

Price Effect of SET50 Stock from Inclusion and Exclusion



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ผลกระทบต่อราคาหุ้นที่ถูกปรับเข้าหรือตัดออกจากดัชนี SET 50



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ชรรมาทิตย์ สกุนวณิษย์ : ผลกระทบต่อราคาหุ้นที่ถูกปรับเข้าหรือตัดออกจากดัชนี SET 50 .
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เป้าหมายหลักของนักลงทุนหรือผู้จัดการกองทุนก็คือผลตอบแทนสูงสุด การศึกษาเรื่องผลของ
 ราคาหุ้นจากการปรับเข้าหรือตัดออกจากดัชนีจะมีประโยชน์กับกลุ่มเป้าหมายเหล่านี้ เพื่อนำผลการศึกษา
 พฤติกรรมหุ้นเป็นแนวทางในการปรับกลยุทธ์หรือการวางแผนการลงทุน ในงานวิจัยนี้ศึกษาผลต่อราคาหุ้น
 ผ่านการคำนวณโดยใช้ Market Model ข้อมูลที่ใช้อยู่ระหว่างปี พ.ศ. 2553 - 2563 รวบรวมจาก
 เว็บไซต์ตลาดหลักทรัพย์แห่งประเทศไทยและ Investing.com ในส่วนของผลการศึกษาพบว่า
 สอดคล้องกับงานวิจัยก่อนหน้านี้ อัตราผลตอบแทนเฉลี่ยผิดปกติ (AAR) เพิ่มขึ้นในช่วงวันประกาศและ
 วันที่มีผลจริง ในกรณีของหุ้นที่ถูกปรับเข้า แต่ลดลงในกรณีหุ้นที่ถูกปรับออก ในส่วนของแนวโน้มค่าอัตรา
 ผลตอบแทนผิดปกติเฉลี่ยสะสม (CAAR) เพิ่มขึ้นในกรณีของหุ้นที่ถูกปรับเข้า แต่ลดลงในกรณีของหุ้นที่
 ถูกปรับออก ผลการศึกษาจากค่าของค่าสัมประสิทธิ์ความสัมพันธ์ระหว่างผลตอบแทนของหุ้นและตลาด (ค่า
 เบต้า) พบว่าค่า AAR และ CAAR มีแนวโน้มที่สูงกว่าในกรณีของหุ้นที่มีความสัมพันธ์สูง และผล
 การศึกษาแบ่งตามประเภทอุตสาหกรรม ในกรณีหุ้นที่ถูกปรับเข้าพบว่า ค่า CAAR ของอุตสาหกรรม
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Maximize profit is the main goal for investor or securities manager. The study of price effect of included or excluded stock will be beneficial for them, in order to choose investment strategy or planning. In this paper, the market model method was constructed with financial data between 2010 to 2020 from Stock Exchange of Thailand and Investing.com. The results of the study are consistent with the previous studies. The AAR increase at the around announcement and effective date for inclusion but decrease for exclusion case. The CAAR is upward trend for inclusion case and negative trend for exclusion case. The analysis by beta value is found that the high beta value result in higher AAR and CAAR value. Lastly, the analysis by industry is found that the Agro&Food and Financial industry's CAAR value are negative for inclusion case. However, the Technology industry's CAAR is positive for exclusion case.



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1. Introduction

Nowadays, the main long-term goal of listed company is not only wanted to have high performance or high turnover rate but also granted for the new source of funds via attracting investors to invest in their company's stock. The company can use this source of funds to develop or invest in new projects. Companies that are traded their stock in the SET market, for example SET50 or SET100, usually have higher trade volume and high price than small stock market, MAI. By the reason of, SET market has strict regulation and registration guidelines caused more liquidity in company listed in SET index. But also, these companies seem extremely seductive in investors view. Aims to enter the SET index, the company needs to have high rate of growth and performance.

The study of price effect before and after listed stock included or excluded from the SET50 index will be beneficial for investors or securities manager to choose the strategies of investment planning in order to maximize benefit. The analysis of price effect behavior of stock along with fundamental analysis, examine the financial and economic factors, will raise more confidence resulted in wealth and financial independence. Moreover, there is more probability of speculation to gain more yield from the change in index. The inclusion case, the investor should buy stock in the period which price become significantly low. Exclusion case when should investor sell stock in order to reach the gain the high yield and maximize profit in short run holding period.

The study about behavior of stock price that included or excluded from the index has a long-standing interest. There are many researchers observed the significant abnormal return. In 1980's, Harris and Gruel's

research published in 1986 was the first study that investigated the price effect on S&P500 index. They also found the positive abnormal return for inclusion stock and negative abnormal return for exclusion stock. Until now, there are many researches applied to other indices; for example, FTSE, Nasdaq, CAC40, Nikkei or DAX both in developed and developing countries' market, observed and found the different results. The research question about price effect is still an open question.

This study uses the daily return data investing.com and index data from SET 50 of the inclusion and exclusion case. The time frame of study is 2010 – 2020 using the daily return and calculate the abnormal return, average abnormal return, and cumulative abnormal return by the market model method in order to calculate. The results from this study can probably be the guidance for investors, retail or institution who track the index

2. Summary of Literature Review

Hypothesis

Price Pressure Hypothesis

First of all, the price pressure hypothesis posits assumes that change in demand and supply of included and excluded stock causes the price effect in short run. The change in investment planning to conform with reference index results in volatility trade volume and price pressure in short run. However, the effect is temporary, no effect on stock equilibrium price in long run. Eventually, the price will reverse to the origin equilibrium price.

Kraus and Stoll summarized the price pressure hypothesis that a small amount of transaction of stock (buy or sell) have no effect on stock market. But the highly interested stock especially the include or exclude from the index result in large change in stock's demand resulted in change in stock's price. However, this hypothesis can only temporarily hold because the price shock and large demand is a temporary basis and eliminated over time (Kraus and Stoll 1972). Harris and Gruel studied the stock added to S&P 500 index and explain that the behavior this added stocks to index are consistent with the price pressure hypothesis. Upward price pressure from inclusion result from increased demand to stock index. In addition, this research observes the added stock and found that increasing in price result from index fund buying. And also, this effect elevates the stock trading volume after adjustment period (Harris and Gurel 1986). Biktimirov also proposed that price pressure hypothesis, the announcement of addition to index cause excessive demand. However,

the price effect could back to equilibrium price after inclusion (Biktimirov, Cowan et al. 2004).

Imperfect Substitute Hypothesis

The Second hypothesis is Imperfect substitute hypothesis. Long-run demand curve of stock is inelastic and downward sloping. In addition, no stock can perfectly substitute to other stock resulted in excess demand from index investors in inclusion case and higher equilibrium price. Consequently, this hypothesis summarize that the price effect is permanently increase (decrease) for inclusion (exclusion) case in the long run.

Kraus and Stoll inferred the stock demand is not perfectly elastic, so there are not close substitutes for every stock. After shock in stock price, the demand curve shifts, and price converge to new equilibrium. In case that not perfect substitutes stock is included in index, the demand curve shifts right hand side and result in higher equilibrium price (Kraus and Stoll 1972). In addition, Shleifer also found that demand curve is imperfect substitute, downward slope, and permanently shift left- or right-hand side after shock in the long run, until there is new shock situation to the stock (Shleifer 1986).

Liquidity Hypothesis

Another related theory is Liquidity hypothesis. The specific information of included stock has an impact on its price. The analyst uses this information to forecast the good or bad company's earning. This situation can push inclusion stock's price up because of goods new announcement.

Beneish and Gardner described that the result from inclusion is increase in stock trading volume (Beneish and Gardner 1995). As a result of lower trading cost, the demand increases and this is the cause of soaring in price (Amihub and Mendelson 1989). Because of more information in market, analytics more discuss and value the stock included in index. The transaction cost of included stock diminishes from the higher liquidity resulted in permanent positive price effect since on announcement date. Conversely, there would have a reversed effect for exclusion case which stock analytic will pay less attention. The consequence of this event is that trading cost will increase after exclusion. For long term study, Hegde and McDermott has found that long term return increase but not affect to liquidity (Hegde and McDermott 2003).

The S&P 500 Index Effect Studies

The most of studies of index effect in the United States of America's stock market focus on S&P500 index due to main used index by index funds. The price effect is collected from many studies as follows.

Jain studied both included and excluded effect of S&P 500 stock from 1977 to 1983. He estimated the mean return amounting to 3.07% on announcement day. The excess returns were not significantly different from zero for all inclusion case (Jain 1987). However, there are significant negative return for exclusion case. Shleifer studied S&P 500 index over period 1976 – 1983 and included positive return at 2.79% on announcement day from inclusion case (Shleifer 1986). Harris and Gurel studied data between 1978 and 1983, detected the positive price effect before the effective date from excess demand by index fund. However,

the price will move back to same equilibrium level supported by the Price Pressure Hypothesis. Abnormal price increase 3.13% for included stock and negative abnormal price at 1.4% on announcement date (Harris and Gurel 1986).

Before 1989, the announcement date and effective are the same day, SEC announced the new stock list at the effective date. After that, the S&P 500 index has adopted new policy. The new stock list was announced 5 days before effective date. (Lynch and Mendenhall 1997) and (Beneish and Whaley 1996), They both studied S&P 500 index after 1989 and found the significant positive price effect from inclusion case on announcement date (3.16% and -6.26%, Lynch, and 4.39%, Beneish). The abnormal price soar until effective date. Their studies are consistent with Price Pressure and Imperfect Substitute Hypothesis because decrease in price after effective date in some cases. Whaley (1996) also found the “S and P Game” the stock price reaction from change in investment behavior of risk arbitrage. They will bid stock on announcement date and arbitrage few days after that. This brings profit to arbitrage before the index fund bid the stock on effective date.

In case paper that published in 20th century. The Investor Recognition Hypothesis by Merton stated that the stock, inclusion case, gain more benefit from augmentation in the degree of investor awareness resulted in more effectiveness and more opportunity access to investment funds (Merton 1987). The study by Chen is consistent by this hypothesis. Chen studies the S&P 500 index from 1989 to 2000 and found the asymmetry of change in included and excluded stock price. While the rising in stock price will be long-lasting for inclusion case, the result is completely opposite for exclusion case (Chen 2002). Moreover, Cooper and Woglom

explained that stock price in S&P500 index rise after announcement. This causes stock more volatile, and most was reversed in following weeks. The decline in price is not the result from change in fundamental of firm which mean that not good result in the long period (Cooper and Woglom 2003).

The Non- S&P 500 Index Effect Studies

Other than case study in United States, the result from many case studies in other country are compatible. That is, there is abnormal return on announcement date.

For FTSE 100 index, Opong and Hamill studied FTSE 100 index in 1984 – 1999 and found abnormal return occur before date of announcement and reverse price effect afterward (Opong and Hamill 2014). In addition, Brealey reported that positive return, 0.05%, for added stocks and worse return, -0.30%, compared to market for deleted stock on announcement date but not statistically significant. However, the abnormal returns between announcement and effective date are statistically significant (Brealey 2000). Mase studied FTSE 100 index from 1992 to 2005 and found significant price effect, 0.10%, since before announcement date to effective date. Nonetheless, the price is back to equilibrium rate 30 days after effective date (Mase 2007).

In case of Nikkei index, Liu used Nikkei 500 index and claimed both persistent augmentation in abnormal return even change in event from before announcement date to after effective date (1.54% and -2.57%). Thus, the results are consistent with the Imperfect Substitution Hypothesis (Liu 2000).

For TSE 300 index, Jog and Okumura studied the included and excluded stock data during period 1991 – 2000. It is found the permanent change in prices for both cases in short run period. For long run period, the result found the significant upward trend of price for inclusion and opposite for exclusion. In addition, the price trend of both cases stabilizes after revision (Jog and Okumura 2003).

The SET Index Effect Studies

According to Thailand's SET index, there are a few index effects studies. The first study from Keratithamkul to detect the abnormal return from index changing announcement in Thailand stock market during 2001 to 2005 of SET50 index. The result shows that abnormal return at announcement date is significant at 0.33% for inclusion case and still significant positive at 0.37% for exclusion case. For the long run effect, Mean Cumulative Abnormal Returns (MCAR) is 1.34% for inclusion and -3.63% for exclusion (Keratithamkul 2005). Following research from Teerapongpratya, studied the price and volume effect of index effect of SET 50 from 2001 to 2008. In the announcement day, there is positive abnormal return at 0.27% for inclusion and negative return at -0.02% for exclusion. In addition, the trading volume is affected by this event (Teerapongpratya 2010). The price effect is the same trend in Triempanichgul research of SET 50, data 2001 – 2010, using the market adjust method conclude that abnormal return on announcement date is 1.151% (Triempanichgul 2010). Lastly, Laokulrach and Trisupinyo studied price effect SET 100 from 2012 – 2017 using market model. In case of inclusion event, the 0.89% abnormal return is positive on announcement date. And -0.75% one day after announcement for exclusion case (Laokulrach and Trisupinyo 2018).

3. Data

Many researches show the price effect which consider the abnormal returns of the included and excluded stocks from the index. They inferred that cause of existing abnormal returns before the Effective Date (ED) was the track of funds following the index composition which was trying to rebalance their portfolio. To test the abnormal return of stock resulting from change of SET50 index composition. investigate Thai index funds, this study uses the SET50 index as representative. The reason of using SET50 index is that the stock in SET50 index has large capitalization, caused low volatility of price. This result in the low number of outlier and clearly reflect the value of stock by the change in price.

In efficient market, stock price movement will rapidly change because of the absorption of news quickly. Nonetheless, Thai stock market is not strong form efficiency market. Thus, the impact of all news does not completely reflect by the stock price and level of news impact is rather hard to measure.

Data in this paper was detected and corrected. A sample that has daily return higher than 6% or less than -6% from the events; for example, news which directly benefit the industry, company's expansion strategies, and other news that shows the advantages or disadvantages, was eliminated. The reason of elimination the highly dominate stock price is that increase or decrease in low price stock cause the higher percentage change in return and affect to the average than other high price stock which cause the average not reflects the real trend. This causes the bias in the average of abnormal return. Moreover, the stock

which go through merger and acquisition, go under name change of company or exit from the stock market.

