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Domestic Macroeconomic Fundamentals and External Financial Conditions Affecting the Indonesian Stock Market: An ARDL approach

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ABSTRACT

The aim of this research is to evaluate the relative impact of domestic macroeconomic stability and external financial shocks in shaping the Indonesian stock market, providing critical insights into market resilience over nearly two decades of recurring global volatility. Using quarterly data from 2006Q1 to 2025Q4, this paper employs an autoregressive distributed lag (ARDL) bound test framework and an error correction model (ECM) to assess both the short-run dynamics and long-run equilibrium relationship between the log of the Indonesian Stock Market and six explanatory variables such as GDP growth, exchange rate, foreign portfolio investment, inflation, interest rate, and global financial market volatility (VIX). The bounds testing procedure confirms the presence of a long-run cointegrating relationship among the variables, indicating that the Indonesian equity market is jointly anchored by domestic macroeconomic conditions and external risk factors. The long-run estimates show that inflation and global financial market volatility exert significant negative effects on the Indonesian stock market, while GDP growth, exchange rate movements, foreign portfolio investment, and interest rates do not display statistically significant long-run effects. In the short run, exchange rate changes, GDP growth, foreign portfolio investment, and changes in the VIX are important drivers of Indonesia's equity market movements. The error correction term is negative and statistically significant, suggesting that approximately 13% of short-run disequilibrium is corrected each quarter. These findings underscore the necessity for a synchronized policy framework that balances price stability with proactive capital-flow surveillance to mitigate external shocks. Ultimately, the study highlights that in an increasingly integrated global market, emerging market resilience depends as much on managing global risk sentiment as it does on domestic economic health.

Keywords: *Indonesia Stock Market, Autoregressive distributed lag (ARDL), Long and Short Run, Macroeconomic fundamentals, External financial Conditions.*

1. INTRODUCTION

Stock market is an important indicators of economic conditions because they show investor confidence, economic stability, and the broader financial welfare of countries (Keswani et al., 2024). In the last two decades, emerging markets have grown rapidly and have taken on an essential role in the global financial system, contributing substantially to global economic growth and trade (Aslam et al., 2025). During the same period, major financial disruptions, including the Global Financial Crisis, COVID-19 pandemic, and recent geopolitical conflicts, have significantly influenced market behavior across the world (Bhargava, 2025). As a result, emerging markets tend to experience greater volatility than developed markets and often react unevenly to global financial shocks (Hajilee & Niroomand, 2026).

Indonesia, as one of Asia's and Asean's largest emerging economies also a member of the E7 member countries, provides an important context for analyzing the relationship between domestic macroeconomic fundamentals and external financial conditions. Although the Indonesian Stock Market has shown strong growth over time, it remains exposed to macroeconomic instability and turbulence in global markets (Siska et al., 2023). Previous studies indicate that major macroeconomic variables, such as exchange rate, interest rates, inflation, GDP, and foreign portfolio investment, have a significant effect on Indonesian stock market capitalization in both the short term and the long term (Siska et al., 2023). In addition, periods of high global financial market uncertainty is represented by VIX, are positively and structurally associated with higher risk premiums required by international investors in Indonesian financial assets (Fahmi Sahlan et al., 2025).

Although many studies have examined the macroeconomic determinants of stock prices, evidence on the full interaction between domestic fundamentals and global shocks remains inconsistent (Subakir & Naqvi, 2025). Empirical research on the Indonesian market often relies on relatively constrained study periods and generally neglects the

incorporation of important global risk proxies, thereby failing to capture the market's true vulnerability during periods of heightened international uncertainty (Situmorang & Kaluge, 2025). This study responds to these limitations by applying the Autoregressive Distributed Lag (ARDL) bounds testing approach and Error Correction Model (ECM) to assess the influence of domestic stability (GDP growth, exchange rate, inflation, interest rate) and external shocks (foreign portfolio investment and VIX) on the IDXC. Utilizing quarterly data from 2006Q1 to 2025Q4, this approach identifies both immediate market responses and long-term equilibrium dynamics across two decades of global financial disruptions (Omar et al., 2022). More importantly, the inclusion of the VIX offers a novel contribution by directly quantifying the role of international investor anxiety in this specific emerging market setting (Sarwar & Khan, 2017).

