



Research Paper

Stock Liquidity When an Enterprise Repurchases Shares on the Free Market

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ABSTRACT: This paper examines the effect of share repurchases on stock liquidity surrounding announcement dates, and in the repurchasing year. Using hand-collected 525 repurchase announcements of Vietnamese firms during the period from 2007 to 2016, the author finds a little improvement in liquidity in short term. Controlling for some potential determinants of stock liquidity, the result shows that the effective rate of repurchase reduces stock price sensitivity, but does not affect two other aspects of liquidity, namely depth and relative spread. Therefore, the author concludes that the liquidity effect of repurchase weakly supports the competing market-maker hypothesis.

KEYWORDS: Share repurchase, Stock liquidity.

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I. INTRODUCTION

To this day, the issues regarding the effect of share repurchase on stock liquidity still do not have uniformed resolution. Share repurchasing can contribute to improvements in liquidity if the share purchase does not have implicate on the particular information of value of the business that only the administrator knows about. In that situation, businesses repurchase shares similar to other investors in the market market, competitive transactions will lead to improved liquidity (this is the argument of the hypothesis “Competing Market Maker Hypothesis”). The opposite argument however may also be true, that share repurchases reduce liquidity because the management are the people who repurchase shares for the business. This can be explained due to the manager being knowledgeable about the value of the business (in other words, they possess more information - “Informed Traders” in comparison to external investors) therefore outside investors are worried about the disadvantages gained when trading with traders that are perceived to be more knowledgeable, as such these investors act cautious during transactions by putting higher asking prices whenever businesses are repurchasing shares. This leads to a widening price gap or in other words, reduced liquidity. It is because of such contrary arguments that the research surrounding the influence of share repurchasing has on stock liquidity is given so much attention and is in need of further verification.

In Vietnam, the act of businesses repurchasing shares on the free market first began in Q4/2007, prior to that there were no businesses that publicized or implemented repurchasing programs. The delay in the repurchasing activities of businesses when compared to when the stock market first started to operate can be traced back to two reasons: Firstly, Q4/2007 is the date where there was a decrease in stock prices after long periods of high growth in 2006 and early 2007; Secondly, perhaps an important cause might be the slow pace of passing laws in regards to the repurchasing of shares by enterprises. It wasn't until 2007 that these regulations for a legal framework for repurchases were put into effect, these included securities law number 70/2006/QH11 of the National Assembly and circular number 18/2007/TT-BTC of the Ministry of Finance which enabled for repurchase by enterprises on the free market for the first time. From the end of 2007 to the end of 2016, listed companies announced a total of 525 repurchases of their own shares on the free market. Looking at the share repurchase announcements by enterprises, one of the reasons the businesses give for making the repurchase was to improve stock liquidity. However, in reality, there is no conclusion on if stock liquidity actually improves as a result of these activities.

Allowing businesses to buy back their own shares on the Vietnamese market has attracted domestic researchers. Some notable research on the aspects of repurchase include: The reactions in the market to publicized repurchases of Vo Xuan Vinh and Trinh Tan Luc (2015); The factors that impact repurchase decisions of Tran Thi Hai Ly and Hoang Thi Phuong Thao (2015); Tu Thi Kim Thoa and Nguyen Thi Uyen Uyen (2015). Other research that study the influence of ownership on liquidity, microeconomics structures (such as transaction mechanisms) on liquidity and how liquidity affects profitability by Batten and Vo (2014), Tran Thi Thuy Linh (2011); the impact of liquidity on company value by Nguyen Ngoc Thuyet and Nguyen Thi Thanh Tuy (2017); Blockholder ownership and liquidity by Dang Tung Lam and Nguyen Thi Minh Hue (2017). From this it can be seen that research on repurchase activities or liquidity in Vietnam has been limited and that these two topics have only been researched separately, as such there has been no research on share repurchase of businesses in correlation with stock liquidity in Vietnam.

There are quite a few studies around the world on the impact of share repurchases on liquidity, however, share repurchases in Vietnam have characteristics that are quite different from those in developed countries like: The repurchase program is carried out in a fairly short period of time, reports on the actual amount of shares repurchased by the enterprise are announced more clearly in the repurchase announcements made by enterprises. Therefore, this feature provides an excellent context for evaluation in the relationship between share repurchases and liquidity.

For the above reasons, this study was conducted with the expectation of helping to better understand the role of share repurchase activities on stock liquidity in the Vietnamese market with the circumstances of there being no consistent empirical evidence on this issue from international studies. The research question “Does repurchasing shares harm or improve the stock liquidity of enterprises ?” will be given a resolution through the examination of the changes in liquidity a few days prior and after repurchase announcements (consider short-term liquidity fluctuations), and the changes in liquidity that occur in the year that businesses pursue share repurchases.

