



EXAMINING THE EFFECT OF PRICE VOLATILITY AND FOREIGN CURRENCY EXCHANGE ON TRADING LIQUIDITY: CROSS-COUNTRY ANALYSIS USING PANEL ARDL APPROACH

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Abstract. This study aims to examine the effect of stock price volatility on trading liquidity by involving the domestic currency exchange rate against the United States Dollar (USD). The observation period was determined from January 2014 to March 2025 with weekly data frequency. The markets selected as research subjects came from three countries: Indonesia, Turkey, and Saudi Arabia. The data collected consisted of individual stock prices in these three capital markets, which have large capitalization and high liquidity. The other data are trading volume and the domestic exchange rate of the three countries against the USD, namely IDR, TRY, and SAR. The technique used to analyze the association between these variables was the ARDL Panel approach. The results indicate that stock liquidity is negatively affected by price volatility and positively affected by the exchange rate during the same period. In addition, the interaction variable of volatility and exchange rate shows a positive sign on stock liquidity. Based on these results, investors should choose stocks with low volatility and seek momentum when the domestic currency weakens so that their shares can be easily and quickly transacted.

Keywords: Exchange Rate, Panel ARDL, Price Volatility, Trading Liquidity

1. Introduction

Stock trading liquidity is the ease and speed with which a stock can be bought and sold by stock exchange participants. Stock liquidity can also be defined as the availability of demand (bid) from buyers when someone wants to sell their shares and the availability of shares for sale (ask) when someone needs a particular stock. A stock liquidity can be seen, among other things, in the higher or lower transaction volume or trading frequency over a specific period that can be completed on the exchange [1,2]. A more liquid stock indicates a greater number of buyers and sellers transacting, meaning it sells well on the stock exchange. An illiquid stock means few people are trading it due to a lack of interest.

Stock liquidity is a crucial condition for the functioning of a market for every listed stock [3]. Liquidity is important to examine in depth because it concerns the interests of market participants who need to quickly and easily convert shares into cash and access ownership of a company. Liquidity is important because it helps investors achieve expected returns as compensation for liquidity risk. Understanding the importance of stock liquidity can help investors design more efficient portfolio and investment strategies and align return expectations with liquidity risk profiles [4].

If liquidity is thin, the market can be disrupted because transactions between investors can be slow and create market inefficiency, thus hindering price stability. Low liquidity also increases the holding period for potential sellers and the holding period for buying shares, resulting in



many trade execution delays. This eliminates potential profits, reduces financial asset turnover, and leads to stock market dysfunction. More broadly, liquidity is also important for companies, analysts, and regulators because it influences market perception and the credibility of information [5,6].

The condition of stock market liquidity in Indonesia, Turkey, and Saudi Arabia shows different characteristics, although they all face significant challenges. In Indonesia, stock market liquidity has tended to decline in recent years, as indicated by the drop in daily trading value which even reached its lowest level since the pandemic in July 2025 [7]. Moreover, external pressures such as high global interest rates have caused foreign investors to withdraw funds, worsening liquidity [8].

Market liquidity in Turkey is heavily influenced by macroeconomic instability, inflation, and the depreciation of the lira. Reports show that banks' foreign currency liquid assets have fallen significantly, increasing market risks [9,10]. Meanwhile, in Saudi Arabia, liquidity temporarily increased by 40% in 2023 due to capital market reforms, but authorities have also faced a decline in the quality of liquidity due to the concentration of trading in large-cap stocks. In fact, its stock market was among the worst-performing globally in 2025 [11–13].

The main issue faced by investors and issuers in these three countries is that market liquidity not only fluctuates but also often rises without being accompanied by good trading quality. The increase in trading volume is often driven more by high volatility than by strong corporate fundamentals. This makes liquidity speculative and temporary, thus reducing the attractiveness of the capital market as a stable long-term funding source [7–13].

One important determinant that results in poor stock liquidity is price volatility. Previous research reported that volatility negatively impacts stock liquidity. Muzaffar and Malik [14] reported that lower liquidity in Asian markets is caused by higher volatility. Furthermore, Zhao et al. [15] emphasized that during periods of high volatility, liquidity decreases significantly. Sharp spikes in liquidity cause liquidity to shrink, which disrupts the availability of short-term liquidity by increasing transaction costs [16]. Excessive volatility often makes investors cautious, thus reducing trading volume and stock liquidity. This can reduce the number of potential investors, which ultimately has a negative impact on market liquidity.

