


Ownership Structure and Stock Liquidity: A Taiwan Study

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Abstract

This study uses firms listed in Taiwan from 2009 to 2018 as samples to investigate the correlation between ownership structure and stock liquidity. The results indicate that blockholder and institutional ownership have a nonlinear effect on stock turnover rate except the firms with low stock liquidity and profitability. The inflection point of institutional ownership has a pronounced change after including the interaction effect of low stock liquidity or operation deficits. Besides, low stock liquidity and operation deficits have a moderating effect on ownership structure and stock liquidity. The low stock liquidity aggravates the negative effect of blockholder ownership on the stock turnover rate and changes the effect of institutional ownership on the stock turnover rate from positive to negative. The operating deficits weaken the negative effect of blockholder ownership and lessen the positive effect of institutional ownership on the stock turnover rate.

Keywords

Ownership Structure, Stock Liquidity, Blockholder Ownership, Institutional Ownership, Stock Turnover Rate, Operating Deficits

1. Introduction

Stock liquidity is the ability for stock to be transacted quickly and at a low cost. It is a key factor market investors consider when making investment decisions. The literature has revealed that investors prefer stocks with high liquidity (Bou-bakri *et al.* [1]; Thapa and Poshakwale [2]). According to the minority shareholder expropriation theory, ownership concentration increases the potential of majority shareholders to expropriate minority shareholders (Yeh and Woidtke [3]), which often leads to problems of agency between controlling and minority shareholders (Claessens *et al.* [4]; Young *et al.* [5]). Therefore, high blockholder

ownership can decrease stock liquidity (Attig *et al.* [6]; Prommin *et al.* [7]). Institutional investors can influence stock liquidity through the information effect, trading effect, and herding behavior (Bushee and Goodman [8]; Cao and Petrasek [9]; Chordia *et al.* [10]). Furthermore, according to the institutional investor theory, institutional investors can act as supervisors, improving the quality of corporate governance, reducing agency costs, and increasing market participants' confidence and stock liquidity (Baker and Wallage [11]; Chung *et al.* [12]; Jain *et al.* [13]). Accordingly, this study explores the effects of blockholder and institutional investors on stock liquidity from the perspective of ownership structures. This is an important issue for an emerging market with high ownership concentration by dominant shareholders and for a thin market (or a small market) led by retail investors let it is easy to manipulate the stock market for the institutional investors.

Taiwan's stock market is a small market, and the structure of investors is consisting of many individual investors. The market is deeply influenced by institutional investors. The individual investors' behaviour usually follows institutional investors which dominate the stock market. In Taiwan, deadstock (or zombie stock) is defined as money-losing stock or stock that has a low trading volume (e.g., an average daily trading volume of fewer than 100,000 shares) for a long period of time. To solve the problem of deadstock, the Taiwan Stock Exchange promulgated a stock delisting regulation in March of 2019 that specifies that listed companies determined by certified accountants in audit reports to have major uncertainties regarding their continued operation or to have stock with a net asset value per share of less than NT\$3 must make improvements within 3 years; if improvements cannot be made within this time, the firm's stock will no longer be traded and will be delisted after 6 months. On July 1, 2021, market making for quality stock with low liquidity was performed to increase investors' trading opportunities, enhance stock liquidity, and attract more capital investment in the Taiwan Stock Market. The inclusion criteria for quality stock with low liquidity are a stock listed for 1 year with a relatively low average daily trading volume, turnover rate, and volatility; no operating deficits in the year preceding; earnings per share higher than NT\$2; and dividends in the year preceding. Whether operating deficits and profitability differential results in the low stock liquidity group is an important issue that stock exchange regulators, corporate governance, and investors care about. Accordingly, this study also investigates the interactive effect between low stock liquidity and operating deficits.

This study contributes the following. First, the literature regarding stock liquidity has mostly focused on market transactions. This study explores the correlations between ownership structures and stock liquidity within the context of corporate governance practice in Taiwan. The results indicate that blockholder and institutional ownership have a nonlinear effect on stock liquidity except for the firms with low stock liquidity and profitability. Moreover, the inflection point of institutional ownership has pronounced change after including the interaction

effect of low stock liquidity or operation deficits. This provides implications for an emerging market with high blockholder ownership concentration and a thin or small market led by retail investors. Second, the empirical research design is a novelty. This study manipulates the interaction terms to examine whether operating deficits and profitability differential results in the low stock liquidity group or whether the low and high stock liquidity firms with operating deficits yield differential results. The results show that low stock liquidity and operating deficits have a moderating effect on ownership structure and stock liquidity. These could offer additional insight into the empirical literature and provide a reference for stock exchange regulators. Third, the methodology is rigorous. The groupwise heteroscedasticity and contemporaneous correlation of the firms and periods are considered to reduce regression coefficient estimation bias in the panel data regression model.

The rest of the paper is organized as follows. Section 2 reviews the literature on ownership structures and stock liquidity. Section 3 describes the data and methods, including a discussion of the samples, variable definitions, and empirical models. Section 4 presents an analysis and discussion of empirical findings. Section 5 concludes this paper.

