along with the evolution of technology, natural disasters are getting common. Despite, knowing that natural hazards are not random as its probability and consequences of occurrences can be calculated, damages resulted from the disasters are still significant. In fact, scientific data is just too general which information regarding on occurrence on specific locations is eliminated and the natural disasters are too unpredictable. Undoubtedly, the natural disaster is a disastrous that caused by the Mother Nature or it can be defined as the act of God. The natural calamities often reacted from internal or beneath the earth's surface, external or topological, weather-related that consists of meteorological and hydrological and biological circumferences that beyond one's control. As shown in Table 1, there are 5 sub-groups of natural disasters that include 12 types of disaster and 24 sub-types (Guha, Vos, Below, & Ponserre, 2012).

Table 1: Types of Natural Disasters and Examples (Source: Guha, Vos, Below, & Ponserre, 2012)

Biological	Geophysical	Hydrological	Meteorology	Climatological
<ul style="list-style-type: none"> • Epidemic -Viral Infectious Disease -Bacterial Infectious Disease -Parasitic Infectious Diseases -Fungal Infectious Disease -Prion Infectious Disease • Insect Infestation • Animal Stampede 	<ul style="list-style-type: none"> • Earthquake • Volcano • Mass Movement (Dry) -Rockfall -Landslide -Avalanche -Subsidence 	<ul style="list-style-type: none"> • Flood -General Flood -Flash Flood -Storm Surge / Coastal Flood • Mass Movement (Wet) -Rockfall -Landslide -Avalanche -Subsidence 	<ul style="list-style-type: none"> • Storm -Tropical Cyclone -Extra-Tropical Cyclone -Local Storm 	<ul style="list-style-type: none"> • Extreme Temperature -Heat Wave -Cold Wave -Extreme Winter • Drought • Wildfire -Forest Fire -Land Fire

Almost everywhere in the world has the risk of exposure to a natural disaster and it leads to a huge loss of life and property damages. Not only that, serious implications on economic development of affected countries also existed which its severity depends on the ability to recover. According to Eisensee and Stromberg (2007), a storm attacked the India without act knowingly and it killed 278 people and affected 40,000 victims. In the United States, FEMA (2003) stated that estimated average annual loss resulted from natural disasters from year 1989 to 1993 reached USD3.3 billion and yet the loss continued to grow to USD 13 million annually for the following four years (from year 1994 to 1997). There were 905 natural disasters worldwide in year 2012 and 93% of it were weather-related disasters. About US\$170 billion were cost and \$70 billion were lost. In fact, 45% of the weather

related disasters were storms, 36% were floods, 12% were climatological and 7% were geophysical events (earthquakes and volcanic eruptions). 2011 Japanese tsunami occurred after the 9.0-magnitude earthquake, for instance, had took away 14,358 people lives while 11,889 were still missing and caused more than 100 billion of dollars of financial damages (Koerniadi, Krishnamurti, & Rad, 2011).

In fact, psychological research has long recognized that weather conditions can influence an individual's mood that can create inclination to engage in particular behaviors. The most essential finding is that weather can induce one's mood state which the process of rational or optimal decision-making will be affected. Therefore, it is important to consider the possibility of the stock market is related by the weather factors. In order to prove this statement, the word "weather" should be magnified and by seeing the more obvious and significant effects of weather on stock market, weather-related disasters and stock markets in relevant industries should be studied in the future.

According to new report, weather-related disasters have caused almost 2.4 trillion of dollars in economic damages and it killed almost 2 millions in the world since year 1971 (Kahn, 2014). Not only in United States of America but in the whole world that weather-related and natural disasters happen the most frequent with the most stern effects. About 90% of all authoritatives asserted that weather-related disasters already resulted in almost 500 deaths per year and RM46 billion or USD14 billion in damage (Cornell University Cooperative Extension, 2014). Although weather predictions have evolved much more accurate, even with all the high-end

technology available, the extent of weather-related damage still associates with many other variables, one of which is related to the awareness and actions of people being affected by the disasters. Somehow, some natural disasters such as tsunamis or the period of rain flows may beyond our control and they often result in high fatalities.

Based on the researches from National Severe Storms Laboratory (NSSL), hydrological (floods) was the second most severe weather related disaster but the occurrence of flood is getting more common and frequent nowadays due to many reasons. Flooding is an overflowing of huge amount of water that above the normal limits, especially beyond on what used to be the dry land. Floods can occur anytime during the year whether during heaving rains, when ocean waves come on shore or when dams break. Flooding may happen with only a few inches of water over the land or it may cover a house to the rooftop. The flood can decline quickly in a few minutes or over a long period and even may last for a few days, weeks or longer. It kills more people each year than tornadoes, hurricanes, lightning or other disasters. There are average 5000 floods each year in the world that making that it is the most common yet deathful weather-related disaster. In year 2007, initial estimates of damages from floods were at more than 100 million ringgit or USD28.42 million, said by the Malaysia's Prime Minister Abdullah Ahmad Badawi (Ria, 2003). Hence, floods is the most common and widespread of all weather-related natural disasters as it is a threat that experienced anywhere everywhere in the world that receives rain. In the recent years, deadpan floods occurred more frequent in Southeast Asia. In December 2006 and January 2007, Sabah, Peninsular Malays and Sumatra were facing the worst floods for 100 years which resulted 100 000 victims were suffering

and it caused serious economy damages. Besides, Jakarta in Indonesia was suffered floods and 80 people were killed during the same time.