Findings on the effect of return volatility on stock trading liquidity are inconsistent. The effect is negative, with the argument that high volatility results in low trading liquidity. However, in some cases, stock volatility has no effect on stock liquidity [17]. These studies yield fragmented results and fail to encompass different findings in a single analysis. This is likely due to the analytical techniques used not being able to capture different results due to ignoring past lag periods, necessitating analytical techniques that address this weakness.

Another determinant is each country's currency exchange rate against the USD. This is related to the global economic impact on the stock market due to the inflow of international investor funds directly trading international stocks. It can be due to real economic movements, namely the influence of exchange rates on a company's export-import capabilities and opportunities. It directly impacts a company's revenue and then indirectly impacts stock price volatility.

This research expands existing models by incorporating foreign exchange rate dynamics as a determinant of stock liquidity, reflecting foreign investor participation in the domestic capital market. Foreign investors purchasing power is expected to increase when the international currency (USD) appreciates, thus increasing liquidity. Therefore, if the USD appreciates, volatility will negatively impact stock liquidity. Conversely, if the USD depreciates or its purchasing power declines, volatility will have no impact on liquidity.



Several studies in Indonesia have produced findings on the effect of exchange rates on liquidity, including [18]. When the IDR exchange rate against the USD depreciates, liquidity, as measured by trading frequency, increases. Theoretically, exchange rate volatility influences investor psychology and decisions (especially foreign investors), which is reflected in market liquidity levels. In the short term, depreciation can increase liquidity because local stock prices are perceived as cheaper by foreign investors. Furthermore, in the long term, depreciation leads to increased revenue and earnings for exporting companies, which in turn attracts investors to purchase their shares, as indicated by increased trading volume or wider bid spreads. Exchange rate depreciation is often associated with improved earnings prospects for export-oriented companies, thus encouraging investor reaction through increased stock trading volume.

Research of [19] found that exchange rate shocks that increase the competitiveness of export products can improve cash flow and company valuations, which in turn influence investor interest in trading related stocks. This finding is in line with [20], which shows that currency depreciation can increase export volume and create investor portfolio rebalancing, especially in sectors with high exposure to international trade. Thus, exchange rate depreciation can be an external factor that stimulates increased trading activity in individual stocks and certain sectors.

Empirical evidence suggests that the impact of depreciation on market liquidity is not universal. Large depreciations sometimes attract short-term speculative flows (increasing stock liquidity), or conversely trigger foreign capital outflows (reducing liquidity). The final direction depends on the macro context and sentiment. Furthermore, [21] suggests that market reactions to currency devaluations vary across countries and sectors, with exporting stocks tending to experience increased trading activity, while stocks with import dependency or foreign exchange debt face pressure.

Furthermore, [22] added that although depreciation can improve company performance in the medium term, stock market responses are often heterogeneous and depend on the company's financial structure. Therefore, research on the relationship between exchange rate depreciation and stock trading liquidity needs to consider differences in economic context, sector structure, and liquidity indicators used. With the problem description and gaps in the research stated above, this paper tests the effect of price volatility on trading liquidity by linking USD exchange rates in 3 (three) selected countries with the Panel ARDL technique.

2. Methods

2.1. Observation period

This research analyzes the stock liquidity (LQS) variable by associating it with the stock price volatility (VPS) and exchange rate (FER) variables. This research examines weekly data from January 2014 to March 2025. The stock markets selected for this study are located in three countries: Indonesia, Turkey, and Saudi Arabia. The total number of observations for each stock market is 583 weekly periods.

There are several important similarities among the stock exchanges of Indonesia, Turkey, and Saudi Arabia, particularly from an international economic and global investment perspective. All three are often viewed as part of the emerging market group where the stocks in these stock exchanges often attract foreign investors, but they are also vulnerable to capital outflows. In addition, stock indexes become volatile, domestic currencies are under pressure, and stocks experience significant fluctuations. Furthermore, they are still in the deepening stage, continually striving to increase liquidity, expand market capitalization, attract global institutional investors, and improve transparency and governance. Indonesia Stock Exchange, for example, is working to strengthen its status in the MSCI Emerging Markets through capital

market reforms. Saudi Arabia is also aggressively opening to foreign investors, while Turkey has for years sought to strengthen integration with European and global markets.

