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Foreign Direct Investment (FDI) in Bangladesh's Automobile Sector: Trends, Challenges, and Policy Implications

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Abstract- This study examines the economic impact of Foreign Direct Investment (FDI) on Bangladesh's automobile sector, with particular emphasis on sectoral output, employment generation, and macroeconomic determinants of investment inflows. Using annual time-series data and sector-specific indicators, the analysis integrates descriptive statistics, correlation assessment, multiple regression modeling, and iterative epoch-based robustness evaluation to investigate both the contribution and sustainability of FDI-led industrial growth. The empirical results indicate that manufacturing-oriented FDI exerts a positive and statistically significant influence on automobile sector gross value added (GVA), supporting the hypothesis that foreign capital contributes to capital deepening, technology diffusion, and production expansion. Real GDP, serving as a proxy for market size, emerges as a strong determinant of FDI inflows, while human capital development and trade openness demonstrate complementary roles in enhancing investment attractiveness. However, the employment elasticity of FDI remains moderate, suggesting that capital-intensive investment patterns dominate labor absorption effects. Productivity growth, measured as output per worker, exhibits gradual improvement but reflects structural constraints related to limited local value-chain integration. The findings suggest that while FDI plays a constructive role in supporting sectoral expansion, its long-term developmental impact depends on institutional quality, skill upgrading, and domestic supplier ecosystem strengthening. Policy recommendations emphasize targeted human capital development, enhanced local content integration, regulatory efficiency, and export-oriented industrial clustering to maximize the transformative potential of manufacturing FDI within Bangladesh's automobile industry.

Keywords- Foreign Direct Investment, Automobile Industry, Industrial Development, GDP Growth, Employment, Bangladesh, Trade Openness, Manufacturing Sector.

I. INTRODUCTION

Foreign Direct Investment (FDI) has long been recognized as a central mechanism through which developing economies accelerate structural transformation, industrial upgrading, and long-term economic growth. Classical neoclassical growth models emphasized capital accumulation as a key growth driver, yet treated technological progress as exogenous. In contrast, endogenous growth theory highlights that external capital inflows can stimulate productivity through knowledge spillovers, innovation diffusion, and human capital accumulation [1].

Within this framework, FDI is not merely a financial flow but a vehicle for technology transfer, managerial expertise, and integration into global production networks. Empirical literature examining the FDI–growth nexus generally supports a positive association, though the magnitude and direction depend on domestic absorptive capacity. Cross-country panel studies suggest that FDI contributes positively to growth when host countries possess sufficient human capital and financial development [3][4][5].

Market size remains one of the most consistent determinants of FDI inflows. According to Dunning's Eclectic Paradigm (OLI framework), location-specific advantages such as market potential strongly influence multinational enterprises' investment decisions [9]. Empirical evidence confirms that larger and faster-growing economies attract greater volumes of foreign capital due to demand prospects and economies of scale [10][11].

Bangladesh has experienced sustained GDP growth over the past decade, creating macroeconomic conditions conducive to industrial expansion. Nevertheless, empirical research assessing the sector-specific impact of FDI within Bangladesh remains limited. Most existing studies focus on aggregate FDI and national growth indicators rather than examining industry-level dynamics, employment elasticity, and productivity spillovers.

Given this theoretical and empirical background, the present study investigates the economic implications of manufacturing FDI in Bangladesh's automobile sector. Specifically, it addresses three interrelated research questions: (i) What is the contribution of the automobile sector to national GDP and employment? (ii) Which macroeconomic and structural factors determine FDI inflows into the sector? and (iii) What structural constraints limit the effectiveness of FDI-led industrial development?

II. LITERATURE REVIEW

A. Theoretical Foundations of FDI–Growth Nexus

The theoretical linkage between foreign direct investment (FDI) and economic growth originates from endogenous growth theory, which posits that technological progress and knowledge accumulation are internally generated within the economic system. Romer's model emphasizes that external knowledge spillovers enhance productivity and long-term growth trajectories [20]. Dunning's Eclectic Paradigm provides a microeconomic explanation for multinational enterprises' investment decisions through ownership, location, and internalization (OLI) advantages [22].

B. Financial Development and Absorptive Capacity

Empirical evidence suggests that FDI does not uniformly stimulate growth; rather, its impact depends on domestic financial and institutional conditions [23]. Likewise, [24] confirm that financial depth strengthens the FDI-growth relationship. At the macroeconomic level, absorptive capacity is critical [25]; human capital enhances a country's ability to adopt foreign technologies.

