

The Effects of Exchange rate on the Trade Balance in the Sri Lankan Context after Post Liberalization.

Sinnathurai Vijayakumar*

Senior lecturer, Department of Economics, University of Jaffna. Vijai114@gmail.com

Abstract

Generally the developing countries have relied on devaluation of exchange rate as a tool in enhancing the trade balance and balance of payment. This is not different in the case of Sri Lanka. The study is based on two country model involving trade between Sri Lanka and the U.S.A. This study is based on secondary time series data from 1977 to 2010. The model I have recourse to is a model adopted by many researchers where the trade balance and real exchange rate are directly linked. The analysis is done by the use of statistical package Eviews includes the econometric procedures of Unit root test, Engle - Granger and Johansen technique for co- integration and also IRF analysis to test J curve effect along with multiple regression analysis. The aim of the study is to scrutinize the relationship among trade balance, real exchange rate and real income and to find out whether there is existence of J curve in the bilateral trade between Sri Lanka and United State. Several literatures in regard to the relationship between trade balance and exchange rate effect in globe shows fact that some empirical studies supported J curve and some other studies is did not. Similarly, Some Economists clearly mentioned that the devaluation may work better for industrialized countries than for developing countries. Many developing countries are exporting the commodities that are in elastic. Their price elasticity is less than one or in elastic. But they are importing the commodities that have inelastic demand. Therefore, devaluation of exchange rate does not produce a favorable effect on trade balance of developing countries. In case of Sri Lanka, The unit root test confirms that all variables make the series stationary. Therefore it can be stated that all variables are integrated of order 1. The Engle- Granger methodology has revealed that the variable in the model 1 are co integrated implying that a long run relationship exists between the variables. It is clear the fact that IRF analysis does not show any sign of the J curve. In brief, the result suggests that variables In TB, In RER, In RSL and In RUS are co- integrated. The result brings to light the fact that the real exchange rate has significantly positive influence on the trade balance of Sri Lanka both in the short- run and the long-run. However, evidence of J curve effect is non existence for trade between Sri Lanka and USA. The devaluation improving the trade balance in the short- run has repetitive tendency in the long-run.

Key words: Trade balance, Balance of payment, J curve, Devaluation, real exchange rate

1. Introduction

Sri Lanka experienced several exchange rate regimes. At the very inception, Sri Lanka was operating under fixed exchange rate system. The first exchange rate regime change in Sri Lanka occurred in 1968 when a unified fixed but adjustable exchange rate was introduced as part of the Britton wood system .The exchange rate system which was in till 1977 did not provide

favorable effect on the balance of payment of Sri Lanka. Therefore, a new exchange rate system, Managed floating exchange rate, was introduced in 1977 by the UNP (United Nation party). In 2001 free floating system was introduced and is still in operation. Sri Lankan government endeavored to find out a favorable or significant solution to the problem of balance of payment

but the Sri Lankan government did not achieve the expected effect on balance of payment. The trade balance of a country is determined by number of factors such as exchange rate changes, monetary and fiscal policy, domestic and foreign income growth, supply shock and competitiveness. Among these factors, change in exchange rate has been a significant factor in this analysis. According to the Marshall-Lerner condition and the Bickerdike-Robinson-Metzier conditions, currency devaluation would lead to the improvement of the trade balance and eventually have positive impact on the balance of payment. In policy making, the effect of exchange rate on the trade balance has been very important in the international trade literature. Because it is used in the policy making of every country. Thus, the paper will definitely help the Sri Lankan policy makers as well as other developing countries for policy making in regard to international trade and devaluation

2. Objective of Study and methodology

Generally the developing countries have relied on devaluation of exchange rate as a tool in enhancing the trade balance and balance of payment. This is not different in the case of Sri Lanka. This study tries to focus on the fact that change in exchange rate is a key determinant in the trade balance of Sri Lanka. In other words, the objective of the study is to examine trade balance and exchange rate relationship for Sri Lanka in her trade with United State of America if ML condition holds in the long run supporting J curve.

