Explaining Penny Stock Returns Versus Non-Penny Stock Returns from a Liquidity Perspective

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ABSTRACT

The presence of higher penny stock returns in the Malaysian stock market in recent years may have attracted the attention of investors. On the other hand, it indicates a liquidity risk premium, implying a higher risk associated with the stocks. Employing yearly panel data of 434 penny firms and 319 non-penny firms from 1st January 2019 to 31st December 2023, this study aimed to explain penny stock returns versus non-penny stock returns in the Malaysian stock market from a liquidity perspective. The dependent variables were penny and non-penny stock returns in the Malaysian stock market meanwhile, the main independent variable was liquidity. The other independent variables consisted of the factors in the five-factor model; risk, firm size, book-to-market, and momentum. Further, this study employed three static panel data, namely Pooled Ordinary Least Squares, Random Effects Model and Fixed Effects Model. The finding showed that liquidity, book-to-market, and momentum influenced penny stock returns significantly. Simultaneously, liquidity, firm size, and momentum influenced non-penny stock returns in the Malaysian stock market.

Keywords: Liquidity, Penny Stock Returns, Non-Penny Stock Returns, Malaysian Stock Market, Five-Factor Model

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INTRODUCTION

Stock market plays a crucial role in the financial market and contributes significantly to a country's economic development. Generally, any investment decisions in the stock market involve a complex process. This is because of stock selection from a multitude of choices based on the information derived and analysed by the investors (Nofsinger, 2014). According to Thangavelu (2019), stocks are mainly categorized into penny and non-penny stocks. As Jasiniak (2018) highlighted, investors with limited stock market knowledge, small capital, and less experience in the stock trading environment tend to favor penny stocks. Meantime, non-penny stocks are commonly favoured by knowledgeable and experienced investors (Jasiniak, 2018). Theoretically, penny stock is a common share of a small-sized firm with a low market capitalization that traded at low prices (Yi, 2020). In Malaysia, penny stocks are stocks that traded below RM1 per share, whereas non-penny stocks are those traded above RM1 per share (Yi, 2020; Monash, 2016). To conclude, penny stocks are traded at low prices, while non-penny stocks are traded at high prices, regardless of the market and currencies.

An ongoing argument arises on the performance comparison between penny stocks and non-penny stocks in the stock markets. Due to this fact, prices of penny stocks are lower than those of non-penny stocks; however, the returns for both stocks are varied. As Liu et al. (2015) highlighted, penny stock returns are approximately twice as high and volatile as non-penny stock returns in the United States (US) stock market. Liu et al. (2012) also pointed out that a spike in penny stocks resulted in significant abnormal returns in the US stock market. Song and Park (2019) reported that penny stock returns outperform non-penny stock returns in the Korean stock market. In the Malaysian stock market context, the phenomenon of penny stock returns surpassing non-penny stocks has become evident from 2019 to 2021 (Figure 1). It shows that average penny stock returns are 6.22 percent in 2020 and 7.49 percent in 2021, whereas non-penny stock returns are 2.66 percent in 2020 and 5.39 percent in 2021.

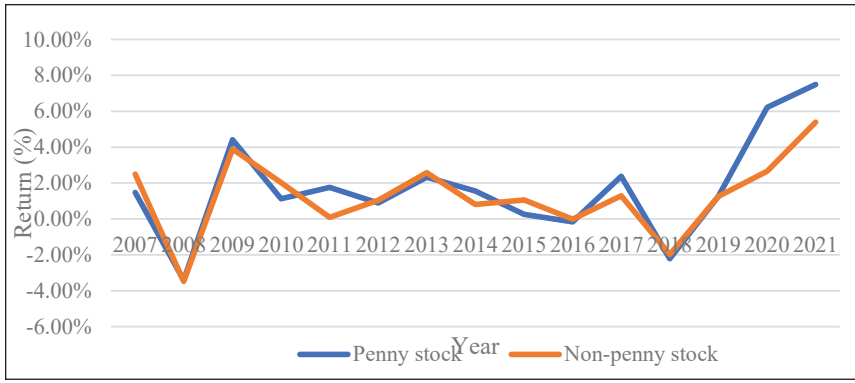

Figure 1: Average of Penny and Non-penny Stock Returns in the Malaysian Stock Market

Source: Thomson Reuters Database (2022)

According to Liu et al. (2012), penny stocks have potential profits, which allow investors to earn up to 1000 percent returns in just a few months or days. However, the potential penny stock returns may not always be perceived as attractive by investors. For example, investors seeking a positive abnormal return might not discover penny stocks appealing if their higher returns are associated with higher risk. This statement is supported by Mehmmod et al. (2021); the Malaysian stock market is among the countries suffering high uncertainty risk due to its weak regulatory system. Consequently, investors found it challenging to precisely determine the price of a penny stock that accurately reflects its value, leading to uncertainty in the investment potential of penny stocks (Liu et al., 2012). Therefore, it is worth considering whether penny stocks have an undiscovered investment potential or are justifiably neglected as an investment option.

There seems to be significant concern regarding liquidity risk among investors in the Malaysian stock market (Musneh et al., 2021). This study observed that penny stocks had consistently higher illiquidity values compared to non-penny stocks from 2007 to 2021. In line with findings by Musneh et al. (2021) and Liew et al. (2016), higher illiquidity of penny stocks led to a wider ask-bid spread, making trade more challenging due to supply and demand imbalances. While ask-bid spreads rise, investors are susceptible to liquidity risk during trading activities. Indeed, a liquidity risk premium2 may reflect the higher risk associated with investing in penny stocks in this market (Sterenczak, 2021). Consequently, the liquidity risk

premium in penny stock returns raises a challenge in comprehending its role; thus, it will influence their ability to achieve sustainable returns (Liu et al., 2012). Hubermand and Halka (2001) and Chordia et al. (2000) proposed that liquidity should be in asset pricing models3 due to the presence of liquidity premiums across various stock markets. Thereby, this study employed asset pricing models to explain penny stock returns versus non-penny stock returns in the Malaysian stock market from a liquidity perspective.

In practical terms, Bursa Malaysia implemented a two-year Pilot Market Making Programme (PMMP) to increase liquidity for less traded and illiquid stocks in the Malaysian stock market (SCM, 2021). Bursa Malaysia will evaluate the program's liquidity efficiency by considering various quantitative factors before determining the practicality of implementing a long-term initiative in the Malaysian stock market. In other words, the criteria for eligible PMMP stocks are available for both penny and non-penny stocks in this stock market. This study presents fresh insights for policymakers, especially Bursa Malaysia, by explaining penny stock returns versus non-penny stock returns in the Malaysian stock market from a liquidity perspective.

