



Macroeconomic conditions and stock returns in Indonesia's consumer sector: Evidence of sectoral heterogeneity and financial vulnerability

Chairani Manasye Riama Sinaga¹, Rahmat Aryo Baskoro^{1,*}

¹ Department of Management, Faculty of Economics and Business, Universitas Indonesia, Depok, West Java 16424, Indonesia.

*Correspondence: rab2012@ui.ac.id

Received Date: May 23, 2026

Revised Date: July 02, 2026

Accepted Date: July 08, 2026

ABSTRACT

Background: This study examines the impact of macroeconomic conditions on stock returns in Indonesia's consumer sector, with the objective of determining whether these effects differ across sectoral classifications and firms' financial conditions. Although existing research broadly recognizes the linkage between macroeconomic indicators and stock returns, much of the literature implicitly assumes homogeneous responses across firms and sectors, particularly within the consumer industry. **Methods:** Using a quantitative panel data approach, this study analyzes firms in the consumer sector listed on the Indonesia Stock Exchange over the 2015–2024 period, incorporating inflation, policy interest rates, exchange rate growth, money supply (M2), unemployment, and real gross domestic product growth as explanatory variables, while controlling for profitability and leverage. **Findings:** The analysis employs the Common Effects Model with Panel-Corrected Standard Errors to account for heteroskedasticity and cross-sectional dependence, and introduces sector classification and financial distress, measured by the Altman Z-Score, as moderating variables. The results indicate that the influence of macroeconomic factors on stock returns is heterogeneous rather than uniform: policy interest rates consistently exert a negative and statistically significant effect, whereas the effects of inflation, exchange rate movements, money supply, unemployment, and economic growth vary across sectoral classifications and financial distress conditions, as reflected in several significant interaction terms. **Conclusion:** These findings imply that aggregate macroeconomic signals are transmitted to stock returns through distinct channels depending on firms' sectoral positioning and financial health. The study therefore concludes that analyses which overlook such heterogeneity risk producing incomplete or misleading inferences regarding macro–return relationships in emerging markets. **Novelty/Originality of this article:** The novelty of this research lies in its integrated moderation framework, which simultaneously considers sector classification and financial distress within a unified panel setting, thereby offering a more nuanced and context-specific understanding of how macroeconomic factors shape stock returns in Indonesia's consumer sector.

KEYWORDS: consumer sector; financial distress; macroeconomic indicators; sector classification; stock returns.

1. Introduction

Stock returns are commonly viewed as market-based summaries of how investors price firms' expected cash flows and risks under evolving macroeconomic conditions. Within the Efficient Market Hypothesis, publicly available information should be rapidly incorporated into prices, implying that unexpected movements in inflation, policy interest

Cite This Article:

Sinaga, C. M. R., Baskoro, R. A. (2026). Macroeconomic conditions and stock returns in Indonesia's consumer sector: Evidence of sectoral heterogeneity and financial vulnerability. *Economic Resilience and Sustainable Development*, 3(2), 108-124. <https://doi.org/10.61511/ersud.v3i2.2026.3896>

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rates, and exchange rates are promptly reflected in return dynamics (Fama, 1970; Bodie et al., 2023; Bekaert et al., 2023). Indonesia's equity market offers a compelling setting in which to revisit this proposition. Over the past decade, the Composite Stock Price Index has closely tracked major domestic and global developments, including the sharp contraction during the COVID-19 shock and the subsequent recovery alongside stabilising inflation, a more accommodative monetary stance, and improving household consumption (BPS, 2024; BI, 2024). Concurrently, the composition of market participants has shifted markedly. The rapid growth of domestic retail investors has amplified the influence of macroeconomic indicators and widely disseminated economic news on trading behaviour and return volatility (IDX, 2025). These developments underscore the academic and practical relevance of clarifying how core macroeconomic variables—inflation, policy interest rates, exchange rate movements, money supply (M2), unemployment, and real gross domestic product growth—are transmitted into stock returns in Indonesia.

The consumer sector is particularly well suited to such an investigation because of its central role in both the real economy and the capital market. Household consumption has consistently accounted for more than half of national output (BPS, 2024), while consumer-related industries have remained among the largest contributors to market capitalisation on the Indonesia Stock Exchange (OJK, 2019). Nevertheless, theory and market evidence suggest that macroeconomic shocks are unlikely to affect firms within this sector uniformly. The exchange's classification into consumer cyclical and consumer non-cyclical firms captures structurally different demand conditions: cyclical firms' revenues are more sensitive to household income fluctuations and business-cycle conditions, whereas non-cyclical firms face comparatively stable demand because their products remain essential across economic states (Indonesia Stock Exchange, 2024). Consistent with this distinction, sector-focused market analyses characterise discretionary segments such as retail and automotive as more exposed to inflationary pressure and monetary tightening, while staples such as food and beverages are perceived as more resilient owing to steadier demand (JP Morgan Indonesia Equity Strategy, 2023). Moreover, the transmission channels themselves differ across macroeconomic indicators. Unemployment, for instance, primarily operates through household income security and confidence, potentially reshaping consumption patterns in ways that diverge from the pricing and financing channels associated with inflation and interest rates.

