

CHAPTER –VII

STABILITY OF THE LONG-RUN RELATIONSHIP BETWEEN TRADE DEFICIT AND BUDGET DEFICIT IN MALDIVES

7.1 Introduction:

The study of cointegration in Chapter VI confirms the existence of long-run relationship between 'budget deficit' and 'trade deficit' series in the Maldives. However, it is imperative to know if the relationship is stable. Stability of the long-run relationship is established if the short-run shocks transmitted through BD_t or TD_t channel converge before long. The stability of the long-run relationship is being studied through the estimation of '*Vector Error Correction Model*' (VECM).

The '*Vector Error Correction Specification*' restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing a wide range of short-run dynamics. The *Cointegration* term is known as the '*error correction*' term since the deviation from the long-run equilibrium is corrected gradually through a series of partial short run adjustments. Therefore, *VEC* modeling gives important information about the short-run relationship between the cointegrated variables. We, therefore, seek to study the stability of the long-run relationship between ΔBD_t and ΔTD_t series. The study in this Chapter is devoted to address this issue.

7.2 The Estimable VEC Model.

The estimable *Vector Error Correction Model* consists of the following equations..

$$\Delta TD_t = \gamma_1 + \rho_1 z_{t-1} + \alpha_1 \Delta TD_{t-1} + \alpha_2 \Delta TD_{t-2} + \alpha_3 \Delta BD_{t-1} + \alpha_4 \Delta BD_{t-2} + \hat{\varepsilon}_{1t} \quad (7.1) \quad \text{and}$$

$$\Delta BD_t = \gamma_2 + \rho_2 z_{t-1} + \beta_1 \Delta BD_{t-1} + \beta_2 \Delta BD_{t-2} + \beta_3 \Delta TD_{t-1} + \beta_4 \Delta TD_{t-2} + \hat{\varepsilon}_{2t} \quad (7.2)$$

where,

ΔTD_t = first difference of trade deficit

ΔBD_t = first difference of budget deficit

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

ε_{1t} and ε_{2t} are white noise errors, α_1 , α_2 , α_3 and α_4 are the coefficients of lagged (ΔTD_t , ΔBD_t) respectively in equation (7.1) and β_1 , β_2 , β_3 and β_4 are the coefficients of lagged (ΔBD_t , ΔTD_t) respectively in equation (7.2), γ_1 and γ_2 are constants of regression in equations (7.1) and (7.2).

In the estimation of '*Vector Error Correction Model*', at least one of ρ_1 , or ρ_2 of cointegrating terms in (7.1) and (7.2) should be nonzero. The lag-length in estimation is determined through AIC and SIC.

7.3 Results of the Estimation [Equations (7.1)-(7.2)]

The results of estimation of the '*Vector Error Correction Models*' consisting of equations (7.1) and (7.2) have been presented in the Table 7.1 below.

Table-7.1

Results of the estimation of Vector Error Correction Model [Equation (7.1) and (7.2)]

Dependent Variable	Explanatory Variables	Coefficients	S.E	't'-statistics
ΔTD_t	γ_1	-30.20246	50.2855	-0.60062
	\hat{e}_{t-1}^{***}	0.870190	0.21638	-4.02154
	ΔTD_{t-1}^*	0.603546	0.40991	1.47240
	ΔTD_{t-2}^{**}	0.541488	0.27021	2.00394
	ΔBD_{t-1}	-0.406938	0.42167	-0.96507
	ΔBD_{t-2}	-0.024259	0.39263	-0.06179
ΔBD_t	γ_2	-6.035795	31.7669	-0.19000
	\hat{e}_{t-1}	-0.046085	0.13670	-0.33714
	ΔBD_{t-1}^{**}	-0.707773	0.26638	-2.65701
	ΔBD_{t-2}	-0.225807	0.24804	-0.91038
	ΔTD_{t-1}	-0.234442	0.25895	-0.90535
	ΔTD_{t-2}	-0.150139	0.17070	-0.87954

*, **, *** indicates statistical significance at the 10%, 5% and 1% level respectively. S.E = Standard Error

7.4 Stability of the VEC Model

The roots of the *Characteristic Polynomials* corresponding to *Autoregressive Structures* in equations (7.1) and (7.2) are given by the Table 7.2.

Table 7.2

Roots of Characteristic Polynomial

Endogenous variables: DBD DTD	
Exogenous variables:	
Lag specification: 1 2	
Root	Modulus

1.000000	1.000000
-0.973176	0.973176
0.228651 - 0.750664i	0.784715
0.228651 + 0.750664i	0.784715
-0.354209 - 0.290944i	0.458380
-0.354209 + 0.290944i	0.458380

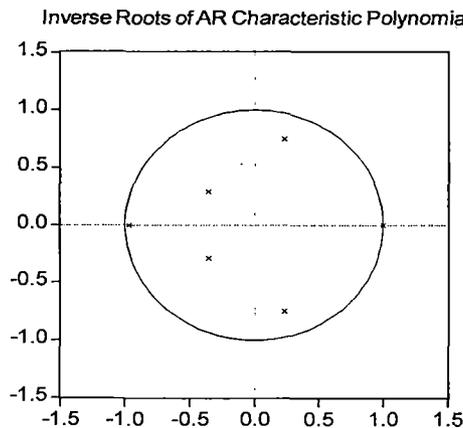
It is observed from the Table 7.2 that

- (i) the absolute values of the *characteristic roots* are less than unity.
- (ii) three of the *characteristic roots* are positive (statistically greater than zero)
- (iii) two of the characteristic roots are negative (statistically lower than zero)
- (iv) one of the roots has been pegged to unity because of the constraints of the system.