2. Literature Review

The ownership has a significant effect on bank liquidity (Díaz and Huang [14]). Research reveals that firms with decentralized ownership have higher agency costs, and the shareholders of such firms generally have a lower motivation to supervise the firms, which results in free-rider problems and expropriation by managers (Grossman and Hart [15]). Therefore, the higher ownership dispersion does not improve market liquidity (Omet [16]). According to the minority shareholder expropriation theory, ownership concentration can reduce managers' discretionary power, leading majority shareholders to have more influence and the power to intervene in a firm's decision-making to benefit themselves. Under such circumstances, agency problems between controlling and minority shareholders are likely to occur (Claessens *et al.* [4]; Young *et al.* [5]). Furthermore, majority shareholders are assumed to possess private information, leading to information asymmetry and thus a higher adverse selection cost. As a result, concentrated ownership structures via the threat of informed trading, adversely affect stock trading activity (Leaño and Pedraza [17]). Firms with more concentrated ownership experience significantly lower stock liquidity (Attig *et al.* [6]; Prommin *et al.* [7]; Brockman *et al.* [18]). However, the dominant monitor-insider hypothesis contends that dominant shareholders are not detrimental to market liquidity, since they are motivated to protect liquidity in order to reduce their exit costs and/or to improve the information transfer of their value-enhancing activities to markets. The ownership concentration by dominant shareholders may be not an adverse governance mechanism (Cueto and Switzer [19]).

Institutional investors can influence stock liquidity through the information effect, the trading effect, and herding behavior, with the information effect referring to institutional investors having information advantages over other investors, which may reduce stock liquidity (Bushee and Goodman [8]; Bae *et al.* [20]). However, firms with higher institutional ownership have narrower spreads, higher market quality index, and smaller price impact of trades (Jiang *et al.* [21]). Hence, firms may alleviate information asymmetry and improve stock market liquidity by increasing institutional ownership. On the other hand, the trading effect and herding behavior are likely to increase stock liquidity (Cao and Petrasek [9]). The conventional wisdom states that institutional investors improve market efficiency by correcting mispricing. Their participation helps enhance liquidity by promoting trade activities and price discovery (Ding *et al.* [22]; Luo *et al.* [23]). Nevertheless, institutional investors' speculation behaviour and their destabilising effect on the stock market (Kong and Kong [24]) may increase firm-level stock return volatility (Chen *et al.* [25]). Besides, from the corporate governance perspective, firms with higher institutional ownership have significant future improvements in shareholder rights, consistent with shareholder activism (Bushee *et al.* [26]). Therefore, higher institutional ownership is associated with greater management disclosure, analyst following, and liquidity, resulting in lower information asymmetry, which enhances monitoring and decreases trading costs (Boone and White [27]). Theories on institutional investors and active monitoring propose that high institutional ownership encourages institutional investors to monitor corporate management (Baker and Wallage [11]; McCahery, *et al.* [28]), which improves corporate governance, reduces agency costs, enhances investors' confidence, and thus increases stock liquidity (Jain *et al.* [13]; Chung *et al.* [12]).

3. Data and Methodology

The firms listed in Taiwan between 2009 and 2018 are selected as samples. After excluding financial sectors and those with less than 3 years of data, 1773 firms (14,497 annual observations) are included for analysis. The data are retrieved from the Taiwan Economic Journal database. In July 2020, 440 (25.4%) of the 1731 firms listed on the Taiwan Stock Market have a trading volume of fewer than 100,000 shares, and approximately 300 firms have a trading volume of fewer than 50,000 shares. In this study, the average daily trading volume of 100,000 shares is used as the criterion to divide the samples into two groups (*i.e.*, high and low liquidity). In total, 3178 observations with an average daily trading volume < 100,000 shares (low stock liquidity group), which comprise 21.92% of the total observations, and 11,319 observations with an average daily trading volume \geq 100,000 shares (high stock liquidity group), which comprise 78.08% of the total observations.

The stock liquidity variables are stock turnover rate (Prommin *et al.* [7]; Qian *et al.* [29]; Tran *et al.* [30]) and the dummy of low stock liquidity. The ownership

Table 1. Variable definition.

Variable	Symbol	Definition
Stock liquidity		
Stock turnover rate (%)	<i>turnover</i>	Average monthly ratio of stock trading volume to total number of ordinary shares outstanding
Low stock liquidity	<i>lowliq</i>	A dummy variable that equals 1 for the firm with an average daily stock trading volume less than 100,000 shares, and 0 otherwise
Ownership structure		
Blockholder ownership (%)	<i>blockhold</i>	Proportion of number of shares held by the majority shareholders to total number of ordinary shares outstanding
Institutional ownership (%)	<i>insthold</i>	Proportion of number of shares held by the institutional investors to total number of ordinary shares outstanding
Firm-specific control variable		
Firm size	<i>lna</i>	Natural logarithm of the total assets
Return on assets (%)	<i>ROA</i>	Ratio of net income after tax before interest to total assets
Operating deficits	<i>loss</i>	A dummy variable that equals 1 for the firm with a negative ROA, and 0 otherwise
Debt ratio (%)	<i>debratio</i>	Ratio of total debt to total assets
Price-to-book ratio	<i>pbratio</i>	Ratio of price per share to book value per share
Stock return (%)	<i>return</i>	Natural logarithm of monthly stock return at current year
Industry	<i>industry</i>	The sample divided into three industries based on the standard industrial classification of Taiwan, including electronic technology, biological and agricultural technology, conventional industries

structure variables are blockholder ownership and institutional ownership (Prommin *et al.* [7]; Tran *et al.* [30]). Additionally, the variables of firm-specific characteristics that affect stock liquidity are also controlled, such as firm size, return on assets (ROA), dummy of operating deficits, debt ratio, price-to-book ratio, stock return, and industry (Prommin *et al.* [7]; Chung *et al.* [12]; Chordia *et al.* [31]; Ali *et al.* [32]; Nadarajah *et al.* [33]; Zilin *et al.* [34]). The definition for the variables is presented in **Table 1**. Furthermore, to prevent the results from being affected by outliers, the top and bottom 1% of data for all continuous variables are winsorizing.

