Tourism and EG of Sri Lanka: An ARDL Bound Test Approach

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Abstract
The contribution of the tourism industry to the economic growth of Sri Lanka is very important. It is a vital segment of the Sri Lankan economy. The purpose of this study is to explore the contribution of tourism to the economic growth of Sri Lanka. The Autoregressive Distributed Lag bounds testing approach used as the analytical process to find the long-run and short-run behaviours between Sri Lankan tourism industry and economic growth using three variables real gross domestic product, international tourist arrivals and real effective exchange rate. Altogether, this analysis reveals that both short run and long run, tourism positively impact to the economic growth of Sri Lanka. Thus, it is important to Sri Lanka government focus on development of tourism infrastructure and proving political solutions, resolve conflicts which make negative consequences on Sri Lanka tourism industry.

Keywords: EG, Tourism, Cointegration.

Introduction
Tourism been contributing significantly to EG of most developing and developed countries [1]. Moreover, policy makers of developing countries focus on to develop the economic policies thereby promote tourism industry as a potential source of economic growth (EG) [2]. Thus, tourism is considered a vital part of the trade-in international services, which generate foreign exchange income to the host country, creates employment opportunities in various sectors and stimulates the development of services and EG and development [3].

Hence lack of comprehensive empirical studies has yet been made in Sri Lanka context with perspective to examine relationship between development of tourism and EG, this study fills the gap by examining whether tourism leads to EG of Sri Lanka. Therefore, the findings of this study will beneficial to take decisions and make development regarding the tourism industry in Sri Lanka. The aim of this study is to fit a model for tourism and EG of Sri Lanka.

Methodology
The variables used in this study are gross domestic product (GDP), tourist arrivals and economic growth (ER). Annual data from 1970 to 2019 are used and collected from the Central Bank of Sri Lanka. Auto Regressive and Distributed Lag (ARDL) used for this study. The ADF test is carried out to check the stationary of the variables. The equation (1) below represents the ARDL -Unrestricted EC Model (UECM) used in this study.

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} \delta_i \, \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \delta_{2i} \, \Delta LTA_{t-i} + \sum_{i=0}^{q2} \delta_{3i} \, \Delta LEXR_{t-i} + \beta_1 \, LGDP_{t-1} + \beta_2 \, LTA_{t-1} + \beta_3 \, LEXR_{t-1} + \epsilon_t \tag{1}$$

where, GDP is gross domestic products, TA and EXR tourist arrivals and ER respectively. The first difference operator denotes by Δ; β_0 indicates the intercept and white noise error

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term indicates by ϵ_t. All variables are converted into their natural logarithms and it represented by L.

ARDL long-run model can be estimate in the second step. It is as follows:

$$LGDP_t = \beta_0 + \sum_{i=1}^{p} \delta_i \, LGDP_{t-i} + \sum_{i=0}^{q1} \delta_{2i} \, LTA_{t-i} + + \sum_{i=0}^{q2} \delta_{3i} \, LEXR_{t-i} + \epsilon_t \qquad (2)$$

here Akaike Information Criteria (AIC) is used to select the model. Estimating short-run dynamics using the error correction (EC) model is the third step. The following is the equation for it.

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} \delta_i \, \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \delta_{2i} \, \Delta LTA_{t-i} + \sum_{i=0}^{q2} \delta_{3i} \, \Delta LEXR_{t-i}$$
$$+ \varphi \, ECM_{t-1} + \epsilon_t \qquad (3)$$

where, short-run dynamic coefficients are indicates by δ_1, δ_2 and δ_3. Coefficient of the speed of adjustment term is represented by φ.

Results and Discussion
Unit Root Test
Stationary of the variables were tested and the results are illustrated in Table-1. The results indicate that the GDP, tourist arrivals and ER are stationary at first difference.

Table 1. ADF test results

Variable	Const.	Const. and Trend	Decision
LGDP	0.9526	0.2819	
LTA	0.222	0.0849*	
LEXR	0.3571	0.9109	
ΔLGDP	0***	0***	I(1)
ΔLTA	0.0004***	0.002***	I(1)
ΔLEXR	0***	0***	I(1)
(*)Sig. at the 10%, (**)Sig. at the 5%, (***) Sig. at the 1%			

Lag Order Selection
In this study, orders of lag selection for the three variables was done by based on AIC. The AIC value is small for ARDL (3,1,1) compared to other models. Therefore, selected model is ARDL (3,1,1).

Results of Bounds Test Approach to Co-integration
Table 2 represents co-integration relationship as the result of ARDL bounds test. The result indicates that the upper bound critical value of 4.14 at the 10% of significant level obviously lower than the computed F-statistic. Hence, the results can be concluded by rejecting the null hypothesis of no co-integration and concluded that long run co-integration exists between tourism and EG.

Table 2. Bound test results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significant	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.9014	10%	3.17	4.14
K	2	5%	3.79	4.85
		2.5%	4.41	5.52
		1%	5.15	6.36

Estimating Long-Run Coefficients

The table 3 indicates the coefficient of ARDL(3,1,1) model and revealed that tourism and ER are positive and significant at 1% level. Hence, this result provide evidence to confirm that in long run, both tourism arrival and ER have a positive effect on EG of Sri Lanka.

Table 3. Long-run results for ARDL (3,1,1)

Dependent Variable: LGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.204234	1.283470	-4.054816	0.0002
LTA	0.401824	0.130057	3.089600	0.0034
LEXR	0.700131	0.118141	5.926204	0.0000

EC Representation for the Selected ARDL (3,1, 1) Model

The table 4 outlines the short-run estimates obtained using the ARDL EC model using the equation 3. The EC coefficient has negative sign and it is statistically significant. It means that the adjustment from the short-run deviation is 121.3%.

Table 4. Short-run results for ARDL (3,1,1)

Dependent Variable: D(LGDP)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.092057	0.059832	-1.538593	0.1320
D(LGDP(-1))	1.367500	0.516732	2.646439	0.0117
D(LGDP(-2))	0.161913	0.149116	1.085820	0.2842
D(LGDP(-3))	0.142361	0.148214	0.960511	0.3427
D(LTA(-1))	0.031555	0.095001	0.332156	0.7416
D(LEXR(-1))	0.506289	0.319933	1.582483	0.1216
ECT(-1)	-1.212671	0.481393	-2.519086	0.0160

Residual Diagnostics for The ARDL (3,1,1) EC Model
Serial Correlation Test

The serial correlation results shown in the table 5 and reveals that there is no serial correlation in this model.

Table 5. Serial correlation LM test results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.004626	Prob. F(2,37)	0.3760
Obs*R-squared	2.369326	Prob. Chi-Square(2)	0.3058

Conclusion

The results revealed that in long-run, both tourist arrivals and ER have a positive effect on EG. But in short-run, although tourism arrival and ER have a positive effect on EG, the effect is not significant. To sum up, the major finding of this study evidence that long run positive effect higher than the short run positive effect of tourism on EG of Sri Lanka. Thus, in the Policy making context, Sri Lanka economy rationalizes the need of encouraging tourism both short-run long-run perspective by identifying the significance of tourism-led economy for Sri Lanka.

References

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