IMPACT OF FISCAL AND MACROECONOMIC IMBALANCES ON ECONOMIC GROWTH: A CONTEXT OF REGULATION

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Abstract

Promoting sound fiscal policies and sustainable economic growth is a global priority, including in Nepal. This study analyzes the effect of fiscal and macroeconomic imbalances on the Nepalese economy from 2006–2007 to 2020–2021. Utilizing time series data, the study examines the relationship between gross domestic product (GDP), budget deficit, trade deficit, and foreign direct investment (FDI). The augmented Dickey-Fuller (ADF) test confirms variables' stationarity at the first difference, with long-term relationships analyzed through the Johansen cointegration test (JCT) and short-term changes captured by the error correction model (ECM). Short-term economic growth (i.e., GDP) exhibits a negative correlation with the budget deficit and a positive correlation with the trade deficit and FDI, though not statistically significant ($p > 0.05$). However, these variables are cointegrated in the long run, emphasizing their interconnectedness and potential linear combination. The error correcting term (-0.034) indicates a convergence speed of 3.4 percent towards long-term equilibrium. Additionally, diagnostic tests confirm the stability of coefficients in the employed models. The results align with Ahmad et al. (2013) in Pakistan but contrast with Aung (2017) in Myanmar, suggesting that while a trade deficit may stimulate short-term growth, its prolonged existence could potentially harm the nation's economic growth in the long term.

Keywords: Trade Deficits, Budget, Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Economic Growth

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1. INTRODUCTION

The exploration of the relationship between fiscal and macroeconomic imbalances and their profound impact on economic growth constitutes a crucial and globally relevant subject of inquiry. Nepal faces a unique set of economic challenges that embarks on a comprehensive exploration of the multifaceted connections between fiscal deficits, trade deficits, foreign direct investment (FDI), and their collective effect on Nepal's economic growth. Fiscal deficits, characterized by government expenditures exceeding revenue, have been a persistent feature of Nepal's economic landscape, dating back to the late 1980s (Mehta, 2018; Karki et al., 2023). These deficits have ignited debates and discussions among economists, policymakers, and researchers concerning their implications for economic growth. The prevailing wisdom on the impact of fiscal deficits on economic growth diverges significantly.

Keynesian economics suggests that increasing government spending, often associated with fiscal deficits, can stimulate domestic consumption. However, this surge in consumption tends to result in higher imports, contributing to trade imbalances (Perez-Montiel & Manera, 2021). Such a scenario raises pertinent questions about the link between budget deficits and long-term economic growth. Moreover, the sustained presence of budget deficits has led to concerns about their impact on economic growth. Barro (1974) argues that budget deficits can stimulate economic growth by boosting aggregate demand through tax cuts and increased government spending. Nevertheless, Van and Sudhipongpracha's (2015) study of developing Asian countries between 1990 and 2006 presents a contrasting perspective, implying that budget deficit reduces gross domestic product (GDP) growth rates. Nepal's fiscal deficits have steadily grown since 1988, driven by fiscal policies such as tax cuts and increased government expenditure. These policies, while potentially boosting short-term aggregate demand, contribute to a growing trade imbalance as imports surge (Obstfeld, 2001).

The coexistence of trade deficits and budget deficits in Nepal highlights their interconnectedness and influence on the national economy. In Nepal's case, this trade imbalance has persisted and warrants careful examination. Obstfeld (2001) posits that an increase in the budget deficits may lead to an increase in the trade imbalance. This occurs as budget deficits often elevate interest rates which attracts new capital and leads the exchange rate to rise. Keynesian economics further elucidates this connection by asserting that budget deficits, driven by increased government spending, lead to heightened domestic consumption. This heightened consumption, however, is influenced by people's levels of education, information, and understanding, in turn, fosters greater imports and contributes to trade imbalances (Fatima et al., 2012; Maharjan et al., 2022). While trade deficits may signify economic expansion, it is essential to recognize that they are not inherently detrimental (Alessandria, 2007). The United States experience, for instance, demonstrates that increased trade deficits can coexist with economic growth (Griswold, 2007). However, prolonged trade deficits have the potential to erode GDP and employment rates in the long run (Griswold, 2007). Moreover, significant trade deficits might also impede economic growth by diverting funds from international assets' net marketing (Baloch, 2009). According to Aung's (2017) empirical research in Myanmar, widening trade imbalances have a large and negative influence on GDP growth over the long run, further highlighting the need for a comprehensive analysis in Nepal. Nepal's persistent trade deficit, which stood at over NPR 1.42 trillion by mid-July 2023, poses significant concerns ("Trade deficit", 2023). Despite this, Nepal experienced a temporary improvement in its trade balance during the pandemic due to reduced imports and strong remittances. However, a subsequent decline in foreign exchange reserves raises questions about the nation's macroeconomic stability and susceptibility to external shocks (The World Bank, 2022).