Understanding the return dynamics of penny stocks compared to non-penny stocks through the lens of liquidity offers valuable insights for internal users of accounting information, particularly financial managers, corporate strategists, and investor relations officers. Penny stocks possess unique characteristics in terms of risk assessment and market valuation due to their low trading volumes, high volatility, and limited disclosure. From a managerial standpoint, evaluating liquidity's impact on pricing and returns can assist in devising capital allocation strategies, enhancing investor communication and improving risk management efforts. This also implies that internal decision-makers can optimize their responses to financial signals from the market, reinforce performance benchmarks, and adapt disclosure settlements to improve transparency based on return patterns influenced by liquidity. This study thus bridges market behavior with internal financial decision-making, offering practical implications for managers seeking to navigate the informational asymmetries and liquidity constraints often associated with penny stock environments.

LITERATURE REVIEW

Liquidity, Stock Returns and Managerial Finance Perspectives

The interaction between liquidity, penny stock returns, and financial decision-making presents a multifaceted area of investigation, offering valuable implication to both managerial finance and management accounting standpoints. Liquidity, as an indicator of an asset's value and shiftable nature, marks a business's cash reserves and has utmost importance while shaping investment strategies and corporate financial policies (Emery & Cogger, 1982). Penny stocks, which are known for their lower price brackets and meager trading volumes, are nearly always susceptible to volatility. This makes liquidity much more important as these stocks are manipulable and subject to greater trading volume (Pasupuleti, 2012). Managerial finance has a stream of literature which relates to liquidity and the capital structure decision optimization, working capital management, and financial distress mitigation. Management accounting relates to resource allocation efficiency and tracking the resource allocation efficiency control mechanisms, as well as the performance targets for enabling adequate liquidity within the firm. Understanding the effects of digital transformation is of value as it can enhance a firm's value the liquidity of its stocks on the capital market, consequently, helping listed firms to achieve sustainable development (Liu et al., 2024).

Penny stock movements, in constrast, often markedly different from established and pricier stocks, merit deep analysis leveraging behavioral finance and market microstructure. Behavioral finance focuses on biases motivating investor decisions, such as the lure of easy money and the neglect of the stock's actual fundamentals. The market microstructure theories focus on the intricate details of the trading mechanisms, price discovery process, and order flow's effect on the penny stock returns. Emerging trends in behavioral finance certainly mark the importance of exploring its potential as an alternative mainstream theory of asset pricing (Sharma & Kumar, 2019). The topics of information asymmetry, liquidity, and returns as they pertain to the penny stock market recur frequently in the managerial finance and management accounting literature (Wang et al., 2023). More specifically, management accounting systems can help lessen information asymmetry on the market by offering relevant and precise financial data

in a timely manner to investors and other market participants, increasing the transparency of the market and decreasing the potential for adverse selection problems.

Stock liquidity remains very essential to financial decisions from the viewpoint of the managerial finance as well as the management accounting side of the ledger. In the case of managerial finance, liquidity has an impact on the capital structure, risk exposure, and the timing of investments, especially for high risk investments such as penny stocks. From the management accounting angle, appropriate liquidity control coupled with effective information systems reduces asymmetry and enhances internal decision-making. These two viewpoints merge to suggest, and rightly so, that liquidity is not only a market factor, but these also accentuate the importance of liquidity as a component of integrated financial management and creation of corporate value.

Theoretical Framework

The five-factor model is derived from the Capital Assets Pricing Model (CAPM) developed by Linter (1965), and Sharpe (1964). CAPM is widely used in asset pricing models in investment and financial theories. From a theoretical standpoint, the CAPM is based on five fundamental assumptions: all investors are price takers with identical economic perspectives, they make rational investment decisions, expect homogenous returns, believe in risk-free lending, can borrow and lend simultaneously (Linter, 1965; Sharpe, 1964). Nevertheless, the CAPM's assumptions failed to explain additional factors that affect stock returns in the stock market (Su and Taltavull, 2021).

In 1993, Fama and French proposed that the size and book-to-market variables had significant explanatory power for the cross-section of expected returns. It is known as Fama and French (1993)'s three-factor model. Afterwards, Carhart (1997) introduced an additional factor which is momentum, in the four-factor model. Amihud (2002) improved the model to examine stock returns by introducing a new factor, which is the liquidity factor. Other independent variables such as risk, firm size, book-to-market, and momentum are common variables in the five-factor model (Amihud, 2002).

Liquidity represents the influence of order flow on the stock market prices. Simply put, a seller's price discount is the extra cost a buyer incurs while making a market order because of an unfavourable selection of stocks and transaction costs (Amihud and Mendelson, 1986). Hence, the cross-sectional variation of expected stock returns can be explained by the liquidity factor. To note, Kong (2006) found that the influence of liquidity on stock returns is statistically significant by employing a five-factor model developed by Amihud (2002), regardless of the time. In other words, a stock's return depends on its expected liquidity in the stock market. Acharya and Pedersen (2005) also posited a similar view that liquidity predicts future stock market movements and co-moves with present returns. The five-factor model by Amihud (2002) showed that stock returns can be forecasted by considering the liquidity factor.

According to Naik and Reddy (2021), having liquidity is crucial for investors as it influences returns and assists in investment strategies. Nneji (2015) reported that liquidity can explain the stock market's resilience level. As evidenced, numerous studies have proved the relationship between liquidity and stock returns (Bradrania et al., 2015; Chang et al., 2010; Amihud and Mendelson, 1986). Other studies by Bradrania and Peat (2014), Cao and Petrasek (2014), and Lee (2011) also examined the influence of variation liquidity in the stock market. This is because liquidity is time-varying, prompting present contributions to comply with various stock market structures (Naik and Reddy, 2021). This study addresses the potential concern by examining penny stock returns versus non-penny stock returns in the Malaysian stock market from a liquidity perspective.

Penny and Non-Penny Stock Returns

Prior studies have examined factors influencing both penny and non-penny stock returns in the Korean stock market (Song and Park, 2019) and the US stock market (Liu et al., 2015). Both studies employed a one-factor model (Capital Assets Pricing Model), three-factor model (Fama and French, 1993), four-factor model (Carhart, 1997), and five-factor model (Amihud, 2002). In relation to variables, Song and Park (2019) employed size, book-to-market, momentum, liquidity, trading volume, and price-earnings ratio. In the meantime, Liu et al. (2012) employed size, idiosyncratic volatility, illiquidity, short-interest ratio, and institutional investors as variables.

