The impact of institutional ownership and valuation on stock price around SET50 index inclusion and exclusion

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ผลกระทบของสัดส่วนนักลงทุนสถาบันและการประเมินมูลค่าต่อราคาของหลักทรัพย์ที่ถูกปรับเข้าหรือออกจากดัชนี SET50

น.ส.ประณิตตรา ฤทธิวิทยาสกุล

สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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ประณิตตรา ฤทธิวิทยาสกุล : ผลกระทบของสัดส่วนนักลงทุนสถาบันและการประเมินมูลค่าต่อราคาของหลักทรัพย์ที่ถูกปรับเข้าหรือออกจากดัชนี SET50. (The impact of institutional ownership and valuation on stock price around SET50 index inclusion and exclusion) อ.ที่ปรึกษาหลัก : รศ. ดร.บุญเลิศ จิตรมณีโรจน์

วิจัยนี้ศึกษาผลกระทบของสัดส่วนนักลงทุนสถาบันและการประเมินมูลค่าต่อราคาของหลักทรัพย์ที่ถูกปรับเข้าหรือปรับออกจากดัชนี SET50 ในช่วงปี 2557 - 2564 ผลการศึกษาพบว่าราคาของหลักทรัพย์ที่ถูกปรับเข้าดัชนีและราคาของหลักทรัพย์ที่ถูกปรับออกจากดัชนีตอบสนองอย่างไม่สมมาตร ผลกระทบต่อการถูกปรับออกจากดัชนีมีความรุนแรงมากกว่าการถูกปรับเข้าดัชนี อีกทั้งยังพบว่าสัดส่วนของนักลงทุนสถาบันและอัตราผลตอบแทนของหลักทรัพย์ที่มากกว่าปกติมีความสัมพันธ์ในทิศทางเดียวกันสำหรับกรณีที่ถูกปรับออกจากดัชนี แต่ไม่ใช่สำหรับกรณีที่ถูกปรับเข้าดัชนี บริษัทที่ถูกปรับออกจากดัชนีมีสัดส่วนนักลงทุนสถาบันที่ลดลงและส่งผลให้ราคาของหลักทรัพย์ลดลง นอกจากนี้การประเมินมูลค่าไม่มีผลกระทบต่อราคาของหลักทรัพย์ที่มีการปรับเข้าหรือปรับออกจากดัชนี

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This study examines the impact of institutional ownership and valuation on stock price around the changes in index constituents. Specifically, this paper studies the significant SET50 index during the period of 2014 – 2021. According to the empirical result, there is an asymmetric price response between index additions and index deletions. The effects from exclusions are considerably stronger than from inclusions. The findings also show that percentage ownership of institutional investors and abnormal return are positively correlated in case of exclusions but not for inclusions (though insignificant). Companies deleted from the index result in lower institutional holdings and subsequently exhibit lower share prices. Moreover, stock valuation has no effect on stock price in response to the announcement of index inclusion and exclusion.

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1. Introduction

Stock price response to index inclusion and exclusion has widely been examined for a long time, especially the well-recognized S&P 500 Index. The evidence from prior studies showed a significant increase in stock prices for added stocks and a decrease in stock prices for deleted stocks (Harris and Gurel, 1986; Shleifer, 1986; Dhillon and Johnson, 1991; Amihud and Mendelson, 1986). Meanwhile, another evidence suggested a positive impact on stock additions, but not a negative impact on stock deletions (Merton, 1987). This hypothesis claimed that investor recognition about the companies excluded from index membership remains the same. In terms of Thai equity market, the most relevant index is SET50. It is normally presented as a performance benchmark and mostly tracked by overall investors, especially the index funds. Besides, nowadays many brokerage firms in Thailand publish investment strategies regarding the announcement of SET50 index composition changes. Therefore, it is undeniable that index inclusion and exclusion have continuously attracted attention from the market.

The objective of this study is to investigate the price effects associated with changes in SET50 index list, both inclusion and exclusion, and the role of institutional ownership and stock valuation over the period of 2014 - 2021. The first considered determinant is 'institutional ownership'. Due to the existence of index funds, stocks additions and deletions in the index would suddenly affect stock demand, causing price reactions (Harris and Gurel, 1986; Shleifer, 1986). Various literatures documented a strong positive relationship between changes in institutional holdings and stock prices surrounding the announcement of index rebalancing (Pruitt and Wei, 1986; Chen 2004; Biktimirov et al., 2004; Shankar and Miller, 2006). Anyway, most of the empirical evidence about the impact of institutional investors is from developed market and just one evidence from Indian market (Ahluwalia et al., 2020). Against the limited

information about Thai market, this research examines the impact of institutional ownership on stock price around SET 50 index inclusion and exclusion.

As index fund trading and index reconstitution are obviously associated, several literatures emphasized on institutional investors. However, not only passive funds are involved in the announcement of index composition. The other groups of investors, such as active funds or retail investors, might seek benefits from index inclusion and exclusion events. With the rule of thumb, investors buy a stock in which is perceived to be a low price and later sell them at a higher price. Therefore, this paper proposed another main determinant which is 'stock valuation'. Fundamental analysis is commonly implemented in order to value securities. Based on the results of many studies, they concluded that market multiples and subsequent stock returns are significantly correlated (Capaul et al., 1993; Basu, 1977, Goodman and Peavy, 1983; Bird and Whitaker, 2003). Since company's earnings are crucial and perhaps the most closely followed by the market (Nicholson, 1960; Bildersee et. al, 1990), this paper mainly focuses on price-to-earnings indicator. Many authors attempted to evaluate the association between price-to-earnings ratio and stock returns (Basu, 1977; Goodman and Peavy, 1983; Akhtar, 2021). They found that stocks with low P/E typically achieve superior performance, in terms of return measurement, compared to stocks with high P/E. Following the model of Ahluwalia et al. (2020), price-to-earnings ratio, which is one of the control variables, is represented as a dummy for valuation. If the P/E of stock is less than the P/E of index, it is classified as a cheap stock and the value is equal to 1, otherwise 0. The weakness of dummy variable is that it ignores the magnitude of stock valuation, which is actually meaningful. For that reason, deviation of stock P/E from SET50 P/E is used instead. This paper investigates the impact of valuation on stock price around SET 50 index inclusion and exclusion, with the expectation that stocks with low P/E ratio (or underpriced stocks) would exhibit better

abnormal returns associated with index rebalancing events when compared with high P/E stocks.

2. Literature Review

2.1 Announcement effects of index inclusion and exclusion

Several hypotheses have been advanced to explain stock price reactions to changes in index constituents.

First of all, Harris and Gurel (1986) examined how changes in the S&P 500 composition affect stock prices and volumes, during the year of 1976 - 1988. Their empirical results showed that stocks added to S&P 500 Index will experience an increase in stock prices by more than 3 percent on the day after the announcement of index inclusion whereas deleted stocks will result in a decline. This caused by subsequent index funds trading, which significantly affects demand for stocks. They also stated that the impact on stock prices is consistently reversed to equilibrium price over time, particularly 2 weeks, because of temporary demand around announcement, confirming no new information related to changes in the index list. This study supports the price pressure hypothesis.

On the contrary, downward-sloping demand hypothesis (Shleifer, 1986) argued that the price response associated with inclusion and exclusion of index leads to a permanent effect on stock prices. Since one stock could not be a perfect substitute for one another, market segmentation could explain volume and price effects. Some investors, such as index-tracking funds or individual investors who interested in the index, certainly purchase or sell the stocks according to index announcement. Another explanation is transaction costs. The stock buyers pay higher price to compensate for sellers' transaction costs. While the price pressure and downward-sloping demand

hypotheses assume that the stock price effects are from massive buying or selling of index funds, the other three hypotheses believe that the events of index inclusion and exclusion convey new information to the market.

As stocks added to S&P 500 Index would lead to closer monitoring (Shleifer, 1986) and higher volume improves stock liquidity (Harris and Gurel, 1986), the announcement of index inclusion and exclusion is unlikely to be an information-free event. In accordance with information hypothesis, Dhillon and Johnson (1991) documented that the inclusion of stocks signals about the firms' favorable anticipation. Conversely, companies that are excluded from the index list carry negative information to the market. They further concluded that price effects are permanent. With an analysis of earnings expectations (Denis et al., 2003), stocks added to S&P 500 Index normally have better performance as a consequence of investors' higher expectation on corporate earnings. Accordingly, the events of stock additions and deletions influence the quality of those stocks, affecting stock prices to move up or down.

Apart from the mentioned hypotheses, Amihud and Mendelson (1986) presented the liquidity hypothesis. Additions of stocks to the index would gain attention from the market. More frequent trading improves liquidity as well as reduces the trading costs, which are measured by the difference between bid price and ask price. Consequently, stock prices rise following a shift in demand. On the other hand, deletions of stocks from the index result in lower liquidity and prices.

The last clarification is shadow cost hypothesis which stated by Merton (1987). It said that the inclusion of stocks leads to higher investor recognition. After that, the group of investors, who currently has incomplete diversified portfolio, will hold added stocks for diversification purpose. This result in a lessen shadow cost, driving stock price up. Nonetheless, the stock prices just respond to index inclusion, but not index exclusion. Whether stocks are excluded from the index list or not, the market have

already known about them. The popularity of stocks being deleted remains unchanged. As a result, stock prices do not deteriorate.