Economic growth may be possible due to the channels opened up by FDI, which can facilitate the sharing of expertise and the formation of partnerships between foreign and domestic businesses, even fostering stock market and initial public offerings (Melnyk et al., 2014; Karki et al., 2024). Importing capital as well as technology from other countries, both developed and developing, can increase innovation and productivity in the economy (Dahal et al., 2020; Solomon & Eka, 2013). FDI fosters competitiveness by infusing new knowledge, production methods, and management and accounting practices into domestic firms (Dahal, 2021; Silvio & Ariel, 2009). Despite these opportunities, Nepal has historically attracted relatively modest levels of FDI compared to its counterparts (The World Bank, 2018), raising concerns about its future access to FDI in the post-COVID-19 era (Regmi, 2023). Against the backdrop of persisting budget and trade deficits and relatively low FDI levels in Nepal, an examination of the nation's budgetary trends becomes crucial, encompassing both long-run and short-run implications for economic development.

As stated, the primary aim of this research is to develop a model that analyzes the impact of fiscal and macroeconomic imbalances on Nepal's economic growth. Consequently, the following research questions are addressed by this study:

RQ1: What effect do trade imbalances have on economic growth?

RQ2: How do fiscal deficits, including budget deficits, influence economic growth?

RQ3: What role does foreign direct investment play in Nepal's economic growth?

By employing empirical analysis within a time-series econometric framework, this research aims to provide insight into the dynamic relationships between fiscal deficits, trade deficits, FDI, and GDP.

The remainder of the study is organized as follows. In Section 2, a literature review is presented. The methodology for the research is detailed in Section 3. The results are presented in Section 4. In Section 5, the research findings are discussed. In the final Section 6, the study's conclusions are presented.

2. LITERATURE REVIEW

2.1. Empirical evidence

The nexus between international trade and economic development, both long and short-term, has been a subject of considerable scholarly discourse and empirical investigation. Within the realm of trade theories, Mercantilism presents a historical perspective. Mercantilism advocates for trade-restricting measures such as taxes and restrictions on imports while stimulating exports through government subsidies (Chijioke et al., 2021). This perspective suggests that nations can benefit from global trading by adopting protectionism that encourages exporters while discouraging importations, thereby achieving a positive trade balance. Notably, the active involvement of small enterprises plays a pivotal role in achieving economic prosperity. The causative linkage between the current accounts deficits (CAD) and budget deficits has been a contentious topic in economic literature. Vamvoukas (1999) investigated both short and long-run relationships between these economic factors employing a Granger causality and an error correction model (ECM). Similarly, Akbostanci and Tunç (2001) examined short-term relationships between these deficits through an ECM equation. Several studies have reported a causative connection between fiscal and macroeconomic variables in emerging economies (Ahmed, 1986; Banday & Aneja, 2019; Bhat & Sharma, 2018; Helmy, 2018). Using the autoregressive distributed lag (ARDL) model, Nautiyal et al. (2022) also found a link between CAD and fiscal deficits, validating Keynes' twin deficit hypothesis. Limoa and Weku (2024) investigated the relationship between fiscal policy and financial sustainability in promoting economic prosperity amid global instability. The study highlighted how government taxation and spending decisions influence economic outcomes such as aggregate demand, employment, inflation, social welfare, infrastructure development, and income inequality. It also emphasized the importance of prudent fiscal management and debt sustainability for long-term financial viability. By focusing on debt restructuring and fiscal consolidation, the research underscored the need for effective debt management to mitigate fiscal risks and ensure sustainable economic growth.

Furthermore, studies conducted in Asian nations such as India, Sri Lanka, and Thailand have lent credence to the Keynesian paradigm, emphasizing the connection between fiscal and CADs (Baharumshah & Lau, 2007; Kulkarni & Ericsson, 2001; Ratha, 2012). Duasa (2007) examined the relationship between Malaysia's trade stability, money supply, revenue, and real exchange rates. Employing the ARDL cointegration method, the researcher found that trade imbalances and exchange rates have a statistically insignificant positive relationship that impacts economic growth. The study also identified the money supply and domestic income as factors affecting the trade balance. Acharya (2013) investigated the factors influencing foreign trade in Nepal, using panel data analysis. The study extended the global trade gravity model from a Nepalese perspective, demonstrating the significance of factors such as distance to trading partners and time-invariant factors in affecting Nepal's trade balance. Kafle (2017) analyzed the foreign trade trends in Nepal, revealing a significant trade loss attributed to declining exports and rising imports. The study pointed to political volatility and frequent transitions as contributors to adverse changes in trade policy and the widening trade deficit.

