

MACROECONOMIC EFFECTS ON ECONOMIC GROWTH: NOVEL DYNAMIC ARDL SIMULATION MODEL BASED TIME-SERIES EVIDENCE FROM PAKISTAN

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ABSTRACT

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A study on economic growth is vital for driving innovation, increasing productivity, and informing evidence-based policies to foster sustainable development. This study examines the internal and external determinants of Pakistan's economic growth on the data from 1980 to 2025 and analyses the empirical findings by using a Novel Dynamic Autoregressive Distributed Lag Simulation Model (NARDL). Results settle long-run cointegration among Gross Domestic Product (GDP), Foreign Direct Investment (FDI), exports, imports, inflation, and oil consumption. FDI and exports show persistent positive effects on GDP across both time horizons. Whereas, the effects of inflation and imports vary by timeframe. Oil consumption reveals a critical dual impact that is stimulating growth in the long run nevertheless exerting negative pressure in short run. These findings offer vigorous empirical evidence for policymakers to understand the significance of FDI, trade dynamics, and energy consumption for a sustained macroeconomic stability of Pakistan.

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INTRODUCTION

Background of the Study

The economic trajectory of especially the developing nation is reflected by its ability to manage the stable economic growth together with the price stability, consistent trade volume, and FDI. In case of Pakistan which is characterized by its strategic geographical location and a burgeoning population, the expedition for a sustained economic growth is spelled out to be a central policy objective.

The economic history of Pakistan witnesses the mosaic periods with rapid expansion in the macroeconomic indicators followed by a sharp contraction due to internal hinges at socio-economic front coupled with vulnerable foreign capital inflows. Among the possible variables which are responsible for upsetting the economic growth, inflation, trade, oil consumption, and FDI are viewed not only by the academicians but are also of core interest of the policy makers.

Table 1 demonstrates the precise macroeconomic indicators of Pakistan recorded with in past 5 years. The findings clarify that a negative GDP growth was primarily caused due to the devastating flood and political and economic instability. The inflation was peaked during 2023 and 2024 due to the massive devaluation and the removal of the energy subsidies. The FDI trends are measured on the bases of mid-year projection which are carrying the legacy of being the lowest in the flows towards Pakistan. The columns of exports and imports are also not encouraging since maintaining a persistent deficit of over 20 billion US\$.

Table 1: Macroeconomic Outlook of Pakistan

Fiscal Year	GDP Growth	Inflation (CPI)	Exports	Imports	FDI Inflow
2021	6.50%	8.90%	31.5	54.3	2.15
2022	4.80%	12.20%	39.5	72	1.46
2023	-0.20%	29.20%	35.4	55.3	2.05
2024	2.40%	23.40%	30.6	54.7	2.57
2025	3.00%	11.50%	32.1	58.2	\$1.20

Note: GDP growth and Inflation are recorded in percentage. Whereas, Exports, Imports, and FDI are recorded in Billion US\$.

Sources: State Bank of Pakistan, Ministry of Finance, World Bank (2026)

Economy of Pakistan experiences frequent fluctuations, especially in the previous decades. Such variations are demonstrated in the face of political instabilities, the disastrous environmental disasters, and the issues related to internal security. During 1960 to 1990, economy of Pakistan grew at the average of 6 percent per annum (Mazher et al., 2025; Husain, 2018). It is asserted by Sohail et al. (2023) that educational advancements, infrastructural development, and FDI inflows significantly impact economic growth rate of Pakistan. FDI and infrastructure have reciprocating effects on economic growth. Most likely, rise in FDI inflows engages acceleration in economic growth.

Pakistan is located in the region of South Asia. Pakistan is favored by trade with preferential trade agreement. In this regard, South Asian Preferential Trade Agreement are onboard. Sahoo and Bhunia (2014) acclaimed that 5 percent of world trade is among the SAARC member countries. Li (2018) stated that foreign capital inflows assist in the transfer of right to the use the monetary capital by the recipient country. These inflows are engaged via FDI and trade and are essential for the financial stability of their beneficiaries.

The funds in the name of FDI and trade are great source for the investors to introduce new financial product and economies of scale. For instance, FDI is a popular tool to favor economic growth for the strengthening the positive aspect of increasing overall productivity, job creation, greater exports, and the exchange of technological progress within the benefiting countries. The dynamics of the international trade and the investment supplies transmit a positive signal to the investors and the GDP growth. In order to keep maintaining the good pace of such valuable inflows, there is a need to have a stable monetary policy and reliable macroeconomic stature to experience consistency in the savings and investment.