1.1 Background of the study

Malaysia and Thailand are geographically situated outside the “Pacific Rim of Fire” so they are considered as disaster-free countries as they almost escape all the severe natural disasters such as volcanic eruption, typhoon, earthquake and hurricanes. Malaysia and Thailand, anyhow, are not able to escape from several extreme weathers and climatic disasters such as thunderstorms, monsoonal floods, continuous rain and hazes. For example, flood happened in Kedah and Perlis in year 2010 was the worst flood in Malaysia.

Ngai (1997) realized that flood risk is the product of flood as the level of flood risk is increasing dramatically in Malaysia due to the increasing number of residents in flood plains and so as the concentrated economic activities that take place at flood risk. There are at least 3.5 million of residents live on flood plains which are very vulnerable to flood on every possibility. Historically, people in Malaysia and Thailand already lived and grew on the bank of major rivers in the countries. Almost all the activities are done with the river such as planting, fishing, washing and the others. Associated with the natural factors of monsoon rain fall, storms and poor drainage and other men-made factors, flood has becoming more common with an increasing number of occurrence.

Almost certainly, weather does has the critical influences on the development and economics in the agriculture. For instance, water deterioration, crops damages, loss of livestock, and increased vulnerability of livestock to diseases, flooded farm machinery and environmental damages to and from agricultural chemicals which all are involved in the agricultural production will be damaged seriously by the floods that arised by non-stop raining. In fact, flood has the strongest effects on agricultural development as it is almost impossible to predict and it destroys a huge hectares of crops, farms and houses in a short period of time. Tran et al. (2008) observed the impacts of floods on the economy, environment, and society in Thua Thien Hue. The study found that floods have an impact on most sources of income because of the way that they destroy crops in the rice field. This indicated that it is very hard for the land to dry up for replanting. Too much water for a long period will kill the plants or stunt their growth.

Furthermore, agriculture which included farmland, commodity markets and agribusiness stocks has been the great interest among investors since year 2008 (Antoni & Detre, 2014). Correspond to the Manulife Financial agriculture investment manager in Hancock Agricultural Investment Group, said that investing in agriculture stocks definitely can reduce the market risk or market volatility on a diversified portfolio due to the results of significant negatively correlated and slight positively correlation between farmland returns and other stocks and bonds such as real estate in the past years (HAIG, 2012). Perhaps it does attract the investors who often found little success by diversifying their portfolio thru allocation of many kinds of assets. There are lots of benefits for the investors if getting involved in

agriculture sector and the easiest way to access in agriculture sector is the equity investment. Agriculture asset class gives a very liquid investment with low transaction costs and at an efficient pricing. By investing in agribusiness stocks, investors get to admit more information regarding agriculture commodity.

In Southeast Asia, agriculture is the major sources of livelihood which estimate 115 million hectares of land are used for the production of rice, maize, oil palm, natural rubber and coconut (ADB. 2009). There are evidences that the greatest level of productivity in Southeast Asia is the irrigated rice which is currently in the most intensive production for export and import purposes. More than one crop with the yield of 12.5tonnes per hectare per year is grown. Yet, Malaysia and Thailand provide the largest areas for rice production.

There are close relationships between the United States, Thailand and Malaysia. It can be proved that the US agribusiness is eager to participate in the US Agribusiness Trade Mission (ATM) with the corporation of Malaysia and Thailand so that they are able to get the first-hand information, get to close to the decision makers and meetings with related business contacts with the purpose of setting the US agribusiness in the Southeast Asian market. The US ATM finds the spotlight on Malaysia as Malaysia provides a wide agriculture market in dairy products, fresh fruits, tree nuts, general dry goods and potato products. There are evidences that the members of ASEAN, Malaysia, the Philippines, Burma and Thailand with a total population of 262 million are the strongest trading partners of the United States.

Besides, among all the types of rice that produced in Thailand, Jasmine rice is always the most demanding rice and it is the first Thailand's rice exporters. According to United Nations ESCAP (2011), as shown in the Table 2, the rice exported from Thailand included brown rice, glutinous rice, white rice and jasmine rice was increased steadily from year 2007 to 2010. Among all the types of rice, Jasmine rice covered the largest export of rice from Thailand to overseas in the past four years. In year 2007, Jasmine rice exported for about USD1 085.32 million in the total of USD3 261.28 export of Thailand's agricultural products. The export of Thailand's Jasmine rice then kept increasing to USD1 450.08 million in year 2010.

