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Effects of Fiscal Variables on External Sector Deficit of Nepal with Reference to Indian Factors

Shobha Dhungana[1]

Abstract

The basic intent of this paper is to examine the effects of fiscal variables on trade and the current account deficit of Nepal considering the Indian factors. Using the time series data of 48 years of the study period from 1975 to 2022, Engle-Granger's co-integration and error correction models are used to examine the fiscal effects on the trade deficit, and the ARDL model is used to examine the effects on current account deficit. The basic variables used in the analysis are government expenditure to GDP ratio, budget deficit to GDP ratio, trade deficit to GDP ratio, broad money supply to GDP ratio, trade openness, real exchange rate, and real per-capita Indian GDP. Data are taken from the Ministry of Finance, Nepal Rastra Bank, and World Development Indicators. The findings show that the government expenditure to GDP ratio and trade openness positively affect the trade deficit as domestic factors, while real per-capita Indian GDP positively affects the trade deficit as an external factor. Also, the budget deficit to GDP ratio has a positive effect, while the broad money supply to GDP ratio has a negative effect on the current account deficit as domestic factors. The real exchange rate is negatively and real Indian per-capita GDP are positively driving the Nepal's current account deficit as external factors. This study identifies the real exchange rate with Indian rupees, Indian real per-capita GDP, and financial development as novel explanatory variables of current account deficit and therefore provides additional evidence on external deficit in the context of Nepal.

Keywords: *Fiscal effects, Trade deficit, Current account deficit, Real exchange rate, Co-integration.*

JEL Classification: *E62, F13, F32, F31, C22.*

Introduction

A prolonged external sector deficit creates macroeconomic instability and adversely affects growth. This study considers trade and current account deficits as external sector deficits. Fiscal policy, as claimed by Mundell-Fleming,

[1] **Ms. Dhungana** is a M. Phill graduate in Economics from T. U. also a section officer at Supreme Court of Nepal. Email: shobhadhungana86@gmail.com, ORCID: https://orcid.org/0009-0008-1273-1675. She acknowledges **Prof. Dr. Ram Prasad Gyanwaly** for guidance in preparing this paper and also estimating the econometric models.

generally has a direct impact on external balance. Under the fixed exchange rate regime, increased government expenditure shifts the IS curve towards the right that increases the interest rate and the income at quasi-equilibrium. This increase in income increases the volume of imports of the goods and services, creating both trade and current account deficits. Thus, expansionary fiscal policy increases the trade and current account deficit. On the contrary, tight fiscal policy may lead to the case of trade and current account surplus (Levacic & Rebmann, 1982). In developing countries like Nepal, limited resources pose constraints in increasing development expenditure. So, the budget is mostly in deficit. This deficit budget has the effect of increasing government expenditure and increasing income, thereby leading to trade and current account deficit. Nepal has current account convertibility but not capital account convertibility. This limits the effect of an increase in the interest rate on the balance of payment.

Keynes argues that exports have a positive effect and imports have a negative effect on income and output. Thus, trade deficit adversely affects income and growth. Furthermore, persistent deficits in trade and current accounts may create scarcity in foreign exchange, and the country may not have enough foreign exchange to import basic and capital goods. This may have negative consequences on the economy. Therefore, it is important to understand the factors that determine the trade and current account deficit and the way the fiscal policy affects these two types of deficits so that well-informed macroeconomic policies for stability and growth can be formulated.

Nepal has an open border with India in the east, south, and west. There is free mobility of goods and services across the borders. Nepal has a pegged exchange rate with India. So, prices are easily transmitted from one country to another. Similarly, central banks do not have full control over the net foreign assets component of the money supply. Again, two-third of the trade of Nepal is with India. The size of India's population and GDP are many times larger than those of Nepal. Thus, Indian factors are also equally important for determining trade and the current account deficit in Nepal. In this connection, this paper sets the following two objectives.

a. To analyze the nature of the trade deficit, current account deficit, and other specific macro variables that could affect the external deficit in Nepal.
b. To examine the effects of fiscal variables on Nepal's trade deficit and current account deficit, considering the Indian factors as exogenous variables.

This study helps us to understand the importance of fiscal factors in explaining the trade deficit. It also reveals that the Indian real per-capita GDP, real exchange rate with Indian rupees, and financial development are instrumental in explaining the current account deficit in Nepal.

Review of Literature

Afonso and Opoku (2023) have examined the nexus between fiscal and current account imbalances in 18 OECD economies using data from 1995Q1 to 2018Q1 and applying panel co-integration and panel vector autoregressive (VAR). The findings confirm a long-run relationship between fiscal and current account balances. On the other hand, an increase in real government consumption generally worsens the current account balance. The impact of the real effective exchange rate is not statistically significant.

Sanni et al. (2022) have examined the twin deficits hypothesis for Nigeria, accounting for the role of the exchange rate. The study utilizes an annual data series spanning 1981 to 2019 and uses the Autoregressive Distributed Lag (ARDL) model for the estimations. Among other findings, the study reveals the existence of a bi-directional causation between fiscal deficit and current account deficit. Similarly, the study shows a positive relationship between fiscal balance and current account balance in both the short-run and long-run during exchange rate appreciation and depreciation thus confirming the role of exchange rate in the twin deficit hypothesis in Nigeria. The study recommends the introduction of a debt ceiling for governments, an improvement in the efforts towards non-oil export promotion, minimizing imports, and improving revenue generation.

Helmy (2018) employs a new approach to the twin deficit hypothesis aimed at enhancing policy making in Egypt - an oil-producing country. The study tracks the causal link between the merchandise trade deficit and the budget deficit of Egypt by examining the conventional twin deficit hypothesis using a VAR model. The study also checked for the existence of a co-integration between the budget deficit and the merchandise trade deficit using the data from 1990 to 2017. The study refutes the twin deficit hypothesis in favor of the current account targeting hypothesis.

