Macroeconomic Conditions and Corporate Profitability: Panel Data Evidence from Malaysia's Automotive Industry

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ABSTRACT

This article examines how national macroeconomic conditions are associated with the financial performance of publicly listed automotive companies in Malaysia. The analysis uses a balanced panel of six firms observed annually from 2014 to 2023, producing 60 firm–year observations. Return on assets (ROA) is modelled as a function of foreign direct investment (FDI), GDP growth, an interest-rate measure, inflation, and the MYR/USD exchange rate. The empirical design combines descriptive and correlation analysis with fixed-effects estimation, heteroskedasticity and serial-correlation diagnostics, feasible generalized least squares (FGLS), and the dynamic-panel estimates reported in the underlying study. GDP growth is the most consistent correlate of profitability: its coefficient is positive and statistically significant in the fixed-effects, dynamic-panel, and FGLS specifications. The FGLS estimates also associate ringgit depreciation with lower ROA, whereas the exchange-rate coefficient is not stable across estimators. FDI, interest rates, and inflation do not display stable statistically significant relationships with ROA. The results suggest that domestic economic activity and currency-related cost exposure are more consequential for the sampled firms than aggregate capital inflows alone. At the same time, the six-firm panel, the common national variation of the macroeconomic regressors, the questionable negative minimum in the reported interest-rate series, and the use of 48 instruments for six groups in the dynamic model require cautious interpretation. The article therefore treats the estimates as sector-specific associations and develops implications for managerial planning, investors, and macroeconomic policy rather than strong causal claims.

Keywords: automotive industry; corporate profitability; GDP growth; exchange rate; panel data; Malaysia; return on assets

INTRODUCTION

Corporate profitability is produced at the intersection of internal capabilities, industry conditions, and the wider macroeconomic environment. This distinction matters in capital-intensive and internationally connected industries because changes in aggregate demand, financing conditions, input prices, and currency values can affect operating margins and asset utilisation at the same time. The Malaysian automotive industry provides a particularly useful setting for examining these linkages. Listed firms operate across vehicle assembly, component manufacturing, distribution, dealerships, logistics, and after-sales services. These activities are connected to domestic household demand but also to imported components, foreign brands, cross-border supply chains, and financing conditions.

The relevance of the macroeconomic environment does not imply that every firm responds identically to a national shock. Prior profitability research shows that firm size, leverage, liquidity, working-capital management, competitiveness, market share, and management capabilities can create persistent differences in

returns across firms and industries (Batra & Kalia, 2016; Nanda & Panda, 2018; Acquaah, 2003; Pieri & Verruso, 2019). Research comparing macroeconomic and firm-specific explanations similarly finds that the relative importance of the two levels can vary across countries and economic episodes (Cheong & Hoang, 2021). A sector-level panel should therefore be interpreted as a study of macroeconomic exposure filtered through heterogeneous business models, not as a claim that national variables mechanically determine firm outcomes.

Five macroeconomic channels are examined. First, FDI may provide capital, technology, managerial knowledge, and supplier linkages, but economy-wide inflows may not be directed toward the sampled companies or the automotive value chain. Evidence on Malaysia shows that the relationship between FDI, financial development, and growth is mediated by national conditions rather than being automatic (Alzaidy et al., 2017). Studies of Malaysian FDI determinants likewise emphasise that growth, inflation, exchange-rate conditions, and other institutional or macroeconomic factors shape the location and volume of inflows (Ramlan et al., 2021; Zaharum et al., 2024). Second, GDP growth captures changes in aggregate activity, disposable income, vehicle demand, and capacity utilisation. Third, interest rates affect corporate borrowing costs and the affordability of vehicle credit. Fourth, inflation can raise material, labour, logistics, and distribution costs while reducing real purchasing power. Fifth, ringgit depreciation can raise the domestic-currency price of imported components and machinery, although exporters or firms with effective hedging may experience an offset.

Research Gap and Contributions

The empirical literature provides useful but incomplete guidance for the Malaysian automotive case. Tuncay and Cengiz (2017) examine macroeconomic indicators and profitability among Turkey's largest industrial organisations, while Nanda and Panda (2018) separate firm-specific and macroeconomic determinants in Indian manufacturing. Cheong and Hoang (2021) explicitly compare macroeconomic and firm-specific influences across Singapore and Hong Kong and show that the balance can change across pre-crisis, crisis, and post-crisis periods. These studies establish the value of multi-level analysis, but their samples, institutional environments, industry compositions, and outcome measures differ from those of Malaysian automotive firms. The Malaysian evidence is consequently better treated as a complementary sector-specific case.

