INVESTOR TYPE EFFECT TO VOLATILITY-VOLUME RELATIONSHIP: SET50 INDEX FUTURES

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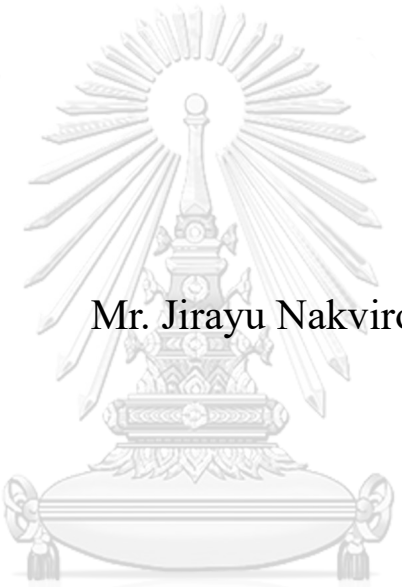

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ประเภทนักลงทุนที่มีผลต่อความสัมพันธ์ระหว่างความผันผวนและปริมาณ: ดัชนี SET50 ฟิวเจอร์ส

นายจิรายุ นาควิโรจน์

สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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Field of Study	Finance
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จิรายุ นาควิโรจน์ : ประเภทนักลงทุนที่มีผลต่อความสัมพันธ์ระหว่างความผันผวนและปริมาณ: ดัชนี SET50 ฟิวเจอร์ส. (INVESTOR TYPE EFFECT TO VOLATILITY-VOLUME RELATIONSHIP: SET50 INDEX FUTURES) อ.ที่ปรึกษาหลัก : ดร. ธนวิต แซ่ซือ

การศึกษานี้สำรวจปฏิสัมพันธ์ที่ระหว่างประเภทต่างๆ ของผู้ค้าและผลกระทบที่ตามมาต่อความสัมพันธ์ระหว่างความผันผวนและปริมาณการซื้อขายในตลาด SET50 Index Futures ของไทย การศึกษาจำแนกผู้ค้าออกเป็นนักลงทุนสถาบัน นักลงทุนรายย่อย และนักลงทุนต่างชาติ โดยตรวจสอบพฤติกรรมการซื้อขายและการเข้าถึงข้อมูลที่แตกต่างกันของพวกเขา การวิจัยมีเป้าหมายเพื่อทำความเข้าใจว่าโปรไฟล์ของนักลงทุนที่หลากหลายนี้มีผลกระทบต่อความผันผวนของตลาดอย่างไร โดยเฉพาะในบริบทของตลาดการเงินที่กำลังเติบโตอย่างไทย

ด้วยการใช้เทคนิคเศรษฐมิติหลากหลาย เช่น การจำแนกกิจกรรมการซื้อขายออกเป็นตัวแปรที่คาดการณ์ไว้และตัวแปรที่ไม่คาดการณ์ไว้ ผลการวิจัยเปิดเผยว่ามีความสัมพันธ์เชิงบวกระหว่างปริมาณการซื้อขายที่คาดการณ์ไว้ของนักลงทุนรายย่อยกับความผันผวนของตลาด ซึ่งสอดคล้องกับแนวคิดที่ว่านักลงทุนที่มีข้อมูลน้อย ซึ่งขาดการเข้าถึงข้อมูลส่วนตัวหรือข้อมูลที่สำคัญ เป็นกลุ่มที่มีความคิดเห็นที่แตกต่างกันมากขึ้น น่าแปลกที่นักลงทุนรายย่อยแสดงความระมัดระวังมากขึ้นในสถานการณ์ตลาดที่ไม่คาดคิด โดยลดปริมาณการซื้อขายลง ซึ่งตรงข้ามกับพฤติกรรมการเก็งกำไรทั่วไปของพวกเขา ในทางกลับกัน นักลงทุนสถาบันและนักลงทุนต่างชาติ ซึ่งมักถือว่าเป็นนักลงทุนที่มีข้อมูลมากกว่า ไม่แสดงผลกระทบที่มีนัยสำคัญทางสถิติต่อความผันผวนของตลาด นอกจากนี้ การศึกษายังพบว่าการเปลี่ยนแปลงใน open interest ไม่มีผลกระทบที่สำคัญต่อความผันผวนของ SET50 Index Futures ซึ่งบ่งชี้ถึงความจำเป็นในการสำรวจเพิ่มเติมในแง่มุมนี้

การวิจัยนี้มีส่วนช่วยในการให้ข้อมูลเชิงลึกที่มีค่าสำหรับหน่วยงานกำกับดูแล ผู้จัดการการลงทุน และนักวางแผนการตลาด โดยเฉพาะในการกำหนดนโยบายและกลยุทธ์สำหรับตลาดกำลังเติบโต การเข้าใจบทบาทที่แตกต่างของประเภทนักลงทุนเป็นสิ่งสำคัญสำหรับความพยายามในการทำให้ตลาดมีเสถียรภาพและปรับกลยุทธ์การลงทุนให้สอดคล้องกับพฤติกรรมของตลาด

สาขาวิชา	การเงิน	ลายมือชื่อนิสิต .....
ปีการศึกษา	2566	ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

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KEYWORD: Traders Types, Market Volatility, Trading Volume, Institutional Investors, Retail Investors, Foreign Investors, Open Interest, SET50 Index Futures, Emerging Markets, Market Behavior

Jirayu Nakviroj : INVESTOR TYPE EFFECT TO VOLATILITY-VOLUME RELATIONSHIP: SET50 INDEX FUTURES . Advisor: TANAWIT SAE SUE, Ph.D.