2.2 Institutional ownership and stock returns

Prior studies documented changes in institutional ownership is positively correlated to stock returns (Jones, 1999; Nofsinger and Sias, 1999; Cai et al., 2000; Sias et al, 2006; Campbell et al., 2008). As stated by Jones (1999) and Nofsinger and Sias (1999), herding and positive-feedback trading by institutional investors are major drivers of this phenomena. According to Pruitt and Wei (1986), they studied the effect of S&P 500 index rebalancing during the 1973 – 1986 period on actual changes in institutional ownership, which is initially suggested by Harris and Gurel (1986) and Schleifer (1986). Their findings showed that one of the key factors which influences abnormal return in the event of index inclusion and exclusion is institutional ownership. In addition, the effect of changes in institutional holdings, subsequent to stock additions and deletions, occurs for both included and excluded companies. The changes of institutional ownership could be explained by index fund trading (Schleifer, 1986). To mimic index's return and reduce tracking error, the replication of index composition is required. This creates a substantial buying for listing stocks as well as selling for delisting ones. With regard to downward-sloping demand hypothesis (Shleifer, 1986), the increased institutional demand for companies added to the index would definitely affect the prices. The empirical evidence from Chen (2004), which extended the research by investigating S&P 500 Index from 1962 to 2000, provided similar conclusions. Apart from S&P 500 Index, Shankar and Miller (2006) examined S&P 600, which is an index of small-cap stocks. They found a significant increase in institutional holdings for added stocks and also a decrease in institutional holdings for deleted stocks, supporting positive relation between changes in institutional ownership and stock additions/deletions following index reconstitution. Another small-cap index being

assessed is Russell 2000 by Biktimirov et al. (2004). After investigating the abnormal returns, trading volumes, and institutional ownership in response to changes in Russell 2000 components, they presented that the percentage ownership of institutional investors changes as similar as others reported. The recent research is conducted in Indian market by focusing on Niffy 50 and Next Nifty 50 during 2002 – 2016 (Ahluwalia et al., 2020). They found that after the announcement of index rebalancing, there is an increase in holdings of institutional investors for the newly added stocks and they generally exhibit positive returns whereas there is an opposite for the deleted stocks. Overall, the impact of changes in institutional ownership is consistent among many indices.

2.3 Valuation and stock returns

Stock valuation is typically concerned by market participants, such as analysts and investors, for the purpose of investment analysis. The underlying rationale is to evaluate whether the stock prices are undervalued, overvalued or fair compared to their intrinsic value. According to Penman (1992), fundamentals-based valuation could be applied to assess the value of stocks. Many researchers investigated the relation between market multiples (such as price-to-book ratio, price-to-earnings ratio, price-to-sales ratio, price-to-cash flow ratio, book-to-market ratio, dividend yields) and stock returns. (Capaul et al., 1993; Basu, 1977, Goodman and Peavy, 1983; Bird and Whitaker, 2003). The findings suggested that those market indicators have significant impact on subsequent U.S. stock returns. Correspondingly, various market multiples have explanatory property in relation to expected stock returns.

Nevertheless, price-to-earnings ratio, which is computed by current market price divided by annual earnings per share, is commonly used as a valuation measure. By examining the relationship between price and earnings of 100 stocks, Nicholson (1960) proposed that the current stock prices are mainly based on companies'

anticipated earnings. Moreover, the stocks with low multiples tend to appreciate more than the stocks with high multiples. On top of that, Bildersee et. al (1990) suggested that investors are interested in earnings and normally use it to value the companies. For the empirical evidence on performance, low P/E stocks have higher future returns compared to high P/E stocks (Basu, 1977). The results indicated that the price-to-earnings ratio could be used as a measure to predict stock returns, contradicting to the efficient market hypothesis. Similarly, Goodman and Peavy (1983) also tested whether stocks with low P/E create excess returns. To derive the pure effect of P/E, small-size and infrequent trading biases are controlled for the sample and price-earnings relatives or PERs is implemented to control industry bias. The results showed that low P/E stocks outperformed high P/E stocks, therefore, stocks with low ratio provided substantial abnormal returns. More recently, the study of emerging financial market, which composed of Malaysia, Philippines, Indonesia, Thailand and Singapore, further supported the significant inverse relationship between price-to-earnings figure and stock returns (Akhtar, 2021).

3. Hypothesis Development

This paper examines the impact of institutional ownership and valuation on stock price around SET50 index inclusion and exclusion. By inheriting the evidence of past literatures, the research hypotheses of the impact of institutional ownership are proposed as follows:

H1. Firms added to SET50 index experience higher institutional ownership and positive abnormal returns.

H2. Firms deleted from SET50 index experience lower institutional ownership and negative abnormal returns.

From the empirical results of various investigations regarding relative valuation and stock returns, the research hypotheses of the impact of valuation are proposed as follows:

H3. Firms added to SET50 index experience higher positive abnormal returns when they are undervalued, compared to overvalued firms.

H4. Firms deleted from SET50 index experience lesser negative abnormal returns when they are undervalued, compared to overvalued firms.

4. Data and Methodology

4.1 Data

The list of companies that are added to or deleted from SET50 index is obtained from The Stock Exchange of Thailand's website. The sample period is from January 2014 to December 2021 (8-year period). The index rebalancing events occur 2 times per year; every January and July, which are called the effective dates. For the announcement dates, SET normally announces the list of stocks that are going to be listed and delisted 10 business days prior to the effective date. There are 16 times of SET50 index rebalancing events over ten years, which contains 110 observations: 55 inclusions and 55 exclusions. Due to corporate actions such as merger & acquisition and delisting, some stocks are excluded from the final sample. The list of stock additions and deletions is shown in Table 1. Additionally, the data on stock price, SET50 index level, institutional holdings, number of outstanding shares, firm age, firm size, the amount of firm's debt and assets, and firm's earnings are obtained from Datastream.

Table 1. List of stock additions and deletions.

	1H14	2H14	1H15	2H15	1H16	2H16	1H17	2H17
Additions	THCOM VGI	KKP M	CK ~~HEMRAJ~~ KTIS SPALI	BA ~~BMCL~~ CBG ITD SAWAD TPIPL WHA	BLA SCCC TASCO	BEM GPSC KCE ~~MTLS~~	GLOBAL KKP PTG SPRC THAI	BJC BPP EA ~~MTLS~~ RATCH SCCC TISCO
Deletions	KKP MAKRO	CK THAI	BLA GLOBAL KKP THCOM	BAY ~~BIGC~~ BJC KTIS SCCC SPALI VGI	~~BMCL~~ RATCH THCOM	ITD JAS M SCCC	BEC ~~MTLS~~ SAWAD TASCO TTW	BA BCP CENTEL CK PTG THAI WHA

	1H18	2H18	1H19	2H19	1H20	2H20	1H21	2H21
Additions	BCP BEAUTY CENTEL TPIPP SAWAD WHA	BGRIM DELTA ~~GLOW~~ KTC RATCH TOA	GULF WHA	OSP SAWAD	VGI	BPP TTW	BAM COM7 DELTA	IRPC KCE STA STGT
Deletions	BLA DELTA ~~GLOW~~ RATCH SCCC TPIPL	BCP KCE PSH SAWAD TPIPP WHA	BEAUTY CBG	CENTEL SPRC	~~ROBINS~~	BANPU DELTA	BPP IRPC WHA	AWC BAM TOA VGI

4.2 Variables

Following numerous studies related to abnormal returns as shown in Table 2, the details of all variables considered in this research and how they are constructed are presented as follows:

(i) Abnormal return (AR)

The abnormal return is computed based on the Market Adjusted Model (Lynch and Mendenhall, 1997; Barontini and Rigamonti, 2000).

$$AR_i = R_i - R_m$$

where AR_i represents abnormal return for stock i on announcement date

R_i represents actual return for stock i on announcement date

R_m represents SET50 index return on announcement date

Following Kassim et al. (2017), the stock return and market return are computed by:

$$R_i = \ln(\frac{P_{i,t}}{P_{i,t-1}})$$

where $P_{i,t}$ represents closing price for stock i on announcement date

$P_{i,t-1}$ represents closing price for stock i on the date before announcement

$$R_m = \ln(\frac{P_{m,t}}{P_{m,t-1}})$$

where $P_{m,t}$ represents SET50 index level on announcement date

$P_{m,t-1}$ represents SET50 index level on the date before announcement

Cumulative abnormal return (CAR)

According to the model of Kassim et al. (2017), it is computed as follows:

$$CAR_i = \sum_{t=t_1}^{t=t_2} AR_i$$

where CAR_i represents cumulative abnormal return for stock i

AR_i represents abnormal return for stock i on announcement date

(ii) Changes in institutional ownership (ΔIO)[1]

It is computed following Pruitt and Wei (1989), who initially examined the effect of institutional ownership.

$$\Delta IO_i = IO_{i,t} - IO_{i,t-1}$$

where ΔIO_i represents changes in institutional ownership for stock i

$IO_{i,t}$ represents institutional ownership for stock i after announcement date

$IO_{i,t-1}$ represents institutional ownership for stock i before announcement date

$$IO = \frac{Total\ ownership\ held\ by\ institutional\ investors}{Total\ number\ of\ outstanding\ shares}$$

(iii) Deviation of stock P/E from SET50 P/E (P/E_Dev)[2]

$$P/E\_Dev_i = P/E_i - P/E_m$$

where P/E_i represents P/E for stock i on announcement date

P/E_m represents P/E for SET50 index on announcement date[3]

[1] Data for institutional ownership is available on a monthly basis.

[2] Refer to trailing price-to-earnings ratio.

[3] SET50 P/E is downloaded from Datastream. It is derived by dividing the total market value of an index by the total earnings, thus providing an earnings-weighted average of PERs of the constituents.

$$P/E_i = \frac{Price_i}{EPS_i}$$

where $Price_i$ represents closing price for stock i on announcement date

EPS_i represents earnings per share for stock i on announcement date

$$P/E_m = \frac{\sum(Price_i * N_i)}{\sum(EPS_i * N_i)}$$

where $Price_i$ represents closing price for stock i on announcement date

EPS_i represents earnings per share for stock i on announcement date

N_i represents number of shares in issue for stock i on announcement date

(iv) Firm age (Age)

The age of the firm is measured as the number of months since the firm has been incorporated.

(v) Firm size $(Size)$

Market capitalization of a given stock is used as a proxy for its size. In this study, the firm size is measured on announcement date.

(vi) Debt-to-assets ratio (DTA)

For the capital structure, debt-to-assets ratio of each company is calculated as debt divided by assets on announcement date.

