An Analysis of the Relationship between Tourist Arrivals and Exchange Rates: An Empirical Study in the Context of Sri Lanka

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Abstract

This study prominently aimed to find the relationship between the tourist's arrivals and the exchange rates in Sri Lankan context using the quantitative approach method. The time series data for the period of 1950 to 2014 were collected from the annual report of the central bank of Sri Lanka. The tourists arrivals was the dependent variable and Exchange rate of French Franc, Exchange rate of Indian Rupee, Exchange rate of Japanese Yen, Exchange rate of Pound Sterling, Exchange rate of US dollar, and Dummy (D) were the independent variables in this study. The dependent variable was influenced by the independent variables influenced by external determinants. All the variables used in this study were stationary at its first difference. That is, all the six variables were integrated of same order one I(1). There was a one way causal relationship between exchange rate of Japanese Yen and exchange rate of French Frank, Exchange rate of Sterling Pound and exchange rate of US dollar. The arrival of tourist decreased by 0.84 percent before 1977 and the arrival of tourists increased by 0.84 percent after 1977 along with the changes in exchange rates. Exchange rate of French Franc, Exchange rate of US dollar and Dummy were related directly with the tourists' arrival. The value of R-squared is 0.910208 which is less than Durbin-Watson Statistic (1.434773). All the variables were having a long run associationship or all the variables were finally moving together. The contribution of the tourism sector to the Gross Domestic Product of the country would be motivated and energized by the exchange rate of Sri Lankan currency with other foreign currencies.

Keywords: Exchange rate, tourists arrival, Gross Domestic Product, Sri Lanka, guantitative approach

1. Introduction

Over the past decade, there was a considerable growth in international visitor arrivals in Sri Lanka from various countries. Much conjecture surrounds the factors affecting these trends and, in particular, the role of exchange rate movements which have seen the changes over the periods. The Sri Lankan tourism industry, being one of the fastest growing industries of the post conflict economy, achieved a multitude of success during 2015. Tourist arrivals recorded 1,798,380 arrivals, almost achieving the revised target of 1.8 million arrivals set for the year. Significant increase in investment in the tourism industry, tourism related infrastructure development, introduction of new tourist attractions and strategic promotional campaigns conducted by the private sector and the government in order to attract more tourists in to the country, helped achieve this success.

Tourist arrivals from all major regions, except Eastern Europe, increased in 2015. Western Europe continued to be the largest tourist origin for Sri Lanka with the number of tourist arrivals increasing by 15.3 per cent to 552,442. However, continuing the trend observed since 2012, tourist arrivals from Western Europe, as a share of total arrivals, fell further to 30.7 per cent in 2015, from 37.1 per cent in 2012, reflecting the growth in tourist arrivals from non-traditional sources. The share of tourist arrivals from East Asia increased continuously since 2010, mainly due to the impact of China dominating the region at an impressive growth rate. In terms of individual country basis, India remained as the leading

country of tourist origin with 316,247 arrivals in 2015, while China surpassed the UK to come second, followed by Germany, Maldives and France. These six countries together accounted for 54.8 per cent of tourist arrivals to Sri Lanka in 2015. The highest growth of 67.6 percent to 214,783 of tourist arrivals was recorded from China, followed by both Netherlands and Denmark, recording a growth of 35.3 per cent, to 32,742 and 15,203 arrivals, respectively. In terms of the purpose of visit, about 67 per cent of tourists visited the country for purpose of holiday, in 2015.

Tourist arrivals for business purposes recorded a marginal level of1 per cent, while the share of tourist arrivals for other purposes, such as visiting friends and relatives, religious and cultural purposes, health, education and sports, was about 32 per cent of total arrivals in 2015.

The Sri Lankan rupee remained broadly stable during the first eight months of 2015, but depreciated substantially thereafter, as a result of the Central Bank decision to allow greater flexibility in the determination of the exchange rate. The lower than expected foreign exchange inflows, coupled with high levels of outflows, exerted significant pressure on the exchange rate during the year. This was mainly due to the reversal of foreign investments in the government rupee securities market, in anticipation of, and the subsequent hike in interest rates in the US, and the high level of demand for foreign exchange, due to increased expenditure for non-oil imports and foreign debt service payments.

