“Determinants of the successful single stock futures market in Thailand”

AUTHORS	Woradee Jongadsayakul

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Woradee Jongadsayakul (Thailand)

DETERMINANTS OF THE SUCCESSFUL SINGLE STOCK FUTURES MARKET IN THAILAND

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Woradee Jongadsayakul, Ph.D., Associate Professor, Faculty of Economics, Department of Economics, Kasetsart University, Thailand.

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Abstract

Thailand's Single Stock Futures market has grown recently over the last ten years, evidenced by its 8th place in top 10 exchanges in the world by number of single stock futures traded in 2021. Since the main goal of any futures exchange is to list a successful contact, it is important to demonstrate the determinants of the success of Single Stock Futures. This study uses the sample consisting of 89 companies, on which stocks are underlying for Single Stock Futures in the period between January 2017 and December 2021, and finds that the best fitting method in modelling determinants of the success of Single Stock Futures is the fixed effects model. As expected, the results confirm the existence of a positive relationship between characteristics of underlying stock, including size, volatility, and liquidity, and the successful futures contract. Furthermore, the findings show the negative effects of the first year of contract trading and the tightened daily price limit of Single Stock Futures in response to the COVID-19 pandemic situation on contract success.

Keywords stock futures, trading volume, contract success, fixed effects model, Thailand Futures Exchange, COVID-19

JEL Classification G12, G15, G23

INTRODUCTION

Asia-Pacific is currently the world's largest region for derivatives trading, accounting for 47.4% of the global market share in 2021. Although Thailand has faced a strong dented global economy from the impact of COVID-19 pandemic, Thailand Futures Exchange (TFEX) as the only organized derivatives exchange in Thailand saw record high volumes of derivatives trading in both 2020 and 2021. The continuous growth of TFEX's total trading volume was evidenced by its improved world ranking from 26th in 2019 to 25th in 2020. TFEX attained the same ranking position as last year on the 2021 list of the top derivatives exchanges worldwide. TFEX was also ranked 8th in terms of single stock futures trading volume in WFE Derivatives Report 2021 published by the World Federation of Exchanges (2022). To better match investor needs, TFEX continues to introduce new products and adds new underlying stocks for Single Stock Futures. Equity derivatives contract provides short selling possibility, and its success plays a useful role in reducing transaction costs (Zeckhauser & Niederhoffer, 1983). However, there is a chance that new products become unsuccessful after introduction. According to Westerholm and Ahmed (2013), "at the end of 2007 the Australian Securities Exchange decided to cease trading in individual stock futures, due to lack of interest and the availability of alternative products such as low exercise price options, contracts for difference and warrants" (p. 4). Other failed futures contracts are also discussed in prior studies (see, e.g., Johnston & McConnell, 1989;

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Perversi et al., 2002; Till, 2015). Since the success of the exchange depends on its trading volume and liquidity, it is necessary to identify factors that the exchange should consider in selecting new products. It will reduce the rate of contract failure once introduced.

1. LITERATURE REVIEW AND HYPOTHESES

Trading volume is a best-known proxy for the success of futures contracts. There is a lot of success criteria suggested by researchers. Sandor (1973) studies plywood futures contract and suggests the annual trading volume of 1,000 contracts as a cut-off point to identify the successful contract. On the other hand, Silber (1981) defines a contract as a successful contract when its annual volume exceeds 10,000 contracts. Dew (1981) introduces 10,000 contracts per day as a criterion for contract success. However, the daily trading volume of 1,000 contracts is suggested by Carlton (1984) to distinguish successful contracts from unsuccessful ones. Considering monthly trading volume, Holder et al. (1999) define contract success when its volume exceeds 10,000 contracts per month. Instead of a single threshold defining contract success, Gorham and Kundu (2012) use trading volume in the fifth year and create four categories of success: "highly successful – greater than 1 million contracts, successful – between 100,000 to 1 million contracts, moderately successful – between 0 and 100,000 contracts, and dead – zero contracts" (p. 126). However, rather than using an arbitrary cutoff point to identify contract success, this study adapts trading volume as a continuous measure of contract success, following previous studies by Black (1986), Corkish et al. (1997), Ciner et al. (2006), Hung et al. (2011), Mugo-Waweru and Kim (2013), Quintino and David (2013), and Sobti (2020).

