Indian Journal of Economics & Business, Vol. 3 No. 1 (January-June, 2017)

EXCHANGE RATES, FREE TRADE AGREEMENT AND BILATERAL TRADE BALANCES OF SRI LANKA

SOORIYAKUMAR KRISHNAPILLAI* **AND**
HENRY THOMPSON**

Abstract

This paper examines the short run and long run effects of real exchange rate changes and Free Rate Agreement (FTA) on the real trade balance of Sri Lanka with major trade partners. India and Japan are major sources of Sri Lankan imports and USA is major export destination. Results show that there is a clear J-curve effect and also Marshall-Lerner condition holds. The FTA with India has decreased the real bilateral trade balance of Sri Lanka. This focus on the bilateral trade balance relationships with major trade partners should be useful for policy makers in Sri Lanka.

I. INTRODUCTION

The exchange rate is an important policy variable that influences trade flows, capital flows, inflation, international reserves, and remittances. Many empirical analyses examine how exchange rate changes affect the trade balance of developing and developed countries. There is still considerable disagreement regarding the effectiveness of currency devaluation as a tool for increasing the balance of trade. Many Asian countries encountered crisis in 1997 due to poor choice and implementation of this policy. However, there is no consensus in the theoretical or empirical literature about any unique effect of the exchange rate volatility on macroeconomic indicators.

Immediately after independence in 1948, Sri Lanka adopted a highly regulated financial, fiscal, and industrial policy along with inward-oriented import substituting trade and overvalued exchange rate system. The resulting economic growth was not satisfactory. Thus, in order to achieve a high and sustained economic growth and rapid development, Since 1977, most of the trade and industrial policies have aimed at higher growth in the export sector. International competitiveness, faster growth of export-oriented industries, tariff rationalization, access to bigger markets,

* Graduate Student 306, Comer Hall, Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, AL 36849, *E-mail: kzs0008@auburn.edu*

** Professor 302, Comer Hall, Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, *E-mail: thomph1@auburn.edu*

encouraging imports of intermediate capital goods were the main objectives of the exchange rate and trade policies of government. The trade deficit widened as the import bill increased under the influence of the government's development program and defense expenditure.

Since the independence in 1948, Sri Lanka has gone through different exchange rate regime from fixed exchange rate to floating exchange rate regime. These changes had different effects on nominal, real effective exchange rate and trade balance and balance of payments over the years. The Sri Lanka Rupee was pegged to sterling pounds under the Bretton Woods system in 1948. After it was pegged to the dollar in 1971 it started to depreciate with the dollar. In a major reform in November 1977, multiple exchange-rates were introduced. Then, the rupee depreciated further relative to United States dollar. Sri Lanka introduced floating exchange rate system in August 1990.

Western countries were the major export destinations and Asian countries were the major import suppliers. The USA and U.K are Sri Lanka's major export destination. India and Japan are major sources of Sri Lankan imports. The composition of exports demonstrated the continuing dominance of industrial exports followed by agricultural and mineral exports. USA and EU are the major destinations for the export of textiles and garments. Establishment of Free Trade Arrangements (FTA) between India and Sri Lanka has accelerated the development of national economies, promoting mutually beneficial bilateral trade and strengthening intra-regional economic cooperation.

Being a small open economy, the continuously improving liberal economic environment and the greater freedom in trade, investment and payments have benefited Sri Lanka in maintaining its growth momentum and in strengthening the ability to face recurrent external shocks during the last three decades. Sri Lanka remained firmly committed to the multilateral trading system, being a founder member of the World Trade Organisation (WTO).

The aim of this paper is to examine whether there is a difference in the short run and long run relationships between the real exchange rate and the real trade balance with different trade partners and whether the Marshall- Lerner (ML) conditions holds and also to estimate the impact of Free Trade Agreement (FTA) with India on bilateral trade balance of Sri Lanka.

Singh (2002) examined the relationship between trade balance, real exchange rate, domestic income, and foreign income for Indian data. The study indicates that real exchange rate and domestic income shows a significant impact on trade balance. Onafoworas (2003) investigated the effects of real exchange rate changes on the bilateral real trade balance in three ASEAN countries (Malaysia, Indonesia and Thailand) with the US and Japan using cointegrating vector error correction model (VECM). The results indicate a positive long-run relationship between the real exchange rate and the real trade balance in all cases, these estimations for Malaysia-US, Indonesia-US, and Indonesia-Japan show that real trade balance

has a negative relationship with real domestic income and a positive relationship with real foreign income in the long run. But, the real trade balances in the models for Malaysia-Japan, Thailand-US, and Thailand-Japan indicates a different result, the positive relationship with real domestic income and a negative relationship with real foreign income.