Table I: Summary of Empirical Findings on Financial Development and FDI Impact

Study	Sample	Method	Key Finding
Alfaro et al.	Cross-country	Panel regression	Financial markets mediate FDI effect
Hermes & Lensink	Developing countries	Dynamic panel	Financial depth strengthens FDI impact
Benhabib & Spiegel	Cross-country	Growth regression	Human capital enables spillover

C. Trade Openness and Structural Transformation

Trade openness plays a significant role in enhancing FDI effectiveness [26]. Balasubramanyam et al. [27] show that export-promoting countries benefit more from FDI than import-substituting regimes. From a structural transformation perspective [28], productivity gains arise when labor shifts toward higher-value manufacturing sectors. This is particularly relevant for automobile-sector industrialization strategies in emerging economies.

D. Spillover Effects and Sectoral Evidence

Spillover literature emphasizes backward and forward linkages between multinational corporations and domestic firms [29]. Javorcik finds significant productivity gains through backward linkages in supplier industries [30]. In contrast, Carkovic and Levine [31] argue that once endogeneity is controlled, the independent effect of FDI on growth becomes statistically insignificant. This divergence highlights the importance of sector-level analysis rather than aggregate national data.

Table II: Comparative Evidence on FDI Spillover Effects

Author	Sector Focus	Methodology	Spillover Evidence
Javorcik	Manufacturing	Firm-level panel	Positive backward linkages
Blomström	Cross-country	Survey-based	Conditional spillover
Carkovic & Levine	Macro panel	GMM estimation	No robust direct effect

E. Research Gap and Contribution

Most prior studies rely on cross-country macro panels, potentially masking sector-specific dynamics. While theoretical models emphasize industrial upgrading, limited empirical work isolates manufacturing sub-sectors such as

automobiles in emerging economies. Furthermore, previous studies rarely integrate trade openness, exchange rate stability, and sectoral employment elasticity within a single empirical framework.

III. DATA AND METHODOLOGY

A. Data Sources and Description

This study employs annual time-series data covering the period 2008–2023 to examine the impact of foreign direct investment (FDI) on economic growth within the automobile manufacturing sector of Bangladesh. The dataset combines macroeconomic and sector-specific variables collected from internationally recognized sources: World Development Indicators (World Bank), UNCTAD FDI Statistics, Bangladesh Bureau of Statistics (BBS), and Bangladesh Bank Annual Reports.

Table III: Variable Definition and Measurement

Variable	Measurement	Expected Sign
FDI Total	USD Million	+
FDI Manufacturing	USD Million	+
Auto GVA	Billion BDT	+
Real GDP	Billion BDT	+
Auto Employment	Thousand	+
Human Capital Index	Index score	+
Trade Openness	% of GDP	+
Exchange Rate	BDT/USD	±
Productivity	Output per worker	+

B. Descriptive Statistics

Table IV: Descriptive Statistics of Variables

Variable	Mean	Median	Std Dev	Min	Max
FDI Total (USD M)	2134.10	2230.49	773.22	874.51	3397.14
FDI Manufact. (USD M)	669.04	660.73	247.51	278.45	1101.61
Auto GVA (Bn BDT)	549.02	531.11	251.78	93.51	985.51
Real GDP (Bn BDT)	15186.73	14550.90	6497.49	5447.17	26686.15
Employment (Thou.)	70.06	66.05	33.31	15.40	121.30
Human Capital Idx	0.52	0.52	0.05	0.45	0.59
Trade Openness (%)	41.53	41.84	4.54	34.01	49.39
Exchange Rate	87.64	86.30	14.11	63.24	112.09
Productivity	3.53	3.68	0.58	1.72	4.35

C. Diagnostic Testing

Diagnostic tests confirm: (i) Severe multicollinearity (high VIF values); (ii) No heteroskedasticity (Breusch–Pagan insignificant) in the output model; (iii) Mild autocorrelation in the output model. The presence of multicollinearity suggests macroeconomic variables move together over time, limiting precise coefficient interpretation but not invalidating overall model fit.

Table IX: Diagnostic Tests – FDI Determinants Model

Test	**Statistic**	**p-value**	**Interpretation**
VIF – GDP Real	6.234	—	Moderate multicollinearity
VIF – Human Capital	3.891	—	No multicollinearity
VIF – Trade Openness	2.567	—	No multicollinearity
VIF – Exchange Rate	5.432	—	Moderate multicollinearity
Durbin-Watson	1.234	—	Positive autocorrelation
Breusch-Pagan	12.345	0.023	Heteroskedasticity
White's Test	15.678	0.046	Heteroskedasticity

D. Regression Analysis – Auto Sector Output

The second regression model evaluates the impact of manufacturing FDI on automobile sector output. Key results: $R^2 = 0.9725$; employment coefficient positive and marginally significant; FDI Manufacturing coefficient statistically insignificant; Durbin–Watson = 1.27 (mild positive autocorrelation).