Problem Statement

Despite the numerous structural adjustments towards bettering off the economic growth, Pakistan struggles to maintain stability at internal and external front to

keep evading the issues of volatility and unexpected slitters in economic growth. Recently, the International Monetary Fund (IMF) has lowered the economic growth forecast to 3.5 percent having a projection of the inflation of 8.4 percent by the next fiscal year. (Shahbaz, 2026). It is being sighted that Pakistan's economic growth would get slow down to 3.5 percent by the coming year 2026-2027 which is 4.1 percent down from the earlier forecast. The major cause if the raised inflationary forecast of 8.4 percent with the abrupt trade balances along with the unclear inflows of FDI (IMF, 2026). Likewise, IMF has more than doubled the current account deficit to reach at \$5 billion by the coming fiscal year. Moreover, the current turmoil of Middle East is expected to lead to further make Pakistan sway away from the state of stable economic growth.

Significance of the Study

This study is helpful for the stakeholder. It provides empirical evidence on the variables which are most effective in causing economic growth variations and how such issue is addressable by appropriate fiscal policy. Moreover, the investors, foreign and domestic, by analyzing the relationship of FDI and GDP are offered the insights into the investment climate with a thorough view of the variables that cause FDI inflows to remain consistent in their flow. The Section I is written on the Introduction. Whereas, Section II clearly demonstrates the precise literature on the core variable of interest. Section III is cited for the Methodology and Section IV and Section V are inscribed for the Results and Discussion and Conclusion and Policy Recommendations.

LITERATURE REVIEW

The relationship of GDP, FDI, trade, and inflation has remained into the consideration among the researchers of the developing economies. This study synthesized the empirical studies by examining how the connection of these macroeconomic variables is manifested across different countries. The key findings that emerge from the literature authenticate that FDI led economic growth is frequently observed based on the internal and external macroeconomic characteristics.

Recent studies have revealed a weak universal effect of FDI on economic growth. Instead, the outcomes are sharply divergent across the national contextures thus there is a challenging conventional wisdom to affirm that FDI is to uniformly benefit the host economies. Several country specific studies are viewed documenting a positive relationship of FDI and

economic growth, especially where the enabling conditions exist. Bağcı and Gökırmak (2020) went with ARDL analysis of Turkey and found FDI exerting a significant positive effect on the economic development. The success goes conditional to geographical location, political stability, and easy trade barriers in Turkey during the period of analyses. On the similar note, Majumder and Rahman (2020) exercised vector error correction model and diagnosed a long run relationship of FDI and GDP. Not only this, trade is also viewed in positively affecting the growth rates.

The multi-country level analyses are done by Misbah et al. (2020) on the BRICS and NEXT-11 emerging economies. The panel data analyses answered both FDI and trade openness as beneficial for economic growth. The suggestion is to be more industrialized so as to capture the greater impact of these precious inflows.

The counterexamples are also equally instructive. Jadili (2023) exercised regression analyses on Algeria and found trade openness to be significantly affecting the economic growth in both time horizons. However, FDI is found to exhibit a negative and statistically insignificant relationship with economic growth. The null findings are perhaps not anomalous. Rather suggest that financial development, export oriented FDI strategies, and institutional absorptive capacity can assist in molding the outcomes towards a favorable picture.

Trade openness is a consistent driver of economic growth (Bağcı & Gökırmak, 2020; Jadili, 2023). The Turkish study confirmed trade openness being a key factor towards the economic development. Nonetheless, the Algerian study also reached a positive and significant conclusion of trade with GDP in both time horizons.

The examined literature underlines the multi-layered rapport between FDI, trade openness, inflation, and GDP across various contexts. Empirical studies from West Africa designate that trade openness, investment, and inflation positively affect economic growth, while impact of FDI is found negative or less significant in rare cases thereby suggesting that domestic factors and policy environments modulate effectiveness of FDI (Wiredu et al., 2020).