The resultant persistent depreciation pressure on the Sri Lankan rupee against the US dollar necessitated the continuous intervention of the Central Bank in the domestic foreign exchange market, in order to reduce volatility. Supported by the supply of US dollars 1.9 billion by the Central Bank, on a net basis, the rupee recorded a marginal depreciation of 2.42 per cent against the US dollar, during the first eight months of the year. However, on 03 September 2015, the Central Bank decided to limit its intervention in the domestic foreign exchange market and allowed the exchange rate to be largely determined by the demand and supply conditions of the market. This resulted in the Sri Lankan rupee depreciating by 6.64 per cent against the US dollar, during the period from 04 September to end 2015. Overall, the rupee depreciated against the US dollar by 9.03percent to Rs. 144.06 as of end 2015. The annual average exchange rate of the rupee against the US dollar also depreciated to Rs. 135.94 in 2015 from Rs. 130.56 in 2014 (CBSL, 2015).

Meanwhile, the Sri Lankan rupee showed a mixed performance against other major currencies during 2015, depending on the movements of cross currency exchange rate. Accordingly, the rupee depreciated against the pound sterling by 4.46 per cent, the Japanese yen by 8.20 per cent and the Indian rupee by4.62 per cent, while appreciating against the euro by 1.30 per cent. Reflecting the overall impact of the movements of major currencies against the US dollar in international markets, the rupee depreciated against the Special Drawing Rights (SDR) by 4.89 per cent during 2015.

The exchange rates of Sri Lanka with the other counties are the instrumental signals for attracting the tourists into Sri Lanka. The changes in the value of exchange rates greatly affect the number of arrivals of tourists being attracted to Sri Lanka. As result, this study specifically analyses the effects on the arrivals of the tourists into Sri Lanka due to the changes in the value of exchange rates with various countries.

2. Objective of the Study

To empirically analyze the relationship between the arrivals of tourists and the various exchange rates of the countries after the outward oriented economic policy implemented in Sri Lankan context

3. Limitation of the Study

This study analyses only the empirical data of Sri Lanka, related with the tourists arrivals and the various exchange rates. Though the various exchange rates are connected with different countries, the relationship analyzed in this study is only applicable to the Sri Lankan context. Therefore, no correlation any types of tests connecting any other countries are not considered in this study.

4. Literature Review

Chia-Lin Chang and Michael McAleer (2009) found that the conditional volatility estimates are not sensitive to the long memory nature of the conditional mean specifications. The QMLE for the GARCH (1,1), GJR(1,1) and EGARCH(1,1) models for Korean tourist arrivals to Taiwan and the Korean Won / New Taiwan $exchange rate are statistically adequate and have sensible interpretations. Asymmetry (though not leverage) is found for several alternative HAR models.

George Agiomirgianakis, Dimitris Serenis, et al. (2014) examined the effects of Exchange Rate Volatility on tourist flows into Turkey for the period of 1994~2012 using co-integration analysis. They found that (i) there is a negative relationship between exchange rate volatility and tourist inflows into Turkey; (ii) there is a negative impact of the relative price ratio on the tourist flows indicating that relatively expensive places deter tourist arrivals, given the keen international competition among alternative destinations; (iii) GDP per capita at tourist origin, measured in Purchasing Power Parities, exerts positive influence on tourist flows. Finally they conclude and suggested some direct policy implications: first, policy makers of a tourist destination country aiming to target potential markets for their tourist products, should, in principle, avoid markets prone to exchange rate volatility due to political and social upheavals or financial instability.

Lelwala EI and Gunaratne LHP (2008) aimed to investigate the economic determinants of long-run and short run tourism demand from United Kingdom to Sri Lanka by employing co-integration and error correction mechanism. They used quarterly time series data for the period 1978q1 to 2007q4. They found that the exchange rate variable is significant in long run indicating the elasticity of around 0.7, but it causes to increase the tourists' arrivals slightly because the positive elastic is less than one. They concluded that exchange rate showed a positive impact on tourist arrivals in the long run, that is, favourable exchange ratio between Sri Lankan rupee and Pound Sterling might gain an advantageous situation for Sri Lankan tourism in the long run, but there is no effect in the short run.

