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RESEARCH ARTICLE

AN EMPIRICAL INVESTIGATION ON MACROECONOMIC DETERMINANTS OF TOURIST ARRIVALS TO SRI LANKA

[1]Rashika Mudunkotuwa and [2,*]Hettige Don Karunaratne

[1]CINEC Maritime Campus, Sri Lanka
[2]University of Colombo, Sri Lanka

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ABSTRACT

The study investigates the macroeconomic determents of tourist arrivals in Sri Lanka, using annually series of the corresponding variables. To achieve the objectives both time series technique and econometrics techniques were used to analyze data. The statistical techniques used include the unit root Augmented Dickey Fuller test in order to fulfill the objective of stationary for all the time series. The results from granger causality test revealed that past behavior of gross domestic production, gross domestic per capita income, government expenditure on capital and net lending, imports of goods, exports of goods and foreign direct investment are significant factors which determine the present behavior of tourist arrivals in Sri Lanka. The regression analysis it showed that all macroeconomic variables are strongly linear associated with tourist arrivals. The VECM model has revealed that there exists long run relationship between tourist arrivals and those variables. The results derived in this study can be effectively used for implementation of new strategies to attract more tourists to Sri Lanka.

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1. INTRODUCTION

Tourism industry has been identified as one of the key industries by economists since it contributes to the development of the economy. There are direct benefits and indirect benefits associated with the tourism industry. Accommodation earnings, visitors expenditure, transport earnings are some of direct contributions while investment spending on travel tourism, government collective travel and tourism spending and impact of purchasing from supplier are considered as indirect travel and tourism contribution (WTTC, 2014). The contribution of tourism industry to the economic development depends on the power of the tourist attraction factors by the economy. Attraction of tourism to the economy mainly depends on economic and non-economic factors. Most of Asian countries are endowed in natural resources including Sri Lanka and those factors can't control by the government or any institution in the economy. Therefore, each nation can compete by better management and control of the economic factors influence tourist arrivals. It is widely acknowledged that growth of tourist arrivals contributes to economic growth through its various impacts, such as employment generation, foreign exchange earnings, and government revenues with multiplier effects, development of infrastructure, and improvement of entrepreneurial activities and skill formation of the labour force.

****Corresponding author: Hettige Don Karunaratne,***
University of Colombo, Sri Lanka.

Because tourism is a multidisciplinary activity that involves several industries and draws upon a variety of skills, its benefits are spread over a wider section of society comparatively to other sectors of the economy (Telce and Schroenn, 2006). Finally tourism is contributed to overall gross domestic production and employment creation in the economy. Since there are more contributions to the economy it is time to change the international competiveness among the others considering uplift of economic factors affecting to the attraction of tourist. The Sri Lanka has been implementing various projects to attract more tourist the economy. The Authority on World Travel & Tourism has forecasted Sri Lanka as a better place among the other Asian countries with respect to contribution of tourism industry to Gross Domestic production as shown in Figure1.In order to achieve, focused contribution to GDP, policy makers and private sector institutions have to understand behavior of economic and non-economic factors affecting to tourist arrivals to Sri Lanka. The tourism industry is influential in the advancement of macroeconomic development and change the direction of macroeconomic variables in the economy. It is evident that well developed tourist industrys in the world encourage investors and corporations to allocate their limited resources to increase in investments in tourist industry in efficiently, which lead to increase rate of economic growth. Policy makers have to more concern about relationship between tourist arrivals and behavior of macroeconomic variables.

Therefore policy makers, corporations and individuals need to find out whether there is a relationship among macroeconomic variables and tourists arrivals. The dynamic relationship between macroeconomic variables and tourist arrivals is well-documented in the literature. However, the past literature related to examine the causality relationship and elasticity between macroeconomic variables and tourist arrivals in related to the Sri Lanka are few. Therefore, the paper examines the causality relationship between selected macroeconomic variables and elasticity among the variables after identifying macroeconomic variables which are influenced to the demand for tourists to the economy. There are large number of factors affecting on the tourist attraction of a country and broadly categories as geographical, social, political and economic disciplines. Sri Lankan is a wealthier country with the natural resources but other factors has to be considered in meaning fully. This study is devoted to investigate economic factors affecting on tourist arrivals in Sri Lanka.