Sadiku et al. (2015) also used the ARDL model with selected macroeconomic indicators like real GDP, inflation, unemployment rate, and budget balance to explain current account development. Empirical results indicate strong support for integration between the current account, fiscal balance, financial development, terms of trade, and trade openness. The financial development, fiscal balance, and terms of trade are positively correlated with the current account balance, while openness to international trade is negatively correlated with the current account balance. Moreover, including a lagged current account as an endogenous variable in the model indicates the persistence of current account deficits.

Bhatt and Karki (2020) examined the causal relationship between the budget deficit and the current account deficit of Nepal using a set of time series data from 1975 to 2019. The basic variables of the analysis are real GDP, budget deficit, and current account deficit. Based on the ARDL model, the empirical finding indicates that rising budget deficits put more stress on the current

account deficits in both of long run and short run. Furthermore, the Granger causality test reconfirms that unidirectional causation runs from budget deficit to current account deficit. However, the weakness of the paper is that it puts real and nominal variables in one place and ignores other important variables in the regression equation.

Kafle et al. (2022) examined the relationship between budget and trade deficits in Nepal using the ARDL model and the time series data from 1988 to 2018. Other variables used in the models are real exchange rate, openness of trade, and inflation. The ARDL model finds no significant long-term relationship between budget deficit, trade deficit, real exchange rate, and inflation. Again, F - Bound test statistics do not support the long-run relation. However, the signs of the coefficients suggest negative relations between trade deficit, real exchange rate, and inflation while positive relations between trade openness.

The review shows that most international literature does not account for the effects of external factors on the trade deficit and current account deficit. In that respect, this study adds value by considering Indian factors. In the Nepalese context, Bhatt and Karki (2020) used only the budget deficit, current account deficit, and RGDP of Nepal, but they ignored the case of the real exchange rate, trade openness, and Indian factors. Similarly, Kafle et al. (2022) could not establish the long-run relation through the F- Bound test, though it uses real exchange rate, trade openness, and inflation as an explanatory factor. Both studies do not account for the Indian factors that may potentially affect trade deficit and the current account deficit. Hence, this study adds the value by incorporating the broader fiscal factors, such as government expenditure in explaining the trade deficit. Further, it also considers the real exchange rate with Indian rupees, Indian real per-capita GDP, and financial development. These are novel explanatory variables of the current account deficit in Nepal. Fiscal variables matter for the external deficit in Nepal. It also establishes the long-run relationship between current account deficit, budget deficit, real exchange rate, financial development, and Indian real per-capita GDP through the F - Bound test, which was not established earlier.

Research Methodology

Tools and Method of Data Analysis

The study adopted a descriptive method to analyze the nature of the external deficit. Similarly, econometric tools are used to examine the relationship of fiscal variables with trade and current account deficits.

Definition of Variables

Trade deficit = Imports – Exports.

Budget deficit = Government expenditure - Tax revenue.

Current account deficit = Debit - Credit in current account.

Trade openness = (Exports + Imports) / GDP

External deficit = Trade deficit and current account deficit.

Real exchange rate = $\frac{e * ICPI}{NCPI}$

Where, e = Exchange rate with Indian currency

ICPI = Indian Consumer Price Index

NCPI = Nepalese consumer price index

Nature and Sources of Data

The study used time series data of 48 years from 1975-2022 related to GDP at purchase price, GDP deflator, government expenditure, tax revenue, and budget deficit from Economic Survey published by Ministry of Finance; exports, imports, total trade, broad money supply, exchange rate, current account deficit, net foreign assets, CPI of Nepal from the Quarterly Economic Bulletin published by Nepal Rastra Bank; and CPI of India, GDP of India, population of India from World Development Indicators published by World Bank.

Econometric Model

The relationship between fiscal variables and the trade deficit is examined using Engle-Granger co-integration (Engle & Granger, 1987) and the Error Correction Model (ECM) as shown in given Model-I and Model-II.

Model - I: The long-run equilibrium relationship of trade deficit to GDP ratio (td) with government expenditure to GDP ratio (gexpgdp), and trade openness (topen) is examined using Engle-Granger co-integration and ECM as the relationship is given in equation (1).

$$lntd_t = \alpha + \beta_1 \, lngexpgdp_t + \beta_2 lntopen_t + u_t \ldots\ldots\ldots (1)$$

Where, expected sign of $\beta_1 > 0$, and $\beta_2 > 0$

The corresponding Error Correction Model is estimated using the given equation (2)

$$Dlntd_t = \alpha - \theta ECT_{t-1} + \beta_1 \Delta lntopen_t + \beta_2 \Delta lngexpgdp_t + \beta_3 \Delta lntd_{t-1} + u_t \ldots\ldots..(2)$$

Where, θ is the error correction coefficient and $\theta < 1$.

Expected sign of $\beta_1 > 0$, $\beta_2 > 0$, and $\beta_3 > 0$,

Ratio variables are, by nature, real variables so that all the variables are real.

Model – II: - The long-run equilibrium relationship between trade deficit ratio (td), government expenditure ratio, trade openness (topen), and Indian real per-capita GDP (rpcgdp) is examined by using Engle-Granger co-integration and ECM with the help of the given equation (3).

$$lntd_t = \alpha + \beta_1 lngexpgdp_t + \beta_2 lntopen_t + \beta_3 lnrpcgdp_t + u_t \ldots\ldots\ldots 3)$$

Expected sign of $\beta_1 > 0$, $\beta_2 > 0$ $\beta_3 < 0$ or > 0

Corresponding Error Correction Model is estimated using the following equation.

$$\Delta lntd_t = \alpha - \theta ECT_{t-1} + \beta_1 \Delta lntopen_t + \beta_2 \Delta lngexpgdp_t + \beta_3 \Delta lnrpcgdp_t + u_t \ldots..(4)$$

Note: ln stands for natural logarithms. Here, u_t is random disturbances.

The expected sign of $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$ or < 0, and θ is the error correction coefficient.

Ratio variables are, by nature, real variables so that all the variables are real.