II. MODEL AND ESTIMATION

In this study, we measure trade balance as the ratio of the bilateral exports value (X) to the bilateral imports value (M). The X/M ratio has been used in many empirical investigations of the trade balance-exchange rate relationship (Gupta-Kapoor and Ramakrishnan, 1999). The ratio can be interpreted as nominal or real trade balance (Bahmani-Oskooee, 1991) and also the ratio in a logarithmic model gives the Marshall-Lerner condition exactly rather than as an approximation (Boyd *et al.* (2001).

We specify the bilateral real trade balance with India, Japan and U.S.A as a function of real domestic income, real foreign income, bilateral real exchange rate, and a (0,1) dummy variable for the free trade agreement in 2000 for the equation of India. The reduced form of the equation is given as follows:

$$\ln(X/M)t = \propto_0 + \propto_1 Iny_t + \propto_2 Iny_t^* + \propto_3 InREER_t + \propto_4 D + \varepsilon_t \quad (1)$$

Where: *ln* is natural logarithm, Yt is real domestic income, Yt* is real foreign income, REERt is real effective exchange rate, D is a shift dummy variable and ε_t is an error term.

We use annual data covering the period 1982 to 2007 collected from the IMF, International Financial Statistics, 2008 CD-ROM, and IMF, Annual Direction of Trade Statistics. Central bank of Sri Lanka estimates the monthly real effective exchange rate (REER) based on trade composition with 24 trading partner countries. The selection of the countries in the basket is based on bilateral trade shares and the importance in terms of competitiveness of those countries exports with Sri Lankan exports in international markets. This paper estimates annual REER according to the formula the central bank uses for monthly REER but this paper consider 2005 as base year.

$$REER = \pi_{i=1}^{24}[(e/e_i)(p/p_i)]^{w_i} \quad (2)$$

Where e: Exchange rate of the Sri Lankan rupee against the US dollar (US dollars per rupee in index form)

e_i: Exchange rates of currency *i* against the US dollar (US dollars per currency *i* in index form)

w_i: Weights attached to the country/ currency *i* in the index

P : Consumer Price Index (CPI) of Sri Lanka

P_i: Consumer price index of country *i*

Theory suggests that the volume of exports (imports) to a foreign country (domestic country) should increase as the real income and purchasing power of the trading partner (domestic economy) rises, and vice versa. So, it indicates that $\propto_1 < 0$ and $\propto_2 > 0$. But, if the increase in real income is due to an increase in the production of import-substitute goods, imports may decline as income increases. Then, we can expect $\propto_1 > 0$ and $\propto_2 < 0$. The impact of exchange rate changes on trade balance, $\propto_3$, could be positive or negative. Due to depreciation, that is REER increase, there is an increase in the volume of exports and decrease in the volume of imports but higher REER increases the value of each unit of import. Then, if the value of exports is greater than the value of imports trade balance would improve. But if the value of imports is greater than value of exports trade balance would tend to deteriorate. It depends on the export and import elasticity. If the sum of export elasticity and import elasticity is greater (lower) than one depreciation increases (decreases) the trades balance.

The sign on $\propto_4$ for dummy variable, D_{2000} (Free Trade Agreement) in the equation for India is ambiguous. It has to be determined empirically since it can be positive or negative. This model describes the long-run equilibrium relationship among the variables in the bilateral real trade balance model for each country. In order to examine the pattern of dynamic adjustments in the short-run to establish these long-run relations in response to various shocks to the system, vector error correction model (VECM) is estimated for each country:

$$\Delta InZ_t = \propto + \sum_{i=1}^{3} \beta_i \, \Delta InZ_{t-1} + \gamma \Delta Inx_t + \delta \varepsilon_{t-1} + u_t \qquad (3)$$

where Z_t is a vector of endogenous variables, real domestic income(y_t), real foreign income (Yt*) and real effective exchange rate (REERt). X_t is the vector of exogenous variables, Dummy variable, (D_{2000}), ε_{t-1} is an error term and α, β, γ and δ are coefficient matrices. If co-integration between the endogenous variables exists, this model can be estimated by OLS method. This model can be used to estimate the influence of real effective exchange rate changes on real trade balance separately from the influence of other variables by constructing an impulse-response function for generalized one standard deviation real effective exchange rate innovation.