The index is adjusted twice a year. The announcement date will usually 10 trading days before effective date in the mid- June and mid-December of year. The new list of stock will be effective every first trading day of January and July. The announcement and effective date from 1H2010 to 2H2020 are shown in the table 1

Table 1 Announcement and Effective Date

Year	Announcement Date	Effective Date
1H 2010	17 DEC 2009	4 JAN 2010
2H 2010	14 JUN 2010	2 JUL 2010
1H 2011	15 DEC 2010	4 JAN 2011
2H 2011	14 JUN 2011	4 JUL 2011
1H 2012	14 DEC 2011	4 JAN 2012
2H 2012	13 JUN 2012	2 JUL 2012
1H 2013	14 DEC 2012	2 JAN 2013
2H 2013	17 JUN 2013	2 JUL 2013
1H 2014	16 DEC 2013	2 JAN 2014
2H 2014	17 JUN 2014	2 JUL 2014
1H 2015	15 DEC 2014	5 JAN 2015
2H 2015	16 JUN 2015	2 JUL 2015
1H 2016	14 DEC 2015	4 JAN 2016
2H 2016	17 JUN 2016	4 JUL 2016
1H 2017	16 DEC 2016	4 JAN 2017
2H 2017	16 JUN 2017	3 JUL 2017
1H 2018	13 DEC 2017	3 JAN 2018
2H 2018	18 JUN 2018	2 JUL 2018
1H 2019	17 DEC 2018	2 JAN 2019
2H 2019	18 JUN 2019	1 JUL 2019
1H 2020	18 DEC 2019	2 JAN 2020
2H 2020	15 JUN 2020	1 JUL 2020

To study the price change effect in 2020s from SET50 index. This study uses the timeframe between 2010 to 2020, consisting of 22 periods of revision. The list of stock in SET50 index (from 2010 to 2020) and the historical data of Announcement Date (AD) and Effective Date (ED) are all available on the Stock Exchange of Thailand's website

(<https://www.set.or.th>). Daily stock closing price can be obtained from investing.com (www.investing.com).

Table 2 List of Inclusion of Stocks from SET50 Index from 1H10 – 2H20

1H10	2H10	1H11	2H11	1H12	2H12	1H13	2H13	1H14	2H14	1H15	2H15
BCP	BLA	BTS	BCP	BJC	HEMRAJ	JAS	CENTEL	THCOM	KKP	CK	BA
QH	HMPRO	DCC	PTTGC	SPALI	INTUCH	KK	CK	VGI	M	KTIS	BDMS
TRUE	IVL	KK		TPC		TTW	GLOBAL			SPALI	BMCL
	TISCO	ROBINS									CBG
	TPIPL	SSI									ITD
		STA									SAWAD
											TPIPL
											WHA
3	5	6	2	3	2	3	3	2	2	3	8

1H16	2H16	1H17	2H17	1H18	2H18	1H19	2H19	1H20	2H20
BLA	BEM	GLOBAL	BJC	BCP	BGRIM	GULF	AWC	CRC	BPP
SCCC	GPSC	KKP	BPP	BEAUTY	DELTA	WHA	OSP	VGI	SCGP
TASCO	KCE	PTG	EA	CENTEL	GLOW		SAWAD		TTW
TU	MTLS	SPRC	MTLS	SAWAD	KTC				
	PSH	THAI	RATCH	TPIPP	MTC				
			SCCC	WHA	RATCH				
			TISCO		TOA				
4	5	5	7	6	7	2	3	2	3

Table 3 List of Exclusion of Stocks from SET50 Index from 1H10 – 2H20¹

1H10	2H10	1H11	2H11	1H12	2H12	1H13	2H13	1H14	2H14	1H15	2H15
CCET	BECL	BCP	PTTAR	KK	STA	DCC	ESSO	KK	CK	BLA	BAY
ITD	MCOT	HANA	PTTCH	SSI	TPC	HEMRAJ	SPALI	MAKRO	THAI	GLOBAL	BGH
MBK	SCIB	KSL		TTW		TPIPL	TISCO			KKP	BIGC
	TPC	PSL									BJC
	TSTH	QH									KTIS
		TTA									SCCC
											SPALI
											VGI
3	5	6	2	3	2	3	3	2	2	3	8

¹ ■ Merger and acquisition, ■ Name change, ■ Exit the market

1H16	2H16	1H17	2H17	1H18	2H18	1H19	2H19	1H20	2H20
BMCL	JAS	BEC	BA	BLA	BCP	BEAUTY	CENTEL	BPP	BANPU
RATCH	ITD	MTLS	BCP	DELTA	KCE	GLOW	KKP	ROBINS	DELTA
THCOM	M	SAWAD	CENTEL	GLOW	MTLS		SPRC		TCAP
TUF	PS	TASCO	CK	RATCH	PSH				
	SCCC	TTW	PTG	SCCC	SAWAD				
			THAI	TPIPL	TPIPP				
			WHA		WHA				
4	5	5	7	6	7	2	3	2	3

According to table 2 and 3, there are 86 cases of sample for inclusion and 86 cases of sample for exclusion in this timeframe. However, the 13 cases of sample for inclusion are excluded which totally 6 cases from merger and acquisition, 6 cases from name change and 1 case from the exit of market, the detail is shown in table 4.

Table 4 The Event Detail of Excluded Stock

Stock	Detail
BECL	Merged to BEM
BMCL	
SCIB	Merged to TCAP
PTTAR	Merged to PTTGC
PTTCH	
HEMRAJ	Merged to WHA
KK	Company name change to KKP
BGH	Company name change to BDMS
TUF	Company name change to TU
MTLS	Company name change to MTC
PS	Exit the market

In addition, the analysis of average abnormal return and cumulative of average abnormal return by two criteria, beta value and industry.

First by beta criteria, the beta is coefficient that measures the fluctuation and responsiveness of stock compared to overall stock market. For instance, 1.5 stock's beta means 50% more volatile than overall market. The beta can be calculated by dividing the covariance of stock and market's return by the variance of market's return.

$$\beta_i = \frac{\text{Cov}(R_i, R_m)}{\text{Var}(R_m)}$$

The beta value that is less than 1 means that stock return is less volatile than market. That is to say, the movement of stock tend to be more slowly compared to overall market. So, it is less risky for including this stock in the portfolio. For beta more than 1, the stock volatility is more than the market. The addition of this sort of stock to portfolio soar the portfolio risk but increase the expected return.

The range of sample stock beta is more than zero, no decrease beta. As shown in table 5, the beta criteria divide the sample into 3 groups. First, the beta between 0 – 0.5 has 9 and 13 stocks for inclusion and exclusion cases. Second, the beta between 0.5 – 1, the largest sample size, has 30 stocks for both cases. Lastly, the high volatility stock, beta more than 1, has 13 and 9 stocks for inclusion and exclusion cases.

Table 5 List of Stock by Beta

Beta		Stock									#stock
Less than 0.5	I	DCC	GLOW	JAS	KCE	KTIS	RATCH	THAI	TTW	TU	9
	E	CCET	DCC	GLOW	JAS	KCE	KTIS	MAKRO	MBK	MCOT	13
Between 0.5 - 1	I	PSL	RATCH	THAI	TTW						30
		BA	BCP	BDMS	BEAUTY	BEM	BJC	BLA	BPP	BTS	
		CBG	DELTA	GLOBAL	HMPRO	INTUCH	KKP	KTC	M	QH	
	E	SCC	SPALI	STA	TASCO	THCOM	TISCO	TOA	TPIPL	TPIPP	30
		VGI	ROBINS	SSI							
		BAY	BCP	BEAUTY	BEC	BJC	BLA	BPP	DELTA	GLOBAL	
More than 1	I	HANA	KKP	KSL	M	PSH	QH	SCCC	SPALI	STA	13
		TASCO	TCAP	THCOM	TISCO	TPIPL	TPIPP	TSTH	TTA	VGI	
		ROBINS	BIGC	SSI							
More than 1	E	BGRIM	CENTEL	CK	GPSC	GULF	ITD	IVL	OSP	PTG	9
		SAWAD	SPRC	TRUE	WHA						
		BANPU	CENTEL	CK	ESSO	ITD	PTG	SAWAD	SPRC	WHA	9

Note: I and E stand for Inclusion and Exclusion respectively

Table 6 List of Inclusion of Stocks from SET50 Index from 1H10 – 2H20

1H10	2H10	1H11	2H11	1H12	2H12	1H13	2H13	1H14	2H14	1H15	2H15
BCP	BLA	BTS	BCP	BJC	HEMRAJ	JAS	CENTEL	THCOM	KKP	CK	BA
QH	HMPRO	DCC	PTTGC	SPALI	INTUCH	KK	CK	VGI	M	KTIS	BDMS
TRUE	IVL	KK		TPC		TTW	GLOBAL			SPALI	BMCL
	TISCO	ROBINS									CBG
	TPIPL	SSI									ITD
		STA									SAWAD
											TPIPL
											WHA
3	5	6	2	3	2	3	3	2	2	3	8

1H16	2H16	1H17	2H17	1H18	2H18	1H19	2H19	1H20	2H20
BLA	BEM	GLOBAL	BJC	BCP	BGRIM	GULF	AWC	CRC	BPP
SCCC	GPSC	KKP	BPP	BEAUTY	DELTA	WHA	OSP	VGI	SCGP
TASCO	KCE	PTG	EA	CENTEL	GLOW		SAWAD		TTW
TU	MTLS	SPRC	MTLS	SAWAD	KTC				
	PSH	THAI	RATCH	TPIPP	MTC				
			SCCC	WHA	RATCH				
			TISCO		TOA				
4	5	5	7	6	7	2	3	2	3

SET provides the industry and sector indices that are calculated by price of stocks that have the same fundamentals and characteristics. In total, there are 8 industries and 28 sectors.

Table 7 Industry and Sector in SET 50 Index

Industry	Sector
Agro and Food Industry (.AGRO)	Agribusiness (.AGRI)
	Food and Beverage (.FOOD)
Consumer Products (.CONSUMP)	Fashion (.FASHION)
	Home and Office Products (.HOME)
	Personal Products and Pharmaceuticals (.PERSON)
Financials (.FINCIAL)	Banking (.BANK)
	Finance and Securities (.FIN)
	Insurance (.INSUR)
Industrials (.INDUS)	Automotive (.AUTO)
	Industrial Materials and Machinery (.IMM)
	Paper and Printing Materials (.PAPER)
	Petrochemicals and Chemicals (.PETRO)
	Packaging (.PKG)
Property & Construction	Steel and Metal Products (.STEEL)
	Construction Materials (.CONMAT)

(.PROPCON)	Construction Services (.CONS)
	Property Fund & REITs (.PF&REITs)
	Property Development (.PROP)
Resources (.RESOURC)	Energy and Utilities (.ENERG)
	Mining (.MINE)
Services (.SERVICE)	Commerce (.COMM)
	Health Care Services (.HEALTH)
	Media and Publishing (.MEDIA)
	Professional Services (.PROF)
	Tourism & Leisure (.TOURISM)
Technology (.TECH)	Transportation & Logistics (.TRANS)
	Electronic Components (.ETRON)
	Information & Communication Technology (.ICT)

Source: SET

The analysis of stock by industry is divided into 6 industries; the Agro and Food Industry (.AGRO), Financials (.FINCIAL), Property and Construction (.PROPCON), Resource and Industrials (.RESOURC and .INDUS), Service (.SERVICE) and Technology (TECH). My study have merge the Industrials to Resource because Industrials has only 1 case for exclusion. It is impossible to calculate the standard deviation. The Resource industry is more likely to has same characteristics as Industrials due to the Petrochemicals and Chemical sector.

According to table 8, the Financial, Property and Construction, and Resource and Industry have sample more than 10. There are 5 – 6 samples for rest industries.

Table 8 List of stock by Industry

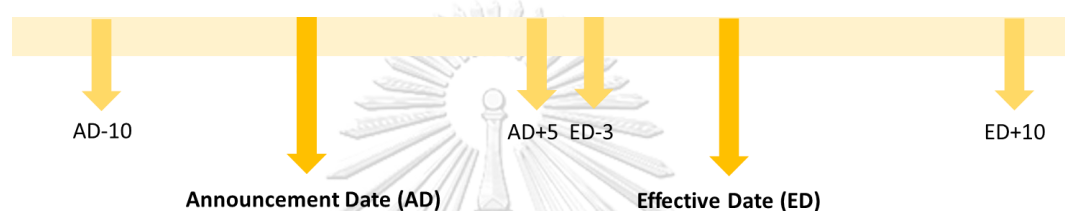
Industry		Stock							#stock	
AGRO	I	CBG	KTIS	M	OSP	STA	TU		6	
	E	KSL	KTIS	M	STA				4	
FINCIAL	I	BLA	KKP	KTC	SAWAD	TISCO			5	
	E	BAY	BLA	KKP	SAWAD	TCAP	TISCO		6	
PROPCON	I	CK	DCC	ITD	PSH	QH	SCCC	SPALI	TASCO	12
	E	TOA	TPIPL	WHA						11
RESOURC and INDUS	I	BCP	BGRIM	BPP	GLOW	GPSC	GULF	IVL	PTG	13
	E	RATCH	SPRC	TPIPP	TTW	SSI				11
SERVICE	I	BANPU	BCP	BPP	ESSO	GLOW	PTG	RATCH	SPRC	11
	E	TPIPP	TTW	SSI						12
SERVICE	I	BA	BDMS	BEAUTY	BEM	BJC	BTS	CENTEL	GLOBAL	12
	E	HMPRO	THAI	VGI	ROBINS					13
TECH	I	BEAUTY	BEC	BJC	CENTEL	GLOBAL	MAKRO	MCOT	PSL	13
	E	THAI	TTA	VGI	ROBINS	BIGC				6
TECH	I	DELTA	INTUCH	JAS	KCE	THCOM	TRUE			6
	E	CCET	DELTA	HANA	JAS	KCE	THCOM			5

Note: I and E stand for Inclusion and Exclusion respectively

4. Research Methodology

This research uses the Event study to test the hypothesis of price change from included and excluded stock. The main event is the date that Stock Exchange of Thailand announce the included and excluded stock; announcement date (AD), and date that announced stock has effectively included and excluded; effective date (ED).