Both cross-sectional and time-series data are collected. To prevent potential collinearity between fixed intercept terms and variables of the dummy that does not change with time, a two-way random-effects panel data regression model is applied for analysis. The following five models are developed:

$$turnover_{it} = \alpha_0 + \sum \beta ownership_{it} + \sum \gamma Z_{it-1} + \sum \tau industry_i + u_i + \delta_t + \varepsilon_{it} \quad (1)$$

$$turnover_{it} = \alpha_0 + \sum \beta ownership_{it} + \sum \theta ownership_{it}^2 + \sum \gamma Z_{it-1} + \sum \tau industry_i + u_i + \delta_t + \varepsilon_{it} \quad (2)$$

$$turnover_{it} = \alpha_0 + \sum \beta ownership_{it} + \sum \theta ownership_{it}^2 + \sum \phi lowliq_{it} * ownership_{it} + \sum \omega lowliq_{it} * ownership_{it}^2 + \sum \gamma Z_{it-1} + \sum \tau industry_i + u_i + \delta_t + \varepsilon_{it} \quad (3)$$

$$turnover_{it} = \alpha_0 + \sum \beta ownership_{it} + \sum \theta ownership_{it}^2 + \sum \phi loss_{it-1} * ownership_{it} + \sum \omega loss_{it-1} * ownership_{it}^2 + \sum \gamma Z_{it-1} + \sum \tau industry_i + u_i + \delta_t + \varepsilon_{it} \quad (4)$$

$$turnover_{it} = \alpha_0 + \sum \beta ownership_{it} + \sum \theta ownership_{it}^2 + \sum \phi lowliq_{it} * loss_{it-1} * ownership_{it} + \sum \omega lowliq_{it} * loss_{it-1} * ownership_{it}^2 + \sum \gamma Z_{it-1} + \sum \tau industry_i + u_i + \delta_t + \varepsilon_{it} \quad (5)$$

Equation (1) is the linear model of ownership structure; Equation (2) is the quadratic model of ownership structure (Prommin *et al.* [7]; Chia *et al.* [35] [36])¹. In Equation (3), the cross-multiplying term *lowliq* × *ownership* is included to determine the interactive effects of low stock liquidity and ownership structure. In Equation (4), the cross-multiplying term *loss* × *ownership* is incorporated to determine the interactive effects of operating deficits and ownership structure. In Equation (5), the cross-multiplying term *lowliq* × *loss* × *ownership* is added to analyze the interactive effects of ownership structure and a firm with both low stock liquidity and operating deficits. In these models, *turnover* is the stock turnover rate; *ownership* is the ownership structure; *lowliq* is a dummy for low stock liquidity; *loss* is a dummy for operating deficits; *Z* is the firm-specific characteristics; *industry* is the three industries; *u_i* and *δ_t* are firm-effects and year-effects, respectively; and *ε_{it}* is the residual term. To prevent contemporaneous endogeneity in variables, *loss* and *Z* are all-time lag of one period (*t* − 1) data. Moreover, in Equations (1)-(5), the groupwise heteroscedasticity and contemporaneous correlation of the firms and periods are considered to reduce regression coefficient estimation bias in the panel data models.

4. Empirical Results

The descriptive statistics and the two-sample t-test for the difference between the mean are presented in **Table 2**. There is great heterogeneity in the two groups. In the low stock liquidity group, the stock turnover rate lies between 0.13% and 13.33%, while the standard deviation is 1.533%; blockholder ownership lies between 3.59% and 59.83%, while the standard deviation is 13.326%; institutional

¹Chia *et al.* [35] [36] provide evidence of a nonlinear relationship between the number of shareholders and liquidity, and while more shareholders are associated with higher liquidity in Malaysia Market. However, Prommin *et al.* [7] suggest that there is no evidence that the relationship between ownership and liquidity is a nonlinear in Thailand market.

Table 2. Descriptive statistics and t-test for difference between mean.

Variable	Low stock liquidity				High stock liquidity				T-test
	Mean	Min	Max	SD	Mean	Min	Max	SD	
<i>turnover</i>	1.63	0.13	13.33	1.533	15.23	0.13	70.14	14.453	13.594***
<i>blockhold</i>	28.12	3.59	59.83	13.326	20.17	3.59	59.83	10.737	-7.597***
<i>insthold</i>	41.82	0.90	91.48	24.033	37.58	0.90	91.48	22.169	-4.241***
<i>lnta</i>	7.10	5.31	10.52	0.970	9.63	5.30	12.84	1.405	1.525***
<i>ROA</i>	0.34	-30.70	24.95	10.448	3.91	-30.70	24.95	8.179	3.564***
<i>debratio</i>	40.32	4.90	83.67	19.577	40.79	4.90	83.67	17.509	0.463
<i>pbratio</i>	1.90	0.42	10.25	1.817	1.82	0.42	10.25	1.522	-0.082**
<i>return</i>	-0.30	-8.67	14.48	3.450	1.26	-8.67	14.48	4.099	1.562***

Note: Low stock liquidity is the stocks with an average daily trading volume < 100,000 shares; high stock liquidity is the stocks with an average daily trading volume \geq 100,000 shares. The definition for the variables is presented in **Table 1**. SD is the standard deviation.