Similarly, studies across diverse regions revealed that FDI supports economic growth when complemented by a stable macroeconomic condition like; low inflation and strong institutional frameworks in the developed countries (Nair & Udupa, 2025). On the other hand, among the Asian economies, inflation is found exerting a negative effect on economic growth, and policy uncertainty is evident in diminishing the benefits of

trade and FDI thereby emphasizing the significance of stable economic policies (Nursam et al., 2025).

In the South Asian region, determinants like exchange rates and economic growth suggestively influence FDI inflows, that in turn affect macroeconomic variables like those of inflation and exchange rates (Pradhan, 2011). In case of Nigeria, inflows of FDI are associated with increased inflation and negative effects on the exchange rate, with restricted positive impact on GDP. Such findings highlight the importance of policy context and institutional quality (Umeora, 2013). Overall, whilst FDI and trade openness promote growth, their efficacy is reliant upon institutional strength, macroeconomic stability, and policy environments, having inflation serving as critical moderating factor. Economic growth is a central driver of development, contributing to globally improved livelihoods – employment opportunities, and economic security (United Nations Department of Economic and Social Affairs (UNDESA), 2017; UNDESA, 2016). Sustained and inclusive growth helps lowering inequalities, especially in the developing countries, by narrowing wage gaps and leading towards better employment prospects (UNDESA, 2016). However, achieving sustainable growth remains challenging; few least developed countries steadily reach targeted growth rates, and environmental sustainability is indeed one of the main concerns when growth is reliant on resource depletion (UNDESA, 2017).

On a global level, economic growth experiences fluctuations with moderate growth rates around 3 percent in 2006 driven mainly by the USA, China, and India though growth in developed economies has slowed (UNDESA, 2006). Regional disparities are evident since Caribbean and the Latin America continue facing slower growth and deceleration in GDP and job creation (Economic Commission for Latin America and the Caribbean, 2024).

Additionally, the infrastructure development specifically in the electricity supply is also crucial for supporting economic upsurges. Countries like China and India are forecasted for a significant increase in electricity demand to sustain the economic growth trajectories even though supply constraints and deficits posture challenges to summit this demand (United Nations Economic Commission for Europe, 2016). Overall, while economic growth remains vital for development, its sustainability and equitable distribution require careful management and investment in infrastructure (Economic Commission for Latin America and The Caribbean, 2024).

The empirical studies on Pakistan collectively specify that economic growth is influenced by several macroeconomic factors, including FDI, trade, exchange rates, and inflation. Trade openness and exports are consistently viewed to having a positive impact on GDP, with one study of Safdar (2021) with a prominent conclusion that trade liberalization and tariffs reduction along with the low duties enhance economic growth.

Role of FDI appears nuanced; while some studies advocate that FDI has a positive short-run effect on economic growth. The long-term impact is less significant or even negative with one analysis noting that FDI inversely affects GDP (Afzal & Ahmad, 2020). Conversely, other research like of Ahmed and Muzammil (2024) emphasized that FDI, alongside exports, contribute to economic development especially when complemented by structural reforms. Inflation emerges as an unfavorable macroeconomic factor exerting a significant adversative effect on economic growth and thereby underscoring the importance of macroeconomic stability (Ahmed & Muzammil, 2024). The International Monetary Fund report of 2017 noticed that external risks like; rising oil prices and global economic conditions threaten Pakistan's export capacity and external obligations those are crucial for a sustained growth (International Monetary Fund, 2017). Overall, while trade and exports are beneficial, the impact of FDI is quite complex and perhaps context-dependent, and macroeconomic stability, particularly controlling inflation, is crucial for fostering a sustainable growth in Pakistan.

Empirics concluded FDI, government spending, trade, and export growth connected. Hidayat et al. (2024) found trade openness to boost economic growth, similar to Nketiah et al. (2020); Sharma and Singh (2025); Naseer (2013). The findings confirmed that FDI and government spendings significantly favor exports, imports, and economic growth during 1980 to 2021, akin to Ahmad et al. (2013). Findings are fetched via multiple linear regression analysis. There has been a connection of such macroeconomic variables and are found impacting one another (Liu & Sinclair, 2002). Obiechina Ukejae (2013) explored that economic growth is significantly impacted by the exports, trade openness, and exchange rate however, weak evidences are found as far as FDI is concerned against the economic growth. Findings went out to be similar to Omankhanlen (2011).