Figure 1 Event Window



Event Window

Pre-announcement period includes 10 days before announcement date to a day before announcement date (AD-10, AD-1). Because the price of selected stock can be moved up or down before announcement date due to the public's prediction from the market available of stock information, for example, the price, volume, and financial statement in recent year. This information can be used to predict the possibility of inclusion or exclusion by analyst and fund manager. Accordingly, it is possible that price of included and excluded stock can be changed before the announcement date.

Announcement date (AD), if investors do not make price forecasting, there is the occurrence of price effect at Announcement date from information effect. There by, this research set framework around Announcement date to analyze price effect from inclusion and exclusion of index stock. Mostly, The Stock Exchange of Thailand (SET) will

announce the list of included and excluded stocks in advance approximately for 2 weeks before applied.

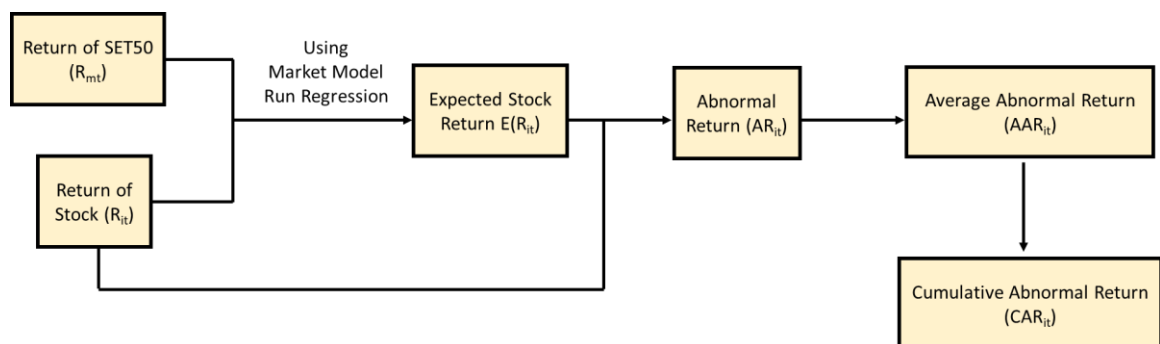
Post-announcement period includes a day after announcement date to a day before Effective date (AD+1, ED-1). This period last around for 2 weeks.

Effective date (ED), the change of stock index does create impact at the first day trade of January (the first-half year) and July (the second-half year). In general, the index funds bid and offer for stocks at this day due to reduction in probability of tracking errors in their portfolio. These group of investors sharply create big demand in included stock causing positive abnormal return. Conversely, the falling in supply of excluded stocks do causes negative abnormal return at Effective Date. Accordingly, the effect from demand and supply from index funds could significantly create abnormal return in this period.

Post-effective date Period include a day after effective date to 15 days after effective date (ED+1, ED+10).

Price Effect

Figure 2 The Methodology Flow Chart



The research methodology are as follows: First, the return of stock (R_{it}), dependent variable, and return of SET50 index (R_{mt}), as independent variable, are to run regression by market model method repeatedly in every stock, the result is the alpha and beta of the stock. Secondly, the expected return $E(R_{it})$ of every stock and every date followed by the event window is calculated by plug in the alpha, beta and return of SET50 index. Thirdly, the abnormal return is calculated by subtraction of the return of the stock (R_{it}) with expected return $E(R_{it})$. Next, the average abnormal return of every in the event window is calculated by using the average calculation. Lastly, the calculation of cumulative abnormal return by summation of abnormal return from the first date to the last date of the timeframe the study.

The abnormal return from market model method

The abnormal return is the difference between actual return and expected return of the stock

$$AR_{it} = R_{it} - E(R_{it})$$

Where, AR_{it} is the abnormal return on stock i on day t

R_{it} is the return on stock i on day t

$E(R_{it})$ is the expected return on stock i on day t

The market model is used for calculation the expected return $E(R_{it})$.

$$E(R_{it}) = \alpha_i + \beta_i R_{mt}$$

Where, R_{mt} is return on SET50 index on day t

α_i is expected return on stock return from company's specific factors

β_i is coefficient of volatility of stock return compared to SET50 index return

Average Abnormal Return (AAR) of totally N stocks at date t

$$AAR_t = \frac{\sum_{i=1}^N AR_{it}}{N}$$

Where, AAR_t is average abnormal return on day t

N is number of sample firms

Hypothesis: to test the significant of abnormal return on day t by using t-test

$$H_0 : AAR_t = 0$$

$$H_1 : AAR_t \neq 0$$

$$t_{AAR_t} = \frac{AAR_t}{S_{AAR} / \sqrt{N}}$$

The Standard Deviation of average abnormal return can be calculated by the formula

$$S_{AAR} = \sqrt{\frac{1}{N} \sum_{i=1}^N (AR_{it} - AAR_t)^2}$$

The Cumulative Average Abnormal Return (CAAR)

$$CAAR_{t_1, t_2} = \sum_{t=t_1}^{t_2} AAR_t$$

Where, t_1 is the first date

t_2 is the last date

Hypothesis: to test the significant of cumulative abnormal return on day t by using t-test

$$H_0 : CAAR_{t_1, t_2} = 0$$

$$H_1 : CAAR_{t_1, t_2} \neq 0$$

$$t_{CAAR_{t_1, t_2}} = \frac{CAAR_{t_1, t_2}}{S_{AAR} / \sqrt{N}}$$

5. Results

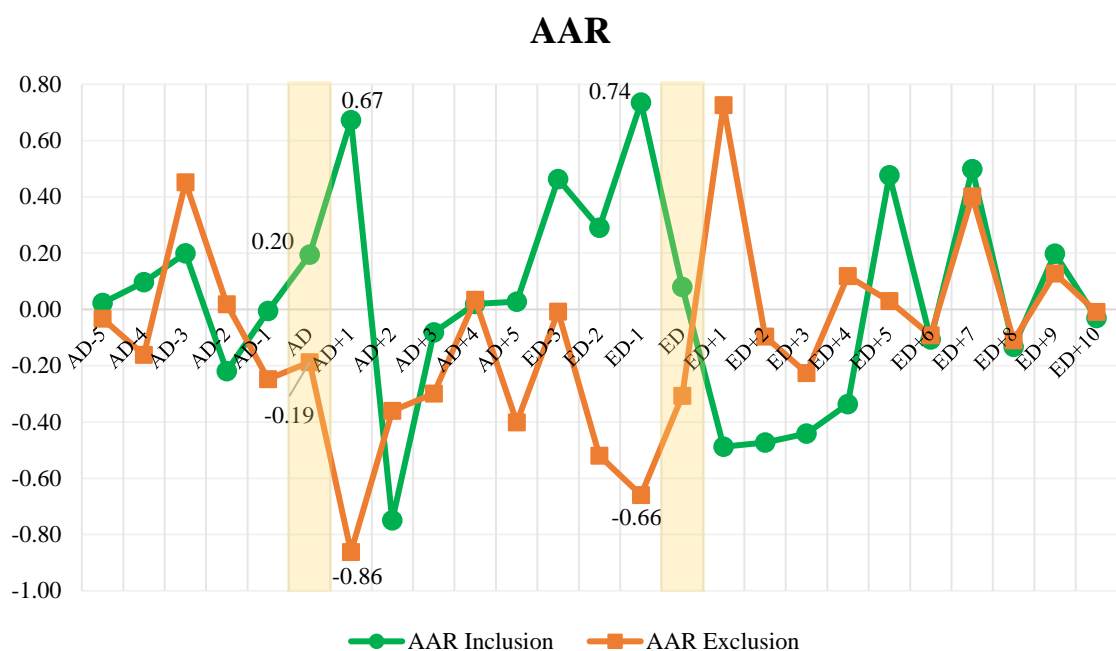
According to the hypothesis, the price effect occurs in the from inclusion or exclusion. The effect results in average abnormal return and cumulative average abnormal return value not equal zero. Figure 3 and 4 show AAR and CAAR graph around the announcement date and effective date in both cases, more information in reference table I and II.

The AAR on the announcement date is 0.20% for inclusion with t-statistic of 4.41 (at 1% level of significance) for inclusion case and -0.19% with t-statistic of -4.52 (at 1% level of significance) for exclusion case. The AAR around the announcement date reaches a peak at 0.67% with statistic of 14.98 (at 1% level of significance) for inclusion case and get down to the bottom at -0.86 with t-statistic of -20.93 (at 1% level of significance) both on 1 day after announcement date. The formal announcement of index could post on SET website after stock market was closed. Accordingly, the included in index stock's buying volume increase resulted in soar in return but selling volume increase in case of exclusion resulted in decrease in return. In conclusion, it shows the abnormal return around the announcement date is significantly different from zero in both cases.

On effective date, the AAR is 0.08% with t-statistic of 1.81 (at 10% level of significance) for inclusion case and -0.31% with t-statistic of -7.24 (at 1% level of significance). For inclusion case, the AAR around the effective date reaches a peak on 1 day before announcement date at 0.74% and decrease the days after. For exclusion case, AAR reaches the bottom -0.66% and increase the day after. The price effect's trend is consistent with the Price Pressure Hypothesis. There is no effect on stock

equilibrium price in the long run, in the case that the performance of company equal. Another reason support about the high volatility of AAR around this period is the rebalancing of portfolio by the index tracking fund. To summarize, the abnormal return around the effective date is significantly different from zero both inclusion and exclusion of stock.

Figure 3 Inclusion and Exclusion AAR



According to figure 4 and table 9, CAAR is 0.09% for inclusion and 0.03% for exclusion. This shows barely change in abnormal return within pre-announcement period.

On announcement date, the CAAR is 0.29%, 1% significance level for inclusion and -3.23% for exclusion, 1% significance level. The results are consistent with other studies.

Post-announcement date period, the CAAR is 1.67% and -3.23% for included and excluded stock. The increase in abnormal return for inclusion case is consistent with Whaley's S and P Game reaction, that is

the arbitrage bid stock on announcement date, then arbitrage and gain profit in a few days around this period. This reaction resulted in augmentation in stock's return.

The effective date, the CAAR reaches the pinnacle at 1.75% with 1% significance level for inclusion case and drops to the bottom point at -3.54% with 1% significance level for exclusion case.

Post-effective date period, the CAAR decreases to 0.91% after reaching a peak value for inclusion. However, the graph reverses to increasing trend and reaches to -2.67% at 10 days after effective date for exclusion case.

To sum up, the positive price effect from inclusion case is lower than the negative price effect from exclusion case. When the SET 50 index stock list change, index fund is obligated to change portfolio and investment plan. After inclusion new stock, index fund needs to invest in the 50 stocks in SET 50 index. The weight of included stock added to index fund portfolio depends on fund manager. This creates the demand resulted positive return. Conversely, index fund also had to sell all amount of excluded stock in portfolio created the oversupply situation and resulted more negative return impact.

Figure 4 Inclusion and Exclusion CAAR

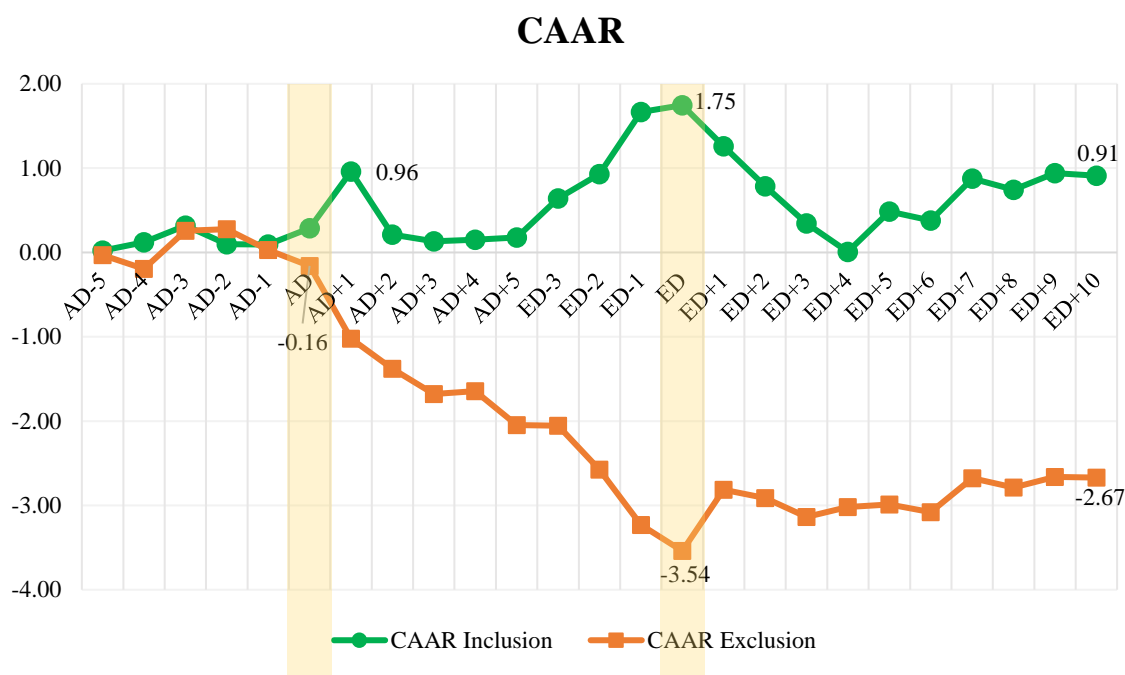


Table 9 CAAR for Inclusion and Exclusion

Period	CAAR - Inclusion	CAAR - Exclusion
Pre-AD Period	0.09	0.03
AD	0.29	-0.16
Post-AD Period	1.67	-3.23
ED	1.75	-3.54
Post-ED Period	0.91	-2.67

Analysis by Beta

The analysis of abnormal return by beta value criteria is divided into 3 sample groups and sequence by the following. First, the low beta stock, beta less than 0.5, has 10 cases. Secondly, the stock, beta between 0.5 – 1, has 42 cases. Lastly, the high beta stock, more than 1, has 19 cases.