FDI has grown in popularity, particularly in developing nations like Nepal, which possess abundant resources but often lack adequate funding, effective management, and advanced technology. FDI has the potential to lead to advanced technology, competing practices, and intellectual capital, which can enhance the recipient nation's economy (Elwell, 2007). Balasubramanyam et al. (1996) discovered that FDI was more critical for economic development in countries that promoted exports than in import-substituting ones, emphasizing that FDI's impact varies across nations and can be influenced by trade policy. Li and Liu (2005) argued that FDI has both direct and indirect influences on economic growth and workforce development. De Mello (1999) stated that FDI may help economies of all stages of development. It is well-accepted that investment is a major factor in economic development (Artelaris et al., 2006). Investment is emphasized as crucial for stimulating growth in both endogenous and neoclassical growth models. FDI is a category of investment reflecting an enduring interest in an enterprise beyond the investor's home economy (Organisation for Economic Co-operation and Development [OECD], 2008). Ekpo (1997) demonstrated a link between FDI and industrial output growth of Nigeria's manufacturing sector, both short and long-term. FDI, in particular, was found to enhance total factor productivity, by increasing the professional commitment of workers along with other facets of the country of destination (Ekpo, 1997; Shahi et al., 2022). However, FDI's impact is not unequivocally positive. Rivera-Batiz (1990) argued that FDI can stifle domestic industries, leading to overproduction and dumping of foreign goods, which can have adverse effects on the economy of the host country.

The association between trade deficits and federal governmental budget deficits has been scrutinized from multiple angles. Stern (1987) highlighted that attempts to address trade deficits can overlook the consequences of decreasing the trade deficits without concurrently decreasing the budget deficits. Using the Granger causality test, Islam (1998) examines the connection between Brazil's trade and budget deficits, discovering bilateral causality between these variables. Alkswani (2000) explored the relationship between trade and budget deficits of Saudi Arabia, concluding that trade deficits causally influence budget deficits. While Rehman (2012) found no causal link between GDP and budget deficits, he did find a positive link between productive spending and GDP growth. Adam and Bankole (2000) introduced the possibility of non-linear relationships between fiscal deficit and growth, particularly in developing economies. Nelson and Singh (2012) analyzed the impact of fiscal deficit on the growth of GDP, while Popescu (2016) examined the link between macroeconomic and fiscal factors, including GDP and trade balance. In addition, macroeconomic factors also influence the growth of capital markets and investment activities (Pant et al., 2022). Tung (2018) investigated how fiscal deficits affect economic growth in

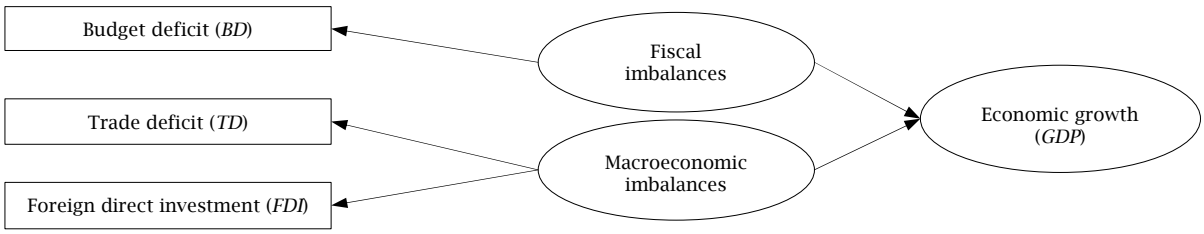
Vietnam and came to the conclusion that they have a detrimental effect on gross output, net exports, private investment, and FDI. Further, Gupta et al. (2023) investigated the significant impact of fiscal and macroeconomic imbalances on economic growth in the United Kingdom within the context of Brexit and COVID-19. Key factors such as the unemployment rate, GDP index, earnings, and trade were analyzed over the past decade. The study highlighted that economic imbalances, particularly in trade, created bottlenecks and inflation by early 2021.

The extensive literature on these macroeconomic variables illustrates the dynamic ways in which fiscal and macroeconomic deficits can influence a nation's economy. However, the impacts vary widely across countries and are contingent on a host of factors, making this area of research both compelling and essential for informing economic policy and decision-making.

2.2. Theoretical framework

The Keynesian theory, as founded by Keynes, J. M. in 1936, serves as the foundational framework for understanding the dynamics between government fiscal policies, trade deficits, and economic growth (Perez-Montiel & Manera, 2021). According to Keynesian principles, when a government increases its spending, it induces the private sector to spend more as well, on both homegrown and abroad products. This, in turn, leads to a paradoxical situation: while domestic production surges, exports decrease due to increased domestic demand, but imports rise due to higher private consumption and the leveraging effect of retail bank lending facilities (Bhandari et al., 2021). As a result, the government has a fiscal imbalance since its expenses exceed its revenues. Salen (2003, as cited in Yellen, 1989), postulated a positive association between fiscal deficits and various macroeconomic aggregates. This proposition implies that fiscal deficits can boost domestic output, stimulate private investment, increase aggregate demand, and encourage savings, all while maintaining consistent interest rates. This theoretical foundation serves as a framework for this study's main goal, which is to examine the effects of fiscal and macroeconomic imbalances on Nepal's economic growth, as shown in Figure 1.

Figure 1. Theoretical framework of the study



2.3. Hypotheses design

In alignment with the insights gained from the above literature review, the following hypotheses are postulated to guide the empirical investigation:

H1: There exists a significantly negative relationship between budget deficits and the economic growth of Nepal.

H2: There exists a significantly negative relationship between trade deficits and economic growth in Nepal.

H3: There exists a significantly positive association between foreign direct investment and economic growth in Nepal.