The remaining sections of the research include the following content: Part 2 showcases the theoretical basis and the previous research made on the relationship between share repurchases and stock liquidity; part 3 describes the details regarding data collection, experimental modeling and variable measurements; part 4 is on the findings and discussions of the research, and lastly, part 5 comes to a conclusion on the research.

II. THEORETICAL BASIS

Whether repurchases of shares impact stock liquidity of a business was a topic that was brought to life in a research by Barclay and Smith (1988) where they presented two hypotheses: (1) Information asymmetry hypothesis; and (2) Competing market maker hypothesis. Firstly, repurchasing shares in the open market often incurs costs because they create opportunities for managers to use internal information to their own advantage, while leaving losses for shareholders. This hypothesis is known as the “information asymmetry hypothesis”. With this hypothesis, Barclay and Smith (1988) supposed that the repurchasing of shares by enterprises in the free market leads to adverse selection for outside investors (those who do not possess information) when doing transactions with managers. As a result, outside investors will set high selling prices, creating a growing disparity in the bid-ask spread, and thus the stock's liquidity will decrease. Secondly, in contrast to the information asymmetry hypothesis, a business that utilizes limit order to buy its own stock can lessen the gap in prices and create a deeper and broader order book, this hypothesis is called the “competing market maker hypothesis”. Accordingly, if the manager buys back shares with no inside information they have about the company value, then in this situation if the manager decides to place limit orders then it can lead to a decrease in price differences (via ordering at a higher price), or it can spark an increase in market depth for the purchasing party.

Despite the proposal of the two hypotheses, empirical evidence made by Barclay and Smith (1988) leans more strongly in favor of the information asymmetry hypothesis. Many research studies after that based their studies on the arguments made by Barclay and Smith (1988) on the information asymmetry hypothesis to find resolution to whether businesses are providing liquidity or creating demand for liquidity when they repurchase their shares in the free market. From the perspective of the market's microeconomic structure, businesses are simply one of the investors participating in transactions in the secondary market, they can influence the demand or supply of liquidity over a time horizon, meaning they are willing to buy stocks immediately without waiting and more importantly the information advantage they have compared to other traders, causing unfavorable choices for the counterparty when participating in the transaction with them. It is due to the fact that parties involved in the transactions are reluctant when participating and causes a broadening of the ask and bid price ranges.

Brockman and Chung (2001) provided evidence that supports the information asymmetry hypothesis by Barclay and Smith (1988) when they discovered the relationship between repurchase and stock liquidity in the Hong Kong stock market, such as the bid-ask spread expanding and the stock depth decreasing. Brockman

and Chung (2001) also found significantly increased adverse selection costs during the re-acquisition period. Because of that, repurchasing on the free market can lead to liquidity costs for the enterprise. Brockman and Chung (2001) assume that managers often have an advantage in information on the enterprise and the share repurchases by enterprises' behavior reflect the market timing of the manager. Ginglinger and Hamon (2007) put forth evidence that share repurchases negatively impact liquidity by analyzing the repurchase announcements in the French stock market. There, the bid-ask spread increased while stock depth decreased.

Meanwhile, other research studies have shown that share repurchase improves stock liquidity. McNally and Smith (2011) found that liquidity was enhanced from repurchasing activities. During buyback programs, the relative spread was smaller and the market depth was higher when compared to periods prior to the programs. Liquidity was also higher on days that saw buybacks than days that didn't. de Cesari et al. (2011) found solid evidence to support share repurchasing helping to improve stock liquidity in the Italian stock market. Based on the fact that businesses in Italy often announce buybacks with the accompanying purpose of improving liquidity and stabilizing stock prices as well as the empirical evidence gathered using different methods by de Cesari et al. (2011) that showed share repurchases had a major impact on the reduction of relative spread, which helps aid in the goals of creating liquidity that enterprises had stated prior in their buybacks announcements.

