

CHAPTER – VI

STABILITY OF THE LONG-RUN RELATIONSHIP BETWEEN TADE DEFICIT AND BUDGET DEFICIT IN NEPAL

6.1 Introduction

Co-integration study in Chapter V confirms the existence of long-run relationship between Trade Deficit (ΔTD_t) and Budget Deficit (ΔBD_t) series in Nepal. Stability of the long-run relationship is established if short-run shocks transmitted through ΔTD_t or ΔBD_t channel converge before long. The stability of long-run relationship is in this chapter studied through the Vector Error Correction Model (VECM).

6.2 Vector Error Correction Modeling

Vector Error Correction (VEC) modeling is a restricted Vector Auto Regression (VAR) that has been developed for make use of non-stationary data series those are known to be co-integrated. The VEC shows co-integrating relationship built into the model and it restricts the long-run dynamics of the endogenous variable to converge to their co-integrating relationships while allowing short-run adjustments

In doing so, the co-integrating term is known as the 'Error Correction' because the deviation from long run equilibrium is corrected by a numbers of partial adjustments (dynamics). It is pertinent to run this model here in our study to analyze the nature and speed of adjustments concerned to the specified models. Likely possibilities of test results would be:

- a. the short-period shocks might not have upset long-run relationship among variables
- b. the short-run dynamics might be converging, and
- c. the long-run relationship might have been stable.

6.3 VEC and the Estimable Models

In the present study the estimable Vector Error Correction model consists of the following equations:

$$\Delta TD_t = \gamma_1 + \rho_1 z_{t-1} + \alpha_1 \Delta TD_{t-1} + \alpha_2 \Delta TD_{t-2} + \alpha_3 \Delta BD_{t-1} + \alpha_4 \Delta BD_{t-2} + \varepsilon_{1t} \quad (6.1)$$

$$\Delta BD_t = \gamma_2 + \rho_2 z_{t-1} + \beta_1 \Delta TD_{t-1} + \beta_2 \Delta TD_{t-2} + \beta_3 \Delta BD_{t-1} + \beta_4 \Delta BD_{t-2} + \varepsilon_{2t} \quad (6.2)$$

where,

ΔTD_t = first difference of trade deficit (real) series

ΔBD_t = first difference of budget deficit (real) series

z_{t-1} = first lag of error term of co-integrating equation;

ε_{1t} and ε_{2t} are white noise errors;

$\alpha_1, \alpha_2, \alpha_3$ and α_4 are the coefficients of lagged ($\Delta TD_t, \Delta BD_t$) in equation (6.1), and

$\beta_1, \beta_2, \beta_3$ and β_4 are the coefficients lagged ($\Delta TD_t, \Delta BD_t$) in equation (6.2)

γ_1 , and γ_2 are constants regression of equations in (6.1) and (6.2) respectively.

In the estimation of Vector Error Correction model, at least one of ρ_1 , or ρ_2 of cointegrating terms in (6.1) and (6.2) should be nonzero. The lag length in estimation is determined through AIC and SIC criterion.

6.3.1 Vector Error Correction Estimates for Real Trade Deficits & Real Budget Deficits

The results of estimations of the Vector Error Correction Models consisting of equations (6.2) and (6.3) have been presented in Table 6.1

Table -6.1
Results of the Estimations of Vector Error Correction Model

Dependent Variable	Explanatory Variables	Coefficient	't' statistics
ΔTD_t	Constant (γ_1)	-634.5413	[-1.79508]**
	Z_{1t-1}	-0.177630	[-2.50440]***
	ΔTD_{t-1}	-0.086450	[-0.49165]
	ΔTD_{t-2}	0.068210	[0.39323]
	ΔBD_{t-1}	-0.915835	[-1.72665]**
	ΔBD_{t-2}	-0.727554	[-1.38764]*
ΔBD_t	Constant (γ_2)	-68.99995	[-0.51069]
	Z_{1t-1}	0.034616	[1.27686]
	ΔBD_{t-1}	-0.162533	[-0.80169]
	ΔBD_{t-2}	0.089712	[0.44766]
	ΔTD_{t-1}	-0.007219	[-0.10741]
	ΔTD_{t-2}	0.072632	[1.09548]

, **, * Indicates statistical significance at the 10%, 5%, 1% level.*

6.3.2 Findings from the VEC Model Estimation

The Table 6.1 shows that,

- (ii) $\hat{\rho}_1$, the coefficient of Z_{1t-1} (in equation 6.1 is significant at 1% level.
- (iii) $\hat{\alpha}_3$, the coefficient of ΔBD_{t-1} is significant at 5% level.
- (iv) $\hat{\alpha}_4$, the coefficient of ΔBD_{t-2} is significant at 10% level.

- (v) $\hat{\rho}_2$, the coefficient of Z_{1t-1} (in equation 6.2) is significant at 10% level.
- (vi) $\hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3$, and $\hat{\beta}_4$ are found to be insignificant even at 10% level.

6.4 Economic Interpretations of the Findings on the Short-run Dynamics

These findings provide valuable indications about short-run dynamics and the nature of short-run causality between TD and BD in the economy of Nepal. These are as follows:

- (i) Significant $\hat{\rho}_1$, (i.e. $\hat{\rho}_1 \neq 0$) shows that the shocks in the previous period significantly affect the long-run relationship between TD and BD.
- (ii) $\hat{\rho}_1 < 0$ indicates that ΔTD_t falls short of its long-run equilibrium value because of the short-run shock.
- (i) $|\hat{\rho}_1| < 1$ indicates that the short-run deviation of ΔTD_t from its long-run equilibrium value is converging. This means that such deviation does not last long and ΔTD_t gets back to its long-run value again.
- (ii) Significant values of $\hat{\alpha}_3$ and $\hat{\alpha}_4$ (i.e. $\hat{\alpha}_3 \neq 0, \hat{\alpha}_4 \neq 0$) indicate that the long-run values of ΔTD_t are determined by the current and the lagged values of ΔBD_t . Consequently, variations in ΔTD_t are explained and caused by those in ΔBD_t . The short-run causality runs from ΔBD_t to ΔTD_t .
- (iii) Insignificant values of the $\hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3$, and $\hat{\beta}_4$ indicate that long-run values of ΔBD_t are not determined by the lagged values of ΔTD_t . Consequently, variations in ΔTD_t are not explained and caused by those, in ΔBD_t . This testifies that the short-run causality does not run from ΔTD_t to ΔBD_t .

- (iv) Insignificant values of $\hat{\rho}_1$, $\hat{\beta}_1$, $\hat{\beta}_2$, $\hat{\beta}_3$, and $\hat{\beta}_4$, as given by the statistical tests, indicate that ΔBD_t is not an *endogenous variable* in the system. Consequently, any shock through the channels of BD or TD in the short-run fails to exert any effect on its values.

6.5 Summary:

This Chapter is devoted for the study of stability of long-run equilibrium relationship between Trade Deficits (TD) and Budget Deficits (BD).

More specifically, the findings of our study in this chapter are as follows:

- (i) *ΔTD_t is the endogenous variable while ΔBD_t is exogenous variable. In such case, TD maintains a long-run equilibrium relationship with BD.*
- (i) *The shocks significantly affected the long-run equilibrium relationship between TD and BD in the short-run.*
- (ii) *The 'long-run equilibrium relationship' that TD maintains with BD is 'stable' since the 'short-run dynamics' displays a converging pattern.*