This study is fully based on secondary data and involves two country models in consideration of bilateral trade between Sri Lanka and the USA. The multiple regression model was employed to analyze the data. In this study, there are several variables such as trade balance, real exchange rate, real GDP of Sri Lanka and real GDP of the USA that are included in the model. The period of study ranges from 1977 to 2010. The entire analysis

has been carried out with the use of econometric concepts of co integration and Granger causality test.

3. Literature Review

Weliwita and Hiroshi Tsujii (2000) undertook several studies in regard to the trade balance and effects of exchange rate. They examined the responsiveness of Sri Lanka's trade deficit to devaluation during the period of post-1977 and 2010 using co integration and found out the results that notwithstanding persistent devaluation the trade deficit continued to move in the wrong direction suggesting that exchange rate policy was unable to create a favorable balance of trade position. Individual trade volumes also were not responsive to the changes in real exchange rates. While the increase in Sri Lanka's imports has a positive correlation with the rise in domestic income the growth in its exports is positively correlated with the rise in incomes in importing countries. This analysis did not identify long run equilibrium relationship between the trade balance RER, and real GNP. Rose (1990) examines the impact of real depreciation on the trade balance for 30 developing countries and finds lack of evidence that real depreciation would lead to an improved trade balance for Argentina, Brazil, Chile, Colombia, Peru, and Uruguay. Onafowora (2003) in his study of trade balance and exchange rate effects based on some countries like Thailand, Indonesia and Malaysia pointed out that generalized impulse response functions suggest that the ML condition holds in the long run with varying degree of J curve effects in the short run. These findings have some implications for these East Asian countries' bilateral trade with Japan and with the US. Based on the Marshall-Lerner condition, a continued depreciation of these East Asian countries currencies against the US dollar and Japanese yen is likely to lead to an improvement in their trade balance with the US and Japan.

However, this improvement occurred only 3 or 4 periods after a real devaluation. Bahmani-Oskooee and Malixi (1992) concluded the fact that there is evidence of a J-curve for Brazil and lack of support for a J-curve for Peru. They also find that several other shapes, such as the I-, M-, and N-curves, characterize the response of the trade balance to real depreciation in the short run and that real depreciation would lead to improved trade balance in 8 countries, including Brazil and Peru, in the long run. Bahmani-Oskooee (2002) in his study based on Thailand, Germany, Japan, Singapore, UK, and USA mentioned the fact that there was evidence of J curve only in the bilateral balance between Thailand and Japan and between Thailand and United states. Bahmani-Oskooee and Alse (1994) critically examined the J-curve effect for twenty two developing countries and elucidated the fact that there is lack of evidence of a J-curve for Argentina, Brazil, Colombia, and Ecuador. Bahmani-Oskooee and Brooks (1999) tested the phenomenon by employing cointegration and error-correction modeling between the U.S. and her trading partners. They showed that while in the short-run the trade balance does not necessarily follow the J-Curve phenomenon, in the long-run it improves. Himarios (1989) also investigated the J curve phenomenon. Yusoff (2007) has investigated the long run relationship between Malaysia's trade balance and real exchange rate using co integration technique. In this study, He found out the results that real exchange rate depreciation improves the Malaysian balance of trade in the long run supporting the presence of J curve. Therefore, from the study of relationship between trade balance and exchange rate effect, we can understand that some studies supported J curve and some other studies is did not. Some Economists clearly mentioned that the devaluation may work better for industrialized countries than for developing countries. Many developing countries are exporting the

commodities that are in elastic. Their price elasticity is less than one or in elastic. But they are exporting the commodities that have inelastic demand. Therefore, devaluation of exchange rate does not produce a favorable effect on trade balance of developing countries as expected. With regard to studies based on Sri Lanka, this fact is seemingly true. Yet it is necessary to observe if this was the case under different exchange rate régimes in Sri Lanka.