(vii) Stock return volatility (Vol)

According to Ahluwalia et al. (2020)'s volatility construction, it is computed based on historical daily return.

$$Vol_i = \sqrt{\sum_{t=1}^{k} \frac{(R_i - \bar{R})^2}{N-1}}$$

where R_i represents actual return for stock i on announcement date

$\bar{R}$ represents average return for stock i

N represents number of observations

k represents number of trading days in a previous month

Table 2. Variable review.

Variable	Researches
Institutional ownership (IO)	Pruitt and Wei (1989); Chan et al. (2013); Ahluwalia et al. (2020)
Deviation of stock P/E from SET50 P/E (P/E_Dev)	Created by author
Firm age (Age)	Gompers and Metrick (2001); Chen et al. (2013); Ahluwalia et al. (2020)
Firm size (Size)	Chen et al. (2003); Chen et al. (2013); Thuy et al. (2019); Ahluwalia et al. (2020)
Debt-to-assets ratio (DTA)	Thuy et al. (2019)
Stock return volatility (Vol)	Ahluwalia et al. (2020)

4.3 Methodology

As market reactions to the announcement of index inclusion and exclusion would result in different directions; inclusion leads to positive abnormal returns while

exclusion leads to negative abnormal returns, the sample is classified into stock additions and stock deletions. Then, the observations are tested separately according to their groups.

4.3.1 Descriptive statistics

Before employing the models to study the impact of institutional ownership and valuation on stock price, the descriptive statistics of abnormal return and other variables on the announcement date are presented. However, there is a concern that the effects from events of index revision happen for a period, not just on the announcement date. Thus, this research also reports the data statistics of cumulative abnormal return with the event window of (-5,5), which is 5 trading days before and after the announcement date.

4.3.2 Determinants of abnormal returns

The two determinants of abnormal returns considered in this research projects are institutional ownership and valuation. Firstly, this paper examines the impact of institutional ownership on stock price around SET50 index inclusion and exclusion with the following two equations:

$$AR\_inclusion_i = \alpha + \beta_1 \Delta IO_i + \beta_2 Log(Age)_i + \beta_3 Log(Size)_i + \beta_4 DTA_i + \beta_5 Vol_i + \varepsilon_i \quad (1.1)$$

$$AR\_exclusion_i = \alpha + \beta_1 \Delta IO_i + \beta_2 Log(Age)_i + \beta_3 Log(Size)_i + \beta_4 DTA_i + \beta_5 Vol_i + \varepsilon_i \quad (1.2)$$

where abnormal return (AR) is dependent variable and changes in institutional ownership (ΔIO) is independent variable. To control for other factors which could affect the abnormal returns, variables of natural logarithm of firm age $(Log(Age))$,

natural logarithm of firm size $(Log(Size))$, debt-to-assets ratio (DTA), and stock return volatility (Vol) are employed.

Based on literature review, the sign for the coefficient of ΔIO variable, or β_1, is expected to be positive surrounding the events of index inclusion and exclusion. The companies added to SET50 index should result in higher institutional holdings and subsequently exhibit higher share prices. In contrast, the deleted companies should experience negative price response following the lower ownership of institutional investors.

Secondly, to investigate the impact of valuation on stock price around SET50 index inclusion and exclusion, the regression models are presented as follows:

$$AR\_inclusion_i = \alpha + \beta_1 P/E\_Dev_i + \beta_2 Log(Age)_i + \beta_3 Log(Size)_i + \beta_4 DTA_i + \beta_5 Vol_i + \varepsilon_i \quad (2.1)$$

$$AR\_exclusion_i = \alpha + \beta_1 P/E\_Dev_i + \beta_2 Log(Age)_i + \beta_3 Log(Size)_i + \beta_4 DTA_i + \beta_5 Vol_i + \varepsilon_i \quad (2.2)$$

where abnormal return (AR) is dependent variable and deviation of stock P/E from SET50 P/E (P/E_Dev) is independent variable. Several control variables are natural logarithm of firm age $(Log(Age))$, natural logarithm of firm size $(Log(Size))$, debt-to-assets ratio (DTA), and stock return volatility (Vol).

From reviewing many papers about stock valuation and abnormal returns, I expect a negative coefficient for P/E_Dev variable, or β_1. The companies with negative P/E deviation are perceived to be underpriced by investors. Once SET announces that they are going to be added to the index list, they should experience higher positive returns compared to overpriced companies. In case of exclusion, those companies should in turn experience lesser negative abnormal returns. For the expensive stocks (stock P/E

is more than SET50 P/E), they should generate lower positive returns for additions and higher negative returns for deletions.

Furthermore, institutional ownership does not represent only passive funds, but also the active funds. Since it is widely known that there are price effects associated with the announcement of changes in index constituents, active funds could take actions to reap benefit from those events. For their consideration to make investment decisions, stock valuation should be taken into account. Thus, percentage of institutional holdings might depend on perception about the value of stocks. This study conducted an additional analysis by adding an interaction term between institutional ownership and valuation. The models to study statistical association between two explanatory variables are:

$$AR\_inclusion_i = \alpha + \beta_1 \Delta IO_i + \beta_2 P/E\_Dev_i + \beta_3(\Delta IO_i)(P/E\_Dev_i) + \beta_4 Log(Age)_i + \beta_5 Log(Size)_i + \beta_6 DTA_i + \beta_7 Vol_i + \varepsilon_i \quad (3.1)$$

$$AR\_exclusion_i = \alpha + \beta_1 \Delta IO_i + \beta_2 P/E\_Dev_i + \beta_3(\Delta IO_i)(P/E\_Dev_i) + \beta_4 MktRet_i + \beta_5 Log(Age)_i + \beta_6 DTA_i + \beta_7 Vol_i + \varepsilon_i \quad (3.2)$$

According to the above two equations, the coefficient of the interaction term between institutional ownership and valuation, or β_3, is expected to be negative. The cheaper the stocks, the greater the likelihood of getting returns, and the more the attractiveness from investors. Hence, active funds are more interested in undervalued stocks (or stocks with negative P/E deviation), resulting in a negative relationship between P/E deviation and institutional holdings. On the other hand, overvalued stocks (or stocks with positive P/E deviation) would gain less attention from institutional investors, specifically the active funds.

5. Results and Findings

5.1 Sample summary and descriptive statistics

Table 3 reports the descriptive statistics for all the variables considered in this study, regarding the announcement of SET50 index inclusion and exclusion over the period of 2014 - 2021. The data is classified into two panels: Panel A presents the sample of added companies and Panel B presents the sample of deleted companies. There are 55 observations for each panel. Comparing statistics across two panels, the mean and median of abnormal return are positive for stock additions (1.06% and 1.08% respectively) while they are negative for stock deletions (-1.23% and -1.02% respectively), supporting the evidence from previous research (Harris and Gurel, 1986; Shleifer, 1986; Dhillon and Johnson, 1991; Amihud and Mendelson, 1986). For the changes in institutional ownership, the percentage ownership of institutional investors, on average, increases by 0.28% for the included stocks whereas it is opposite for the excluded stocks, with a decrease of 0.34%. These results correspond with many studies conducted in other countries (Pruitt and Wei, 1986; Chen 2004; Biktimirov et al., 2004; Shankar and Miller, 2006; Ahluwalia et al., 2020). The mean deviation of stock P/E from SET50 P/E for both panels are not much different, 9.24X for inclusions and 8.08X for exclusions. Moreover, the data descriptive for control variables, which are firm age, firm size, debt-to-assets ratio, and stock return volatility, varies very little across panels.

Table 3. Data descriptive for all the variables**.**

	Mean	Median	Std. Dev.	Minimum	Maximum
Panel A: Stock Additions					
Number of observations = 55					
AR	0.0106	0.0108	0.0172	-0.0166	0.0610
ΔIO	0.0028	0.0012	0.0112	-0.0228	0.0381
P/E_Dev	9.2433	7.2000	17.2612	-21.5100	48.6900
Log(Age)	1.8327	1.8733	0.6495	0.7396	2.7042
Log(Size)	4.8229	4.7853	0.1898	4.5769	5.6474
DTA	0.3043	0.2799	0.2083	0.0000	0.6943
Vol	2.5314	0.8358	9.1224	0.0520	66.9381
Panel B: Stock Deletions					
Number of observations = 55					
AR	-0.0123	-0.0102	0.0229	-0.0650	0.0442
ΔIO	-0.0034	-0.0012	0.0185	-0.1149	0.0168
P/E_Dev	8.0804	2.1000	143.6700	-26.6100	25.7122
Log(Age)	2.1119	2.3662	2.6886	1.1349	0.4645
Log(Size)	4.6978	4.6574	5.4013	4.3673	0.1963
DTA	0.3351	0.2867	2.7500	0.0000	0.3841
Vol	1.3870	0.7841	20.2612	0.0354	2.8264

This table presents the sample's descriptive statistics for the SET50 index inclusion and exclusion over the period of 2014 – 2021.

5.2 Analysis of SET50 index inclusion and exclusion announcement

Before conducting an analysis of SET50 index inclusion and exclusion announcement, this paper studies the distribution of daily abnormal returns and cumulative abnormal returns from 5 days before to 5 days after the announcement. As observations are the stocks entering or leaving the SET50 index, they normally have different characteristics. From the histograms illustrated in Figure 1 – Figure 4, the distributions seem to be not normal. Jarque-Bera test is further conducted to verify the normality and the results indicate that most of the distributions are not normal.

Therefore, the Wilcoxon signed-rank method will be applied to find the median of abnormal returns and cumulative abnormal returns.