III. EMPIRICAL RESULTS

We estimated the appropriate lag length for each variable by using Schwarz information Criterion (SIC). The Augmented Dickey-Fuller (ADF) unit root tests were done to test for the presence of unit roots of each variable (Dickey and Fuller, 1981). A cointegration test was done by utilizing the Johansen (1988) maximum likelihood procedure to check whether there is a stable long-run equilibrium relationship among non-stationary economic variables. If the variables are found to cointegrate then we estimate the VECM to generate the generalized impulse response functions for each country. ADF test for all variables are given in Table

1. This results show that they have unit root. Then, they are stationary at first difference and I(1) variables. The results of cointegration tests reported in Table 2 show that there is existing long run cointegrating relationship between ln (X/M), ln (Y), ln (Y*), ln (REER) for Japan, between ln (X/M), ln (Y), ln (Y*), ln (REER) and D_{2000} (dummy variable for free trade agreement) for India and between ln (X/M), ln (Y), ln (Y*), ln (REER) for U.S.A. Since there is one cointegrating vector linking the variables, an economic interpretation of the results can be obtained by normalizing the cointegrating vector on *ln* (X/M). The estimated coefficients of the cointegrating vector, using the Johansen method are given in Table 3.

In all cases, the results show that there is a positive long-run relationship between the real effective exchange rate and the real trade balance as expected. This means if a real depreciation leads to more quantities to be exported and less to be imported. The real trade balance has a negative long-run relationship with real domestic income. The real trade balance has a positive long-run relationship with real foreign income in the case of Japan and U.S.A. but has negative relationship in the case of India. The reason for negative relationship might be that the increase in real income of India is partially due to an increase in the production of import-substitute goods, then, imports may decline as income increases. The coefficient on the D_{2000} (dummy variable for FTA) is negative and significant in the equation for India. It indicates that, after FTA, Sri Lanka's import from India has increased more than Sri Lanka's export to India.

We examined the dynamic responses by generating generalized impulse response functions of the trade balance to permanent one-standard error depreciation in exchange rate. The impulse responses functions for all countries show that there is an initial deterioration in a Sri Lanka's bilateral real trade balance followed by an improvement. This confirms the J-curve effects of depreciation in exchange rate on trade balance. India and Japan are major sources for Sri Lankan's import and U.S.A is major export destination. Sri Lanka had trade deficit with India and Japan and trade surplus over the whole sample period from 1981 to 2007. Because of Sri Lankan currency depreciation, there will not be an immediate decrease in import volume. Then, import value effect is greater than import volume effect immediately after the depreciation in exchange rate. This deteriorates the trade balance in short run but export increase and import decrease in long run improve trade balance in long run. In all cases, the depreciation in exchange rate has positive long run relationship with trade balance when other variables are unchanged. Then, the Marshall- Lerner (ML) conditions holds.

IV. CONCLUSION

This study concludes that there is a long run equilibrium relationship among the real trade balance, real exchange rate, real domestic income, and real foreign income. Our findings for bilateral trade with India, Japan, and the US suggest that when there is no change in other factors there is a clear short run J-curve effect of

depreciation on the bilateral trade balance and also the depreciation in the exchange rate has a positive long run relationship with the trade balance. The Marshall-Lerner conditions hold. The FTA with India has decreased the real bilateral trade balance of Sri Lanka.

Table 1
Stationary Test

Variable	*lags*	*Deterministic term*	*ADF t-test*
lny	0	constant, trend	-1.528561
lnREER	0	constant	-2.067328
lnyin	1	constant, trend	-2.388827
lnyjpn	3	constant, trend	-2.970561
lnyusa	3	constant	-0.288847
tbin	0	constant	-0.425466
tbjpn	1	constant, trend	-2.833948
tbusa	0	constant	-0.288847