Rasbrant and de Ridder (2013) argues if the manager of the acquiring business prioritizes a low purchase price and has a patient attitude then the relative spread will get smaller and the stock depth of the buyers will increase on days that the repurchase occurs. Firms that have a patient attitude and are not trying to buy all at once, are more likely to buy small amounts each day by placing limit orders at the best bid price. These buy orders play a role in setting the lower limit of the bid price, which has the effect of providing liquidity to the market, decreasing relative spread and increasing stock depth. However, a different possibility can occur from this. The relative spread may be smaller, but the stock depth on the buyer side is reduced on buyback days, if the manager wants to execute the buyback program quickly. Because such businesses can buy large volumes every day, and place limit orders within the current relative spread or at the seller's asked price. The buy order that is limited to the current price difference will lessen the relative spread but reduce the stock depth to the best bid price. Buy orders that meet the best asking price will reduce liquidity for the seller. However, due to the influence of information in the order flow, there will often be a new buy order placed right after the large buy order that was just made. This results in an increase in the price of each best bid. Both ask and bid price increase so it does not necessarily widen the relative spread, however, the depth of the buying side is likely to be reduced. Rasbrant and de Ridder (2013) found that the bid-ask spread of the stock in the Swedish market decreased and that there was an increase in stock depth during buyback periods of enterprises. This is consistent with the argument that managers carry out the repurchase program patiently and prioritize low purchase prices.

Cook et al. (2004) also reported that there was a decrease in the relative spread and used this decrease as evidence that share repurchase did indeed increase stock liquidity. Hillert et al. (2016) provided proof that share repurchases improved liquidity. Ben-Rephael et al. (2014) discovered that enterprises recorded higher liquidity in buyback months. Hillert et al. (2016) recommended exercising control over endogeneity issues that previous studies had yet not been able to resolve. In addition, the research by Hillert et al. (2016) noted that liquidity had an influence on enterprises that had buyback activities. Buybacks create liquidity when investors sell a business' shares.

Alongside that, some studies report mixed results on the effect of share repurchase on stock liquidity. Singh et al. (1994) inspected the two hypotheses that was first proposed by Barclay and Smith (1988) and proposed their own hypothesis, the "inventory-holding-cost hypothesis" with the hopes that the aspects of each hypothesis would combine together to help explain the changes in liquidity measurements. Singh et al. (1994) reported that there was an increase in the relative spread prior to the buyback announcements but no increase after the announcements. Miller and McConnell (2009) tested the information asymmetry hypothesis and the negative impact of share repurchase on liquidity by examining the relative spread during buyback announcements. By utilizing univariate and multivariate analysis to control changes in trading volume, changes in volatility and stock price, Miller and McConnell (2009) was not able to find any evidence on stock liquidity decreasing. Wiggins (1994) found a small decrease in the relative spread but no evidence of a change in stock depth after the buyback announcement and conclusion of the repurchase, thus he concluded that repurchasing shares does not negatively impact liquidity. Furthermore, Kim (2005) reported that there was no relationship between information asymmetry and the fluctuations of liquidity. Nayar et al. (2008) claim that stock liquidity improved significantly only during the period when the firm's offer to repurchase shares is outstanding and not after that. In other words, share repurchases can only be used as a method for temporary stock liquidity improvements and not one that can be used for long-term liquidity improvements.

In summary, the different theoretical arguments about the impact of share repurchases on stock liquidity all have their own supporting evidence. Therefore, in the situation where there are differing levels of

information asymmetry in different markets, there needs to be further research done on stock liquidity and share repurchases.

III. METHODOLOGY AND DATA

3.1. Methodology

The methods used in this study are event study and regression methods on panel data. Event study is used to examine the change in liquidity after the buyback announcement date compared to before, while panel data regression is used to evaluate the effect of actual buyback on liquidity during the year .

3.1.1. Event study

Announcing a repurchase of a company's own shares is a type of public disclosure event of the firm, so event studies are used to see whether the liquidity of the firms in the buyback announcement sample have improved or declined in the months before and after the repurchase announcements. Accordingly, this study will test (using T-test) the degree of change in liquidity afterwards compared to prior to the repurchase event.

In this method, the event date is determined to be the date that the repurchase program initiates (day 0) and the date where the buyback announcement is posted on the Stock Exchanges' websites. The event window is regarded as being several days prior and after the buyback announcement date. Determining the length of the event window is arbitrary and inconsistent across studies, for instance Singh et al. (1994) used windows [2, 99] in comparison to [-100, -3]; [2, 99] with [-30, -3]...; Kim (2005) on the other hand considers the 60 days prior and after the announcement. A lot of specifics of repurchase activities stem from regulations in Vietnamese laws: Enterprises must disclose information at least 7 days before the date of the treasury stock purchase transaction; afterwards, the business has a maximum of 90 days to complete an announced buyback (effective prior to 2012, in accordance to circular number 18/2007/TT-BTC of the Ministry of Finance) or a maximum of 30 days (effective from 2012 onwards, in accordance to circular number 130/2012/TT-BTC). Therefore, several event windows are chosen to evaluate changes in liquidity before the announcement and after the announcement, which is suitable for the timing regulations related to buybacks in Vietnam. Event windows that were chosen for evaluation included: [-10, 3] and [0, 7]; [-33, -3] and [0, 30]; [-93, -3] and [0, 90].