The study differs from earlier studies as it is the first to address the issue of economic disparities and the nation's prosperity. The proposed hypotheses and the theoretical framework, rooted in Keynesian economics and supported by relevant literature, provide the conceptual basis for comprehending the dynamic interactions between macroeconomic and fiscal imbalances and economic growth in the context of Nepal.

3. RESEARCH METHODOLOGY

This study uses a descriptive research design aimed at gathering factual information regarding Nepal's trade balance and its effect on the nation's economic growth. Additionally, it employs a causal-comparative design to investigate the relationships among the variables used. This research used a data set from 2006–2007 to 2020–2021. The Ministry of Finance and the Nepal Rastra Bank were the primary data sources, confirming the accuracy and credibility of the information. The study focuses on this period to capture long-term trends and changes in Nepal's economic dynamics. A quantitative approach was employed for data analysis, utilizing the STATA software. The collected data were meticulously organized using STATA and Microsoft Excel, ensuring accuracy and facilitating subsequent analysis, including:

- Stationarity testing: Given the time series data, the augmented Dickey-Fuller (ADF) test was conducted to determine stationarity. Stationary data are a prerequisite for further analysis.
- Cointegration and ECM: Following stationarity verification, the research proceeded with the Johansen cointegration test (JCT) to determine long-term relationships among budget deficits, trade deficits, and economic growth. In parallel, the vector ECM (VECM) was employed to explore short-term dynamics.
- Diagnostic tests: Diagnostic tests were conducted to address issues such as normality, heteroscedasticity, and autocorrelation, ensuring the validity of the model and its assumptions. The Wald test was utilized to assess causality between the factors of study.

Model specifications: The following is the primary approach used to determine how trade imbalances affect economic growth:

$$lnGDP_t = \beta_0 + \beta_1 lnBD_t + \beta_2 lnTD_t + \beta_3 lnFDI_t + \varepsilon \quad (1)$$

where, *ln* denotes the natural logarithm; GDP_t denotes the real GDP; β_0, β_1, β_2, and β_3 are the coefficients; BD_t represents budget deficit; TD_t represents trade deficit; FDI_t represents approved FDI; and ε signifies the residual term.

Additionally, an ECM was used to measure the long-term causal relationship, with an illustrative equation below.

$$\Delta lnGDP_t = \beta_0 + \beta_1 \Delta lnBD_t + \beta_2 \Delta lnTD_t + \beta_3 FDI_t + \beta_4 ECT_{t-1} + V_i \quad (2)$$

where, Δ signifies the first difference of variables; $\beta_0 \ldots \beta_4$ represents coefficients; ECT_{t-1} denotes the error correction term resulting from the long-run cointegration link; and V_i represents the white noise residual term.

The ECT coefficient is vital in exploring the rate of adjustment and the long-run equilibrium association between the dependent (*GDP*) and independent factors (*TD, BD*, and *FDI*). It signifies how quickly equilibrium is reestablished in response to deviations. An ECT coefficient that is both significant and negative indicates the adjustment towards long-term equilibrium. In parallel, the study evaluates the significance of the independent variables' coefficients to determine their impact on the short-run relationship.

Employing alternate methodologies to this study could enhance the research. One such approach is the application of cognitive behavioral theory, as proposed by Devkota et al. (2023). This approach would involve examining peoples' beliefs, values, and perceptions that influence individual behaviors and choices, providing a more comprehensive understanding of the subject matter. In addition, for testing hypotheses related to economic theories, an alternative statistical methodology worth considering is the utilization of non-parametric methods such as kernel density estimation (KDE). This approach, suggested by Longford and Pittau (2006), allows for modeling the data in more detail, based on the level of smoothing used. While KDE is particularly suitable for uni- and bivariate data, it also offers insights into some tri-variate features through the modeling of conditional distributions, as outlined by Quah (1996). Integrating these alternative methodologies could enrich the research, offering comprehensive perspectives and contributing to a more robust exploration of the research questions at hand.

4. RESULTS

4.1. Augmented Dickey-Fuller test for unit roots

Augmented Dickey-Fuller test was employed to examine whether or not the variables under study are stationary. The null hypothesis (H_0) for this test assumes that the variables are non-stationary with unit roots, often associated with trends or structural breaks over time. Stationarity implies that mean, variance, and autocorrelation properties remain constant over time, a prerequisite for time series data analysis.

If the t-statistic is smaller than the 5% critical threshold in this case, we accept the null hypothesis, signifying that the data is non-stationary at the initial level. Since time series data often show stationarity in analysis, the first difference between the variables is computed to determine stationarity.

Table 1. Augmented Dickey-Fuller test results

Variable	*Level test t-statistic*	*First difference t-statistic*	*Trend at first difference*	*Cons at first difference*
GDP	0.140 (-3.000)	-3.739 (-3.000)	0.86	2.91
BD	-1.331 (-3.000)	-3.958 (-3.000)	0.94	-0.79
TD	-1.713 (-3.000)	-3.412 (-3.000)	-4.55	6.53
FDI	-2.604 (-3.000)	-6.387 (-3.000)	-0.53	1

Note: Exogenous: constant, linear trend.
Source: Authors' elaboration using STATA.