Both studies found that liquidity factors influence abnormal penny stock returns. On the other hand, Liu et al. (2011) employed a one-factor model (CAPM), three-factor model (Fama and French, 1993), and four-factor model (Carhart, 1997) in order to explain penny and non-penny stock returns in the US market. Liu et al. (2011) used firm size, book-to-market, momentum, and volatility as variables. Nonetheless, all these models failed to prove the influence of liquidity on penny and non-penny stock returns in the US stock market. It showed the model's explanatory power to explain penny stock returns improved after introducing the liquidity factor in the five-factor model (Amihud, 2002).

Urbanksi et al. (2015) and Zaremba and Zmundzinski (2014) investigated the determinants of penny and non-penny stock returns in the Poland stock market. Return on equity, market-to-earning value, market-to-book value, and market capitalization as variables. In the meantime, Zaremba and Zmundzinski (2014) used risk, size, value, momentum, and liquidity. Both investigations employed the three-factor model by Fama and French (1993) and the five-factor model (Amihud, 2002). Both studies showed the ability to explain abnormal penny stock returns by using a five-factor model (Amihud, 2002). Kong (2006) previously studied the asset pricing model with integration liquidity risk in the Chinese stock market. This study used variables of risk, firm size, book-to-market, momentum, and liquidity. The finding found that the influence of liquidity on stock returns was statistically significant by employing a five-factor model developed by Amihud (2002), regardless of the time.

Liquidity in Five-Factor Model and Hypotheses Development

Liquidity refers to how easily and quickly stocks can be bought and sold in the market (Chiang and Zheng, 2015; Bogdan et al., 2012). Prior studies have found that there was a negative relationship between liquidity and penny stock returns (e.g., Silva et al., 2022; Chiang and Zheng, 2015; Chang et al., 2010). This was attributed to various factors such as ask-bid spread discrepancies, infrequent trading activities, limited disclosure information, high cost of trading and brokerage costs, unpredictable macroeconomics, lacking supervision by regulators, the global financial crisis, and political instability (Abdullah and Fakunnmaju, 2019; Amihud, 2002). A lack of liquidity led to a decrease in penny stock price, increasing penny stock returns (Silva et al., 2022).

Chiang and Zheng (2015) and Bogdan et al. (2012) have found the influence of low stock liquidity on stock returns is mainly driven by penny stock. As a matter of fact, liquidity risk premiums were present in the stock market (Sterenczak, 2020; Uddin, 2009). A liquidity risk premium is an additional expected return on a stock that invests demand to compensate for the potential loss incurred from liquidity costs (Silva et al., 2022; Sterenczak, 2017). To claim the presence of liquidity risk premium in the stock market, it is essential to prove a negative relationship between liquidity and penny stock returns, especially with the inclusion of low stock liquidity outperforming the market.

Other prior studies found that there was a positive relationship between liquidity and non-penny stock returns (e.g., Zhong, 2021; Chiang and Zheng, 2015; Chang et al., 2015; Violita and Soeharto, 2019). As Violita and Soeharto (2019) and Bogdan et al. (2012) argued, stocks with high liquidity can be easily converted into cash. In other words, stocks with high liquidity tend to attract more investor interest for purchase. Thus, a rise in the firm's stock leads to higher non-penny stock returns (Violita and Soeharto, 2019). In another instance, the larger firm's stock (i.e. non-penny stock) with higher liquidity is prone to share more information with the stock market, thus reducing the information asymmetry (Silva et al., 2022; Bogdan et al., 2012). In short, the non-penny stock has high liquidity, contributing to its superior performance in the stock market (Violita and Soeharto, 2019; Bogdan et al., 2012). Thus, this study developed the following hypotheses:

Hypothesis (a): Liquidity has a negative influence on penny stock returns in the Malaysian stock market.

Hypothesis (b): Liquidity has a positive influence on non-penny stock returns in the Malaysian stock market.

Table 1: Mapping of Hypotheses to Liquidity Proxy, and Models

Hypothesis	Independent Variable (Liquidity)	Dependent Variable	Type of Stock	Model/Test Used	Expected Direction
Hypothesis (a): Liquidity has negative influence on penny stock returns in the Malaysian stock market	Bid-Ask Spread	Stock Returns	Penny Stocks	Static panel models, including Pooled OLS, Random Effects Model (REM), and Fixed Effects Model (FEM), were estimated under both one-way and two-way specifications	Negative
Hypothesis (b): Liquidity has positive influence on non-penny stock returns in the Malaysian stock market			Non-penny Stock		Positive

METHODOLOGY

Data, Sources and Methods

This study examined all stock listed on the Main Market and Ace Market of Bursa Malaysia (2024). To be more precise, 434 penny firms and 394 non-penny firms out of 1019 total firms listed in Bursa Malaysia (2024) were eligible to be in the sample of this study. The study employed 434 penny firms, which are stocks traded below RM1 per share and 394 non-penny firms, which are stocks traded above RM1 per share. This study intentionally beganits sample period on 1st January 2019, which aligned with the onset of COVID-19's influence on the Malaysian stock market. This period captured the emergence and progression of the pandemic, along with the associated market volatility and shifts in investor behavior. The selection of this timeframe was not incidental; rather, it was strategically chosen to investigate the notable phenomenon observed during this period, penny stocks consistently outperforming non-penny stocks, as illustrated in Figure 1. By anchoring the study in this context, the analysis inherently incorporated the effects of the pandemic, enabling a more meaningful exploration of how liquidity conditions influenced return dynamics under

crisis-driven market conditions. This study ended the sample period on 31st January 2023 as the most recent observation period that this study could cover. All data sources were retrieved from the Thomson Reuters Database and Bursa Malaysia.

Further, this study employed panel data for analysis. Law (2018) stated that the panel data was formed by integrating individual units and time series data sets into one comprehensive data set. There are three static panel data such as Pooled Ordinary Least Squares (OLS), Random Effects Model (REM), and Fixed Effects Model (FEM). The Pooled OLS implies that both interception and slope remain consistent across firms and time. At the same time, the error term represents differences across firms and time, aligning with the classical assumptions of OLS (Law, 2018). The Random Effects Model (REM) implies that individual-specific effects are considered as random variables (Law, 2018). The Fixed Effects Model (FEM) is employed when assuming that the individual-specific effect consists of individual-specific intercepts to be estimated (Law, 2018). Afterwards, this study examined the specific effects among Pooled OLS, REM or FEM by employing Poolability Test, Breusch Pagan (LM) Test and Hausman Test.