Trend and Experiences of Sri Lanka in the trade balance and the exchange rate

Sri Lanka enjoyed several exchange rate system such as fixed exchange rate, Dual exchange rate (1966- 1977), managed floating exchange rate (1977 -2001) and free floating exchange rate(2001). Sri Lanka had used fixed exchange rate system since independence. In 1949 through the Currency Amendment Act no 4, the practice of sterling Indian rupee links was abandoned and the Sri Lankan rupee was directly linked with the sterling. This gave the country the opportunity to set its own desired exchange rate. The only significant action taken during this era is the devaluation of the rupee against the U.S Dollar in 1949. This was done to boost rubber exports to the U.S region .The Central Bank of Sri Lanka (1998, 191) reports that the devaluation coupled with the Korean War boom brought about a surplus in the BOP of the country. Sri Lanka enjoyed current account surplus during this period. After some period, particularly latter part of 1960s, export price started to go down and imports increased in a higher proportion than exports. This situation has worsened the Sri Lanka's trade balance and BOP. Therefore, the government of Sri Lanka had to devalue the rupee in order to increase the exports and decrease its imports in the domestic market. But the country did not achieve the expected result and went to the worst situation in trade balance. In this

circumstance, the government of Sri Lanka introduced the dual exchange rate system (FEES) in 1968. Under the dual exchange rate system, essential imports and nontraditional exports received an official exchange rate and all other imports and exports were operated under higher exchange rate system. But Sri Lanka did not enjoy much benefit from the dual exchange rate. During 1973 another exchange rate system was initiated. It is the Convertible Rupee Account CRA. A proportion of foreign earnings from selected economic activities were allowed to be kept in Convertible Rupee Accounts under this scheme. The objective here obviously was the promotion of such activities. Even though this dual exchange rate was introduced there was deficit trade balance in Sri Lanka. As soon as new party assumed office in 1977, the new government in Sri Lanka introduced extensive reforms in economic and financial policies, thus, ending years of protectionist, inward-oriented development strategies espoused by the previous regime. New outward oriented development policies included liberalizing imports by removing price and quantity restrictions, announcing an incentive scheme to attract foreign direct investment, creating an export

processing zone to enhance manufactured exports, removing restrictions on capital transactions to integrate domestic and foreign capital markets, and imposing ceilings on interest rates to bring them down to realistic levels (Jayasuriy, 1994). Also, steps were taken by the new government to reduce welfare expenditures and rationalize various subsidies to ease budget related pressures on interest rates, prices, and the balance of payments. An integral part of the reform process was the reform of the trade regime as part of a program for stabilization and structural adjustment. Central to the reform of the trade regime was the switch in the exchange rate policy from a fixed exchange rate system to a managed floating system. In the twenty first century, the free floating exchange rate regime introduced in 2001 and still continues to be in operation. The following figures show that behavior of trade balance and current and capital account balance during the post liberalization period during which period both managed floating and free floating exchange rate system was in operation and still free floating exchange rate is in operation in Sri Lanka