Earning from tourism has continued to record a healthy growth in Sri Lanka in 2014 with higher spending and increased duration of stay by tourists. Meanwhile investment in the tourism sector has expanded further in 2014 with introducing international hotel chains to Sri Lanka. It can be seen that importance of tourism promotion has been highlighted by the activities taken by the government of Sri Lanka because the tourism industry enhance the economy through many channels. After finding out significant factors which affect to the tourist arrivals economy can allocate their limited resources to identified factors to further development of the tourist industry. It facilitates to improve the tourism industry of Sri Lanka with collaboration between private and government institutions of Sri Lanka and Tourist Board of Sri Lanka.

2. Objective of the Study

This study has two main objectives as;

- To identify the granger causality between tourist arrivals and macroeconomic factors affecting the tourist arrivals
- To develop a model to forecast future tourist arrivals to Sri Lanka

3. Review of Literature

The relationship between the tourist arrivals and macroeconomic determinants have been extensively discussed by many scholars over the years. Among them, Carla Massidia et al. (2012) examined relationship between the international tourist arrival and GDP in Italy using VECM. It was found that the long run and short run simultaneous relationships across per capita international tourism arrivals and real GDP. The study has used quarterly data from 1987 to 2009. Akinboade and Braimoh (2010) studied linkages between tourism and trade for South Africa. Tourism was co-integrated with GDP. It was found that long run relationship exists between real GDP and international tourist arrivals. Munóz and Amaral (2000) have revealed that economic demand theory suggested as country's income rises, more of its residents can afford to visit other countries, and therefore tourist arrivals are a positive function of income. While Muchapondwa and Pimhidzai (2011) have estimated the coefficients of the determinants of international tourism demand for Zimbabwe for the period 1998 to 2005.

The results revealed that change in global income has significant impact on international tourism demand. Hanafiah and Harun (2010) have found out tourism demand in Malaysia based on the key economic factors like income, price, exchange rate, consumer price Index, distance, population and economic crisis using a modified Gravity model. The results have found that income is the most important factor that affects tourism flow. Teresa and Teodosio (2000) have found out the impact of the economic determinants of the international demand on tourist services in Spain. Study revealed that real per capita income influence the demand for Spanish tourist services. The estimated income elasticity was positive 1.40 concluding that it was a luxury service for the people. Artus (1970) has suggested that travelers are more conscious of exchange rates that they use and they are using them as proxy for the cost of living abroad. Raymond (2001) has examined the impact of economic factors on tourism in Hong Kong. Real tourism expenditure (RTE) had been considered as dependent variable and Exchange rate had been considered as a one of independent variable. It was revealed that expected expenditure of tourists was depending on the Exchange rate. Carla Massidia et al. (2012) have found there was long run and short run relationship between International Tourism Arrivals and total international commercial transactions (imports and exports) for the Italian economy. The study has used quarterly data from 1987 to 2009.Turner and Witt (2001) have revealed that a long-term bidirectional relationship between tourism and trade exists and the relationship was positive. Further results were shown that international trade plays a major role in influencing business tourism demand. Muhammad and Andrews (2008) have identified that a country's exports have a positive effect on tourist arrivals.

Habibi et al. (2009) have investigated that the trade openness has an insignificant and positive impact on the tourism demand in Malaysia. Gil- Alana and Fischer (2007) have found that the causality relation resulting from tourism as tourist visits have impact on trade. Thus, tourism is thought to be able to promote cross-border exports by originating entrepreneurial activities as a result of learning about new business opportunities, while travelling and demand for new products to be consumed back home may be created as a consequence of learning about them during foreign travel. WTTC (2014) has stated that Money spent by foreign visitors to a country or visitor exports is a key component of the direct contribution of Travel & Tourism. Samimi et al. (2013) have revealed that the existence of Granger causality and co-integrated relationships between tourism associated Foreign Direct Investment (FDI) and tourism development in developing countries using panel VECM techniques from 1995 to 2008. The results were confirmed the existence of a co-integrated relationship between variables in the long run. In addition, there is a bilateral long-run causality between tourism related FDI and tourism development, while there is no short-run causality between variables.