3.1.2. Regression analysis

Liquidity variables

To capture aspects of liquidity, stock liquidity in this study is represented by three different measures, including:

(1) *Relative price differences*: This measurement is determined by the differences between the ask and the bid price divided by the middle of these two prices. The larger the relative price difference, the less liquid the stock.

(2) *Price sensitivity*: According to Amihud (2002) this measurement is based on the idea of price sensitivity measurements to scale the impact of market orders on price, it is considered a measurement that fully captures the sensitivity of price to trade size. The way the measure is calculated in the form the absolute value of the return per USD traded during the day is as follows:

The annual sensitivity of a stock is calculated by averaging the sensitivity of the days of the year of that stock.

(3) *Depth*: This measurement represents the value of sellers and buyers at the best bid and ask prices. Higher depth is a sign that the stock is more liquid because the best bid and ask prices are in effect for large trades. Higher depth is a sign that the stock is more liquid because the best bid and ask prices are in effect for large trades. Stock depth is determined as follows:

$$\text{DEPTH} = \text{Best ask price} \times \text{Ask volume} + \text{Best bid price} \times \text{Bid volume}$$

DEPTH is calculated for each trading day of each stock, then averaged across the days during the year for each stock.

Share repurchase variable

This study uses two variables of share repurchases which are:

(1) *Actual percentage of shares repurchased* (REP): Equal to the actual number of shares repurchased divided by the number of outstanding shares.

(2) *Dummy variable* (REP_DUM): Takes a value of 1 if a business actually has a repurchase in a year, and becomes 0 if the business does not repurchase in that year.

Control variables

(1) *Rate of return* (R) is a significant and consistent factor impacting stock liquidity (Hameed et al., 2010; Hillert et al., 2016; Rhee & Wang, 2009).

(2) *Volatility* (VOL) represents the risk aspect of liquidity providers in the market must face, as such researchers such as: Fernández-Amador et al. (2013), Kale and Loon (2011), Lesmond (2005) found that volatility had an influence on stock liquidity, although these reports were inconsistent.

(3) *Market capitalization scale* (lnMC) impacts liquidity due to information asymmetry, in that, larger firms are expected to have lower information asymmetry and lower adverse selection costs that counterparties usually have to bear, thus increasing liquidity (Acharya & Pedersen, 2005; Hillert et al., 2016; Lesmond et al., 1999; Rhee & Wang, 2009).

(4) *Return on assets* (ROA) was reported by researchers as having a positive impact on liquidity of stock (Qi et al., 2010).

(5) *Financial leverage* can increase the risks of a business, which can make liquidity decrease (Chang & Yu, 2010; Peress, 2010). However, leverage can also play a monitoring role in businesses, thereby minimizing agency costs as well as motivating managers to make better decisions in managing which can help with liquidity improvements (Frieder & Martell, 2006).

(6) *Market to book value* was also considered as it can represent growth opportunities (Hillert et al., 2016).

The two variables state ownership and institutional share ownership of the organization are included to represent ownership structure (Bushee & Goodman, 2007; Choi et al., 2010) because it can provide corporate management structures, affecting the level of information transparency and thereby affecting liquidity.

Research model

To investigate whether the actual repurchase has an impact on stock liquidity in the year of the buyback, the author estimates a multivariate regression model based on the developmental models by Brockman and Chung (2001), de Cesari et al. (2011), Hillert et al. (2016). The model is as follow:

$$LIQ\%X = \alpha Z + \delta REP\%X + \beta_1 R\%X + \beta; VOL\%X + \beta_a MTB\%XG1 + \beta_c LEV\%XG1 + \beta_{dln} MC\%XG1 + \beta_h ROA\%XG1 + \beta_i BIG4\%XG1 + \beta_{IDUAL}\%XG1 + \beta_m GOV\%XG1 + \beta_{1INST}\%XG1 + \beta_{11} LIQ\%XG1 + \vartheta\%X + \varepsilon\%X \quad (5)$$

Within that,

LIQ: Liquidity measurement;

REP: The variable represents the scale of the enterprise's share repurchase activity (In the robustness test, the variable REP is replaced by the dummy variable REP_DUM);

The control variables have been defined in Table 1, including:

R: Annual return rate of stocks;

VOL: The standard deviation of daily returns is converted to years;

MTB: Market value to book value of equity;

lnMC: Size of company;

LEV: Leverage;

ROA: Ratio of net profit to total assets;

BIG4: Dummy variable audit of the Big4;

DUAL: Duality;

GOV: Ownership ratio of state shareholders;

INST: Share ownership ratio of institutional shareholders;

◆t: The year fixed effects are controlled to capture changes in the macroeconomic environment

Fixed effects model is used to examine how share repurchases affect stock liquidity over a longer time period following announcements and and takes into account only actual repurchase transactions and the control of other possible factors that can have an impact on liquidity.