For inclusion case, the AAR on the announcement date is 0.37% (not significance), 0.32% (at 1% level of significance), and 0.48% (at 1%

level of significance) respectively. Exclusion case, the AAR on the announcement date is 0.41 (at 1% level of significance), -0.48 (at 1% level of significance), and -0.02 (at 1% level of significance) respectively.

The AAR for inclusion case on effective date is 0.37% (at 1% level of significance), 0.07% (not significant), and -0.05% (not significant) respectively. The value for exclusion case is -0.24% (at 5% level of significance), -0.32% (at 1% level of significance), and 0.21 (not significant).



Figure 5 AAR Inclusion Case by Beta

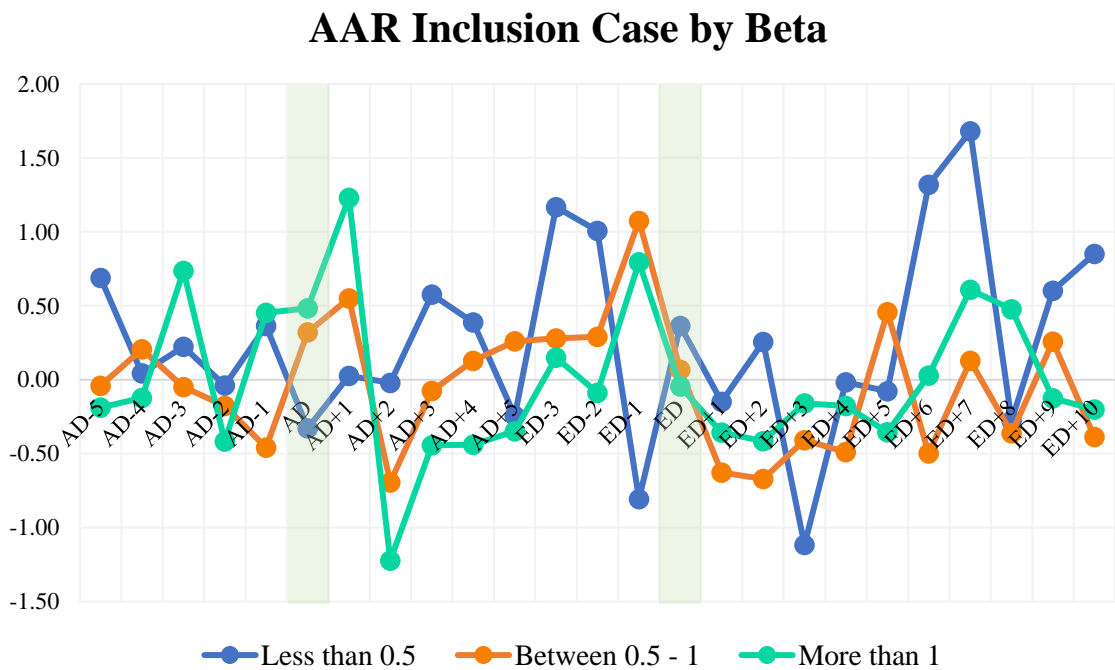
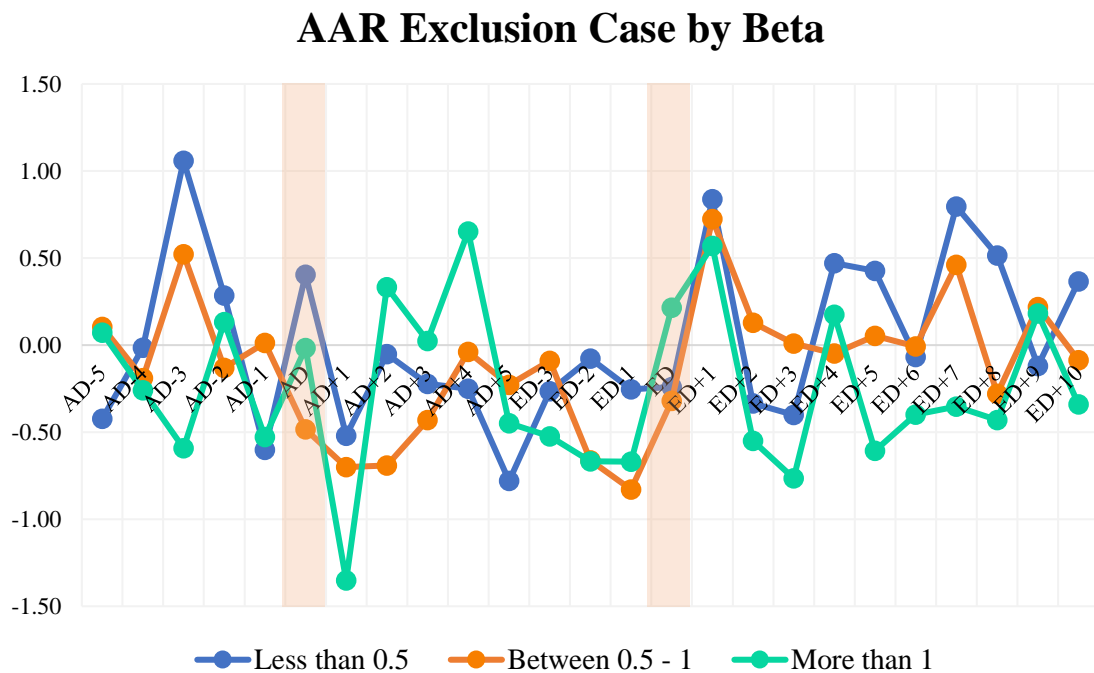


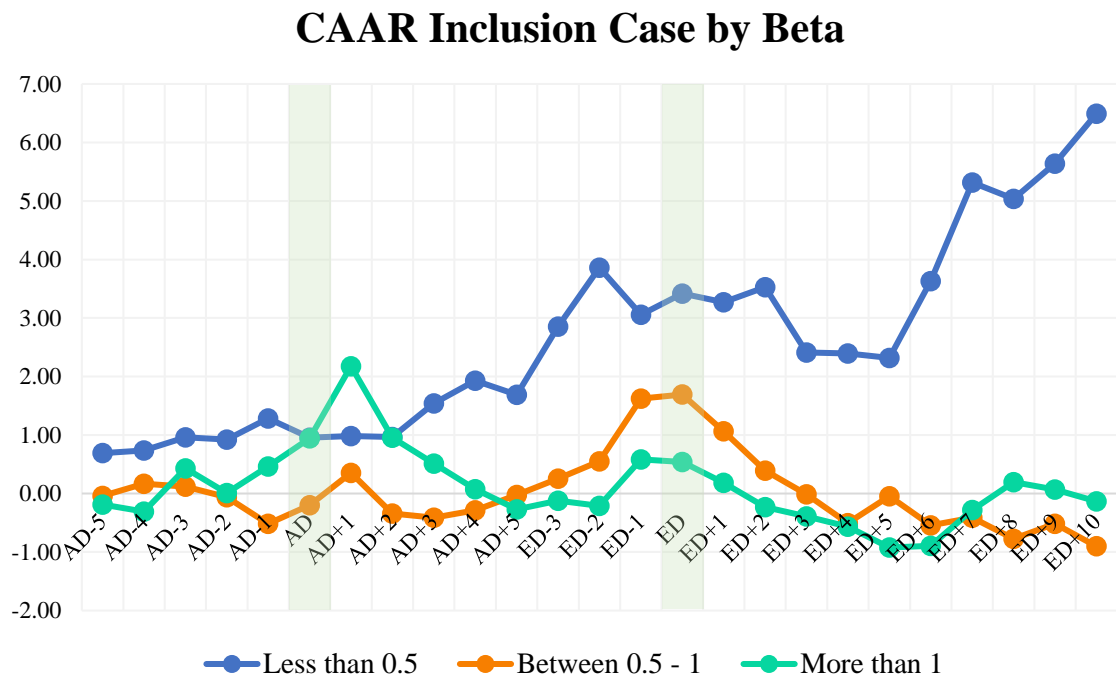
Figure 6 AAR Exclusion Case by Beta



The CAAR for inclusion case start increasing trend for 1 day before to 1 day after announcement date and 2 days before to a day before effective date in case of the beta between 0.5 – 1 and more than 1's stock. The decreasing trend after effective date. In these 2 cases of beta's volatility are lower than the beta less than 0.5's stock. (Chen 2002)

For beta less than 0.5 stock, the CAAR increase after the effective date. There are 2 possible explanations why CAAR is higher. First, the number of samples for beta less than 0.5 is only 9 – 10, which are less than others. There by, the CAAR is more volatility when there are some outlier data. Figure 7 shows the relation between beta and abnormal return. The low beta value, in case of everything equal, results in high AR, AAR, and CAAR respectively.

Figure 7 CAAR Inclusion Case by Beta



The CAAR for exclusion case, before announcement date, is positive in case of stock beta less than 0.5 and between 0.5 – 1 but value less than zero for beta than 0.5. In post-announcement date period, all CAAR are less than zero and negative trend. In post-effective date period, CAAR decrease, and value are less than zero. However, the trend is different, that is upward trend for beta less than 0.5, almost flat for beta between 0.5 – 1, and downward trend for beta more than 1.

The explanation for increasing trend in beta less than 0.5 is the same as inclusion CAAR. The low beta results in higher CAAR than high beta cases. The trend is completely opposite, negative slope, for beta more than 1.

Figure 8 CAAR Exclusion Case by Beta

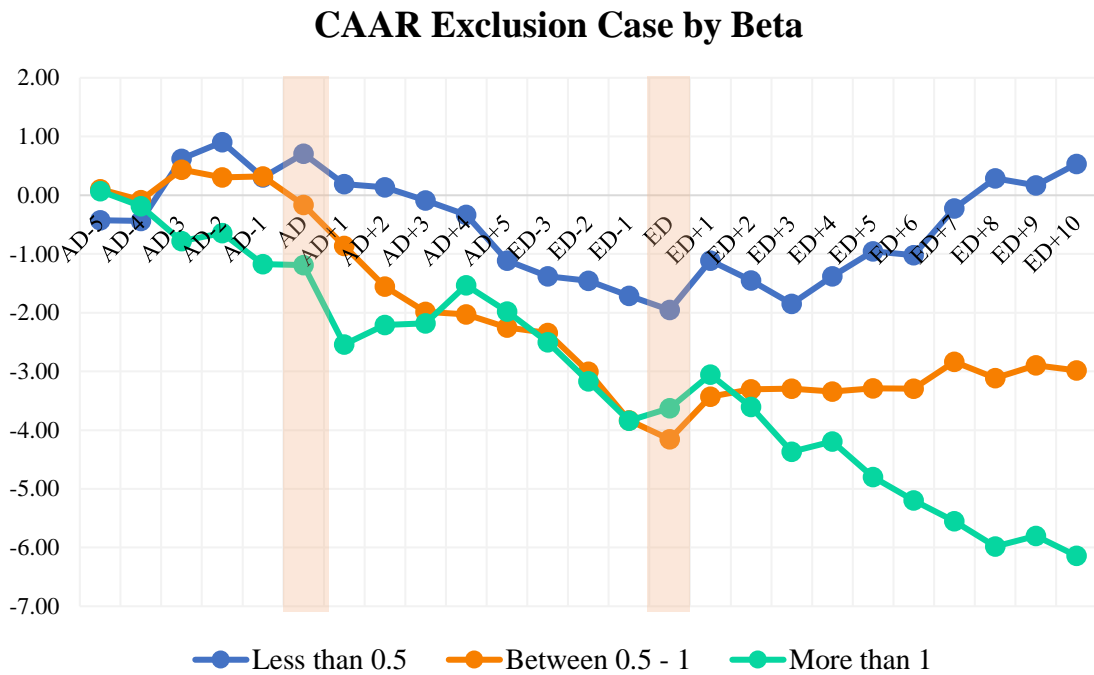
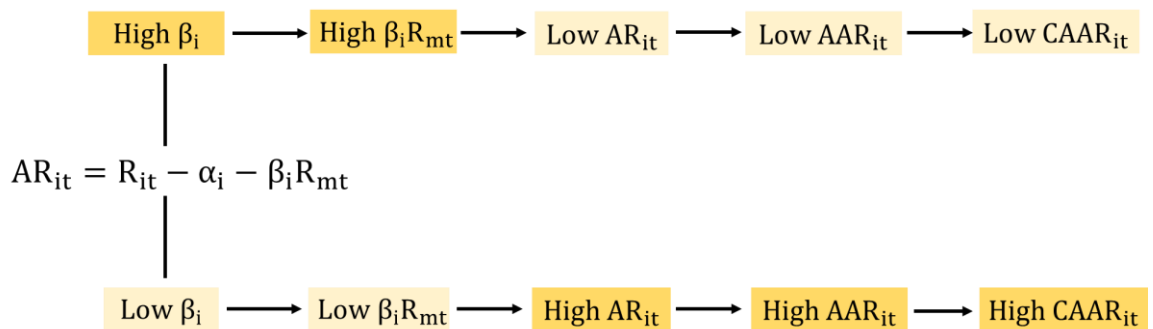


Table 10 CAAR for Inclusion and Exclusion

Period	CAAR - Inclusion			CAAR - Exclusion		
	0 - 0.5	>0.5 - 1	>1	0 - 0.5	>0.5 - 1	>1
Pre-AD Period	1.28	-0.52	0.46	0.30	0.32	-1.17
AD	0.96	-0.20	0.95	0.71	-0.16	-1.19
Post-AD Period	3.05	1.62	0.58	-1.71	-3.84	-3.84
ED	3.42	1.69	0.54	-1.95	-4.16	-3.62
Post-ED Period	6.49	-0.90	-0.13	0.54	-2.98	-6.14

Figure 9 Beta and AR AAR CAAR Relation Flow Chart



Analysis by Industry

According to figure 10, the AAR on announcement date is positive except Agro & Food and Financial Industry. The Property & Construction AAR value is negative on effective date.