Ranasinghe and Deshapriya (2010) have stated that the rapid expansion of international tourism has led to significant employment creation. Tourism can generate jobs directly through hotels, restaurants, nightclubs, taxis, and souvenir sales, and indirectly through the supply of goods and services needed by tourism-related businesses. WTTC (2014) Travel & Tourism generated 105,408,000 jobs directly in 2014 (3.6% of total employment) and it is forecasted to grow by 2.0% in 2015 to 107,519,000 (3.6% of total employment).

Travel & Tourism's Direct Contribution to GDP		2014 - 2024 % growth pa
9	Thailand	6.7
11	India	6.4
17	Tanzania	6.2
26	Sri Lanka	6.1
	Asia Pacific	5.4
56	Kenya	5.2
62	Madagascar	5.1
87	Mauritius	4.4
91	Malaysia	4.4
99	Seychelles	4.3
101	Maldives	4.2
	World	4.2

Travel & Tourism's Total Contribution to GDP		2014 - 2024 % growth pa
8	India	7.0
11	Tanzania	6.7
13	Thailand	6.4
16	Sri Lanka	6.2
	Asia Pacific	5.6
54	Kenya	5.2
65	Madagascar	4.9
83	Malaysia	4.5
91	Mauritius	4.4
96	Maldives	4.2
	World	4.2
104	Seychelles	4.0

Source: The Authority on World Travel & Tourism.

Figure 1. Estimated Travel and Tourism Sector Contribution to GDP in Selected countries, 2014-2024

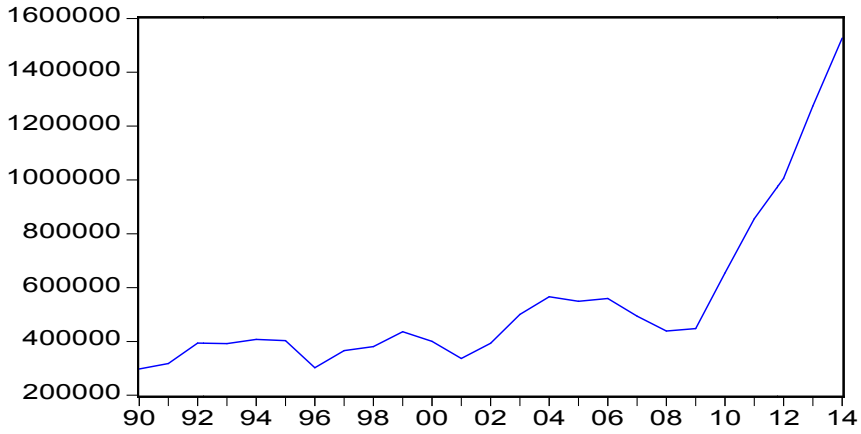

Figure 4.1, Pattern of Tourist Arrivals (TA)

Table 4.1. Normality of Data Series

	CV (%)	Jarque-Bera	Probability
TA	55.97	27.52	0.000
GDP	39.41	2.45	0.294
GDPPC	33.85	2.67	0.264
XER	35.59	2.14	0.343
GE	93.28	4.31	0.116
INF	49.42	4.94	0.085
EX	46.08	1.53	0.466
IM	60.04	3.72	0.156
FDI	80.83	3.84	0.147
DE	50.79	32.82	0.000
TC	40.06	21.14	0.000

Table 4.2. Unit Root Test for Original Series of Data

	ADF - Fisher Chi-square -Significant Value			PP - Fisher Chi-square - Significant Value		
variables	level	1st different	2nd Difference	level	1st different	2nd Difference
TA	1.0000	0.4952	0.0002	1.0000	0.4952	0.0001
GDP	1.0000	0.6751	0.0003	1.0000	0.7883	0.0000
GDPPC	1.0000	0.6261	0.0000	1.0000	0.7526	0.0000
EXR	0.5620	0.5104	0.0037	0.9137	0.0002	0.0000
GE	0.6412	0.6495	0.0000	0.9997	0.0188	0.0000
IN	0.0027	0.0003	0.0062	0.0026	0.0000	0.0000
EX	0.9941	0.0002	0.0000	0.9984	0.0000	0.0000
IM	0.9978	0.0001	0.0020	0.9908	0.0000	0.0000
FDI	0.7766	0.0002	0.0004	0.8613	0.0000	0.0000
DE	0.9999	0.0772	0.0000	0.9999	0.0756	0.0000
TC	0.9999	0.9886	0.0000	0.9999	0.0021	0.0000