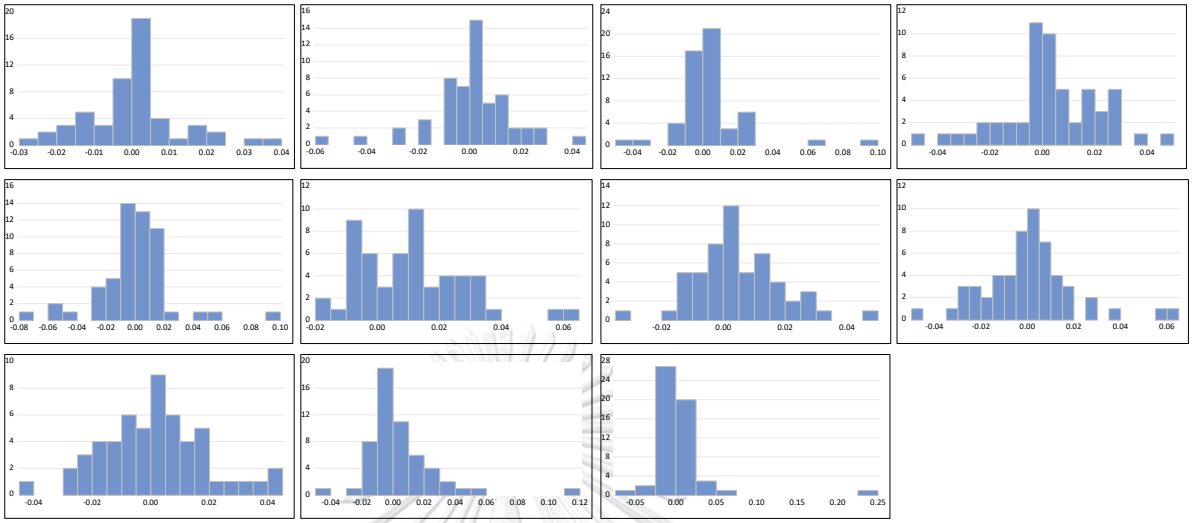

Figure 1. Distributions of abnormal returns surrounding the announcement of inclusions to the SET50 index.

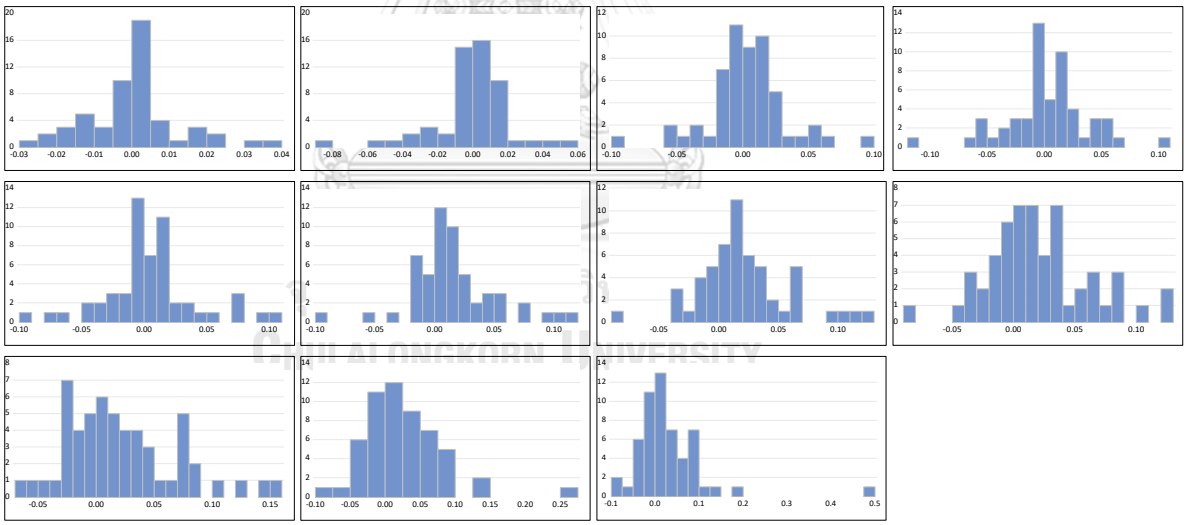

Figure 2. Distributions of cumulative abnormal returns surrounding the announcement of inclusions to the SET50 index.

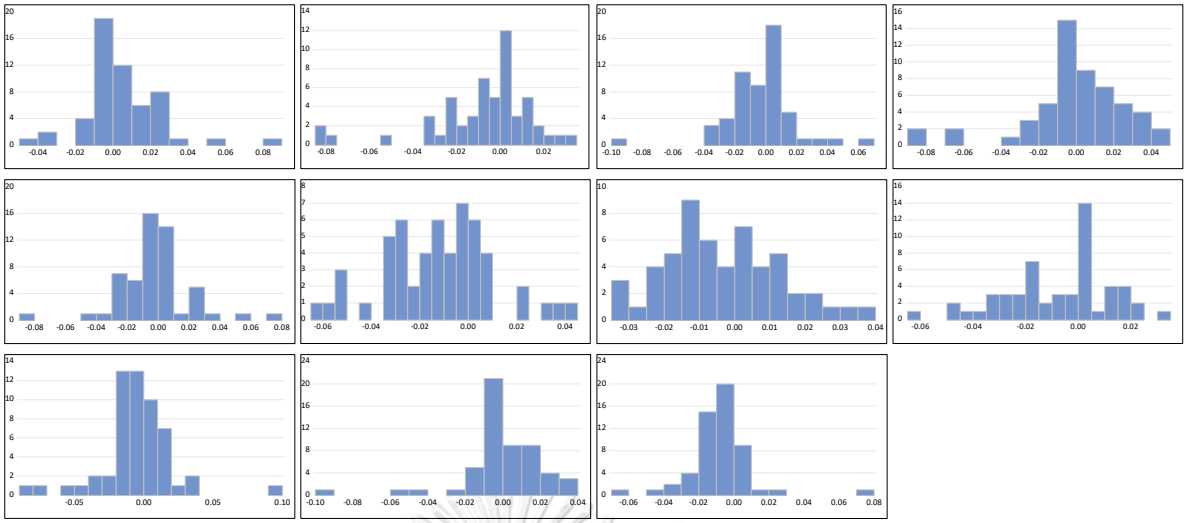

Figure 3. Distributions of abnormal returns surrounding the announcement of exclusions to the SET50 index.

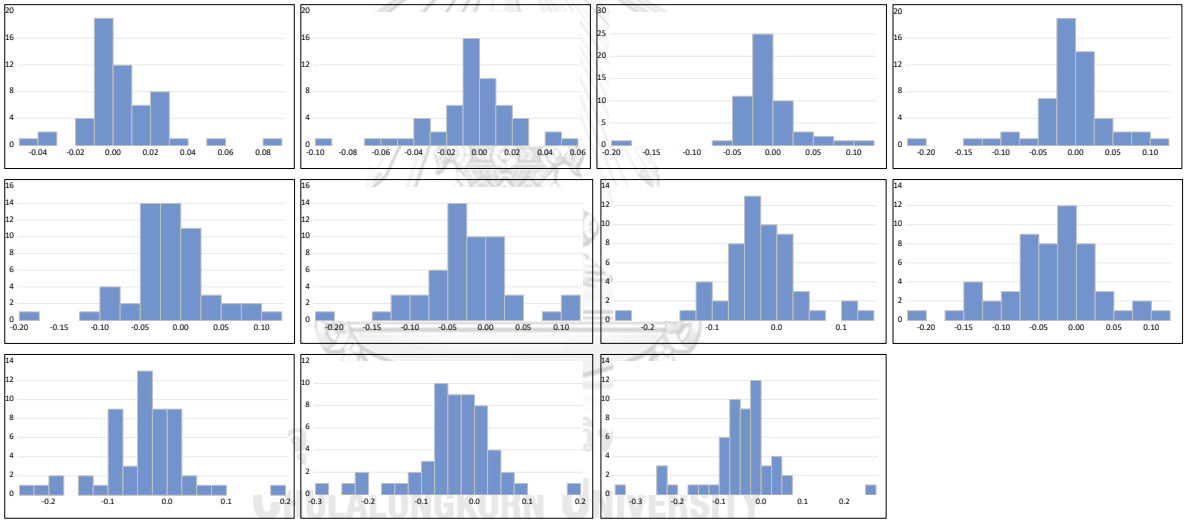

Figure 4. Distributions of cumulative abnormal returns surrounding the announcement of exclusions to the SET50 index.

5.2.1 Abnormal returns and cumulative abnormal returns surrounding SET50 index inclusions and exclusions

Table 4 reports the results of examining how stock price responds to index rebalancing events. It presents the median of daily abnormal returns and cumulative abnormal returns for all inclusions and exclusions, with the event period of 5 days before the announcement to 5 days after the announcement. For SET50 index

inclusion, the abnormal return on the announcement date (event day 0) is 1.08% and the cumulative abnormal return with (-5,0) event window is 1.09%. Both returns are statistically significant at the 1% level. In part of exclusion effect, the abnormal return on the announcement date and cumulative abnormal return with event window of (-5,0) are -1.02% and -2.50% respectively, with statistically significant at the 1% level. Overall, significant abnormal returns for both stock additions and stock deletions are found on the announcement date, which is consistent with various mentioned studies.

Table 4. Abnormal returns and cumulative abnormal returns surrounding SET50 index inclusions and exclusions.