Previous literature investigates the success or failure of derivatives contract and provides several factors influencing contract success. To verify whether a futures contract succeeds or fails, many studies (Gray, 1966; Till, 2015) focus on three elements: (1) demand for hedging; (2) use of speculation; and (3) role of government. According to Cuny (1993), "a successful futures market displays two qualities: a contract providing hedgers with a high-quality (low-residual-risk) hedge and a liquid market" (p. 58). Brodsky (1994) shows that the main reason for using equity derivatives is hedging market risk, followed by income enhancement and asset allocation respectively. However, Ciner et al. (2006) suggest that "the speculation is likely the primary motive to trade on the KOSPI 200 Index futures markets" (p. 346). Therefore, a proper contract design based on these factors is essential for contract success. Moreover, Białkowski and Koeman (2018) provide "evidence of the importance of a well-defined and functioning spot market for the success of the associated futures market. Four important dimensions of spot market design are identified - timeliness, market-based measurement, forward-spot separation, and inclusiveness" (p. 373). Other studies, such as Black (1986), Carlton (1984), Brorsen and Fofana (2001), Hung et al. (2011), Białkowski and Jakubowski (2012), Mugo-Waweru and Kim (2013), Bekkerman and Tejeda (2017), Fizaine (2018), Agrawal et al. (2019), and Sobti (2020), also analyze factors affecting the success of the derivatives contract. The common factors include characteristics of both spot and futures markets. Their results show the impact of spot market characteristics such as volatility, market size, market activeness, product homogeneity, and vertical integration on the contract success. For the futures market components, factors such as contract specifications, market competition, hedge effectiveness, and size of the exchange help explain the contract success. Sanders and Manfredo (2002) add a lack of knowledge regarding futures markets as a factor to determine contract success. Furthermore, past studies are interested in the effects of price limits on futures trading volume. Evans and Mahoney (1997) focus on New York Cotton Exchange and reveal that price limits are negatively related to trading volume of cotton futures. Market participants switch from cotton futures that is subject to price limits to options on cotton futures that is not. Other studies (see, e.g., Reiffen & Buyuksahin, 2010; Janardanan et al., 2019) also document a shift of trading volume from futures with price limits to options without them in a wide range of commodities. In contrast, there is no significant shift to options caused by price limits on coffee futures (Hall et al., 2006).

Table 1. Summary of previous literature on determinants of equity derivative product success

Author	Types of Contracts / Exchange	Model	Measure of Contract Success	Positive Factors	Negative Factors
Ang and Cheng (2005)	Single Stock Futures in OneChicago and NQLX	Correlation analysis/ Regression analysis	Trading volume in the first year	The estimated probability of listing, which is positively related to stocks that are larger, have greater volatility, and share turnover prior to the market opening	
Ciner et al. (2006)	KOSPI 200 Index Futures	Generalized Method of Moments	Daily trading volume	Intraday price volatility	Bid-ask spreads and Asian financial crisis
Hung et al. (2011)	Stock Index Futures in OSE, TSE, TAIFEX, HKEX, SGX-DT and KOFEX	Panel regression	Log of monthly trading volume	Monthly market capitalization of underlying cash market (size), monthly average of daily closing price changes (volatility), volume of the alternative or substitute contracts, having an electronic trading platform, and size of the exchange	Contract size
Białkowski and Jakubowski (2012)	Single Stock Futures in Eurex Exchange	Logit regression	Average daily open interest and trading volume	Tick size, age of contract, and mispricing between spot and futures markets	Contract size and share of institutional ownership
Mugo-Waweru and Kim (2013)	Equity Index Futures and Options in NSE, IDX, KRX, TAIFEX, TFEX, and Bursa Malaysia	Panel regression	Log of annual trading volume	Annual market capitalization of underlying cash market (size), annualized standard deviation of daily price changes (volatility), turnover velocity (liquidity), and the first contract introduced	Being futures contract

While many studies focus on the success or failure of agricultural futures contracts, there is limited academic research on equity derivatives product success. Table 1 summarizes some studies on determinants of equity derivatives product success.