Empirical evidence on macroeconomic determinants of stock returns, particularly in emerging markets, remains inconclusive. Studies focusing on Indonesia and comparable economies report mixed results: while some document negative effects of inflation and interest rates on returns, others find weaker or statistically insignificant relationships, often contingent on sectoral coverage and sample periods (Baek et al., 2024; Marpaung & Pangestuti, 2024). Recent international research suggests that these inconsistencies reflect economically meaningful heterogeneity rather than random variation. Baek et al. (2024) show that smaller, riskier, and more financially vulnerable firms exhibit sharper return adjustments when macroeconomic pressure intensifies. In a related vein, Cheng & Fang (2025) demonstrate that financial distress is associated with more pronounced return corrections as markets reassess intrinsic value, while He et al. (2024) document stronger price reactions to shifts in macroeconomic perceptions among financially constrained firms. Heterogeneity also arises with respect to labour-market risk. Unemployment operates through a distinct transmission channel from inflation and interest rates: rising unemployment weakens household purchasing power and consumption demand, and dampens investor expectations regarding firms' future cash flows across different phases of the business cycle. Measures related to unemployment have been shown to predict aggregate returns and to differentiate cross-sectional stock performance, indicating that exposure to labour-market conditions carries a priced component of systematic risk (Atanasov, 2021; Huynh, 2023). Taken together, these findings imply that although macroeconomic information is public, its translation into stock returns depends on sectoral structure and firm-level resilience—an implication that both aligns with and qualifies the semi-strong form of market efficiency (Fama, 1970; Bodie et al., 2023). This selective

transmission is consistent with theories of asymmetric information (Akerlof, 1970) and firm-level signalling (Spence, 1973), under which a firm's financial distress status functions as a costly signal that conditions how investors interpret macroeconomic news.

Despite these advances, two gaps remain salient in the context of Indonesia's consumer sector. First, many empirical studies continue to analyse the sector in aggregate or rely on broad industry groupings, thereby obscuring differences between consumer cyclical and consumer non-cyclical firms that are central to business-cycle sensitivity (IDX, 2024; Long et al., 2022; Molchanov & Stangl, 2024). Second, although sectoral effects and financial distress have each been examined in isolation, there is limited evidence on whether subsector classification and financial distress jointly moderate macro–return relationships within a single empirical framework, particularly over a medium-to-long horizon encompassing both normal periods and major disruptions such as the pandemic (BPS, 2024; BI, 2024; Baek et al., 2024; Cheng & Fang, 2025; Asis et al., 2021). Addressing these gaps is especially relevant in a market characterised by expanding retail participation and heightened attention to macroeconomic signals (IDX, 2025).

Accordingly, this study analyses the effects of inflation (INF), exchange rate growth (GEXC), policy interest rates (IR), money supply (M2), unemployment (UNEMP), and real gross domestic product growth (GGDP) on annual stock returns of Indonesian listed consumer firms over the period 2015–2024. It further examines whether these effects vary systematically by consumer subsector classification (consumer cyclical versus consumer non-cyclical) and by financial distress status, proxied by a dummy based on the Altman Z-score. The study aims to estimate the direct associations between each macroeconomic indicator and annual stock returns, to identify heterogeneity across consumer cyclical and consumer non-cyclical firms, and to assess whether financially distressed firms exhibit distinct sensitivities to macroeconomic conditions. Guided by asset pricing and market efficiency frameworks, which emphasise expected cash flows and discount rates as transmission channels (Fama, 1970; Bodie et al., 2023), and by empirical evidence on heterogeneity (Baek et al., 2024; Cheng & Fang, 2025; He et al., 2024; Atanasov, 2021; Huynh, 2023), the study formulates directional hypotheses where appropriate: INF is expected to be negatively associated with returns (H1), GEXC is expected to be negatively associated with returns (H2), IR is expected to be negatively associated with returns (H3), M2 is expected to be positively associated with returns (H4), UNEMP is expected to be negatively associated with returns (H5), and GGDP is expected to be positively associated with returns (H6). In addition, consumer subsector classification is expected to moderate the macroeconomic effects on returns (H7), and financial distress is expected to moderate these effects such that return sensitivity to macroeconomic changes differs between distressed and non-distressed firms (H8).

2. Methods

2.1 Research design and population

This study adopted a quantitative, explanatory research design to examine the relationship between macroeconomic indicators and annual stock returns of consumer-sector firms listed on the Indonesia Stock Exchange, while assessing whether the strength of these relationships varies by consumer subsector classification and firms' financial distress status. The firm served as the unit of analysis, and the empirical setting comprised an annual firm–year panel spanning the period 2015–2024. The use of a medium-horizon panel was intended to capture macro–return linkages in a more stable manner than short-horizon data, while still accommodating major shifts in Indonesia's macroeconomic environment and stock market dynamics over the past decade.

The population consisted of all consumer-sector firms listed on the Indonesia Stock Exchange during 2015–2024, as defined by the IDX Industrial Classification. The consumer sector was divided into consumer cyclical and consumer non-cyclical categories based on the IDX Industrial Classification and the IDX Fact Book, with classifications cross-checked

against sector labels in S&P Capital IQ Pro to ensure consistency. The sample was selected using purposive sampling to obtain a complete and consistent panel over the observation horizon. Firms were included if they: remained listed throughout 2015–2024 and had end-of-year stock price data available from end-2014 onward to enable consistent calculation of 2015 returns, implying that firms conducting initial public offerings after 2014 were excluded; belonged to the consumer sector, either cyclical or non-cyclical; disclosed complete annual financial statements for the entire study period; did not experience material sector reclassification during the observation window; and possessed the market price history and accounting information required to compute stock returns and firm-level ratios used in the analysis.

2.2 Data sources and collection

The study relied exclusively on secondary data obtained from official publications and reputable databases. Annual stock price data, based on end-of-year closing prices, were collected from S&P Capital IQ Pro and supplemented where necessary with firm disclosures. Annual financial statement data used to compute return on assets, leverage, and the Altman Z-Score Emerging Market Score (EMS) were retrieved from S&P Capital IQ Pro. Macroeconomic variables were compiled from official releases issued by Statistics Indonesia/*Badan Pusat Statistik* (BPS) in 2024 and Bank Indonesia (BI) in 2024. In particular, the policy interest rate series, money supply (M2), and the IDR/USD exchange rate were sourced from BI publications, including the *Statistik Ekonomi dan Keuangan Indonesia* (SEKI). Sector classification data were obtained from IDX references, namely the *IDX Fact Book* and the *IDX Industrial Classification*. Data collection followed a documentation approach in which relevant numerical series were identified, recorded, and compiled into an annual firm–year panel dataset. Prior to estimation, the data were validated by checking year-to-year consistency and reconciling overlapping series across sources where applicable.