Day	Inclusion						Exclusion					
	AR		Wilcoxon Statistic	CAR		Wilcoxon Statistic	AR		Wilcoxon Statistic	CAR		Wilcoxon Statistic
-5	0.0000		0.3499	0.0000		0.7264	0.0000		1.3225	0.0000		1.3225
-4	0.0000		0.4675	0.0000		0.4362	-0.0024	**	2.2822	-0.0025		1.1065
-3	0.0000		0.4370	0.0011		0.3167	-0.0006	*	1.8308	-0.0112	**	2.4926
-2	0.0003		0.3310	0.0004		0.5270	-0.0002		0.3477	-0.0050		1.3531
-1	0.0007		1.3029	0.0041		0.3087	-0.0025		0.8672	-0.0122	**	2.0653
0	0.0108	***	3.9505	0.0109	***	0.0009	-0.0102	***	3.8249	-0.0250	***	3.2718
1	0.0023	**	2.1575	0.0131	***	0.0002	-0.0052		1.7134	-0.0297	***	3.5483
2	0.0011		0.0209	0.0152	***	0.0012	-0.0041	**	2.2330	-0.0255	***	3.8667
3	0.0010		0.3812	0.0112	***	0.0055	-0.0050		1.7888	-0.0330	***	4.1097
4	-0.0006		0.7667	0.0186	***	0.0021	-0.0033		0.3980	-0.0318	***	3.7578
5	-0.0022		0.0209	0.0179	***	0.0038	-0.0082	***	4.2940	-0.0433	***	4.4951

This table presents the median of abnormal returns and cumulative abnormal returns of SET50 index inclusions and exclusions during the period of 2014-2021. The daily abnormal return is the difference between stock actual return and SET50 index return. Wilcoxon Statistics test the null hypothesis that returns are insignificantly different from zero. Symbol ***, **, and * indicate level of significance at 1%, 5% and 10 % respectively.

Figure 5 shows the median of daily abnormal returns surrounding the announcement of inclusions to the SET50 index. From 5 days before the announcement to 3 days before the announcement, there is no abnormal return. The added stocks start to generate an abnormal return of 0.03% on the event day -2 (or 2 days before the announcement). One day later, they could exhibit a slightly higher return of 0.07%. The peak in abnormal return is on the day of announcement, which jumps from 0.07% to 1.08%. After announcement, abnormal returns are normalized and somewhat positive for 3 days, before they become negative. Figure 6 also shows that the cumulative abnormal return increases substantially on the announcement date. This indicates that the market could predict which stocks are going to be added to the list before SET announces it. Investors begin to buy those expected stocks early, driving stock prices up on the event day -2. However, the greatest inclusion effect is on the announcement date as some investors may wait for the publication. Moreover, the effect from index inclusion seems to be temporary, suggesting that capital market is quite efficient.

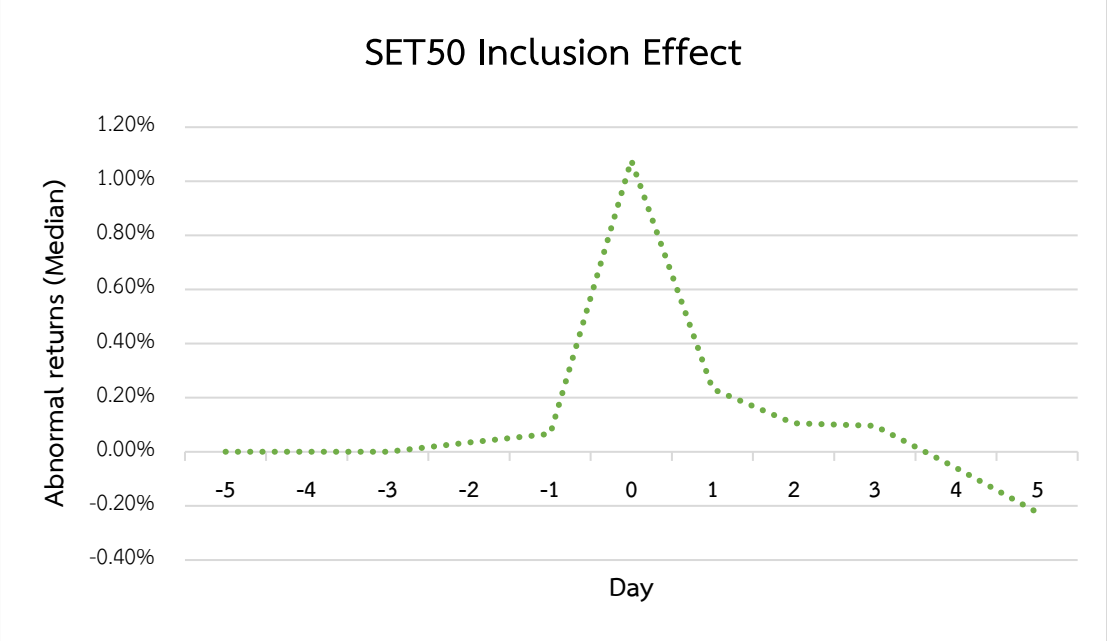

Figure 5. Abnormal returns surrounding the announcement of inclusions to the SET50 index.

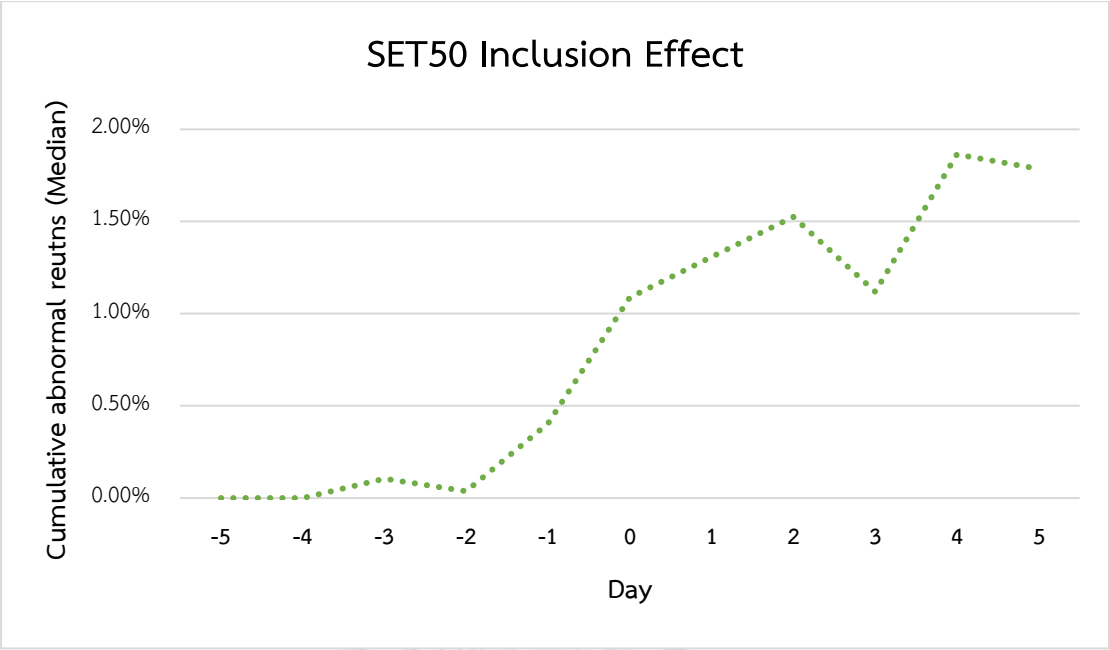

Figure 6. Cumulative abnormal returns surrounding the announcement of inclusions to the SET50 index.

The abnormal returns associated with the announcement of index exclusion are shown in Figure 7. Obviously, market reacts to stock deletions before the announcement of changes in index composition is published. The daily abnormal return becomes negative since 4 days before the announcement and it lasts until the end of this study's event period (5 days after the announcement). On the event day of announcement, the abnormal return dramatically drops to -1.02%. In addition, the abnormal returns after the announcement are still negative (but not as much as on the announcement date). Figure 8 shows that the deleted stocks' cumulative abnormal return consistently decreases and experiences a negative of 4.33% on 5 days after the announcement. This implies the underreaction phenomenon in behavioral finance. As investors underreacted to new information, the prices of deleted stocks persistently decrease after announcement. The exclusion response further indicates an inefficient market since there is no reversal effect.

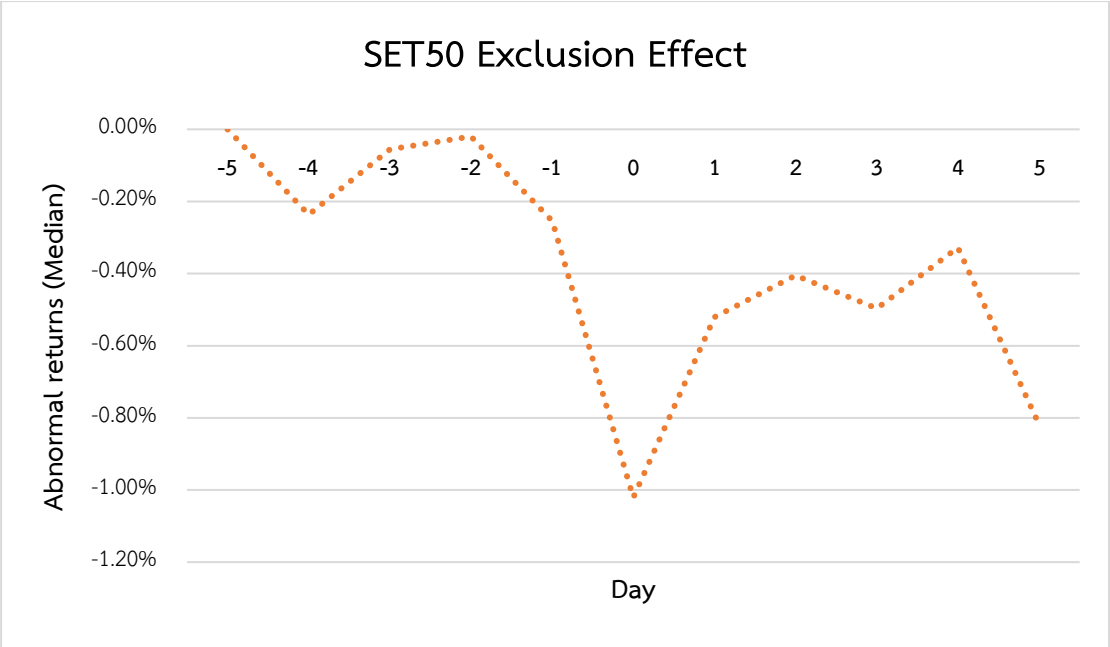

Figure 7. Abnormal returns surrounding the announcement of exclusions to the SET50 index.