From Table 1, trading volume is usually used as a dependent variable. The independent variables can be classified into two groups:

1. Characteristics of underlying market: Size of underlying market, volatility of underlying market, and liquidity of underlying market are positively related to the successful contracts.

2. Characteristics of futures market: A positive relationship exists between contract specification, including tick size and age of contract, and the success of a contract. Volume of the alternative or substitute contracts, mispricing between spot and futures markets, having an electronic trading platform, and size of the exchange are also positive factors in determining contract success. On the other hand, there are negative effects of bid-ask spreads, contract size, share of institutional ownership, and being futures contract on the successful contract.

Adding to the existing literature, this study aims to understand what determines the success of Single Stock Futures in the context of TFEX. The following hypotheses are tested in this study:

H1: *Characteristics of the underlying stock, including size, volatility, and liquidity, are positively related to the success of Single Stock Futures.*

H2: *Characteristics of the Single Stock Futures market, including the first year of contract trading and the tightened daily price limit in response to the COVID-19 pandemic situation, are negatively related to the success of Single Stock Futures.*

2. METHOD

The data used in this study come from SETSMART for the period from January 2017 to December 2021. TFEX currently provides 128 underlying stocks for Single Stock Futures; however, this study uses the sample consisting of 89 companies on which stocks are underlying for Single Stock Futures over the entire period 2017–2021. Following previous literature, trading volume of Single Stock Futures

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Table 2. List and measurement of variables

Variable	Explanation
Contract success (VOL)	Natural log of monthly trading volume of Single Stock Futures
Size of underlying stock (SIZE)	Natural log of monthly market capitalization of underlying stock
Volatility of underlying stock (VOLAT)	Monthly standard deviation of daily stock returns (x_i) or $\sqrt{\frac{\sum_{i=1}^{n}\left(x_i-\bar{x}\right)^2}{n-1}}\times\sqrt{21}(\%)$
Liquidity of underlying stock (LIQUID)	Monthly turnover ratio of underlying stock (%)
First year of contract trading (FIRST)	Based on the dates when TFEX added new underlying stocks on Single Stock Futures, a contract is assigned a value of one if it is traded in its first year and zero otherwise
COVID-19 pandemic situation (COVID)	A contract is assigned a value of one during the period when there is the tightened daily price limit of Single Stock Futures due to the COVID-19 pandemic situation and zero otherwise

in natural logarithmic form is used as a measure of its success. There are five explanatory variables. To represent characteristics of underlying market, the model includes underlying stock's size, volatility, and liquidity. Two dummy variables, one for Single Stock Futures trading in its first year and another for the period in which TFEX applied the tightened daily price limit of Single Stock Futures due to the COVID-19 pandemic situation, are also used to capture characteristics of futures market. Table 2 provides the measurement of all variables stated in the model.

To determine the success of the Single Stock Futures market, this paper considers panel data on a sample of 89 companies on which stocks are underlying for Single Stock Futures over 60 months starting from January 2017 to December 2021, a total of 5,334 observations. The panel data are unbalanced. Monthly trading volume of some contracts is zero so that their natural log form is undefined. Applying a one-way error component model for disturbances, the following equation is estimated:

$$VOL_{it} = a_0 + a_1 SIZE_{it} + a_2 VOLAT_{it} + + a_3 LIQUID_{it} + a_4 FIRST_{it} + a_5 COVID_t + e_{it} \quad (1)$$

with

$$e_{it} = \mu_i + \nu_{it}, \quad (2)$$

for i = 1, 2, …, 89; t = 1, 2, …, 60

This paper applies three common approaches to estimate the regression model using panel data. They are as follows (Baltagi, 2001):

1. Pooled Ordinary Least Square Regression Model (POLS): This model combines time series and cross section data and assumes $\mu_i = 0$ and $\nu_{it} \overset{\text{i.i.d.}}{\sim} N\left(0, \sigma_\nu^2\right)$. All independent variables are uncorrelated with ν_{it} for all i and t. Ordinary Least Square technique is used to estimate the model.