The article makes three contributions. First, it concentrates on a strategically important Malaysian industry rather than combining unrelated sectors. Second, it reads the reported estimates across static and dynamic estimators, distinguishing findings that are consistent from results that depend on model choice. Third, it makes the identification limits of a small macro-panel explicit. The panel contains only six firms, while the national regressors take the same value for all firms in a given year. Consequently, the regressors have limited independent cross-sectional variation, and the estimates should not be interpreted as if they were generated by a large cross-sectional design. The article also treats the dynamic GMM results as supplementary because the reported model uses 48 instruments for six groups, a configuration that raises the instrument-proliferation concern documented by (Roodman, 2009).

The remainder of the article is organised as follows. Section 2 develops the theoretical framing and hypotheses. Section 3 describes the sample, variables, and econometric strategy. Section 4 presents the descriptive, correlation, diagnostic, and regression evidence. Section 5 discusses the findings, implications, and limitations. Section 6 concludes.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Theoretical Framing

The article combines the Eclectic (OLI) Paradigm with an institutional perspective on macroeconomic exposure. The OLI Paradigm explains international investment and production through ownership, location, and internalisation advantages. Contemporary reviews emphasise that the paradigm is best used as a flexible framework for understanding how firm-specific capabilities interact with location conditions, rather than as a

single-variable theory of performance (Wagner, 2019; Li et al., 2025). For Malaysian automotive firms, the location component is especially relevant: market size, infrastructure, supplier capabilities, exchange-rate conditions, policy settings, and access to regional production networks can affect the returns realised from firm assets.

Institutional theory adds the proposition that organisations are embedded in formal rules, market institutions, and economic conditions that influence both opportunities and constraints. In this study, GDP growth, inflation, interest rates, and the exchange rate are not treated as institutions in a narrow legal sense. They are observable indicators of the institutional and macroeconomic environment within which firms plan, finance, source, price, and invest. The combined framing therefore links macroeconomic conditions to firm profitability through operational mechanisms, while recognising that the final effect depends on ownership advantages, internalisation choices, and firm-level adaptation.

Figure 1 summarises this logic. Each macroeconomic variable is connected to plausible demand, cost, financing, or investment channels. Those channels are filtered through pricing power, leverage, liquidity, import intensity, hedging, supply-chain position, and heterogeneity across the six firms. The empirical models then estimate associations between national variables and ROA, not a fully identified structural causal model.