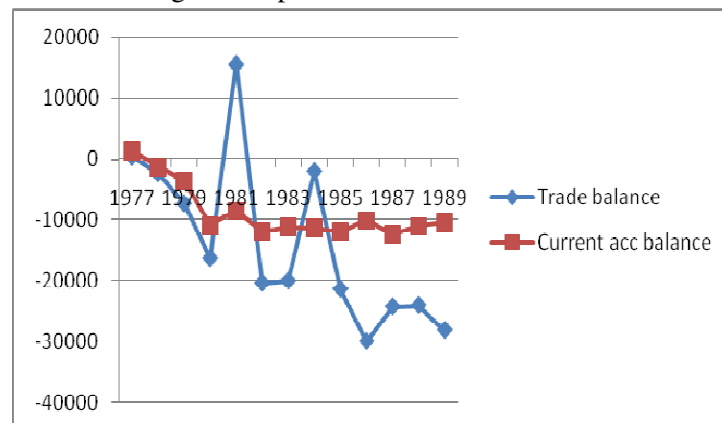


Figure 1: Trade and current account balance behavior of Sri Lanka

Source: Central bank of Sri Lanka- various reports

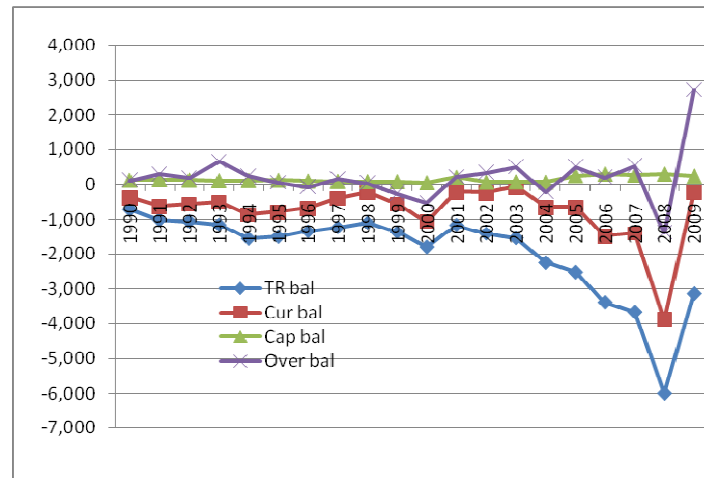


Figure 2: Balance of payment behavior of Sri Lanka

Source: Central bank of Sri Lanka- various reports

Based on the data found in terms of million rupees, trade and current account balance behavior between 1977 -1989 is shown in figure 1. But, figure 2 is drawn based on the data in terms of million Dollars in regard to balance of payment behavior. The important matter that is observed here is that the trend of current account balance depends upon the trend of trade balance of Sri Lanka. In other words, the surplus or the deficit of current account balance has been determined by the surplus or the deficit of trade balance. Sri Lanka that had the surplus of trade balance in 1977 has mostly subsequent deficit of trade and current account balance. Nevertheless, there have been occasional improvement in the trade and current account balance in Sri Lanka. Figure 1 and 2 clearly show the trend of trade, current and capital accounts balance of Sri Lanka. What is observable here is that the deficit and surplus of current account balance is less than that of trade balance in Sri Lanka. The reason is that the open economic system that came in operation after 1977 have had favorable private and government transfer. In other words, the transfer payment in Sri Lanka is always favorable but after trade liberalization and open economy, it has more injection of private transfer into Sri Lanka

economy. The figure 2 further shows that there is always positive status of capital account.

4. Model, Data Analysis and Discussion

As already mentioned above, this study focuses on only bilateral trade between Sri Lanka and the USA. The researcher indicates the fact that trade balance is determined by three variables, namely real exchange rate, real GDP of Sri Lanka and real GDP of the USA. Therefore, researcher uses the following model which has been used by many researchers analyzing the same issue in other some countries. The determining the trade balance between SL and the USA is shown via function below.

$$TB = f(RER, RSL, RUS)$$

On the basis of this function, multiple regression models can be written as follows

$$TB = \beta_0 + \beta_1 RER + \beta_2 RSL + \beta_3 RUS + u_t \quad (1)$$

In equation, TB is trade balance, RER and RUS refers to the real GDP of Sri Lanka and United state of America respectively, u_t is error term. Bahmani –Oskooee (2003) Onofowora (2003) used the same model to examine the relationship between trade balance and exchange rate among some selected countries

The equation one can be rearranged in log form for our purpose of study as follows

$$\ln TB_t = \beta_0 + \beta_1 \ln RER_t + \beta_2 \ln RSL_t + \beta_3 \ln RUS_t + \varepsilon_t \quad (2)$$