George Agiomirgianakis, et al. (2015) examined the effect of Exchange Rate Volatility (ERV) for Iceland, on tourist arrivals exports during the period of first quarter of 1990 to fourth quarter of 2014. It is claimed by some researchers that exchange rate volatility causes a reduction on tourist arrivals. Empirical researchers often utilize the standard deviation of the moving average of the logarithm of the exchange rate as a measure of exchange rate fluctuation. In this study, a new measure for measuring volatility is proposed. The empirical methodology used relies upon the theory of co-integration, error correction representation of the exchange rate volatility measures using the Autoregressive Distributed Lags (ARDL) modeling to co-integration. Overall, our findings suggest that there is a negative effect of volatility to tourists' arrivals for Iceland.

5. Methodology

The time series data are used in this study. The annual time series data for the period from 1950 to 2014 of the exchange rates of the different countries and the arrivals of the tourists from the world arena to Sri Lanka are used to analyze the relationship between the variables in this study. The data specified are

collected from the Anural Report of Central Bank of Sri Lanka. Arrival of tourists is used as the dependent variable in this model. The Exchange rates of US dollar (EUD), Pound Sterling (ESP), Japanese Yen (EJY), Indian Rupee (EIR), French Franc (EFF) and Dummy (D) are used as the independent variables of this model. The dummy variable is defined as 1 for outward oriented economic policy of Sri Lanka implemented after 1977 and 0 for Inward Oriented Policy of Sri Lanka implemented before 1977. All the variables are transformed into the Natural Logarithmic function to find the percentage relationship and changes between the dependent and independent variables used in the model.

Accordingly, the following model is defined and estimated:

$$TAR = f\,(EFF, EIR, EJY, ESP, EUD, D) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$\ln TAR_t = \alpha_0 + \alpha_1 \ln EFF_t + \alpha_2 \ln EIR_t + \alpha_3 \ln EJY_t + \alpha_4 lnESP_t + \alpha_5 \ln EUD_t + \alpha_6 D + \varepsilon_\tau \ldots\ldots\ldots\ldots(2)$$

Where,

$lnTAR_t$= Arrivalof Tourists – Time series

$lnEFF_t$= Natural logarithm of Exchange rate of French Frank - Time series

$lnEIR_t$ = Natural logarithm of Exchange rate of Indian Rupee - Time series

$lnEJY_t$= Natural logarithm of Exchange rate of Japanese Yen - Time series

$lnESP_t$ = Natural logarithm of Exchange rate of Sterling Pound - Time series

$lnEUD_t$ = Natural logarithm of Exchange rate of US dollar -Time series

D = Dummy Variable

$\varepsilon_\tau =$ The error term with the conventional statistical properties - Time series

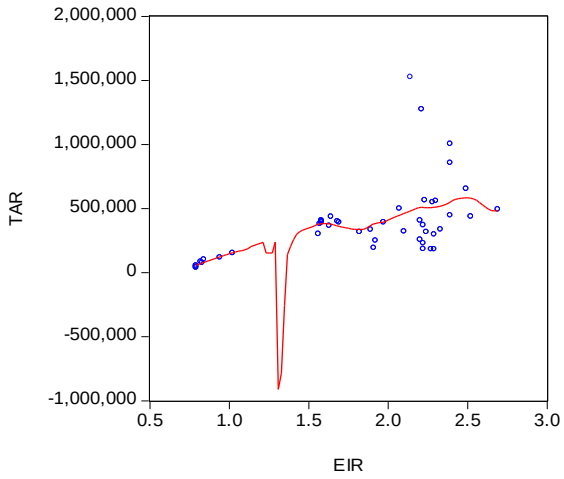
$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ = Coefficients of the model/ independent variables