ownership lies between 0.90% and 91.48%, while the standard deviation is 24.033%; ROA lies between -30.07% and 24.95%, while the standard deviation is 10.448%. In the high stock liquidity group, the stock turnover rate lies between 0.13% and 70.14%, while the standard deviation is 14.453%; blockholder ownership lies between 3.59% and 59.83%, while the standard deviation is 10.737%; institutional ownership lies between 0.90% and 91.48%, while the standard deviation is 22.169%; ROA lies between -30.07% and 24.95%, while the standard deviation is 8.179%. In terms of standard deviation for variables, the variation in blockholder and institutional ownership and ROA (13.326%, 24.033%, and 10.448%, respectively) is higher in the low stock liquidity group, and the variation in the stock turnover rate and institutional ownership (14.453% and 22.169%, respectively) is higher in the high stock liquidity group.

The mean values of debt ratio for low and high stock liquidity groups are 40.32% and 40.70%, respectively, and the t-test is nonsignificant. The mean values of blockholder and institutional ownership and price-to-book ratio in the low stock liquidity group are 28.12%, 41.82%, and 1.90, respectively; while those of the high stock liquidity group are 20.17%, 37.58%, and 1.82, respectively. The t-test shows that blockholder and institutional ownership and price-to-book ratio in the low stock liquidity group are significantly higher than those of the high stock liquidity group. This indicates that the low stock liquidity group contains firms with high growth potential.

Before conducting the subsequent regression analyses, the correlations and collinearity between the variables are examined. The Pearson correlation coefficients (ρ) and variance inflation factor (VIF) for the variables are presented in **Table 3**. The ρ between variables ranges between -0.2752 and 0.3692, which indicates a low correlation². The VIF ranges between 1.16 and 1.54, indicating that

² $|\rho| \leq 0.4$ is modestly correlated, $0.4 < |\rho| \leq 0.7$ is moderately correlated, $|\rho| > 0.7$ is highly correlated.

Table 3. Pearson correlation matrix.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	VIF
(1) <i>turnover</i>	1								
(2) <i>blockhold</i>	-0.2752	1							1.16
(3) <i>insthold</i>	-0.1772	0.2753	1						1.41
(4) <i>lnta</i>	0.0474	-0.0726	0.3692	1					1.54
(5) <i>ROA</i>	0.1365	-0.0408	0.1657	0.2261	1				1.26
(6) <i>debratio</i>	-0.0386	0.0750	0.0754	0.3307	-0.1402	1			1.21
(7) <i>pbratio</i>	0.1151	0.0732	0.1835	-0.1193	0.2140	-0.0611	1		1.24
(8) <i>return</i>	0.3176	-0.0526	0.0106	0.0260	0.2977	-0.0358	0.3126	1	1.19

Note: The definition for the variables is presented in **Table 1**. VIF is the variance inflation factor.

the collinearity between the variables is not serious.

The results of ownership structure and stock liquidity are displayed in **Table 4**. In Model 1, the coefficients of blockholder and institutional ownership are -0.1454 and -0.0645 , respectively. The result shows that ownership has a significant negative effect on the stock turnover rate, which is consistent with findings of prior studies, indicating that higher cost of agency problems and adverse selection are often caused by high blockholder ownership which adversely affects stock trading activity (Claessens *et al.* [4]; Young *et al.* [5]; Attig *et al.* [6]; Prommin *et al.* [7]; Brockman *et al.* [18]; Leñaño and Pedraza [17]), and that institutional ownership could reduce stock liquidity through the information effect (Bushee and Goodman [8]; Bae *et al.* [20]).

In Model 2, the linear coefficients of blockholder and institutional ownership are -0.3049 and 0.0744 , respectively; and the quadratic coefficients are 0.0027 and -0.0016 , respectively; showing that the effects of blockholder and institutional ownership on stock turnover rate are nonlinearity³. That is, blockholder ownership could have a positive effect on the stock turnover rate when over 54.45%, however, institutional ownership could have a negative effect on the stock turnover rate when over 23.25%. Models 3-5 have the same results⁴. These results imply that blockholders are motivated to protect liquidity in order to increase their wealth at a high ownership level (Cueto and Switzer [19]). By contrast, the trading effect, herding behavior, and attracting investors' attention of institutional investors are likely to increase stock liquidity at a low ownership level (Cao and Petrasek [9]; Baker and Wallage [11]; Ding *et al.* [22]; Luo *et al.* [23]). However, institutional investors have an adverse effect on the stock turnover rate at a high ownership level.

³The endogeneity may be present between ownership structure and stock liquidity, the dynamic GMM (Arellano and Bover [37]; Blundell and Bond [38]) is adopted for analysis. The results reveal that ownership structure has a nonlinear effect on the stock turnover rate.

⁴In Models 3-5, the inflection point of blockholder ownership lies between 37.91% and 56.59%, and the inflection point of institutional ownership lies between 12.30% and 86.89%.