This study delves into the complex interplay between various types of traders and the resulting effects on the volatility-volume relationship in Thailand's SET50 Index Futures market. It categorizes traders into institutional, retail, and foreign investors, examining their distinct trading behaviors and access to information. The research aims to discern how these diverse investor profiles impact market volatility, particularly in the context of an emerging financial market like Thailand.

Utilizing a range of econometric techniques, the study categorizes trading activity into expected and unexpected variables. The findings reveal a positive correlation between retail investors' expected trading volume and market volatility, aligning with the notion that less informed traders, lacking access to private or semi-fundamental information, exhibit a greater dispersion of beliefs. Surprisingly, retail investors display more caution in unexpected market scenarios, reducing their trading activity, which contrasts with their general speculative behavior. Conversely, institutional and foreign investors, often considered more informed, do not show a statistically significant impact on market volatility. Additionally, the study finds that changes in open interest do not significantly influence the volatility of the SET50 Index Futures, suggesting a need for further exploration into this aspect.

The research contributes valuable insights for regulatory bodies, investment managers, and market strategists, especially in formulating policies and strategies for emerging markets. Understanding the differentiated roles of investor types is crucial for market stabilization efforts and aligning investment approaches with market behaviors.

Field of Study:	Finance	Student's Signature .....
Academic Year:	2023	Advisor's Signature .....

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CHAPTER 1 : INTRODUCTION

Financial markets are complex systems influenced by a multitude of factors, including the participation and behavior of different trader types. Understanding the dynamics between trader types is crucial for comprehending market volatility and trading volume. This study investigates the effects of trader types on the volatility-volume relationship in the context of the SET50 index Futures market.

The SET50 index futures market, comprising the 50 largest stocks traded on the Stock Exchange of Thailand, represents a vital segment of the local financial landscape. The inclusion of the SET50 index futures provides an efficient and widely recognized instrument for investors to gain exposure to the broader Thai stock market. Due to its significance and popularity among market participants, analyzing the volatility-volume relationship within this market offers valuable insights into the dynamics of trader types and their impact on market behavior.

This paper specifically focuses on examining the effects of three distinct trader types on the volatility-volume relationship in the SET50 index futures market: institutional investors, retail investors, and foreign investors.

Institutional investors, including banks, investment firms, and pension funds, play a crucial role in the financial markets due to their substantial resources, research capabilities, and trading expertise. Their trading decisions are often based on detailed analysis, fundamental research, and proprietary models. By studying the volatility-volume relationship for institutional investors, we can gain insights into the impact of informed trading, sophisticated strategies, and potentially privileged access to information on market volatility.

Retail investors, on the other hand, comprise a large and diverse group of market participants. They often have distinct trading preferences, risk tolerance levels, and limited access to information compared to institutional investors. Retail investors may

rely on public sources of information, social sentiment, or personal investment strategies. Analyzing the volatility-volume relationship for this group helps us understand how retail trading behaviors, sentiment-driven trading, and noise trading may contribute to market volatility.

Foreign investors, including both institutional and retail investors from outside Thailand, bring an international perspective and capital flow dynamics to the SET50 index futures market. Their participation can be influenced by global economic trends, geopolitical events, and specific investment opportunities in the Thai market. By examining the volatility-volume relationship for foreign investors, we can gain insights into the impact of cross-border capital flows, global market integration, and the transmission of volatility from international markets to the SET50 index futures market.

Understanding how these three trader types—institutional investors, retail investors, and foreign investors—affect the volatility-volume relationship is essential for market participants, regulators, and policymakers. The findings can inform investment strategies, risk management practices, and policy interventions aimed at maintaining market stability and fostering efficient market functioning.

In the realm of theoretical market microstructure models (Pagan 1984), the movements in prices and trading volume are closely associated with the arrival of new information. When information arrives, it sets the stage for the formation of expectations among market participants. These expectations, in turn, play a pivotal role in shaping trading decisions and actions undertaken by investors. Bae, Yamada et al. (2008) stated market volatility fluctuates significantly depending on which investor types participate in trade. In addition to the above statement, Bjonnes, Rime et al. (2007) demonstrates that the link between trading volume and market volatility varies with the type of traders. Institutional investors' trading volume is most strongly correlated with volatility, whereas non-financial investors' trading shows no correlation.

Examining the effects of trader types, each type has different capacities to access new information. The information advantage hypothesis states that informed investors, who have access to valuable information, benefit from their knowledge by making homogeneous investments. This leads to a narrow range of trading prices Avramov, Chordia et al. (2006) and Daigler and Wiley (1999) showed that informed traders drive a positive volatility-volume relationship, on the contrary, uninformed traders resulted in a negative relationship. Investors who lack or have slow access to knowledge and data are unable to precisely make investments. This leads to a wider range of heterogeneous investment decisions.

Contrary to the previous notion, the dispersion of belief model challenges the idea that informed traders with access to information always share the same insights. In fact, their perspectives may vary in terms of content, or even if they possess identical information and insights, their analysis and interpretation can differ Hindy (1994). Consequently, this divergence in viewpoints can result in a positive relationship between price and volatility. Kartsaklas (2018) evidenced in the Korean market showed that informed traders also drive a positive volatility-volume relationship.