Diagnostic Tests

Four diagnostic tests were carried out: descriptive analysis, multicollinearity test, heteroskedasticity test, and serial correlation test. The descriptive analysis presented a preliminary analysis and summary of data to comprehend the penny stock returns, non-penny stock returns, liquidity, risk, firm size, book-to-market, and momentum attributes in the Malaysian stock market. Meanwhile, penny stock returns, non-penny stock returns, liquidity, risk, firm size, book-to-market, and momentum in an empirical Model A and B were highly intercorrelated, which led to multicollinearity. The heteroskedasticity test indicates varying spread or variance. In short, the variance around the regression line, which signifies the average relationship among penny stock returns, non-penny stock returns, liquidity, risk, firm size, book-to-market, and momentum remains inconsistent regardless of changes in these variables (Pesaran, 2015). The error term is serially correlated if the estimated value coefficient of correlation between any two observations of the error term is not equal to zero. Then, the error term is serially correlated. The serial correlation leads to at least two consequences. First, OLS will no

longer be the estimator with minimum variance. Second, it leads to biased OLS estimations of SE($\hat{B}$)s, resulting in the hypothesis testing being invalid. To be specific, serial correlation is primarily caused by specification errors such as omitting relevant variables, non-linearities, measurement errors, or inaccurate function form in the equation (Studenmund, 2017).

Measurement of Variables

The study addressed the performance of penny and non-penny stock returns as the dependent variables in the Malaysian stock market. As the SCM (2021) had not established any official price guidelines to identify and categorize penny and non-penny stocks for the Malaysian stock market. Thangayelu (2019) asserted that terms employed to define penny and non-penny stocks may vary or be solely acknowledged within a country's specific market trading environment. Following the criteria adopted by Yi (2020) and Monash (2016), 434 firms were classified as penny stocks as stock traded below RM1 per share and 319 firms as non-penny stocks as stock traded above RM1 per share in the Malaysian stock market. Further, this study employed the measurement developed by Negara and Wibowo (2021) and Pesaran (2015) to calculate penny and non-penny stock returns. The measurement of penny stock returns is presented in Equation (1) and non-penny stock returns is presented in Equation (2):

$$PSR_i = \frac{CP_1 - CP_0}{CP_0} \times 100 \quad (1)$$

$$NPSR_i = \frac{CP_1 - CP_0}{CP_0} \times 100 \quad (2)$$

Where:

PSR_i = Yearly return of *i*th firm
$NPSR_i$ = Yearly return of *i*th firm
CP_1 = Closing price on the current year of ith firm
CP_0 = Closing price on the prior year of ith firm

In addition, this study examined liquidity as its main independent variable. The other independent variables consisted of the factors in the five-factor model introduced by Amihud (2002): risk, firm size, book-to-market, and momentum. Table 1 presents the measurement summary of the dependent and independent variables.

Table 2: Summary of Measurement Dependent and Independent Variables

No.	Variables	Notation	Units	Measurements	Past studies
1	Penny Stock Returns	PSR	%	$= \frac{CP_1 - CP_0}{CP_0} \times 100$	Negara and Wibowo (2021); Pesaran (2015)
2	Non-Penny Stock Returns	NPSR	%	$= \frac{CP_1 - CP_0}{CP_0} \times 100$	Negara and Wibowo (2021); Pesaran (2015)
3	Liquidity	LIQ	RM	$= Ask_i - Bid_i$	Amihud (2002)
4	Risk	RISK	Beta	$= \frac{COV\ (R_i - R_m)}{VAR}$	Ragab et al. (2020)
5	Firm Size	FS	RM	$= CP_i \times NOS_i$	Ragab et al. (2020)
6	Book-To-Market	BM	Ra Ratio	$= BE_i \times MC_i$	Moardi et al. (2020)
7	Momentum	MM	RM	$= H_i - L_i$	Negara and Wibowo (2021)

Notes: = closing price of the current year of firm, = closing price the prior year of firm, = ask of the firm, and = bid of firm, = covariance, = return of firm, = return on the overall market, = variance, = number of shares outstanding of firm, = share value of book equity of company, = market capitalization of firm, = high stock's cumulative return, = low stock's cumulative return.

The empirical model is as follows:

Model A:

$$PSR_i = \alpha + \beta_1 LIQ_{1it} + \beta_2 LRISK_{2it} + \beta_3 LFS_{3it} + \beta_4 LBM_{4it} + \beta_5 MM_{5it} + \mu_i + \lambda_t + \nu_{it} \quad (3)$$

Model B:

$$NPSR_i = \alpha + \beta_1 LIQ_{1it} + \beta_2 RISK_{2it} + \beta_3 LFS_{3it} + \beta_4 LBM_{4it} + \beta_5 MM_{5it} + \mu_i + \lambda_t + \nu_{it} \quad (4)$$

Where:

PSR	=	Penny Stock Returns
$NPSR$	=	Non-Penny Stock Returns
i	=	ith firms
t	=	Time
L	=	Natural Logarithm
α	=	Constant Term
β	=	Beta Coefficients
LIQ	=	Liquidity
$RISK$	=	Risk
FS	=	Firm Size
BM	=	Book-to-Market
MM	=	Momentum
μ_i	=	Individual-specific effects
λ_t	=	Time
v_{it}	=	Error term

RESULTS AND DISCUSSION

Descriptive Analysis

This study conducted descriptive statistics as a preliminary analysis and summary of data to comprehend the penny stock returns, non-penny stock returns, liquidity, risk, firm size, book-to-market, and momentum attributes in the Malaysian stock market. As presented in Table 3 the overall mean of penny stock returns was 0.9332 and the standard deviation was 75.9738. The minimum and maximum returns for penny stocks were -1344.44 and 675. Next, the overall mean of liquidity was 0.0617 and the standard deviation was 1.6598. The minimum and maximum of liquidity were -15.4156 and 77.2657.