Table 4. Results of ownership structure and stock liquidity.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
<i>blockhold</i>	-0.1454*** (0.0135)	-0.3049*** (0.0455)	-0.1753*** (0.0499)	-0.3227*** (0.0489)	-0.2804*** (0.0469)
<i>insthold</i>	-0.0645*** (0.0086)	0.0744*** (0.0263)	0.1435*** (0.0292)	0.0895*** (0.0295)	0.0876*** (0.0279)
<i>blockhold</i> ²		0.0027*** (0.0007)	0.0005 (0.0008)	0.0028*** (0.0007)	0.0023*** (0.0007)
<i>insthold</i> ²		-0.0016*** (0.0002)	-0.0023*** (0.0003)	-0.0018*** (0.0003)	-0.0019*** (0.0003)
<i>blockhold</i> × <i>lowliq</i>			-0.3478*** (0.0432)		
<i>insthold</i> × <i>lowliq</i>			-0.2478*** (0.0312)		
<i>blockhold</i> × <i>loss</i>				0.0737 (0.0489)	
<i>insthold</i> × <i>loss</i>				-0.0649* (0.0342)	
<i>blockhold</i> × <i>lowliq</i> × <i>loss</i>					-0.1571*** (0.0481)
<i>insthold</i> × <i>lowliq</i> × <i>loss</i>					-0.1152*** (0.0377)
<i>blockhold</i> ² × <i>lowliq</i>			0.0064*** (0.0007)		
<i>insthold</i> ² × <i>lowliq</i>			0.0029*** (0.0003)		
<i>blockhold</i> ² × <i>loss</i>				-0.0006 (0.0008)	
<i>insthold</i> ² × <i>loss</i>				0.0008** (0.0003)	
<i>blockhold</i> ² × <i>lowliq</i> × <i>loss</i>					0.0028*** (0.0008)
<i>insthold</i> ² × <i>lowliq</i> × <i>loss</i>					0.0017*** (0.0004)
<i>Intra</i>	0.8976*** (0.1509)	0.9181*** (0.1477)	-0.1613 (0.1490)	0.9480*** (0.1482)	0.7919*** (0.1505)
<i>ROA</i>	0.1031*** (0.159)	0.1030*** (0.0157)	0.0991*** (0.0149)	0.1208*** (0.0194)	0.0751*** (0.0169)
<i>debratio</i>	0.0069 (0.0101)	0.0058 (0.0101)	0.0214** (0.0092)	0.0053 (0.0101)	0.0085 (0.0100)
<i>pbratio</i>	0.3661*** (0.1092)	0.4169*** (0.1092)	0.4596*** (0.1035)	0.3999*** (0.1096)	0.4651*** (0.1091)

Continued

<i>return</i>	0.7293*** (0.0381)	0.7222*** (0.0381)	0.6445*** (0.0380)	0.7222*** (0.0379)	0.7092*** (0.0381)
constant	7.9569*** (1.2619)	7.5064*** (1.4047)	14.5036*** (1.3691)	7.2679*** (1.4071)	8.1848*** (1.4053)
Industry	yes	yes	yes	yes	yes
year-effects	yes	yes	yes	yes	yes
firm-effects	yes	yes	yes	yes	yes
Adj. R ²	0.2344	0.2414	0.3094	0.2418	0.2497
Wald χ^2	2128.41***	2170.23***	3078.27***	2221.58***	2446.16***
inflection point (<i>blockhold</i>)		54.46	37.91	56.59	42.89
inflection point (<i>insthold</i>)		23.25	86.91	12.30	linear

Note: The definition for the variables is presented in **Table 1**. The robust standard errors of the coefficient estimates are reported in parentheses. The asterisks ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Models 3-5 represent the results of including low stock liquidity and operating deficits as interaction terms. In Model 3, the coefficients for *blockhold* \times *lowliq* and *insthold* \times *lowliq* are -0.3478 and -0.2478 , respectively, which indicates that low stock liquidity aggravates the negative effect of blockholder ownership on stock turnover rate, and changes the effect of institutional ownership on stock turnover rate from positive to negative. In Model 4, the coefficients for *blockhold* \times *loss* and *insthold* \times *loss* are 0.0737 and -0.0649 , respectively, which represents that operating deficits weaken the negative effect of blockholder ownership and also lessen the positive effect of institutional ownership on stock turnover rates. In Model 5, the coefficients for *blockhold* \times *lowliq* \times *loss* and *insthold* \times *lowliq* \times *loss* are -0.1571 and -0.1152 , respectively, the result is the same as in Model 3. In conclusion, low stock liquidity and operating deficits have a moderating effect on ownership structure and stock liquidity.

In Model 2, the inflection points of blockholder and institutional ownership are 56.46% and 23.25%, respectively. After including the interaction of *ownership* \times *lowliq* (Model 3), the inflection point of blockholder ownership drops down to 37.91%, but the inflection point of the institutional ownership changes to 86.91%. Considering the interaction of *ownership* \times *loss* (Model 4), the inflection point of blockholder ownership has not changed appreciably (56.59%), but the inflection point of the institutional ownership dramatically declines to 12.30%. After adding the interaction term of *ownership* \times *lowliq* \times *loss* (Model 5), the inflection point of blockholder ownership is 42.89% and institutional ownership is linearity. These results reveal that the inflection point of institutional ownership has a pronounced change after including the interaction effect of low stock liquidity or operation deficits. The trading effect and active monitoring of institutional investors could facilitate the stock turnover rate of the firms with

low stock liquidity (Cao and Petrasek [9]; Ding *et al.* [22]; Luo *et al.* [23]). Furthermore, institutional investors have an advantage in information about a firm with operating deficits, the firm's stock turnover rate would decrease with a rise in institutional ownership (Bushee and Goodman [8]; Bae *et al.* [20]).

Table 5. Results of operating deficits and profitability.