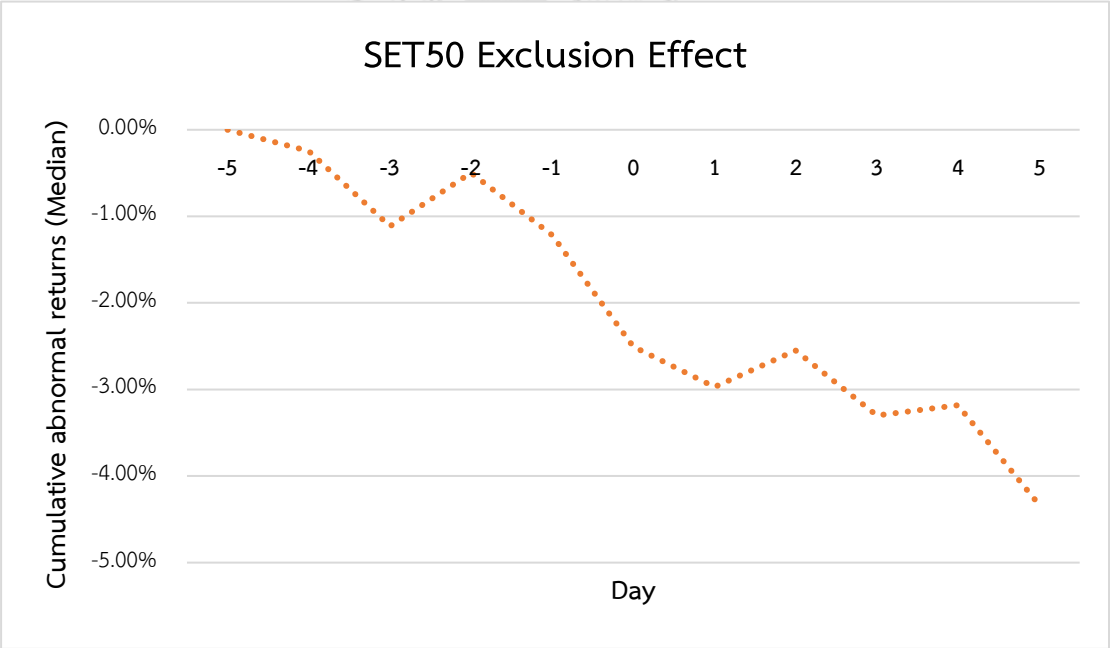

Figure 8. Cumulative abnormal returns surrounding the announcement of exclusions to the SET50 index.

Regarding the comparison of index inclusion and exclusion, there is an asymmetric price response. Price effects from exclusions are considerably stronger than from inclusions. As shown in Figure 6 and Figure 8, the cumulative abnormal return with event window of (-5,5) is 4.33% for deleted stocks while it is just 1.79% for added stocks. On top of that, companies added to the index exhibit a temporary increase in price while deleted companies exhibit a permanent price decline. Results are contradicted to the hypotheses of downward-sloping demand, information, and liquidity, which suggest symmetric effects. Nonetheless, these asymmetric effects could be explained by the theory of loss aversion. The loss (or negative returns) from stock deletions is more powerful than the gain (or positive returns) from stock additions.

5.2.2 Abnormal returns and institutional ownership

In this section, the 'institutional ownership' variable for inclusions and exclusions is analyzed. The data is divided into two sub-groups: higher institutional ownership stocks and lower institutional ownership stocks. Changes in institutional ownership is the percentage difference between institutional ownership after announcement and institutional ownership before announcement. Stocks with positive changes in institutional holdings are classified as *higher* whereas stocks with negative changes in institutional holdings are classified as *lower*. Then, the median of abnormal returns on announcement date and cumulative abnormal returns with the event window of (-5,5) are computed by the Wilcoxon signed-rank test.

According to SET50 inclusion effect as shown in Figure 9, there is a positive relation between returns, both abnormal returns and cumulative abnormal returns, and institutional ownership. More importantly, the higher institutional ownership stocks result in higher positive abnormal return and cumulative abnormal return compared to lower institutional ownership stocks. On the announcement date, the

abnormal returns for higher and lower groups are 1.09% and 0.98% correspondingly. Although abnormal returns of two sub-groups are somewhat similar, the cumulative abnormal returns (-5,5) have a large difference. The cumulative abnormal returns are 1.79% for higher institutional ownership stocks and only 0.13% for stocks with lower institutional holdings.

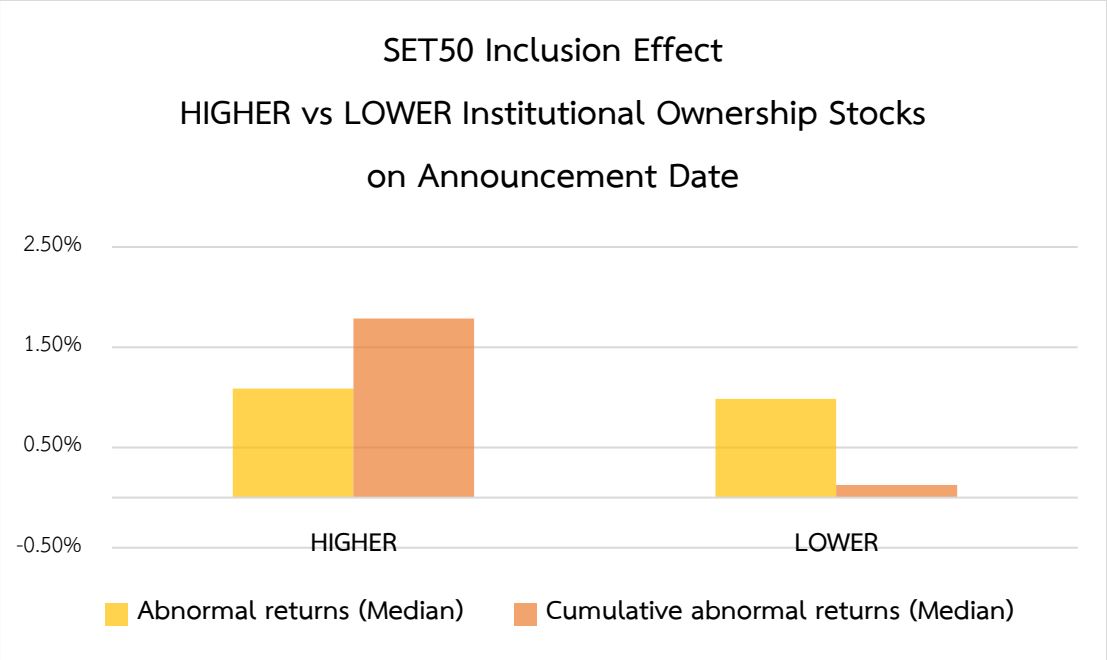

Figure 9. Abnormal returns and cumulative abnormal returns surrounding the announcement of inclusions to the SET50 index, Higher vs Lower institutional ownership.

Stock returns and institutional ownership for deleted stocks are positively correlated as reported in Figure 10. It is obvious that stocks with lower institutional holdings experience more negative abnormal return and cumulative abnormal return than the stocks with higher institutional ownership. The abnormal return and cumulative abnormal return for lower institutional ownership stocks are -1.95% and -2.27% respectively while they are -0.38% and -1.00% for higher institutional ownership stocks.

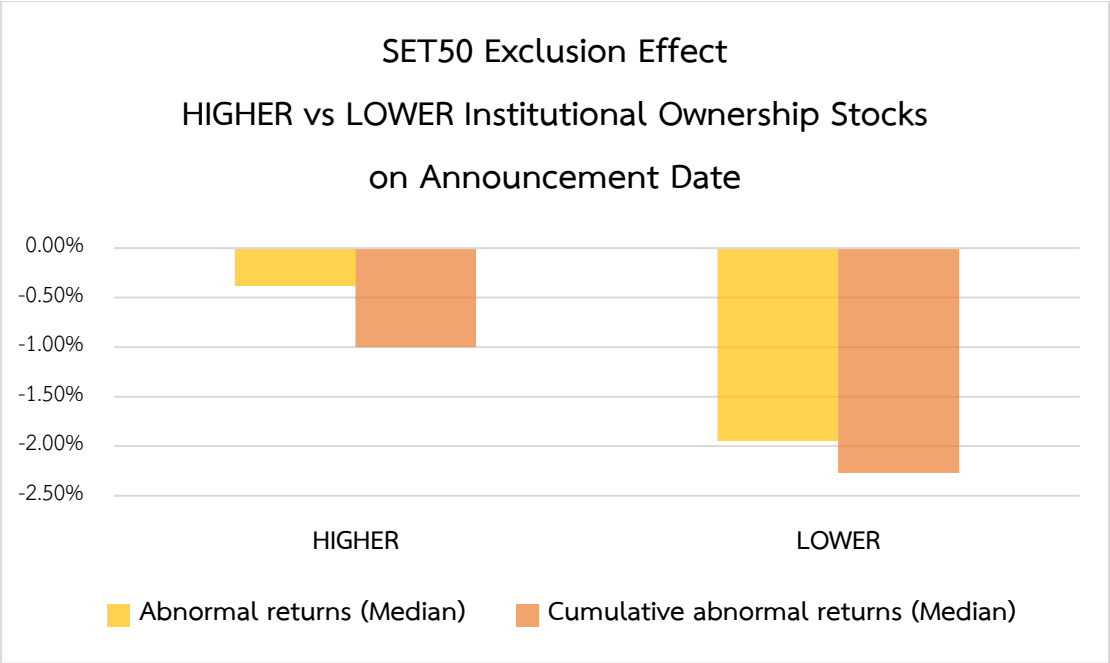

Figure 10. Abnormal returns and cumulative abnormal returns surrounding the announcement of exclusions to the SET50 index, Higher vs Lower institutional ownership.