Potential causes of endogeneity in the relationship between repurchases and liquidity will be controlled using GMM (Generalized Method of Moments) in the robustness test.

3.2. Research data

The research sample includes 525 share repurchase announcements of listed companies in the Ho Chi Minh City Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX). Of the 525 announcements, there were repurchases in 337 firms–year because some firms made more than one announcement during the year.

Data on share repurchase is collected manually from repurchase announcements (from the official websites of HOSE, HNX, financial institutions and listed companies).

Market data is used to calculate various measures of liquidity, which contain: Daily closing price, trading volume, number of trading days, rate of return, best ask and ask prices of stocks during trading days (sourced from FPT Securities Corporation).

Other accounting and market data contained: Total assets, total capitalization, liabilities, book value of equity, net profit, share ownership of state shareholders and institutional shareholders were used to calculate control variables. This data was sourced from Datastreams Thomson Reuters.

Data on duality and organizations responsible for reporting financial audits are collected manually on each financial audit report of the enterprise and from *cafe.vn* website.

The period studied was characterized by an average return of negative 14% with fairly high volatility (34,2%). The average MTB ratio is less than 1, suitable for periods when the stock market is less favorable (the average rate of return is also negative) and when the average market price is below the book value. In general, businesses utilize liability to finance about 51% of their total assets. During the research period, businesses had an average ROA of only about 6,1%. About 21% of firm-year observations have reports audited by one of four international auditing organizations (Big4). The rate of 75% of businesses in the sample having a president or vice president holding the position of CEO shows that the level of independence is quite low. State ownership is quite high in the businesses, with an average rate of up to 31,9%, higher than institutional ownership. Across all firm-year observations, 7,1% of firms repurchase shares. On average, listed enterprises only buyback about 0,21% of outstanding shares. The maximum repurchase rate in any given year is approximately 26% of outstanding shares.

IV. FINDINGS AND DISCUSSION

4.1. Short-term liquidity changes during buyback announcements

The 7-day window is considered due to Vietnamese regulations requiring businesses to disclose repurchase information at least 7 days before the transaction start date. Examining liquidity changes in this time frame to see the market reaction to news of the repurchase announcement. The author wants to see the effects of repurchases on liquidity rather than the effect of announcements during a 30 and 90-day window prior and after announcement, this is due to laws requiring companies to repurchase within 30 days (from 2012 onwards) and 90 days (prior to 2012) after announcements finish.

The results in Table 4 show that within the 7-day announcement window, there was an improvement in liquidity, the spread decreased by 0,2% (on average). However, the role that announce buybacks play in reducing price and increasing stock depth did not see any clear improvement.

In a longer time frame, including days when business buyback activities take place, the relative spread narrows down by about 0,1%, the price influence also decreases and is statistically significant for the 30-day time frame. The stock depth did increase but had no statistical significance so therefore the stock depth was reported as having no clear improvements. Within the 90-day time frame, there was no improvement in liquidity, in fact the increase in relative spread reveals illiquidity. The spread even increased by more than 0,1%. The initial conclusion for the univariate analysis is that share repurchases improve liquidity short-term right around the date of the repurchase announcement.

The mean statistical test of the liquidity gap after and before the buyback announcement is shown in Table 4.

Hypothesis test: $\Delta LIQ = 0$

ΔLIQ	N	Average	t statistic (Average=0)	Standard deviation	p25	p50	p75
7 days before and after the buyback announcement ([-10, -3] and [0, 7])							
QUOTEMID	426	-0,002	-4,094	0,012	-0,0060	-0,0006	0,0021
AMIHUUD	432	-0,342	-1,071	6,643	-0,0888	-0,0011	0,0054
DEPTH	426	31.553	1,076	605.265	-18.600	5.812	57.476
30 days before and after the buyback announcement ([-33, -3] and [0, 30])							
QUOTEMID	432	-0,001	-2,0793	0,010	-0,0035	0,0000	0,0028
AMIHUUD	436	-0,496	-2,2928	4,517	-0,1322	-0,0006	0,0132

Table 4: Changes in liquidity around buyback announcement events

Note: QUOTEMID is the relative spread, AMIHUDD is the price sensitivity, DEPTH is the depth of the stock. Bold numbers indicate the different spreads that are 0 and are statistically significant.