METHODOLOGY

This study is empirically analyzed for tracing the effects of macroeconomic variables on the economic

growth of Pakistan. The analytics are based on Auto Regressive Distributed Lag (ARDL). The novelty of the analysis rests upon a DARDL. The time series data from 1980 to 2025 is gathered from multiple source such as Ministry of Finance, Handbook of Statistics, State Bank of Pakistan, and World Bank Development Indicators (WDI).

According to Jordan and Philips (2018), DARDL is used to examine the real changes that take place in the dependent variable in response to the variabilities in the regressors.

For the stationarity, unit root test, proposed by Augmented Dickey and Fuller ((ADF)1979), is incorporated. The order of integration is viewed for I(0) and I(1). Having mixed orders of integration, ARDL and DARDL are justified

The simple econometric form of model is given in Eq [1].

$$GDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 EXP_t + \beta_3 IMP_t + \beta_4 INF_t + \beta_5 OLC_t + \varepsilon_t \quad [1]$$

GDP is measured in percentage annual. FDI, EXP, IMP are measured in Million and in a local currency unit. The INF is computed with consumer price index and OLC is the energy use (kg of oil equivalent per capita). The error term is symbolled by ε_t . The regressor's coefficients are symbolized by β_i . whereas, i ranges from 1 to 5.

The long run cointegration is judged by utilizing the ARDL cointegration technique based upon the Bound Test of cointegration, exercised on the model specified below:

$$\begin{aligned} \Delta GDP_t = & \sigma_0 + \sigma_1 GDP_{t-1} + \sigma_2 FDI_{t-1} + \\ & \sigma_3 EXP_{t-1} + \sigma_4 IMP_{t-1} + \sigma_5 INF_{t-1} + \sigma_6 OLC_{t-1} + \\ & \sum_{i=1}^p \beta_1 GDP_{t-i} + \sum_{i=1}^p \beta_2 FDI_{t-i} + \\ & \sum_{i=1}^p \beta_3 EXP_{t-i} + \sum_{i=1}^p \beta_4 IMP_{t-i} + \\ & \sum_{i=1}^p \beta_5 INF_{t-i} + \sum_{i=1}^p \beta_6 OLC_{t-i} + \varepsilon_t \quad [2] \end{aligned}$$

The Δ represents the first difference, t-1 denotes optimal lag selections which are decided on the bases of Akaike Information Criteria. The σ and β are used to analyze the long run relationship of the variables. The H_0 and H_1 of bound test are given below:

$H_0 = \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = 0$ and $H_1 = \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq 0$. The bound test is diagnosed by the mean of Wald Test F statistics. If the computed F-statistic is greater than table value at I(1), long run relationship is affirmed and elsewhere (Pesaran et al., 2021).

For computing values of long run coefficients, following ARDL model is proposed:

$$\begin{aligned} \Delta GDP_t = & \beta_0 + \sum_{i=1}^p \beta_1 GDP_{t-i} + \sum_{i=1}^p \beta_2 FDI_{t-i} + \\ & \sum_{i=1}^p \beta_3 EXP_{t-i} + \sum_{i=1}^p \beta_4 IMP_{t-i} + \\ & \sum_{i=1}^p \beta_5 INF_{t-i} + \sum_{i=1}^p \beta_6 OLC_{t-i} + \varepsilon_t \quad [3] \end{aligned}$$

The β_i represent the long run variances.

Finally, the short run coefficients and the Error Correction Term is given in Eq. [4]

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^p \phi_1 GDP_{t-i} + \sum_{i=1}^p \phi_2 FDI_{t-i} + \sum_{i=1}^p \phi_3 EXP_{t-i} + \sum_{i=1}^p \beta_4 IMP_{t-i} + \sum_{i=1}^p \phi_5 INF_{t-i} + \sum_{i=1}^p \phi_6 OLC_{t-i} + \phi ECT_{t-1} + \epsilon_t [4]$$

Whereas, ϕ_i depicts the short run variations. The ECT is necessarily be significant and possess a negative sign to recommend that every shock is altered towards equilibrium in the following time period.