Table 3: Descriptive Statistics of Penny Stock Returns

Variable		Mean	Std. Dev.	Min	Max
PSR	Overall	0.9332	75.9738	-1344.44	675
	Between		30.2069	-275.01	116.9829
	Within		69.7583	-1068.5	558.9503
LIQ	Overall	0.0617	1.6598	0.002	77.2657
	Between		0.7425	0.0028	15.4872
	Within		1.4846	-15.4156	61.8401
LRISK	Overall	0.0757	0.9308	-6.2146	2.8904
	Between		0.7881	-4.3026	1.7815
	Within		0.5738	-4.7829	3.3052
LFS	Overall	4.8199	1.1051	-0.8916	9.9389
	Between		1.0081	2.2558	8.9476
	Within		0.4539	1.5829	7.9854
LBM	Overall	-0.2318	0.9692	-2.8134	9.9197
	Between		0.8437	-2.0944	3.4904
	Within		0.4844	-2.7978	9.3292
MM	Overall	0.0454	0.0584	0.001	0.9
	Between		0.0282	0.0044	0.2165
	Within		0.0512	-0.161	0.729

Notes: PSR represents penny stock returns, L represents natural logarithm, LIQ represents liquidity, FS represents firm size, BM represents book-to-market, and MM represents momentum.

Table 4 presents the highest overall mean of non-penny stock returns, which was 8.2292 and the standard deviation was 77.3825. The minimum and maximum of non-penny stocks returns were -92.8962 and 1193.75. The overall mean of liquidity was 0.5311 and the standard deviation was 8.1759. The minimum and maximum of liquidity were -52.9088 and 266.7172.

Table 4: Descriptive Statistics of Non-Penny Stock Returns

Variable		Mean	Std. Dev.	Min	Max
NPSR	Overall	8.2292	77.3825	-92.8962	1193.75
	Between		30.5577	-50.7511	210.0297
	Within		71.1179	-272.917	995.8397
LIQ	Overall	0.5311	8.1759	0.0008	266.7172
	Between		3.6616	0.0097	534689
	Within		7.3107	-52.9088	213.7794

Variable		Mean	Std. Dev.	Min	Max
RISK	Overall	0.999	0.7787	-2.27	4.289
	Between		0.6825	-1.3852	3.388
	Within		0.3777	-1.2622	2.7438
LFS	Overall	6.6404	1.9126	1.0402	13.0353
	Between		1.8664	2.3767	12.4489
	Within		0.4257	4.9803	11.1714
LBM	Overall	0.115	0.941	-2.1203	4.125
	Between		0.8755	-1.7131	3.4904
	Within		0.3553	-1.6965	9.3292
MM	Overall	6.0979	168.2587	0.005	6349.455
	Between		75.0967	0.0288	1269.959
	Within		150.5825	-1263.836	5085.594

Notes: NPSR represents non-penny stock returns, L represents natural logarithm, LIQ represents liquidity, FS represents firm size, BM represents book-to-market, and MM represents momentum.

Static Panel Data Analysis

Table 5 presents regression penny stock returns (Model A) from three static panels: Pooled OLS, REM, and FEM in one way and two-way. The coefficient, standard error, and p-value of Pooled OLS appeared like REM in both the one-way and two-way. From a one-way perspective, firm size, book-to-market, and momentum positively influenced and were significant at 1 percent on penny stock returns. Meanwhile, from a two-way perspective, only book-to-market and momentum showed a positive influence and was significant at 1 percent on penny stock returns. Simultaneously, both f-statistics in one-way and two-way showed significance at a 1 percent level. Law (2018) highlighted that there are potential biases because Pooled OLS might have heterogeneity bias and REM may have random individual-specific effects. Due to this, it violates the classical assumptions of OLS, and both are no longer considered BLUE. Further, this study employed FEM to address the issue of heterogeneity bias and random individual-specific effects that may arise from Pooled OLS and REM. The results showed that firm size, book-to-market, and momentum showed a positive influence and significance at 1 percent on penny stock returns in a one-way perspective. Conversely, only book-to-market and momentum showed a positive influence and significance at 1 percent on penny stock returns in a two-way

perspective. Both f-statistics in one-way and two-way were atthe less than 1 percent significance level; thus, it indicated the overall significance of regression in this model A.

Table 5: Static Panel Data (Penny Stock Returns)

	ONE-WAY			TWO-WAY		
	POLS	**REM**	**FEM**	**POLS**	**REM**	**FEM**
CONSTANT	-39.1303	-39.1303	-233.3784	-63.9815	-63.9815	-237.5773
	(7.7952)	(7.7952)	(22.6119)	(7.9815)	(7.9815)	(21.9419)
LIQ	-27.2917	-27.2917	-42.9558	-21.389	-21.389	-55.7825
	(39.9551)	(39.9551)	(43.3245)	(39.162)	(39.162)	(42.9078)
LNRISK	-0.6264	-0.6264	-1.4914	-1.39154	-1.39154	-2.0244
	(1.7997)	(1.7997)	(2.7275)	(1.7375)	(1.7375)	(2.6698)
LNFS	8.726	8.725995	49.2888	7.3007	7.3007	45.9571
	(1.5336)***	(1.5336)***	(4.4643)***	(1.4846)***	(1.4846)***	(4.4137)***
LNBM	18.4358	18.43581	35.7702	16.5211	16.5211	32.1117
	(1.7736)***	(1.7736)***	(4.0217)***	(1.7130)***	(1.7130)***	(3.9241)***
MM	6.7764	6.7764	104.499	47.8244	47.8244	51.84565
	(29.362)***	(29.362)***	(31.4653)***	(30.2847)	(30.2847)	(33.177)
F-Statistics	31.44	157.18	102.27	44.22	176.87	32.66
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Poolability Test		1.71			1.68	
		(0.0000)***			(0.0000)***	
Breucsh-Pagan (LM) Test	450.04			261.38		
	(0.0000)***			(0.0000)***		
Hausman Test		292.42			255.17	
		(0.0000)***			(0.0000)***	
Observations	1,956	1,956	1,956	1,956	1,956	1,956
Multicollinearity				1.04		
Heteroskedasticity				2.3		
				(0.0000)***		
Serial Correlation				0.059		
				0.8083		

Notes: L represents natural logarithm, LIQ represents liquidity, FS represents firm size, BM represents book-to-market, and MM represents momentum. Figures in the parentheses are standard errors, except for the Breusch-Pagan test, Hausman test, Heteroskedasticity, and Serial Correlation tests, which are p-values. *** indicates 1% significance level, ** indicates 5% significance level, and * indicates 10% significance level.