There may be stationary or non stationary in variables in the model. Thus, it can be identified whether they are stationary or not before evaluating the nexus in the variables in equation 1. That is to say, through carrying out Unit Root Test, whether the variables are stationary or not can be ascertained. Through this process, spurious regression phenomenon is removed. As explained by Gujarati in his book Econometrics(2003) makes the following observation “Sometimes we expect no relationship between two variables yet a regression of one the other variable often shows a significant relationship.... it is therefore very important to find out if the relationship between economic variables is spurious or nonsensical”. In this study, researcher assumes that the null hypothesis is Non Stationary ($H_0 = \text{Non Stationary}$). In consonance with it, if the

absolute value of ADF statistic is greater than critical value (t table value), null hypothesis (H_0) is rejected and thereby series is stationary where the ADF test is used. Conversely, if the absolute value of ADF statistic is less than critical value (t table), H_0 is accepted and thus, the accepted the series is non – stationary.

The ADF test was computed on the levels of each variable with a time trend of following equation.

$$\Delta Y_t = \beta_1 t + \beta_2 t + \delta Y_t - 1 + \varepsilon_t \quad (3)$$

According to rule, at the 1% significance level, the null hypothesis is accepted for all the variables because the absolute value of ADF statistic is less than t table value in table 1. Therefore, all variables are non-stationary. This differs from the findings of Weliwita & Tsuji (2000) where all variables except In TB were non stationary. Therefore, non-stationary variables are converted into stationary using first difference.

Table 1: Level significance of variable.

Variable	ADF statistic	t table value at 1%
In TB	-2.556990	-3.349871
In RER	-2.343828	-2.724071
In RSL	-1.944468	-3.339320
In RUS	-1.015422	-4.1356022

Next the variables are tested to find the order of integration.

Table 2: First difference of variable.

Variable	ADF statistic	t table value at 1%
In TB	-3.782043	-3.241458
In RER	-4.654725	-3.397457
In RSL	-4.621970	-4.240065
In RUS	-5.652154	-4.243309

In accordance with table 2, all variables are stationary as the absolute value of ADF statistic is greater than critical value after first difference. The 1st differences of all variables make the series stationary. Therefore it can be stated that all variables are integrated of order 1. This provides sufficient ground to conduct the co integration analysis.

The purpose of using the Engle Granger methodology is to observe whether there is no integration relationship between variables or not. Thus an OLS regression is used on equation (2) and a unit root test is conducted on the residuals obtained. The results of the OLS are summarized as follows.

$$\begin{aligned} \hat{TB} = & -185.4392 + 0.225980 \ln RER_t - 1.310815 \ln RSL_t + 8.374432 \ln RUS_t \\ & (-3.371767) \quad (0.213134) \quad (-0.852236) \quad (2.856147) \end{aligned}$$

$$R^2 = 0.892405$$

In accordance with above regression result, RER and RUS have positive relationships with TB. When RSL and RER remain constant, a 1% rise in RUS increases TB by 8.3% and when RSL and RUS remain constant, a 1% appreciation in RER boosts TB by 0.22% and vice versa. Further, the regression results suggest that RSL has a negative relationship with trade balance indicating when RER and RUS remain constant

a 1% increase in RSL would make TB decrease by 1.3%. This confirms the positive relationship between imports and RSL. The high R^2 clearly shows that 89 % of the variations in TB are explained by the variables included in the model. Next a unit root test is performed on the residuals. The result is summarized in the following table 3

Table 3: Unit root test on residual series

		t-Statistic	Prob.*
Augmented Dickey – Fuller test statistic		-3.239154	0.0021
	1% Level	-2.236923	
	5% Level	-1.734414	
	10% Level	-1.329329	

* Mackinnon (1996) one – sided P-values.

$$\begin{aligned} \Delta \hat{U}_t = & -0.337016 u_{t-1} \\ & (-3.216756) \end{aligned}$$

Null-hypothesis (non-stationary) is rejected as absolute value of the ADF statistic is more than absolute critical value (t table value). Therefore the alternative hypothesis is accepted indicating that the residual series is stationary. In this backdrop, it is possible to say that the

variables in (2) are co integrated. Now, it is necessary to examine if the Johansen method would confirm these findings.