Table 1 presents the findings of the ADF tests. For *GDP*, the t-statistic at the level test is 0.140, which is less than the 5% critical value of -3 (irrespective of its sign). Thus, the null hypothesis (H_0) that *GDP* is not stationary at the initial level cannot be rejected. However, after differencing, the t-statistic becomes -3.739, which is less than the 5% critical value, indicating that *GDP* becomes stationary at the first difference. For *TD*, the level test yields a t-statistic of -1.713, again falling below the 5% critical value of -3, implying non-stationarity at the initial level. However, after differencing, the t-statistic becomes -3.412, which is not less than the 5% critical value of -3 and hence causes H_0 to be rejected. This means the *TD* becomes stationary at the first difference. Similarly, both *BD* and *FDI* display non-stationarity at the level test. Nevertheless, they both become stationary at the first difference.

4.2. Optimum lag length selection

After achieving stationarity to all variables in the first difference, the study proceeded to conduct the JCT. Before this, it was imperative to identify the optimal lag length for the variables since it was assumed that the present-year data in the time series were influenced to some extent by their previous-year data.

Table 2. Optimum lag length selection

Lag	*0*	*1*	*2*	*3*	*4*
Log-likelihood (LL)	-7.645	37.17		1369.74	1402.9
Likelihood ratio (LR)		89.64			66.319*
Degrees of freedom (Df)		16	16	16	16
Probability (P)		0	0	0	
Final prediction error (FPE)	0.001*	6.90e-07*	-6.3e-37*		
Akaike information criterion (AIC)	2.118	-3.122		-241.044	-247.073*
Hannan-Quinn information criterion (HQIC)	2.027	-3.578		-242.047	248.076*
Schwarz-Bayesian information criterion (SBIC)	2.263	-2.398		-239.452	-245.481*

*Note: * Significance at 1% level.*
Source: Authors' elaboration using STATA.

The findings of lag length selection, which are crucial for the subsequent cointegration analysis, are shown in Table 2. The selected models were utilized to analyze the relationship between the study factors based on the optimal lag length of 2, allowing for a comprehensive exploration of the study's hypotheses.

4.3. Johansen cointegration test results

After confirming the variables' stationarity through the ADF test, the study advanced to perform the crucial JCT. The cointegrating relationship is vital in deciding whether to employ a VECM or a vector autoregressive model (VAR) for the analysis and also in determining if there occurs a long-run association among the variables. After confirming that the variables exhibited stationarity at the first difference and determining the optimal lag length as 2, JCT was performed.

Table 3. Results of Johansen cointegration test

Maximum rank	*Parms*	*LL*	*Eigenvalue*	*Trace statistics*	*5% critical value*
0	20	31.378		72.811	47.210
1	27	54.485	0.971	26.596*	29.680
2	32	62.252	0.697	11.063	15.410
3	35	67.445	0.550	0.677	3.760
4	36	67.783	0.051	-	-

*Note: * Significance at 1% level.*
Source: Authors' elaboration using STATA.

Decision criteria: Whether to accept or reject the cointegration H_0 depends on how the trace statistics value compares to the critical value at 5%.

If the trace statistic exceeds the critical value, it indicates cointegration and a long-term equilibrium relationship among the variables. If the trace statistic is below the critical value, it implies no cointegration, meaning the variables do not share a common long-term trend.

In the case of rank 0, the trace statistics value is 72.811, while the 5% critical value is 47.210. As the trace statistics exceed the 5% threshold value at rank 0, H_0 could not be accepted. However, in rank 1, the trace statistics value is 26.596 and less than the 5% critical value (29.680). Therefore, in this instance, we accept H_0, indicating the existence of cointegration at rank 1. There is no need to explore other ranks, as it is established that at rank 1, cointegration exists among the variables. This implies a long-run relationship among the series, signifying that they are interconnected and can be linearly combined. Consequently, even if short-run shocks affect individual series, they will eventually converge over time in the long run.

4.4. Results from vector error correction model

Table 4 displays an analysis in which the VECM was employed to explore temporal dependencies between variables. Each independent variable's lag coefficient and p-value were calculated to understand these findings.

Table 4. Results from vector error correction model

Panel A: Summary statistics of VECM estimation						
Equation	***Parms***	***RMSE***	***R-squared***	χ^2	$P > \chi^2$	
D_lGDP	6	0.020	0.920	79.137	0.000	
D_lBD	6	1.057	0.131	1.058	0.983	
D_lTD	6	0.150	0.740	19.894	0.003	
D_FDI	6	0.371	0.874	81.165	0.000	
Panel B: Coefficient estimates of VECM variables						
Variables	***Coef.***	***Std. error***	***z***	***P > |z|***	***[95% conf. interval]***	
_cons	0.032	0.021	1.54	0.124	-0.008	0.074
lBD LD	-0.005	0.013	-0.40	0.689	-0.031	0.020
lTD LD	0.080	0.056	1.41	0.157	-0.030	0.190
lFDI LD	0.002	0.015	0.14	0.886	-0.028	0.032
lGDP LD	-0.009	0.433	-0.02	0.983	-0.859	0.840
D_lGDP_ECT L1	-0.034	0.321	-0.110	0.091	-0.662	0.594

Note: RMSE — root mean square error.
Source: Authors' elaboration using STATA.