The secondary data analyzed includes individual stock prices in the three capital markets, which have large capitalization and high liquidity. This data is needed to calculate individual stock returns and then to obtain return volatility. Additionally, other data required is the number of shares traded for each individual stock on a weekly basis. The next data point is the domestic exchange rates of the three countries (IDR, TRY, and SAR) against the USD.

2.2. Analysis Technique

The technique applied to investigate the association between variables in this study is the ARDL Panel model. The Autoregressive Distributed Lag (ARDL) framework extended to panel data (Panel ARDL) is a powerful tool for modeling relationships when variables may have different orders of integration ($I(0)$ and/or $I(1)$), and when both short-run dynamics and long-run equilibrium relationships are of interest. In the context where the dependent variable is LQS, and the explanatory variables are VPS, FER, and the interaction ($VPS \times FER$), the ARDL Panel allows us to uncover not only how volatility and exchange rate individually influence liquidity, but also whether their combined effect (the interaction) has an additional moderating or amplifying effect.

Pesaran, Shin, and Smith introduced the panel ARDL framework and its estimators—PMG, MG, and DFE—enabling modeling of both short-run and long-run relationships with flexibility in heterogeneity across cross-section units [23,24]. Unlike traditional panel methods, Panel ARDL can be applied even when variables are a mixture of $I(0)$ and $I(1)$ (but none $I(2)$), and it yields estimates of long-run multipliers and error correction parameters [23].

Let $i = 1, \dots, N$ index cross-section units (eg, firms) and $t = 1, \dots, T$ index time. A general Panel ARDL model with one lag of the dependent variable and contemporaneous and lagged explanatory variables, including interaction, can be written:

$$LQS_{it} = \alpha_i + \sum_{j=0}^p \beta_{ij} LQS_{it-j} + \sum_{j=0}^q \gamma_{ij} VPS_{it-j} + \sum_{j=0}^r \delta_{ij} FER_{it-j} + \sum_{j=0}^s \theta_{ij} VPS * FER_{it-j} + \varepsilon_{it}$$

Here, α_i is a fixed intercept for unit i , β_i captures autoregressive persistence in liquidity of stock (LQS), while γ_i , δ_i , and θ_i are contemporaneous effects of volatility of stock price (VPS), foreign exchange rate (FER), and their interaction. Lags p , q , r , s allow for dynamics in each explanatory variable. The interaction term of $VPS * FER$ allows us to test whether the effect of volatility on liquidity depends on the level (or shock) of exchange rate, or vice versa. In narrative form: "VPS and FER individually determine LQS, and the interaction may either amplify or mitigate those effects. For example, high volatility may further reduce liquidity when exchange rates are particularly volatile or at certain levels."

To distinguish short- and long-run effects, we transform the ARDL model into an Error Correction Model (ECM) representation:

$$\Delta LQS_{it} = \mu_i + \lambda_i (LQS_{it-1} - \beta_{1,i} VPS_{it-1} - \beta_{2,i} FER_{it-1} - \beta_{3,i} (VPS * FER)_{it-1}) + \sum_{j=0}^{q-1} \gamma_{ij} \Delta VPS_{it-j} + \sum_{j=0}^{r-1} \delta_{ij} \Delta FER_{it-j} + \sum_{j=0}^{s-1} \theta_{ij} \Delta (VPS * FER)_{it-j} + \varepsilon_{it}$$

In this form, λ_i is the error-correction coefficient -a negative and significant-. This λ_i indicates convergence toward long-run equilibrium. The long-run influence of volatility,

exchange rate, and their interactions are captured by β_1 , β_2 , and β_3 respectively. Meanwhile, short-run dynamics are in differences Δ .

Ameziane and Benyacoub applied a Panel CS-ARDL (cross-sectionally augmented ARDL) model to study exchange rate volatility's effect on economic growth across emerging countries, using GARCH-based volatility proxies and finding both direct and indirect effects, depending on exchange rate regimes [25,26]. Although their dependent variables differ, their methodology underscores the utility of advanced panel-ARDL variants for volatility analysis.