Table 4.3 Granger Causality between TA with Macroeconomic Variables

Null Hypothesis:	F-Statistic	Causal inference
GDP does not Granger Cause TA	5.88615(0.01079)	Causality
TA does not Granger Cause GDP	1.4263(0.26608)	No causality
GDPPC does not Granger Cause TA	2.58966(0.10269)	No causality
TA does not Granger Cause GDPPC	2.49669(0.11041)	No causality
EXR does not Granger Cause TA	1.79338(0.19488)	No causality
TA does not Granger Cause EXR	0.14195(0.86862)	No causality
GE does not Granger Cause TA	5.30281(0.01547)	Causality
TA does not Granger Cause GE	0.78978(0.46906)	No causality
INF does not Granger Cause TA	1.26475(0.30623)	No causality
TA does not Granger Cause INF	2.49966(0.11016)	No causality
EX does not Granger Cause TA	6.83695(0.00618)	Causality
TA does not Granger Cause EX	1.93239(0.17368)	No causality
IM does not Granger Cause TA	9.1292(0.00183)	Causality
TA does not Granger Cause IM	1.92837(0.17425)	No causality
FDI does not Granger Cause TA	4.24974(0.03078)	Causality
TA does not Granger Cause FDI	1.39063(0.27441)	No causality
DE does not Granger Cause TA	0.2045(0.81693)	No causality
TA does not Granger Cause DE	11.7219(0.00055)	Causality
TC does not Granger Cause TA	0.92074(0.41619)	No causality
TA does not Granger Cause TC	10.0264(0.00119)	Causality

*parenthesis is indicated the probability value.

This includes employment by hotels, travel agents, airlines and other passenger transportation services. It also includes, for example, the activities of the restaurant and leisure industries directly supported by tourists.

3. METHODOLOGY

This study used data on tourist arrivals obtained from various issues of annual reports of the Authority of World Travel and Tourism, and Tourist Board of Sri Lanka. These data consists of time series observations on tourist arrivals to Sri Lanka and selected macroeconomic variables of Sri Lanka. The time series data on tourist arrivals and selected macroeconomic variables were collected for the period 1980 to 2014. The data on macroeconomic variables were obtained from annual report of Central Bank in Sri Lanka. As determinants of tourist arrivals, Gross Domestic Production (GDP), Per Capita Gross Domestic Production (GDPPC), Exports of Goods (EX), Imports of Goods (IM), Official Average Exchange Rate (EXR), Inflation (INF), Tourist Cost per Day (TC), Foreign Direct Investment (FDI), Government Expenditure (GE), Direct Employment (DE), selected among many other macroeconomic variables.

The analysis of the long term and short term dynamic relationship between above-mentioned macroeconomic variables and tourist arrivals will be undertaken through either Engle and Granger (1987) or Johansen and Juselius (1990) protocols. The procedures given below are used to investigate such dynamic relationships among variables.

3.1 Test for Stationary

Time series data can be either stationary or non-stationary. Autoregressive integrated moving average (ARIMA) model can be fitted for stationary series only. The common type of non-stationary series are given bellow,

Pure random walk: $Y_t = Y_{t-1} + \varepsilon_t$ (1)

Where ε_t is independent and circulated with zero mean and variance.

Random walk with drift: $Y_t = \alpha + Y_{t-1} + \varepsilon_t$ (2)

Where ε_t is white noise and α is a drift. It does not contain long run mean and variance.

Deterministic trend : $Y_t = \alpha + \beta t + \varepsilon_t$

This has a mean which increases with fixed trend.

Random walk with drift and deterministic trend:

$Y_t = \alpha + Y_{t-1} + \beta t + \varepsilon_t$ (3)

As described above non stationary series cannot be modeled using ARIMA approach. Thus time series have to be converted in to stationary series by taking first difference or second deference of the time series.