Fiscal Variables and Current Account Deficit

The relationship between the fiscal variables and current account deficits is estimated using the ARDL model. The current account to GDP ratio (CAD) and budget deficit to GDP ratio (BD) were stationary at the level, but other variables were stationary at first differences. So, the Engle-Granger co-integration approach can't be used as shown in Models I & II. Since the variables are both I (0) and I (1), a better approach is to use the ARDL model. Variables used in the models are CAD, BD, trade openness (topen), real exchange rate with Indian currency (rxrate), M2 to GDP ratio (m2gdp), and Indian real per-capita GDP (rpcgdpi). Variables are transformed in log scale.

Model – III: - The basic ARDL model is given as follows -

$$lncadash_t = \alpha + \beta_1 lnbd_t + \beta_2 lnrxrate_t + \beta_3 lnm2gdp_t + \beta_4 lnrpcgdp_t + u_t \ldots (5)$$

Where, expected sign of $\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$, and $\beta_4 > 0$ or < 0.

Note: Cadash = Monotonically transformed CAD by change of origin.

A change of origin was necessary to make the CAD positive for log transformation. Regression coefficients are independent of change of origin. Ratio variables are, by nature, real variables so that all the variables are real. This model is estimated using the ARDL method at various lags using Akaike Information criteria, and the corresponding ECM model is reported.

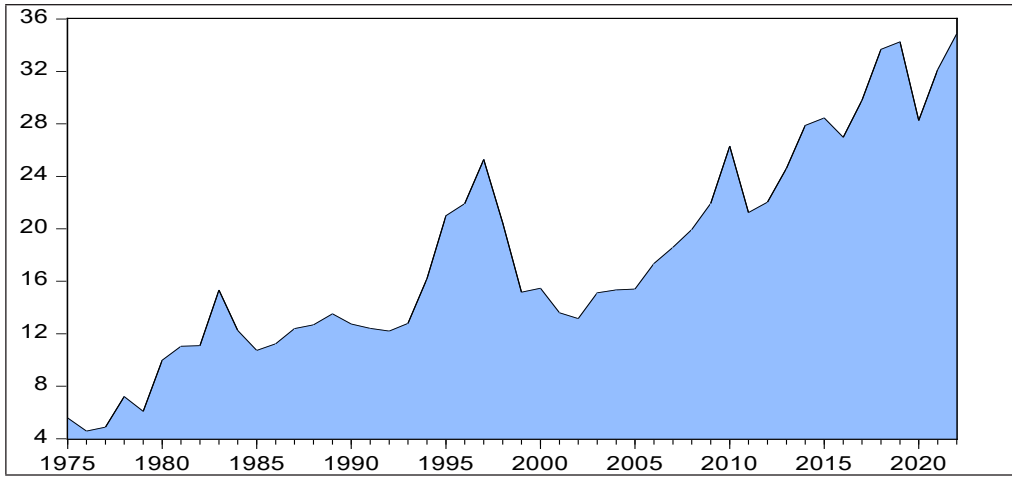
Nature of Trade Deficit, Current Account Deficit, and Other Specific Macro-economic Variables

Trade Deficit as Percent of GDP

The trade deficit to GDP ratio in 1975 was just 5.6 percent, and it started to increase gradually and reached 15.3 percent in 1983 as shown in Figure 1.

After that, it started to decline and reached 10.7 percent in 1985. It was the time when Nepal started a structural reform programme and became somewhat stationary up to 1993, and at that time, the deficit to GDP ratio was 12.8 percent. Nepal entered a democratic Era (Constitutional Monarchy) in 1990. It started an economic liberalization policy, which resulted in rapid growth in the trade deficit, and reached another peak level in 1997, where the deficit ratio was 25.3 percent. After that, it took a downturn and continuously declined up to 2002 when the deficit ratio was down to 13.2 percent. It was a period of the Maoist movement so that trade was disrupted, and internal demand was distorted. So, there was a decline in the trade deficit. There was marginal growth in the deficit between 2003 and 2005. The ceasefire was declared in 2006, then the Maoist movement ended. When the trade gained momentum, the deficit started to increase and peaked in 2010 with a new record of 26.3 percent. In 2011, it declined to 21.2 percent and then started to increase continuously and reached a new peak in 2019 with a new record of 34.2 percent. In 2020, it came down to 28.3 percent, then overshot and reached the historical maximum level in 2022 with a new record of 34. 9 percent. In 2022, there was a heavy deficit in the balance of payment and the deficit of the NRs. 255 billion. Nepal adopted a restrictive policy to reduce the deficit.

Figure 1: Trade Deficit as Percent of GDP



Source: Authors construction based on data on NRB, 2023.

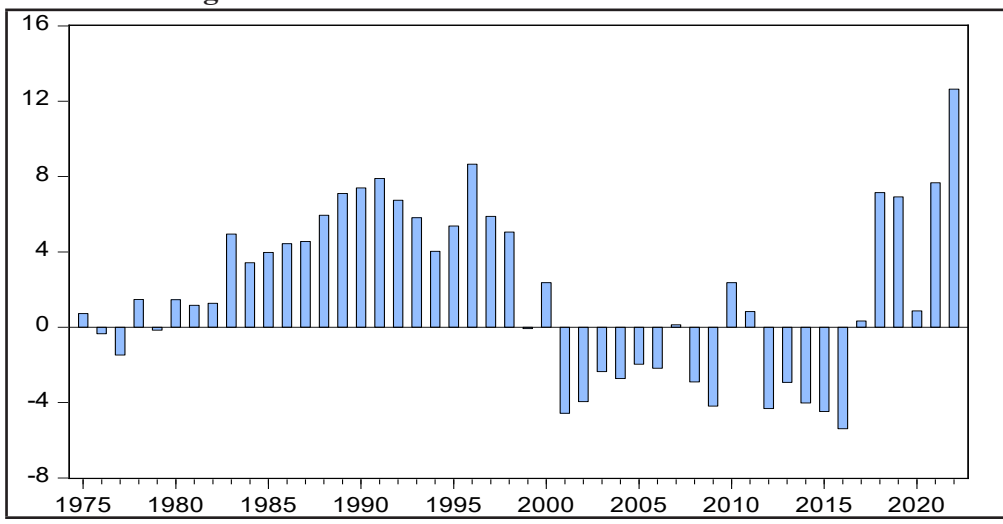
Current Account Deficit as Percent of GDP

