

Currency Depreciation and J Curve Analysis: A Case Study Based on Sri Lanka

Hasitha Lakmal and Prasanna Perera.

*Department of Economics and Statistics, University of Peradeniya,
Sri Lanka*

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Introduction

The variability of foreign exchange rates affects many economic activities in all over the world. Currency depreciation or currency devaluation directly affects to decrease imports and increase exports. Therefore trade balance will be favorable. The currency devaluation immediately raises the domestic currency price of imports. The quantities of imports and exports don't adjust right away. Therefore trade balance deficit increases in the short run. As time passes, the quantity of imports fall and quantity of exports rises. Eventually, the trade balance moves toward a surplus. This type of system can be called a J curve (Yarbrough and Yarbrough, 2003).

Real exchange rate devaluation badly affects on trade balance in the short run but it favorably affects in the long run. Therefore, there is a J curve effect regarding bilateral trade in Thailand (Bahmani-Oskooee and Kantipong, 2001). Although in long run bilateral real exchange rate devaluation or depreciation favorably affects on trade balance but not in the short run (Dash, 2013). However, according to Perera (2009) and Vijayakumar (2014), bilateral foreign exchange rate positively affects on trade balance between Sri Lanka and USA in both long run and short run. But no studies have been conducted to examine the effect of currency depreciation (Sri Lanka introduced freely floating exchange rate system in 2001) on bilateral trade balance between Sri Lanka and her main trading partner India using J curve analysis.

Objective

The main objective of this study is to identify the impact of foreign exchange rate (express as direct quotation) on trade balance in Sri Lanka. The study also examines is there a J curve effect between Sri Lanka and India.

Methodology

Basically trade balance depends on real exchange rate and real income of countries. Following Bahmani-Oskooee and Kantipong (2001) this study employed multiple regression model. We took natural logarithm for all variables.

$$\ln TB_t = \beta_0 + \beta_1 \ln GDP_{SL,t} + \beta_2 \ln GDP_{IND,t} + \beta_3 \ln RER_t + \varepsilon_t \quad (1)$$

Where, TB refers to trade balance (TB is defined as a ratio); GDP_{SL} refers to Sri Lanka's income; GDP_{IND} refers to India's income; RER refers to real exchange rate; ε_t refers to the error term and t indicates time period. This study was covered time period of 2002 quarter 1 – 2013 quarter 4. The data on above variables were collected from and annual reports of Central Bank of Sri Lanka and Department of Census and Statistics in Sri Lanka.

As the first step of the estimation procedure, ADF test and Phillip Peron test were used to check the Stationary of data. Johansen co-integration test was used to identify the long run relationship and also VECM was used to identify both short run and long run relationship as well as long run equilibrium among the variables. The Impulse Response Function (IRF) was employed to identify the J curve effect.

Results and Discussion

Unit root tests revealed that all variables were non-stationary at the level, but were stationary at first difference which suggest that all the variables under this study were integrated in order 1 [I(1)] The lag length criteria suggested 4 lags (See appendix Table 2). Johansen co-integration rank test has detected one co-integration relationship which conform long run relationship among the variables.

Table 1: Results of Long Run Relationship from VECM

Dln_TB	Constant	Dln_RER(-1)	Dln_GDP _{SL} (-1)	Dln_GDP _{IND} (-1)
1.000000	0.202425	15.91223 [1.82208]	51.50516 [-3.88519]	14.07285 [1.83435]

Note: t values are in parenthesis

According to the table 1, RER (only 10% significance level) and GDP_{SL} have a negative and significant impact on TB while GDP_{IND} has a positive and significant relationship at 10% in the long run.