In summary, the Panel ARDL approach with interaction allows researchers to assess how stock liquidity responds dynamically to price volatility, exchange rate fluctuations, and their combined effects. The model captures both short-run transient dynamics and long-run equilibrium relationships. The inclusion of an interaction term is especially important when one believes that the effect of volatility may be moderated by exchange rate levels -or vice versa- reflecting more realistic financial market mechanisms.

3. Results and Discussion

3.1. Data stationarity testing and statistical test results

The results of stationarity tests using various panel unit root test approaches (Levin, Lin & Chu; Im, Pesaran & Shin; ADF-Fisher; PP-Fisher) indicate that LQS and VPS are stationary at the level (Table 1). This is indicated by significant probability values below 0.05 in all tests used. Thus, both variables can be categorized as variables with zero-order integration [I(0)]. This finding strengthens the evidence that stock liquidity and volatility data in weekly sample periods are relatively stable in their mean and variance distributions, making them suitable for analysis without requiring further processing at higher degrees of integration.

Table 1. Summary of Unit Root Panel Stationarity Test

Variable	Prob. for I(0)	Prob. for I(1)	Stationarity
LQS	0.0001	-	Level, I(0)
VPS	0.0000	-	Level, I(0)
FER	0.8936	0.0000	Difference, I(1)
VPS*FER	0.0617	0.0000	Difference, I(1)

Source: processed data.

In contrast, the FER variable is proven to be non-stationary at the level, where most tests indicate an insignificant probability. However, after testing on the first difference, the FER becomes stationary. This indicates that the FER is included in the category of variables with first-order integration [I(1)]. This condition reflects the nature of exchange rate data which tends to form long-term trends and volatility, but its changes in the first difference are more random and stable.

Similarly, the interaction variable VPS*FER also exhibits a similar pattern to FER. This variable is not stationary at the level, but becomes stationary after being estimated in first differences. Thus, VPS*FER can be categorized as an I(1). This is understandable considering that interaction variables often amplify the trend or volatility properties already present in each of their constituent variables, particularly in financial data that is sensitive to price and exchange rate dynamics.

Based on these overall results, it can be concluded that the combination of variables in this study consists of a mixture of I(0) and I(1). This condition is in accordance with the prerequisite for applying Panel ARDL which requires no variables with second-order integration [I(2)]. In other words, ARDL can be used validly in this context because of its flexible nature to handle variables with mixed integration of I(0) and I(1). Therefore, the results of the stationarity test

support the feasibility of the Panel ARDL model for analyzing the short-term and long-term relationships between stock liquidity, price volatility, exchange rates, and their interactions.

The results of the Autoregressive Distributed Lag (ARDL) panel estimation using the Pooled Mean Group (PMG) method are shown in Table 2. The table reports the long-term and short-term associations between LQS and VPS, FER, and the interaction variable VPS*FER. The selected model based on the Akaike criterion (AIC) is PMG(2,0,0,0), with a log-likelihood value of -625.7967, which is better than other alternative models. Thus, it can be said that this model is quite representative in explaining the dynamics of stock liquidity in the research sample.

Long-term estimation results (coefficients) show that the VPS variable has a significant negative effect on LQS with a coefficient of -7.0697 ($p < 0.01$). This means that increasing stock price volatility in the long term will reduce stock liquidity. This is consistent with market microstructure theory, which states that high volatility causes price uncertainty, discouraging investors from transacting, ultimately reducing liquidity. Thus, price stability is an important factor in maintaining the depth of the capital market.

Table 2. Results of ARDL Panel Testing with Dependent Variable LQS

Variable	Coefficient	Prob. Value
Long run		
C	2,353	0.000
VPS	-7,069	0.000
FER	0.012	0.000
VPS*FER	0.596	0.000
Short run		
Cointeq	-0.186	0.133
D(LQS(-1))	-0.309	0.000

Source: processed data.

The FER variable has a significant positive effect on the LQS with a coefficient of 0.0116 ($p < 0.01$). This positive interpretation indicates that domestic currency depreciation (increased FER value) drives increased stock liquidity. This mechanism can be explained by attracting foreign investors, as exchange rate depreciation can increase foreign investor interest in relatively cheaper domestic assets, thereby increasing stock trading volume and improving market liquidity.