Over the last 48 years, Nepal has faced a current account deficit (CAD) for 31 years and a surplus only for 17 years, as shown in Figure 2. In 1975, CAD was 0.7 percent of GDP. In 1976 and 1977, it was 0.3 and 1.5 percent of GDP. Between 1980 and 1998, the current account was continuously in deficit, and the maximum value of the deficit was 8.6 percent of GDP in 1996. The Figure-1

shows that it was marginally surplus in 1999, i.e. 0.06 percent of GDP. In 2000, it again became a deficit of the amount 2.4 percent. The period between 2001 and 2006 was the golden period for the current account in Nepal because it was surplus for six years. In 2007, it was a deficit, but in 2008 and 2009, it became a surplus, and in 2010 and 2011, it again became a deficit. The current account was continually surplus between 2012 and 2016, with a maximum value of 5.6 percent in 2016. The current account was continuously in deficit between 2017 and 2023.

Historically, the maximum deficit appeared in 2022, and the value was 12.6 percent. The balance of payment was also in deficit in 2022. Thus, the current account deficit seems to be a serious problem in the Nepalese context. Generally, a deficit of 5 percent or more is considered a serious problem. The CAD as a percentage of GDP is shown in the Figure 2. So, a positive amount indicates the deficit, and a negative amount indicates the surplus. The deficit is defined as debit minus credit in the balance sheet of the current account.

Figure 2: Current Account Deficit as Percent of GDP



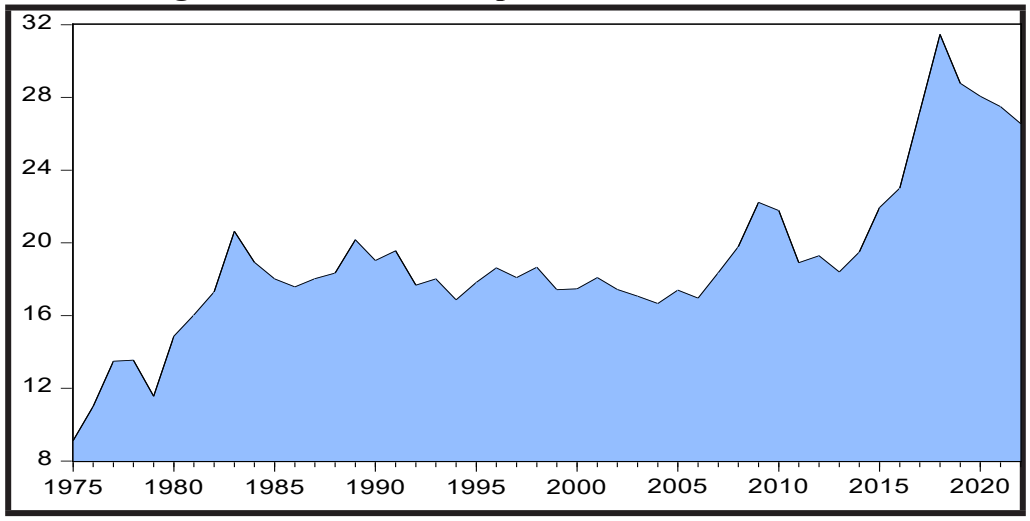
Source: Authors construction based on data of NRB, 2023.
Note: Deficit = Debit – Credit: Deficit (+), Surplus (-)

Government Expenditure to GDP Ratio

Government expenditure is the basic fiscal variable that could have an impact on trade and current account deficit. The trend of government expenditure to GDP ratio is shown in Figure 3. It shows that the government expenditure to GDP ratio was increasing. In 1975, government expenditure to GDP ratio was 9.1 percent. It gradually increased and reached 20.6 percent in 1982. After 1982, it seems somewhat stationary up to 2008, when this ratio was 19.8 percent. In 2009, it reached a new peak level of 22.2 percent and then started to decline

to 18.4 percent in 2013. Then, government expenditure rapidly increased and reached a maximum of 31.5 percent in 2018.

Figure 3: Government Expenditure as Percent of GDP



Source: Authors construction based on data of MoF, various issues.

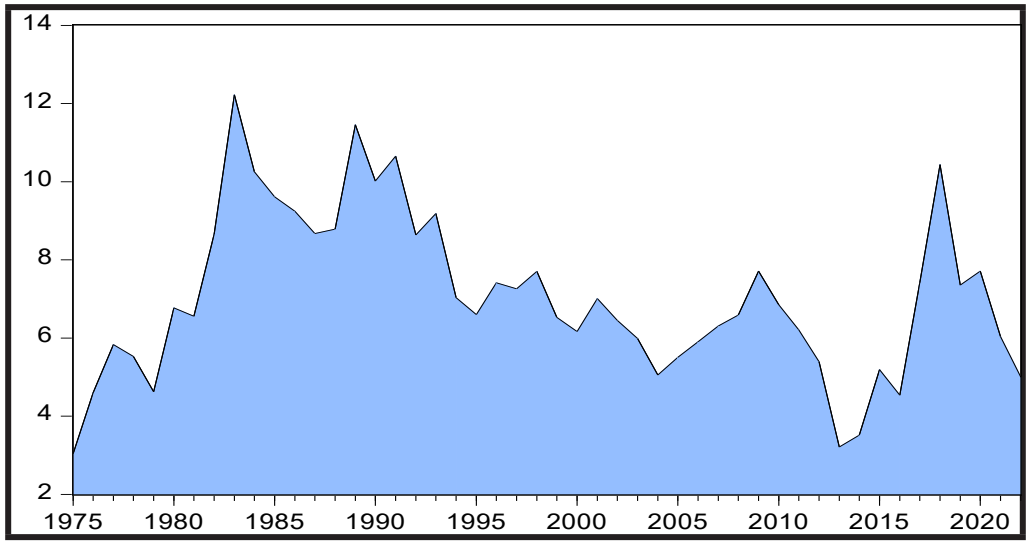
One of the main reasons for this rapid growth in government expenditure was the reconstruction of earth quickly devastated infrastructure initiated by the government after 2015. Government expenditure to GDP ratio is gradually declining between 2019 and 2022.