In summary, the percentage of institutional investors could explain the magnitude of abnormal returns and cumulative abnormal returns in response to changes in the index list. For SET50 inclusion effect, higher institutional ownership stocks result in more positive returns than lower institutional ownership stocks. On the other hand, deleted stocks with lower institutional holdings exhibit more negative stock returns than higher sub-group surrounding the announcement of exclusions to SET50 index.

5.2.3 Abnormal returns and price-to-earnings

To get a sense of 'price-to-earnings', this paper conducts an additional analysis on price-to-earnings variable. All stock additions and stock deletions are categorized into undervalued stocks or overvalued stocks. If stock P/E is less than SET50 P/E (or negative deviation of stock P/E from SET50 P/E), it is classified as *undervalued* stock. A stock is classified as *overvalued* when its P/E is more than SET50 P/E (or positive

deviation of stock P/E from SET50 P/E). Afterward, the median of abnormal returns on announcement date and cumulative abnormal returns with the event window of (-5,5) are computed by the Wilcoxon signed-rank test.

The result in Figure 11 shows that undervalued stocks experience much higher positive abnormal returns than overvalued stocks associated with SET50 index inclusion. The abnormal return of undervalued stocks is 1.15% while the abnormal return of overvalued stocks is just 0.47%. For the cumulative abnormal returns, they are 1.21% for undervalued stocks and 0.10% for overvalued stocks. This indicates that underpriced companies could generate stock returns more than double of the overpriced ones.

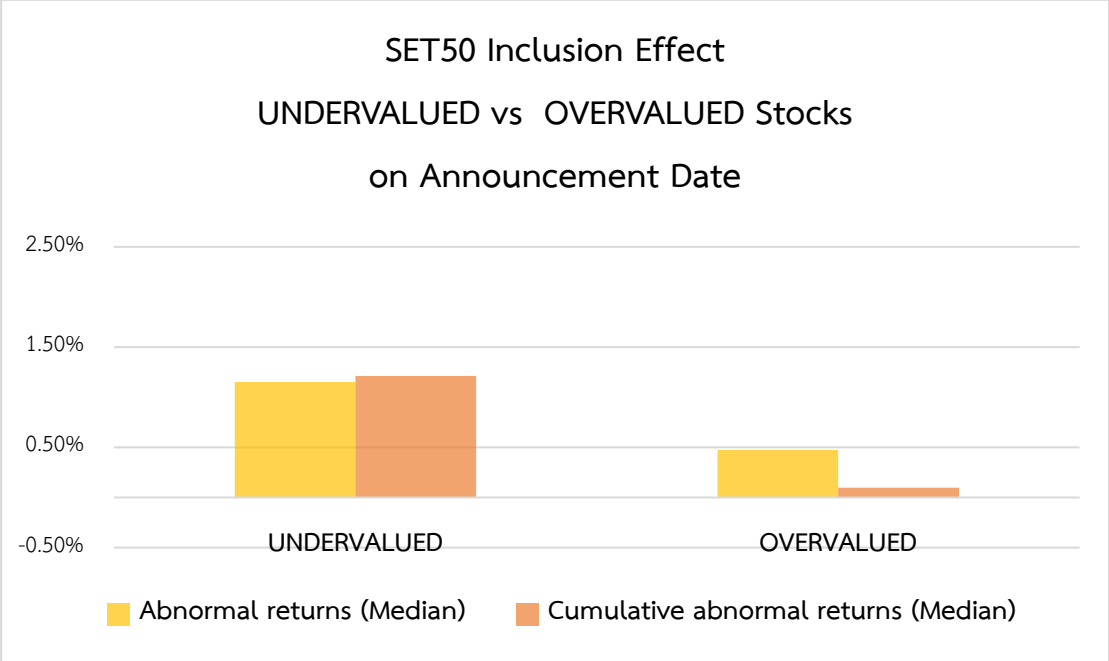

Figure 11. Abnormal returns and cumulative abnormal returns surrounding the announcement of inclusions to the SET50 index, Undervalued vs Overvalued stocks.

In case of exclusion as shown in Figure 12, undervalued stocks exhibit lesser negative abnormal return with -1.26% and cumulative abnormal return with -1.46% compared to overvalued stocks, which have abnormal return of -1.56% and cumulative abnormal return of -2.29%. This result documented that firms deleted from SET50 index experience lesser negative abnormal returns when they are undervalued, compared to overvalued firms.

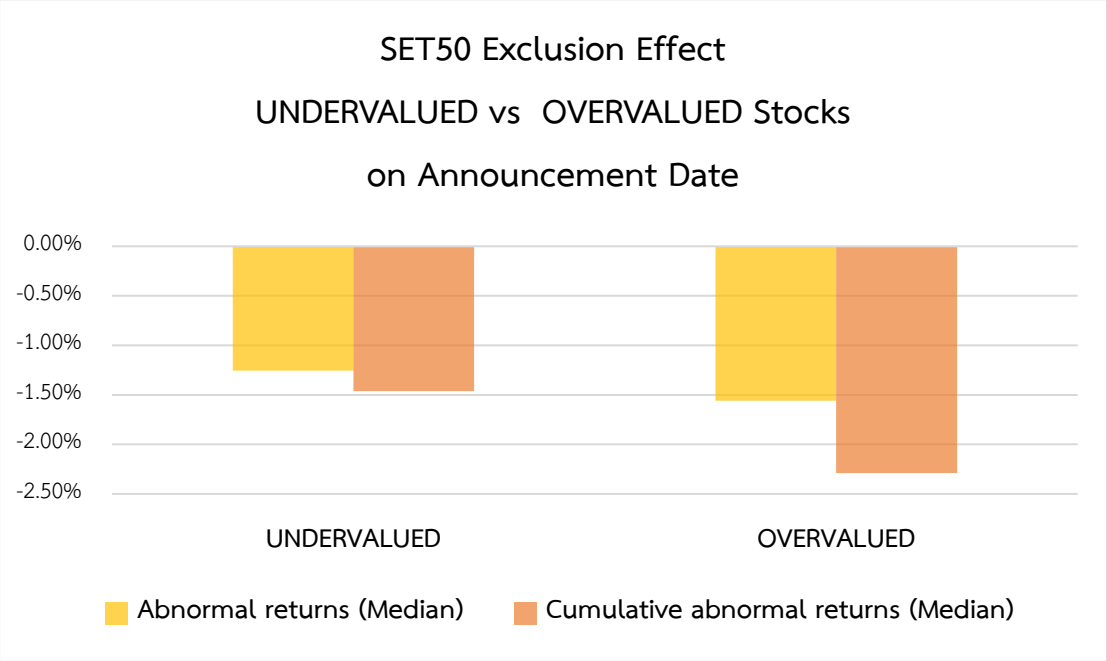

Figure 12. Abnormal returns and cumulative abnormal returns surrounding the announcement of exclusions to the SET50 index, Undervalued vs Overvalued stocks.

Overall, stock valuation, which is measured by price-to-earnings ratio, is another characteristic that could explain the magnitude of stock returns following the changes in index composition. The cheap stocks generate higher positive returns for inclusions and lower negative returns for exclusions. In contrast, expensive stocks generate lesser positive returns when they are added to SET50 index and more negative returns when they are deleted from the index.

5.3 Regression results

5.3.1 Impact of institutional ownership on stock price

Table 5. Stock returns and institutional ownership.

Parameter	Inclusion		Exclusion	
	AR	t-Stat	AR	t-Stat
Intercept	-0.0784	-1.0515	0.087198	1.139103
ΔIO	-0.1116	-0.5303	0.399150 **	2.194092
Log(Age)	0.0060	1.6154	-0.002483	-0.355237
Log(Size)	0.0167	1.0801	-0.019367	-1.202014
DTA	-0.0001	-0.6853	-7.84E-05	-0.95731
Vol	0.0000	0.0617	0.000624	0.535654
R-squared	0.1103		0.1581	
Adjusted R-squared	0.0195		0.0722	
Observations	55		55	

This table summarizes the results of regressions for SET50 index inclusion and exclusion. The dependent variable is abnormal return (AR) which is the difference between stock actual return and SET50 index return. The independent variable is changes in institutional ownership before and after the announcement (ΔIO). The control variables are firm age (Log(Age)), firm size (Log(Size)), debt-to-assets ratio (DTA), and stock return volatility (Vol). Symbol ***, **, and * indicate level of significance at 1%, 5% and 10 % respectively.

Table 5 presents the results for the impact of institutional ownership on stock price surrounding the changes in index composition events. Based on previous studies, firms added to the index should experience higher institutional holdings and positive abnormal returns while the deleted firms experience lower institutional holdings and negative returns (Pruitt and Wei, 1986; Chen 2004; Biktimirov et al., 2004; Shankar and Miller, 2006). Unfortunately, the results show that coefficient of institutional ownership is insignificant for stocks entering SET50 index but significantly positive for deleted stocks. This means that the percentage ownership of institutional investors and abnormal return are positively correlated in case of exclusions but not for inclusions. Portfolio rebalancing strategies might be the reason for different results. As passive investment or indexing seeks to replicate an index return, fund managers have to

adjust their portfolio weights towards the tracked index. The process of selling deleted stocks typically happen promptly, in order to follow new index composition or to reserve money for new added stocks. This results in lower institutional holdings and returns on the event of announcement. In contrast, there might be a lag time for fund managers to buy the added stocks as they are allowed to trade before, trade after or trade as close as the rebalancing point. Hence, the impact of institutional holdings on stock price following index inclusion does not occur on the announcement date.

5.3.2 Impact of valuation on stock price

Table 6. Stock returns and P/E deviation.