3.2 Unit Root for Stationary

Stationarity of the data is important for forecasting. Also checking for stationarity, unit root testing has been carried out prior to modeling. Autocorrelation function of stationary series tells about what kind of ARIMA model is suitable for the time series along with partial autocorrelation function (Diebold and Kilian, 2000). Unit root tests were developed by David Dickey and Wayne Fuller (1979) and Pierre Perron and Peter Phillips (1988) and they are commonly known as Augmented Dickey Fuller test and Phillips Perron test.

3.3 Augmented Dickey Fuller Test

$Y_t = \emptyset Y_{t-1} + u_t$

The test studied the null hypothesis of an ARIMA model against the stationary ARIMA alternative. The null hypothesis is,

H_0: series include unit root ($\emptyset \geq 0$)
Vs

H_1: series is stationary ($\emptyset<0$)

Test for random walk against a stationary

H_0: $Y_t=Y_{t-1}+U_t$

H_1:$Y_t = \varphi Y_{t-1} + U_0 \quad \varphi < 1$

Test for random walk with drift against a stationary

H_0: $Y_t = Y_{t-1} + U_t$

H_1: $Y_t = \varphi Y_t + \mu + U_0$

Test for a random walk with drift and constant against a stationary

H_0: $Y_t = Y_{t-1} + U_t$

H_1: $Y_t = \varphi Y_t + \mu + \lambda t + U_0$

$$\Delta Y_t = \alpha + \beta T + \gamma Y_{t-1} + \sum_{i=0}^{p} \varphi_i \Delta Y_{t-1} + \varepsilon_t \qquad (4)$$

Y_t is level and ΔY_t is first difference time series. T is time in year. α is the intercept constant. β is the coefficient on the time period. γ is the coefficient presenting root. p is the lag order of first difference autoregressive process. α,β, γ are parameters which are estimated.

3.4 Johansen's Co-integration

Co-integration is a statistical property generally applies for set of stationary series. When the observed series are stationary at the first difference, it is said to be that the series are integrated of order one. That is series are in I(1). Once a unit root has been confirmed for all data series as stationary, it is required to test whether there is any possibility for the existence of a long-run equilibrium relationship among a given set of variables. In this aspect it is required to find the lag period Johansen's co-integration test is very sensitive to the choice of optimal lag length. Thereafter, the sequential modified likelihood ratio test statisticsis used to select the number of lags required in the co-integration test.

3.5 Testing for the Causality

The researcher's selected the granger procedure because it consists the more powerful and simpler way of testing causal relationship. The Granger-causality test is planning to use to investigate direction of causation between stock market performance and macroeconomic variables. The outcome from the Granger-causality test was used to determine whether the variables under study can be used to predict each other or not. At the same time, the variables used in the granger-causality test were all assumed to be stationary i.e. I (0) process. Finally, the causality test helps to ascertain whether a uni-directional or bi-directional (feedback) relationship exists between macroeconomic variables and tourist arrivals. Data analysis was carried out using time series software E-views 5.0 and statistical software SPSS 16.

4. RESULTS AND DISCUSSION

4.1 Temporal Variations of Macroeconomic Variables

The graphical representation of Tourist Arrivals time series can be easily identified that the series is stationary or not which observes the evidence of mean, variance, autocorrelation and seasonality. Figure 4.1 highlights the graphical representation of TA from 1990-2014 due to changes in economic and market. The TA has no significant gradual movements till year 2009. Thereafter, upward trend can be identified and a steep upward slope is notable after year 2009 due to the end of Sri Lankan civil war. The following figure indicate the variability of Gross Domestic Production (GDP)

4.2 Normality of Time Series

Table 4.2 is represented the Jarque – Bera Statistics and Coefficient of Variance (CV) which can be used to identify the variability of the time series. The Jarque-Bera statistic is significant only for TA, DE and TC. Thus it can be concluded the distributions of all series except TA, DE and TC are not significantly deviate from normality. It can be seen that the variables GE and FDI have exceptionally high variability and CV of the two series are 93.28% and 80.3%. the other series also have a considerable variability and CV varies from 33.85% (GDPPC) to 60.04% (IM). Thus in order to reduce the hetroscedasicity all the variables were transformed to log.