2.3 Variable measurement

Dependent variable: annual stock return (RET). For firm i in year t , annual stock return was measured as the annual log return calculated from end-of-year closing prices. Log returns were employed to normalise differences in price levels across firms and to reflect continuously compounded returns commonly used in empirical finance (Bodie et al., 2023), consistent with macro–stock return studies (Chiang, 2023; Liu & Serletis, 2022). Returns were computed using end-of-year prices and expressed as unit-free ratios.

Independent variables: macroeconomic indicators. Six macroeconomic indicators were specified as the primary independent variables. Inflation (INF) was measured as the annual year-on-year inflation rate based on Indonesia's national Consumer Price Index for December, as published by BPS. The reported value was used directly and cross-checked against BI's SEKI for consistency, and expressed in percentage terms, in line with standard practice in macro–asset return analysis (Chiang, 2023). Exchange rate change (GEXC) was captured using the IDR/USD middle exchange rate at end-December obtained from BI. To focus on year-to-year variation and mitigate scale effects, the exchange rate was transformed into a log-growth (log-difference) measure, with positive values indicating rupiah depreciation and negative values indicating appreciation. This transformation follows established macro-finance practice in analysing exchange-rate shocks and sectoral vulnerability (Thorbecke, 2023; Baek et al., 2024; Elgharib et al., 2025). Monetary policy stance was proxied by the policy interest rate (IR) at end-December. The BI Rate was used for 2015, while the BI 7-Day Reverse Repo Rate (BI7DRR) was used for 2016–2024, reflecting BI's operational framework change and the absence of BI7DRR data prior to 2016. Both series were treated as the primary policy rate indicator and expressed in percentage terms, consistent with empirical studies examining stock return responses to monetary conditions (Arin et al., 2024; Sharif et al., 2025; Kim, 2023). Money supply (M2) was

measured as end-of-year M2 obtained from BI's SEKI. M2 was retained in level form to represent systemic liquidity conditions over time, while reducing instability and potential multicollinearity associated with growth-rate transformations. To harmonise numerical scale across regressors, M2 was rescaled into trillion rupiah by dividing by 10^{12} , a standard step to improve numerical stability in panel estimation without altering economic interpretation (Baek et al., 2024; Sharif et al., 2025; Liu et al., 2022). Unemployment (UNEMP) was measured using the national open unemployment rate/*Tingkat Pengangguran Terbuka* (TPT) published by BPS. Because TPT is released semi-annually, the August figure was used to represent the annual unemployment level, given its relative stability and consistent use in annual reporting. UNEMP was expressed in percentage terms, consistent with evidence that labour market conditions convey information relevant to equity risk and returns (Baek et al., 2024; Nyasha et al., 2022). Real economic activity was captured by real GDP growth (GGDP), measured as annual year-on-year growth computed from BPS real GDP series at constant prices. Growth rates were calculated directly from consecutive annual levels to ensure consistency across years and expressed in percentage terms, aligning with macro-stock return research linking output growth to equity cash-flow expectations and systematic risk (Sharif et al., 2025; Thorbecke, 2023; Belkhaoui & Farhani, 2025).

Moderating variables. Two moderating variables were incorporated to test for heterogeneous macro-return relationships. Consumer subsector classification (DS) was defined as a time-invariant dummy distinguishing consumer cyclical firms from consumer non-cyclical firms based on IDX classification, verified against S&P Capital IQ Pro. DS was not included as a standalone regressor; instead, it was interacted with each macroeconomic indicator (e.g., $INF \times DS$, $GEXC \times DS$, $IR \times DS$, $M2 \times DS$, $UNEMP \times DS$, $GGDP \times DS$) to examine whether the slope of each macro-return relationship differs across subsectors, consistent with the sectoral heterogeneity perspective in macro-finance (Thorbecke, 2023). Financial distress (DD) was proxied using a dummy derived from the Altman Z-Score Emerging Market Score (EMS). The original Z-Score framework was introduced by Altman (1968) and adapted for emerging markets by Altman et al. (1995). Following Altman et al. (1995), the EMS specification employed book value of equity to enhance stability in emerging market contexts. EMS was computed annually for each firm using accounting data from S&P Capital IQ Pro. Rather than using EMS as a continuous variable, the study constructed a yearly distress dummy based on an annual tercile approach: firms were ranked by EMS, with those in the bottom tercile classified as distressed and the remainder as non-distressed, consistent with empirical practice in Baek et al. (2024). Firm-year observations with zero total liabilities, for which EMS components could not be computed, were retained in the baseline regressions but excluded from the tercile classification to avoid invalid distress assignments, resulting in a potentially unbalanced panel in distress-based estimations. This exclusion does not represent a random loss of data: the affected firm-years are identifiable by a specific balance-sheet characteristic—operating with little or no interest-bearing debt—rather than by unobserved factors related to returns. Consequently, while the resulting panel is unbalanced, the exclusion is unlikely to introduce systematic bias into the distress classification or into the main regression estimates.

Control variables. To mitigate omitted variable bias associated with firm fundamentals, two control variables were included. Leverage (LEV) was measured as total liabilities divided by total assets, computed from annual balance sheet data, consistent with common empirical finance practice and with Baek et al. (2024) and Arin et al. (2024). Profitability was captured by return on assets (ROA), defined as net income divided by average total assets, calculated as the mean of total assets in year t and $t-1$. This measure reflects annual profitability relative to the asset base and aligns with Bodie et al. (2023) as well as firm-level macro vulnerability studies (Baek et al., 2024). ROA was expressed in percentage terms.