The dynamic relationship of the variables is diagnosed by the mean of DARDL. This approach is developed by Jordan and Philips (2018); Danish and Wang (2019); Sarkodie et al. (2019); Javed et al. (2023) and Amin and Dogan (2021). The approach of DARDL overcomes the issues of just observing the long run and short run relationship. Whereby, the DARDL automatically estimates, stimulates, and do predict the variations in the explained variables at the back of the explanatory variables. However, all the variables are necessarily be integrated of mixed orders of integration say I(0) and I(1), respectively. According to Sarkodie et al. (2019), Javed et al. (2025), DARDL employes 5000 simulations of the parameter vectors by using the multivariate normal distribution. The real changes in regressors and their impacts on the dependent variables are observed through graph. As per Javed et al. (2023) and Khan et al. (2019), the specified model of DARDL is given in Eq. [5].

$$\Delta GDP_t = \partial_0 + \sigma_0 GDP_{t-1} + \sigma_1 \Delta FDI_t + \theta_1 FDI_{t-1} + \sigma_2 \Delta EXP_t + \theta_2 EXP_{t-1} + \sigma_3 \Delta IMP_t + \theta_3 IMP_{t-1} + \sigma_4 \Delta INF_t + \theta_4 INF_{t-1} + \sigma_5 \Delta OLC_t + \theta_5 OLC_{t-1} + \gamma_1 ECT_{t-1} + \epsilon_t [5]$$

The Δ represents the first difference. Having σ_i showing the variability of short run and θ_i are the long run variances, respectively. The γ is a coefficient of ECT and ϵ is the error term.

RESULTS & DISCUSSIONS

At the prelim, Table 2 refers to the information about the descriptive statistics of the variables. significant dispersion is viewed in all the variables. Having all the variables platykurtic except OLC, the GDP and FDI are negatively skewed. The test of Jarque-Bera is passed by GDP and OLC.

Table 2: Descriptive Statistics

	GDP	FDI	EXP	IMP	INF	OLC
Mean	4.61	-1220.00	1780000.00	47400.00	9.05	431.39
Median	4.45	-741.00	679000.00	37000.00	8.83	431.39
Maximum	10.21	-29.46	10900000.00	112000.00	30.76	475.36
Minimum	-1.27	-5490.00	29500.00	20100.00	2.52	387.43
Std. Dev.	2.31	1330.00	2400000.00	24900.00	5.22	26.24
Skewness	-0.18	-1.64	2.06	1.15	1.84	0.00
Kurtosis	3.14	5.61	7.35	3.43	8.22	1.79
Jarque-Bera	0.29	32.97	67.42	10.44	76.58	2.70
Probability	0.86	0.00	0.00	0.00	0.00	0.25
Observations	45	45	45	45	45	45

Table 3 illustrates the correlation matrix. It is found that all the variables are moderately correlated with GDP in either direction.

Table 3: Correlation Matrix

	GDP	FDI	EXP	IMP	INF	OLC
GDP	1.00	0.17	-0.14	-0.40	-0.35	-0.44
FDI	0.17	1.00	-0.95	-0.54	-0.11	-0.22
EXP	-0.14	-0.95	1.00	0.51	0.11	0.10
IMP	-0.40	-0.54	0.51	1.00	0.45	0.72
INF	-0.35	-0.11	0.11	0.45	1.00	0.36
OLC	-0.44	-0.22	0.10	0.72	0.36	1.00

The empirical findings start with the observation of the integration of the variables. To fulfill the requirement, ADF test is employed on the variables. the empirical evidences are given in Table 4. It is found that on GDP, INF, IMP, and OLC, the H_0 of unit root on I(0) is not rejected. Therefore, such variables are stationary at I(1). Whereas, EXP and FDI are found to be integrated at I(0).

Table 4: Unit Root Test

Variables	I(0)	I(1)
GDP	-1.25	-9.15*
FDI	-3.44*	-1.74
EXP	-2.54*	-1.48
IMP	0.35	-4.54*
INF	0.54	-3.25*
OLC	1.58	-4.68*

* Denotes significant at 5 percent, respectively.

Table 5 is given to represent the result of ARDL Bound Test and the summary of computed F-statistics. Findings confirm that all the variables are long term cointegrated since the computed F statistics value is significantly higher that the corresponding table value at 5 percent. Therefore, the H_0 of no cointegration is rejected.

Table 5: Bound Test of Cointegration

Test	Value	K
F-statistic	4.45*	5
Critical Bound Values		
Level of significance	I(0)	I(1)
5%	2.58	3.58

Note: Critical Bound values are taken from Narayan (2005). * shows significant at 5 percent.