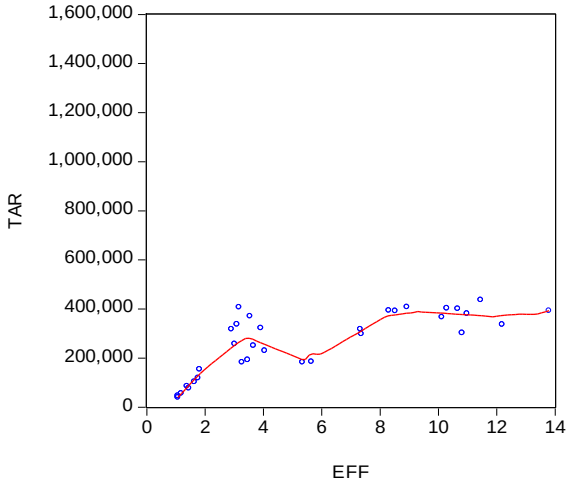
Augmented Dickey-Fuller test can be used to test the stationary of the time series data (Damordar N. Gujarati (2005). The long run relationship between the variables can be identified by using the Co-integration test. Error Correction Mechanism is used to find the short run relationship and Granger Causality test is used causal relationship between various exchange rates and export.

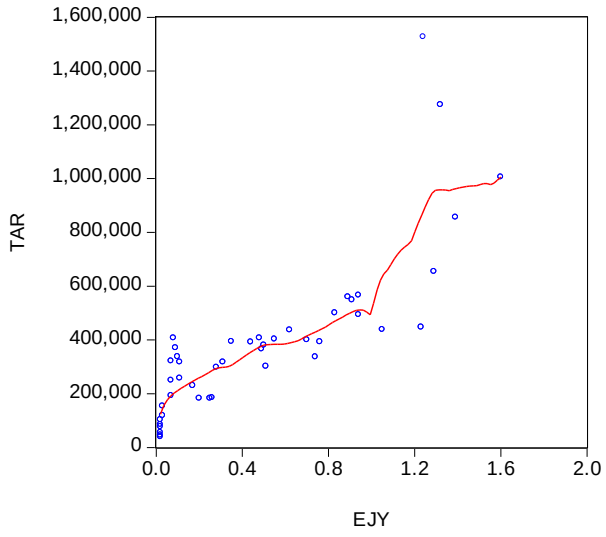
Correlation Test, Heteroscedasticity Test, and Jarque-Bera (JB) Test of Normality of residuals are used to find the correlation, heteroscedastic or homoscedastic, distribution of the residuals in this model. And also, Stability test is used to find the stability of the model at the certain significant level. E-Views, Minitab and Excel statistical software are used to run this model.