The VPS*FER interaction variable has a significant positive effect with a coefficient of 0.5958 ($p < 0.01$). This finding suggests that the negative impact of stock price volatility on liquidity can be influenced by exchange rate movements. Currency depreciation can mitigate the negative effects of volatility on liquidity by increasing foreign capital inflows into the domestic stock market. In other words, although high volatility typically reduces liquidity, this effect can be mitigated when the exchange rate depreciates. In other words, the weakening of the rupiah acts as a moderating factor that reduces the negative effects of stock price volatility on market liquidity. The constant (C) value of 2.3534 is significant at the 1% level. This indicates that under conditions where the independent variables are stable, stock liquidity remains positive, reflecting the presence of other fundamental factors supporting stock trading activity in the market.

In short term estimates (coefficients), the error correction term (Cointeq) variable has a value of -0.1860 with a significance level of 0.1334. Although the negative sign is as expected (as it indicates a correction mechanism towards long-term equilibrium), its insignificance indicates that the speed of short-term adjustment towards long-term equilibrium is not strong enough. In other words, if a system shock occurs, the correction process towards equilibrium requires a relatively longer time. Meanwhile, the first lag LQS coefficient of -0.3089 is significant at

$p < 0.01$, indicating a persistence effect. This means that changes in stock liquidity in the previous period still influence current liquidity conditions, with a negative direction indicating a dynamic adjustment process of market liquidity.

Overall, these estimation results emphasize the importance of considering the dynamics of stock price volatility and currency exchange rates in influencing market liquidity. Exchange rate strengthening or exchange rate stability can help mitigate the negative impact of volatility on liquidity, making monetary policy strategies and market interventions relevant for maintaining stock trading quality.

3.2. Discussion of the Influence of Price Volatility on Stock Liquidity

Long-run estimates from the ARDL Panel model show a VPS coefficient of -7.0697 ($p < 0.001$). This highly statistically significant result suggests that an increase in VPS is associated with a decrease in LQS in the analyzed cross-section. Economically, the -7.07 value indicates a relatively strong effect: a one-unit increase in VPS is associated with a decrease in the average LQS of approximately 7.07 units, holding other variables (FER and interaction terms) constant.

The economic logic behind these findings rests on microstructure theory: price volatility increases inventory risk and adverse selection for liquidity providers (market makers). Under conditions of high volatility, market makers are wary of holding positions that fluctuate rapidly, so they respond by widening bid-ask spreads, reducing quoting depth, or withdrawing from the market -all of which reduce market liquidity [27,28]. Furthermore, funding and margin mechanisms can exacerbate these effects: as volatility increases, funding costs and the capital requirements for holding positions also rise, making liquidity providers more risk-averse [29].

In terms of dynamics, although the long-run relationship between VPS and LQS is strong, the error-correction term ($\text{COINTEQ} = -0.186$, $p = 0.1334$) is insignificant, indicating that the readjustment to long-run equilibrium is relatively slow and heterogeneous across cross-sections. However, the first lag of LQS changes is negative and significant ($D(\text{LQS}(-1)) = -0.3089$, $p < 0.001$), indicating a short-term corrective reaction (mean-reversion) in liquidity after the shock -meaning that the liquidity change partially accumulates and persists in the following period, before finally (gradually) adjusting to equilibrium conditions.

These empirical results are consistent with the literature that finds a negative relationship between volatility and liquidity. Models explaining market maker behavior (Kyle; Glosten-Milgrom) theoretically predict that volatility increases information asymmetry and risk, thereby depressing liquidity [27,28]. Macro/market-wide empirical evidence also supports this: Federal Reserve analysis shows that periods of high volatility are associated with worsening liquidity conditions in Treasury and other markets [30]. Cross-country studies on liquidity and volatility also report that liquidity shocks increase liquidity premiums and reduce market depth -reinforcing the finding that volatility weakens liquidity [31].

However, there is literature highlighting nuances or differing results. Several studies in the era of highly integrated markets driven by high-speed trading (HFT) show that HFT/algorithmic trading mechanisms sometimes improve liquidity under normal conditions despite increased volatility, because they provide automated liquidity provision; but in extreme events (e.g., flash crashes), these structures can rapidly deteriorate liquidity [32,33]. In other words, the VPS-LQS relationship is heterogeneous: in markets dominated by automated liquidity providers, increased volatility does not necessarily lead to decreased liquidity as in traditional markets; the market context (fragmentation, the role of HFT, regulation) determines the direction and magnitude of the effect.