The Engle Granger method indicates the fact that there is co- integrating relationship among the stated co integrating vector i.e. one

co integrating relationship. However there is a possibility of having several co integrating vector in the specified model i.e. there can be at least n-1 relationships. In such a situation the Johansen Method is better suited to examine if co integration exist and if so how many co integrating vectors could be found in the model. The equation that is to be estimated could be stated as follows

$$\Delta X_t = \delta + \sum_{i=1}^{k-1} \Pi_i \Delta X_{t-i} + \Pi_k \Delta X_{t-k} + \varepsilon_t \quad (4)$$

Where Δ is a difference operator, k is the lag length, δ is a constant, X_t is a column vector of the involved variables. The Johansen method is a two test procedure which gives results of the Trace test and maximum Eigen value test. The results are given below.

Table 4: Trace test
Unrestricted Co integration Rank test (Trace)

Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob**.
None *	0.578450	64.77052	37.60613	0.0011
At most 1*	0.532743	34.71483	29.11707	0.0188
At most 2	0.345427	14.09668	16.43471	0.1605
At most 3*	0.258536	5.436280	3.331466	0.0277

Trace test indicates 2 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

** Mackinon – Haug – Michelis (1999) p-values

Above trace test shows that the existence of at least 2 co integration relationships at 5% level. The Eigen value test clearly confirms this result. The both trace and Eigenvalue test confirm the result that there is existence of two co

integration relationship .The existence of two co integration vectors indicates that the relationship between the variables is not unique or not stable.

Table :5 Eigenvalue test
Unrestricted Co integration Rank test (Maximum Eigenvalue)

Hypothesized No.of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob**.
None *	0.578439	28.15533	25.58434	0.0212
At most 1*	0.692749	21.45821	22.11184	0.0313
At most 2	0.255438	6.040457	15.45450	0.4743
At most 3*	0.148520	5.316279	3.721460	0.0347

Max – eigenvalue test indicates 2 co integrating equ(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

** Mackinon – Haug – Michelis (1999) p-value

To find out J curve effect between Sri Lanka and USA it is important to use Impulse Response Function analysis (IRF). The generalized impulse responses are an average of the current and the past shocks, and the impulse responses are expressed as conditional expectations based on historic information (Elif Akbostanci, 2004). Gupta-Kapoor and Ramakrishnan analysis (1999) explicitly indicates the existence of the J-curve on the Japanese trade balance based on error correction model and impulse

response function. The IRF analysis was also used by Onafowora (2003) to examine the ML condition and to race out J curve effect in the long run on the data basis of some selected Asian countries. Likewise, researcher has used TRF analysis to find out J curve effect on bilateral trade between Sri Lanka and the USA. It is illustrated with the help of Response of in RER to In TB figure 3.

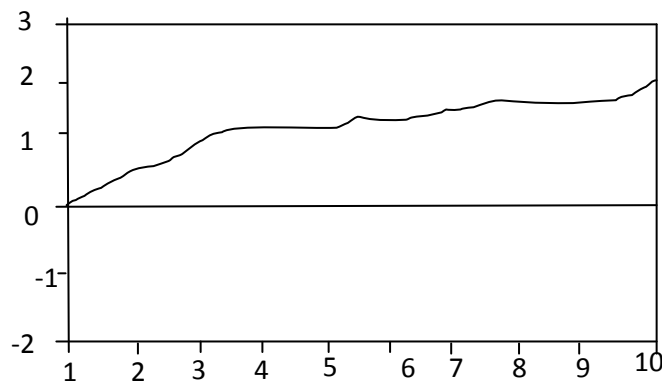


Figure 3: Response of In RER to In TB

In consonance with it, this response function - figure does not show the fact that there is J curve effect between Sri Lanka and the USA bilateral trade. In other words, response function -figure does not show that in the wake of currency devaluation initially trade balance does not worsen and that there is no subsequently improvement. On the contrary, what the result reveals is that the devaluation improves the trade balance at a faster rate and subsequently the trade balance further improves at constant rate in the long run. From this what we can say is that there is no J curve between Sri Lanka and the USA bilateral trade.