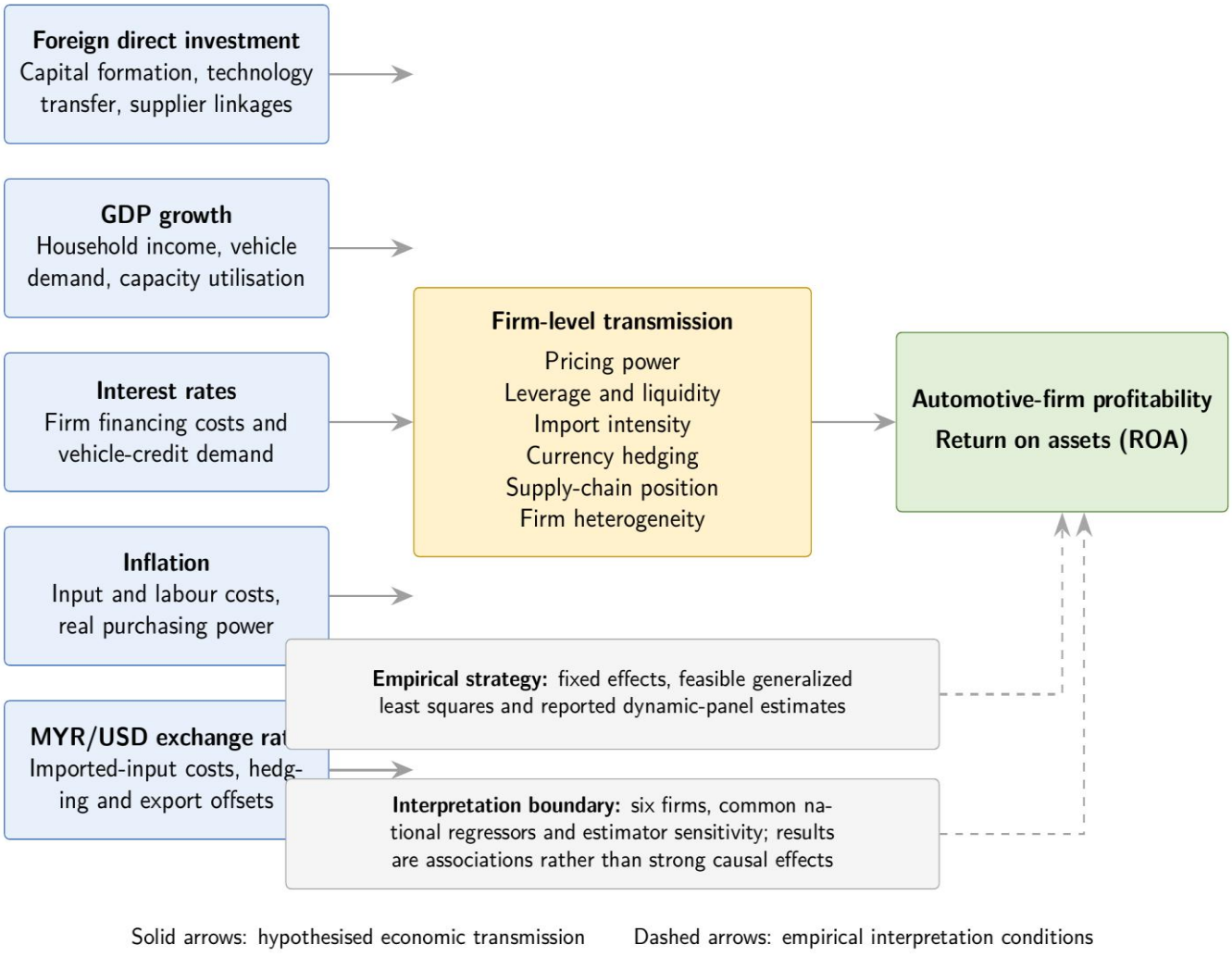

Figure 1: Conceptual Transmission of Macroeconomic Conditions to Automotive-Firm Profitability.

Note. Solid arrows denote hypothesised economic transmission; dashed arrows denote empirical strategy and interpretation conditions. FDI = foreign direct investment; FE = fixed effects; FGLS = feasible generalized least squares; ROA = return on assets.

Macroeconomic Conditions and Profitability

The literature cautions against treating profitability as a purely macroeconomic outcome. Batra and Kalia (2016) find that size is positively related to profitability while leverage is negatively related in a sample of Indian companies, and Nanda and Panda (2018) show that internal and macroeconomic determinants can vary across pre-crisis and post-crisis periods. Evidence from industrial and durable-goods settings also points to the role of productivity, labour cost, financial structure, market share, and competitiveness in explaining firm-level differences (Pieri & Verruso, 2019). These findings motivate a channel-based hypothesis design: each national variable is predicted to have a directional association, but the magnitude and statistical significance may be attenuated by unobserved firm characteristics and measurement choices.

Foreign Direct Investment

FDI can strengthen profitability through capital deepening, technology transfer, managerial practices, worker training, and the development of local supplier networks. The Malaysian literature identifies FDI as part of a wider growth and financial-development process rather than an isolated inflow with an immediate firm-level payoff (Alzaidy et al., 2017). The location decision itself responds to economic growth, inflation, exchange-rate conditions, and other determinants (Ramlan et al., 2021; Zaharum et al., 2024). The OLI perspective therefore predicts potential benefits when automotive firms possess the capabilities to absorb external knowledge and internalise production advantages.

However, the use of aggregate FDI creates a measurement problem. National inflows may be concentrated in electronics, services, energy, or projects involving unlisted firms. They may also generate benefits with a lag, or create competition that compresses margins for domestic incumbents. The expected coefficient is therefore positive but uncertain in a six-firm sector panel. The hypothesis is stated as:

H1: Foreign direct investment is positively associated with the financial performance of Malaysian automotive companies.