2. RESEARCH METHODOLOGY

2.1. Data

This study employs a quantitative time-series approach utilizing secondary data to examine the dynamic relationship between domestic macroeconomic variables and external financial conditions through the Indonesian stock market. The observation period spans comprehensively from the first quarter of 2006 to the fourth quarter of 2025. The primary research object is the natural logarithm of the IDX Composite (IDXC) price, representing Indonesia's stock market index. This transformation of stock price data into natural logarithms is a widely adopted approach in financial time series analysis, as it helps normalize the data distribution and facilitates the interpretation of percentage changes (Brooks, 2019). Furthermore, this variable relies on end-of-period closing prices, as quarterly closing figures provide consistent benchmarks for assessing market performance and enable accurate comparison across different time periods (Ungar & Oprean-Stan, 2025).

The explanatory variables in this study involve several domestic and external variables, each measured and sourced according to established methodological standards. Gross Domestic Product (GDP) is expressed as the percentage of GDP growth at constant prices, reflecting the real economic output changes (Naula et al., 2025). Foreign Portfolio Investment (FPI) is measured as a net flow which means it can record negative values as a percentage of GDP. Meanwhile, inflation (INF), interest rate (IR), exchange rate (EXR), and volatility index (VIX) are originally available in higher frequencies such as monthly or daily, those variables are subsequently calculated as quarterly averages. The conversion of these higher frequency observations into quarterly averages is to align data frequencies, smooth out short-term temporary fluctuations, preserve underlying trends, and accurately capture general market sentiment over the observation period (Akhmad Faeda Insani et al., 2025). Specifically, INF and IR are expressed in percentage form. The EXR is measured against the US Dollar (USD/IDR), serving as a fundamental benchmark in Indonesia because of dollar's dominant role in international trade settlements and foreign capital flows (Ahmar et al., 2024). Finally, applying the same analytical rationale used for the dependent variable, both EXR and VIX data are transformed into natural logarithm forms to facilitate coefficient interpretation in the regression analysis. A comprehensive summary of the descriptive statistics for all aforementioned variables is presented in Table 1.

Table 1. Descriptive Statistics

	IDXC	GDP	INF	IR	FPI	EXR	VIX
Mean	8.385658	4.806238	4.938	6.345833	1.277775	9.401674	2.909284
Median	8.502242	5.092	4.205	6	1.517	9.494034	2.854111
Maximum	9.064961	7.078	16.89667	12.75	5.314	9.721516	4.070815
Minimum	7.177983	-5.324	0.566667	3.5	-3.421	9.058397	2.332914
Std. Dev.	0.486305	2.083582	3.160761	1.936269	1.755974	0.21705	0.328565
Observations	80	80	80	80	80	80	80
Source	CEIC	CEIC	BI	BI	CEIC	CEIC	CBOE

Note: The dataset consists of 80 quarterly observations spanning from 2006Q1 to 2025Q4

2.2. Methodology

$$\Delta \mathrm{LIDXC}_t = \alpha_0 + \sum_{i=1}^{p} \gamma_i \Delta LIDXC_{t-i} + \sum_{i=0}^{q_1} \delta_i \Delta GDP_{t-i} + \sum_{i=0}^{q_2} \theta_i \Delta LEXR_{t-i} + \sum_{i=0}^{q_3} \varphi_i \Delta FPI_{t-i} + \sum_{i=0}^{q_4} \psi_i \Delta INF_{t-i} + \sum_{i=0}^{q_5} \omega_i \Delta IR_{t-i} + \sum_{i=0}^{q_6} \rho_i \Delta LVIX_{t-i} + \phi_1 \mathrm{LIDXC}_{t-1} + \phi_2 \mathrm{GDP}_{t-1} + \phi_3 \mathrm{LEXR}_{t-1} + \phi_4 \mathrm{FPI}_{t-1} + \phi_5 \mathrm{INF}_{t-1} + \phi_6 IR_{t-1} + \phi_7 \mathrm{LVIX}_{t-1} + \varepsilon_t \quad (1)$$

