CAUSALITY RELATIONSHIP BETWEEN TOURISM, FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN TAIWAN

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Sung Yu-Chi[1]
Hung-Pin Lin[2+]

[1]Department of Leisure & Tourism Management, Shu-Te University, Kaohsiung, Taiwan
Email: yuchi@stu.edu.tw Tel: +886-7-6158000 ext. 3400
[2]Department of International Business & Trade, Shu-Te University, Kaohsiung, Taiwan
Email: lhp0606@stu.edu.tw Tel: +886-7-6158000 ext. 3319

(+ Corresponding author)

ABSTRACT

This study attempts to investigate the existence of Granger causality and cointegrated relationships among international tourist arrivals (ITA), foreign exchange income (FEI), foreign direct investment (FDI), and economic growth (GDP) using Taiwan's tourism data from 1976 to 2016. The cointegrated results confirm the existence of long-run relationships among the variables, and the Granger causality results show that there is a bi-directional causality between GDP and ITA. In addition, there is a unidirectional causality running from one to another in each pair of these variables, while there is no causality between ITA and FDI. Based on such causality evidence, policy implications reveal that to promote GDP, paying attention to FDI to expand ITA is a feasible policy to achieve economic growth.

1. INTRODUCTION

Tourism business, as a part of economic growth, has been the main focus in the last few decades. Many studies have witnessed that tourism expansion not only benefits foreign exchange income (FEI), but also creates job opportunities, and provokes the growth of the tourism industry. A beneficial result of this is that it motivates overall economic growth (Lee and Chang, 2008). The World Tourism Organization (WTO) statistics report that in the past, from 1990 to 2005, the annual average growth rate of international tourism arrivals (ITA) in developing countries was 6.5%, when compared to the global tourists growth, which was 4.1% (Ashley *et al.*, 2007). Further, according to the report of UN World Tourism Organization (UNWTO), in 2016, the statistics for the Asia-Pacific region reveal that there was a 9% increase in international arrivals, followed by Africa, with 8% and the Americas, with 3%.

Taiwan, as a part of the Asia-Pacific regime, has always been an attractive travel destination for international tourists, especially from neighboring countries. In 2002, to promote the tourism market, the Taiwan Tourism Bureau introduced the Doubling Tourist Arrivals Plan (DTAP) as the part of National Tourist Expansion Plan, officially called "challenge 2008." The purpose of this plan was to create better hospitality and surroundings to

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achieve the goal of doubling the number of worldwide tourists visiting Taiwan. It provided more employment opportunities, and then, indirectly improved the domestic economy.

Over the years, from 1976 to 2016, the ITA to Taiwan increased more than tenfold, from 1008,126 to 10690,279, and the FEI from international tourist spending increased more than 28 times from US\$ 0.466 billion in 1976 to US\$ 13.374 billion in 2016. Therefore, international tourist spending can represent an alternative form of balance of payments through the accumulation of FEI for an economy system (Balaguer and Cantavella-Jorda, 2002). Most former studies have generally proven that international tourist spending does benefit economic growth because FEI from tourist spending can be treated as imported-capital goods to generate goods and services, local employment, imported tax income, and extra kinds of sales revenue, which may lead to economic growth (Uysal and Gitelson, 1994; Archer, 1995; Durbarry, 2002). This economic relationship between tourism expansion and economic growth is known as tourism-led growth.

In the recent years, the relationship between tourism and economic growth has been studied. Further, tourism and foreign direct investment (FDI) have emerged as important factors in attaining sustainable economic growth for developed and developing countries. This is because the essence of tourism activity requires not only goods and services, but also financial and capital accumulation, infrastructure facilities, transportation, knowledge, and access to international distribution chains. Therefore, the accessibility of financial sources such as FDI, have played an important role in the tourism industry, and the administration sector in developing countries usually create tourism expansion policies by attracting FDI to be an exclusive priority to stimulate economic growth (Zhang *et al.*, 1999; Endo, 2006; Subbarao, 2008; Andergassen and Candela, 2009). Since that the importance of FDI and tourism expansion has been determined, a question may arise as to whether FDI directly contributes to tourism expansion, or, on the contrary, whether tourism expansion actually inspires growth in FDI. Many studies have often focused on the issues as a result of the relationship between FDI and economic growth, and the results mostly indicate that FDI actually contributes to economic growth. However, compared with the flourishing relationship between FDI and economic growth, a causal relation between tourism expansion and FDI seems scarce. Chen (2010); Selvanathan *et al.* (2012) and Tang *et al.* (2007) found that there is a unidirectional causality running from FDI to tourism arrivals. Kaur and Sarin (2016) indicated that there exists a unidirectional causality running from tourism arrivals to FDI. Samimi *et al.* (2013) found a bi-directional causal relationship between FDI and tourism arrivals.

Based on the above results, the direction of causal relation between tourism expansion and FDI has been mixed and the long-run relationship between them has not yet been touched by research. In this study, despite the effective indicators of economic performance such as the tourism industry, FEI and FDI have grown significantly in Taiwan over the past several decades, and as far as our knowledge permits, only a few rare studies have paid attention to the long-run interactions and dynamic causalities among these indicators. In this study, we attempt to examine the dynamics of the causality and cointegrated relationships among tourism arrivals, FDI, and economic growth, and we aim to answer the following three questions. First, since we use Taiwan tourism data for the period from 1976 to 2016. the question is whether this data empirically satisfies the stationary status or not. Second, we examine whether there is any long-run relationship between tourism, FDI, FEI, and economic growth. Lastly, if a long-run relationship exists, we see if there is any causal relationship among these four variables. On the other hand, we also check to see if ITA or FDI can be a "growth engine" for Taiwan's economic performance, directly or indirectly.