GDP Growth

GDP growth is a proxy for the intensity of domestic economic activity. Expansion can increase household income and confidence, strengthen vehicle demand, improve sales of replacement parts and after-sales services, and raise the utilisation of fixed assets. The automotive sector is consequently expected to exhibit cyclical exposure to aggregate demand. The Malaysian automotive literature directly identifies economic factors as relevant to sector conditions (Sin et al., 2024), while cross-country profitability studies report positive links between growth conditions and firm performance in some settings (Tuncay & Cengiz, 2017; Cheong &Hoang, 2021). GDP growth may also capture correlated business-cycle conditions that influence credit availability and investment.

The expected relationship is positive:

H2: GDP growth is positively associated with the financial performance of Malaysian automotive companies.

Interest Rates

Interest rates influence firms through at least two channels. A financing channel raises or lowers the cost of bank borrowing and other debt. A demand channel changes the affordability of vehicle loans and can delay purchases of durable goods. Malaysian research on debt-market interest rates highlights the importance of distinguishing short- and long-term conditions rather than assuming that a single rate captures all financing costs (Hadi et al., 2019). Evidence from manufacturing and financial-sector studies also suggests that the relationship between rates and profitability can depend on leverage, liquidity, asset maturity, and the phase of the business cycle (Panda et al., 2022; Al-Slehat, 2022).

A negative association is hypothesised because higher rates are expected to increase financing costs and weaken credit-sensitive demand, although a procyclical policy rate or an imperfect rate measure could produce a different sign:

H3: Interest rates are negatively associated with the financial performance of Malaysian automotive companies.

Inflation

Inflation can compress profitability by increasing the cost of steel, electronics, energy, labour, logistics, and imported parts. It can also reduce consumers' real purchasing power. The final effect depends on pricing power, inventory timing, contractual arrangements, and whether cost increases are passed through to vehicle and service prices. Prior work links inflation to financial development and performance, but the direction and significance are not uniform across sectors and countries (Batayneh et al., 2021; Purwohandoko & Iriani, 2021). Inflation may also coincide with stronger nominal demand, making a simple negative hypothesis an empirical proposition rather than a certainty.

H4: Inflation is negatively associated with the financial performance of Malaysian automotive companies.

Exchange Rate

The MYR/USD exchange rate is measured as ringgit per US dollar, so a higher value represents ringgit depreciation. Depreciation raises the domestic-currency cost of imported components, machinery, technology, and foreign-currency liabilities. The effect can be moderated by export revenue, local sourcing, contractual pass-through, and financial hedging. Firm-level evidence from open economies shows that imported inputs are an important route through which exchange-rate changes reach domestic prices (Ahn & Park, 2015), while research on Korean firms demonstrates why depreciation can have both cost and competitiveness effects (Choi & Pyun, 2020).

The expected effect is therefore directional in the present sample but not assumed to be universal. If import exposure dominates, depreciation lowers ROA; if export and competitive-price effects dominate, the sign could be positive. The hypothesis is stated as:

H5: The MYR/USD exchange rate is significantly associated with the financial performance of Malaysian automotive companies.

DATA AND METHODOLOGY

Sample and Data Sources

The study uses annual secondary data for six publicly listed Malaysian automotive companies over 2014–2023: APM Automotive Holdings Berhad, Bermaz Auto Berhad, DRB-HICOM Berhad, MBM Resources Berhad, Sime Darby Berhad, and Tan Chong Motor Holdings Berhad. The balanced panel contains 60 firm–year observations. Firm-level ROA was obtained from company annual reports and Bursa Malaysia-related financial disclosures. Macroeconomic data were compiled from the World Bank and Bank Negara Malaysia. The source manuscript operationalised FDI in US dollars billions, GDP as annual growth, interest rates in percentage terms, inflation as the annual percentage change, and the exchange rate as MYR per US dollar.

The sampling frame is intentionally narrow because the research question concerns listed automotive firms rather than the Malaysian corporate sector as a whole. This focus improves sectoral relevance but limits external validity. It also means that the five macroeconomic regressors have a common annual value across all firms. The effective variation for those regressors is therefore temporal, while the firm dimension mainly contributes repeated observations and firm-specific intercepts.

Variables and Operationalisation

Table 1 reports the variables and expected signs. ROA is calculated as net income divided by total assets and multiplied by 100. The macroeconomic predictors are measured at the national level. The interest-rate series requires particular scrutiny: the reported descriptive statistics include a negative minimum of -2.35 even though the variable is described as an interest-rate measure. That value may reflect a transformed or real-rate series rather than a conventional policy rate. The interpretation of H3 should therefore remain conditional until the source series and transformation are confirmed.