GDP and *BD*: In the short run, *BD* seem to have a negative correlation with *GDP*, as indicated by the negative coefficients. However, this relationship is not statistically significant (p > 5%). This suggests that changes in fiscal deficits do not significantly impact *GDP* in the short term. This contradicts the work of Barro (1974), who argued that BD can stimulate economic development through tax cuts and increased government spending. However, it supports Van and Sudhipongpracha's (2015) study, which suggested that fiscal deficits hurt GDP growth rates.

TD and *FDI*: The positive coefficients suggest that there is a short-term positive relationship between *TD* and approved *FDI*. However, this relationship is also not statistically significant (p-value > 0.05). This implies that short-term changes in *TD* and *FDI* approval have insignificant influence on each other.

$$\Delta lnGDP_t = 0.032 - 0.005\,\Delta BD_{t-1} + 0.080\,\Delta TD_{t-1} + 0.002\,\Delta FDI_{t-1} - 0.034\,ECT_{t-1} \quad (3)$$

This result is consistent with the notion that a trade deficit may signify economic expansion (Alessandria, 2007). This result is also consistent with the findings that the effect of *FDI* on economic growth (*GDP*) in the short term may not be substantial though their impacts are remarkable in the in long-run (Melnyk et al., 2014). However, it also underscores the need for further investigation, as prolonged *TD* could potentially erode *GDP* and employment rates in the long run (Griswold, 2007).

4.5. Error correction model and speed of adjustment

The ECT coefficient is -0.034, which is significantly different from zero at the 10% level. This implies that yearly errors are rectified at a rate of about 3.4% or there are no longer any departures in the long-run equilibrium.

This finding is consistent with the literature on ECMs, which indicates that such models are designed to capture the rate at which imbalances are restored to equilibrium (Hamilton, 1994). In this case, the relatively slow adjustment process of 3.4% per year implies that the variables in the system are likely to converge toward their long-term equilibrium over time.

Next, we examine short-term causality between the study's variables, utilizing the insights from Eq. (2), as well as the results extracted from Table 4, in addition to the residual values derived from the error testing performed in the short run via regression analysis, as illustrated in Table 5.

Table 5. Regression results (Ordinary least squares method)

Panel A: Model summary				
Source	***SS***	***Df***	***MS***	***Number of obs. = 15***
Model	0.557	3	0.186	Prob > F = 0.000
Residual	0.02	11	0.002	R-squared = 0.965
Total	0.577	14	0.041	RMSE = 0.0430
Panel B: Regression coefficients				
lGDP	***Coef.***	***Std. error***	***T***	***P > |t|***
lBD	0.029	0.014	2.18	0.052
lTD	0.23	0.031	7.51	0
lFDI	0.011	0.025	0.45	0.662
_cons	10	0.209	47.8	0

Panel C: Descriptive statistics of residuals					
Residuals	***Obs.***	***Mean***	***Std. dev.***	***Min***	***Max***
Error	15	-3.10e-11	0.038	-0.061	0.082

Note: SS — sum of squares, MS — mean squares.
Source: Authors' elaboration using STATA.

The findings of the regression analysis utilizing the ordinary least squares (OLS) method are shown in Table 5, which assists in determining the residual value. The residual value, written as -3.10e-11, is an important factor in understanding the error correction process in the short run. It quantifies the discrepancy between the observed and anticipated values of the model.

4.6. Wald test to check the causality

Additionally, we conduct Wald coefficient analyses to assess the importance of the estimated parameters. Table 6 displays the results of parametric restriction analysis for economic growth, fiscal, and macroeconomic variables.

Table 6. Wald test results

Equation	***Excluded***	***χ^2-statistic***	***Df***	***Prob > χ^2***
lGDP	*lTD*	26.557	2	0.000
	lBD	4.058	2	0.001
	lFDI	4.477	2	0.007
	All	35.643	6	0.000
lTD	*lGDP*	14.657	2	0.001
	lBD	12.924	2	0.002
	lFDI	10.569	2	0.000
	All	20.828	6	0.000
lBD	*lGDP*	0.621	2	0.000
	lTD	0.854	2	0.001
	lFDI	0.219	2	0.000
	All	3.522	6	0.000
lFDI	*lGDP*	12.45	2	0.002
	lTD	47.809	2	0.000
	lBD	52.473	2	0.000
	All	170.8	6	0.000

Source: Authors' elaboration using STATA.

Table 6 illustrates that the p-value in the first row is 0.00, which is less than 0.05, indicating that the *TD* Granger causes the *GDP*. Similarly, all of the p-values were 0.00, which was less than 0.05, indicating that *BD* and approved *FDI* have a causal effect on *GDP*. This implies that both the Granger causality from *TD* and control factors to real *GDP* growth continued during the analytic period, as did the steady long-run correlations between these variables.