These results suggest that regulators and exchange operators should consider liquidity provision mechanisms during periods of volatility. Market-making incentives, capital

requirements, and stabilization mechanisms (e.g., circuit breakers, liquidity support) can help mitigate liquidity declines during periods of increased volatility. For investors, these findings emphasize the importance of considering market volatility conditions when assessing the ability to enter/exit positions without inflating transaction costs.

3.3. Discussion of the Influence of Exchange Rates on Stock Liquidity

The long-term estimation results of the ARDL Panel technique show that FER has a positive coefficient of 0.0116 ($p < 0.001$). This means that domestic currency depreciation (an increase in the FER value) significantly drives an increase in LQS. Economically, this finding illustrates that when the domestic currency weakens against foreign currencies, stock trading activity actually increases, resulting in higher market liquidity. This increase can be explained because domestic currency depreciation creates an incentive for foreign investors to enter the stock market, given that the price of foreign-denominated assets becomes relatively cheaper [34,35].

From a macroeconomic perspective, exchange rate depreciation can attract foreign capital due to potential currency gains and improved export prospects for domestic companies. Export-oriented companies will benefit more from overseas sales, making their shares more attractive to investors. This influx of foreign funds increases trading volume, narrows bid-ask spreads, and increases market depth, which is reflected in increased stock liquidity [36]. Thus, the positive relationship between domestic currency depreciation and stock liquidity reflects a transmission mechanism from the foreign exchange market to the capital market. Theoretically, these results are in line with the flow-oriented models proposed by Dornbusch and Fischer, where currency depreciation increases export competitiveness, thereby boosting firm value and investor interest [37]. Portfolio balance theory also supports this explanation, as exchange rate shifts influence international investors' preferences in placing their portfolios in domestic assets [38].

The results of this study are also consistent with previous findings. For example, research in emerging markets found that domestic currency depreciation increases foreign capital inflows and improves stock market liquidity [39]. Feng et al. [31] showed that global liquidity flows and external shocks play a role in influencing volatility and liquidity premiums in various markets, confirming the close link between macroeconomic factors and liquidity [31]. On the other hand, some studies have found contradictory results. For example, high exchange rate volatility can actually increase uncertainty, reduce foreign investor participation, and reduce liquidity [40]. This suggests that the FER–LQS relationship is asymmetric: controlled depreciation can attract liquidity, while extreme depreciation or excessive volatility can reduce market liquidity.

The economic significance of these results is important for regulators and market participants. For regulators, maintaining exchange rate stability is key, not only to controlling inflation but also to ensuring stock market liquidity. For investors, understanding exchange rate dynamics can inform cross-border investment strategies, particularly in conditions of moderate depreciation, which increases opportunities for market liquidity.

3.4. Discussion of the Effect of Price Volatility Interaction with Exchange Rates on Stock Liquidity

Long-term estimation results using the ARDL Panel technique show that the $VPS \times FER$ interaction variable has a positive coefficient of 0.5958 ($p < 0.001$). This coefficient indicates that the effect of stock price volatility (VPS) on stock liquidity (LQS) is not linear, but is moderated by the exchange rate (FER). When the domestic currency depreciates (an increase in the FER), the negative impact of VPS on liquidity is weakened or even reduced. In other



words, the FER acts as a moderating variable that reduces the pressure of price volatility on decreasing liquidity.

Economically, this relationship can be explained through the mechanism of capital flows. Domestic currency depreciation makes domestic assets cheaper for foreign investors, thus attracting capital inflows [34]. Foreign capital flows increase transaction volume, narrow bid-ask spreads, and deepen order books, thereby cushioning the decline in liquidity typically caused by high price volatility. Therefore, although stock price volatility increases inventory risk and adverse selection, which causes market makers to reduce liquidity supply, this effect can be offset by increased trading activity resulting from exchange rate depreciation.

These findings are consistent with market microstructure theory. The Kyle [27] and Glosten–Milgrom [28] models suggest that price volatility increases information asymmetry and risk for liquidity providers, thus generally reducing liquidity. However, from a macro perspective, market liquidity and funding liquidity theory [29] and the Dornbusch–Fischer [37] flow-oriented model explain that currency depreciation can strengthen export competitiveness and attract foreign capital flows. This condition implies increased transaction activity, which ultimately improves liquidity.