Table 1. The Variables and Expected Signs

Variable	Role	Measurement	Expected sign
ROA	Dependent	Net income / total assets × 100	—
FDI	Independent	Foreign direct investment, US dollars billions	+
GDP	Independent	Annual GDP growth (%)	+
Interest rate	Independent	Annual interest-rate measure (%)	−
Inflation	Independent	Annual inflation rate (%)	−
Exchange rate	Independent	MYR per US dollar; higher values indicate depreciation	± / exposure-dependent

Note. ROA = return on assets; FDI = foreign direct investment.

Econometric Specification and Estimation Strategy

The static panel model is:

$$\mathrm{ROA}_{it} = \alpha + \beta_1 \mathrm{FDI}_t + \beta_2 \mathrm{GDP}_t + \beta_3 \mathrm{INT}_t + \beta_4 \mathrm{INF}_t + \beta_5 \mathrm{EX}_t + \mu_i + \varepsilon_{it},$$

where i indexes firms and t indexes years. μ_i captures time-invariant firm heterogeneity and ε_{it} is the idiosyncratic error term. The initial model-selection sequence should compare pooled OLS, fixed effects (FE), and random effects (RE), using the Breusch–Pagan Lagrange Multiplier test and Hausman test as relevant. Because the source analysis reports heteroskedasticity and serial correlation, inference should be based on an estimator or covariance matrix that addresses those features. FGLS is reported as one robustness specification, but it is not treated as automatically superior in a panel with very small N and T.

The dynamic specification introduces lagged profitability:

$$\mathrm{ROA}_{it} = \alpha \mathrm{ROA}_{i,t-1} + \beta' \mathrm{X}_t + \mu_i + \varepsilon_{it}.$$

The lag coefficient is economically meaningful because profitability may persist through brand capital, dealer networks, customer relationships, capacity, and adjustment costs. The underlying study reports system-GMM estimates, but the model uses 54 observations and 48 instruments for six groups. As emphasised by Roodman (2009), instrument proliferation can overfit endogenous variables and weaken specification tests. The dynamic results are therefore reported as supplementary evidence. A stronger future design would collapse instruments, restrict lag depth, report AR(1), AR(2), Hansen or Sargan, and Difference-in-Hansen tests, and compare results with parsimonious FE and bias-corrected alternatives.

EMPIRICAL RESULTS

Descriptive Statistics

Table 2 shows considerable variation in profitability. Mean ROA is 5.597%, with a standard deviation of 7.457 percentage points and a range from -8.43% to 29.68%. This spread is consistent with heterogeneous business models and exposure across manufacturers, distributors, and diversified groups. GDP ranges from -5.46% to 8.86%, capturing both contraction and expansion during the sample. The exchange rate ranges from 3.27 to 4.56 MYR per US dollar, indicating meaningful variation in the domestic-currency cost of dollar-denominated inputs. The negative minimum in the interest-rate measure remains a data-verification issue rather than a result to be given a substantive interpretation.

Table 2. Results on Analysis Descriptive

Variable	Obs.	Mean	Std. dev.	Min.	Max.
ROA	60	5.597	7.457	−8.43	29.68
FDI	60	3.093	1.170	1.20	5.41
GDP	60	4.089	3.541	−5.46	8.86
Interest rate	60	2.576	2.951	−2.35	7.33
Inflation	60	1.995	1.430	−1.14	3.87
Exchange rate	60	4.110	0.332	3.27	4.56

Correlation Structure

The reported pairwise correlations between ROA and the macroeconomic variables are small: -0.091 with FDI, 0.071 with GDP, 0.144 with the interest-rate measure, -0.042 with inflation, and -0.141 with the exchange rate. These unconditional correlations should not be confused with partial regression effects. In particular, GDP is positively significant in the multivariate FE model despite its small bivariate correlation with ROA, illustrating how firm effects and correlated macroeconomic predictors can change the conditional estimate.

The regressors themselves display stronger associations. Interest rates and FDI correlate at -0.742, while inflation and GDP correlate at 0.808. Such collinearity can inflate standard errors and make individual coefficients sensitive to specification. It also reinforces the importance of presenting joint model results, testing alternative measures, and avoiding a claim that an insignificant coefficient proves the absence of an economic channel.