Budget Deficit to GDP Ratio

The budget deficit to GDP ratio gradually increased from 1975 to 1983 and reached the historical maximum level of 12.2 percent in 1983, as shown in Figure 4. After that, it started to decline continuously and reached a local minimum of 8.7 percent in 1987.Then, it started to increase and attained the second-highest maximum level in 1989 with a score of 11.4 percent. Nepal started a structural reform programme in the mid-1980s, and a multi-party democracy with a constitutional monarchy was established in 1990. Nepal again adopted the enhanced structural adjustment programme after 1990. So, the budget deficit to GDP ratio started to decline and reached 5.1 percent of GDP in 2004. Then, it slightly increased and reached 7.7 percent in 2009. In 2010 onwards, it gradually declined and reached the historical minimum level of 3.2 percent of GDP in 2013.

In the coming years, it started to increase and reached its third-highest peak in 2018 with a score of 10.4 percent. There was an strong earthquake in 2015; then the government accelerated its expenditure for reconstruction. So, the budget deficit to GDP ratio started to increase and reached the third-highest peak. After 2018, it again started to decline and reached 5 percent of GDP in 2022.

Figure 4: Budget Deficit as Percent of GDP



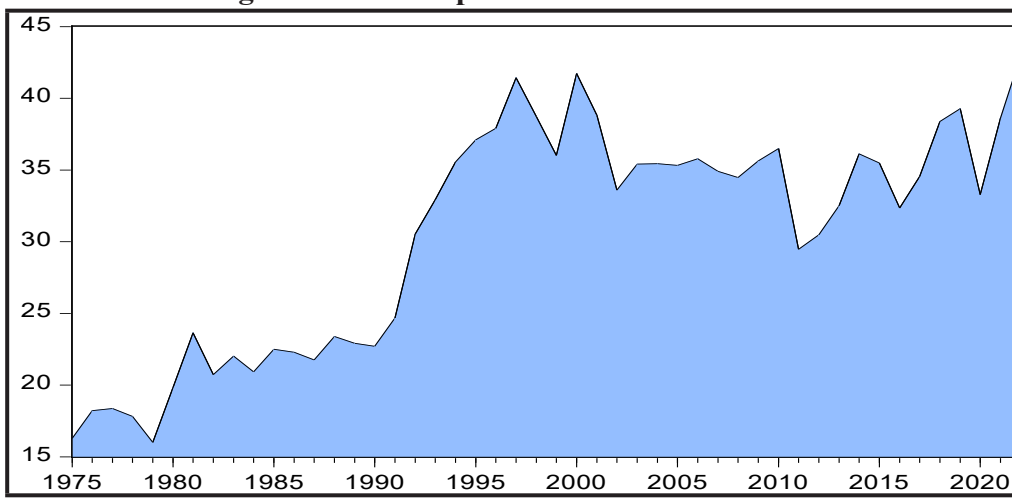
Source: Authors' construction based on data of MoF various issues.

This analysis shows that Nepal had a persistent budget deficit from 1975 to 2022. The deficit fluctuated; the highest peak was 12.2 percent, and the minimum trough was 3.2 percent. How far did these fluctuations affect the external deficit in Nepal? This is the basic question of the analysis.

Trade Openness as Percent of GDP

The nature and trend of trade openness variables are shown in given Figure 5. The exports plus imports to GDP ratio is taken as a trade openness indicator. Trade openness accelerates the pace of foreign trade. In 1975, the trade openness ratio was 16.3 percent, and it gradually increased to 22.7 percent in 1990. Economic liberalization has gained momentum since 1990, though it was initiated in the mid-1980s. So, this ratio increased at a faster rate and reached a new peak level in 1997, recording a height of 41. 4 percent. After that, it came down and reached 36 percent in 1999. There was rapid growth in the openness index in 2000, which recorded a new high peak level of 41.7 percent. After that, it gradually declined and reached 29.5 percent in 2011 which was the minimum level after 1997. Liberalization accelerates the imports of goods and services, but Nepalese exporters could not have utilized that opportunity of trade liberalization rather exports to GDP ratio started to decline. This was the main reason for the decline in the trade openness index after 1997. There was certain volatility in this ratio. But in 2022, it reached up to 43 percent of GDP. From 1997 to 2022, the ratio fluctuated but it remained roughly stationary; this is because the export sector of Nepal was declining, but the import ratio was roughly increasing. All these backgrounds indicate how trade openness could lead to a trade deficit in Nepal.

Figure 5: Trade Openness as Percent of GDP



Source: Authors construction based on data of NRB, 2023.

Empirical Analysis: Effects of Fiscal Variables on Trade Deficit and Current Account Deficit of Nepal

Unit Root Test

The unit root test of the variables using the ADF test is shown in the given Table 1. ADF statistics lag zero, one, and two are reported here. All variables are in log scale while the current account deficit is reported in both level form (cad) and log form (encash). All the variables are non-stationary at level except lncadash and lnbd. Thus, lncadash and lnbd are I (0). Table 1 shows that all the variables are stationary at first difference. Thus, it is concluded that lncadash and lnbd are I (0), and all other variables are I (1).