4.7. Diagnostic tests

Table 7 displays the results of several diagnostic tests conducted to ensure the consistency and credibility of the data and analytical results.

Table 7. Results of diagnostic tests

Panel A: Jarque-Bera test for normality				
Equation	***χ^2-statistic***	***Df***	***Prob > χ^2***	***Decision criteria***
D_lGDP	1.013	2	0.602	H_0: The population is normally distributed
D_lBD	1.826	2	0.515	
D_lTD	1.323	2	0.401	
D_lFDI	1.104	2	0.575	
All	5.267	8	0.728	
Equation	***Skewness***	***χ^2-statistic***	***Df***	***Prob > χ^2***
Skewness test				
D_lGDP	0.645	0.9	1	0.343
D_lTD	0.5	0.427	1	0.513
D_lBD	-0.444	0.542	1	0.462
D_lFDI	0.051	0.006	1	0.94
All		1.874	4	0.759
Kurtosis test				
D_lGDP	2.289	0.274	1	0.601
D_lTD	3.64	0.221	1	0.638
D_lBD	2.45	0.164	1	0.685
D_lFDI	1.686	0.935	1	0.334
All		3.236	4	0.81
lags(p)	***χ^2-statistic***	***df***	***Prob > χ^2***	***Decision criteria***
Panel B: Diagnostic tests				
Durbin's alternative test for autocorrelation				
1	0.704	1	0.4014	H_0: No serial correlation
Breusch-Godfrey LM test for autocorrelation				
1	1.471	1	0.2252	H_0: No serial correlation
Lagrange-multiplier test				
1	0.4988	16	0.97361	H_0: No autocorrelation at lag order
2	2.2812	16	0.68420	
Breusch-Pagan/Cook-Weisberg test for heteroscedasticity				
	1.49		0.2227	H_0: Constant variance variables — fitted values of GDP

Source: Authors' elaboration using STATA.

Table 7 shows the findings of p-value-based diagnostic tests establishing the normal distribution, absence of autocorrelation, and homoscedasticity of the time series data. In this study, the significance threshold employed to test the findings was 0.05%. As a result, the model used in this study is considered as good and acceptable.

4.8. Eigenvalue stability condition

The stability or instability of a fixed point (equilibrium point) can be determined by using eigenvalue. A system can be initially disrupted around a stable fixed point, but it will eventually return to and remain in its original position. A prerequisite for stability: for a VAR(p), the stability condition also necessitates that all the eigenvalues of A (the AR matrix of the companion form of Y_t) are less than one in modulus or that all the roots are greater than one. Therefore, we have that a VAR(p) is called stable if det(I – A1z – A2z2, …, Apzp) = 0 for $|z| \leq 1$.

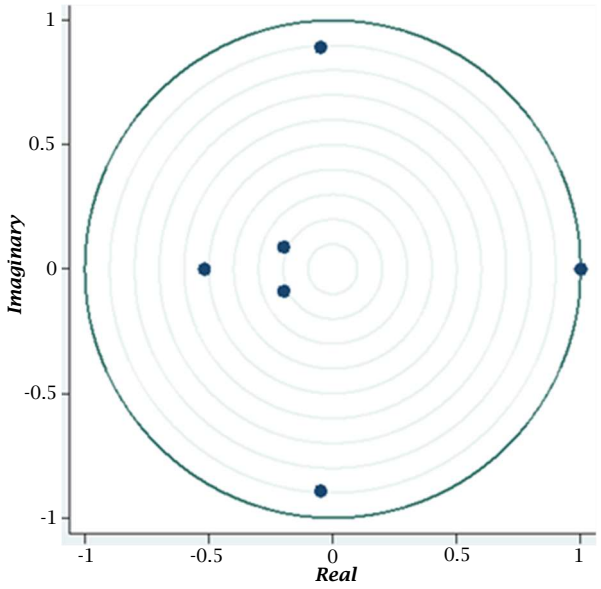
Table 8 shows that the VECM specification imposes three-unit moduli, as illustrated in Figure 2.

Table 8. The stability condition for eigenvalues

Eigenvalue	***Modulus***
1	1
1	1
1	1
-0.049 + 0.892i	0.893
-0.049 – 0.892i	0.893
-0.517	0.517
-0.198 + 0.0891i	0.217
-0.198 – 0.0891i	0.217

Source: Authors' elaboration using STATA.

Figure 2. The stability condition for eigenvalues: Roots of the companion matrix



Note: The VECM specification imposes three-unit moduli.
Source: Authors' elaboration.

According to the VECM standard, all remaining eigenvalues lie outside of the unit circle. This stability emphasizes the appropriateness of our model's specifications, implying that they are not misspecified.