Comparison with previous research shows a consistent pattern. Phylaktis and Ravazzolo [34] found that the relationship between exchange rates and stock prices is very close, especially through the international capital flow channel [41,42]. Feng et al. [31] report that global liquidity shocks play a significant role in determining the liquidity premium, indicating a link between external factors and domestic liquidity conditions. Thus, the Panel ARDL results support the view that exchange rates can act as a moderating factor that reduces the negative effects of volatility on liquidity.

However, some research also shows conflicting results. Studies during crisis periods emphasize that extreme depreciation or high exchange rate volatility actually increases uncertainty, drives investors out of the market, and ultimately reduces liquidity [29,37]. This suggests that the moderating effect of the FER is not always positive, but rather depends on the intensity of the depreciation and the overall stability of the financial market.

The economic implications of these results are important for regulators and market participants. Regulators need to be aware that under moderate depreciation conditions, liquidity can increase due to foreign capital inflows. However, under extreme depreciation conditions, the same effect can be negative. For investors, understanding the dynamics of the interaction between price volatility and exchange rates is crucial for portfolio allocation strategies, particularly in emerging markets that are vulnerable to external shocks.

Higher stock liquidity indicates that the stock is increasingly attractive to investors. Liquid stocks are important for investors because they are more easily transacted, creating opportunities for capital gains. Stock liquidity is also beneficial for issuers, as new shares are quickly absorbed by the market when the company issues them. Furthermore, it also allows companies to avoid the threat of delisting (removal) from the equity market. Extremely illiquid stocks, or those with virtually no trading, are quite risky. Extremely illiquid stocks can be dangerous because their price movements are limited, and even when traders want to sell, there are no buyers. Such stocks can be subject to delisting by stock exchange authorities, which means the shares are removed from the list of tradable stocks on the stock exchange.

The results of this examination paper demonstrate that stock price volatility negatively impacts trading liquidity. The greater the price volatility, the lower the trading liquidity, as investors tend to avoid stocks with significant price fluctuations. However, when linked to global exchange rate movements against the domestic currency, the potential impact may differ.



If the domestic currency depreciates (the USD depreciates nominally), investors will tend to perceive stock prices as lower, leading them to purchase more. In this situation, the exchange rate weakens the effect of price volatility on trading liquidity. For example, if the IDR depreciates (the rupiah is cheap), volatility has no impact on liquidity. Conversely, if the IDR appreciates (the rupiah is expensive), volatility will reduce liquidity.

4. Conclusion

Based on the long-term estimation results using the Panel ARDL technique, this study found that stock price volatility (VPS) has a negative effect on stock liquidity (LQS). This finding confirms that increased price volatility leads to a substantial decrease in trading liquidity. Conversely, the exchange rate (FER) has a positive effect, indicating that domestic currency depreciation actually encourages increased stock liquidity through the influx of foreign investors and increased trading activity. Furthermore, the VPS*FER interaction variable is significantly positive, indicating that exchange rate depreciation can moderate the negative impact of price volatility on liquidity. Overall, these results emphasize the importance of considering the interaction between micro factor (stock price volatility) and macro factor (exchange rates) in understanding the determinants of market liquidity.

These findings provide important insights into the importance of stock liquidity, which is highly sensitive to a combination of micro (price volatility) and macro (exchange rate) factors. For regulators, these results demonstrate the need for stabilization policies that consider the interconnectedness of the capital market and the foreign exchange market. Moderate depreciation has been shown to strengthen liquidity, but price volatility remains a threat to market depth. Therefore, macroprudential supervision and stabilization instruments, such as market-making incentives, need to be strengthened to maintain liquidity in volatile market conditions.

For market participants, particularly institutional investors, these results underscore the importance of diversification and hedging strategies against exchange rate risk and price volatility. Foreign investors may view currency depreciation as an opportunity, but must still consider the risks of high volatility. Meanwhile, for stock exchanges, providing trading mechanisms that can mitigate pressure during high volatility, such as circuit breakers or increased order book transparency, would significantly help maintain market confidence.

Future research could expand the model by adding other macroeconomic variables, such as interest rates, foreign capital flows, and the global uncertainty index, to capture broader dynamics. Furthermore, moderation and asymmetric analysis (e.g., using NARDL) could also be conducted to test whether currency depreciation and appreciation have different impacts on stock liquidity. Thus, future research findings could enrich the literature on the interaction between price volatility, exchange rates, and stock liquidity.

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