2.4 Model specification and estimation

The empirical analysis employed panel data regression to exploit both cross-sectional and time-series variation in annual stock returns. Four model families were estimated. The baseline model regressed annual log returns on the six macroeconomic indicators and the two control variables. The sector moderation model augmented the baseline specification with interactions between each macroeconomic indicator and DS to test for differences in macro sensitivities between consumer cyclical and non-cyclical firms. The distress moderation model extended the baseline model by including interactions between each macroeconomic indicator and DD to assess whether macro sensitivities differ between distressed and non-distressed firms. Finally, the combined moderation model incorporated interactions with both DS and DD, enabling a four-group (G1–G4) risk-profile mapping based on subsector type and financial condition. This mapping was treated as an exploratory and descriptive synthesis rather than a separate inferential hypothesis test, and was used to interpret layered sectoral and financial risk patterns implied by the moderation estimates. All hypotheses were evaluated at the 1%, 5%, and 10% significance levels. Inference relied on panel-corrected standard errors (PCSE) to address potential heteroskedasticity, autocorrelation, and cross-sectional dependence commonly observed in macro-financial panels. All estimations were conducted using EViews, with consistent settings applied across model variants to ensure comparability of coefficients and interaction effects.

2.5 Analytical procedure

The analysis proceeded in several stages. First, descriptive statistics, including minimum, maximum, mean, and standard deviation, were reported for all variables. A correlation matrix for macroeconomic and control variables was then constructed to provide an initial overview of linear associations; this step served as a preliminary diagnostic rather than a definitive test of multicollinearity, which was formally assessed using the variance inflation factor (VIF). Second, panel model specification was evaluated by comparing the common effect model (CEM), fixed effect model (FEM), and random effect model (REM) using the Chow test, Hausman test, and Lagrange multiplier test, respectively, in line with standard panel econometric practice. Third, diagnostic tests were applied to the baseline CEM to assess heteroskedasticity, autocorrelation, cross-sectional dependence, and multicollinearity. These diagnostics informed the final estimation strategy and error correction approach rather than imposing strict classical assumptions. Finally, the main models were estimated using the selected specification and a consistent PCSE-based inference framework. As a robustness check, alternative specifications within the same methodological framework were estimated to assess whether the direction and overall pattern of relationships remained stable under relevant estimation variations; these robustness analyses were treated as complementary and did not replace the primary model as the basis for inference.

3. Results and Discussion

3.1 Descriptive statistics and preliminary diagnostics

Table 1 report descriptive statistics for all variables used in the analysis, including annual stock returns (RETURN); macroeconomic indicators— inflation (INF), exchange rate growth (GEXC), policy interest rate (IR), money supply (M2), unemployment (UNEMP), and real GDP growth (GGDP); firm-level controls (ROA and LEV); and the sector dummy (DS) and financial distress dummy (DD). The summary statistics point to substantial dispersion in annual stock returns, with a mean of -0.035 and a standard deviation of approximately 0.459 , reflecting pronounced equity-return volatility in Indonesia over the sample period, particularly around major macroeconomic shocks such as the COVID-19 pandemic. The

return distribution is positively skewed and leptokurtic, as reflected in the skewness and kurtosis statistics, indicating departures from normality that are typical of financial return series.

Table 1. Descriptive statistics

Parameters	RETURN	INF	GEXC	IR	M2	UNEMP	GGDP	ROA	LEV	DS	DD
N	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1031
Mean	-0.035	0.029	0.026	0.052	6.825	0.057	0.042	0.031	0.273	0.541	0.318
Std. Dev.	0.459	0.011	0.048	0.012	1.612	0.006	0.021	0.118	0.265	0.499	0.466
Min	-2.12	0.016	-0.041	0.035	4.549	0.049	-0.021	-0.955	0	0	0
Max	3.322	0.055	0.103	0.075	9.247	0.071	0.053	0.621	2.388	1	1
Skewness	0.834	0.964	0.306	0.244	0.148	0.77	-2.492	-0.567	2.333	-0.163	0.781
Kurtosis	8.591	3.656	1.8	2.351	1.534	2.615	7.506	15.942	13.462	1.026	1.61

Macroeconomic indicators also exhibit meaningful time-series variation. Inflation and the policy interest rate display comparatively moderate dispersion, consistent with Indonesia's macroeconomic stabilisation framework, whereas money supply (M2) varies more widely in levels, reflecting structural liquidity expansion over the decade. Unemployment and real GDP growth shift markedly around the pandemic period, underscoring the salience of labour-market and growth dynamics for consumption-oriented firms. At the firm level, return on assets (ROA) spans a wide range—including negative values—indicating episodes of operational stress for a subset of firms. Leverage (LEV) is strongly right-skewed, pointing to heterogeneous capital structures within the consumer sector.

Table 2. Pearson correlation matrix

Variable	RETURN	INF	GEXC	IR	M2	UNEMP	GGDP	ROA	LEV
RETURN	1.000								
INF	-0.047	1.000							
GEXC	-0.075	0.451	1.000						
IR	-0.162	0.278	0.549	1.000					
M2	-0.020	-0.164	0.015	-0.088	1.000				
UNEMP	0.037	-0.124	0.151	-0.429	-0.135	1.000			
GGDP	-0.005	0.461	0.111	0.508	-0.038	-0.783	1.000		
ROA	0.168	0.056	0.008	0.040	-0.057	-0.065	0.094	1.000	
LEV	-0.117	0.013	0.033	0.010	-0.015	0.027	-0.007	-0.362	1.000

To complement the descriptive evidence, Table 2 present the correlation matrix among the main variables. Pairwise correlations between macroeconomic indicators and stock returns are generally small in magnitude, suggesting that no single macroeconomic variable dominates return movements in a bivariate setting. Notably, policy interest rates are negatively correlated with returns, while ROA is positively correlated, consistent with standard asset-pricing intuition. Correlations among macroeconomic indicators are moderate in some cases—particularly among inflation, exchange rate growth, and interest rates—reflecting macroeconomic interdependence, yet none exceed conventional thresholds that would immediately indicate severe multicollinearity.

Table 3. Multicollinearity diagnostics (variance inflation factors)

Variable	INF	GEXC	M2	UNEMP	IR	GGDP	ROA	LEV
Centered VIF	1.88	2.652	1.209	4.163	2.627	4.207	1.167	1.155

Formal multicollinearity diagnostics were assessed using variance inflation factors (VIF), reported in Table 3. All centred VIF values for the explanatory variables remain below commonly cited thresholds, indicating that multicollinearity is unlikely to constrain the regression estimates. Elevated uncentred VIF values for certain macroeconomic variables appear to reflect scale and trending behaviour rather than harmful collinearity within the regression framework. Overall, these diagnostics support the suitability of the dataset for

panel regression estimation, provided that heteroskedasticity and cross-sectional dependence are appropriately addressed.