Again the inverse roots of the **AR characteristic polynomials** lie with in the unit circle. This is shown in the Figure 7.1

Figure 7.1

Inverse roots of AR characteristic polynomials



All these testify for the **stability of the estimated VEC model consisting of the equations (7.1) and (7.2)**

7.5 Findings From the Table 7.1 [Equation 7.1]

The Table (7.1) shows that

- (i) $\hat{\rho}_1$ the coefficient of \hat{e}_{t-1} is significant at 1% level.
- (ii) $\hat{\rho}_1$ is positive and less than unity.
- (iii) $\hat{\alpha}_3 \hat{\alpha}_4$ are not significant even at 10% level.

7.6 Economic Interpretations of The Findings About The Short Run dynamics [Equation (7.1)]

These findings provide valuable implications about short-run dynamics and the nature of short-run causality between TD_t and BD_t in the economy of Maldives. These are as follows:

- (i) the significant coefficient of Z_{t-1} in the cointegrating equation (7.1) indicates that the short-run shocks, transmitted through the trade deficit channel, affect the long-run dynamic relationship between budget deficit and trade deficit in Maldives.
- (ii) coefficient of Z_{t-1} being positive, i.e. $\hat{\rho} > 0$ indicates that, following shocks transmitted through the trade deficit channel, budget deficit registers a rise above the long-run equilibrium level.
- (iii) $\hat{\rho} < 1$ i.e. the coefficient of Z_{t-1} being less than unity indicates that such deviation of trade deficit from its long-run equilibrium level are temporary and convergent. Thus the long-run relationship between trade deficit (dependent variable) and budget deficit (independent variable) is **stable**. Consequently, the corresponding short-run dynamics defines '*stable equilibrium process*'.
- (iv) All the coefficients of lagged budget deficit terms in the equation (7.1) are statistically insignificant (even at 10% level). It indicates that, in the short run adjustment process, budget deficit fails to *Granger Cause* trade deficit.

7.7 Findings from the Table 7.1 (Equation 7.2)

The Table 7.1 shows that in the equation (7.2)

- (i) $\hat{\rho}_2$ the coefficient of Z_{t-1} is not significant even at 10% level.
- (ii) $\hat{\beta}_1$, the coefficient of ΔBD_{t-1} , is significant even at 1% level.
- (iii) all other coefficients ($\hat{\beta}_2, \hat{\beta}_3, \hat{\beta}_4$) fail to be significant even at 10% level.

7.8 Economic Interpretation of The Findings From the Table 7.1 [Equation 7.2]

The economic significance of these findings is as follows.

- (i) $\hat{\rho}_2$ being insignificant (even at 10% level), indicates that the shocks, transmitted through the budget deficit channel, fail to disturb the long-run relationship that budget deficit maintained with trade deficit.

(ii) $\hat{\beta}_3$ and $\hat{\beta}_4$, the coefficients of $\Delta TD_{t,i}$ ($i = 1, 2$) respectively, are not significant even at 10% level. This indicates that trade deficit fails to *Granger Cause* budget deficit in the short-run in the economy of Maldives over the period of study.

7.9 Summary of the Chapter VII

This Chapter is devoted to the study of *stability of long-run equilibrium relationship* between Trade Deficits (TDt) and Budget Deficit (BDt). The findings of our study in this chapter are as follows.

- (i) *There exists no cointegration and, therefore, a long run equilibrium relationship between budget deficit (BDt) and Trade Deficit (TDt) series at level.*
- (ii) *Cointegration exists between first differenced data-sets for budget deficit and trade deficit.*
- (iii) *Budget deficit and trade deficit series are CI (1, 1).*
- (iv) *The short run shocks, transmitted through the trade deficit channel, affect the long run dynamic relationship that trade deficit maintains with budget deficit.*
- (v) *The deviations of trade deficit from its long- run equilibrium level are temporary and convergent.*
- (vi) *The long- run relationship that trade deficit maintains with budget deficit is stable.*
- (vii) *Consequently, the short-run dynamics for the trade deficit defines a 'stable equilibrium process.*
- (viii) *The shocks, transmitted through the budget deficit channel, fails to disturb the long -run relationship that budget deficit maintains with trade deficit.*
- (ix) *Budget deficit fails to 'Granger Cause' trade deficit in the short run.*
- (x) *Trade deficit fails to 'Granger Cause' budget deficit in the short run.*
- (xi) *Budget deficit and trade deficit, therefore, appear to be independent of each other in the short-run in the economy of Maldives.*
- (xii) *The Ricardian Equivalence Hypothesis seems to be valid in the short-run.*