2. Fixed Effects Model (FE): This model assumes variation within individuals. In this case, μ_i are assumed to be fixed parameters to be estimated and the remainder disturbances are stochastic with $\nu_{it} \overset{\text{i.i.d.}}{\sim} N\left(0, \sigma_\nu^2\right)$. All independent variables are uncorrelated with ν_{it} for all i and t. Least Squares Dummy Variable technique is used to estimate the model.

3. Random Effects Model (RE): This model assumes μ_i as random variables. In this case, $\mu_i \overset{\text{i.i.d.}}{\sim} N\left(0, \sigma_\mu^2\right)$, $\nu_{it} \overset{\text{i.i.d.}}{\sim} N\left(0, \sigma_\nu^2\right)$, and μ_i are independent of ν_{it}. All independent variables are uncorrelated with μ_i and ν_{it}, for all i and t. Generalized Least Square technique is used to estimate the model.

Note that when the true model is FE, POLS yields biased and inconsistent estimators. This is an omission variable bias since POLS deletes the individual dummies. Therefore, it is important to test poolability of the data using Chow test presented by Chow (1960). In choosing between FE and RE, the key consideration is whether all independent variables are correlated with μ_i. Hausman (1978) proposes a method for testing this assumption. This paper conducts both Chow test and Hausman test.

1. Chow test: To test the joint significance of these dummies, $H_0 : \mu_1 = \mu_2 = \ldots = \mu_{N-1} = 0$, an F-test is performed.

$$F = \frac{(RRSS - URSS)/(N-1)}{URSS/(NT - N - K)} \overset{H_0}{\sim} F_{N-1, NT-N-K}. \quad (3)$$

where *RRSS* is restricted residual sums of squares obtained by applying POLS, and URSS is unrestricted residual sums of squares obtained by applying *FE*. If the null hypothesis is rejected, FE is more appropriate than POLS in estimating panel data.

2. Hausman test: This test is based on the difference between RE and FE estimates, $H_0 : \beta_{RE} = \beta_{FE}$. Under the null hypothesis of no correlation between the independent variables and the error term, there should be no difference between RE and FE estimators, implying that both RE and FE estimators are consistent, but FE estimator is inefficient. Therefore, RE is preferred to FE. If the null hypothesis is rejected, RE estimators become biased and inconsistent. However, FE yields unbiased and consistent estimators. FE is more appropriate than RE in estimating panel data. The Hausman test statistic is asymptotically distributed as λ_K^2 and given by

$$H = (\beta_{RE} - \beta_{FE})' \left[\operatorname{var}(\beta_{FE}) - \operatorname{var}(\beta_{RE})\right]^{-1} \times \times (\beta_{RE} - \beta_{FE}) \overset{H_0}{\sim} \lambda_K^2, \quad (4)$$

where *K* is the number of independent variables.

3. RESULTS

This section presents a brief overview of the Single Stock Futures market in Thailand and estimation results for determinants of the successful Single Stock Futures market in Thailand

3.1. Single Stock Futures Market in Thailand

After the start of SET50 Index Futures and Options trading on TFEX, Single Stock Futures was launched as the third derivatives product on November 24, 2008 to provide investors with more investment alternatives in order to better manage risk and even improve profitability. Each Single Stock Futures, with a contract size of 1,000 shares, has four contract months, expiring in March, June, September and December. To reduce the impact of the COVID-19 pandemic on market volatility, TFEX adjusted the daily price limit of equity derivatives, including Single Stock Futures, from +/- 30% to +/- 15% during the period March 18, 2020 to September 30, 2020. While TFEX total trading volume increased continuously, Single Stock Futures volumes declined in 2020 compared to the previous year by 9.04 percent reaching only 47,386,674 contracts. Single Stock Futures regained its position as the most actively traded derivatives product in 2021, accounting for 52.05 percent of TFEX volumes. As shown in Table 3, Single Stock Futures reached a record high on TFEX in 2021, with total yearly trading volume of 70,326,055 contracts. It rose by 48.41% from the previous year. Moreover, open interest increased by 80.65% with a total of 3,221,487 contracts at the end of year 2021. At present, TFEX's Single Stock Futures trading depends upon 128 underlying stocks traded on the SET. Table 4 shows date of issuance and number of new underlying stocks. There are currently ten batches of Single Stock Futures issued by TFEX. Over the last five years, TFEX introduced four new sets of Single Stock Futures. Although the selected underlying stocks usually are large-cap stocks with high liquidity and popularity among investors, average daily trading volume of Single Stock Futures with new underlying stocks was low in the year it was issued as shown in Figure 1. Overall, average daily trading volumes of Single Stock Futures hit record low levels in 2020.