Prior to estimation, the panel specification was tested formally: the Chow test (CEM vs. FEM: $F = 0.985$, $p = 0.527$) and the Breusch–Pagan LM test (CEM vs. REM: all $p > 0.16$) found no evidence that firm-specific or random effects improve on CEM, and the Hausman test (FEM vs. REM: $\chi^2 = 0.000$, $p = 1.000$) confirmed no meaningful difference between the fixed- and random-effects estimators. These results indicate that unobserved, time-invariant firm characteristics are not systematically correlated with the regressors, supporting CEM as the baseline; PCSE was applied separately to correct standard errors for heteroskedasticity and cross-sectional dependence.

3.2 Baseline effects of macroeconomic indicators on stock returns

The baseline panel regression results, estimated using a common effects specification with panel-corrected standard errors, are reported in Table 4. This model evaluates the direct associations between macroeconomic indicators and annual stock returns in the consumer sector, controlling for firm profitability (ROA) and leverage (LEV), and does not incorporate moderating variables. The findings indicate that macroeconomic indicators do not exert uniformly significant effects when jointly modelled.

Table 4. Summary of panel regression results

	(1) BaselineCEM + PCSE	(2) Sector moderation (DS)CEM + PCSE	(3) Distress moderation (DD)CEM + PCSE	(4) Combined moderation (DS & DD)CEM + PCSE	(5) Robustness (DIST, continuous) CEM + PCSE
C	0.312 (0.706)	0.221 (0.519)	0.660 (1.230)	0.396 (0.694)	-0.329 (-0.529)
INF	-4.835** (-2.310)	-1.303 (-0.646)	-2.181 (-0.888)	0.494 (0.194)	-4.103 (-1.503)
GEXC	0.915 (1.617)	0.053 (0.097)	0.924 (1.369)	0.048 (0.066)	-0.058 (-0.075)
IR	-10.709*** (-4.575)	-8.085*** (-3.594)	-10.852*** (-3.926)	-7.845*** (-2.675)	-8.396** (-2.472)
M2	-0.012 (-1.020)	-0.001 (-0.136)	-0.005 (-0.384)	0.005 (0.341)	0.007 (0.415)
UNEMP	4.148 (0.762)	2.431 (0.464)	-2.769 (-0.410)	-1.707 (-0.242)	11.936 (1.592)
GGDP	4.374*** (2.718)	2.140 (1.386)	2.925 (1.484)	1.121 (0.577)	3.161 (1.512)
ROA	0.556*** (3.032)	0.536*** (2.947)	0.506*** (2.747)	0.485*** (2.646)	0.502*** (2.910)
LEV	-0.112** (-2.077)	-0.115** (-2.210)	-0.082 (-1.385)	-0.084 (-1.462)	-0.105 (-1.351)
DS	-	0.171 (0.509)	-	0.501 (1.370)	0.495 (1.291)
DD	-	-	-1.241* (-1.640)	-1.263* (-1.650)	-
INFDS	-	-6.534*** (-4.083)	-	-5.315*** (-2.726)	-5.559*** (-2.777)
GEXCDS	-	1.596*** (3.713)	-	1.708*** (3.675)	1.695*** (3.469)
IRDS	-	-4.862*** (-2.737)	-	-5.933*** (-3.077)	-5.883*** (-2.938)
M2DS	-	-0.019** (-2.151)	-	-0.019** (-2.024)	-0.021** (-2.133)
UNEMPDS	-	3.178 (0.766)	-	-1.864 (-0.390)	-1.657 (-0.333)
GGDPDS	-	4.154***	-	3.693**	3.878**

		(3.352)		(2.368)	(2.448)
INFDD	-	-	-7.305*** (-2.905)	-6.722*** (-2.601)	-
GEXCDD	-	-	-0.361 (-0.393)	-0.508 (-0.547)	-
IRDD	-	-	1.214 (0.327)	1.850 (0.493)	-
M2DD	-	-	-0.009 (-0.518)	-0.008 (-0.457)	-
UNEMPDD	-	-	21.522** (2.454)	21.387** (2.401)	-
GGDPDD	-	-	4.373** (2.523)	3.836** (2.128)	-
DIST	-	-	-	-	0.075 (1.240)
INFDIST	-	-	-	-	0.561** (2.566)
GEXCDIST	-	-	-	-	-0.011 (-0.152)
IRDIST	-	-	-	-	0.209 (0.559)
M2DIST	-	-	-	-	-0.001 (-0.611)
UNEMPDIST	-	-	-	-	-1.522** (-2.037)
GGDPDIST	-	-	-	-	-0.181 (-0.986)
Observations	1110	1110	1031	1031	1031
R-squared	0.076	0.081	0.087	0.093	0.091
Adjusted R-squared	0.069	0.069	0.074	0.073	0.071
F-statistic	11.246	6.449	6.450	4.688	4.562
Model / Effects	Common effects	Common effects	Common effects	Common effects	Common effects

Note. Columns (1)–(5) correspond to the baseline, sector-moderation (DS), distress-moderation (DD), combined (DS+DD), and robustness specifications described in Methods. Coefficients are reported with t-statistics in parentheses; ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Among the macroeconomic variables, the policy interest rate (IR) shows a consistently negative and statistically significant coefficient. In the balanced-panel specification, a one-unit increase in the policy rate is associated with a substantial decline in annual stock returns, significant at the 1% level. This pattern accords with the theoretical expectation that higher interest rates raise discount rates and tighten liquidity conditions, thereby lowering equity valuations, as discussed by Bodie et al. (2023). The adverse interest-rate effect also aligns with empirical evidence reported by Baek et al. (2024) and Arin et al. (2024), who document stronger negative equity responses to monetary tightening in settings characterised by heightened macroeconomic sensitivity.