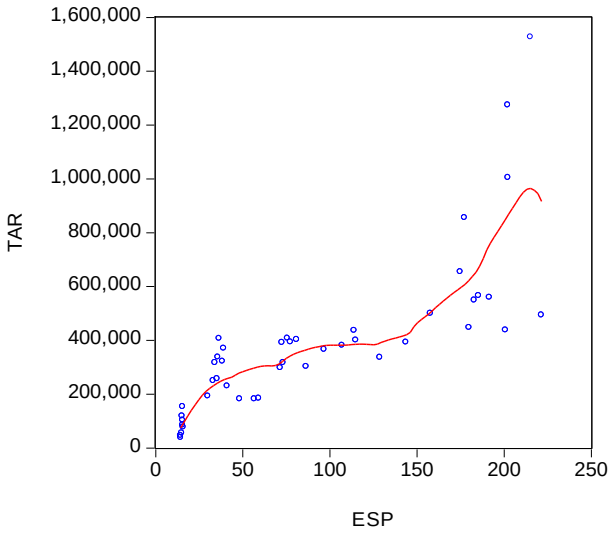
6. Results and Discussion

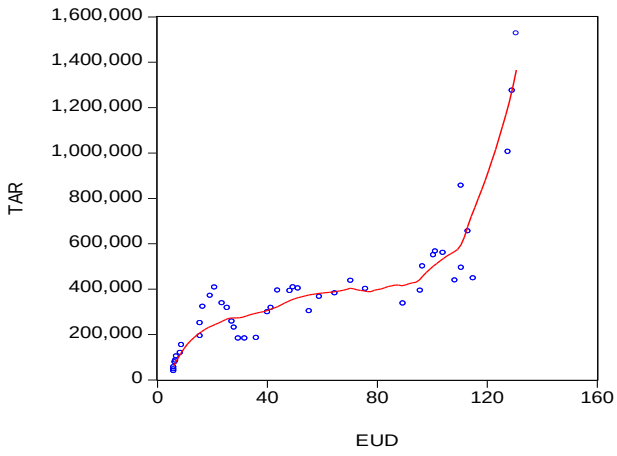
6.1 Kernel Fit











6.2 Unit root tests (Augmented Dickey Fuller test)

The results of the ADF test are shown in the table 01for all the variables (dependent and independent) used in this model as an intercept, trend and intercept and neither intercept nor trend. It can be concluded that the null hypothesis of non-stationary (having unit root) cannot be rejected at 5% level of significance at the data level forms I(0)of all the variables when they are used as constant, trend and constant or none , but it is accepted. But all the variables are stationary at its first difference because the null hypothesis of non-stationary is rejected for all the variables (the value of Test statistic value > the value of Test critical value at 5% level of significance).

Accordingly, all the six variables are integrated of same order one I(1). It is found that all the variables are not suffering from the problem of spuriousness when they used in the model at the first difference. Therefore, all the variables can be used in this model at the first difference. It means that the absence of spuriousness avoids the wrong conclusions and findings which may lead to meaningless and biased results.

Table 01: Results of ADF test

Variable	ADF test	Intercept/ Constant		Trend and Intercept		None/Neither intercept nor trend		Overall Decision
		Test statistic value	Test Critical Value (5%)	Test statistic value	Test Critical Value (5%)	Test statistic Value	Test Critical Value (5%)	
lnTAR	First Difference	4.56	2.93	4.56	3.51	3.92	1.94	Stationary
lnEFF	First Difference	7.59	2.91	8.02	3.50	3.40	1.94	Stationary
lnEIR	First Difference	6.83	2.90	6.77	3.48	6.81	1.94	Stationary
lnEJY	First Difference	8.45	2.90	8.39	3.48	7.40	1.94	Stationary
lnESP	First Difference	6.46	2.90	6.53	3.48	5.76	1.94	Stationary
lnEUD	First Difference	7.61	2.90	7.68	3.48	6.24	1.94	Stationary

6.3 Grange Causality test (Vector Auto Regression Estimate – VAR model)

This test is used to find the causal relationship between the variables used in this model. The results of the test are shown in the table 02. All the three null hypotheses are rejected because the value of probability is less than 5% significance level at lag value of 2. Exchange rate of Japanese Yen can statistically affect both exchange rate of French Frank and exchange rate Pound Sterling. Exchange rate of Pound Sterling can statistically affect exchange rate of US dollar. There is a one way causal relationship between exchange rate of Japanese Yen and exchange rate of French Frank, Exchange rate of Sterling Pound and exchange rate of US dollar. As a result, the variables of EFF, EJY, ESP, and EUD are considerably connected each other. This model (ex. Consisting of two variables) is estimated as follows:

$$TAR1t = \alpha + \sum_{j=1}^{k} \beta\, jTARt - j + \sum_{j=1}^{k} \gamma j\, EFFt - j + u1t \ldots\ldots\ldots\ldots\ldots (3)$$

$$EFFt = \alpha' + \sum_{j=1}^{k} \theta\, jTARt - j + \sum_{j=1}^{k} \gamma j\, EFFt - j + u2t \ldots\ldots\ldots\ldots\ldots (4)$$

Table 02: Granger Causality Test

Null Hypothesis	F-Statistic	Prob.
LOG(EJY) does not Granger Cause LOG(EFF)	4.35231	0.0186
LOG(EJY) does not Granger Cause LOG(ESP)	10.1097	0.0002
LOG(ESP) does not Granger Cause LOG(EUD)	5.11272	0.0090