Variable	Low stock liquidity		High stock liquidity	
	Deficits	Profitability	Deficits	Profitability
<i>blockhold</i>	0.0003 (0.0169)	-0.0315** (0.0143)	-0.3053*** (0.0915)	-0.2901*** (0.0620)
<i>insthold</i>	0.0129* (0.0074)	-0.0015 (0.0074)	0.0064 (0.0508)	0.1483*** (0.0356)
<i>blockhold^Δ</i>	-0.0002 (0.0002)	0.0003 (0.0002)	0.0031** (0.0015)	0.0023** (0.0011)
<i>insthold^Δ</i>	-0.0002*** (0.0001)	-0.0001 (0.0001)	-0.0012* (0.0006)	-0.0022*** (0.0004)
<i>Inta</i>	-0.1709** (0.0766)	-0.2278*** (0.0592)	0.8577*** (0.2996)	-0.8981*** (0.1972)
<i>ROA</i>	-0.0049 (0.0070)	0.0678*** (0.0102)	0.0523 (0.0435)	0.1142*** (0.0418)
<i>debratio</i>	-0.00050* (0.0026)	-0.0023 (0.0027)	-0.0325* (0.0189)	0.0719*** (0.0145)
<i>pbratio</i>	-0.0487 (0.0335)	-0.0562 (0.0438)	0.5862** (0.2922)	0.9453*** (0.0189)
<i>return</i>	0.0242 (0.0161)	0.0371*** (0.0135)	0.5958*** (0.1027)	0.8072*** (0.0566)
constant	4.2374*** (0.05995)	3.8698*** (0.5371)	14.1895*** (2.8221)	17.8406*** (1.8008)
Industry	yes	yes	yes	yes
year-effects	yes	yes	yes	yes
firm-effects	yes	yes	yes	yes
Adj. R ²	0.1263	0.1737	0.1894	0.2417
Wald χ^2	126.80***	239.30***	403.57***	1623.74***
inflection point (<i>blockhold</i>)	0.75	52.5	49.24	63.06
inflection point (<i>insthold</i>)	32.25	linear	2.67	33.70

Note: Low stock liquidity is the stocks with an average daily trading volume < 100,000 shares; high stock liquidity is the stocks with an average daily trading volume \geq 100,000 shares. Deficits is the firm with a negative ROA at year $t - 1$; profitability is the firm with a positive ROA at year $t - 1$. The definition for the variables is presented in Table 1. The robust standard errors of the coefficient estimates are reported in parentheses. The asterisks ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

As indicated in **Table 4**, whether operating deficits and profitability differential results in the low stock liquidity group cannot be determined through *ownership* \times *lowliq* in Model 3. Similarly, *ownership* \times *loss* in Model 4 cannot be used to determine whether the low and high stock liquidity firms with operating deficits yield differential results. Therefore, this study further applies an indicator of operational performance, ROA_{t-1} , to differentiate the low and high stock liquidity groups into firms with operating deficits and those with profitability.

The results of firms with operating deficits and those with profitability in high and low stock liquidity groups are displayed in **Table 5**. In the low stock liquidity group, blockholder ownership has a nonsignificant effect on the stock turnover rate of firms with operating deficits, but has a significantly negative effect on the stock turnover rate of firms with profitability. By contrast, institutional ownership has a significantly nonlinear effect on the stock turnover rate of firms with operating deficits, but has a nonsignificant effect on the stock turnover rate of firms with profitability. Generally, institutional investors are a symbolic indicator of good corporate governance for a firm. Firms with operating deficits is interested by institutional investors, their stock liquidity will increase (Baker and Wallage [11]; Jain *et al.* [13]; Bushee *et al.* [26]; Boone and White [27]; McCahery, *et al.* [28]; Chung *et al.* [12]). Nevertheless, for firms with profitability, blockholders may be questioned the adequacy of the firms' corporate governance, which reduces their stock liquidity (Claessens *et al.* [4]; Young *et al.* [5]; Attig *et al.* [6]; Prommin *et al.* [7]; Brockman *et al.* [18]). In the high stock liquidity group, blockholder and institutional ownership have a nonlinear effect on the stock turnover rate of firms with operating deficits and those with profitability.

5. Conclusions

Stock liquidity is a key factor market investors consider. Most of the literature has focused on stock liquidity from the perspective of market transactions. This study analyzes the effects of blockholder and institutional ownership on firms' stock liquidity as well as the interactive effects between low stock liquidity and operating deficits. First, the results demonstrate that the effects of blockholder and institutional ownership on stock turnover rate are nonlinearity except for the firms with low stock liquidity and profitability. The inflection point of institutional ownership has a pronounced change after including the interaction effect of low stock liquidity or operation deficits. This provides implications for an emerging market with high ownership concentration by dominant shareholders and for a thin or small market led by retail investors let it is easy to manipulate the stock market for the institutional investors. Second, this study uses interaction terms to examine whether operating deficits and profitability differential results in the low stock liquidity group or whether the low and high stock liquidity firms with operating deficits yield differential results. The results reveal that the low stock liquidity aggravates the negative effect of blockholder ownership on stock turnover rate, and changes the effect of institutional ownership on stock turno-

ver rate from positive to negative. The operating deficits weaken the negative effect of blockholder ownership and also lessen the positive effect of institutional ownership on stock turnover rates. The low stock liquidity and operating deficits have a moderating effect on ownership structure and stock liquidity. The low stock liquidity and operating deficits enhance the correlation between ownership structure and stock liquidity. These results offer additional insights into the empirical literature and stock exchange regulators. Third, in the low stock liquidity group, blockholder ownership has a significantly negative effect on the stock turnover rate of firms with profitability. By contrast, institutional ownership has a significantly nonlinear effect on the stock turnover rate of firms with operating deficits. This provides evidence to make policy for firms with low stock liquidity for stock exchange regulators.