Figure 10 AAR Inclusion Case by Industry

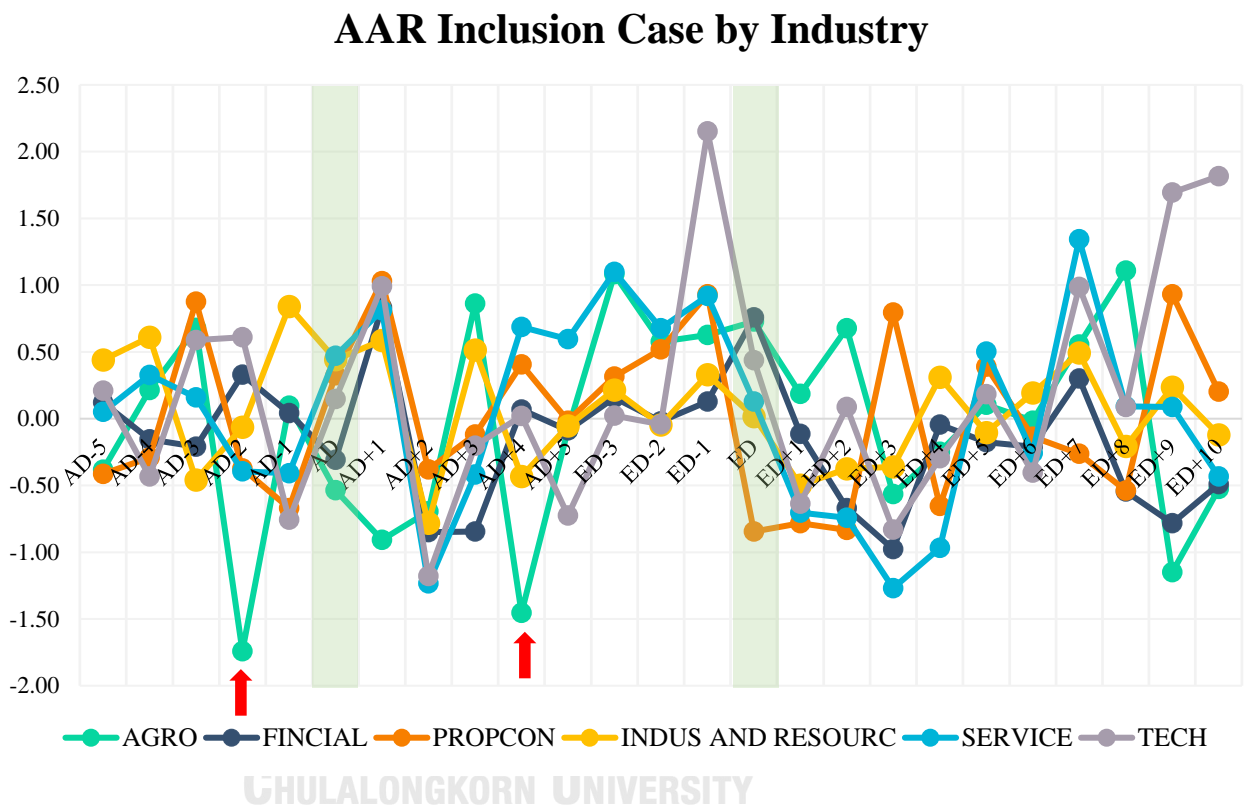
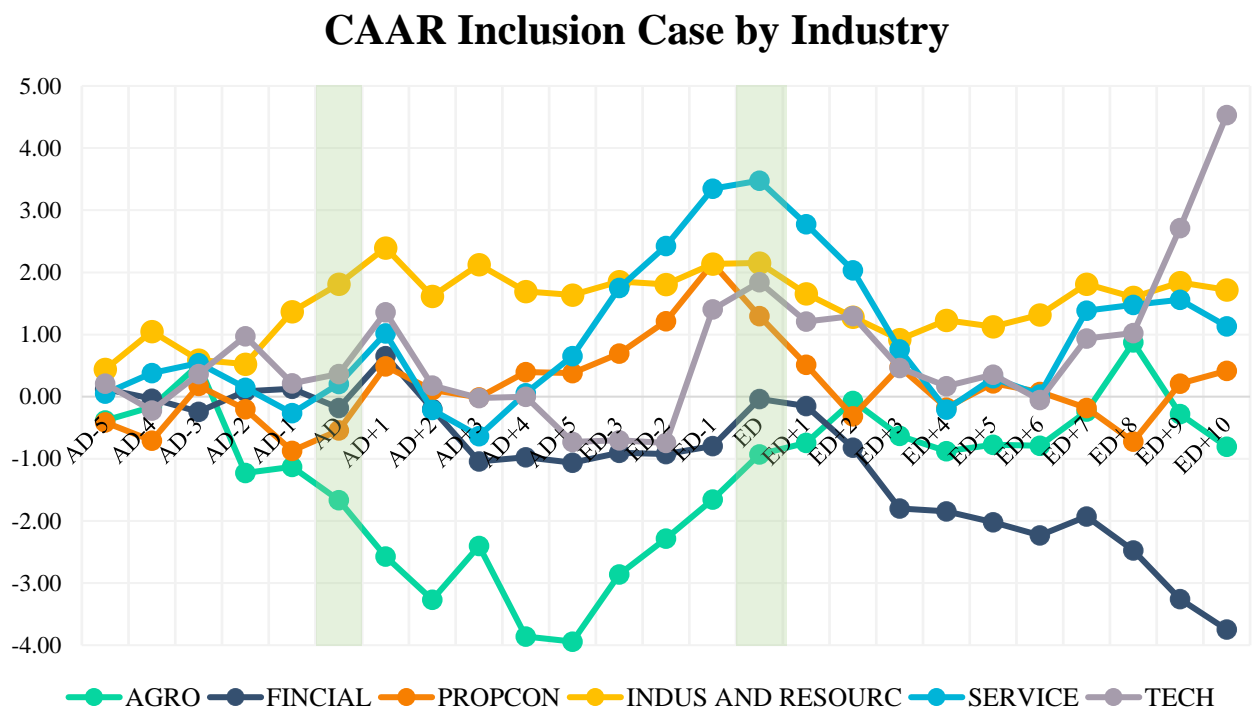


Figure 11 CAAR Inclusion Case by Industry

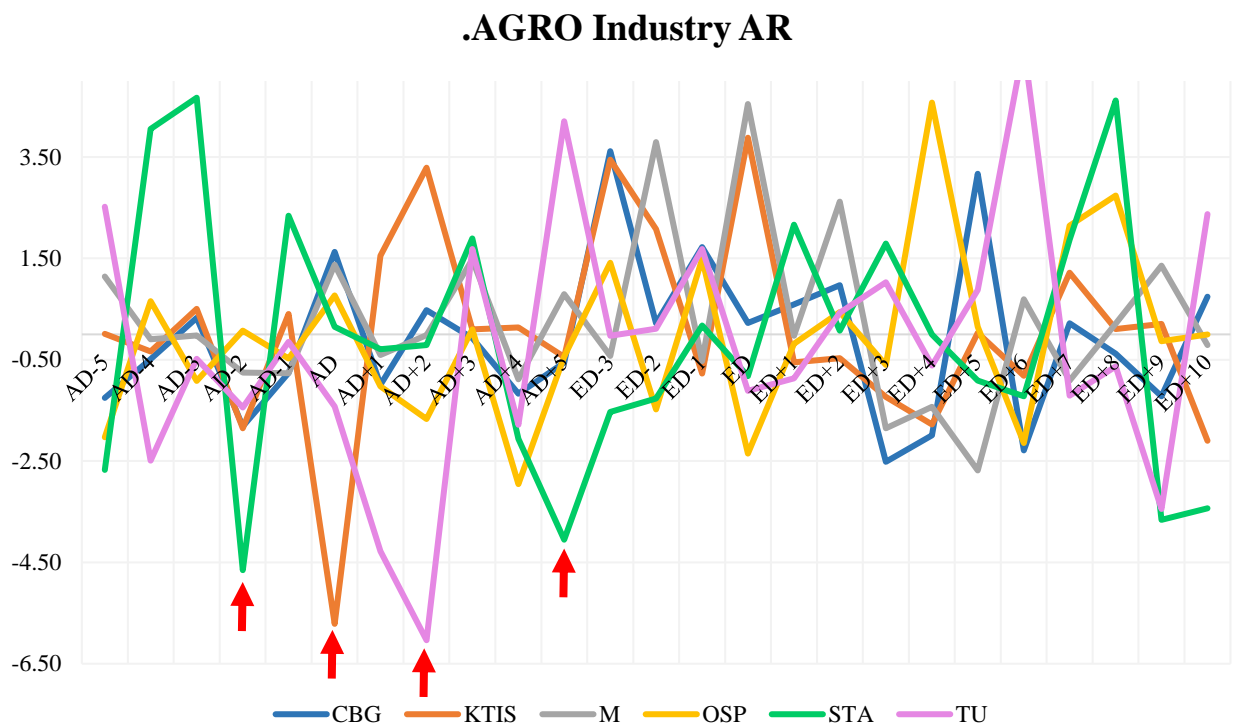


Some of Agro & Food Industry's AR are volatile (AR between 4-6%) and only 6 samples resulted in of negative and volatile AAR and CAAR. The negative AAR on 2 days before announcement date (-1.74%) and 5 days after announcement date (-1.45%) lower the CAAR at announcement date and post-announcement date. The return of Agro & Food Industry is continually fluctuating from the volatile of agricultural products' price. The price of this sector depends on export, world economics and exchange rate. The appreciation of Thai Baht results in higher price that lower the export. The volatility of market situation and product's price radically affects to the profitability.

Example of some stock, STA (Sri Trang Agro-industry Public) company engage in production of natural rubber, KTIS (Kaset Thai International Sugar Corporation) engage in sugar production. And TU

(Thai Union Group PCL) relates in manufacture and sale of frozen, chilled, and canned seafood.

Figure 12 AR Inclusion Case of Agro & Food Industry

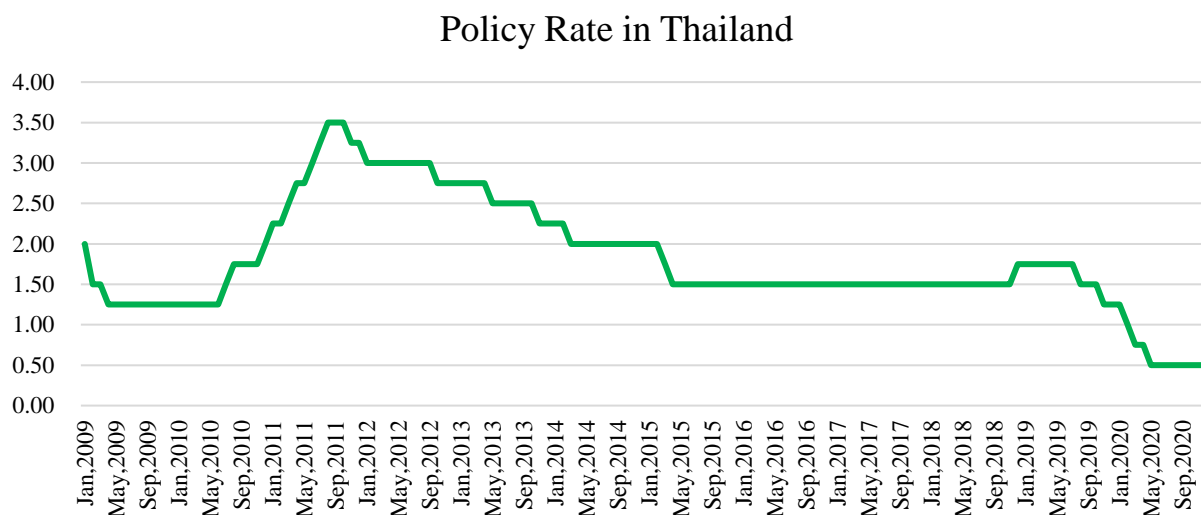


CAAR for financial company decrease after effective date. Financial industry comprises of 3 sectors, Banking, Financial and securities, and Insurance. The investor's concern from news over change in policy rate may affect to investment environment. The volatility in policy rate has negative impacts on companies' profit. The inclusion of this sector occurs around 2015 – 2020, figure 13. The policy rate considerably decreases since 2011 in this period.

The low policy rate environment affects ability of financial company to raise external financing and reduces the stimulus to lending, the opportunity of other financial companies to take more risk would be barely feasible. Thus, one of the results is dwindle in turnover resulted in

drop in stock price. Moreover, the reduced interest can also boost investors to invest in other industry stocks or real estate. As a result, the return of financial industry increases the early period because of inclusion shock effect but decrease after effective day from the effect of financial policy. Example of stocks, TISCO (TISCO Financial Group PCL) - Banking sector, SAWAD (Srisawad Corporation PCL) - Financial and securities sector, BLA (Bangkok life insurance) - Insurance sector.

Figure 13 Policy Rate in Thailand



(Source: Data from BOT)

AAR greatly increase on 3 days before announcement date for Agro & Food, Service and Technology industries led to positive CAAR at pre-announcement date period. However, negative AAR occur in every industry, except Technology, caused negative CAAR and decreasing trend after announcement date. Technology industry is the only exception that impact of positive AAR is greater than negative brought about positive CAAR despite exclusion case.