The purpose of this research is to assess whether different types of investors with different levels of information and motivation to trade, have any influence on the market based on the futures index volatility. This paper also includes effects from open interest (Bessembinder and Seguin 1993) alter open interest have a greater impact on volatility compared to trades that do not affect open interest levels. This research attempts to understand the process in greater detail. The way each investor types of trading affects the volatility of the SET50 index and portrays whether the information gain hypothesis is applicable to Thailand. Regardless of the environmental conditions, with a method from Kartsaklas (2018). Using Ranged-Based volatility proxies namely log range and the Garman-Klass variance estimator in order to assess the result.

CHAPTER 2 : LITURATURE REVIEW

2.1. Theory Framework

2.1.1 The Mixture of Distributions Hypothesis (MDH)

The theoretical framework explains the relationship between trading volume and volatility in financial markets. The MDH suggests that there are different regimes or states in the market, each characterized by a unique relationship between trading volume and volatility. The underlying idea of the MDH is that market dynamics and participants' behavior can vary over time, leading to different patterns in the volume-volatility relationship. This hypothesis acknowledges the presence of heterogeneity and nonlinearity in market processes, highlighting the importance of considering multiple distributions to capture the complex interactions between trading volume and volatility.

Positive relationship between trading volume and market volatility, which can be attributed to the assimilation of new information by informed traders. After adjusting for the influence of informed trading, the relationship between market volatility and trading volume is inversely related. This negative correlation aligns with the theory that increased liquidity in trading often leads to enhanced market depth, which in turn, tends to dampen market volatility. (Clark (1973); Hindy (1994); Epps and Epps (1976); Tauchen and Pitts (1983); Harris and Raviv (1993); Li and Wu (2006)).

2.1.2 Information Models and Dispersion of Beliefs

The theoretical framework combines information, rational expectations, and the dispersion of beliefs to investigate the dynamics of information and expectations in financial markets. The framework aims to provide a comprehensive understanding of how these factors influence market behavior, particularly in terms of volatility and the formation of prices.

Information advantage hypothesis posits that informed traders who possess valuable information play a significant role in shaping market outcomes. These traders, such as institutional investors or market experts, utilize their knowledge and analysis capabilities to make informed investment decisions. Therefore, they will form a homogenous investment decision leading to a negative price-volatility relationship (Glosten and Milgrom 1985).

Rational expectations models propose that market participants form expectations about futures prices and other market variables by incorporating all available information and using rational decision-making processes. In these models, prices are influenced by two key factors: private information and supply uncertainty (Harris and Raviv 1993).

The dispersion of beliefs refers to the idea that market participants may hold different views and opinions about the futures trajectory of prices and market conditions, even when presented with the same information. This diversity in beliefs can stem from differences in interpretation, analysis techniques, or subjective factors such as risk tolerance. When market participants hold conflicting views, their trading actions may lead to price fluctuations and increased trading volume, resulting in heightened market volatility (Harris and Raviv 1993).

The anticipated behavior is that informed traders, leveraging their informational advantages, tend to execute trades within a relatively tight price range around the asset's fair value. This is because these informed traders, which typically include both institutional and foreign investors, are equipped with resources that grant them lower trading costs, more timely and comprehensive information, and sophisticated analytical tools. These advantages facilitate their capacity to discern between short-term market liquidity demands and the underlying fundamental value of assets, allowing for more precise valuations.

On the other hand, retail investors or non-informed traders have slower access to trading insights and less information compared to informed traders, making it difficult for them to accurately estimate the fair value. Consequently, their trading behavior

may exhibit a wider range of prices, reflecting their limited information and potentially resulting in a greater dispersion of beliefs among market participants.

Overall, the study expects to find that the dispersion of beliefs and trading ranges vary across trader types, with informed traders exhibiting a narrower range of prices near the fair value, while non-informed traders display wider ranges influenced by volume and price fluctuations. This analysis will shed light on the role of information and its impact on market behavior and the volatility-volume relationship.

2.2. Empirical Evidence

Numerous empirical studies have examined the relationship between volatility and volume in various financial markets, including both cash and futures markets. The prevailing finding in these investigations is a positive association between volatility and volume. This means that higher levels of trading volume are typically accompanied by increased volatility in the market. This positive relationship between volatility and volume has been consistently reported across different market settings and is considered a common empirical observation (Gallant, Rossi et al. (1992); Bessembinder and Seguin (1993)). In a study by Bessembinder and Seguin (1993), it was observed that there is a significant positive relationship between volume and volatility in eight different futures markets. This finding implies that higher trading volume is associated with increased market volatility. Additionally, the study found a negative relationship between expected open interest and volatility across all markets. This suggests that changes in open interest, which reflect shifts in market depth, are inversely related to volatility. Furthermore, the researchers discovered that trades leading to changes in open interest have a greater impact on prices compared to trades that do not alter open interest. This implies that the volatility-volume relationship may vary depending on the type of traders involved in the market.

In a study conducted by Daigler and Wiley (1999), the impact of trader type on the volatility-volume relationship in futures markets was examined. The researchers

found that the positive relationship between volatility and volume is primarily driven by the public, a group of traders who are not directly involved in the trading floor. These traders are considered less informed and have a greater dispersion of beliefs, which contributes to increased market volatility. On the contrary, clearing members and floor traders, who have the advantage of holding a seat in the futures market and access to more information, tend to decrease volatility. This suggests that their informational advantage enables them to make more informed trading decisions, leading to a dampening effect on market volatility.