6.4 Regression result

As per the OLS method, the output is shown in the table (Table 03) below. This model is mostly significant because most of the variables (04 variables out of 06 variables) are significant to run the model and to explain the relationship between the dependent variable and the dependent variable. This is one of the good sign of this regression model. The estimated coefficient of EFF indicates that 1% change of increase in exchange rate of French Frank increases arrivals of tourists only by 1.33%. There is a direct relationship between those two variables. When the exchange rate of US dollar increases by 1 percent, arrival of tourists increases by 1.64 percent. Thus, Exchange rate of French Frank and US dollar are directly related to arrivals of tourists with various magnitude of significance. Exchange rate of Indian Rupee, exchange rate of Japanese Yen and exchange rate of Pound Sterling are inversely related to the dependent variable. One percent increase in exchange rate of Indian Rupee, in exchange rate of Japanese Yen, and in exchange rate of Pound Sterling can lower the arrivals of tourists by 0.03 percent, 0.96 percent and 1.32 percent respectively.

$$ln\text{TAR} = 7.56 + 1.33lnEFF - 0.03lnEIR - 0.96lnEJY - 1.32lnESP + 1.64lnEUD + 0.84DU$$

And also, the dummy variable is directly related with the dependent variable. Even though the dummy variable is insignificant to run this model and explain the relationship between the variables of dependence and independence. If DU is represented by binary number 0 in the model, the arrival of tourist will decrease by 0.84 percent before 1977 and if DU is represented by binary number 1, the arrival of tourists will increase by 0.84 percent after 1977. Another good sign of this regression model is that the Probability – value of corresponding F – Statistic is less than 5%. It means that all the independent variables used in the model are statistically significant and jointly influence and affect the independent variable (TAR).

Further, the value of R-squared is 0.910208 which is more than 60 percent. That is also another good sign of this regression model. It means that 91 percent of this model is fit or the data used in this model is nicely fitted by 91 percent. Only 9 percent of outside factors (residuals/external influences) is likely to affect this model in explaining the relationship between the dependent and independent variables. Therefore, the influence of the internal variables used in this model is relevant by 98 percent to fit this model. According to the regression results as well, this model is free from the problem of spuriousness as

the value of Durbin-Watson Statistic is higher than the value of R-squared. It means that this model is free from any senselessness or meaningless.

Table 03: Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.567535	2.060392	3.672861	0.0011
LOG(EFF)	1.334287	0.304315	4.384551	0.0002
LOG(EIR)	-0.034579	0.425242	-0.081316	0.9358
LOG(EJY)	-0.968666	0.293335	-3.302253	0.0028
LOG(ESP)	-1.323833	0.458429	-2.887761	0.0077
LOG(EUD)	1.640223	0.476131	3.444894	0.0020
DU	0.848066	0.467582	1.813727	0.0813
R-squared	0.910208	Mean dependent var		12.31118
Adjusted R-squared	0.889487	S.D. dependent var		0.689821
S.E. of regression	0.229321	Akaike info criterion		0.078444
Sum squared resid	1.367292	Schwarz criterion		0.395885
Log likelihood	5.705673	Hannan-Quinn criter.		0.185253
F-statistic	43.92625	Durbin-Watson stat		1.434773
Prob(F-statistic)	0.000000			

6.5 Co-integration Test: Trace Test

This technique is used to test the long run equilibrium relationship between the variables. To test this relationship, the Johansen Co-integration Test is used. The results of the test are as follows:

Table 04: Johansen Co-integration Trace Test

Null Hypothesis No. of Co-integrated Equations	Trace Statistic	Critical Value (5%)	Probability
None *	199.4992	95.75366	0.0000
At most 1 *	132.6186	69.81889	0.0000
At most 2 *	82.02022	47.85613	0.0000
At most 3 *	42.19327	29.79707	0.0012
At most 4 *	15.81274	15.49471	0.0448
At most 5	0.073447	3.841466	0.7864
Trace test indicates 5 co-integrating equations at the 0.05 level (5%)			
* denotes rejection of the null hypothesis at the 0.05 level (5%)			

The table 04 shows the null hypothesis of "there is no long run relationship between the variables or the variables are not co-integrated or there is no co-integration between the variables" used in this model can be rejected because the corresponding Probability value is less than 5%. As a result, all the variables are having long run associationship or all the variables are finally moving together.