Table 2
Johansen's Maximum Likelihood Cointegration Procedure

	Eigenvalue	*Max-Eigen Statistic*	*5% critical Value*	*1% critical value*	*Hypothesized No. of CE(s)*
Sri Lanka/India					
	0.791331	37.60813	37.52	42.36	none*
	0.583915	21.04480	31.46	36.65	At most 1
	0.441515	13.98064	25.54	30.34	At most 2
	0.382111	11.55473	18.96	23.65	At most 3
	0.115905	2.956579	12.25	16.26	At most 4
Sri Lanka/Japan					
	0.859706	47.13633	30.33	35.88	none**
	0.552206	19.28214	23.78	28.83	At most 1
	0.389706	11.85153	16.87	21.47	At most 2
	0.281693	7.940591	3.74	6.40	At most 3
Sri Lanka/U.S.A					
	0.740703	31.04493	27.07	32.24	none*
	0.561167	18.94362	20.97	25.52	At most 1
	0.513462	16.57014	14.07	18.63	At most 2
	0.038057	0.892411	3.76	6.65	At most 3

Note: *(**) denotes rejection of null hypothesis at 5% (1%) level.

Table 3
Estimated Cointegrating Coefficients Derived by Normalizing on ln (X/M)

	Sri Lanka / India	*Sri Lanka / Japan*	*Sri Lanka / U.S.A*
ln(X/M)	1.000	1.000	1.000
lny	-15.67412 (4.53392)	-7.351326 (1.81095)	-20.31472 (4.55629)
lny*	-21.43356 (4.4005)	1.841684 (1.06128)	22.44119 (6.58192)
lnREER	9.034172 (1.28123)	6.255636 (0.66803)	9.976105 (1.57999)
D_{2000}	-1.785295 (0.23084)	———	———
Trend	0.817379 (0.14710)	0.061912	———
constant	162.3062	22.89382	17.02061