Table 3. Total yearly trading volume and open interest of Single Stock Futures

Year	Total Yearly Trading Volume		Open Interest	
	number of contracts	percentage change	number of contracts	percentage change
2017	47,480,762	40.37%	2,393,257	50.57%
2018	55,332,444	16.54%	2,134,802	–10.80%
2019	52,098,173	–5.85%	2,917,490	36.66%
2020	47,386,674	–9.04%	1,783,284	–38.88%
2021	70,326,055	48.41%	3,221,487	80.65%

Table 4. Date of issuance and number of new underlying stocks

Batch	Date of Issuance	Number of New Underlying Stocks
1	24 November 2008	3
2	22 June 2009	11
3	21 March 2011	16
4	18 March 2013	20
5	15 July 2013	10
6	5 October 2015	10
7	16 January 2017	24
8	10 June 2019	19
9	13 July 2020	12
10	7 June 2021	7

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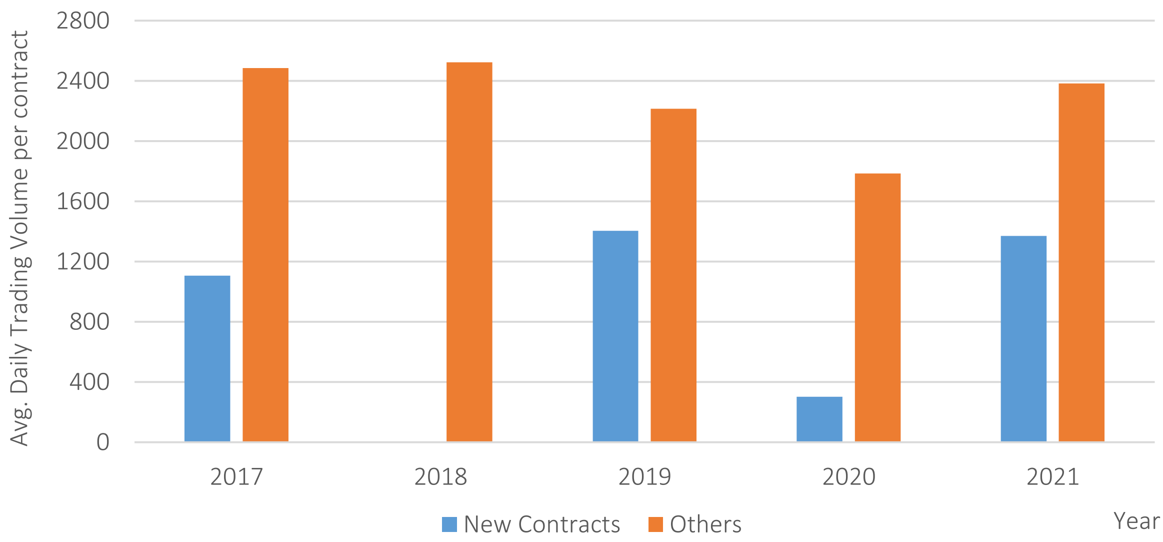

Note: Contract is defined as a new contract in the year it was issued.

Figure 1. Average daily trading volume comparison between new contracts and others

3.2. Determinants of the successful Single Stock Futures market in Thailand

Before getting into any of the model estimation, this paper conducts three approaches for a panel unit root testing under the assumption of independent and identically distributed data. They are as follows:

1. Levin, Lin and Chu Tests (LLC) proposed by Levin et al. (2002).
2. Im, Pesaran and Shin Tests (IPS) proposed by Im et al. (2003).
3. Fisher-type Tests using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests proposed by Maddala and Wu (1999) and Choi (2001).