Apart from that, this study examined the specific effects among Pooled OLS, REM or FEM by employing Poolability Test, Breusch-Pagan (LM) Test and Hausman Test (Table 4). The first specific test was Poolability Test (Pooled OLS versus FEM). Both test results of the one-way and two-way showed that the p-value were less than 1 percent of the significance level. Thus, FEM was preferred compared to Pooled OLS in Model A. Subsequently, the second specific test was Breusch-Pagan (LM) Test (Pooled OLS versus REM). Both test results of one-way and two-way showed that the p-value were less than 1 percent of the significance level. The REM was preferred as compared to Pooled OLS in Model A. Also, the third specific test was the Hausman Test (REM versus FEM). Both test results of one-way and two-way show that the p-value were less than 1 percent of the significance level. The FEM was preferred compared to REM in Model A. Thereby; FEM was the best estimator to explain penny stock returns in the Malaysian stock market from a liquidity perspective.

Furthermore, this study examined three diagnostic tests: multicollinearity, heteroskedasticity, and serial correlation. The variance inflation factors (VIFs) were employed to address the issue of multicollinearity, as shown in Table 4. According to Ahmad et al. (2021), multicollinearity issues arise when the critical threshold of 5 is reached. The test's result showed no severe multicollinearity issue since mean VIFs were less than five among penny stock returns, liquidity, risk, firm size, book-to-market, and momentum due to the advantages of using panel data (Law, 2018). Next, the Modified Wald test was employed to determine the validity of the heteroskedasticity assumption (Pesaran, 2015). The test's result showed that the p-value was less than 1 percent significance level; thus, this study had no issue with heteroskedasticity. The Wooldridge test was employed to determine the presence of first-order serial correlation in the error term (Law, 2018). The test's result showed that the p-value was at more than 10 percent significance level. Hence, there was a serial correlation issue in this study. Indeed, presence of serial correlation can lead to bias and inefficient estimation of penny stock returns, liquidity, risk, firm size, book-to-market, and momentum. It is possible that the coefficients estimated in this study may show inconsistency, which could lead to underestimation or overestimation. Consequently, this can affect the reliability of hypothesis testing (Studenmund, 2017).

Referring to one-way and two-way (Table 4), the FEM test's result showed that the liquidity was insignificant, and Model A had a serial correlation issue. Thus, the study rectified the final model by employing FEM with clustering standard errors to address heterogeneous and serial correlation issues (Table 6). To note, the coefficient, standard errors, and p-value of Pooled OLS appeared like REM in both one-way and two-way. From a one-way perspective, the FEM test's result showed that firm size, book-to-market, and momentum showed a positive influence and were significant at the 1 percent level on penny stock returns. However, it failed to prove the presence of liquidity on penny stock returns in the Malaysian stock market. At the same time, f-statistics in one-way was less than the 1 percent significance level and had the capability to compare the fits of different models (Studenmund, 2017). Therefore, this study further examinedtwo-way clustering standard errors. Remarkably, the FEM test's result showed that liquidity had a negative influence and significance at 1 percent on penny stock returns in the Malaysian stock market. In the meantime, firm size, book-to-market, and momentum showed a positive influence and were significant at the 1 percent level on penny stock returns in the Malaysian stock market. In the meantime, f-statistics in two-way was less than the 1 percent significance level and can be compared the first of various models (Studenmund, 2017).

Liquidity is expected to have a negative influence on penny stock returns. To support this, liquidity had a negative coefficient of -55.7825, the standard error was 29.7057, and a 1 percent significance level. Chiang and Zheng (2015) and Bogdan et al. (2012) have found the influence of low stock liquidity on stock returns is mainly driven by penny stock. Liquidity risk premium influences the stock market, as highlighted by several studies (Sterenczak, 2020; Uddin, 2009). Thus, it was proven that a liquidity risk premium was present in the Malaysian stock market. Malaysian investors argue that penny stocks assist in mitigating potential losses due to liquidity costs, resulting in an additional expected return. Kong (2006) found that the influence of liquidity on stock returns was statistically significant by employing a five-factor model developed by Amihud (2002), regardless of the time. Acharya and Pedersen (2005) also posited that liquidity predicted future stock market movements and co-moves with present returns.

Table 6: Clustering Standard Error (Penny Stock Returns)

	ONE-WAY (ROBUST STANDARD ERROR)			TWO-WAY (ROBUST STANDARD ERROR)		
	POLS	**REM**	**FEM**	**POLS**	**REM**	**FEM**
CONSTANT	-39.1303	-39.1303	-233.3784	-63.9815	-63.9815	-237.5773
	(6.9470)	(6.9470)	(49.1001)	(6.8596)	(6.8596)	(47.8288)
LIQ	-27.292	-27.292	-42.9558	-21.389	-21.389	-55.7825
	(27.673)	(27.673)	(35.0528)	(26.1198)	(26.1198)	(29.7057)**
LNRISK	-0.6264	-0.6264	-1.4914	-1.3915	-1.3915	-2.0424
	(1.9254)	(1.9254)	(3.2130)	(1.8621)	(1.8621)	(3.1928)
LNFS	8.726	8.726	49.2888	7.3007	7.3007	45.95705
	(1.4226)***	(1.4226)***	(9.4636)***	(1.3761)***	(1.3761)***	(9.3377)***
LNBM	18.4358	18.4358	35.7702	16.52113	16.52113	7.3777
	(2.6016)***	(2.6016)***	(12.8069)***	(2.5232)***	(2.5232)***	(12.5838)***
MM	63.7764	63.7764	104.499	47.82441	47.82441	51.8457
	(23.2897)***	(23.2897)***	(29.2032)***	(22.0237)***	(22.0237)***	(25.1325)***
F-Statistics	16.39	81.93	36.24	80.78	323.13	70.54
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***

Notes: L represents natural logarithm, LIQ represents liquidity, FS represents firm size, BM represents book-to-market, and MM represents momentum. Figures in the parentheses are standard errors. *** indicates 1% significance level, ** indicates 5% significance level, and * indicates 10% significance level.

The FEM test's result, indicating that liquidity had a significant negative influence at the 1 percent level on penny stock returns in the Malaysian stock market, carries important implications for internal financial management. The management evaluation needs to be careful when it comes to interpreting high returns from penny stocks, as these returns could be a result of illiquidity risk premiums as opposed to value creation from efficiency (Urbański et al., 2015). Looking at project evaluation within capital budgeting, firms with illiquid stocks might constrain a higher cost of capital or face greater skepticism from investors, thus requiring more conservative project evaluations and a better rationale for high return investments. From a risk management point of view, the outcome indicates that greater scrutiny of liquidity exposure risk has to be managed for companies with lower trading price levels, as illiquidity tends to induce volatility and constrict financial maneuverability, which worsens flexibility. Primarily, the CFO, financial controllers and board members are outwardly

invited as understanding the inverse relationship emphasized put them under proactive market scrutiny within an internal financial controls systems framework to make decisions.