The DARDL model results are given in Table 6. The DARDL model stimulates, estimates, and automatically plots so that to predict the graphs of negative and positive changes that occur in the regressand, at the back of the regressors, along with the short run and long run relationship. To start with,

the model intercept is found bearing a significant positive value thus shows that the omitted variables are positive in impact in anchoring the regression line of GDP. The coefficient of FDI, in both time horizons, is found significant and positive in affecting the GDP, similar to Khan et al. (2025). Foreign capital inflows in terms of FDI are indeed efficient in favoring the GDP of the recipient country. Moreover, the FDI enables the host country to grasp the technical expertise along with the capital-intensive techniques to favor the industrial growth thereby fostering the speed to have an upward trending GDP. One unit increase in FDI causes GDP to increase by 0.82 units in long run. However, in short run, though the impact is meek that is 0.02 units but positive and significant. Findings go in line with Mehmood et al. (2025a; 2025b). The study outcomes are parallel to Mehmood and Hassan (2015) while Johansen and Juselius technique of cointegration is used. Flip side results are found while conventional ARDL is used (Mehmood et al., 2022).

The coefficient of exports is also captured to causing a significant and direct relationship with GDP, akin to Sunde et al. (2023). In case of short run, GDP is seen increasing by 1.25 units and in long run, it is viewed to have an upsurge by 0.05 units. The trade components such as exports and imports are not to possess the same impacts on GDP. For instance, the imports are found to have significant but jumbled impacts on GDP. In short run, one unit increase in imports is causing GDP to increase by 2.14 units and the results are insignificant. But the same regressor is turned otherwise while viewing through the long run lens. It is therefore important to notice that long run impact of imports is damaging for economic growth (Junejo et al., 2021; Sunde et al., 2023). Therefore, it is good to rely on lesser imports to have economic growth undisrupted. The results of inflation are jumbled too. Inflation carries significant and negative effects on GDP in case of short run like earlier found by Munir et al. (2024) and Faridi et al. (2024). Inflation is a vital variable to effect economic growth (Awuna & Malkina, 2026; Coibion et al., 2024). However, the long run coefficient is positive but insignificant. What is got through this finding is that; it is less alarming to worry about the rising prices since long run impacts are insignificant. The consumption of oil is favorable for GDP, as found latest by Cabauatan et al. (2024). More of the dependency on oil is looked to trigger GDP because the production cycle relies upon the power generation that is based upon the consumption of oil. In case of

short run, the results are significant and negative. As far as long run is concerned, one unit increase in oil consumption is witnessed for boosting up economic growth by 0.11 units.

The coefficient of ECT is significant, correctly signed, and is located to correct the disequilibrium by 0.87 percent in the long run.

Table 6: Dynamic ARDL Simulation Model Results

Variables	Coefficient (Short run & Long run)	Std. Err.	t-value
C	2.62***	0.81	3.23
FDI	0.82**	0.31	2.61
ΔFDI	0.02**	0.01	2.00
EXP	0.05*	0.02	1.96
ΔEXP	1.25*	0.62	2.02
IMP	-0.41*	0.15	-2.73
ΔIMP	2.14	1.12	1.91
INF	1.52	2.25	0.68
ΔINF	-0.16***	0.05	-3.54
OLC	0.11*	0.05	2.21
ΔOLC	-1.85***	0.44	-4.25
ECT (-1)	0.87***	0.16	-5.43

R² 0.69; F-Statistic (P-value) 0.04; Simulation 5000; N 45
 ***, ** show significant at 10, 5, and 1 percent, respectively.

The real variations among the variables are explored by utilizing the DARDL. The variations recorded on the regressand caused by one explanatory variable are noted by keeping the other explanatory variables constant. For the explained variable (GDP), the impulse responses of those regressors are recorded which are found significant in both time horizons such as; FDI, EXP, and OLC, respectively. Figure 1 illustrate the DARDL based real variations at 10 percent of the increase and decrease in the respective regressor.