In a study by Bjonnes, Rime et al. (2007), it was observed that the relationship between volume and volatility varies depending on the group of market participants involved in trading. The researchers found that the trading volume of institutional investors had the highest correlation with volatility. This suggests that the actions and trading behavior of institutional investors have a significant impact on market volatility. On the other hand, the trading activity of non-financial investors showed no correlation with volatility, indicating that their trading activities have limited influence on market volatility. This highlights the importance of considering the specific groups of market participants when examining the relationship between volume and volatility.

In a study conducted by Kartsaklas (2018), the volatility-volume relationship for different trader types in the Korean index futures market was examined. The study utilized the Garman-Klass model and log range as a proxy for volatility, considering it as a robust measure The study categorized traders into members (informed) and non-members (less informed) based on information accessibility. Findings showed non-member trades positively correlated with volatility, strengthened by log volume metrics, aligning with prior research Daigler and Wiley (1999). Contrary to expectations, member trading also positively affected volatility, challenging the information advantage hypothesis and instead bolstering the dispersion of belief model. This suggests that actions from both trader types impact market volatility.

For Thai market, KUWALAIRAT and PISEDTASALASA (2014), In the literature on investor behavior and stock market dynamics, it has been consistently observed that various investor types exhibit distinct trading patterns. Studies have delineated these differences, often highlighting that foreign and institutional investors generally display more sophistication in their trading strategies compared to retail investors. The literature suggests that institutional investors tend to augment their net buying positions in periods of lower market volatility, indicating a preference for stability or possibly exploiting lower-priced opportunities.

Retail investors, conversely, are characterized in the literature as highly speculative. They have a propensity to increase their net buying positions not only when market volatility is high but also when markets are perceived to be overvalued. This behavior is indicative of a chase for higher returns, possibly at the cost of greater risk, and suggests that retail investors are driven by momentum and speculative opportunities more than by fundamentals.

Furthermore, the literature points out the importance of understanding the role of investor types in driving stock market development. The trading activities of different investor types, especially foreign and retail investors, are significantly correlated with stock market returns and volatility, underlining their influence on market dynamics.

The literature review reveals a mix of supportive and contradictory findings regarding the relationship between trader types, volume, and volatility in different financial markets. This paper aims to contribute to this body of research by investigating the effects of trader types on the volume-volatility relationship in the Thai Set 50 Index Futures market, as well as examining the impact of changes in open interest on volatility. The methodology used in this study is based on the approach employed by Kartsaklas (2018). By exploring these research questions, this paper aims to provide further insights into the dynamics of the Thai futures market and contribute to the existing literature on trader types and market volatility.

2.3 Variables & Anticipated Outcome

	Anticipated outcome with Volatility	
Trading Volume	Expected	Unexpected
Foreign investor	No or Negative correlation	
Institutional investor	No or Negative correlation	
Retail Investor	Positive correlation	
SET50 Open Interest	Negative correlation	

Market participants with access to superior information, such as institutional and foreign investors, are posited to transact within a relatively narrow price band that closely hews to the perceived fair value of an asset. The presumption here, undergirded by the information advantage hypothesis, is that the trades of informed market actors are less likely to engender price volatility given their propensity to buy and sell based upon robust, informationally driven assessments of asset value.

Conversely, less informed traders, typified by the retail investor cohort, are conjectured to display a broader divergence in their valuation estimates, precipitating transactions across a wider price range vis-à-vis the fundamental value of futures contracts. This broader dispersion of beliefs among such traders is anticipated to contribute to heightened volatility in futures markets, as these individuals' trading actions may be less anchored to informationally substantive evaluations of asset worth.

Additionally, fluctuations in open interest are noteworthy as potential volatility influencers. Specifically, shifts in open interest can catalyze 'volume shocks', which, given the appropriate market conditions, may inversely correlate with volatility. Such dynamics highlight the nuanced role that the evolution of open interest plays in the broader context of market volatility.

2.4 Hypothesis

Hypothesis 1: The trading volume of institutional and foreign investors does not correlate with market volatility.

We hypothesize that the trading volume of institutional and foreign investors exhibits no significant correlation with market volatility. This conjecture rests on the premise that such investors, typically categorized as 'informed traders', engage in trading activities based on access to superior information and analysis. Their trading decisions, which are often based on strategic assessments rather than impulsive reactions to market fluctuations, might not contribute to increased volatility. In case hypothesis 1 is true, it will be supported by Daigler and Wiley (1999). Therefore, if empirical evidence supports our hypothesis, it will underscore the stabilizing influence of informed institutional and foreign investors on market volatility, affirming the information model's premise and raising questions about the applicability of the dispersion of belief model in contexts where trading is dominated by informed agents.

Under the assumption that all investor types have homogeneous expectations regarding futures market movements, it is expected that the anticipated trading volume of each investor type would not exhibit significant differences. Consequently, this homogeneity in expected trading volume across investor types would result in a neutral impact on volatility.

Hypothesis 2: The trading volume of retail investors correlates with market volatility.

We hypothesize that there is a positive correlation between the trading volume of retail investors and market volatility. The underlying basis for this hypothesis is the recognition that retail investors are typically less informed, lacking access to privileged information or comprehensive analyses that might be available to institutional or sophisticated investors.