Fixed-Effects Estimates and Diagnostics

Table 3 reports the conventional FE coefficients. GDP is positive and statistically significant ($\beta = 0.588$, $p = 0.036$). FDI is negative and insignificant ($\beta = -0.164$, $p = 0.828$). The interest-rate coefficient is positive and insignificant ($\beta = 0.410$, $p = 0.170$), while inflation is negative and insignificant ($\beta = -0.899$, $p = 0.218$). The exchange-rate coefficient is negative and marginal at the 10% level ($\beta = -2.971$, $p = 0.090$). The firm effects are jointly significant, supporting the inclusion of firm-specific heterogeneity.

The diagnostic evidence indicates heteroskedasticity and serial correlation. The Modified Wald test rejects homoskedasticity ($\chi^2 = 498.86$, $p < 0.001$), and the reported Wooldridge test rejects the null of no first-

order serial correlation ($p = 0.0028$). These results support robust or alternative covariance treatment. They also mean that conventional FE standard errors should not be treated as the only basis for inference.

Table 3. Results on Fixed-Effects coefficients

Variable	Coefficient	Std. error	p-value
FDI	−0.1640	0.7488	0.828
GDP	0.5880	0.2732	0.036
Interest rate	0.4103	0.2945	0.170
Inflation	−0.8986	0.7203	0.218
Exchange rate	−2.9712	1.7176	0.090

Note. The table reproduces the reported fixed-effects estimates. The reported diagnostics are Modified Wald $\chi^2 = 498.86$ ($p < .001$) and Wooldridge serial-correlation $p = .0028$.

Dynamic-Panel and FGLS Estimates

Table 4 compares the reported dynamic-panel and FGLS estimates. The lagged ROA coefficient is 0.3595 and significant at $p = 0.001$, indicating persistence in profitability. GDP remains positive and significant in the dynamic model ($\beta = 0.8298$, $p = 0.004$) and FGLS ($\beta = 0.3655$, $p = 0.015$). The magnitude differs, but the sign and statistical significance are stable across the three reported approaches. This consistency makes GDP the strongest empirical correlate in the study.

The exchange-rate result is estimator-sensitive. It is positive and insignificant in the dynamic model ($\beta = 1.2724$, $p = 0.773$), but negative and significant under FGLS ($\beta = -3.6820$, $p = 0.011$). Because a higher MYR/USD value represents depreciation, the FGLS coefficient is consistent with imported-input cost pressure. The divergence indicates that currency exposure is plausible but not robustly identified by the current design. FDI, interest rates, and inflation remain statistically insignificant in the supplementary specifications.

Table 4. Dynamic-Panel and FGLS Estimates

Variable	System GMM β	GMM p	FGLS β	FGLS p
Lagged ROA	0.3595	0.001	—	—
FDI	−0.0965	0.908	—	n.s.
GDP	0.8298	0.004	0.3655	0.015
Interest rate	0.2420	0.428	0.2943	0.087
Inflation	−1.5796	0.077	−0.3653	0.401
Exchange rate	1.2724	0.773	−3.6820	0.011

Note. n.s. = not statistically significant. The dynamic model uses 54 observations and 48 instruments for six groups and is interpreted as supplementary evidence.

Hypotheses Assessment

Table 5 summarises the hypothesis assessment. H1 is not supported because FDI is insignificant and negative in the FE and dynamic results. H2 is supported because GDP is positive and significant across the reported FE, dynamic, and FGLS estimates. H3 is not supported: the interest-rate coefficient is positive and insignificant in the reported models. H4 is not supported at the 5% level, although the direction is negative in FE, dynamic GMM, and FGLS. H5 receives mixed support because the exchange-rate coefficient is negative and significant in FGLS but insignificant and positive in the dynamic model.

Table 5. Hypotheses Results for the Study

Hypothesis	**Prediction**	**Assessment**
H1: FDI → ROA	Positive	Not supported
H2: GDP → ROA	Positive	Supported across reported specifications
H3: Interest rate → ROA	Negative	Not supported
H4: Inflation → ROA	Negative	Not supported at 5%
H5: Exchange rate → ROA	Significant	Mixed and estimator-sensitive

DISCUSSION

Interpretation In Relation to Prior Studies

The most consistent finding is the positive relationship between GDP growth and automotive-firm profitability. This result is economically plausible because stronger economic activity can increase household purchasing power, consumer confidence, vehicle registrations, parts demand, and utilisation of fixed assets. It also accords with the broader literature's emphasis on macroeconomic conditions as one layer of profitability determination, while remaining compatible with evidence that firm-specific factors influence the size and persistence of the response (Tuncay & Cengiz, 2017; Nanda & Panda, 2018; Cheong & Hoang, 2021). The result should be described as a conditional association: it is the coefficient on GDP after accounting for the other included national variables and firm effects, not an estimate of the effect of an isolated GDP shock.