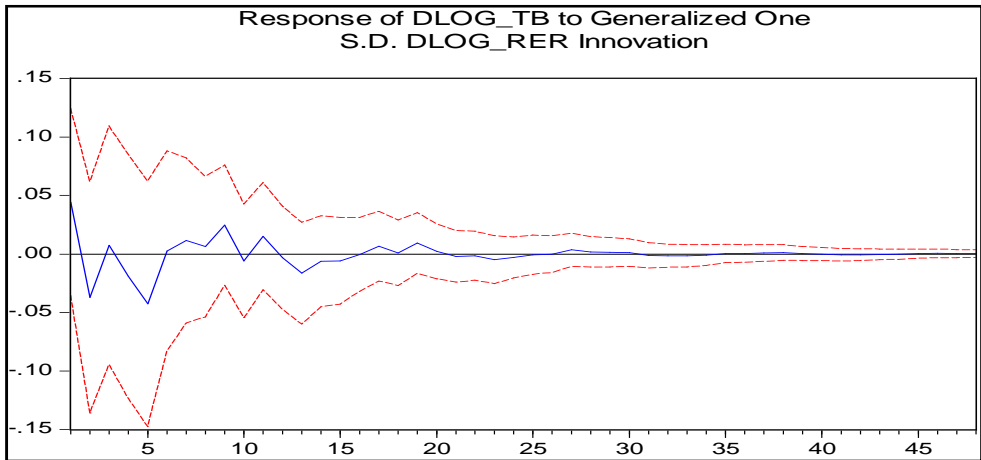
Table 2: Results of Short Run Relationship and Long Run Equilibrium from VECM

Lags	Variables					
	EC	Constant	ΔLn(TB)	ΔLn(RER)	ΔLn(GDP _{SL})	ΔLn(GDP _{IND})
1	-0.2955 [-2.199]	-0.0015 [-0.033]	-1.333 [-6.227]	2.124 [0.934]	-5.021 [-1.414]	0.412 [0.236]
2			-0.998 [-3.344]	-0.089 [0.038]	-3.958 [-1.406]	1.226 [0.872]
3			-0.903 [-3.139]	1.677 [0.727]	-2.484 [-1.193]	0.236 [0.179]
4			-0.524 [-2.4924]	-0.728 [-0.537]	-1.763 [-1.136]	0.577 [0.585]

Note: t values are in parentheses

According to above result of VECM, significant and negative error correction coefficient (-0.2955) indicates 29.5% disequilibrium is corrected every quarter and negative sign of coefficient implies TB moves downwards and towards the long run equilibrium path. However, there was no significant relationship among TB and GDP_{SL}, GDP_{IND} and RER in the short run. According to below generalized IRF results, there was no J curve effect between Sri Lanka and India.

Figure 1: Result of Generalized IRF



Source: Author's calculation

Conclusion

According to the results of this study, there was a positive and significant relationship between trade balance and real exchange rate in the long run but no significant relationship in the short run. Therefore, a small country like Sri Lanka cannot respond to variability of foreign exchange rate in the short run. However Sri Lanka is experiencing balance of payment (BOP) deficit since past decades. So, currency depreciation is the best policy in the long run. Therefore, in the short run, Sri Lanka should take policies not related to the exchange rate. And also we have to impose tariffs on imported goods which can produce domestically and promote the export diversification and maintain relationship among big market like Asia and Europe.

References

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Appendix

Table 1: Results of Unit Root Tests

Variable	ADF		PP	
	Level	1 st Different	Level	1 st Different
Ln(TB)	-2.406	-11.733	-3.322	-12.155
Ln(RER)	-3.235	-4.828	-2.407	-5.226
Ln(GDPSI)	-0.810	-4.497	-0.887	-23.263
Ln(GDPIn)	-2.225	-7.748	-2.544	-7.204

Table 2: The Results of Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	203.3415	NA	1.11e-09	-9.271697	-9.107864*	-9.211280
1	227.6598	42.98119	7.54e-10	-9.658595	-8.839432	-9.356513
2	250.2106	35.66169*	5.68e-10	-9.963282	-8.488789	-9.419534*
3	266.6064	22.87785	5.87e-10	-9.981691	-7.851868	-9.196278
4	287.2356	24.94699	5.26e-10*	-10.19700*	-7.411851	-9.169926

Table 3: The Results of Co-integration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.381685	50.00087	47.85613	0.0310
At most 1	0.313149	29.32834	29.79707	0.0565
At most 2	0.205663	13.17594	15.49471	0.1085
At most 3	0.073341	3.275294	3.841466	0.0703

Trace test indicates 1 co integrating eqn(s) at the 0.05 level