Real GDP growth (GGDP) is positive and statistically significant in the baseline model, suggesting that stronger economic growth coincides with higher consumer-sector equity returns. This result is consistent with the expected cash-flow channel in macro-asset pricing: economic expansions strengthen household income and consumption, improving earnings prospects for consumption-linked firms. Comparable positive growth–return relationships are reported in Baek et al. (2024) and Long et al. (2022), particularly for sectors closely tied to domestic demand.

By contrast, inflation (INF), exchange rate growth (GEXC), money supply (M2), and unemployment (UNEMP) do not exhibit statistically significant direct effects in the baseline specification. The lack of significance for inflation and exchange rate movements suggests

that, on average, these pressures may be anticipated by markets or offset through firm-level adjustments, consistent with the semi-strong form of market efficiency proposed by Fama (1970). Similarly, the insignificance of M2 and unemployment implies that liquidity and labour-market conditions may affect returns through conditional or non-uniform channels rather than through a common direct effect across firms.

Among the controls, ROA is positive and statistically significant, indicating that more profitable firms tend to deliver higher stock returns. Leverage (LEV) is negative and significant in the balanced panel, suggesting that greater financial risk is associated with weaker equity performance. These results are consistent with standard corporate finance logic and prior empirical work identifying profitability and financial risk as key firm-level determinants of equity outcomes (Bodie et al., 2023; Baek et al., 2024).

The models' explanatory power (R^2 ranging from 0.076 to 0.093 across specifications) is modest in absolute terms but consistent with the inherently volatile, sentiment- and firm-specific nature of stock returns, which macroeconomic and firm-level variables alone cannot fully capture. The gradual increase in R^2 from the baseline to the combined moderation model indicates that the sectoral and distress moderators add explanatory content beyond the average effects captured by the baseline specification.

3.3 Sectoral heterogeneity: Moderation by consumer subsector classification

To test whether macroeconomic effects differ between consumer cyclical and consumer non-cyclical firms, interaction terms between each macroeconomic indicator and the sector dummy (DS) were added. The sector-moderation results are presented in Table 4. The interaction estimates indicate pronounced heterogeneity across subsectors. Although inflation does not remain statistically significant as a direct effect for the pooled sample, the inflation–sector interaction ($INF \times DS$) is negative and statistically significant. This implies that inflation has a more adverse association with stock returns for consumer cyclical firms relative to non-cyclical firms. The pattern is consistent with the view that discretionary consumption is more sensitive to purchasing-power erosion, as emphasised in JP Morgan Indonesia Equity Strategy (2023) and framed within the business-cycle logic discussed by Bodie et al. (2023).

Exchange rate growth also displays a positive and statistically significant interaction with DS, indicating that cyclical firms respond differently to currency movements than non-cyclical firms. This finding suggests that depreciation effects are not uniform within the consumer sector and may reflect differences in import intensity, pricing power, and demand elasticity. The result aligns with Thorbecke (2023), who highlights sector-specific exposure as a key determinant of exchange-rate sensitivity in equity returns.

The interaction between the policy interest rate and DS ($IR \times DS$) is negative and statistically significant, reinforcing the implication that cyclical firms are more adversely affected by monetary tightening. This outcome is consistent with the proposition that higher interest rates disproportionately constrain credit-dependent and demand-sensitive businesses, as documented in Arin et al. (2024) and Sharif et al. (2025).

Money supply (M2) shows a negative and statistically significant interaction with DS. Although the direct M2 effect remains insignificant, the interaction indicates that cyclical firms are more responsive to systemic liquidity changes, which may intensify return sensitivity over the business cycle. This conditional liquidity pattern is broadly consistent with Baek et al. (2024), who report heterogeneous macro sensitivities linked to firm characteristics.

The unemployment–sector interaction is not statistically significant, implying that labour-market conditions affect both subsectors in broadly similar ways when financial structure is not explicitly incorporated. In contrast, the GDP growth interaction ($GGDP \times DS$) is positive and significant, indicating that cyclical firms benefit more from economic expansions. This result mirrors Long et al. (2022), who argue that cyclical stocks tend to outperform during recoveries as demand rebounds. Collectively, the sector-moderation results provide strong evidence that consumer subsector classification is consequential for

interpreting macro–return linkages. Analyses that treat the consumer sector as homogeneous risk obscuring these differences, a concern also raised in earlier evidence reviewed by Baek et al. (2024).

3.4 Financial distress as a moderator of macroeconomic effects

The next set of estimates examines financial distress as a moderating factor. Table 4 reports the regression results that include interaction terms between macroeconomic indicators and the financial distress dummy (DD), constructed from the Altman Z-Score EMS. The results indicate that financial distress conditions several macro–return relationships. The inflation–distress interaction ($INF \times DD$) is negative and statistically significant, suggesting that inflation is more adversely associated with returns among distressed firms. This finding is consistent with the argument advanced by Baek et al. (2024) that financially weaker firms are less able to absorb cost pressures and macroeconomic shocks, resulting in sharper equity-market reactions.

The unemployment–distress interaction ($UNEMP \times DD$) is positive and statistically significant. This indicates that labour-market deterioration is associated with a differentiated return response among distressed firms, potentially reflecting complex market expectations regarding restructuring, cost adjustment, or policy support during downturns. While the positive sign may appear counterintuitive, it underscores that market reactions to unemployment shocks are not mechanically uniform and may depend on firm-level financial positioning, consistent with Huynh (2023) in the context of unemployment exposure and stock returns.

The GDP growth–distress interaction ($GGDP \times DD$) is positive and statistically significant, implying that distressed firms experience relatively stronger return improvements during economic expansions. This pattern is consistent with the interpretation that recovery phases may disproportionately benefit financially constrained firms by easing cash-flow pressures and improving solvency prospects, as discussed by Cheng & Fang (2025). Other distress interactions—those involving exchange rate growth, interest rates, and money supply—are not statistically significant in the distress-only moderation model, suggesting that distress selectively amplifies particular macroeconomic channels rather than uniformly intensifying all macro effects. Overall, these findings reinforce the importance of accounting for firm-level financial health in macro–asset pricing analyses and support the view that distress conditions the translation of macroeconomic information into equity returns (Baek et al., 2024; Cheng & Fang, 2025).