4.3 Test for Stationary

Results of the Augmented Dicky- Fuller (ADF) test and Phillips Perron (PP) test of macroeconomic variables and tourist arrivals is shown in Table 4.2. Since the P value for variables in original series at level are greater than the significant level (0.05) null hypothesis could not be rejected for all the variables except inflation rate (IN) under both ADF test and Phillips Perron test. As non-stationary at level, the 1st difference transformation is applied for the original date series. At 1st difference Inflation (IN), Exports (EX), Imports (IM) and foreign direct investment (FDI) are significant since corresponding P values less than the significant level (0.05). However government expenditure (GE), exchange rate (EXR) and cost of tourist (TC) are stationary at 1st different according to the Phillips Perron test. As ADF statistics of most of variables showed non stationary in 1st difference, second difference transformation is applied for the series as variance stabilization measure as shown in Table 4.3.At 2nd difference all the variables are stationary since the P value for the variables are less than the significant level (0.05) under both ADF test and Phillips Perron test statistics conforming stability of the variance.

Table 4.4. Results of lag Order Selection for VECM Model

Lag	AIC	HQ
0	83.11873	83.15111
1	75.77739	75.90693
2	75.65026*	75.87695*
3	75.67418	75.99802
4	75.74107	76.16207

4.4 Granger Causality between Macroeconomic Variables and Tourist Arrivals

The Granger Causality test is statistical hypothesis test for determining whether one time series is useful in forecasting another (Granger 1969). It proposed that if causal relationship exists between variables, these variables can be used to predict each other. The author pointed out that in causality approach, a variable say Y, is caused by X if Y can be predicted better from past values of Y and X than from past values of Y alone. The causality test helps to ascertain whether a uni-directional or bi-directional (feedback) relationship exists between variables. The researcher's choice for the granger procedure is because it consists the more powerful and simpler way of testing causal relationship.

Table 4.5. Results of Johansen Cointegration Test for TASample (adjusted): 1993 2014Series: TA GDP GDPPC Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Significant at 5% level
None *	0.610082	41.71030	29.79707	0.0014	Yes
At most 1*	0.395100	20.99028	15.49471	0.0067	Yes
At most 2*	0.363271	9.931062	3.841466	0.0016	Yes

Table 4.6: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**	Significant at 5% level
None *	0.610082	20.72002	21.13162	0.0570	Yes
At most 1	0.395100	11.05922	14.26460	0.1513	No
At most 2*	0.363271	9.931062	3.841466	0.0016	Yes

Table 4.7: Normalized Cointegrating Coefficients

Variable	TA	GDP	GDPPC
Coefficient value	1.000000	-0.000843	19192.85
Standard error		(0.00022)	(5176.05)
T statistics		-3.81818	3.708011

Table 4.8: Adjustment Coefficients and the Corresponding Standard Error

Variables	D(TA)	D(GDP)	D(GDPPC)
Coefficient value	-0.199982	782.8868	-2.49E-05
Standard error	(0.14840)	(1047.94)	(4.5E-05)

Table4.9 :Results of The ECM Estimates for TA

Cointegrating Eq:	CointEq1
TA(-1)	1.000000
GDP(-1)	-0.000843
	(0.00022)
	[-3.77772]
GDPPC(-1)	19192.85
	(5176.05)
	[3.70801]
C	-3832092

Table 4.10: Cointegration Results for Error Correction Model for TA

Error Correction:	D(TA)
CointEq1	-0.199982[-1.34755]
D(TA(-1))	0.788886[2.69472]
D(TA(-2))	-0.153801[-0.46085]
D(GDP(-1))	-0.000245[-2.05785]
D(GDP(-2))	-0.000164[-1.04419]
D(GDPPC(-1))	5359.465[1.86459]
D(GDPPC(-2))	4791.347[1.48655]
C	-31103.44[-0.75973]

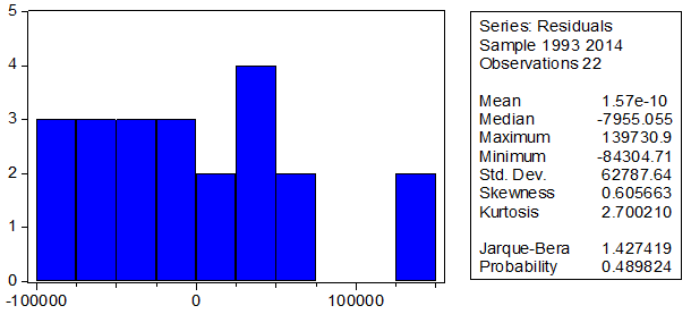

Figure 4.2: Normality Distribution of Residuals of VECM.