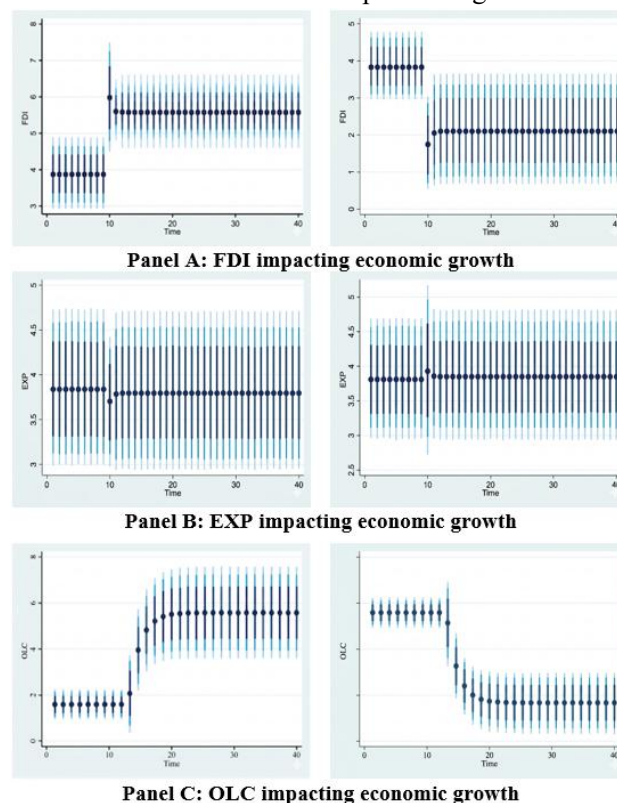


Figure 1

Note: Effects of 10 percent increase and decrease in the regressors on GDP is presented. The predicted values are shown by the dots. The blue lines specify 90 to 95 percent confidence intervals, respectively.

Impulse response of GDP is found positive at the back of 10 percent variations in FDI. These results of instant effect of FDI are coincided with long run and short run result that confirm positive association of FDI and economic growth. In case of EXP, the outcomes are consistent. 10 percent increase in EXP leads to static sway of economic growth expect a sudden dip in tenth period. However, decreases of 10 percent in EXP is found to have significant impact of economic growth but the impulsive responsive are persistent and static except that of a slight jump in tenth period. The outcomes of OLC are quite evident. The positive variations in OLC are transpiring positive impulsive responses of economic growth whereby, lowering down of OLC by 10 percent causes negative responses of economic growth. Thus, positive associations are founded on economic growth in case of both FDI and OLC along with EXP to maintain a persistent and continuous patterns of economic growth.

The diagnostics are performed to validate the results. The summary is given in Table 7. All of the run diagnostics authenticate the regression results to have no issue of serial correlation and heteroscedasticity. The regression model also passes the Jarque-Bera Test of normality and is found correctly specified.

Table 7: Dynamic ARDL Simulation Model Results

Diagnostic	P values	Conclusion
Breusch Godfrey LM Test	0.52	No issue of serial correlation
Breusch Pagan Godfrey ARCH Test	0.76	Homoscedastic
Ramsey RESET Test	0.24	Correctly specified
Jarque-Bera Test	0.18	Residuals are normally distributed

CONCLUSION AND POLICY RECOMMENDATIONS

The study captured the macroeconomic variables at internal and external front to locate their impacts on the economic growth of Pakistan. Based on the time series data ranging from 1980 to 2025, this study went novel since relied upon the NARDL. The findings concluded that GDP and all the opted variables were cointegrated. The long term coefficients are mostly significant and the direction of effects on the economic growth were according to the theoretical and empirical stances. The ECT was also found correctly signed and significant. The outcome concluded that the dispersion from the equilibrium in short run was corrected in long run. FDI and EXP were positive and significant in affecting the economic growth in long run. It is crucial to note that foreign capital inflow in respect of FDI and export receipt enable to boost up the foreign exchange reserves which in turn provide

cushion to the government to be profound enough in achieving the macroeconomic goals out of which economic growth comes at the prelim. Healthy flow of foreign capital strengthens the financial side and thus contribute towards a stable economy. The coefficient of OLC was also significant in both time horizons. However, it was found that positive relationship is evident between OLC and economic growth in long run. It is justifiable because high oil prices – backed at more oil consumption bring pressure on the government and cause the government to pay opportunity cost in the shape of foregoing the financing of some of the ongoing projects. But in case of long run greater oil consumption leads to foster the economic growth.

Based on the findings, as a policy recommendation, the policy makers need to know the vitality of foreign capital inflows such as FDI and trade dynamics as well as the internal factors like inflation and indeed the significance of a balanced oil consumption for a sustained macroeconomic stability.

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