$$LIDXC_t = \beta_0 + \beta_1 GDP_t + \beta_2 LEXR_t + \beta_3 FPI_t + \beta_4 INF_t + \beta_5 IR_t + \beta_6 LVIX_t + \varepsilon_t \quad (2)$$

$$\Delta LIDXC_t = \alpha_0 + \sum_{i=1}^{p-1} \alpha_i \Delta LIDXC_{t-i} + \sum_{j=0}^{q_1-1} \beta_j \Delta GDP_{t-j} + \sum_{k=0}^{q_2-1} \gamma_k \Delta LEXR_{t-k} + \sum_{l=0}^{q_3-1} \delta_l \Delta FPI_{t-l} + \sum_{m=0}^{q_4-1} \theta_m \Delta INF_{t-m} + \sum_{n=0}^{q_5-1} \phi_n \Delta IR_{t-n} + \sum_{r=0}^{q_6-1} \psi_r \Delta LVIX_{t-r} + \rho ECT_{t-1} + \varepsilon_t \quad (3)$$

This research use ARDL bounds testing methodology to examine the relationships among the variables, where Equation (1) represents the unrestricted error correction version of the ARDL model that simultaneously captures the short-run and long-run relationship among the variables following the approach of (Pesaran et al., 2001). Equation (2) is estimated to extract the long-run equilibrium baseline coefficients and elasticities of the macroeconomic determinants. Equation (3) represents the restricted error correction model (ECM) that employed to examine short-term adjustments while measuring how rapidly deviations from the long-run equilibrium are corrected (Engle & Granger, 1987).

3. RESULT AND DISCUSSIONS

Evaluating the stationarity characteristics of the variables is a fundamental prerequisite in time-series modeling, as non-stationary series may produce spurious relationships and unreliable inferential results (Engle & Granger, 1987). To determine the integration properties of the variables included in this study, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are conducted, with the results reported in Table 2. It should be remembered that, for both the ADF and PP tests, the null hypothesis states that a variable contains a unit root and is therefore non-stationary, whereas the alternative hypothesis indicates stationarity. The findings reveal that all variables become stationary either at level *I*(0), or at first difference *I*(1). This result satisfies the requirement for applying the ARDL bounds testing approach, which offers an important advantage over conventional cointegration techniques by allowing a combination of *I*(0) and *I*(1) variables within the same model, as long as none variable is integrated at the second order *I*(2) (Pesaran et al., 2001).

Table 2. Unit Root Test

ADF	**Intercept**		**Trend and Intercept**	
Variable	**Level**	**First Difference**	**Level**	**First Difference**
LIDXC	-2.110	-6.979 ***	-2.787	-6.017 ***
GDP	-3.941***	-6.764 ***	-3.994**	-6.733 ***
LEXR	-0.535	-7.026 ***	-2.121	-6.983 ***
FPI	-7.996***	-10.770 ***	-8.503 ***	-10.709***
INF	-2.628 *	-4.847 ***	-3.974 **	-4.851 ***
IR	-3.832 ***	-4.250 ***	-4.539 ***	-4.353 ***
LVIX	-3.607***	-9.887***	-3.634***	-9.829***
PP	Intercept		Trend and Intercept	
Variable	Level	First Difference	Level	First Difference
LIDXC	-2.155	-6.803 ***	-2.878	-6.985 ***
GDP	-4.026***	-10.071 ***	-4.088***	-9.988 ***
LEXR	-0.529	-6.410 ***	-2.379	-6.357 ***
FPI	-8.011 ***	-47.296***	-8.510 ***	-49.097***
INF	-4.113 ***	-6.937 ***	-4.482 ***	-7.095 ***
IR	-3.384**	-3.988***	-3.237*	-4.219***
LVIX	-3.621***	-10.513***	-3.646**	-10.454***