5. DISCUSSION

In contrast to Aung's (2017) seminal work on Myanmar, where a JCT revealed an inverse correlation between trade deficit and growth of the economy, our study, using the same method, reveals a profound cointegration between trade deficit, budget deficit, approved FDI, and GDP, indicating asymmetric impacts on GDP in the long run, on average, assuming all other factors remain constant (Aung, 2017). Similarly, our short-term analysis, like Aung's VECM, reveals a negative relationship between GDP and budget deficit. This contradicts Barro's (1974) argument that budget deficits can stimulate economic development through tax cuts and increased government spending but aligns with the findings of Van and Sudhipongpracha (2015) that fiscal deficits negatively impact the GDP growth rates. Short-run analysis by Ahmad et al. (2013) demonstrated a positive association between the trade deficit, FDI, and economic growth in Pakistan. However, our study presents non-significant positive relationships between trade deficit, approved FDI, and economic growth in the short run, suggesting a deeper understanding of these dynamics. This is in line with the notion that a trade deficit may signify economic expansion but also emphasizes the need for further investigation, acknowledging the potential erosion of GDP and employment rates with a prolonged trade deficit (Alessandria, 2007; Griswold, 2007; Melnyk et al., 2014).

The ECM with an ECT coefficient of -0.034, significantly different from zero at the 10% level, implies that yearly errors are rectified at a rate of about 3.4%, eliminating deviations from the long-run equilibrium. This slow adjustment process aligns with the literature on ECMs, indicating a gradual convergence toward long-term equilibrium over time (Hamilton, 1994). The VECM and ECM results reveal that changes in fiscal deficits (budget deficits) do not have a substantial impact on GDP in the short term, corroborating with the results of Van and Sudhipongpracha (2015). Similarly, short-term fluctuations in trade deficit and approved FDI show no significant effects on GDP. While these short-term relationships lack statistical significance, it's crucial to recognize the complexity of economic relationships. The absence of statistical significance in the short term doesn't preclude the potential for longer-run effects or more intricate interactions among these variables (Hamilton, 1994).

Furthermore, the Granger causality (Wald test) shows the causal effects of budget deficit, trade deficit, and approved FDI on GDP. This adds another layer of understanding to the relationships examined, reinforcing the dynamic nature of these economic variables and their influence on Nepal's economic regime. The study's findings emphasize the need for policymakers and researchers to consider both short-term and long-term perspectives when formulating economic strategies. While short-term relationships may not always exhibit statistical significance, the cumulative impact over the long term can be substantial (Melnyk et al., 2014; Aung, 2017). Therefore, a deeper understanding of the interactions between fiscal deficits, trade deficits, and FDI is crucial for developing effective economic policies in Nepal.

6. CONCLUSION

The impact of fiscal and macroeconomic imbalances on economic development in Nepal reveals complex and multifaceted dynamics that necessitate a comprehensive approach. The short-term examination suggests certain relationships, with GDP negatively correlated with the budget deficit and positively correlated with the trade deficit and

FDI. However, these associations, while noteworthy, lack statistical significance (p-value > 0.05). This observation, although not definitive, prompts further investigation, particularly concerning the potential long-term repercussions. The identification of cointegration among the study variables over the long run underscores their inherent interconnectedness and the potential for linear combination. This implies that even if short-term shocks influence individual series, in the long run, they will eventually converge over time. This phenomenon suggests a dynamic equilibrium where short-term shocks dissipate over time, reinforcing the importance of considering both immediate and enduring impacts in economic policymaking. The ECM further substantiates this finding, whose ECT coefficient of -0.034 is statistically significant at the 10% level. This means that the rate of correction of deviations from the long-run equilibrium in the current year is around 3.4%, implying a gradual adjustment process. This slow but persistent adjustment indicates that the variables are likely to converge toward their long-term equilibrium over time. Hence, the lack of short-term statistical significance does not dismiss the possibility of longer-term effects or more complex interactions among these variables.

These findings highlight the complex and dynamic relationship of macroeconomic variables, emphasizing the importance of policymakers considering not just the short-run impacts but also the enduring consequences of fiscal and macroeconomic imbalances on economic growth. Sustainable economic growth, as suggested by Adam and Bankole (2000), should be the focal point of policy efforts, necessitating a concerted effort to address structural imbalances and foster resilience. Additionally, this study emphasizes the persistent challenges Nepal faces in reducing its trade deficit, attributed to factors such as a reliance on primary exports, a large pool of unskilled labor, and limited human capital for technological advancement. The identification of these underlying factors emphasizes the importance of implementing targeted macroeconomic policies to address these structural imbalances effectively. Importantly, protectionist foreign trade policies may not yield the desired results, highlighting the need for an alternative approach that encourages openness while safeguarding domestic industries. In light of these complexities, further research is imperative. While this study contributes to the ongoing discourse on economic challenges and policy considerations in Nepal, it is not without limitations. The analysis is constrained by data availability and the complexity of economic interactions, warranting cautious interpretation of the results. Additionally, the study's focus on a specific period may overlook structural changes or external factors influencing economic dynamics. Therefore, future research endeavors should aim to address these limitations by extending the time horizon and incorporating additional variables to provide a more comprehensive understanding of the complex and dynamic relationships among budget deficits, trade deficits, FDI, and economic growth in Nepal. These insights contribute to ongoing discussions regarding economic challenges and policy considerations in Nepal's distinctive economic landscape, aligning with previous research in this field. Ultimately, a holistic approach that considers both short-term and long-term dynamics will be crucial for Nepal's economic development and stability.

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