The summarized results from the panel unit root tests are reported in Table 5. The resulting test statistics show that all panel unit root tests reject the null unit root hypothesis for VOL, VOLAT, and LIQUID at the 1% significance level. Except LLC, the panel unit root null is rejected for COVID at the 1% significance level. Both FIRST and SIZE series are found to be stationary at the 1% significance level by LLC and IPS. Moreover, the panel unit root tests of FIRST are found to be stationary at the 1% significance level by ADF and PP Z-tests and the 10% significance level by ADF and PP Chi-square tests. Although ADF and PP Chi-square tests indicate the failure to find stationarity for SIZE, ADF and PP Z-tests of SIZE show stationary at the 5% significance level. Therefore, it can be concluded that all variables are stationary at their levels.

Table 6 reports the estimation results using three common approaches, including POLS, FE, and RE.

Table 5. Panel unit root tests

Variable (Level Form)	LLC	IPS	ADF		PP	
			Chi-square	Z-stat	Chi-square	Z-stat
VOL	–22.6811***	–27.8773***	1164.57***	–26.2180***	1350.90***	–29.7811***
SIZE	–2.89373***	–2.48887***	200.345	–2.31658**	189.600	–1.95148**
VOLAT	–30.9415***	–31.3191***	1318.03***	–29.2369***	1421.03***	–31.2311***
LIQUID	–23.8691***	–26.9073***	1137.90***	–25.1790***	1413.08***	–30.7279***
FIRST	–4.60558***	–2.83470***	59.7468*	–2.89776***	59.6559*	–2.88998***
COVID	0.29576	–7.86754***	291.815***	–8.14066***	333.298***	–9.62741***

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Table 6. Panel regression model results

Variable	POLS		FE		RE	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	2.033013	0.0000***	–13.65300	0.0000***	–11.54470	0.0000***
SIZE	0.282399	0.0000***	0.912690	0.0000***	0.827807	0.0000***
VOLAT	0.016795	0.0007***	0.041190	0.0000***	0.040235	0.0000***
LIQUID	0.050972	0.0000***	0.031044	0.0000***	0.031833	0.0000***
FIRST	–0.638802	0.0000***	–0.434137	0.0000***	–0.425079	0.0000***
COVID	–0.694934	0.0000***	–0.565462	0.0000***	–0.589328	0.0000***
F-statistic	256.1090	0.0000***	154.3188	0.0000***	162.4990	0.0000***
Chow Test	119.9472	0.0000***	Hausman Test		45.82769	0.0000***

Note: *** denotes statistical significance at the 1% level. Please refer to Appendix A for the fixed parameters estimation in FE.

Table 7. Comparison of standard error estimates for FE regression

Variable	Coefficient	Standard Error (t-statistic)				
		Ordinary Least Square	White cross-section	White period	Cross-section SUR	Period SUR
C	–13.65300	0.981543	1.903136	3.591023	1.763666	2.271845
		(–13.90974)***	(–7.173951)***	(–3.801982)***	(–7.741264)***	(–6.009655)***
SIZE	0.912690	0.039417	0.075804	0.142349	0.070957	0.091363
		(23.15478)***	(12.04015)***	(6.411630)***	(12.86266)***	(9.989667)***
VOLAT	0.041190	0.003152	0.004456	0.008272	0.006576	0.004377
		(13.06624)***	(9.243650)***	(4.979154)***	(6.263291)***	(9.410395)***
LIQUID	0.031044	0.001383	0.003189	0.008335	0.002135	0.002469
		(22.44615)***	(9.733830)***	(3.724474)***	(14.54324)***	(12.57548)***
FIRST	–0.434137	0.059032	0.188729	0.167932	0.136057	0.131752
		(–7.354307)***	(–2.300319)**	(–2.585206)***	(–3.190850)***	(–3.295111)***
COVID	–0.565462	0.041818	0.111023	0.069799	0.125777	0.064174
		(–13.52194)***	(–5.093197)***	(–8.101332)***	(–4.495767)***	(–8.811330)***
R^2		0.732539				
Adjusted R^2		0.727792				

Note: The *t*-statistics (in parentheses) are based on standard error estimates obtained from the covariance matrix estimators in the column headings. **and *** Coefficients are statistically significant at the 5% and 1% level, respectively.