Due to data limitations, my empirical design uncovers how the investment horizon and the number of shareholders affect stock liquidity. These issues could extend to future research. Furthermore, the effects of ownership by investors of different identities and attributes as well as the effects of institutional investors' overbuying and overselling on stock liquidity could also further to be investigated.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- [1] Boubakri, N., Hamza, O. and Kooli, M. (2011) Institutional Investors' Participation in Foreign Firms: Evidence from ADRs. *International Finance Review*, **12**, 145-168. [https://doi.org/10.1108/S1569-3767\(2011\)0000012008](https://doi.org/10.1108/S1569-3767(2011)0000012008)
- [2] Thapa, C. and Poshakwale, S.S. (2012) Country-Specific Equity Market Characteristics and Foreign Equity Portfolio Allocation. *Journal of International Money and Finance*, **31**, 189-211. <https://doi.org/10.1016/j.jimonfin.2011.10.011>
- [3] Yeh, Y.H. and Woidtke, T. (2005) Commitment or Entrenchment? Controlling Shareholders and Board Composition. *Journal of Banking & Finance*, **29**, 1857-1885. <https://doi.org/10.1016/j.jbankfin.2004.07.004>
- [4] Claessens, S., Djankov, S. and Lang, L.H.P. (2000) The Separation of Ownership and Control in East Asian Corporations. *Journal of Financial Economics*, **58**, 81-112. [https://doi.org/10.1016/S0304-405X\(00\)00067-2](https://doi.org/10.1016/S0304-405X(00)00067-2)
- [5] Young, M.N., Peng, M.W., Ahlstrom, D., Bruton, G.D. and Jiang, Y. (2008) Corporate Governance in Emerging Economies: A review of the Principal-Principal Perspective. *Journal of Management Studies*, **45**, 196-220. <https://doi.org/10.1111/j.1467-6486.2007.00752.x>
- [6] Attig, N., Fong, W.M., Gadhoun, Y. and Lang, L.H.P. (2006) Effects of Large Shareholding on Information Asymmetry and Stock Liquidity. *Journal of Banking & Finance*, **30**, 2875-2892. <https://doi.org/10.1016/j.jbankfin.2005.12.002>
- [7] Prommin, P., Jumreornvong, S., Jiraporn, P. and Tong, S. (2016) Liquidity, Ownership Concentration, Corporate Governance, and Firm Value: Evidence from Thailand. *Global Financial Journal*, **31**, 73-87. <https://doi.org/10.1016/j.gfj.2016.06.006>
- [8] Bushee, B.J. and Goodman, T.H. (2007) Which Institutional Investors Trade Based

- on Private Information about Earnings and Returns? *Journal of Accounting Research*, **45**, 289-321. <https://doi.org/10.1111/j.1475-679X.2007.00234.x>
- [9] Cao, C. and Petrasek, L. (2014) Liquidity Risk and Institutional Ownership. *Journal of Financial Markets*, **21**, 76-97. <https://doi.org/10.1016/j.finmar.2014.05.001>
- [10] Chordia, T., Roll, R. and Subrahmanyam, A. (2001) Market Liquidity and Trading Activity. *Journal of Finance*, **56**, 501-530. <https://doi.org/10.1111/0022-1082.00335>
- [11] Baker, C.R. and Wallage, P. (2000) The Future of Financial Reporting in Europe: Its Role in Corporate Governance. *The International Journal of Accounting*, **35**, 173-187. [https://doi.org/10.1016/S0020-7063\(00\)00044-3](https://doi.org/10.1016/S0020-7063(00)00044-3)
- [12] Chung, K.H., Elder, J. and Kim, J.C. (2010) Corporate Governance and Liquidity. *Journal of Financial and Quantitative Analysis*, **45**, 265-291. <https://doi.org/10.1017/S0022109010000104>
- [13] Jain, P., Jiang, C. and Mekhaimer, M. (2016) Executives' Horizon, Internal Governance and Stock Market Liquidity. *Journal of Corporate Finance*, **40**, 1-23. <https://doi.org/10.1016/j.jcorpfin.2016.06.005>
- [14] Díaz, V. and Huang, Y. (2017) The Role of Governance on Bank Liquidity Creation. *Journal of Banking & Finance*, **77**, 137-156. <https://doi.org/10.1016/j.jbankfin.2017.01.003>
- [15] Grossman, S.J. and Hart, O.D. (1980) Takeover Bids, the Free-Rider Problem, and the Theory of the Corporation. *The Bell Journal of Economics*, **11**, 42-64. <https://doi.org/10.2307/3003400>
- [16] Omet, G. (2007) Ownership Structure and Stock Liquidity: Some Evidence from the Jordanian Capital Market. *Corporate Ownership & Control*, **4**, 292-296. <https://doi.org/10.22495/cocv4i2c2p5>
- [17] Leño, M. and Pedraza, A. (2018) Ownership Concentration and Market Liquidity: Evidence from a Natural Experiment. *Economics Letters*, **167**, 56-59. <https://doi.org/10.1016/j.econlet.2018.02.024>
- [18] Brockman, P. and Yan, S.X. (2009) Block Ownership and Firm-Specific Information. *Journal of Banking & Finance*, **33**, 308-316. <https://doi.org/10.1016/j.jbankfin.2008.08.011>
- [19] Cueto, D.C. and Switzer, L.N. (2015) Intraday Market Liquidity, Corporate Governance, and Ownership Structure in Markets with Weak Shareholder Protection: Evidence from Brazil and Chile. *Journal of Management and Governance*, **19**, 395-419. <https://doi.org/10.1007/s10997-013-9263-8>
- [20] Bae, K.H., Ozoguz, A., Tan, H. and Wirjanto, T.S. (2012) Do Foreigners Facilitate Information Transmission in Emerging Markets? *Journal of Finance and Economics*, **105**, 209-227. <https://doi.org/10.1016/j.jfineco.2012.01.001>
- [21] Jiang, C.X., Kim, J.C. and Zhou, D. (2011) Liquidity, Analysts, and Institutional Ownership. *International Review of Financial Analysis*, **20**, 335-344. <https://doi.org/10.1016/j.irfa.2011.06.004>
- [22] Ding, M., Nilsson, B. and Suardi, S. (2017) Foreign Institutional Investment, Ownership, and Liquidity: Real and Informational Frictions. *The Financial Review*, **52**, 101-144. <https://doi.org/10.1111/fire.12126>
- [23] Luo, M., Chen, T. and Yan, I.K. (2014) Price Informativeness and Institutional Ownership: Evidence from Japan. *Review of Quantitative Finance and Accounting*, **42**, 627-651. <https://doi.org/10.1007/s11156-013-0355-y>
- [24] Kong, G. and Kong, D. (2015) Institutional Investors' Trading in Speculation: Evidence from China. *South African Journal of Economics*, **83**, 617-630.