Due to this information asymmetry, retail investors are posited to exhibit a higher dispersion of beliefs regarding the intrinsic value of securities. Such a diversity in viewpoints is likely to manifest in trading behaviors that respond to and potentially amplify market news and events, irrespective of the fundamental value of the assets.

As retail investors act on disparate beliefs, their trading activities may introduce additional noise into the market, thus increasing volatility.

The hypothesized linkage between retail trading volume and market volatility reflects a behavioral pattern wherein the limited information at the disposal of these investors leads to heightened sensitivity to market dynamics. This is expected to result in trading actions that not only react to volatility but could also serve to exacerbate it.

Hypothesis 3: An increase in intraday open interest is leading to a reduction in market volatility.

We posit that an intraday increase in open interest is inversely related to market volatility. The premise of this hypothesis is that a rise in open interest within a trading day reflects an aggregation of positions that are not immediately unwound, indicating a longer-term investment horizon or the formation of hedged positions.

This increase in open interest could suggest a higher level of commitment to the market positions held, implying that traders are not merely engaging in speculative, short-term trades that could contribute to price swings. Instead, they are potentially establishing or adjusting positions based on longer-term expectations or strategic hedging, which may not be as reactive to day-to-day market fluctuations.

Therefore, an increase in open interest might serve as a stabilizing force on market volatility, as it may signal a consolidation of market sentiment and a reduction in the rapid turnover of positions that typically characterizes more volatile trading environments.

In testing this hypothesis, we will analyze the relationship between intraday changes in open interest and corresponding movements in market volatility, controlling for other factors that might influence volatility levels. We anticipate that the empirical evidence will demonstrate a dampening effect of increased open interest on market volatility, which could have important implications for understanding the dynamics of futures markets and for the formulation of trading strategies.

CHAPTER 3 : DATA

This study investigates the effects of trader types on the volatility-volume relationship in the SET50 index futures market in Thailand. The dataset used in this study comprises daily data on the high, low, open, and closing prices of the SET50 futures index, capturing changes in investment participation across different trader types. The dataset includes open interest and trading volume data from three categories of investors in Thailand: local institutions, foreign investors, and local retail investors. These trader types represent different segments of the market with distinct characteristics and trading behaviors. By examining their trading volume and open interest, we can assess their impact on market volatility.

Additionally, the daily price range, including high, low, close, and open prices of the SET50 index, is included in the dataset. These price variables provide insights into the price movements and fluctuations in the market. Analyzing the volatility-volume relationship in conjunction with these price variables allows for a comprehensive understanding of the market dynamics.

The utilization of the SET50 index futures in this study is motivated by several reasons. Firstly, the SET50 index is widely recognized as the primary benchmark index for investments in the Stock Exchange of Thailand (SET). It is calculated based on the share prices of the top 50 companies with high market capitalization and liquidity listed on the SET. As a prominent index, the SET50 provides a wealth of information that is highly relevant for this research. Its comprehensive coverage of the top companies in Thailand offers insights into the overall market sentiment and trends.

Secondly, the futures market associated with the SET50 index allows traders to take both long and short positions. Unlike traditional stock markets where investors can only take long positions, futures markets provide the opportunity for traders to speculate on both upward and downward price movements. The ability to short sell in futures markets is particularly significant as it enables traders to express their expectations and perspectives on expected prices more accurately. By considering the

inclusion of short positions in the analysis, this study captures a broader range of trader perspectives and contributes to a more comprehensive understanding of the volatility-volume relationship.

The importance of the SET50 Index as a benchmark index for Thailand combined with the unique characteristics of the futures market, especially the ability to sell short, make SET50 Index futures an ideal tool for studying the volatility-volume relationship. It provides comprehensive information to analyze the impact of different trader types on market volatility and allows for a more accurate expression of traders' expectations and views. This study aims to leverage these strengths to gain insight into the dynamics of trader types and their impact on the volatility-volume relationship in Thailand's SET50 index futures market.

We use daily time series data from January 2019 to Dec 2022 collected from SETSMART and Bloomberg Database in this study.

Open interest refers to the total number of outstanding contracts that market participants hold at the end of each trading day. It represents the cumulative sum of all long and short positions in a specific futures contract or options series. If another trader sells a futures contract, their short position adds to the open interest. The open interest figure is dynamic and changes with each transaction, as new positions are opened, and existing positions are closed. Additionally, changes in open interest can provide insights into the entry or exit of traders, their positions, and the overall level of investor interest in a particular futures contract.

CHAPTER 4 : METHODOLOGY

When examining the relationship between volatility and trading volume, researchers often choose the iterative OLS method over the multivariate SGARCH approach. The iterative OLS method is a widely used technique in linear regression that assumes normally distributed errors with constant variance. It estimates the parameters by minimizing the sum of squared residuals, providing easily interpretable results. This method is particularly suitable for examining the linear association between volatility and trading volume. By focusing on the primary relationship of interest, iterative OLS allows to obtain initial insights into the volatility-trading volume relationship efficiently. On the other hand, multivariate SGARCH involves modeling the joint dynamics of volatility and trading volume through a multivariate GARCH framework. While this approach can capture the interdependencies between these variables and potentially provide more accurate results, it requires more computational resources and data to estimate a larger number of parameters. Although the multivariate SGARCH is available, we chose to use iterated OLS method to be consistent with the past studies.