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

Table 3. Multicolinearity Test

	GDP	**INF**	**IR**	**FPI**	**EXR**	**VIX**
VIF	1.195079	3.852431	3.988578	1.344294	1.850698	1.322195

Table 4. Selection of ARDL Model (Top Five Models)

Model	Log Likelihood	AIC	Specification
1*	106.016025	-2.395159	ARDL (1, 2, 3, 1, 0, 0, 1)
2	106.858985	-2.391026	ARDL (1, 2, 3, 1, 0, 0, 2)
3	106.729216	-2.387611	ARDL (1, 2, 3, 2, 0, 0, 1)
4	107.698219	-2.386795	ARDL (1, 2, 3, 2, 1, 0, 1)
5	106.678385	-2.386273	ARDL (1, 2, 3, 1, 1, 0, 1)

Multicolinearity test Variance Inflation Factors (VIF) result has been shown in Table 3. We can conclude that the explanatory variables above are not affected by multicollinearity issues, because the VIF values for all those variables are strictly below 5.

The optimal lag structure for the ARDL estimation is determined using the Akaike Information Criterion (AIC), which effectively evaluates the trade-off between the goodness of fit and the complexity of the model to prevent overfitting (Akaike, 1974). As showed in Table 4, the ARDL (1, 2, 3, 1, 0, 0, 1) specification is selected as the most robust baseline framework among the top five evaluated candidates. Model 1 is chosen because it minimizes information loss, yielding the lowest AIC value -2.395159, thus ensuring empirical parsimony in capturing dynamic relationships.

To establish the existence of a long-run equilibrium relationship, the ARDL bounds test is conducted, assuming that none of the variables are integrated at *I*(2). As reported in Table 5, the calculated F-statistic of 4.075 strictly exceeds the upper critical bound, *I*(1), of 3.61 at the 5% significance level (Pesaran et al., 2001). Consequently, the null hypothesis of no cointegration is firmly rejected, confirming the presence of a robust and statistically significant long-run cointegrating relationship between the Indonesian stock market index and its explanatory variables.

Table 5. ARDL Bounds Test of Cointegration

Test Statistic	Value	Significance Level	I(0)	I(1)
F-statistic	4.075**	10%	2.12	3.23
		5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43

Note: *I*(0) and *I*(1) denote integration at the level and first difference

Table 6. Autoregressive Distributed Lag (ARDL) results

Long-run coefficients					Short-run coefficients			
Variable	Coefficient	S.Error	t-Statistic		Variable	Coefficient	S.Error	t-Statistic
GDP	-0.004287	0.04446	-0.09640		D(GDP)	2.510005	0.00436	0.005743
LEXR	-0.40091	0.70846	-0.56588		D(GDP(-1))	0.011231**	0.00432	2.595274
FPI	-0.081517	0.07566	-1.07732		D(LEXR)	-0.616889**	0.26098	-2.363675
INF	-0.161461**	0.07662	-2.10723		D(LEXR(-1))	0.332073	0.24682	1.345407
IR	-0.04664	0.06948	-0.67117		D(LEXR(-2))	0.638624***	0.23133	2.760592
LVIX	-0.593154**	0.26657	-2.22511		D(FPI)	0.006591*	0.00386	1.7072
					D(LVIX)	-0.153024***	0.03578	-4.27651
					ECT(-1)	-0.130370***	0.03578	-5.593312
					C	1.982013***	0.34932	5.673849

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

Table 7. Diagnostic Tests

Test	Statistic	p-value
Autocorrelation	3.067616	0.2157
Heteroscedasticity	15.71281	0.3312
Jarque-Bera Normality Test	1.343008	0.51094
Ramsey RESET Test	2.294403	0.135