Table 7 presents regression non-penny stock returns (Model B) from three static panels: Pooled OLS, REM, and FEM in one-way and two-way. The coefficient, standard error, and p-value of Pooled OLS appeared like REM in both one-way and two-way. To be specific, both Pooled OLS and REM showed firm size had a negative influence and was significanct at the 1 percent level on penny stock returns. Momentum had a positive influence and was significance at 1 percent on penny stock returns. The FEM also showed firm size and momentum had a positive influence and were significant at the 1 percent level on penny stock returns in both one-way and two-way. Both f-statistics in one-way and two-way were less than the 1 percent significance level; thus, it indicated significant overall regression in model B.

In addition, this study examined the specific effects among Pooled OLS, REM or FEM by employing the Poolability Test, Breusch-Pagan (LM) Test and Hausman Test (Table 7). The first specific test is Poolability Test (Pooled OLS versus FEM). Both test results of one-way and two-way showed that the p-value were less than 1 percent of the significance level. FEM was preferred as compared to Pooled OLS in Model B. Next, the second specific test was Breusch-Pagan (LM) Test (Pooled OLS versus REM). Both test results of one-way and two-way showed that the p-value were less than the 1 percent significance level. The REM was preferred compared to Pooled OLS in Model B. The third specific test was the Hausman Test (REM versus FEM). Both test results of one-way and two-way showed that the p-value were less than the 1 percent significance level. The FEM was preferred compared to REM in Model B. Thereby; FEM was the best estimator to explain non-penny stock returns in the Malaysian stock market from a liquidity perspective.

Table 7: Static Panel Data (Non-Penny Stock Returns)

	ONE-WAY			TWO-WAY		
	POLS	**REM**	**FEM**	**POLS**	**REM**	**FEM**
CONSTANT	19.4697	19.4697	-306.894	-0.4327	-0.4327	-324.5359
	(7.7478)	(7.7478)	(36.5888)	(8.2723)	(8.2723)	(37.146)
LIQ	0.2296	0.2296	0.0290	0.226	0.226	0.1925
	(0.2342)	(0.2342)	(0.2414)	(0.229)	(0.229)	(0.2369)
RISK	3.3619	3.3619	6.4541	0.9412	0.9412	2.6834
	(2.5065)	(2.5065)	(4.7539)	(2.5056)	(2.5056)	(5.0963)
LNFS	-2.525	-2.525	45.6264	-2.6695	-2.6695	46.8836
	(1.0809)***	(1.0809)***	(5.6234)***	(1.0588)***	(1.0588)***	(5.7324)***
LNBM	19.3526	19.3526	49.4397	18.6089	18.6089	45.1442
	(2.214)***	(2.214)***	(6.7074)***	(2.1686)***	(2.1686)***	(6.7051)***
MM	-0.0029	-0.0029	-0.0011	-0.007	-0.007	-0.0058
	(0.0113)	(0.0113)	(0.117)	(0.0111)	(0.0111)	(0.0115)
F-Statistics	15.7	78.49	74.34	18.77	75.07	14.34
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Poolability Test		1.83			1.81	
		(0.0000)***			(0.0000)***	
Breucsh-Pagan (LM) Test		1154.13			1942.48	
		(0.0000)***			(0.0000)***	
Hausman Test			261.34			248.95
			(0.0000)***			(0.0000)***
Observations	1,581	1,581	1,581	1,581	1,581	1,581
Multicollinearity				1.08		
Heteroskedasticity				1.1		
				(0.0000)***		
Serial Correlation				6.204		
				(0.0133)***		

Notes: L represents natural logarithm, LIQ represents liquidity, FS represents firm size, BM represents book-to-market, and MM represents momentum. Figures in the parentheses are standard errors, except for the Breusch-Pagan test, Hausman test, Heteroskedasticity, and Serial Correlation tests, which are p-values. *** indicates 1% significance level, ** indicates 5% significance level, and * indicates 10% significance level.

Table 8: Clustering Standard Error (Non-Penny Stock Returns)

	ONE-WAY			TWO-WAY		
	(ROBUST STANDARD ERROR)			(ROBUST STANDARD ERROR)		
	POLS	REM	FEM	POLS	REM	FEM
CONSTANT	19.4697	19.4697	-306.8936	-0.4327	-0.4327	-324.5359
	(6.5418)	(6.5418)	(104.585)	(6.1417)	(6.1417)	(109.0432)
LIQ	0.2296	0.2296	0.209	0.226	0.226	0.1925
	(0.1252)***	(0.1252)***	(0.1018)***	(0.1851)	(0.1851)	(0.1637)
LNRISK	3.3619	3.3619	6.4541	0.9412	0.9412	2.6834
	(3.0156)	(3.0156)	(5.2007)	(2.7694)	(2.7694)	(4.9358)
LNFS	-2.5249	-2.5249	45.6264	-2.6695	-2.6695	46.8836
	(0.9144)	(0.9144)	(16.0043)***	(0.911)***	(0.911)***	(16.8089)***
LNBM	19.3526	19.3526	49.4397	18.60887	18.60887	45.1442
	(3.391)***	(3.391)***	(13.0643)***	(3.2365)***	(3.2365)***	(13.0833)***
MM	-0.0029	-0.0029	-0.0011	-0.007	-0.007	-0.0058
	(0.001)***	(0.001)***	(0.0011)	(0.0015)***	(0.0015)***	(0.0015)***
F-Statistics	8.2400	41.2100	18.3600	45.55	182.19	34.28
	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***

Notes: L represents natural logarithm, LIQ represents liquidity, FS represents firm size, BM represents book-to-market, and MM represents momentum. Figures in the parentheses are standard errors. *** indicates 1% significance level, ** indicates 5% significance level, and * indicates 10% significance level.

This study also examined three diagnostic tests: multicollinearity, heteroskedasticity, and serial correlation. The multicollinearity result showed no severe issues since the mean VIFs were less than five among non-penny stock returns, liquidity, risk firm size, book-to-market, and momentum. This is attributed to the benefits of employing panel data (Law, 2018). The Modified Wald and Wooldridge test result showed that the p-value was less than the 1 percent significance level. It implied that this study had no concerns related to heteroskedasticity and serial correlation.