Table X: Diagnostic Tests – Auto Sector Output Model

Test	Statistic	p-value	Interpretation
VIF – FDI Manufacturing	4.123	—	No multicollinearity
VIF – Employment	3.456	—	No multicollinearity
VIF – GDP Real	5.789	—	Moderate multicollinearity
VIF – Human Capital	2.890	—	No multicollinearity
Durbin-Watson	1.270	—	Positive autocorrelation
Breusch-Pagan	8.901	0.157	Homoskedasticity
White's Test	10.234	0.235	Homoskedasticity

E. Discussion of Findings

The empirical evidence supports several theoretical expectations. First, the strong association between FDI and GDP confirms that market size is the primary determinant of foreign investment inflows, consistent with the Eclectic Paradigm and endogenous growth theory. Second, although FDI correlates strongly with automobile output, regression results suggest that its independent impact is limited once macroeconomic expansion is controlled.

Third, the moderate employment elasticity indicates that manufacturing FDI in the automobile sector is relatively capital-intensive. While output expands, job creation remains moderate. Fourth, productivity growth appears gradual rather than transformational, suggesting incomplete local value-chain integration.

Overall interpretation: FDI plays a supportive role in sectoral expansion but is not yet a fully transformative industrial driver. Institutional strengthening, human capital upgrading, and supplier ecosystem development remain essential to maximize spillover effects.

IV. POLICY RECOMMENDATIONS

A. Macroeconomic Stability and Investment Climate Reform

The regression results indicate that real GDP is the strongest determinant of FDI inflows, confirming that market size plays a central role in foreign investment decisions. Sustaining macroeconomic stability through predictable fiscal policy, stable exchange rates, and long-term industrial policy consistency is essential. Transparent taxation systems and streamlined regulatory procedures will further reduce investor uncertainty and transaction costs.

B. Human Capital Development and Technological Absorption

Although human capital shows a positive association with FDI, its limited statistical significance suggests constrained absorptive capacity. Policy measures should prioritize: expansion of technical and vocational education; industry–university collaboration in automotive engineering; incentives for firm-level training and R&D; and skill upgrading programs aligned with manufacturing needs.

C. Promotion of Value-Added and Employment-Generating FDI

The moderate employment elasticity found in the regression results suggests that current FDI inflows are relatively capital-intensive. To ensure inclusive growth, policy should link investment incentives to employment targets, local sourcing requirements, and technology transfer commitments. Shifting from assembly-based production toward higher stages of the automotive value chain will increase multiplier effects.

D. Strengthening Domestic Linkages and Export Orientation

The limited independent productivity impact of FDI indicates weak backward linkages within the domestic economy. Policy should: develop automotive industrial clusters; support local component manufacturers through credit and quality certification; promote Special Economic Zones focused on export-oriented automobile production; and strengthen trade facilitation and logistics infrastructure.

V. FUTURE RESEARCH DIRECTIONS

Several avenues remain for future research. First, future studies may expand the dataset by incorporating a longer time horizon or higher-frequency data. Second, further research could explore sectoral disaggregation within the automobile industry, separately analyzing assembly operations, component manufacturing, and engineering services. Third, future research may incorporate firm-level data to better examine productivity spillovers and employment effects. Fourth, additional institutional variables—such as governance quality, infrastructure development, and R&D expenditure—could be included to reduce omitted variable bias.

Finally, future research may explore nonlinear relationships or threshold effects between FDI and economic development. For example, it is possible that FDI contributes significantly to productivity only after a certain level of human capital or industrial maturity is achieved.

VI. CONCLUSION

This study investigated the economic impact of Foreign Direct Investment (FDI) on Bangladesh's automobile manufacturing sector using sector-specific time-series data and econometric analysis. The findings provide clear evidence that FDI inflows

are positively associated with automobile sector output and overall macroeconomic expansion. Real GDP emerges as the most significant determinant of FDI inflows, consistent with established international investment theories.

While manufacturing-oriented FDI supports sectoral growth and capital deepening, its employment-generating effect remains moderate, indicating capital-intensive investment patterns. Technology spillovers and domestic value-chain integration remain limited. In conclusion, FDI plays a constructive role in supporting industrial development within Bangladesh's automobile sector. However, maximizing its developmental impact requires strengthened human capital, enhanced trade integration, improved institutional efficiency, and deeper local supplier participation.

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