All methods show the p-value associated with F-statistic equal to 0.0000 meaning that we can reject the null hypothesis that all of the regression coefficients are equal to zero at the 0.01 level. However, the appropriate model can be chosen by conducting Chow test and Hausman test. Chow test for poolability of the data yields an observed F-value of 119.9472 which is distributed as F (88, 5240). Its P-value is 0.0000 indicating that we can reject the null hypothesis at the 1% level of significance. FE is better than POLS. The resulting Hausman test also confirms that FE is most appropriately used in estimating panel data due to an observed λ_5^2 statistic of 45.82769 which is significant at the 1% level. RE estimators become biased and inconsistent, but FE estimators are unbiased and consistent.

Table 7 compares the results from different techniques of obtaining standard error estimates for the FE estimators. All techniques show that all of the regression coefficients are highly significant at the 1% level. More than 70% of the variation in the natural log form of monthly Single Stock Futures trading volume is explained by SIZE (the spot market size), VOLAT (the spot market volatility), LIQUID (the spot market liquidity), FIRST (first year of contract trading), and COVID (COVID-19 pandemic situation). The coefficients of SIZE, VOLAT, and LIQUID are positive and statistically significant at the 0.01 level. The findings indicate that characteristics of underlying stock, including size, volatility, and liquidity, have a positive impact on contract success, and hence support hypothesis *H1*. Hypothesis *H2* states that character-

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istics of the Single Stock Futures market, including the first year of contract trading and the tightened daily price limit in response to COVID-19 pandemic situation, are negatively related to the success of Single Stock Futures. The results in Table 7 show negative and significant coefficients of both FIRST and COVID, thereby supporting *H2*.

4. DISCUSSION

Consistent with previous work, especially Mugo-Waweru and Kim (2013), the estimation results show that characteristics of underlying stock, including size, volatility, and liquidity, are the key factors in determining contract success. Single Stock Futures contract should consist of the underlying share with large market capitalization, higher volatility, and thicker liquidity, since it attracts both speculators and hedgers to the market. Investors are usually more confident about a large capitalization stock, which are generally issued by mature company with a good reputation and long track records of performance. Rather than trading stocks, they can choose to trade in futures contracts on large-cap stocks due to the low upfront payments. Investors are also more likely to hedge their volatile stocks using Single Stock Futures. Furthermore, futures contracts on high-volatility stocks are attractive to traders due to their quick profit potential. Investing in futures contracts on highly liquid stocks is generally safer than those on less liquid stocks. For characteristics of futures market, two dummy variables, one for Single Stock Futures trading in its first year and another for the period in which TFEX applied the tightened daily price limit of Single Stock Futures in response to the COVID-19 pandemic situation, negatively and significantly affect contract success. Like Białkowski and Jakubowski (2012), trading volume on futures with new underlying stock is relatively low in the first year of trading, since Single Stock Futures that has been available on the market longer may receive more investors' attention. Although daily price limit is viewed as a market stabilization mechanism, this finding raises some concern about the negative effect of the tightened daily price limit on trading volume of Single Stock Futures.

CONCLUSION

The majority of past studies focus on the success or failure of agricultural futures. This study adds to the existing literature on equity derivatives success by analyzing what determines the success of the Single Stock Futures market in Thailand. Like most previous literature, characteristics of the underlying market, including size, volatility, and liquidity, have a positive impact on contract success. Two dummy variables for characteristics of futures market, one for Single Stock Futures trading in its first year and another for the period in which TFEX applied the tightened daily price limit of Single Stock Futures in response to the COVID-19 pandemic situation, are negatively related to contract success. Therefore, to promote stock futures trading, organized futures exchanges, including TFEX, should consider characteristics of underlying assets such as size, volatility, and liquidity when selecting new underlying stocks. Stock futures should consist of the underlying share with large market size, higher volatility, and thicker liquidity. Organized futures exchanges should also conduct public relations activities and waive the commission levy of the new contracts for the first year upon the commencement of trading to attract more investors. Different futures contracts should have the different adjustment of daily price limit to mitigate market disturbance. The results could help policymakers and organized futures exchanges by increasing their information regarding the negative effect of the tightened daily price limit on trading activity and thus support them to implement the rule effectively.