Referring to one-way and two-way (Table 7), the FEM test's result showed that the liquidity was insignificant on non-penny stock returns. The study addressed the issue of heterogeneity by employing FEM with clustering standard error, as presented in Table 8. It is worth noting that the coefficient, standard errors, and p-value of Pooled OLS showed similarities to REM in both one-way and two-way. From a one-way perspective, the FEM test's showed that liquidity, firm size and book-to-market showed a positive influence and were significant at the 1 percent level on penny stock returns. From a two-way perspective, firm size, book-to-market, and momentum showed a positive influence and was significantat the1 percent level on non-penny stock returns. Both f-statistics in one-way and two-way were less than the 1 percent significance level and overall had the ability to compare the first of various models (Studenmund, 2017).

Liquidity was expected to have a positive influence on non-penny stock returns. Indeed, liquidity had a positive coefficient of 0.1925, the standard error of 0.1637 but the results remained insignificant. As Violita and Soeharto (2019) and Bogdan et al. (2012) argued, stocks with high liquidity can be easily converted into cash. In other words, stocks that have high liquidity tend to attract more investor interest in purchase. Thus, a rise in the firm's stock leads to higher non-penny stock returns (Violita and Soeharto, 2019). In another instance, the larger firm's stock (i.e. non-penny stock) with higher liquidity is prone to share more information with the stock market, thus reducing the information asymmetry (Silva et al., 2022; Bogdan et al., 2012). In short, the non-penny stock has high liquidity, contributing to its superior performance in the stock market (Violita and Soeharto, 2019; Bogdan et al., 2012).

Albeit the positive coefficient of liquidity on non-penny stock returns, the results of this study showed that liquidity was insignificant in explaining non-penny stock returns indicating that, for non-penny stocks which are more seasoned, liquid, and actively traded, liquidity is not a primary factor in shaping return behavior. This is likely because non-penny stocks tend to have higher trading volumes, more liquidity, narrower bid-ask spreads, and greater visibility among investors and analysts, which makes liquidity a non-issue and reduces returns' dependence on it. In such situations, other factors such as firm fundamentals, macroeconomic variables, and overall market sentiment are likely to have a greater impact on price movements. From an internal stakeholder perspective, the same non-penny stock findings suggest that in performance evaluation and capital allocation, attention can be shifted away from liquidity focused targets and be more on value-added strategies because the stock's liquidity conditions are relatively stable and unlikely to distort stock performance.

CONCLUSION

This study aimed to explain penny stock returns versus non-penny stock returns in the Malaysian stock market from a liquidity perspective. The study employed yearly panel data of 434 penny firms and 319 non-penny firms from 1st January 2019 to 31st December 2023. In particular, the dependent variables were penny and non-penny stock returns in the Malaysian stock market meanwhile, the main independent variable was liquidity. The other independent variables consisted of the factors in the five-factor model introduced by Amihud (2002): risk, firm size, book-to-market, and momentum.

The finding showed that liquidity, book-to-market, and momentum significantly influenced penny stock returns in the Malaysian stock market. In line with Sterenczak (2021) and Uddin (2009), the presence of higher penny stock returns in the Malaysian stock market in recent years has offered higher returns due to liquidity risk premiums. As Hubermand and Halka (2001) and Chordia et al. (2000) had argued, it is crucial to consider liquidity in asset pricing models because of liquidity risk premiums across various stock markets. Therefore, Malaysian investors must consider several aspects, such as local and international news impacting specific firms or industries,

to manage liquidity risk premiums effectively in their investment decision-making (Liew et al., 2016). The following book-to-market influences penny stock returns in the Malaysian stock market.

The finding showed that penny stock showed a high book-to-market value, leading to higher penny stock returns. It implied that the market retains a comparatively lowered perception of the firm's worth. Indeed, book-to-market can evaluate investor's perceptions of a firm's performance in the Malaysian stock market. The following momentum influences penny stock returns in the Malaysian stock market. A high momentum of penny stock return is mainly attributed by the stock's positive performance (Maheshwari and Dhankar, 2017; Gupta et al., 2013; Stork, 2011). To support this, Agathee (2012), Jegadeesh and Titman (2011) stated that positive momentum in penny stocks is driven by investors' tendency to overreact the new information related to the firms' valuation and profitability.

Firm size and momentum also influenced non-penny stock returns in the Malaysian stock market. It is worth noting that liquidity had an influence but showed insignificant results. The following firm size influences non-penny stock returns in the Malaysian stock market. Larger firm size generally exhibits strong financial stability and performs well in the market (Yuliarti and Diyani, 2018). The larger firm commonly has sufficient capital to sustain all their strategies to maximize profits (Handayani et al., 2019). As a result, increased demand for non-penny stock leads to higher prices and returns. The following momentum influences non-penny stock returns in the Malaysian stock market. A low momentum of non-penny stock returns is primarily due to the stock's negative performance (Maheshwari and Dhankar, 2017; Gupta et al., 2012; Stork, 2011). Precisely, it is driven by investors' tendency to underreact the new information related to the firms' valuation and profitability (Agathee, 2012; Jegadeesh and Titman, 2011; Dijk and Huibers, 2002).

The findings of this study offer both empirical insights and practical implications for internal stakeholders such as financial controllers, CFOs, and board-level decision makers. Specifically, the Fixed Effects Model (FEM) results revealed that liquidity had a statistically significant negative influence on penny stock returns in the Malaysian stock market. This indicated that diminished liquidity, represented by greater bid-ask spreads

and lower trading volumes, is linked to greater returns in the penny stock market. This is suggestive of a risk premium that investors demand for holding lower liquid assets. This is a critical notion for internal stakeholders as it demonstrates the role of liquidity perception on investor behavior and firm valuation, particularly for firms with low share prices. Such empirical insights may help to devise better capital market relations, investor relations efforts, and financial disclosures aimed to boost market confidence and lessen liquidity risk. In conclusion, the value of market microstructure insights for strategic financial decisions cannot be overlooked as this study amply demonstrates.

Although several precautions were taken to ensure the accuracy of the results, it is essential to acknowledge that this study has limitations. By employing the five-factor model, this study found that liquidity, book-to-market, and momentum significantly influenced penny stock returns. In contrast, liquidity, firm size, and momentum influenced non-penny stock returns in the Malaysian stock market. Therefore, comprehending penny and non-penny stock returns in the Malaysian stock market can be achieved by integrating the examination with the main and other independent variables.

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