The exchange-rate result provides a more nuanced contribution. The negative FGLS coefficient is consistent with an imported-input channel. When the ringgit depreciates, the domestic-currency cost of components, machinery, technology, and other dollar-denominated purchases may rise. The mechanism is compatible with firm-level evidence that exchange-rate pass-through is transmitted through imported inputs (Ahn & Park, 2015) and with the observation that depreciation can have competing cost and competitiveness effects (Choi & Pyun, 2020). Yet the positive and insignificant dynamic coefficient demonstrates that the result is not stable across estimators. This could reflect differences in weighting, dynamic adjustment, small-sample sensitivity, omitted firm-level exposure, or the fact that diversified firms may combine import-intensive activities with exports and hedging.

The insignificant FDI coefficient is also informative. Aggregate FDI is a coarse proxy for the investment, technology, and supplier-network mechanisms described by the OLI Paradigm. Malaysian research shows that FDI is intertwined with financial development, growth, inflation, exchange rates, and other location conditions (Alzaidy et al., 2017; Ramlan et al., 2021; Zaharum et al., 2024). It does not follow that higher national inflows immediately raise ROA for six listed firms. FDI may enter other sectors, accrue to unlisted suppliers, generate benefits with a lag, or intensify competition. A stronger test would use automotive-sector FDI, foreign ownership at the firm level, foreign-affiliate status, or measures of technology and supplier linkages.

The positive but insignificant interest-rate coefficient does not support the hypothesised negative relationship. Several explanations are possible without selecting one prematurely. The reported measure may not be the intended policy rate, as indicated by its negative minimum. Higher rates may coincide with periods of stronger activity, or firms may have limited short-term refinancing exposure. Consumer-finance effects may also be offset by pricing, product mix, or non-vehicle revenue. Malaysian debt-market evidence supports the need to distinguish rate maturities and transmission horizons (Hadi et al., 2019), while prior profitability studies show that financial structure changes the way monetary conditions reach firms (Panda et al., 2022; Al-Slehat, 2022).

Inflation is negative but insignificant. The sign is consistent with higher input costs and weaker real purchasing power, but statistical uncertainty is substantial. Automotive firms may pass some costs through to prices, renegotiate supply contracts, draw on inventories, or benefit from nominal revenue growth. The result is therefore consistent with a weak or heterogeneous inflation channel rather than evidence that inflation is irrelevant. Prior studies likewise report that the profitability consequences of inflation depend on sectoral structure, financial conditions, and the ability to adjust prices (Batayneh et al., 2021; Purwohandoko & Iriani, 2021).

Theoretical Implications

The findings provide partial support for the OLI–institutional framing. The strongest evidence concerns location conditions, especially broad economic activity, rather than aggregate FDI itself. This distinction is important. The location advantage of Malaysia may shape demand, infrastructure, supplier availability, and operating conditions, but the measured national FDI variable is not a direct measure of the ownership or internalisation choices of the sampled firms. The result therefore cautions against using aggregate capital inflows as a substitute for firm-level internationalisation mechanisms.

The findings also support a layered view of profitability. Industry-level demand conditions appear relevant, while firm-specific capabilities and exposure determine how the shock is transmitted. This interpretation is consistent with evidence that management capabilities and competition influence the sustainability of abnormal profitability (Acquaah 2003) and that competitiveness, labour productivity, financial structure, and market share matter in mature manufacturing industries (Pieri & Verruso, 2019). The theoretical implication is not that macroeconomic variables displace resource-based explanations, but that they condition the returns to firm resources.