Table 4.11 VEC Residual serial Correlation LM Test

Lags	LM-Stat	Prob
1	10.33715	0.3239
2	5.507206	0.7880
3	12.40328	0.1915
4	8.173407	0.5168
5	16.14391	0.0639
6	3.862195	0.9202
7	12.17354	0.2037
8	6.552285	0.6836
9	6.382633	0.7011
10	17.72881	0.0385
11	10.91844	0.2813
12	17.99113	0.0353

At 2nd difference original series and log series both are stationary granger causality can be carried out either for original series or log series. Macroeconomic environment is critically affect tourists arrivals. This study provides a great role to recognize the association of those macroeconomic variables with the tourist arrivals. Table 4.3 represents the granger causality between macroeconomic variables and tourist arrivals data series. The value of F statistics in Table 4.3 is revealed that tourist arrivals granger causes direct employment and tourist cost per day at 5% significant level. Thus it can be argued that past values of tourist arrivals contribute to the prediction of present value of direct employment, tourist cost per day. The study suggested that gross domestic production, Government expenditure, imports, exports and foreign direct investment granger causes tourist arrivals therefore past value of those variables contribute to the prediction of present value of tourist arrivals. Furthermore it can be seen only uni directional causality between variables. However, the value of F statistics revealed that the value of per capita GDP, exchange rate, inflation, direct employment and per day cost of tourist do not contributed to prediction of present value of tourist arrivals.

4.4 Model Development for Forecast TA

The one of the main objective of this study to build up an econometric model for forecast tourist arrivals in future. The best way of construct model for selected variables is time series analysis because of all data series are time series. However problem of insufficient observation in time series model development first regression analysis was carried out to identify most significant variables to tourist arrivals. It was identified that tourist arrivals to Sri Lanka is depend on only gross domestic production and gross domestic per capita income. The time series analysis was carried out for the model development purpose because linear regression analysis is not provided correct interpretation for the time series data sine Variance Inflation Factor (VIF) and Durbin Waston statistics were not supported for the model development. Therefore Johansen cointegration method was applied for the model development.

4.5.1 Selection of Appropriate Lag Length

The important step in the johansen cointegration method is the selection of appropriate lag length of the model by applying maximum like hood estimation procedure. The results of the analysis of optimal lag length for VAR, VECM model based on the sequential modified likelihood ratio test statistics is given in Table 4.4

Results in Table 4.4 indicate that the optimal log length of the model is two according to the Akaike Information Criterion (AIC) and Hunnan Information Criterion (HQ). Thus cointergration test was carried out for tourist arrivals for lag 2.

4.5.2 Estimation of Johansen Cointegration Model for Tourist Arrivals

The Co-integration relationship between TA and other macro-economic variables is tested using Johansen approach at the predetermined lag 2. In these tests, maximum eigen value statistic is known as trace statistic which is compared to the corresponding critical value as shown in Table 4.5. The Trace Test in Table 4.5 indicates the existence of three cointegrating equation at the 5% significance level. This cointegrating equation means that three linear combination exists between the variables that force these indices to have a relationship over the entire 21 years time period, despite potential deviation from equilibrium levels in the short-term. In order to confirm the results the Maximum Eigen value test was carried out and results are shown in Table 4.6.

The results in Table 4.6 indicate that maximum eigen value statistic values are greater than the critical value at 5% significant level ($P<0.05$) Therefore, two cointegration equations can be found. It implied that there exists a long run relationship between TA and macroeconomic variables. Similarly, the maximum Eigen value rejects the null hypothesis of $r = 0$ co-integrating vector at 5 percent significant level and accepts the alternate hypothesis of two co-integrating vector. Therefore, both test statistics suggest the presence of two co-integrating vector. It can be concluded that the variables are co integrated and follow long-run equilibrium relationship. Engle and Granger (1987) stated that the evidence of cointegration rules out spurious correlation and suggests the presence of at least one direction(s) of Granger causality

Results in Table 4.7 indicate that there is one integrating equation, with normalized cointegrating coefficient. Hence, an error correction model should be applied. The study can interpret the coefficients as follows:

- One unit change in gross domestic production lead to change in TA by 0.000843 in log run
- One unit change in gross domestic per capita income will lead to change in TA by 19192.85 in long run.