Before the liberalization of the Sri Lankan trade, Sri Lanka was exporting the primary goods and substantially depended on the imports of consumer goods. Thus, Sri Lanka had trade

relationship with socialists' countries and exported more to these countries. But in 1977, Sri Lankan economy was liberalized and also trade pattern and its features were entirely changed. After liberalization, Sri Lanka has had major trade and commerce with USA and western countries. Particularly after 1980, USA became a leading trade partner of Sri Lanka and is still in operation. The garment industry has had rapid development and above 65% of that was exported to the USA following the operation of liberalization

(note: stoppage of GSP+ does not consider in this study). Protectionism in form of MFA quotas helped Sri Lanka and other developing countries to develop their export oriented garment industries by insulating them from direct competition from established producers

.Therefore, exports of such particular goods of Sri Lanka were fervently exported to USA whether the price fluctuated or not. This could be the reason as to why trade does not deteriorate during devaluation. Much of trade between Sri Lanka and USA are done via trade agreement such as North American Free Trade Agreement and Sri Lanka Free Trade Agreement .As a result, anticipated quota would be traded between two countries despite whatever happens to exchange rate. This is also a reason for the

$$Y_t = \alpha_0 + \sum_{i=1}^l \alpha_i Y_{t-i} + \sum_{i=1}^l \beta_i X_{t-i} + v_t \quad (5)$$

$$X_t = \alpha_0 + \sum_{i=1}^l \alpha_i X_{t-i} + \sum_{i=1}^l \beta_i Y_{t-i} + v_t \quad (6)$$

absence of J curve effect. Granger causality test try to find out granger causation that examines the direction of causation or the direction of influence between the variables. . It is worth mentioning that both ways causation .In the Granger causality it is tested the null hypothesis that X does not granger cause Y. If we can reject the null hypothesis, it implies that X does Granger cause Y. A bivariate regression form for the Granger causation is given below:”

The results of the Granger causality test are listed in the table below.

Table 6: Granger causality test

Null Hypothesis :	Obs	F-Statistic	Prob.
LNRER does not Granger Cause LNTB	31	1.34245	0.2705
LNTB does not Granger Cause LNRER		0.23612	0.7992
LNRSL does not Granger Cause LNTB	31	1.221921	0.4640
LNTB does not Granger Cause LNRSL		1.55384	0.3346
LNRUS does not Granger Cause LNTB	31	2.22423	0.2919
LNTB does not Granger Cause LNRUS		9.19367	0.0014
LNRSL does not Granger Cause LNRER	31	0.23892	0.4390
LNRER does not Granger Cause LNRSL		1.14323	0.4378
LNRUS does not Granger Cause LNRER	31	1.23216	0.3531
LNRER does not Granger Cause LNRUS		0.35225	0.4285
LNRUS does not Granger Cause LNRSL	31	1.92792	0.1843
LNRSL does not Granger Cause LNRUS		4.349521	0.0286

Based on the results there is a high probability In TB does not Granger- cause In RER. Therefore

in RER does not Granger- cause In TB cannot be rejected. For that reason, it appears that Granger causality runs one way, from In RER to In TB.

Similarly it can be stated that Granger -causality runs from In TB to In RSL as there is a high probability that In RSL does not Granger- cause In TB. Also the probability that In TB does not Granger- causes In RUS is low making it possible to say that causation runs from In TB to In RUS. Another important point to note is that with regard to In RSL and In RUS the causation runs from In RSL to In RUS. The effects show a feedback effect thus confirming the results given in the Johansen method of co integration that there exist more than one co integration relationships in this model.