And also, this associationship is ensured by another result that is the value of Trace Statistic (199.4992) is higher than Critical Value (95.75366). Thus, final result of this co-integration test in Johansen Co-integration Trace Test is that 05 co-integrating equations can be likely made using the variables used in this model and there are five errors terms in this system model/Johansen Co-integration model. It leads to run a model called VECM (running a number of equations at a time, consisting of number of independent variables).

6.6 Co-integration Test: Maximum Eigen value

The same result as in Table 04: Johansen Co-integration Trace Test is observed in the Table 05: Johansen Co-integration Maximum. Eigen value Test. Therefore, the two tests of Johansen Co-integration together confirm the validity of the long run relationship and associationship between the variables used in this model. As in the Co-integration Test: Trace Test, five co-integrating equations can be possibility made using the variables in this model.

Table 05: Johansen Co-integration Maximum Eigen-value Test

Null Hypothesis: No. of Co-integrated Equations	Max-Eigen Statistic	Critical Value (5%)	Probability
None *	66.88061	40.07757	0.0000
At most 1 *	50.59834	33.87687	0.0002
At most 2 *	39.82695	27.58434	0.0008
At most 3 *	26.38053	21.13162	0.0083
At most 4 *	15.73929	14.26460	0.0290
At most 5	0.073447	3.841466	0.7864
Max-eigenvalue test indicates 5 co-integrating equations at the 0.05 level (5%)			
* denotes rejection of the null hypothesis at the 0.05 level (5%)			

7. Findings and Conclusion

This study discussed on the relationship between the arrivals of tourists to Sri Lanka and the various exchange rates of the countries concerned. A positive associationship persists between the arrivals of tourists and the exchange rates of French Frank and the exchange rate of US dollar whereas there is an inverse relationship between the arrivals of tourists and the exchange rates of Indian Rupees, Pound Sterling and Japanese Yen. There is a mostly significant relationship between the dependent and independent variables as four main variables out five variables are mostly significant in this model.

One percent of increase in the exchange rate of French Frank promotes the arrivals of tourists to Sri Lanka by 1.33 percent and likewise, one percent of the exchange rate of US dollar promotes the arrivals of tourists by 1.64 percent. It proves that there is a significant and empirical relationship between the arrivals of tourists and US dollar and the exchange rate of French Frank.

Currency depreciation under floating exchange rate or devaluation under fixed exchange rate in terms of US dollar promotes the arrivals of tourist to Sri Lanka because maybe the purchasing power of US dollar against Sri Lankan Rupee increases. Therefore, the tourists from all over the world are driven to visit to Sri Lanka with the intension of maximizing their budget constraint with their leisure time activities. Along

with the case of the dollar, the exchange rate of French Frank affects the arrivals of the tourists to be driven towards Sri Lanka due to the deprecation of currency or devaluation of currency of Sri Lanka.

But empirically it is proved that inverse relationship between the arrivals of tourists and the exchange rates of Indian Rupee, Japanese Yen and Pound Sterling delineates the insignificance of the depreciation or devaluation of the Sri Lankan currency against these currencies. In contrast, the depreciation or devaluation of currencies does not attract the tourists to Sri Lanka in case of these three currencies but the empirical data prove statistically the appreciation or revaluation of these currencies that attracts the tourists to Sri Lanka.

All the variables used this study stationary at the first difference and become meaningful and effective to be used in this model. All the variables other than the exchange rate of Indian Rupee are unidirectional. There is no any causational relationship between the dependent and independent variables. The long run relationship or long run equilibrium relationship is found between the variables.

8. Recommendation

These empirical results can be considered by the policy makers in Sri Lanka in respect of the attraction of the foreign tourist to Sri Lanka. It is suggested that the ways to improve tourism sector in Sri Lanka by understanding the trend of the value of Sri Lankan Rupee per unit of various types of foreign currencies in the global arena can be recognized. A criterion can be recommended to guide the policy makers of Sri Lanka towards more effective depreciation of US dollar than the depreciation of French Franc to attract more tourists to Sri Lanka.

Acknowledgement: The abstract of the paper has already published in the proceedings of 5th Kuala Lumpur International Communication, Education, Language & Social Science Conference (KLiCELS – 2016) held on 19 – 20 November 2016, in Malaysia.

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