4.2. Analysis of the impact of actual repurchases on liquidity

4.2.1. Univariate analysis

The above analysis shows changes in liquidity in the days before the buyback announcement and in the days after. In this section, the author will analyze the impact of actual repurchases on stock liquidity using data from both businesses that buy back and those that don't.

Table 5 compares stock liquidity between the two groups: Group observing firm-year with actual repurchase activity compared to group with firm-year observations in which no actual repurchase activity occurred. The liquidity of years with buybacks is statistically more significant than the liquidity of years without buybacks. AMIHUDD and QUOTEMID decrease while DEPTH increases. The variations are all different from 0 and statistically significant.

	REP (Observed number = 337)	Non_REP (Observed number = 4.393.)	Variation	p-value (Variation=0)
LnAMIHUDD	-1,3045700	-0,1960809	-1,1084890***	5,8561
QUOTEMID	0,0235685	0,0337832	-0,0102147***	7,3994
lnDEPTH	12,013900	11,625330	0,3885661***	5,4097

Table 5: Share repurchase and liquidity

Note: QUOTEMID is the relative spread, AMIHUDD is price sensitivity, DEPTH is stock depth. REP is the observations of a firm-year that had actual buyback activities, Non_REP are observations of a firm-year with no actual buyback activities.

4.2.2. Multivariate analysis

The univariate analysis in Table 5 ignores the possible impact that the factors can have on liquidity and only considers buyback activities. The author will analyze the impact of buybacks on liquidity, with the management of the liquidity determinants presented in section 3.1.2.

Table 6 shows the correlations between the factors that will be included as explanatory factors for stock liquidity. Except for the relatively high negative relationship (0,567) between returns and leverage, other explanatory factors have low correlations, so it is unlikely that the variables are strongly correlated with each other causing questionable regression results.

The bottom part of Table 6 shows the correlations of the three liquidity measures used in this study. The liquidity measures have correlations ranging from 0,75 to 0,85. Note that the negative correlation between DEPTH and the other two measures is as expected due to the contrary meanings of DEPTH and the two measures.

Table 7 shows the regression results of liquidity along with explanatory factors. The author is interested in the variable repurchasing REP shares. Column (1) shows that REP has the effect of reducing price sensitivity, which implies an improvement in liquidity, column (3) shows that buybacks also help improve stock depth in the same year (with a positive and statistically significant coefficient of 1%). However, the buyback does not significantly decrease the relative spread and although the sign of the regression coefficient of REP in column (2) is negative it is not statistically significant.

	(1) lnAMIHUDD	(2) QUOTEMID	(3) lnDEPTH
REPIt	-4,638*** (-2,875)	-0,016 (-1,140)	1,395** (2,486)
Rit	-0,774*** (-9,404)	-0,005*** (-8,206)	0,448*** (14,169)
VOLit	0,013 (0,171)	-0,002*** (-2,884)	0,110*** (3,513)
MTBit-1	0,670*** (4,515)	0,008*** (6,212)	0,141** (-2,414)

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LEVit-1	-0,635* (-1,929)	-0,009*** (-3,878)	-0,013 (-0,103)
lnMCit-1	-0,905*** (-10,674)	-0,006*** (-7,944)	0,321*** (9,684)
ROAit-1	-6,770*** (-7,295)	-0,076*** (-10,305)	1,892*** (5,786)
BIG4it-1	-0,071 (-0,468)	-0,001 (-0,511)	0,070 (1,323)
DUALit-1	-0,056 (-0,499)	0,000 (0,164)	0,053 (1,168)
GOVit-1	0,364* (1,780)	0,005*** (3,225)	-0,215*** (-2,668)
INSTit-1	0,058 (0,489)	-0,002* (-1,738)	-0,020 (-0,439)
lnAMUHUDit-1	0,290*** (16,538)		
QUOTEMIDit-1		0,430*** (18,816)	
LnDEPTHit-1			0,341*** (16,430)
Year effect control	Yes	Yes	Yes
Observable number	3.705	3.657	3.657
F	93,654	94,561	112,260
p	0,000	0,000	0,000
R ²	0,384	0,482	0,465

Table 7: Buyback rate and liquidity

Note: The regression findings were corrected for bias, controlled for time fixed effects and corrected for heteroscedasticity.