The ECM for tourist arrivals was fitted to determine the short run relationship between macroeconomic variable and TA results are shown in Table 4.8. According to the above Table 4.8,0.20 of disequilibrium “corrected” each year by changes in tourist arrivals, 782.88 of disequilibrium “corrected” each year by change in GDP and 0.00002 disequilibrium “corrected” each year by change in GDPPC. The figures in the parentheses indicate the test statistics of the coefficients. It can be seen that significant relationship between macroeconomic variables considered in the study and TA. One cointegration equation is developed for the study as shown in the following Table 4.10 The figures in the parentheses indicate the test statistics of the coefficients. The model has been displayed below equation to explain the relationship between macroeconomic variables and TA.

d(ta) = -0.1999821519* (ta(-1) - 0.0008432557717*gdp(-1) + 19192.85201*gdppc (-1) - 3832092.227) + 0.7888864463*d(ta(-1)) - 0.1538011156*d(ta(-2)) - 0.0002452310463*d(gdp (-1)) - 0.0001641034305*d(gdp(-2)) + 5359.464534*d(gdppc(-1)) + 4791.346939*d(gdppc(-2)) - 31103.43757

4.5.3 Diagnostic test for Error Correction Model for TA

The result of the ECM is given in Table 4.21.In order to provide the final equation acceptable, the study carried out various diagnostic tests. The LM model seems to be fit in the sense that it satisfies the diagnostic test explain below in Table 4.22. The result of the diagnostic tests shows that there is no serious problem of either serial correlation. VEC Residual Serial Correlation LM Tests confirm that there is no serial correlation in the residuals of the ECM regression at lag 1 and lag 2 (P >0.05). This shows that there are no lagged forecast variances in the conditional variance equation. Moreover, the errors are conditionally normally distributed, and can be used for inference. The Error-Correction Model yielded residuals that are normally distributed. This conclusion is arrived at given that the Jarque-Bera statistic is not significant (P=0.489824). The coefficient of the error correction term with two period lag is significant suggesting that the above long run relationship is stable and unique and any disequilibrium created in the short run will be temporary and will get corrected over a period of time.

5. Conclusion

This study investigated the macroeconomic variables which influence the tourist arrivals to Sri Lanka. Results of the granger causality between tourist arrivals and macroeconomic variables namely GDP, GDPPC, EXR, GE,INF, EX, IM, FDI, DE, and TC identified direction of causality while regression analysis identified degree of responsiveness of tourist arrivals with respective to the change in macroeconomic variables. The results of granger causality indicate that overall selected macroeconomic variables directly and indirectly influence on tourist arrivals. Furthermore it revealed that past behavior of GDP, GDPPC, GE, IM, EX and FDI determine the present behavior of tourist arrivals. Among macroeconomic variables which were granger caused with tourist arrivals only GDP and GDPPC have significantly influenced on tourist arrivals to Sri Lanka. Therefore only those two variables were considered for the VECM. It shows that one unit change in GDP lead to change in TA by 0.000843 in log run while one unit change in GDPPC will lead to change in TA by 19192.85 in long run. This study has some practical implications for policy makers and academics in the field of the study. It is supposed that the economic development of the country is the main determinant of the tourist attraction because among all other variables, the variables considered under the economic development were only significantly influenced by the tourist arrivals. The study has suggested that the increment in gross domestic per capita income will increase the tourist arrivals in future. However the sign of the coefficient of the GDP is questionable since according to the economic theory it should positively influence to the tourist arrivals Finally it is recommended that further studies may be desired to consider socio economic factors to formulate better relationship. It is possible to consider quarterly data for most recent years than more past years. Nevertheless researchers can use more countries to identify factors which influence tourist arrivals. Furthermore it is recommended to do further study to find out which category of GDP more influenced by tourist arrival to Sri Lanka.

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