Table 1: Results of Unit Root Test of Variables

S. N.	Variables	Meaning	ADF at Lag		
			0	1	2
1	Cad	Current account deficit	- 1.850	- 1.683	- 1.197
2	lncadash	Log of cad with change of origin	- 2.901**	- 2.430	- 1.824
3	lnbd	Log of budget deficit	- 3.213**	- 2.673	- 2.328
4	lngexpgdp	Log of govt. exp.to GDP ratio	- 2.895	- 2.208	- 1.443
5	lnm2gdp	Log of M2 to GDP ratio	- 2.234	- 2.167	- 2.094
6	lntopen	Log of trade openness	- 1.747	- 1.461	- 1.610
7	lntd	Log of trade deficit	- 2.163	- 2.523	- 2.296
8	lnrxrate	Log of real exchange rate	- 1.740	- 1.004	- 1.311
9	lnrpcgdpi	Log of real per capita GDP of India	0.813	0.717	0.777
10	Δcad	Change in current account deficit	- 7.204***	- 6.055***	- 4.182***
11	Δlncadash	Change in log of cadash	- 8.182***	-6.658***	- 5.039***
12	Δlnbad	Change in log of budget deficit	- 6.843***	-5.113***	- 3.355***

13	Δlngexpgdp	Change in log of govt. exp. to GDP ratio	- 6.358***	-5.367***	- 3.975***
14	Δlnm2gdp	Change in log of M2 to GDP ratio	- 6.720***	-7.187**	- 4.533***
15	Δlnrxrate	Change in log of real exchange rate	- 8.879***	- 4.816***	- 4.632***
16	Δlntopen	Change in log of trade openness	- 7.095***	- 6.684***	- 4.400***
17	Δlntd	Change in log of trade deficit	- 7.242***	- 5.038***	- 3.180**
18	Δlnrpcgdpi	Change in log of real per capita GDP of India	- 7.353***	- 5.019***	- 3.356**

Source: Authors calculation based on data of NRB, 2023; MoF (various issues).

Note: *significant at 10%; **significant at 5%; and ***significant at 1% or better level. lncadas=log(cad+a) where a is arbitrary constant. So, lncadash is monotonically transformed variable of cad.

Model-I: ***Co-integrated Relation: Trade Deficit, Government Exp. and Trade Openness***

Co-integrated relationship is the long run equilibrium relation between the variables. OLS log linear relationship between trade deficit with government expenditure and trade openness was estimated and results is shown in the given Table 2.

Table 2: Co-integrating Relation: I (Dependent Variable: Trade Deficit (lntd)

Exp. Variables	Coefficients	St. Error	t-statistics	P-values	Summary Statistics
C	1.2743	0.1854	6.8738	0.000	R^2 = 0.885; N = 48
lngexpgdp	1.2505	0.1405	8.8981	0.000	D-W = 0.711
lntopen	0.8229	0.1156	7.1212	0.000	F = 174.82 (0.00); Sample: 1975-2022;

Source: Authors calculation.

Residual was obtained from the above equation, and an ADF test was performed. The ADF statistics at zero and one lag were found to be - 3.572 and - 3.934 respectively. The critical value or table value of co-integrating test statistics at the ten percent level is - 3.57. So, it is concluded that there is a co-integrating relation. It means that the trade deficit to GDP ratio, trade openness, and government expenditure to GDP ratios are co-integrated.

All the estimated coefficients of this long-run equation are statistically significant at one percent or better level. The estimated coefficient of trade openness states that as trade openness increases by one percent, the trade deficit to GDP ratio increases by 0.822 percent. Similarly, as government expenditure to GDP ratio increases by one percent, the trade deficit to GDP ratio increases by 1.250 percent. So, the estimated coefficient is elastic. F-statistics show that the overall fitness of the model is good, which is statistically significant. The coefficient of determination (R^2) value shows that an 88.5 percent variation in

trade deficit can be explained by trade openness and government expenditure, which is a comfortable result. In the long run, fiscal variables matter for the trade deficit of Nepal.

Error Correction Model

Table 3 gives the corresponding error correction model in which the coefficient of the error correction term is negative as expected. The estimated coefficient is significant at less than one percent. It states that 27.9 percent of the previous year's disequilibria are corrected for this year, and the system is moving toward equilibrium.

Table 3: Error Correction Model - I (Dependent Variable: Δlntd)

Exp. Variables	Coefficients	St. Error	t-statistics	P-values	Summary Statistics
C	0.0054	0.0178	0.3017	0.7644	R^2 = 0.547; D-W = 1.90; F = 12.38 (0.00); JB = 0.88 (0.64); χ2bpg = 5.512 (0.23), $\chi^2_{LM(2)}$ = 1.985 (0.37), Sample: 1977-2022; N = 46
Δlntopen	2.5517	0.5850	4.3622	0.0001	
Δlngexpgdp	0.9232	0.2021	4.5685	0.0000	
Δlntd (-1)	0.1388	0.1095	1.2679	0.2120	
ECT_{t-1}	- 0.2725	0.1053	- 2.5867	0.0133	

Source: Authors estimation.
Note: ECT= Error Correction Term.

The growth rate of trade openness and the growth rate of trade deficit are positively associated. The estimated coefficient of growth rate of trade openness is 2.551, which is significant at less than one percent. Similarly, the estimated coefficient of the growth rate of government expenditure to GDP ratio is 0.923, which is positive as expected. Thus, the growth rate of government expenditure to GDP ratio and the growth rate trade deficit to GDP ratios are positively related. The estimated coefficient is statistically significant at less than one percent. The coefficient of lagged growth of trade deficit is positive but statistically insignificant. The coefficient of determination is 54.7 percent. The error term seems to be white noise. The error term is normally distributed with non-auto regression and homoscedasticity.

Model - II: ***Co-integrated Relation: Trade Deficit, Government Expenditure, Trade Openness, and Per-capita GDP of India***

The log-linear relationship between trade deficit, government expenditure, trade openness, and real per capita GDP of India was estimated using the OLS method, and the result is shown in Table 4.

Table 4: Co-integrating Relation: II (Dependent Variable: lntd)

Exp. Variables	Coefficients	St. Error	t-statistics	P-values	Summary Statistics
C	- 2.5672	1.1151	- 2.3022	0.0261	$R^2 = 0.910$;
lntopen	0.5636	0.1274	4.4227	0.0001	D - W = 0.73;
lngexpgdp	0.9265	0.1565	5.9217	0.0000	F = 149.44 (0.00);
lnrpcgdpi	0.2685	0.0771	3.4839	0.0011	Sample: 1975-2022; N = 48

Source: Authors estimation.