With the other explanatory variables, the bigger the scale of the enterprise and the ROA, the higher the liquidity. Higher stock returns also contribute to improved liquidity. The impact of these factors on liquidity is consistent with previous evidence. Growth opportunity (MTB) has an adverse effect on liquidity. The author believes that businesses with many growth opportunities contain higher business risks and stronger information asymmetry than businesses with fewer growth opportunities. Therefore, adverse selection costs when trading the stocks of these high growth firms will contribute to reduced liquidity. Volatility (VOL) has the same impact on liquidity. This may seem contrary to expectations, however, it is possible that in a highly speculative market high volatility can pose an opportunity for short-term investors to seek profit through trading. Therefore, volatility in rates of return can attract speculative transactions, reduce price sensitivity (AMUHUD) and increase stock depth. While the market seems to be risk-averse, businesses on the other hand bet on financial risks whenever leverage (LEV) reduces the relative spread and price sensitivity.

Regarding the two variables representing corporate management, the author has not found evidence of duality of managers (DUAL) and the fact that the enterprise is audited by one of the leading auditing groups (BIG4) impacts liquidity. Examining ownership structure, the results show that state ownership has an adverse effect on liquidity. Specifically, the higher the state ownership, the wider the price sensitivity and spread, and the lower the stock depth. These results are consistent and highly statistically significant. State ownership reduces liquidity which is expected, because high state ownership is accompanied by high information asymmetry, weak governance mechanisms in state-owned enterprises, and in addition government-controlled enterprises do not actively trade so state ownership reduces the amount of free float. In contrast, evidence of the effects of institutional ownership on liquidity is quite weak, as shown by the regression coefficient of the INST variable which is only statistically significant at 10% in the relative spread regression model.

4.2.3. Robustness verification

Changing the buyback variable

Table 8 displays the Fixed Effects Model regression results of the three liquidity measurements and explanatory variables.

	(1) lnAMIHUD	(2) QUOTEMID	(3) lnDEPTH
REP_DUMit	-0,240*** (-2,597)	-0,000 (-0,634)	0,035 (1,091)
Rit	-0,775*** (-9,447)	-0,005*** (-8,241)	0,449*** (14,183)
VOLit	0,015 (0,192)	-0,002*** (-2,877)	0,110*** (3,500)
MTBit-1	0,659*** (4,429)	0,008*** (6,181)	-0,139** (-2,365)
LEVit-1	-0,635* (-1,926)	-0,009*** (-3,849)	-0,018 (-0,141)
lnMCit-1	-0,900*** (-10,625)	-0,006*** (-7,934)	0,322*** (9,662)
ROAit-1	-6,758*** (-7,271)	-0,075*** (-10,300)	1,882*** (5,773)
BIG4it-1	-0,069 (-0,451)	-0,001 (-0,502)	0,069 (1,306)
DUALit-1	-0,048 (-0,432)	0,000 (0,179)	0,051 (1,137)
GOVit-1	0,372* (1,819)	0,005*** (3,273)	-0,221*** (-2,743)
INSTit-1	0,063 (0,538)	-0,002* (-1,734)	-0,020 (-0,443)
lnAMUHUDit-1	0,291*** (16,713)		
QUOTEMIDit-1		0,430*** (18,796)	
LnDEPTHit-1			0,342*** (16,489)
Year effect control	Yes	Yes	Yes
Observable number	3.705	3.657	3.657
F	93,861	94,577	112,747
P	0,000	0,000	0,000
R ²	0,384	0,482	0,464

Table 8: Repurchase (binary variable) and payment

Note: The regression results were corrected for bias, controlled for time fixed effects and corrected for heteroskedasticity.

Table 8 presents the results of the robustness test for the relationship between repurchases and stock liquidity. All variables and regression methods are similar to Table 7, except for the stock repurchase variable as it is a dummy variable, taking the value 1 if the firm makes a repurchase during the year and 0 if not. The results in Table 8 are almost consistent with Table 7, businesses that have repurchasing activities have noticed an improvement in liquidity, measurements in price sensitivity (AMIHUD), but do not have a statistically significant liquidity measurement compared to the other two measures. Moreover, the control variables are also consistent with the results in Table 7.