As a subject for further research work, it would be useful to make a comparison of factors affecting the successful futures contracts with underlying stocks across sectors. Another question that remains unresolved is why SET50 Index Options as the only options contract in TFEX is not successful. This issue needs to be resolved to aim for the development of single stock options market in Thailand, which can provide additional opportunities to manage risk and enhance returns.

AUTHOR CONTRIBUTIONS

Conceptualization: Woradee Jongadsayakul.
Data curation: Woradee Jongadsayakul.
Formal analysis: Woradee Jongadsayakul.
Funding acquisition: Woradee Jongadsayakul.
Investigation: Woradee Jongadsayakul.
Methodology: Woradee Jongadsayakul.
Project administration: Woradee Jongadsayakul.
Resources: Woradee Jongadsayakul.
Software: Woradee Jongadsayakul.
Supervision: Woradee Jongadsayakul.
Validation: Woradee Jongadsayakul.
Visualization: Woradee Jongadsayakul.
Writing – original draft: Woradee Jongadsayakul.
Writing – review & editing: Woradee Jongadsayakul.

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APPENDIX A

Table A1. The estimation result of fixed parameters for all 89 companies on which stocks are underlying for Single Stock Futures

Underlying Stock (i)	μ_i	Underlying Stock (i)	μ_i	Underlying Stock (i)	μ_i
AAV	–11.8097	EGCO	–16.3705	RATCH	–15.332
ADVANC	–15.5326	EPG	–12.9642	S	–12.418
AMATA	–12.7232	GLOBAL	–13.7497	SAMART	–12.6428
AOT	–15.0298	GPSC	–14.3645	SAWAD	–14.0269
AP	–12.6714	GUNKUL	–11.618	SCB	–15.467
BA	–14.2389	HANA	–14.4368	SCC	–16.2501
BANPU	–12.3472	HMPRO	–14.1948	SIRI	–10.4818
BAY	–18.1721	ICHI	–13.0182	SPALI	–13.8699
BBL	–15.4072	INTUCH	–15.0171	SPCG	–14.1334
BCH	–12.9924	IRPC	–11.707	STA	–13.1473
BCP	–14.4313	ITD	–11.2208	STEC	–12.7025
BDMS	–14.4532	IVL	–13.8206	STPI	–12.9364
BEAUTY	–12.5391	JAS	–11.1292	TASCO	–12.9109
BEC	–12.624	KBANK	–15.2326	TCAP	–14.677
BEM	–12.7879	KCE	–14.0282	THCOM	–12.9723
BH	–15.663	KKP	–14.5939	TISCO	–14.8456
BJC	–14.7672	KTB	–13.4502	TOP	–14.4786
BLA	–15.1045	KTC	–14.4151	TPIPL	–11.8735
BLAND	–10.3075	LH	–13.2761	TRUE	–11.778
BTS	–13.05	LPN	–12.3699	TTA	–12.9718
CBG	–13.388	MAJOR	–14.3696	TTB	–11.4919
CENTEL	–14.4916	MINT	–13.8732	TTCL	–13.2333
CHG	–11.5346	MTC	–14.3001	TTW	–15.2541
CK	–13.0519	PLANB	–12.4989	TU	–13.455
CKP	–11.9385	PSH	–14.2034	TVO	–14.7612
CPALL	–14.7145	PTG	–12.6032	UNIQ	–12.9478
CPF	–13.8588	PTT	–15.5999	VGI	–12.8659
CPN	–15.1933	PTTEP	–15.0972	VNG	–14.8594
DELTA	–16.9184	PTTGC	–14.5016	WHA	–11.1481
DTAC	–14.0134	QH	–11.4933		

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