3.5 Combined moderation: Sector classification and financial distress

The combined moderation model, reported in Table 4, incorporates interaction terms for both sector classification (DS) and financial distress (DD). This specification enables a more granular reading of macro–return sensitivity across four conceptual firm profiles: non-cyclical non-distress, cyclical non-distress, non-cyclical distress, and cyclical distress. The results suggest that the strongest and most statistically significant macroeconomic effects tend to concentrate among cyclical firms facing financial distress.

In particular, inflation and interest-rate interactions remain negative and significant for this group, indicating heightened vulnerability to price pressures and monetary tightening. Conversely, GDP growth effects appear most pronounced for cyclical distressed firms, pointing to substantial upside sensitivity during recoveries. These patterns are consistent with a multifactor asset-pricing perspective in which systematic risk exposure depends not only on macroeconomic conditions but also on sectoral positioning and firm resilience. The estimates extend prior evidence by demonstrating that sectoral and financial dimensions jointly shape macro–return sensitivities within a single, integrated empirical framework, rather than operating independently.

Consumer Sector Classification (DS)	Financial Distress Status (DD)		
		Non-Distress	Distress
	Non-Cyclical	G1 – Defensive & Healthy (<i>Non-Cyclical, Non-Distress</i>)	G3 – Defensive, but Fragile (<i>Non-Cyclical, Distress</i>)
		a) Low sensitivity to macro shocks b) Most stable, moderate return pattern c) Comparatively insulated from cycles	a) Stable demand, weaker balance sheet b) Sharper reaction to inflation, UNEMP c) Distress outweighs sector defensiveness
	Cyclical	G2 – Cyclical & Healthy (<i>Cyclical, Non-Distress</i>)	G4 – Cyclical & Healthy (<i>Cyclical, Distress</i>)
		a) Strong response to growth (GGDP) b) Sector-driven, not distress-driven c) Buffered by sound financial condition	a) Largest downside to INF, IR shocks b) Largest upside when GGDP improves c) Acts as amplifier of both directions

Fig. 1. Four-group risk profile mapping under dual moderation (DS × DD)

For clarity, the four profiles are labelled G1 (non-cyclical, non-distress), G2 (cyclical, non-distress), G3 (non-cyclical, distress), and G4 (cyclical, distress). Figure 1 summarises these profiles conceptually, and Table 5 reports the implied marginal effect of each macroeconomic indicator for each group, obtained by summing the relevant base coefficient with the corresponding DS and DD interaction terms from the combined model in Table 4.

Table 5. Implied marginal effects of macroeconomic indicators by risk group (G1–G4)

Variable	G1: Non-Cyclical, Non-Distress	G2: Cyclical, Non-Distress	G3: Non-Cyclical, Distress	G4: Cyclical, Distress
Inflation (INF)	0.494	−4.821	−6.228	−11.543
Exchange Rate Growth (GEXC)	0.048	1.755	−0.461	1.247
Interest Rate (IR)	−7.845	−13.778	−5.995	−11.929
Money Supply (M2)	0.005	−0.014	−0.004	−0.018
Unemployment Rate (UNEMP)	−1.707	−3.570	19.681	17.817
GDP Growth (GGDP)	1.121	4.814	4.957	8.651

Note: Values are derived by summing the base coefficient and the relevant DS/DD interaction terms from the combined model in Table 4; they are descriptive/implied effects, not separately estimated coefficients. Source: authors' calculation.

Table 5 shows that inflation's adverse effect and GDP growth's favourable effect both increase monotonically from G1 to G4, while unemployment reverses sign between non-distressed and distressed groups—together indicating that G4 (cyclical, distressed) firms amplify both adverse and favourable shocks, whereas G1 (non-cyclical, healthy) firms remain comparatively insulated. As these values are derived by summing coefficients rather than estimated directly, a formal Wald test on the relevant linear combinations would be needed to establish their significance—noted here as a direction for further robustness testing. This four-group mapping constitutes a central contribution of the study. Rather than treating sector classification and financial distress as separate, additive moderators, it shows that the two dimensions jointly define a firm's macroeconomic risk profile, extending prior heterogeneity studies that typically examine sectoral and financial-distress effects in isolation. The mapping is offered as a descriptive, exploratory synthesis of the estimated interaction effects rather than as a separately tested hypothesis.

3.6 Robustness analysis

Robustness checks were conducted using alternative specifications that retained the same variables and interaction structure but varied certain estimation details, as reported in Table 4. The core results—negative interest-rate effects, positive GDP growth effects, and significant moderation by subsector classification and financial distress—remain qualitatively stable. While some coefficients lose statistical significance under alternative specifications, the direction and relative magnitude of the principal effects are maintained, supporting the robustness of the main inferences.

3.7 Discussion and implications

Several implications follow from the empirical findings for the literature on macroeconomic determinants of stock returns in emerging markets. First, the prominence of interest rates and economic growth underscores the centrality of monetary conditions and real activity in shaping investor expectations, consistent with the theoretical mechanisms discussed by Bodie et al. (2023). Second, the clear evidence of sectoral heterogeneity supports arguments advanced in JP Morgan Indonesia Equity Strategy (2023) and Long et al. (2022) that consumer cyclical and consumer non-cyclical firms respond differently to macroeconomic shocks. Third, the moderating role of financial distress aligns closely with Baek et al. (2024) and Cheng & Fang (2025), who emphasise that firm-level vulnerability conditions how macroeconomic shocks propagate to equity returns. By jointly modelling sector classification and distress, the analysis extends prior work that often examines these dimensions separately.