In this paper, we employ primarily parametric econometric techniques that align with previous studies examining the contemporaneous relationship between trading volume and volatility. Notably, our approach is consistent with studies conducted by Kartsaklas (2018), Daigler and Wiley (1999), Bessembinder and Seguin (1993), and Schwert (1990). By using this methodology, we can obtain unbiased estimates of the conditional daily return volatility while considering various factors such as the day of the week, volatility persistence, and lagged returns.

The returns for the SET50 index futures contracts are defined as $R_{F,t} = 100 * \ln(\frac{F_t}{F_{t-1}})$, where F_t represents the price of the nearby SET50 index futures contract at time t. This equation calculates the logarithmic percentage change in the futures price from one period to the next, denoted as $R_{F,t}$. The numerator (F_t) represents the price of the SET50 index futures contract at time t, and the denominator (F_{t-1}) represents the price of the same futures contract at the previous time period (t-1). By taking the

natural logarithm of the ratio (F_t/F_{t-1}) and multiplying it by 100, we obtain the percentage return for the SET50 index futures. This return calculation allows for the analysis of price movements and performance of the SET50 index futures contracts over time.

$$R_t = 100 \cdot ln\left({F_t}/{F_{t-1}}\right)$$

The research methodology includes the estimation of three equations: equation (1), equation (2), and equation (3). Each equation serves a specific purpose in analyzing the volatility-volume relationship. Here is a breakdown of each equation:

Equation (1): This equation estimates the conditional return based on lagged returns, the day of the week, and lagged volatility. The percent change in the futures price on day t (R_t) is modeled as a function of lagged returns, dummy variables representing the days of the week (d_i), and lagged volatility. This equation helps understand the factors influencing the conditional return of the futures price.

Equation (2): In this equation, the conditional volatility is estimated using transformations of past volatility, the day of the week, and trading activity variables. The volatility on day t (σ_t) is modeled as a function of past volatility, dummy variables for the days of the week, and activity variables such as volume and change in open interest ($A_{k,t}$). This equation helps capture the factors affecting the volatility of the futures price.

Equation (3): This equation transforms the lagged unexpected returns. The residual of equation (1) U_t), representing the unexpected returns, is transformed using the expression $\left|\widehat{U}\right| = \sqrt{\pi/2}$. This transformation ensures that the transformed variable has an expected value equal to the standard deviation of unexpected returns when they follow a normal distribution with a constant mean and time-varying standard deviation $E\left|\widehat{U_t}\right| = \sigma_t\sqrt{2/\pi}$. The transformed variable helps in analyzing the properties and behavior of unexpected returns.

$$R_t = a + \sum_{i=1}^{4} \rho_i d_{i,t} + \sum_{i=1}^{10} \gamma_i R_{t-i} + \sum_{i=1}^{10} \pi_i \hat{\sigma}_{t-i} + U_t \quad (1)$$

$$\hat{\sigma}_t = \delta + \sum_{i=1}^{4} \eta_i d_{i,t} + \sum_{i=1}^{10} \beta_i \hat{\sigma}_{t-i} + \sum_{i=1}^{10} \omega_i \hat{U}_{t-i} + \sum_{k=1}^{m} \mu_k A_{k,t} + e_t \quad (2)$$

$$\hat{\sigma}_t = |\hat{U}_t| \sqrt{\pi/2} \quad (3)$$

$$E(|\hat{U}_t|) = \sigma_t \sqrt{2/\pi} \quad (T.V.)$$

Where $A_{k,t}$ consist of

1. $Expected\ Volume_{Institution}$
2. $Unexpected\ Volume_{Institution}$
3. $Expected\ Volume_{foreign}$
4. $Unexpected\ Volume_{foreign}$
5. $Expected\ Volume_{retail}$
6. $Unexpected\ Volume_{retail}$
7. $Expected\ change\ in\ Open\ Interest$
8. $Unexpected\ change\ in\ Open\ Interest$
9. $Number\ of\ transactions$

In order to estimate the conditional volatility of the SET50 index futures market, equations (1) and (2) are estimated using an iterative ordinary least squares (OLS) procedure. The iterative OLS procedure involves repeatedly estimating the equations until convergence is achieved. This estimation process allows us to obtain estimates of the coefficients in equations (1) and (2), which are crucial for understanding the relationship between the variables and estimating the conditional volatility. By iteratively updating the estimates, we can refine our understanding of the dynamics and volatility patterns in the SET50 index futures market.

1. Calculation of Daily Price Return: The first step involves calculating the close-to-close daily price return of the SET50 index futures contract that is closest to expiration. This return is used to estimate equation (1) without including lagged volatility estimates.
2. Transformation of Residuals: In the second step, the residuals from equation (1) are transformed using the equation (3). These transformed residuals are then used to estimate equation (2).
3. Estimation of Equation (1): In the third step, the fitted volatility values obtained from equation (2) are used to estimate equation (1). This estimation involves incorporating the volatility estimates obtained from equation (2) into equation (1) to obtain more accurate results.
4. Consistent Estimation: Next, the estimation of equation (2) is performed using the residuals obtained from the consistent estimation obtained in the second pass of equation (1). This ensures that the estimation of equation (2) is consistent with the previous estimations.