Parameter	Inclusion		Exclusion	
	AR	t-Stat	AR	t-Stat
Intercept	-0.0796	0.0749	0.1163	1.4592
P/E_Dev	0.0000	0.0001	0.0000	-0.1629
Log(Age)	0.0061	0.0038	-0.0036	-0.4899
Log(Size)	0.0169	0.0156	-0.0254	-1.5137
DTA	-0.0001	0.0001	-0.0001	-0.9922
Vol	0.0000	0.0003	0.0009	0.7302
R-squared	0.1062		0.0759	
Adjusted R-squared	0.0149		-0.0184	
Observations	55		55	

This table summarizes the results of regressions for SET50 index inclusion and exclusion. The dependent variable is abnormal return (AR) which is the difference between stock actual return and SET50 index return. The independent variable is deviation of stock P/E from SET50 P/E (P/E_Dev). The control variables are firm age (Log(Age)), firm size (Log(Size)), debt-to-assets ratio (DTA), and stock return volatility (Vol). Symbol ***, **, and * indicate level of significance at 1%, 5% and 10 % respectively.

Table 6 reports the results for the impact of valuation on stock price associated with changes in index composition events. The coefficients of P/E deviation variable

for both inclusions and exclusions are insignificant at all levels on the announcement date, rejecting hypothesis 3 and 4. This indicates that stock valuation, which is price-to-earnings indicator in this case, has no effect on stock price in response to the announcement of index inclusion and exclusion. Although price-to-earnings ratio and stock returns are negatively correlated in general (Basu, 1977; Goodman and Peavy, 1983; Akhtar, 2021), the estimation results show that it is not true for the case of index rebalancing events. The possible reason is that majority of investors who participate in index rebalancing events are index funds. To remain in balance with tracked index, passive investment portfolio managers must trade the added or deleted stocks, whether they are underpriced or overpriced. Therefore, the perception on stock valuation does not affect stock returns around index inclusion and exclusion.

5.3.3 Statistical association between institutional ownership and valuation

Table 7. Institutional ownership and P/E deviation.

Parameter	Inclusion		Exclusion	
	AR	t-Stat	AR	t-Stat

Intercept	-0.0625		-0.8153	0.0996		1.2379
ΔIO	0.0896		0.3175	0.5921	*	1.7361
P/E_Dev	0.0000		0.0729	0.0000		-0.3299
(ΔIO)(P/E_Dev)	-0.0163		-1.0740	-0.0262		-0.6752
Log(Age)	0.0067	*	1.7146	-0.0026		-0.3592
Log(Size)	0.0131		0.8164	-0.0221		-1.3039
DTA	-0.0001		-0.5366	-0.0001		-0.8516
Vol	0.0000		0.1769	0.0007		0.5740
R-squared	0.1320			0.1662		
Adjusted R-squared	0.0027			0.0421		
Observations	55			55		

This table summarizes the results of regressions for SET50 index inclusion and exclusion. The dependent variable is abnormal return (AR) which is the difference between stock actual return and SET50 index return. Main variable of interest is interaction term between changes in institutional ownership and deviation of stock P/E from SET50 P/E (ΔIO)(P/E_Dev). Other variables are changes in institutional ownership (ΔIO), deviation of stock P/E from SET50 P/E (P/E_Dev), firm age (Log(Age)), firm size (Log(Size)), debt-to-assets ratio (DTA), and stock return volatility (Vol). Symbol ***, **, and * indicate level of significance at 1%, 5% and 10 % respectively.

Table 7 summarizes the results of statistical association between institutional ownership and valuation, focusing on changes in SET50 index list. For both index inclusion and exclusion events, the coefficient of the interaction term between two variables is insignificant. This implies that percentage ownership of institutional investors and stock valuation are not related. As discuss earlier, active investors are not much involved in index rebalancing events. Specifically, institutional ownership is dominated by index funds. As the portion of active investors represents only a small part of institutional ownership, the impact of stock valuation on institutional holdings is not significantly measurable.

6. Summary and Conclusion

The objective of this study is to investigate the price effects associated with changes in SET50 index list, both inclusion and exclusion, and the role of institutional ownership and stock valuation over the period of 2014 - 2021. This paper firstly

examines how stock prices respond to index rebalancing events. Significant abnormal returns on the announcement date and cumulative abnormal returns with the event window of (-5,5) for both inclusions and exclusions are found. Besides, there is an asymmetric price response to index additions and index deletions. This paper further performs two univariate analyses by classifying observations into two sub-groups. The first one is higher versus lower institutional ownership. I observe that added stocks with higher institutional ownership result in more positive returns than lower institutional ownership stocks. On the other hand, deleted stocks with lower institutional holdings exhibit more negative stock returns than the higher sub-group. Another univariate analysis is undervalued versus overvalued stocks. The evidence shows that cheap stocks generate higher positive returns for inclusions and lower negative returns for exclusions. In contrast, expensive stocks generate lesser positive (more negative) returns when they are added to (deleted from) SET50 index. The last part is the regression results from three models: impact of institutional ownership on stock price, impact of valuation on stock price, and statistical association between institutional ownership and valuation. From the first model, the percentage ownership of institutional investors and abnormal return are positively correlated in case of exclusions but not for inclusions (though insignificant). The outcome also reports insignificant relation between stock valuation and abnormal return around SET50 index inclusion and exclusion. Lastly, institutional holdings and stock valuation, which is represented by price-to-earnings ratio, are not related.

The limitation of this study is the data availability of institutional ownership. As there is no daily percentage of institutional holdings, the monthly changes in institutional ownership is conducted. Thus, this paper might not be able to measure the exact impact of institutional ownership on stock price from events of index revision. Another drawback is that an abnormal return is computed based on the Market Adjusted Model. The future studies should apply the Capital Asset Pricing

Model (CAPM) to derive each stock's expected return and use them, rather than market return, to compute an abnormal return. The second suggestion is that the lags of changes in institutional ownership and deviation of stock P/E from SET50 P/E might be used instead of contemporaneous variables. Furthermore, Morgan Stanley Capital International (MSCI) index might be more appropriate to study the institutional ownership effect because most of institutional investors use it as a benchmark to measure their return.

REFERENCES

Ahluwalia, E., et al. (2020). "Institutional ownership, investor recognition and stock performance around index rebalancing: Evidence from Indian market." Journal of Multinational Financial Management 55: 100615.

Akhtar, T. (2021). "Market multiples and stock returns among emerging and developed financial markets." Borsa Istanbul Review 21(1): 44-56.

Amihud, Y. and H. Mendelson (1986). "Asset pricing and the bid-ask spread." Journal of Financial Economics 17(2): 223-249.

Basu, S. (1977). "Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis." The Journal of Finance 32(3): 663-682.

Biktimirov, E. N., et al. (2004). "Do Demand Curves for Small Stocks Slope Down?" Journal of Financial Research 27(2): 161-178.

Bildersee, J. S., et al. (1990). "The international price-earnings ratio phenomenon: A partial explanation." Japan and the World Economy 2(3): 263-282.

Bird, R. and J. Whitaker (2016). The Performance of Value and Momentum Investment Portfolios: Recent Experience in the Major European Markets. Asset Management: Portfolio Construction, Performance and Returns. S. Satchell. Cham, Springer International Publishing: 127-163.

Cai, F. and L. Zheng (2004). "Institutional trading and stock returns." Finance Research Letters 1(3): 178-189.

Campbell, J. Y., et al. (2009). "Caught on tape: Institutional trading, stock returns, and earnings announcements." Journal of Financial Economics 92(1): 66-91.

Carlo, C., et al. (1993). "International Value and Growth Stock Returns." Financial Analysts Journal 49(1): 27-36.

Chan, K., et al. (2013). "A comprehensive long-term analysis of S&P 500 index additions and deletions." Journal of Banking & Finance 37(12): 4920-4930.

Chen, H., et al. (2004). "The Price Response to S&P 500 Index Additions and Deletions: Evidence of Asymmetry and a New Explanation." The Journal of Finance 59(4): 1901-1929.

Chen, Y., et al. (2013). "Stock price response to S&P 500 index inclusions: Do options listings and options trading volume matter?" Journal of International Financial Markets, Institutions and Money 23: 379-401.

Denis, D. K., et al. (2003). "S&P 500 Index Additions and Earnings Expectations." The Journal of Finance 58(5): 1821-1840.

Dhillon, U. and H. Johnson (1991). "Changes in the Standard and Poor's 500 List." The Journal of Business 64(1): 75-85.

Gompers, P. A. and A. Metrick (2001). "Institutional Investors and Equity Prices." The Quarterly Journal of Economics 116(1): 229-259.

Goodman, D. A. and J. W. Peavy (1983). "Industry Relative Price-Earnings Ratios as Indicators of Investment Returns." Financial Analysts Journal 39(4): 60-66.

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.

Jones, S. L., et al. (1999). Herding and Feedback Trading by Different Types of Institutions and the Effects on Stock Prices.

McMillan, D. G. (2019). "Stock return predictability: Using the cyclical component of the price ratio." Research in International Business and Finance 48: 228-242.

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

Nawal Seif, K., et al. (2017). "Impact of Inclusion into and Exclusion from the Shariah Index on a Stock Price and Trading Volume: An Event Study Approach." International Journal of Economics and Financial Issues 7(2): 40-51.

Nicholson, S. F. (1960). "Price-Earnings Ratios." Financial Analysts Journal 16(4): 43-45.

Nofsinger, J. R. and R. W. Sias (1999). "Herding and Feedback Trading by Institutional and Individual Investors." The Journal of Finance 54(6): 2263-2295.

Penman, S. H. (1992). "Return to Fundamentals." Journal of Accounting, Auditing & Finance 7(4): 465-483.

Pruitt, S. W. and K. C. J. Wei (1989). "Institutional Ownership and Changes in the S&P 500." The Journal of Finance 44(2): 509-513.

Shankar, S. and J. Miller (2006). "Market Reaction to Changes in the S&P SmallCap 600 Index." The Financial Review 41: 339-360.

Shleifer, A. (1986). "Do Demand Curves for Stocks Slope Down?" The Journal of Finance 41(3): 579-590.

Sias, Richard W., et al. (2006). "Changes in Institutional Ownership and Stock Returns: Assessment and Methodology." The Journal of Business 79(6): 2869-2910.

Thuy, V., et al. (2019). "The impact of microeconomic factors on the abnormal return of listed stocks in Vietnam." Management Science Letters 9: 1863-1874.

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