From a practical standpoint, the results imply that investors and portfolio managers should incorporate both macroeconomic conditions and firm characteristics when evaluating risk within the consumer sector. Moreover, policies aimed at stabilising inflation and interest rates may have uneven implications across subsectors and financial conditions, which is relevant for regulators concerned with market stability during periods of macroeconomic stress. More broadly, these findings carry implications for financial stability policy and sustainable capital market development in Indonesia. Monitoring the financial health of cyclical consumer firms alongside macroeconomic conditions can help regulators anticipate where systemic risk is likely to concentrate, while greater transparency on firm-level financial resilience may strengthen investor confidence and support more stable, sustainable market development. Overall, the evidence indicates that macroeconomic indicators affect stock returns in Indonesia's consumer sector through heterogeneous and conditional channels. Approaches that ignore subsector structure and financial health risk oversimplifying the transmission of macroeconomic shocks to equity markets, particularly in emerging economies characterised by structural diversity and evolving investor participation.

4. Conclusions

This study investigates the effects of macroeconomic indicators on annual stock returns in Indonesia's consumer sector over the 2015–2024 period, with explicit consideration of sectoral heterogeneity and firm-level financial conditions. Using panel regression with panel-corrected standard errors, the results indicate that macroeconomic influences on returns are not uniform across firms. Policy interest rates stand out as the most consistent and systemically important determinant, exerting a stable and negative effect on stock returns across all model specifications. Firm profitability, proxied by return on assets, also shows a robust positive association with returns, reaffirming the continued relevance of firm fundamentals alongside macroeconomic forces. By contrast, several macroeconomic variables—such as exchange rates, money supply, and unemployment—do not function as direct aggregate drivers of returns when heterogeneity is not explicitly accounted for.

A key contribution of this study is the demonstration that macroeconomic effects are largely conditional on sectoral characteristics and financial health. Distinguishing between consumer cyclical and non-cyclical firms reveals substantial differences in sensitivity to inflation, interest rates, liquidity conditions, and economic growth. Cyclical firms display stronger adverse responses to inflationary pressures and monetary tightening, as well as greater upside exposure during periods of economic expansion, in line with business-cycle theory. In parallel, financial distress significantly amplifies macroeconomic effects: firms classified as distressed experience more pronounced return responses to inflation, labour-market conditions, and economic growth shocks. These findings help reconcile mixed evidence in the existing literature by showing that macroeconomic indicators often operate through interaction channels rather than through homogeneous average effects.

By integrating sector classification and financial distress within a single empirical framework, this study extends prior research that has typically examined these dimensions separately. The evidence supports a semi-strong information-processing view of the market, in which publicly available macroeconomic information is incorporated into stock prices in a selective manner that depends on firm-specific risk profiles. This perspective offers a more nuanced understanding of macro-financial linkages in an emerging-market setting and aligns with the interdisciplinary scope of IASSSF by connecting macroeconomic dynamics, corporate financial resilience, and market sustainability. The results further suggest that analyses which overlook heterogeneity risk oversimplifying the transmission of macroeconomic shocks to equity markets.

Overall, the study concludes that stock returns in Indonesia's consumer sector are shaped by the interaction of macroeconomic conditions, sectoral demand characteristics, and firm-level financial vulnerability. Monetary policy and economic growth emerge as key systemic forces, while other macroeconomic indicators exert influence in more selective and conditional ways. These insights contribute to empirical asset-pricing research in developing economies and support more context-sensitive approaches to assessing financial stability and sustainable market development.

Acknowledgement

The authors gratefully acknowledge the academic guidance and feedback provided during the development of this manuscript, as well as the support received in accessing and organizing the secondary data required for the analysis. The authors also appreciate the institutional resources that enabled the completion of this study, including access to S&P Capital IQ Pro and the official statistical publications used as data inputs.

Author Contribution

Conceptualization, C.M.R.S.; Methodology, C.M.R.S.; Software, C.M.R.S.; Validation, C.M.R.S.; Formal Analysis, C.M.R.S.; Investigation, C.M.R.S.; Resources, C.M.R.S.; Data Curation, C.M.R.S.; Writing – Original Draft Preparation, C.M.R.S.; Writing – Review & Editing, C.M.R.S.; Visualization, C.M.R.S.; Supervision, R.A.B.; Project Administration, C.M.R.S. The authors have read and agreed to the submitted version of the manuscript.

Funding

This research received no external funding.

Ethical Review Board Statement

Not available.

Informed Consent Statement

Not available.

Data Availability Statement

This study used secondary data compiled from official public sources and a licensed financial database. Macroeconomic indicators were obtained from official publications of Bank Indonesia (including SEKI and monetary statistics) and Badan Pusat Statistik. Sector classification references were based on Bursa Efek Indonesia publications (including IDX Fact Book and IDX Industrial Classification). Stock return and firm financial statement data used to compute leverage, ROA, and Altman Z-Score were obtained from S&P Capital IQ Pro under license; therefore, redistribution of the raw firm-level extracts may be restricted. Derived variables and the constructed panel dataset may be made available by the authors upon reasonable request, subject to the licensing terms applicable to S&P Capital IQ Pro.

Conflicts of Interest

The authors declares no conflict of interest.

Declaration of Generative AI Use

During the preparation of this work, the authors used ChatGPT (OpenAI) to assist in improving academic English, clarity, and manuscript structuring for journal submission. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the content of the publication.

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Biographies of Authors

Chairani Manasye Riama Sinaga is an undergraduate extension student in Management at the Faculty of Economics and Business, Universitas Indonesia, and a full-time civil servant at the Indonesian Financial Transaction Reports and Analysis Center (PPATK). Her research combines applied econometric analysis with policy-relevant perspectives on financial stability and investment risk in Indonesia.

- Email: manasyechairani@gmail.com
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Rahmat Aryo Baskoro is a lecturer at the Faculty of Economics and Business, Universitas Indonesia. He holds a Bachelor's degree in Financial Management and a Master's degree in Risk Management from FEB UI. His expertise lies in investment management, financial risk analysis, and capital market studies.

- Email: rab2012@ui.ac.id
- ORCID: 0000-0002-6683-6519
- Web of Science ResearcherID: N/A
- Scopus Author ID: 57468795300
- Homepage: <https://sinta.kemdiktisaintek.go.id/authors/profile/6760485/>