The research methodology for this paper involves incorporating significant lags of each variable, specifically using a lag of 9 to maintain comparability with previous studies and ensure statistical significance. The trading variables in equation (2), including volumes, open interest, and number of transactions, are represented as expected and unexpected values. These variables are measured in units of 1,000. Following Kartsaklas (2018), the process of analyzing trading activity commences with the creation of a detrended activity series. This is achieved by subtracting an equally weighted 200-day moving average from the original activity data. This step is essential for eliminating long-term trends and focusing on more immediate market dynamics. After detrending, the resulting activity series are confirmed to be stationary for all categories of traders as well as for the open interest. Stationarity is a crucial property for time series analysis, ensuring that the statistical properties of the series do not change over time.

To dissect the trading activity further, the detrended series is divided into expected and unexpected components. This division is conducted using an ARMA(0,10). To

estimate the expected trading activity, the ARMA(0,10) model utilizes data from the previous 200 trading days as its input window. This time frame provides a substantial historical context to inform the model's estimations. Within this model, the expected values are derived from the moving average of the past 10 days' changes in the detrended volume. The unexpected component of the trading volume, also known as the residual, is determined by subtracting the expected value (as calculated by the ARMA model) from the actual trading volume.

CHAPTER 5 : EMPIRICAL RESULTS

Table 1

Descriptive Statistics

Panel A: Average Trader Category Volume as a Percentage of Total Volume

Investor types	Foreign Institutional	Local Institutional	Retail	Average Daily Trading Volume
Period				
2019-2020	29.59%	20.23%	50.18%	173,976.13
2020-2021	35.05%	17.00%	47.95%	236,484.89
2021-2022	38.86%	17.15%	43.99%	197,597.35
2022-2023	39.15%	17.06%	43.79%	227,170.38

Panel B: Cross correlations between Trader Categories

Series	Foreign - Institutional	Foreign - Retail	Institutional - Retail
Total	0.4102	0.4437	0.8690
Moving Average	0.8198	0.7674	0.9102
Expected	0.3248	0.3411	0.8889
Unexpected	0.8879	0.3094	0.2009

Table 1 delineates the descriptive statistics pertinent to the daily trading volumes of the SET50 index futures, broken down by the investor classification: foreign, institutional, and retail investors. Panel A of the table delineates the distribution of trading volumes across these investor classes, quantified as a percentage of the total daily volume. Additionally, Panel A provides insight into the average daily trading volumes, revealing that retail investors consistently account for the highest proportion of trading volume, ranging between 42% to 51%. Notably, retail investors' volume was approximately twice that of other categories in the years 2019 and 2020. Post-2020, however, there has been an uptick in the volume attributed to foreign investors, rising to 35.05-39.15%. The dataset also demonstrates a notably high correlation

between the trading volumes of institutional and retail investors.

Panel B addresses the cross-correlation among the trading volumes of different investor types, indicating a significant degree of correlation. This strong interconnectivity presents analytical challenges in disentangling the individual effects of each trader type on the market. To address this, the analysis is conducted iteratively, with each trader type being examined independently to ensure clarity in the interpretation of their respective impacts on trading volumes. An ARMA(0,10) model has been utilized to divided the trading volume into expected and unexpected trading activities, which are fundamental to the analysis.

Table 2

Regressions of Volatility on models

Variables/Model	*OI*	Foreign	Institutional	Retail	Complete
intercept	0.0810	0.8282	-0.1512	-0.1244	0.9485
	0.82	0.24	-1.51	-1.24	0.26
Tue_dum	-0.0882	-0.1100	-0.1085	-0.0997	-0.1234
	1.18	-1.45*	-1.56	-1.43	-1.77**
Wed_dum	-0.1128	-0.1102	-0.1055	-0.0995	-0.1135
	1.48*	-1.54*	-1.52*	-1.31	-1.66*
Thu_dum	0.0042	-0.0062	-0.0215	0.0079	-0.0256
	0.09	-0.09	-0.32	0.13	-0.39
Fri_dum	-0.1395	-0.1267	-0.1241	-0.1234	-0.1331
	-1.68**	-1.76**	-1.72**	-1.73**	-1.82**
SET50 futures volume					
Foreign investor					
Expected	-	3.5827	-	-	5.1514
	-	0.18	-	-	0.26
Unexpected	-	-4.9785	-	-	-7.1523
	-	0.13	-	-	-0.24
Institutional investor					
Expected	-	-	0.5579	-	-1.7737
	-	-	0.35	-	-0.84
Unexpected	-	-	-0.9897	-	2.9253
	-	-	0.21	-	0.82
Retail Investor					
Expected	-	-	-	0.5783	1.1727
	-	-	-	1.48*	2.36**
Unexpected	-	-	-	-0.9453	-1.8516
	-	-	-	1.18	1.50*
SET50 Open Interest					
Expected	0.0035	0.0046	0.0022	0.0014	0.0044
	0.18	0.21	0.19	0.12	0.24
Unexpected	-0.0095	-0.0164	-0.0013	0.0000	-0.0092
	-0.15	-0.14	-0.02	0	-0.08
Sum of 9 lagged volatilities	0.2158	0.2171	0.3878	0.3435	0.3952
	3.18***	3.15***	5.92***	4.94***	5.8***
Sum of 9 lagged unexpected returns	-0.3988	-0.3905	-0.5233	-0.4160	-0.5117
	3.72***	2.77***	4.17***	3.15***	-3.91***
Number of Trans.	0.0234	0.0231	0.0252	0.0248	0.0251
	4.82***	5.51***	6.3***	6.47***	6.58***
Adjusted R-Squared	0.1984	0.2095	0.2286	0.2127	0.2307