The technology industry includes the Information & Communication Technology and Electronic Components. Nowadays, Thai technology companies are integrated into digital transformation to all area of business. The IoT (Internet of things) service enabled automate processes and reduce cost. Then, the long-term prospects for ICT (3G, 4G, and 5G since 2010) and the electronic component for technology supply chains' stock have been far from a sure thing for investor that the price will surely increase. The investor's price target is high, so the return is high even if exclusion.



Figure 14 AAR Exclusion Case by Industry

AAR Exclusion Case by Industry



Figure 15 CAAR Exclusion Case by Industry

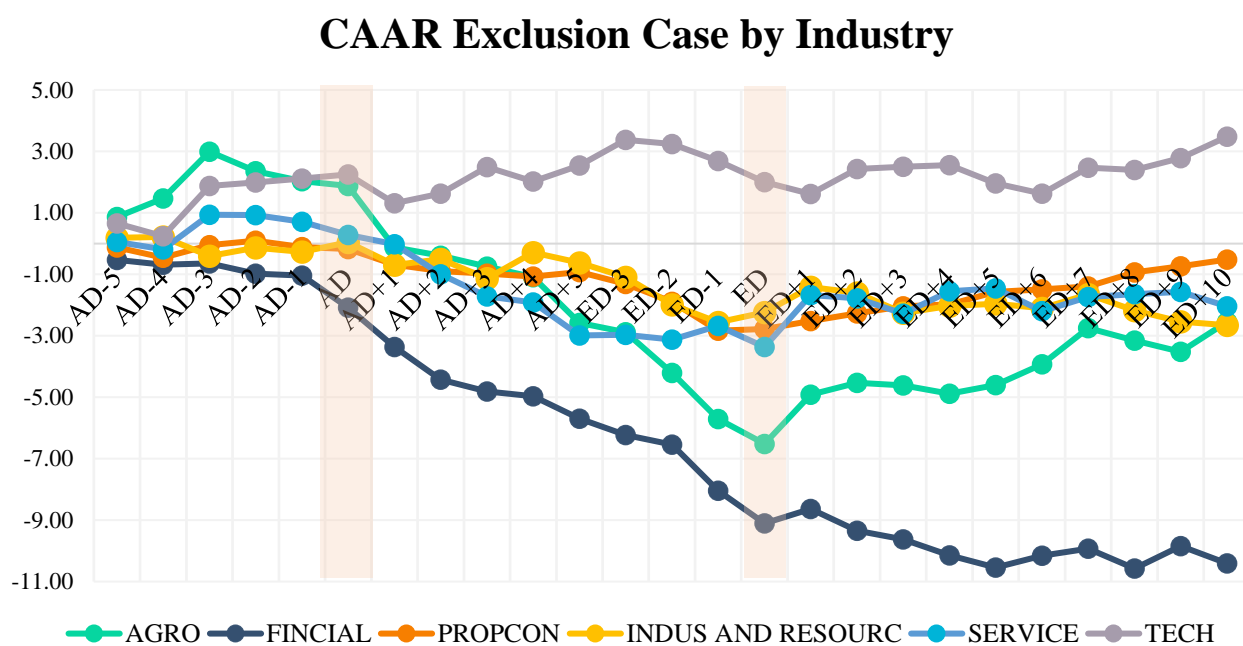


Table 11 Inclusion Case Result by Industry

Period	AGRO		FINCIAL		PROPCON		INDUS & RESOURC		SERVICE		TECH	
	I	E	I	E	I	E	I	E	I	E	I	E
Pre-AD Period	-1.13	2.03	0.13	-1.04	-0.87	-0.12	1.37	-0.27	-0.26	0.71	0.22	2.11
AD	-1.67	1.88	-0.18	-2.08	-0.54	-0.18	1.81	0.04	0.21	0.28	0.37	2.25
Post-AD Period	-1.66	-5.70	-0.80	-8.04	2.14	-2.83	2.14	-2.56	3.35	-2.68	1.41	2.68
ED	-0.93	-6.52	-0.04	-9.10	1.30	-2.78	2.15	-2.23	3.48	-3.37	1.84	2.00
Post-ED Period	-0.80	-2.55	-3.75	-10.41	0.41	-0.51	1.72	-2.65	1.13	-2.04	4.53	3.48

6. Conclusion

The main objective for this study is to investigate the price effect of the stock from the result of inclusion and exclusion from the SET 50 index during 2010 to 2020. According to the previous studies of price effect from included and excluded stock, the result is in the same trend that is the significant positive abnormal return for inclusion case and negative return for exclusion case.

The results of the study are consistent with the previous studies. The AAR reaches a peak at 0.67% on one day after announcement date and 0.74% on 1 day before announcement date. The CAAR trend is increasing and reaches a peak at 1.75% at effective date for inclusion case. For exclusion case, the AAR go to bottom at -0.86% on one day after announcement date and -0.66% on 1 day before announcement date. The CAAR trend is decreasing and reaches to -3.54%.

The analysis by beta value, AAR for stock beta value less than 0.5 has high positive and volatile. These cause the CAAR's trend increasing. The explanation is that the few samples result has easily changed when there is outlier and the low beta value result in low beta times market return term resulted in high CAAR value.

The analysis by industry, for inclusion case, CAAR of almost all industries are positive except the Agro & Food and Financial industry. The Agro & Food industry price is sensitive from weather condition and economic factors. The Financial industry has decrease trend from the change in policy rate that possibly has an impact on the investment environment. The low policy rate affects company's ability to raise

external fund and reduce stimulus to lending. Moreover, investors may invest in other securities like real estate. For exclusion case, CAAR is positive only technology industry. One of the reasons is that IoT (Internet of things) has become everyday life for a very successful build investor confidence and raise industry return even if exclusion from SET 50 index. (Stoll 1972)





APPEDIX

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Appendix Table I: Inclusion Case Result

Period	Date	N	AAR	AAR t-test	CAAR	CAAR t-test
Pre- announcement Period	AD-5	71	0.02	0.52	0.02	0.39
	AD-4	71	0.10	2.20 **	0.12	2.02 **
	AD-3	71	0.20	4.54 ***	0.32	5.40 ***
	AD-2	70	-0.22	-4.96 ***	0.10	1.67 *
	AD-1	66	-0.01	-0.11	0.09	1.54
Announcement Date	AD	70	0.20	4.41 ***	0.29	4.87 ***
Post- announcement Period	AD+1	68	0.67	14.98 ***	0.96	15.95 ***
	AD+2	70	-0.75	-16.96 ***	0.21	3.56 ***
	AD+3	70	-0.08	-1.84 *	0.13	2.20 **
	AD+4	70	0.02	0.45	0.15	2.53 **
	AD+5	71	0.03	0.62	0.18	3.01 ***
	ED-3	70	0.46	10.47 ***	0.64	10.78 ***
	ED-2	71	0.29	6.62 ***	0.93	15.78 ***
ED-1	71	0.74	16.75 ***	1.67	28.25 ***	
Effective Date	ED	70	0.08	1.81 *	1.75	29.40 ***
Post-effective date Period	ED+1	69	-0.49	-10.94 ***	1.26	21.04 ***
	ED+2	70	-0.47	-10.69 ***	0.79	13.24 ***
	ED+3	70	-0.44	-9.98 ***	0.34	5.80 ***
	ED+4	71	-0.33	-7.62 ***	0.01	0.13
	ED+5	71	0.48	10.85 ***	0.49	8.21 ***
	ED+6	68	-0.11	-2.37 **	0.38	6.27 ***
	ED+7	69	0.50	11.20 ***	0.88	14.65 ***
	ED+8	68	-0.14	-3.02 ***	0.74	12.51 ***
	ED+9	69	0.20	4.46 ***	0.94	15.74 ***
	ED+10	67	-0.03	-0.66	0.91	15.01 ***

* 10% level of significance, ** 5% level of significance, *** 1% level of significance

Appendix Table II: Exclusion Case Result

Period	Date	N	AAR	AAR t-test	CAAR	CAAR t-test
Pre- announcement Period	AD-5	68	-0.03	-0.80	-0.03	-0.21
	AD-4	68	-0.16	-3.91 ***	-0.19	-1.26
	AD-3	68	0.45	10.97 ***	0.26	1.68 *
	AD-2	67	0.02	0.44	0.28	1.79 *
	AD-1	65	-0.25	-5.87 ***	0.03	0.18
Announcement Date	AD	67	-0.19	-4.52 ***	-0.16	-1.03
Post- announcement Period	AD+1	68	-0.86	-20.93 ***	-1.02	-6.65 ***
	AD+2	68	-0.36	-8.75 ***	-1.38	-8.99 ***
	AD+3	69	-0.29	-7.25 ***	-1.68	-10.94 ***
	AD+4	67	0.03	0.83	-1.64	-10.64 ***
	AD+5	69	-0.40	-9.83 ***	-2.04	-13.43 ***
	ED-3	69	-0.01	-0.18	-2.05	-13.48 ***
	ED-2	69	-0.52	-12.71 ***	-2.57	-16.89 ***
	ED-1	69	-0.66	-16.14 ***	-3.23	-21.22 ***
Effective Date	ED	64	-0.31	-7.24 ***	-3.54	-22.38 ***
Post-effective date Period	ED+1	68	0.73	17.62 ***	-2.81	-18.34 ***
	ED+2	69	-0.10	-2.35 **	-2.91	-18.97 ***
	ED+3	69	-0.23	-5.53 ***	-3.13	-20.59 ***
	ED+4	69	0.12	2.90 ***	-3.01	-19.81 ***
	ED+5	68	0.03	0.73	-2.98	-19.47 ***
	ED+6	68	-0.09	-2.24 **	-3.08	-20.07 ***
	ED+7	68	0.40	9.77 ***	-2.67	-17.45 ***
	ED+8	69	-0.11	-2.69 ***	-2.78	-18.30 ***
	ED+9	68	0.13	3.11 ***	-2.65	-17.33 ***
	ED+10	67	-0.01	-0.21	-2.66	-17.13 ***

* 10% level of significance, ** 5% level of significance, *** 1% level of significance

Appendix Table III: Inclusion Case by Beta Value

Date	Less than 0.5					Between 0.5 - 1					More than 1				
	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test
AD-5	10	0.69	3.41 ***	0.69	1.30	42	-0.04	-0.60	-0.04	-0.40	19	-0.19	-1.57	-0.19	-1.26
AD-4	10	0.04	0.22	0.73	1.39	42	0.21	3.06 ***	0.17	1.64	19	-0.12	-1.02	-0.31	-2.07 **
AD-3	10	0.22	1.10	0.96	1.81 *	42	-0.05	-0.74	0.12	1.15	19	0.74	6.17 ***	0.43	2.86 ***
AD-2	10	-0.04	-0.18	0.92	1.74 *	42	-0.18	-2.62 ***	-0.06	-0.60	18	-0.42	-3.40 ***	0.01	0.07
AD-1	10	0.36	1.80 *	1.28	2.42 **	40	-0.46	-6.59 ***	-0.52	-4.98 ***	19	0.45	3.79 ***	0.46	3.10 ***
AD	9	-0.33	-1.53	0.96	1.71 *	41	0.32	4.68 ***	-0.20	-1.92 *	19	0.48	4.04 ***	0.95	6.33 ***
AD+1	9	0.03	0.13	0.98	1.76 *	40	0.55	7.95 ***	0.35	3.41 ***	19	1.23	10.29 ***	2.18	14.56 ***
AD+2	9	-0.02	-0.09	0.96	1.73 *	42	-0.69	-10.23 ***	-0.34	-3.34 ***	19	-1.22	-10.21 ***	0.96	6.39 ***
AD+3	10	0.58	2.84 ***	1.54	2.90 ***	41	-0.07	-1.08	-0.41	-4.02 ***	19	-0.44	-3.70 ***	0.51	3.43 ***
AD+4	10	0.39	1.92 *	1.93	3.64 ***	42	0.13	1.90 *	-0.28	-2.80 ***	18	-0.44	-3.57 ***	0.07	0.49
AD+5	10	-0.24	-1.20	1.69	3.18 ***	42	0.26	3.85 ***	-0.02	-0.23	19	-0.35	-2.90 ***	-0.27	-1.82 *
ED-3	10	1.17	5.76 ***	2.85	5.38 ***	42	0.28	4.14 ***	0.26	2.53 **	19	0.15	1.25	-0.12	-0.82
ED-2	10	1.01	4.97 ***	3.86	7.28 ***	42	0.29	4.30 ***	0.55	5.41 ***	19	-0.09	-0.74	-0.21	-1.41
ED-1	10	-0.81	-3.98 ***	3.05	5.76 ***	42	1.07	15.87 ***	1.62	16.00 ***	19	0.80	6.65 ***	0.58	3.91 ***
ED	10	0.37	1.80 *	3.42	6.45 ***	41	0.07	1.00	1.69	16.47 ***	19	-0.05	-0.38	0.54	3.61 ***
ED+1	10	-0.15	-0.74	3.27	6.17 ***	41	-0.63	-9.14 ***	1.07	10.37 ***	18	-0.36	-2.91 ***	0.18	1.19
ED+2	10	0.26	1.26	3.53	6.65 ***	42	-0.67	-9.91 ***	0.39	3.88 ***	18	-0.42	-3.38 ***	-0.23	-1.51
ED+3	10	-1.12	-5.51 ***	2.41	4.54 ***	41	-0.41	-5.95 ***	-0.01	-0.13	19	-0.16	-1.33	-0.39	-2.62 ***
ED+4	10	-0.02	-0.08	2.39	4.51 ***	41	-0.49	-7.14 ***	-0.50	-4.89 ***	19	-0.18	-1.47	-0.57	-3.80 ***
ED+5	10	-0.08	-0.38	2.32	4.37 ***	42	0.46	6.75 ***	-0.05	-0.45	19	-0.35	-2.96 ***	-0.92	-6.17 ***
ED+6	10	1.32	6.50 ***	3.63	6.85 ***	42	-0.50	-7.34 ***	-0.54	-5.35 ***	16	0.03	0.22	-0.89	-5.48 ***
ED+7	10	1.68	8.29 ***	5.31	10.02 ***	42	0.13	1.91 *	-0.41	-4.08 ***	19	0.61	5.10 ***	-0.28	-1.90 *
ED+8	10	-0.28	-1.36	5.04	9.50 ***	42	-0.36	-5.33 ***	-0.77	-7.63 ***	18	0.48	3.88 ***	0.19	1.26
ED+9	9	0.60	2.82 ***	5.64	10.09 ***	41	0.26	3.78 ***	-0.52	-5.01 ***	19	-0.12	-1.04	0.07	0.46
ED+10	10	0.85	4.20 ***	6.49	12.24 ***	41	-0.39	-5.64 ***	-0.90	-8.78 ***	17	-0.20	-1.58	-0.13	-0.83