Table 6 presents the comprehensive estimation results of the optimal ARDL model, describe both the long-run and short-run dynamics of the macroeconomic determinants affecting the Indonesian stock market performance. In the long-run equilibrium, the empirical evidence reveals that only inflation and VIX exert a statistically significant negative impact on the stock index at the 5% level. Specifically, a 1 percentage point increase in inflation is associated with a 16.14% decline in the stock market index. This confirms to the conventional economic rationale that high inflation escalates input costs and discount rates, thereby eroding corporate profitability and investor expectations (Wongbangpo & Sharma, 2002). Furthermore, the coefficient of VIX stands at -0.593, indicating that a 1 percentage point increase in global financial volatility directly translates to a 0.593% decrease in the Indonesian stock market. This underscores that prolonged global financial anxiety heavily depresses domestic market valuation, as international investors systematically reprice risks and withdraw from emerging market assets during periods of elevated global uncertainty (Sarwar, 2012). In contrast, GDP, exchange rate, foreign portfolio investment, and interest rates do not establish a statistically significant relationship with the equity market over the long horizon, suggesting that their influences are primarily absorbed as short-term transitional shocks.

The short-run dynamics reveal a multifaceted interaction where the stock market digests macroeconomic shocks at varying speeds. Immediate changes in foreign portfolio investment, yield a positive and significant effect, reflecting the instant liquidity impact of hot money inflows on emerging equities (Koepke, 2019). Similarly, a contemporaneous spike in VIX heavily suppresses the market, as investors rapidly liquidate emerging market assets during global panics (Sarwar & Khan, 2017). Conversely, GDP shocks manifest with a delay, the first-lagged difference is positively significant because it takes time for economic expansion to fully materialize into corporate earnings (Megaravalli et al., 2018). Furthermore, the exchange rate exhibits a dynamic time-varying effect, an immediate depreciation suppresses the market due to capital flight fear, while a lagged two quarter depreciation strongly stimulates the index by boosting the revenues of export-oriented firms (Bahmani-Oskooee & Saha, 2016). Finally, the highly significant Error Correction Term coefficient of -0.130 ensures dynamic stability, indicating that 13.04% of the short-term disequilibrium is systematically corrected back to the long-run equilibrium path within a single quarter.

To further assess the adequacy of the estimated model, the robustness of the ARDL specification is evaluated through a series of residual diagnostic tests reported in Table 7. The results indicate that the model is free from serial correlation (p-value = 0.2157) and heteroscedasticity (p-value = 0.3312). Moreover, the Jarque-Bera test determined that the residuals are normally distributed (p-value = 0.51094), while the Ramsey RESET test results indicate correct model specification (p-value = 0.135). Lastly, parameter stability is validated using the CUSUM and CUSUMSQ tests, both statistics stay within the critical boundaries, confirming that the short-run and long-run coefficients are structurally stable over the entire sample period. These findings support the adequacy of the model and the estimated coefficients.

4. CONCLUSION

This study confirms a robust long-run cointegrating relationship between the Indonesian stock market and its macroeconomic and external financial determinants from 2006Q1 to 2025Q4. In the long run, only inflation and global financial volatility (VIX) exert statistically significant negative effects on the market index, whereas GDP, exchange rates, foreign portfolio investment, and interest rates act primarily as short-term drivers. In the short run, the market is significantly driven by delayed economic output, immediate foreign capital inflows, sudden global volatility shocks, and a dynamic exchange rate effect that initially suppresses but subsequently stimulates market recovery. Finally, the error correction coefficient of -0.130 indicates that approximately 13% of short-term disequilibrium is corrected quarterly, implying a full adjustment horizon of roughly two years.

Theoretically, the dominant long-run influence of global risk sentiment over domestic fundamentals highlights the deep financial integration of emerging markets. From a policy perspective, maintaining price stability and developing macroprudential mechanisms that are responsive to global volatility are crucial to shielding the Indonesian equity market from external shocks. For investors, these findings emphasize the necessity of anchoring long-term portfolios to inflation and global volatility, while maintaining agility to navigate short-term market swings driven by capital flows, exchange rate dynamics, delayed GDP impacts, and sudden VIX shocks. While this study provides comprehensive insights, future

research should utilize higher-frequency data such as daily or weekly observations to capture abrupt shock transmissions more accurately. Additionally, subsequent studies could expand this framework by incorporating broader geopolitical risk indices or conducting cross-country analysis to validate the universality of these external vulnerabilities.

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