- <https://doi.org/10.1111/saje.12073>
- [25] Chen, Z., Dub, J., Li, D. and Ouyang, R. (2013) Does Foreign Institutional Ownership Increase Return Volatility? Evidence from China. *Journal of Banking and Finance*, **37**, 660-669. <https://doi.org/10.1016/j.jbankfin.2012.10.006>
- [26] Bushee, B.J., Carter, M.E. and Gerakos, J. (2014) Institutional Investor Preferences for Corporate Governance Mechanisms. *Journal of Management Accounting Research*, **26**, 123-149. <https://doi.org/10.2308/jmar-50550>
- [27] Boone, A.L. and White, J.T. (2015) The Effect of Institutional Ownership on Firm Transparency and Information Production. *Journal of Financial Economics*, **117**, 508-533. <https://doi.org/10.1016/j.jfineco.2015.05.008>
- [28] McCahery, J.A., Sautner, Z. and Starks, L.T. (2016) Behind the Scenes: The Corporate Governance Preferences of Institutional Investors. *The Journal of Finance*, **71**, 2905-2932. <https://doi.org/10.1111/jofi.12393>
- [29] Qian, M., Ping-Wen Sun, P.W. and Yu, B. (2018) Top Managerial Power and Stock Price Efficiency: Evidence from China. *Pacific-Basin Finance Journal*, **47**, 20-38. <https://doi.org/10.1016/j.pacfin.2017.11.004>
- [30] Tran, L.T.H., Hoang, T.T.P. and Tran, H.X. (2018) Stock Liquidity and Ownership Structure during and after the 2008 Global Financial Crisis: Empirical Evidence from an Emerging Market. *Emerging Markets Review*, **37**, 114-133. <https://doi.org/10.1016/j.ememar.2018.07.001>
- [31] Chordia, T., Sarkar, A. and Subrahmanyam, A. (2005) An Empirical Analysis of Stock and Bond Market Liquidity. *Review of Financial Studies*, **18**, 85-129. <https://doi.org/10.1093/rfs/hhi010>
- [32] Ali, S., Liu, B. and Su, J.J. (2018) Does Corporate Governance Quality Affect Default Risk? The Role of Growth Opportunities and Stock Liquidity. *International Review of Economics and Finance*, **58**, 422-448. <https://doi.org/10.1016/j.iref.2018.05.003>
- [33] Nadaraja, S., Ali, S., Liu, B. and Huang, A. (2018) Stock Liquidity, Corporate Governance and Leverage: New Panel Evidence. *Pacific-Basin Finance Journal*, **50**, 216-234. <https://doi.org/10.1016/j.pacfin.2016.11.004>
- [34] Zilin, C., Kang, G. and Weiwei, H. (2020) Stock Liquidity and Excess Leverage. *Finance Research Letters*, **32**, Article ID: 101178. <https://doi.org/10.1016/j.frl.2019.04.034>
- [35] Chia, Y.E., Limb, K.P. and Goh, K.L. (2020) Liquidity and Firm Value in an Emerging Market: Nonlinearity, Political Connections and Corporate Ownership. *North American Journal of Economics and Finance*, **52**, Article ID: 101169. <https://doi.org/10.1016/j.najef.2020.101169>
- [36] Chia, Y.E., Limb, K.P. and Goh, K.L. (2020) More Shareholders, Higher Liquidity? Evidence from an Emerging Stock Market. *Emerging Markets Review*, **44**, Article ID: 100696. <https://doi.org/10.1016/j.ememar.2020.100696>
- [37] Arellano, M. and Bover, O. (1995) Another Look at the Instrumental Variable Estimation of Error Component Models. *Journal of Econometrics*, **68**, 29-51. [https://doi.org/10.1016/0304-4076\(94\)01642-D](https://doi.org/10.1016/0304-4076(94)01642-D)
- [38] Blundell, R. and Bond, S. (1998) Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, **87**, 115-143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)