Managerial and Policy Implications

For managers, GDP and exchange-rate scenarios should be integrated into budgeting, demand forecasting, inventory planning, and working-capital decisions. Firms with substantial imported-input exposure can consider currency hedging, supplier diversification, local sourcing, contractual pass-through clauses, and flexible pricing. These measures should be tailored to the firm's actual currency position rather than adopted as generic responses. Working-capital and financing policy also matter because macroeconomic conditions can alter the cost and availability of liquidity; evidence from ASEAN and other emerging markets highlights the joint role of financial development, working capital, and profitability (Setianto & Pratiwi, 2022; Yilmaz & Acar, 2022).

For investors, GDP growth offers a useful top-down indicator of sector demand, but it should be combined with firm-level information on leverage, import intensity, brand mix, dealer networks, inventory turnover, and hedging. The estimator-sensitive exchange-rate finding suggests that investors should avoid treating a single currency coefficient as a universal valuation rule. For policymakers, the results imply that broad-based growth supports automotive profitability, while exchange-rate instability can transmit to firms through imported production costs. Policies that deepen local supplier capabilities and improve access to risk-management instruments may reduce vulnerability without eliminating the benefits of international integration.

Limitations and Robustness Priorities

The first limitation is the small sample: six firms over ten years. The second is the common national variation of the macroeconomic regressors. With year-level predictors, the FE model does not exploit independent firm-level macroeconomic variation; it estimates how firm outcomes co-move with a small number of annual observations after accounting for firm effects. The third limitation is potential omitted-variable bias. Firm size, leverage, liquidity, sales growth, market share, product mix, ownership, and working-capital management are not included as controls, despite their relevance in prior studies (Batra & Kalia, 2016; Nanda & Panda, 2018; Pieri & Verruso, 2019).

The fourth limitation concerns measurement. The interest-rate variable contains a negative minimum that should be reconciled with the source series. FDI is measured at the aggregate national level and may not represent automotive investment. The exchange rate is a bilateral nominal measure and may not capture the trade-weighted or real exposure of each firm. The fifth limitation is dynamic-panel inference. The reported 48 instruments for six groups create a substantial proliferation concern, and the source output does not provide the complete AR(1), AR(2), Hansen/Sargan, and Difference-in-Hansen diagnostics required for a persuasive GMM interpretation (Roodman, 2009).

A revised empirical design should first verify all data definitions and construct firm-level controls. It should then compare pooled OLS, FE, RE, and parsimonious dynamic alternatives; report robust covariance estimators; test cross-sectional dependence and common shocks; and use time effects where appropriate. If GMM is retained, the number of instruments should be reduced through collapsed instruments and restricted lag windows, and all specification diagnostics should be reported. Extending the time period, adding quarterly observations, measuring automotive-sector FDI, and constructing firm-specific import or foreign-currency exposure would materially improve identification.

CONCLUSION

This study examined the association between macroeconomic conditions and profitability among six publicly listed Malaysian automotive companies over 2014–2023. Across the reported FE, dynamic-panel, and FGLS results, GDP growth is the most consistent positive correlate of ROA. The FGLS estimates associate ringgit depreciation with lower ROA, consistent with imported-input cost pressure, but the exchange-rate coefficient is not stable across estimators. FDI, interest rates, and inflation do not exhibit robust statistically significant relationships with profitability in the current sample.

The findings support a cautious interpretation of macroeconomic exposure. Domestic economic activity appears to matter for a cyclical, capital-intensive industry, while currency effects depend on the balance between imported costs, exports, hedging, and firm-specific operating structures. Aggregate FDI is not a sufficiently precise measure of the mechanisms through which international investment could affect the sampled firms. The study's small number of firms, common national predictors, questionable interest-rate measurement, and instrument-intensive dynamic specification limit causal inference and generalisability.

Future research should expand the panel and observation frequency, add firm-specific controls, distinguish manufacturers from distributors and diversified groups, measure direct foreign-currency exposure, and separate automotive-sector FDI from economy-wide inflows. These extensions would allow researchers to test whether macroeconomic shocks operate through demand, financing, imported inputs, or supply-chain linkages, and whether firm capabilities moderate those channels. Until such evidence is available, the present results are best used for sector-aware planning and hypothesis development rather than precise causal forecasting.

DECLARATIONS

Funding: No funding information was supplied with the source manuscript; this statement should be confirmed or amended by the authors.

Conflict of interest: The authors declare no conflict of interest.

Data availability: The study uses secondary data from company annual reports and publicly available macroeconomic sources. The authors should provide a repository or a reproducible data appendix where permitted.

Ethics statement: The study uses publicly available secondary data and does not involve human participants.

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