Table 2: Types of Thailand's Rice Export in Year 2007 to 2010 (Source: United Nations ESCAP, 2011)

Description	Value (Million USD)				Average	Ratio (%)
	2007	2008	2009	2010		
Jasmine rice	1,085.32	1,417.51	1,610.91	1,686.56	1,450.08	31.80
Parboiled rice	670.35	1,706.37	1,522.14	1,433.42	1,333.07	29.23
White rice 100%	946.82	1,666.19	526.85	1,028.65	1,042.13	22.85
White rice 5-45%	147.38	958.19	328.74	295.18	282.37	6.19
Pathumthani fragrant rice	183.17	163.07	146.77	128.98	155.49	3.41
Glutinous rice	75.23	115.73	169.20	149.67	127.46	2.80
Brown rice 5-100% and parboiled	42.37	115.24	107.05	123.12	96.95	2.13
Brown jasmine rice	73.64	63.68	37.18	37.36	52.96	1.16
Brown Pathumthani fragrant rice	6.56	3.41	5.02	15.78	7.69	0.17
Cargo rice	15.01	2.30	0.15	0.10	4.39	0.10
Other brown rice	0.61	0.54	1.39	12.17	3.68	0.08
Other semi-milled/wholly-milled rice	12.50	0.50	0.10	0.002	3.29	0.07
Rice in husk (paddy/rough)	2.33	0.00	0.00	0.01	0.59	0.01
Total	3,261.28	5,612.72	4,466.49	4,911.00	4,660.13	100.00

Table 3 showed the United States was the main exporter market of Thailand's Jasmine rice in year 2007 to 2010 (United Nations ESCAP, 2011). Thailand exported USD200.27 million of Jasmine rice in year 2007 and the amount of exporting was increased to USD312.22 million in year 2010 with the average growth of 28% in four years. On the other hand, Malaysia was the sixth major exporter market of Thailand's Jasmine rice. In year 2007, export of Jasmine rice from Thailand to Malaysia was USD58.13 million. The export was increased to USD88.86 million in year 2009 but it then decreased drastically to USD53.99 million in year 2010. However, it still had the average growth of 3% in the four years and its position was remained.

Table 3: Thailand's Jasmine Rice Export in Year 2007 to 2010 (Source: United Nations ESCAP, 2011)

Importing Country	Value (Million USD)					Ratio (%)
	2007	2008	2009	2010	Average	
USA	200.27	301.38	340.77	406.48	312.22	21.53
Hong Kong	125.31	149.31	166.32	160.02	151.74	10.46
China	132.80	119.50	108.58	126.47	121.84	8.40
Côte d'Ivoire	64.54	57.61	141.70	116.25	95.03	6.55
Singapore	70.97	91.95	100.86	103.41	91.80	6.33
Malaysia	58.13	80.12	88.86	53.99	70.27	4.85
Ghana	45.43	79.63	67.42	83.01	69.12	4.77
Canada	40.11	66.21	70.46	83.59	65.09	4.49
Australia	31.29	68.23	65.33	69.72	56.14	3.87
France	24.53	37.65	42.17	43.43	36.94	2.55
Saudi Arabia	19.47	31.98	32.57	33.05	30.52	2.10
Brunei	19.71	31.68	30.26	26.76	27.10	1.87
Israel	16.88	20.74	29.41	32.62	24.91	1.72
United Arab Emirate	23.39	23.65	19.88	22.32	22.01	1.54
Gabon	10.72	17.32	22.27	24.94	18.81	1.30
United Kingdom	9.95	19.63	18.77	24.38	18.16	1.25
Netherland	10.75	17.29	19.70	18.74	18.82	1.12
Germany	8.16	10.43	14.46	17.77	12.71	0.88
Other importing countries	171.91	203.23	226.12	233.62	208.72	14.39
Total	1,085.32	1,417.61	1,610.91	1,686.56	1,450.08	100.00

The most severe flood that occurred in Southeast Asia which was the Thailand floods that started from July 2011 until December 2011 caused over 20 000 square kilometers of farmland was destroyed and 7 industrial estates were shut down. Thailand floods led to about 65 provinces and countries declared flood disaster zones which we called 2011 Southeast Asia Floods. About 13.6 million people were affected and among them 815 people were dead. Over 1.4 trillion Baht (US\$45.7 billion) overall damages were caused.

2011 Southeast Asian flood is considered as the most destructive events in the past decades. Thailand, Cambodia, Myanmar, Malaysia, Vietnam were covered by the flood and estimated 3.5 million victims were being affected by the severe flood. Starting from the monsoon season, storms and continuous rain fall until flood total lasted for about 6 months. Total 1,327,741 hectares of paddy fields were damaged by the flood and economic loss in around 45 billion of dollars. Paddy fields in Malaysia, on the other hand, were partially damaged. Thailand and Malaysia prove about 30 percent of rice globally and the flood caused 25 percent of the crops could not survive. On that moment, at the another side of world's rice farmers in Arkansas that usually trades 42 percent of rice to the United States also was flooded early on that year. Hence, the United State was directly or indirectly being affected.

As shown in Table 4, the World Bank recorded the estimated damages and losses during the flood that started from Thailand in year 2011 (Poaponsakom & Meethom, 2012). It shown that total USD 909.0 million of damages and losses were caused by the flood. Among of USD 909.0 million, losses and damages of paddy