Note: Standard errors are enclosed in the parentheses

PLOTS OF GENERALIZED RESPONSE FUNCTIONS

Figure 1: Sri Lanka/india

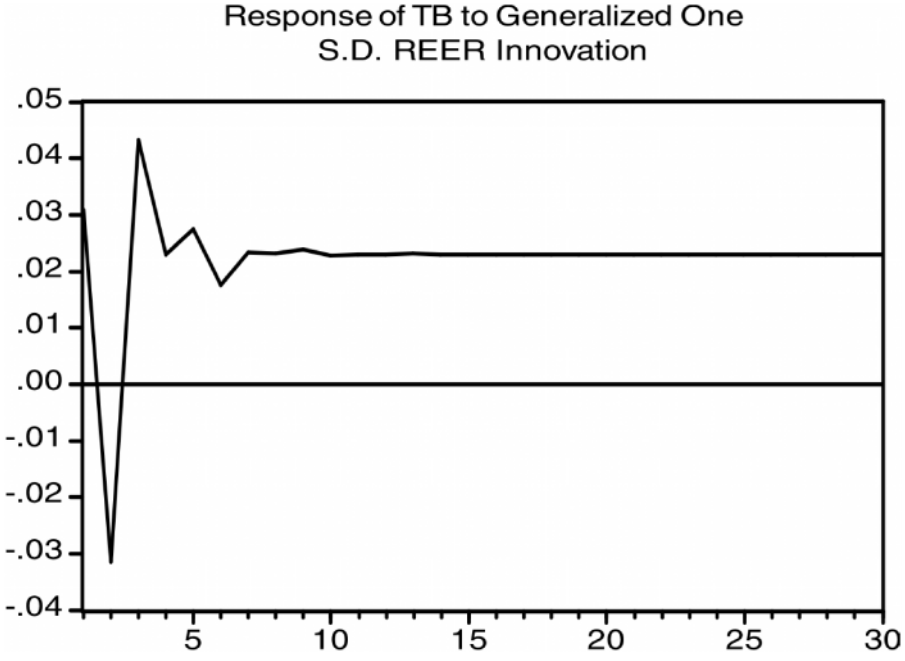


Figure 2: Sri Lanka/Japan

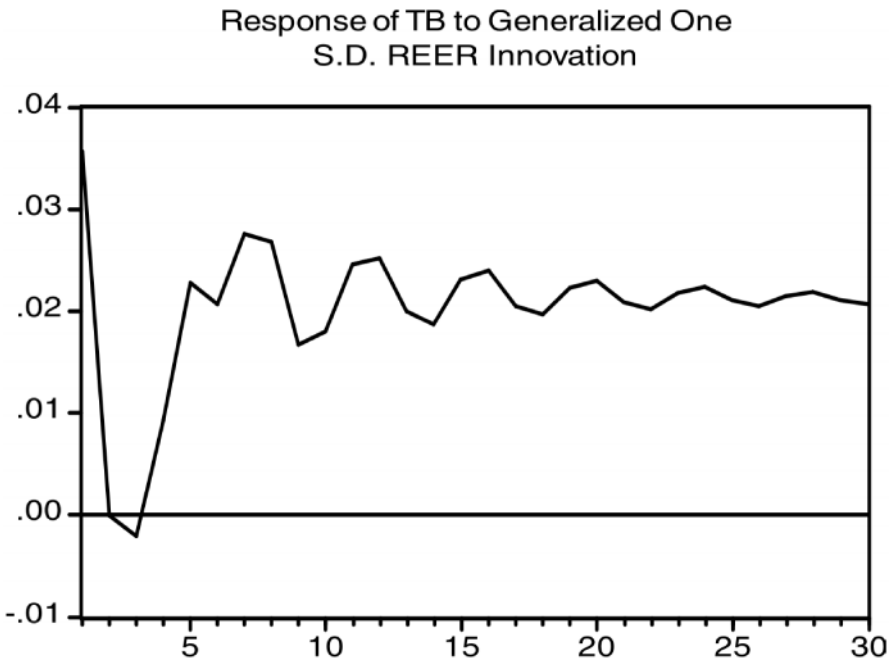
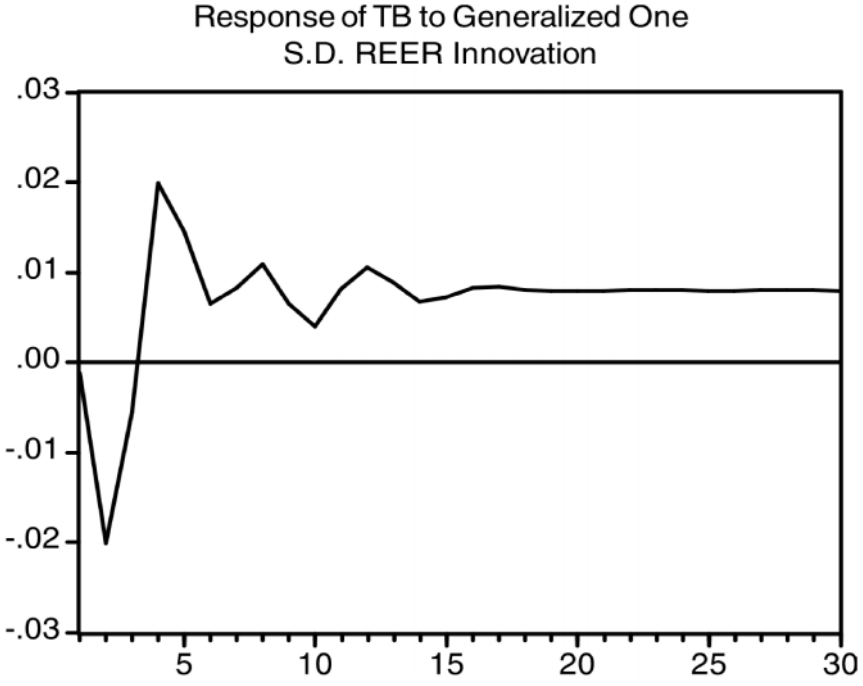


Figure 3: Sri Lanka/U.S.A



References

Bahmani-Oskooee, M., (1995), Real and Nominal Effective Exchange Rates for 22 LDCs: 1971:1 – 1990:4, *Applied Econometrics*, 1995, 27, 591-604.

Boyd, Derick, and Caporale, Gugielmo Maria and Smith Ron (2001), "Real Exchange Rate Effects on the Balance of Trade: Cointegration and the Marshall-Lerner Condition," *International Journal of Finance and Economics*, 6, 187-200.

Dickey, D. A. and Fuller, W. A. (1981), "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root," *Econometrica*, 49, 1057-72.

Guptar-Kapoor, Anju and Ramakrishnan, Uma (1999), "Is There a J -Curve? A New Estimation for Japan", *International Economic Journal*, 13, 71-79.

Johansen, S. (1988), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamics and Control*, 12, 231-254.

Onafowora, O., (2003), Exchange Rate and Trade Balance in East Asia: Is There a J"Curve? *Economics Bulletin,* Vol. 5, Issue 18, 1-13.

Singh, T., (2002), India's Trade Balance: The Role of Income and Exchange Rates, *Journal of Policy Modeling* 24, 437-452.