Endogenous problem

The regression results temporarily ignore the endogeneity problem. Concerns about endogeneity in the above regressions comes from one or several of the following possibilities. First, the above regressions include lagged liquidity variables, to capture liquidity persistence. However, the presence of lagged variables in the fixed effects regression model (to capture the influence of unobserved factors, that does not vary over time but varies across firms in the presence of internal lagged liquidity variables equation) can cause endogeneity problems. Second, in the regressions above, stock volatility, returns and share repurchases are considered in the same period as the dependent variable liquidity. Therefore, there is a possibility of an inverse relationship between liquidity and these variables. For example, a business with illiquid shares may choose to make

buybacks to support liquidity, or liquidity itself can affect stock volatility. High liquidity can be expected to reduce volatility for stocks. For these reasons, endogenous potential may manifest. The GMM estimates presented in Table 9 provide robust estimates for more accurate conclusions about the effects of repurchasing on liquidity. GMM estimation is only valid when the hypotheses have no quadratic autocorrelation in the residual differences and the overidentification hypothesis cannot be rejected.

	(1) lnAMIHUD	(2) QUOTEMID	(3) lnDEPTH
REpit	-5,010* (-1,756)	-0,016 (-0,831)	0,733 (0,735)
Rit	-0,670*** (-3,231)	-0,009*** (-5,669)	0,680*** (8,165)
VOLit	-1,630 (-1,480)	-0,017*** (-3,458)	1,049*** (3,805)
MTBit-1	0,620*** (3,528)	0,005*** (5,189)	-0,152*** (-2,903)
LEVit-1	-0,214 (-1,294)	-0,004*** (-3,665)	0,017 (0,212)
lnMCit-1	-0,548*** (-4,368)	-0,003*** (-6,314)	0,211*** (5,591)
ROAit-1	-3,317*** (-2,817)	-0,042*** (-6,957)	0,807** (2,583)
BIG4it-1	-0,113 (-1,347)	0,000 (0,451)	0,090** (2,348)
DUALit-1	0,048 (0,793)	0,000 (0,295)	-0,015 (-0,558)
GOVit-1	0,788** (2,401)	0,003* (1,882)	-0,339*** (-3,207)
INSTit-1	0,184 (1,167)	0,000 (0,186)	-0,047 (-0,873)
lnAMIHUDit-1	0,675*** (7,596)		
QUOTEMIDit-1		0,822*** (20,373)	
LnDEPTHit-1			0,702*** (12,808)
Year effect control	Yes	Yes	Yes
Observable number	3.101	3.657	3.657
AR1 test	-7,470 0,000	-9,490 0,000	-8,439 0,000
AR2 test	0,191 0,849	1,399 0,162	1,080 0,280
Hansen test	18,113 0,202	19,587 0,548	30,656 0,103

Table 9: Repurchase rates and liquidity – GMM estimates

Note: The regression results have been adjusted for bias, controlled for time fixed effects and heteroskedasticity. AR(2) and Hansen J tests all show that the GMM estimates are reliable.

The GMM regression results in Table 9 show that buybacks reduce price sensitivity (AMIHUD) in column (1) and do not have a significant impact on the relative spread in column (2). However, controlling for endogeneity leading to repurchases no longer exhibits a statistically significant effect on stock depth compared to the results that ignored potential endogeneity in Tables 7 and 8. The control variables all agree on the coefficient and statistical significance as shown in Table 7, all except LEV variables that lost statistical significance in the regression equation with the AMIHUD measure. Additionally, after endogeneity control, firms that have financial statements controlled by the Big4 have higher stock depth, meaning that audits by Big4 have a positive effect on one of the three stock liquidity measures in the study.

In summary, the actual share repurchase rate has some impact on improving liquidity, but has no effect on all three liquidity measures used in the study. This result allows for the conclusion that the evidence on the positive effect of buybacks on liquidity is still limited in the context of the Vietnamese market.

V. CONCLUSION

The study examines the impact of share repurchase on stock liquidity of listed companies in two official Stock Exchanges of Vietnam. The author found that there was liquidity improvement after the repurchase announcement compared to before the announcement. However, the results are limited as liquidity improvement does not occur in all three liquidity measurements. Over longer time frames, the repurchase announcement event has no discernible effect on liquidity.

In regards to the effect of actual repurchases on liquidity, having used annual repurchase and liquidity data, controlled factors that may have affected liquidity as well as accounted for the possibility of endogeneity, the study found only price sensitive regression and dependent variable as displaying signs that actual repurchases improve stock liquidity. Simultaneously there is no evidence that relative spreads have decreased and that stock depth has increased.

With this empirical evidence, the author concludes that share repurchases have a limited impact on liquidity in the Vietnamese market. This implies that businesses that buy back for the purpose of improving liquidity are unlikely to actually achieve their expected goals. Meanwhile, firm characteristics such as: Capitalization size, rate of return, and growth opportunities seem to have a consistent importance in explaining firms' liquidity. This result also helps investors to have a clear path for trading stocks with announced buybacks for the purpose of managing liquidity of investment portfolios.

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