* 10% level of significance, ** 5% level of significance, *** 1% level of significance

Appendix Table IV: Exclusion Case by Beta Value

Date	Less than 0.5				Between 0.5 - 1				More than 1						
	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test
AD-5	17	-0.42	-3.64 ***	-0.42	-1.98 **	39	0.10	1.70 *	0.10	0.44	12	0.07	0.54	0.07	0.13
AD-4	16	-0.02	-0.13	-0.44	-1.99 **	40	-0.19	-3.12 ***	-0.08	-0.36	12	-0.26	-1.93 *	-0.19	-0.34
AD-3	16	1.06	8.83 ***	0.62	2.81 ***	40	0.52	8.57 ***	0.44	1.86 *	12	-0.59	-4.39 ***	-0.78	-1.43
AD-2	17	0.29	2.45 **	0.91	4.24 ***	39	-0.13	-2.12 **	0.31	1.29	11	0.13	0.94	-0.65	-1.14
AD-1	17	-0.60	-5.18 ***	0.30	1.42	36	0.01	0.21	0.32	1.30	12	-0.53	-3.92 ***	-1.17	-2.16 **
AD	16	0.41	3.38 ***	0.71	3.22 ***	39	-0.48	-7.85 ***	-0.16	-0.69	12	-0.02	-0.12	-1.19	-2.19 **
AD+1	17	-0.52	-4.47 ***	0.19	0.89	40	-0.70	-11.51 ***	-0.86	-3.69 ***	12	-1.35	-10.04 ***	-2.54	-4.67 ***
AD+2	16	-0.05	-0.43	0.14	0.63	40	-0.69	-11.37 ***	-1.56	-6.64 ***	12	0.33	2.47 **	-2.21	-4.06 ***
AD+3	17	-0.22	-1.92 *	-0.09	-0.40	39	-0.43	-7.00 ***	-1.99	-8.37 ***	12	0.02	0.18	-2.18	-4.01 ***
AD+4	16	-0.25	-2.08 **	-0.34	-1.52	39	-0.04	-0.64	-2.03	-8.54 ***	12	0.65	4.85 ***	-1.53	-2.81 ***
AD+5	17	-0.78	-6.71 ***	-1.12	-5.22 ***	40	-0.23	-3.73 ***	-2.25	-9.61 ***	12	-0.45	-3.33 ***	-1.98	-3.64 ***
ED-3	17	-0.27	-2.28 **	-1.38	-6.46 ***	38	-0.09	-1.45	-2.34	-9.75 ***	12	-0.52	-3.89 ***	-2.50	-4.60 ***
ED-2	17	-0.08	-0.67	-1.46	-6.82 ***	40	-0.66	-10.89 ***	-3.01	-12.83 ***	12	-0.67	-4.96 ***	-3.17	-5.83 ***
ED-1	17	-0.25	-2.18 **	-1.71	-8.01 ***	40	-0.83	-13.63 ***	-3.84	-16.36 ***	12	-0.67	-4.97 ***	-3.84	-7.06 ***
ED	16	-0.24	-2.01 **	-1.95	-8.86 ***	38	-0.32	-5.14 ***	-4.16	-17.28 ***	11	0.21	1.53	-3.62	-6.38 ***
ED+1	17	0.84	7.21 ***	-1.12	-5.22 ***	39	0.72	11.75 ***	-3.43	-14.46 ***	12	0.57	4.24 ***	-3.05	-5.61 ***
ED+2	17	-0.34	-2.88 ***	-1.45	-6.78 ***	40	0.13	2.12 **	-3.30	-14.09 ***	11	-0.55	-3.91 ***	-3.60	-6.34 ***
ED+3	17	-0.40	-3.45 ***	-1.85	-8.66 ***	40	0.01	0.16	-3.29	-14.05 ***	12	-0.76	-5.68 ***	-4.37	-8.03 ***
ED+4	17	0.47	4.05 ***	-1.38	-6.45 ***	40	-0.05	-0.79	-3.34	-14.26 ***	12	0.18	1.30	-4.19	-7.70 ***
ED+5	17	0.43	3.66 ***	-0.95	-4.46 ***	39	0.05	0.87	-3.29	-13.85 ***	12	-0.61	-4.50 ***	-4.80	-8.82 ***
ED+6	17	-0.07	-0.59	-1.02	-4.78 ***	39	-0.01	-0.13	-3.30	-13.88 ***	12	-0.40	-2.97 ***	-5.20	-9.55 ***
ED+7	17	0.80	6.85 ***	-0.23	-1.05	39	0.46	7.50 ***	-2.83	-11.94 ***	12	-0.35	-2.62 ***	-5.55	-10.20 ***
ED+8	17	0.51	4.42 ***	0.29	1.35	40	-0.28	-4.58 ***	-3.11	-13.28 ***	12	-0.43	-3.20 ***	-5.98	-10.99 ***
ED+9	17	-0.12	-1.03	0.17	0.79	40	0.22	3.59 ***	-2.89	-12.35 ***	11	0.18	1.30	-5.80	-10.20 ***
ED+10	17	0.37	3.15 ***	0.54	2.51 **	39	-0.09	-1.41	-2.98	-12.56 ***	10	-0.34	-2.31 **	-6.14	-10.30 ***

* 10% level of significance, ** 5% level of significance, *** 1% level of significance

Appendix Table V: Inclusion Case by Industry

Date	AGRO				FINCIAL				PROFCON				INDUS AND RESOURC				SERVICE				TECH																				
	N	AAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test	CAAR	t-test				
AD-5	6	-2.29	-1.20	-0.38	-0.73	12	0.12	0.91	0.12	0.37	16	-0.41	-2.72	***	-0.41	-2.42	***	16	0.44	4.23	***	0.44	3.39	***	15	0.05	0.28	0.05	0.17	6	0.21	0.61	0.21	0.44							
AD-4	6	1.29	0.67	-0.17	-0.32	12	-0.15	-1.15	-0.03	-0.10	16	-0.29	-1.92	*	-0.70	-4.13	***	16	0.61	5.86	***	1.05	8.09	***	15	0.33	1.78	*	0.38	1.28	6	-0.43	-1.26	-0.22	-0.48						
AD-3	6	4.08	2.14	0.51	0.98	12	-0.21	-1.56	-0.24	-0.75	16	0.88	5.78	***	0.17	1.01	16	-0.46	-4.42	***	0.59	4.55	***	15	0.16	0.86	0.54	1.82	*	0.59	1.71	*	0.36	0.78							
AD-2	6	-10.44	-5.47	-1.23	-2.34	12	0.33	2.45	0.09	0.27	15	-0.37	-2.37	**	-0.20	-1.14	16	-0.06	-0.61	0.53	4.06	***	15	-0.39	-2.14	**	0.14	0.49	6	0.61	1.77	*	0.97	2.07	***						
AD-1	6	0.59	0.31	-1.13	-2.16	12	0.04	0.31	0.13	0.40	16	-0.67	-4.42	***	-0.87	-5.11	***	16	0.84	8.08	***	1.37	10.54	***	13	-0.41	-2.06	**	-0.26	-0.83	6	-0.76	-2.20	**	0.22	0.46					
AD	6	-3.21	-1.68	*	-1.67	-3.18	***	11	-0.31	-2.19	**	16	0.33	2.15	**	-0.54	-3.19	***	16	0.44	4.26	***	1.81	13.95	***	15	0.47	2.56	**	0.21	0.70	6	0.15	0.43	0.37	0.78					
AD-1	6	-5.44	-2.85	***	-2.57	-4.91	***	12	0.83	6.19	***	0.65	2.01	**	14	1.03	6.35	***	0.49	2.67	***	2.40	18.47	***	14	0.81	4.25	***	1.02	3.32	***	0.99	2.89	***	1.36	2.89	***				
AD-2	6	-4.16	-2.18	**	-3.27	-6.23	***	12	-0.85	-6.32	***	-0.20	-0.60	16	-0.38	-2.50	**	0.11	0.62	16	-0.78	-7.32	***	1.61	12.45	***	15	-1.23	-6.68	***	-0.21	-0.72	6	-1.18	-3.42	***	0.18	0.38			
AD-3	6	5.18	2.71	***	-2.40	-4.58	***	12	-0.85	-6.28	***	-1.04	-3.20	***	16	-0.12	-0.78	-0.01	-0.07	16	-0.51	4.94	***	2.13	16.41	***	14	-0.42	-2.19	**	-0.63	-2.06	**	6	-0.20	-0.59	-0.02	-0.05			
AD-4	6	-8.73	-4.57	***	-3.86	-7.36	***	12	0.07	0.51	-0.97	-2.99	***	16	0.41	2.68	***	0.39	2.31	**	16	-0.43	-4.17	***	1.69	13.06	***	14	0.69	3.60	***	0.06	0.18	6	0.02	0.06	0.00	0.00			
AD-5	6	-0.50	-0.26	-3.94	-7.52	***	12	-0.09	-0.65	-1.06	-3.25	***	16	-0.01	-0.10	0.38	2.23	**	16	-0.06	-0.53	1.64	12.64	***	15	0.60	3.23	***	0.65	2.19	**	6	-0.73	-2.11	**	-0.73	-1.55				
ED-3	6	6.49	3.40	***	-2.86	-5.45	***	12	0.16	1.16	-0.90	-2.77	***	16	0.32	2.08	**	0.70	4.08	***	16	0.21	2.07	**	1.85	14.29	***	14	1.10	5.75	***	1.75	5.70	***	6	0.02	0.06	-0.70	-1.50		
ED-2	6	3.45	1.81	*	-2.28	-4.35	***	12	-0.02	-0.16	-0.92	-2.84	***	16	0.52	3.41	***	1.21	7.12	***	16	-0.05	-0.45	1.81	13.93	***	15	0.68	3.67	***	2.43	8.18	***	6	-0.04	-0.12	-0.75	-1.59			
ED-1	6	3.76	1.97	**	-1.66	-3.16	***	12	0.13	0.96	-0.80	-2.44	**	16	0.93	6.13	***	2.14	12.58	***	16	0.33	3.18	***	2.14	16.48	***	15	0.92	4.98	***	3.35	11.28	***	6	2.15	6.26	***	1.41	2.99	***
ED	6	4.36	2.28	**	-0.93	-1.77	*	12	0.76	5.63	***	-0.04	-0.12	15	-0.85	-5.39	***	1.30	7.38	***	16	0.02	0.16	2.15	16.60	***	15	0.13	0.70	3.48	11.72	***	6	0.44	1.27	1.84	3.93	***			
ED-1	6	1.12	0.58	-0.74	-1.42	12	-0.11	-0.84	-0.15	-0.46	15	-0.78	-4.99	***	0.52	2.93	***	0.52	2.93	***	16	-0.50	-4.79	***	1.66	12.76	***	14	-0.70	-3.68	***	2.77	9.03	***	6	-0.64	-1.85	*	1.21	2.57	***
ED-2	6	4.06	2.13	***	-0.07	-0.13	12	-0.67	-4.98	***	-0.82	-2.52	***	15	-0.83	-5.31	***	-0.32	-1.80	*	16	-0.38	-3.61	***	1.28	9.87	***	15	-0.74	-4.02	***	2.03	6.85	***	6	0.09	0.25	1.30	2.76	***	
ED-3	6	-3.38	-1.77	*	-0.63	-1.20	12	-0.98	-7.26	***	-1.80	-5.52	***	16	0.80	5.24	***	0.48	2.81	***	16	-0.36	-3.46	***	0.92	7.09	***	14	-1.27	-6.64	***	0.76	2.48	**	6	-0.83	-2.42	***	0.46	0.99	
ED-4	5	-1.24	-0.71	-0.88	-1.53	12	-0.04	-0.33	-1.84	-5.66	***	16	-0.65	-4.31	***	-0.17	-1.02	16	0.31	2.98	***	1.23	9.48	***	15	-0.97	-5.25	***	-0.21	-0.70	6	-0.30	-0.86	0.17	0.36						
ED-5	6	0.62	0.33	-0.78	-1.48	12	-0.18	-1.31	-2.02	-6.20	***	16	0.39	2.56	**	0.21	1.26	16	-0.11	-1.01	1.12	8.67	***	15	0.50	2.72	***	0.30	1.00	6	0.18	0.54	0.35	0.75							
ED-6	6	-0.09	-0.05	-0.79	-1.51	12	-0.21	-1.56	-2.23	-6.84	***	15	-0.14	-0.87	0.08	0.45	16	0.19	1.85	*	1.32	10.15	***	14	-0.26	-1.35	0.04	0.12	5	-0.41	-1.08	-0.05	-0.10								
ED-7	6	3.32	1.74	*	-0.24	-0.45	12	0.30	2.23	**	-1.93	-5.92	***	16	-0.26	-1.72	*	-0.18	-1.07	16	0.49	4.74	***	1.81	13.95	***	14	1.34	7.04	***	1.38	4.50	***	5	0.99	2.62	***	0.93	1.82	*	
ED-8	6	6.65	3.49	***	0.87	1.66	*	12	-0.54	-4.04	***	-2.47	-7.59	***	15	-0.54	-3.43	***	-0.72	-4.09	***	1.60	12.36	***	15	0.09	0.50	1.48	4.97	***	6	0.09	0.25	1.02	2.17	**					
ED-9	6	-6.90	-3.62	***	-0.28	-0.53	11	-0.78	-5.56	***	-3.26	-9.57	***	15	0.93	5.94	***	0.21	1.20	16	0.24	2.26	**	1.84	14.17	***	15	0.09	0.47	1.56	5.26	***	6	1.69	4.92	***	2.71	5.78	***		
ED-10	5	-2.63	-1.51	-0.80	-1.40	10	-0.49	-3.33	***	-3.75	-10.50	***	15	0.20	1.29	0.41	2.35	**	16	-0.12	-1.16	1.72	13.24	***	15	-0.43	-2.34	**	1.13	3.81	***	6	1.82	5.28	***	4.53	9.65	***			