5. Conclusion

The paper has analyzed the exchange rate and trade balance relationship with two country model and also tried to find out the existence of J curve effect with the use of various econometric methods such as unite root test, Engle- Granger method, Johansen method of co integration, IRF analysis and Granger -Causality test on the basis of the data of bilateral trade between Sri Lanka and United State of America after post liberalization. The unit root test confirms that all variables make the series stationary. Therefore it can be stated that all variables are integrated of order 1. This provides sufficient ground to conduct the co integration analysis. The Engle- Granger methodology has revealed that the variable in the model 1 are co integrated implying that a long run relationship exists between the variables. It is clear the fact that IRF analysis does not show any sign of the J curve. In brief, the result suggests that variables In TB, In RER, In RSL and In RUS are co-integrated. The result brings to light the fact that the real exchange rate has significantly positive influence on the trade balance of Sri Lanka both

in the short- run and the long-run. The Granger causality test confirms the fact that real exchange rate (RER) Granger causes trade balance of Sri Lanka. However evidence of J curve effect is non existence for trade between Sri Lanka and USA. The devaluation improving the trade balance in the short- run has repetitive tendency in the long-run.

References

- Akbostanci, Elif (2004). Dynamics of the Trade Balance: The Turkish J-Curve. *Emerging Markets Finance and Trade*, 40 (5), 57-73.
- Bahmani-Oskooee, M. (1985). Devaluation and the J -Curve: Some Evidence from LDCs, *The Review of Economics and Statistics*, 67(3), 500-504.
- Bahmani-Oskooee, M. and Brooks, T. J. (1999). Bilateral J -Curve Between U.S. and her Trading Partners , *Weltwirtschaftliches Archiv*, 135, 156-165.
- Bahmani-Oskooee, M. and M. Malixi. (1992). More Evidence on the J-Curve from LDCs, *Journal of Policy Modeling*, 14, 641-653.
- Bahmani-Oskooee, M., and J. Alse (1994), Short-Run versus Long-Run Effects of Devaluation: Error-Correction Modeling and Cointegration, *Eastern Economic Journal*, 20, 453-464
- Bahmani-Oskooee, M. and Kantipong.T. (2001), Bilateral J curve between Thailand and her trading partners , *Journal of Economic Development*, 26,(2), 107-117 .
- Central Bank of Sri Lanka ,Various Annual reports(1997- 2010), Colombo.
- Dunham,D and Kelegama,S.(1998). Stabilization and Adjustment: Sri Lankan Experience 1977 -1993 ,

- Economic and Political weekly,33(.24),1475-1482.
- Gujarati,D.N, (2003) , Basic Econometrics , cGraw- Hill, Singapore.
- Guptar-Kapoor, A. and Ramakrishnan.U (1999). Is There a J -Curve? A New Estimation for Japan, International Economic Journal, 13(4), 71-79.
- Hassan, M. K. and Tufte D.R., (1998). Exchange rate volatility and aggregate export growth in Bangladesh, Applied Economics, 30(2), 189-201.
- Himarios, D. (1989). Do Devaluations Improve the Trade Balance? The Evidence Revisited, Economic Inquiry, 27, 143-168.
- Miles,M.A.(1979). The Effects of Devaluation on the Trade Balance and the Balance of Payment: Some New Results, Journal of Political Economy,87(3), 600-620.
- Onafowora,O.(2003). Exchange rate and trade balance in East Asia; Is there J curve, Economics Bulletin, 5(18),1-13.
- Rose A.K., (1990). Exchange rates and the trade balance: some evidence from developing countries, Economic Letters, 34, 271-275.
- Yusoff, Mohammed B. (2007). Malaysian Trade Balance and the Real Exchange Rate, International Review of Applied Economics 21, 655-667.
- Weliwita and Hiroshi Tsujii (2000). The exchange rate and Sri Lanka trade deficit, Journal of economic development, 25, 2, 131-153