Residual was obtained from the above equation, and an ADF test was performed. The ADF statistics at one lag were found to be - 4.21. The critical value or table value of co-integrating test statistics at ten percent is - 3.979. So, it is concluded that there is a co-integrating relation. There is a long-run equilibrium relationship between trade deficit, trade openness, government expenditure, and Indian per-capita real GDP. Ratio variables are, by nature, real variables so that real per-capita GDP is taken to represent the Indian factor. Trade deficit, trade openness, and government expenditure are ratio variables.

All the estimated slope coefficients of this long-run equation are statistically significant at one percent or better level. The estimated coefficient of trade openness states that as trade openness increases by one percent, the trade deficit increases to 0.563 percent. Similarly, as government expenditure to GDP ratio increases by one percent, the trade deficit to GDP ratio increases by 0.926 percent. Thus, fiscal variables matter for Nepal's trade deficit. Two-thirds of Nepal's trade with India used to be due to the open border between the east, west, and south. The estimated coefficient for Indian real per-capita GDP is 0.268, which states that as the per-capita GDP in India increases by one percent, the trade deficit of Nepal increases by 0.268 percent. The sign is opposite to the Keynesian argument but in line with the monetary approach to the balance of payment. As income in India increases, demand for money increases, people exchange goods and services for money, and so exports of India increase. This means that Nepal's trade deficit will increase. Another argument is that Nepal is self-sufficient in only a few limited numbers of goods and services. A large chunk of goods and services are imported from India. As production in India increases, the market mechanism injects goods and services from India to Nepal so that Nepal's trade deficit increases.

Error Correction Model

Table 5 gives the corresponding error correction model. The coefficient of error correction term is negative, as expected. The estimated coefficient is significant at less than one percent. It states that 39.7 percent of the previous year's disequilibrium is corrected for this year, and the system is moving toward equilibrium.

Table 5: Error Correction Model - II (Dependent Variable: Δlntd)

Exp. Variables	Coefficients	St. Error	t-statistics	P-values	Summary Statistics
C	- 0.0258	0.0230	- 1.1238	0.2679	$R^2 = 0.643$; D - W = 2.06; F = 11.74(0.00); JB = 3.23(0.19); χ2bpg = .92(0.24), $\chi^2_{LM(2)}$ = 2.96 (0.22), Sample: 1977-2022; N = 46
Δlntopen	2.3316	0.5395	4.3219	0.0001	
Δlntopen(-1)	- 1.1028	0.6234	- 1.7690	0.0847	
Δlngexpgdp	0.8617	0.1813	4.7531	0.0000	
Δlnrpcgdpi	0.8093	0.4136	1.9564	0.0576	
Δlntd(-1)	0.3194	0.1209	2.6426	0.0118	
ECT_{t-1}	- 0.3970	0.1061	- 3.7425	0.0006	

Source: Authors estimation.

Note: ECT= Error Correction Term.

The coefficients of current and one-year lag trade openness variables are 2.332 and - 1.102, respectively. Both the coefficients are statistically significant. The net effect is positive. Thus, in the short run, the trade openness also increases the trade deficit in Nepal. The estimated coefficient of government expenditure to GDP ratio is 0.861, which is positive and significant at less than one percent. Thus, the growth rate of government expenditure to GDP ratio and the growth rate of trade deficit to GDP ratio are positively related in Nepal. Growth in government expenditure is driving the growth of the trade deficit in Nepal. Another variable affecting the growth in the trade deficit ratio in Nepal is the growth in Indian real per-capita GDP. The estimated coefficient of growth in the Indian real per capita is 0.809, which is positive and statistically significant at five percent. Thus, Indian economic growth is driving Nepal's trade deficit. The final variable is lagged growth in the trade deficit ratio the estimated coefficient is 0.319, and it is significant at one percent. The coefficient of determination is 64.3 percent. The error term seems to be white noise. The error term is normally distributed with non-auto regression and homoscedasticity. So, the Model seems better fitted.

Model - III (ARDL): *Fiscal Variables and Current Account Deficit*

An ARDL Model on the variables lncadash, lnbad, lnrxrate, lnm2gdp, and lnrpcgdpi was estimated, and the selected model was of the order ARDL (1, 2, 3, 2 ,3). The long-run equilibrium relation is shown in Table 5. All the estimated coefficients of explanatory variables are statistically significant. The estimated coefficient of budget deficit is positive as expected and statistically significant at less than one percent level. There is a positive relationship between the budget deficit and the current account deficit. One percent increase in budget deficit increases the transformed current account deficit by 3.425 percent. Another external factor affecting the current account deficit in Nepal is the real exchange rate. Decreases in the real exchange rate (appreciation) increase the current

account deficit. This is because the price in Nepal is higher than in India, and Nepalese products become less competitive. The coefficient of the real exchange rate is negative, as expected, and statistically significant.

Table 6: ARDL Long Run Relation (Dependent Variable: lncadash)

Exp. Variables	Coefficients	St. Error	t-statistics	P-values
lnbd	3.4259	0.5967	5.7412	0.0000
lnrxrate	- 13.299	4.7628	- 2.7922	0.0092
lnm2gdp	- 6.6574	1.9994	- 3.3297	0.0024
lnrpcgdpi	5.1105	1.7401	2.9369	0.0064

Source: Authors' estimation.

Table 7: Lower and Upper Value of F Bound Statistics

Significance Level	I (0)	I (1)	Summary Statistics
10%	2.638	3.772	F- Bound Statistics (k=4) = 6.309**;**
5%	3.178	4.45	No. of observations = 45
1%	4.394	5.914	

Source: Authors' estimation.

The coefficient of the financial development variable is negative and statistically significant at 1 percent or better level. Financial development reduces the size of the current account deficit in Nepal. Another variable affecting the current account deficit is the Indian real per-capita GDP. The estimated coefficient of Indian real per capita GDP is 5.110, which is significant at less than one percent. The reasons for the positive effect of Indian real per-capita GDP are already discussed above. The F-bound statistics of the ARDL model is 6.30, which is above the upper bound value of F- statistics at one percent. Thus, the long-run relationship is statistically significant, which shows a co-integrated relationship. Estimated coefficients are quite large because the dependent variable is the ratio of current account deficit to GDP, which is on a logarithmic scale (Appendix – I).