Table 2 showcases the findings from a volatility regression analysis performed ranging from January 2019 to December 2022. This regression aims to uncover the link between volatility and multiple models, which include categories of trader-expected and unexpected volumes, daily dummy indicators, lagged volatilities and returns, and transaction counts. To segregate the expected from the unexpected components in trading volume and open interest, the ARMA (0,10) approach was utilized. The variable of interest in these regression evaluations is daily

volatility, computed using the daily standard deviation, as described in equation (2). Importantly, metrics like volumes, open interest, and transaction count are denoted in units of 1,000. The figures displayed beneath the regression coefficients are t-statistics, which indicate the relevance of each coefficient and assess if it substantially diverges from zero. Symbols *, **, and *** highlight statistical relevance at the 15%, 10%, and 5% thresholds respectively.

Further, Table 2 elaborates on the results of volatility regression for each trader category alongside all other A_k variables. It was observed that the model accounting for institutional investors alone exhibited the highest adjusted R-square, indicative of a superior explanatory power relative to other single investor type models. This is notable despite institutional trades comprising less than 20% of the total trading volume. Conversely, the model incorporating open interest demonstrated the lowest adjusted R-square, suggesting that open interest alone may not be a substantial determinant of market volatility in this context.

Further examination revealed that the coefficients for daily dummies were statistically significant and predominantly negative, specifically for Tuesday, Wednesday, and Friday. A plausible explanation for the observed decrease in volatility on Fridays, where shows the most consistent significant result, could be attributed to the inclination of some investors to avoid the risk of holding positions over the weekend. This behavior likely reflects a strategic choice to mitigate exposure to weekend news events or market gaps upon the subsequent opening.

The analysis indicated that the trading volume of informed investors, those presumed to have access to privileged information, does not have a statistically significant correlation with market volatility. This means that with the data at hand, we cannot assert with certainty that the trading activities of informed investors have a clear impact on market volatility.

For Retail investors, retail investors' expected trading volume, meaning trades that are anticipated based on normal market patterns, has a significant positive correlation with market volatility. This suggests that when retail investors trade as expected (perhaps responding to known market trends or scheduled economic announcements),

their activity tends to coincide with or contribute to greater fluctuations in market prices. This could be due to their trading strategies, which may involve attempting to capitalize on perceived market movements or trends. In contrast, retail investors' unexpected trading volume, trades that are not anticipated based on past behaviors or known information, has a significant negative correlation with market volatility. This implies that when retail investors engage in trading that deviates from the norm, perhaps in reaction to unforeseen events or information, it correlates with a reduction in market volatility. This could indicate that during times of uncertainty, may lead to a situation where retail investors feel they lack sufficient information to trade confidently, prompting a withdrawal from active trading until more information becomes available. One other implication could be that retail investors might exhibit risk-averse behavior when confronted with unexpected events, choosing to hold onto cash or existing positions rather than engaging in new trades that could potentially lead to losses if the market reacts unfavorably.

Upon examination, reveals that both the expected and unexpected components of open interest do not manifest statistically significant deviations from the null value. Consequently, this suggests that variations in open interest, irrespective of whether they are within the realm of market anticipation or occur as surprises, are not consequential in affecting the volatility of the SET50 Index Futures within the Thai financial market.

CHAPTER 6 : CONCLUSIONS

This study offers empirical insights into how various trader types can influence the volume-volatility interplay in the Thailand SET50 Index Futures market. Different trader types possess distinct capabilities for accessing quality information and exhibit varying trading motivations. The trading activity variables are further categorized into expect and unexpected variables.

The findings revealed that the expected trading volume of retail investors is positively related to market volatility. This outcome aligns with prior research conducted by Kartsaklas (2018) and Daigler and Wiley (1999). It supports the notion that traders who lack private or semi-fundamental information tend to be less informed, leading to a wider dispersion of beliefs. Our findings corroborate the notion that retail investors tend to heighten market volatility. This effect is largely attributed to their speculative or impulsive trading behaviors, spurred by limited access to comprehensive information. Consequently, these investors exhibit a greater dispersion of beliefs. Nonetheless, it was observed that in scenarios where the market faced unexpected events, retail investors displayed a tendency towards caution, reducing their trading activity until a clearer understanding of the market could be attained.

Institutional and Foreign Investors (Informed Traders): The analysis yielded non-statistically significant results regarding the trading activities of institutional and foreign investors. This lack of significance suggests an absence of sufficient evidence to assert a definitive impact on market volatility from these investor classes within the scope of the current study. Change in Open Interest: The study indicates that fluctuations in open interest do not significantly alter the volatility of the SET50 Index Futures market. This null finding underscores the potential need for further investigation into the mechanisms through which open interest might affect market dynamics.

The culmination of this research provides valuable contributions across various facets of the financial markets. For regulatory bodies, the insights derived from the differentiated behaviors of investor groups serve as a compass for designing policies

aimed at market stabilization and the mitigation of unwarranted volatility, creating a more secure investment landscape. Investment managers and strategists can harness this knowledge to refine their approaches to global investment, particularly in emerging markets, thereby aligning strategies with the demonstrated behaviors of investors in similar conditions to those of the SET50 index.

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