* 10% level of significance, ** 5% level of significance, *** 1% level of significance

Appendix Table VI: Exclusion Case by Industry

Date	AGRO				FINCIAL				PROPCON				INDUS AND RESOURC				SERVICE				TECH									
	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test	N	AAR	t-test	CAAR	t-test
AD-5	4	0.87	1.86 *	0.87	0.62	11	-0.53	-3.23 ***	-0.53	-0.47	18	-0.12	-1.50	-0.12	-0.58	15	0.19	1.58	0.19	0.79	14	0.05	0.31	0.05	0.15	7	0.66	2.82 ***	0.66	2.33 **
AD-4	4	0.61	1.30	1.48	1.05	11	-0.16	-0.96	-0.69	-0.61	18	-0.34	-4.28 ***	-0.46	-2.23 **	15	0.02	0.19	0.22	0.88	14	-0.24	-1.42	-0.19	-0.54	6	-0.42	-1.66 *	0.24	0.79
AD-3	4	1.52	3.25 ***	2.99	2.13 ***	11	0.04	0.24	-0.65	-0.58	18	0.41	5.17 ***	-0.05	-0.23	15	-0.62	-5.07 ***	-0.40	-1.63	13	1.12	6.45 ***	0.94	2.62 ***	7	1.64	7.01 ***	1.88	6.64 ***
AD-2	4	-0.63	-1.35	2.36	1.68 *	10	-0.33	-1.93 *	-0.98	-0.83	18	0.14	1.79 *	0.09	0.46	14	0.27	2.15 **	-0.13	-0.51	14	-0.01	-0.04	0.93	2.70 ***	7	0.11	0.49	2.00	7.04 ***
AD-1	4	-0.33	-0.70	2.03	1.45	10	-0.06	-0.37	-1.04	-0.89	18	-0.21	-2.67 ***	-0.12	-0.57	14	-0.14	-1.08	-0.27	-1.05	13	-0.22	-1.28	0.71	1.98 **	7	0.12	0.51	2.11	7.46 ***
AD	4	-0.15	-0.33	1.88	1.34	11	-1.04	-6.32 ***	-2.08	-1.85 *	18	-0.06	-0.72	-0.18	-0.85	15	0.31	2.51 **	0.04	0.16	12	-0.43	-2.35 **	0.28	0.76	7	0.14	0.60	2.25	7.95 ***
AD+1	4	-2.00	-4.28 ***	-0.12	-0.09	11	-1.28	-7.80 ***	-3.36	-2.99 ***	18	-0.51	-6.40 ***	-0.69	-3.33 ***	15	-0.73	-5.98 ***	-0.69	-2.80 ***	14	-0.30	-1.82 *	-0.02	-0.07	7	-0.94	-4.01 ***	1.32	4.64 ***
AD+2	4	-0.27	-0.58	-0.39	-0.28	11	-1.07	-6.50 ***	-4.43	-3.95 ***	18	-0.21	-2.63 ***	-0.90	-4.35 ***	15	0.18	1.45	-0.51	-2.08 **	13	-0.98	-5.61 ***	-1.00	-2.80 ***	7	0.31	1.31	1.62	5.72 ***
AD+3	4	-0.56	-0.77	-0.75	-0.54	11	-0.39	-2.37 **	-4.82	-4.29 ***	17	-0.08	-0.98	-0.98	-4.60 ***	15	-0.62	-5.06 ***	-1.13	-4.59 ***	14	-0.72	-4.28 ***	-1.72	-4.99 ***	7	0.87	3.73 ***	2.50	8.80 ***
AD+4	4	-0.35	-0.74	-1.10	-0.78	11	-0.15	-0.90	-4.96	-4.42 ***	18	-0.09	-1.19	-1.07	-5.20 ***	15	0.84	6.89 ***	-0.29	-1.17	12	-0.19	-1.06	-1.91	-5.14 ***	7	-0.47	-2.03 **	2.02	7.13 ***
AD+5	4	-1.49	-3.19 ***	-2.59	-1.84 *	11	-0.73	-4.45 ***	-5.69	-5.07 ***	18	0.15	1.86 *	-0.92	-4.48 ***	15	-0.33	-2.71 ***	-0.62	-2.52 **	14	-1.08	-6.41 ***	-2.99	-8.67 ***	7	0.52	2.23 **	2.54	8.97 ***
ED-3	4	-0.30	-0.64	-2.88	-2.06 **	11	-0.54	-3.28 ***	-6.23	-5.55 ***	16	-0.39	-4.60 ***	-1.31	-6.00 ***	15	-0.47	-3.83 ***	-1.09	-4.42 ***	14	0.02	0.12	-2.97	-8.62 ***	7	0.84	3.58 ***	3.38	11.92 ***
ED-2	4	-1.32	-2.83 ***	-4.20	-3.00 ***	11	-0.30	-1.86 *	-6.54	-5.83 ***	18	-0.59	-7.35 ***	-1.90	-9.21 ***	15	-0.90	-7.32 ***	-1.99	-8.06 ***	14	-0.16	-0.94	-3.13	-9.07 ***	7	-0.14	-0.62	3.24	11.42 ***
ED-1	4	-1.50	-3.21 ***	-5.70	-4.07 ***	11	-1.50	-9.16 ***	-8.04	-7.17 ***	18	-0.94	-11.75 ***	-2.83	-13.76 ***	15	-0.57	-4.65 ***	-2.56	-10.36 ***	14	0.45	2.67 ***	-2.68	-7.77 ***	7	-0.55	-2.36 **	2.68	9.47 ***
ED	3	-0.81	-1.51	-6.52	-4.02 ***	10	-1.06	-6.18 ***	-9.10	-7.74 ***	18	0.05	0.61	-2.78	-13.52 ***	15	0.32	2.64 ***	-2.23	-9.05 ***	13	-0.69	-3.94 ***	-3.37	-9.41 ***	5	-0.68	-2.46 **	2.00	5.97 ***
ED+1	4	1.61	3.44 ***	-4.91	-3.50 ***	11	0.47	2.85 ***	-8.63	-7.70 ***	17	0.27	3.24 ***	-2.52	-11.89 ***	15	0.82	6.68 ***	-1.42	-5.74 ***	14	1.69	10.06 ***	-1.68	-4.86 ***	7	-0.38	-1.63	1.62	5.72 ***
ED+2	4	0.38	0.81	-4.53	-3.23 ***	11	-0.71	-4.30 ***	-9.34	-8.33 ***	18	0.25	3.09 ***	-2.27	-11.04 ***	15	-0.19	-1.52	-1.60	-6.49 ***	14	-0.11	-0.64	-1.78	-5.17 ***	7	0.81	3.47 ***	2.43	8.58 ***
ED+3	4	-0.08	-0.17	-4.61	-3.29 ***	11	-0.29	-1.76 *	-9.63	-8.58 ***	18	0.23	2.93 ***	-2.04	-9.90 ***	15	-0.66	-5.37 ***	-2.26	-9.16 ***	14	-0.49	-2.93 ***	-2.28	-6.60 ***	7	0.06	0.27	2.50	8.81 ***
ED+4	4	-0.28	-0.60	-4.89	-3.48 ***	11	-0.52	-3.15 ***	-10.15	-9.04 ***	18	0.06	0.79	-1.97	-9.59 ***	15	0.23	1.85 *	-2.03	-8.24 ***	14	0.72	4.30 ***	-1.55	-4.51 ***	7	0.05	0.22	2.55	8.99 ***
ED+5	4	0.29	0.61	-4.60	-3.28 ***	11	-0.40	-2.42 **	-10.54	-9.40 ***	17	0.41	4.97 ***	-1.57	-7.40 ***	15	0.08	0.65	-1.95	-7.92 ***	14	0.09	0.55	-1.46	-4.24 ***	7	-0.59	-2.52 **	1.96	6.91 ***
ED+6	4	0.67	1.44	-3.93	-2.80 ***	11	0.39	2.35 **	-10.16	-9.05 ***	18	0.08	0.95	-1.49	-7.25 ***	15	-0.15	-1.23	-2.11	-8.53 ***	14	-0.74	-4.38 ***	-2.20	-6.38 ***	6	-0.33	-1.32	1.63	5.31 ***
ED+7	4	1.18	2.52 **	-2.75	-1.96 *	11	0.23	1.38	-9.93	-8.85 ***	18	0.10	1.25	-1.39	-6.76 ***	15	0.45	3.71 ***	-1.65	-6.69 ***	14	0.46	2.76 ***	-1.73	-5.03 ***	6	0.84	3.33 ***	2.47	8.05 ***
ED+8	4	-0.40	-0.86	-3.15	-2.25 **	11	-0.64	-3.92 ***	-10.57	-9.42 ***	18	0.46	5.76 ***	-0.93	-4.53 ***	15	-0.53	-4.31 ***	-2.18	-8.83 ***	14	0.09	0.53	-1.65	-4.78 ***	7	-0.07	-0.29	2.40	8.46 ***
ED+9	4	-0.37	-0.79	-3.52	-2.51 **	11	0.73	4.44 ***	-9.85	-8.78 ***	18	0.20	2.47 **	-0.74	-3.58 ***	14	-0.36	-2.86 ***	-2.54	-9.95 ***	14	0.07	0.43	-1.57	-4.57 ***	7	0.39	1.65	2.78	9.82 ***
ED+10	4	0.97	2.09 **	-2.55	-1.82 *	10	-0.57	-3.26 ***	-10.41	-8.85 ***	18	0.22	2.78 ***	-0.51	-2.50 **	14	-0.11	-0.90	-2.65	-10.39 ***	13	-0.47	-2.68 ***	-2.04	-5.70 ***	7	0.69	2.96 ***	3.48	12.26 ***

* 10% level of significance, ** 5% level of significance, *** 1% level of significance

REFERENCES

Amihub, Y. and H. Mendelson (1989). "Liquidity and cost of capital: implications for corporate management." *Journal of Applied Corporate Finance* 2(3): 65-73.

Beneish, M. D. and J. C. Gardner (1995). "Information costs and liquidity effects from changes in the Dow Jones Industrial Average list." *Journal of Financial and Quantitative Analysis* 30(1): 135-157.

Beneish, M. D. and R. E. Whaley (1996). "An anatomy of the "S&P Game": The effects of changing the rules." *The Journal of Finance* 51(5): 1909-1930.

Biktimirov, E. N., et al. (2004). "Do demand curves for small stocks slope down?" *Journal of Financial Research* 27(2): 161-178.

Brealey, R. A. (2000). "Stock prices, stock indexes and index funds." Bank of England Quarterly Bulletin.

Chen, H. W. e. a. (2002). "Additions to and deletions from an open-ended market index: Evidence from the Australian All Ordinaries." *Australia Journal of Management* 27: 45-74.

Cooper, D. and G. Woglom (2003). "The S&P 500 effect: Not so good in the long run." *The Journal of Investing* 12(4): 62-73.

Harris, L. and E. Gurel (1986). "Price and volume effects associated with changes in the S&P 500 list: New evidence for the existence of price pressures." *The Journal of Finance* 41(4): 815-829.

Hegde, S. P. and J. B. McDermott (2003). "The liquidity effects of revisions to the S&P 500 index: An empirical analysis." *Journal of Financial Markets* 6(3): 413-459.

Jain, P. C. (1987). "The effect on stock price of inclusion in or exclusion from the S&P 500." *Financial Analysts Journal* 43(1): 58-65.

Jog, V. and T. Okumura (2003). Market Reaction to Inclusions and Exclusions in Toronto Stock Exchange 300 Index. Proceedings of the 2003 Northern Finance Association conference. Accessed May, Citeseer.

Keratithamkul, C. (2005). The effect on stock price of inclusion or exclusion from the

SET50 index, Faculty of Commerce and Accountancy Thammasat University.

Kraus, A. and H. R. Stoll (1972). "Price impacts of block trading on the New York Stock Exchange." *The Journal of Finance* 27(3): 569-588.

Laokulrach, M. and C. Trisupinyo (2018). "Price Effect of Changing in the Stock Exchange of Thailand 100 Index's Constituents." *Editorial Board* 12(8): 54.

Liu, S. (2000). "Changes in the Nikkei 500: New evidence for downward-sloping demand curves for stocks." *International Review of Finance* 1(4): 245-267.

Lynch, A. W. and R. R. Mendenhall (1997). "New evidence on stock price effects associated with changes in the S&P 500 index." *The Journal of Business* 70(3): 351-383.

Mase, B. (2007). "The impact of changes in the FTSE 100 index." *Financial Review*, 42: 461-484.

Merton, R. C. (1987). "A simple model of capital market equilibrium with incomplete information."

Opong, K. K. and P. A. Hamill (2014). "Spot Market Effects Surrounding Compositional Changes to the FTSE 100: Transitory or Permanent?".

Shleifer, A. (1986). "Do demand curves for stocks slope down?" *The Journal of Finance* 41(3): 579-590.

Stoll, A. K. a. H. R. (1972). Price Impacts of Block Trading on The New York Stock Exchange.

Teerapongpratya, T. (2010). The effects of index changes in Thai stock market HG5750. 55. A3 T447 2010, Faculty of Commerce and Accountancy Thammasat University.

Triempanichgul, C. (2010). The impacts of index rebalancing and their implications: the case of SET50 index HG5750. 55. A3 C485 2010, Faculty of Commerce and Accountancy Thammasat University.

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