ARDL Error Correction Model

The corresponding ARDL error correction model is shown in Table 8. The coefficient of error correction term is negative, as expected. The estimated coefficient is significant at less than one percent. It states that 76.3 percent of the disequilibrium of the previous year is corrected to this year, and the system is moving towards equilibrium. The coefficients of current and one-year lagged budget deficit are 1.762 and - 1.266. Both the coefficients are statistically significant. The combined effect of the net effect of the budget deficit on the current account deficit is positive. Another short-run factor affecting the current account deficit is the real exchange rate, and the coefficient is negative, as expected, but not statistically significant. Thus, the real exchange rate has only a long-run effect. In the short run, financial development has both negative and positive effects. Financial factors also matter in the current account deficit in

Nepal. The intercept terminology is also statistically significant at less than one percent. The coefficients of Indian real per-capita GDP and their lags are both positive and negative are statistically significant

Table 8: ARDL Error Correction Model (Dependent Variable: Δlncadash)

Exp. Variables	Coefficients	St. Error	t-statistics	P-values	Summary Statistics
C	- 38.0063	6.3533	- 5.9821	0.0000	R^2 = 0.604; F = 4.577(0.00); D - W = 2.36; JB = 1.04(0.59); χ2bpg = 18.30 (0.24), AIC = 1.55 Sample: 1977-2022; N = 46.
Δ(lnbd)	1.7621	0.4173	4.2231	0.0002	
Δ(lnbd (-1))	- 1.2664	0.4433	- 2.8569	0.0078	
Δ(lnrxrate)	- 0.9149	2.6803	- 0.3414	0.7353	
Δ(lnrxrate (-1))	4.4951	3.0141	1.4913	0.1467	
Δ(lnrxrate (-2))	8.1140	2.7828	2.9157	0.0068	
Δ(lnm2gdp)	- 3.1640	1.0763	- 2.9398	0.0064	
Δ(lnm2gdp (-1))	2.9410	1.1037	2.6647	0.0125	
Δ(lnrpcgdp)	6.0397	1.9913	3.0330	0.0051	
D(lnrpcgdp (-1))	- 2.2067	2.1239	- 1.0390	0.3074	
Δ(lnrpcgdp (-2))	- 4.8452	2.1015	- 2.3056	0.0285	
ECT_{t-1}	- 0.7674	0.1281	- 5.9915	0.0000	

Source: Authors Estimation.

Note: ECT= Error Correction Term.

Coefficient of determination is 60.4 percent. The random error term seems white noise. Error term is normally distributed with non-auto regression and homoscedasticity. Model seems better fitted. Above analysis shows that fiscal variables are causing the current account deficit in Nepal. The budget deficit is a major fiscal variable affecting the current account deficit in Nepal. Another domestic factor affecting the current account deficit is financial development. The real exchange rate and Indian real per-capita GDP are the external factors determining the current account deficit in Nepal. The estimated coefficient is quite large because the dependent variable is the growth rate of the current deficit to GDP ratio. The model in the original CAD variable is shown in Appendix I. Results are similar to this.

Conclusion

The trade deficit to GDP ratio of Nepal has been persistently increasing. In 1975, it was 5.57 percent; in 2022, it reached 34.87 percent. Over the last 48 years, Nepal has faced a current account deficit for 32 years and a surplus only for 16 years. Thus, the trade and current account deficits have become a serious concern for Nepal. This paper examined the relationship between fiscal variables, trade deficit, and current account deficit in Nepal, including the Indian factors. The trade openness and government expenditure to GDP ratio positively

drives the trade deficit ratio on the domestic front, while on the external front, the Indian real per-capita GDP positively affects it. There is both a long-run and short-run relationship between those variables. Similarly, on the current account side, the budget deficit is positively driving the current account deficit while financial development is negatively affecting it. These are the domestic factors. On the external front, the real exchange rate with Indian currency and Indian real per-capita GDP are affecting the current account deficit in Nepal. Thus, Nepal has to reduce the size of the budget deficit, reduce government expenditure to GDP ratio, enhance financial development, control the appreciating real exchange rate, and emphasize the import substitution process to improve the external balance of Nepal.

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Appendix – I: ARDL Long Run Form and F - Bounds Test

Dependent Variable: D (CAD) Included obsercations: 45

Conditional Error Correction Regression

Variables	Coefficients	Std. Error	t-Statistic	Prob.
Cad (-1)*	- 0.284222	0.107613	- 2.641149	0.0124
Lngexpgdp**	0.200491	0.038095	5.262905	0.0000
Lnm2gdp**	- 0.133321	0.029512	- 4.517543	0.0001
Lnrxrate(-1)	- 0.351932	0.149195	- 2.358865	0.0242
Lnrpcgdp(-1)	0.035567	0.007519	4.730157	0.0000
D(Cad(-1))	- 0.277635	0.141197	- 1.966298	0.0575
D(Cad(-2))	- 0.413769	0.146545	- 2.823498	0.0079
D(Lnrxrate)	0.006096	0.142378	0.042813	0.9661
D(Lnrxrate(-1))	0.145615	0.146654	0.992919	0.3278
D(Lnrxrate(-2))	0.249915	0.132908	1.880359	0.0686
D(Lnrpcgdp)	0.172041	0.109314	1.573825	0.1248

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 1: No Constant and No Trend

Variables	Coefficients	Std. Error	t-Statistic	Prob.
Lngexpgdp	0.705403	0.253469	2.782997	0.0087
Lnm2gdp	-0.469074	0.176971	-2.650571	0.0121
Lnrxrate	-1.238227	0.692318	-1.788524	0.0826
Lnrpcgdp	0.125140	0.048405	2.585255	0.0142

EC = Cad - (0.7054*lngexpgdp - 0.4691*lnm2gdp - 1.2382, *lnrxrate + 0.1251*lnrpcgdp)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
			Asymptotic: n =1000	
F-statistic	6.369904	10%	1.9	3.01
k	4	5%	2.26	3.48
		2.5%	2.62	3.9
		1%	3.07	4.44