Based on the above stated problems, the rest of this paper is structured as follows. Section 2 expresses the general framework, including the ADF stationary test, cointegration test of long-run examination, and Granger causality analysis. Section 3 points out the empirical results. Finally, concluding remarks and policy implications are presented in Section 4.

2. METHODOLOGY AND DATA

2.1. Data Sources

In this empirical study, the data set comprises time series data covering the period from 1976 to 2016. ITA refers to international tourist arrivals. GDP, FEI and FDI are measured by US dollars in millions, and represent the gross domestic product, foreign exchange income and the net inward foreign direct investment, respectively. All these four variables, ITA, GDP, FEI, and FDI, are taken in their natural logarithms prior to conducting the empirical analysis, and have been obtained from the tourism statistics database of the Taiwan Tourism Bureau and the Directorate General of Budget, Accounting and Statistics, Executive Yuan, Taiwan.

2.2. Unit Root Test

Before examining the causality relationships among the selected variables, unit root test is the first step to help examine stationarity, because non-stationary variables may cause a spurious regression, if the properties of these variables are not reflected, and may undermine the standard empirical results (Granger and Newbold, 1974). In this study, a unit root test is conducted by using the Augmented Dickey–Fuller (ADF) test. The ADF test (Dickey and Fuller, 1979) uses serial correlation by adding lagged values of explanatory variables in terms of the t statistic of τ_2 coefficient of the following regression:

$$\Delta x_t = \tau_0 + \tau_1 t + \tau_2 x_{t-1} + \sum_{i=1}^{n} \Delta x_{t-1} + \varepsilon_t \qquad (1)$$

Where Δx_t is the first difference operator with lag terms, ε_t is the white noise with a stationary random error of autocorrelation. The null hypothesis suggests that x_t is a non-stationary series and rejected when τ_t is significantly negative. To determine the optimal lag orders in Eq.(1) regression, we use the Akaike Information Criterion (AIC) rule to determine the value of the number of lags (n).

2.3. Johansen's Cointegration Tests

Once a unit root test has been confirmed for a data series, a long-run cointegrating relationship must exist among variables (Johansen and Juselius, 1990). The cointegration test is applied to conduct the systematic co-movement of variables over the long-run, and is widely used in many empirical studies, such as Pave and Mirjana (2010) and Timur *et al.* (2011). The technique of the Johansen cointegration test is to construct a Vector Auto-Regression (VAR) model which uses the likelihood maximum (i.e., L-Max) process to select the presence of cointegrating vectors. The criterion of L-Max statistic is:

$$\pi_{max}(k, k+1) = -N \ln(1 - \hat{\pi}_{k+1}), \quad (2)$$

Where $\hat{\pi}_{k+1}$ is the estimated smallest eigenvalues, and N denotes the numbers of observed values. In Eq.(2), the null hypothesis of maximum cointegrating vectors k and $k=0$ are tested against the alternative hypothesis of maximum cointegrating vectors $k+1$ and $k=1$, respectively. If all the series of valuables are integrated of the same orders, then there must be a presence of cointegration and exist a constant long-run relationship in compliance with the long-run endogenous growth of variables.

2.4. Causality Tests

In order to examine the causal effects existing in time series variables, Granger (1969) proposes the causality relationship between variables. The assumption of Granger causality is that the time series variable of X can Granger cause Y if Y can be predicted by using the histories of X, and vice versa. To implement the causality tests, we use the Sims (1980) bivariate VAR model in the following terms:

$$\Delta X_t = \alpha_1 + \sum_{i=1}^{n} \beta_{1i} \, \Delta X_{t-i} + \sum_{j=1}^{n} \gamma_{1j} \, \Delta Y_{t-j} + \mu_{1t} \qquad (3)$$

$$\Delta Y_t = \alpha_2 + \sum_{i=1}^{n} \beta_{2i} \, \Delta X_{t-i} + \sum_{j=1}^{n} \gamma_{2j} \, \Delta Y_{t-j} + \mu_{2t} \qquad (4)$$

Where α, β and γ represent the intercept terms and estimate coefficients, respectively. The null hypothesis assumes that in Eq.(3), Y does not Granger cause X when $\gamma_{1j} = 0$; and in Eq.(4), X does not Granger cause Y when $\beta_{2i} = 0$. In this study, Wald statistics (Granger, 1969) are applied to observe the joint hypothesis of $\gamma_{1j} = 0$ and $\beta_{2i} = 0$, and the causality types of the four variables, namely, ITA, FEI, FDI and GDP, denoted as X and Y are presented in the following:

2.5. Causality Relationships among Variables

- A unidirectional causality running from variable X to variable Y.
- A unidirectional causality running from variable Y to variable X.
- A bi-directional causality between variables X and Y.
- No causality between variables X and Y.

3. EMPIRICAL RESULTS AND DISCUSSION

3.1. Results of Unit Root Tests

The ADF unit root test helps approve the stationarity and the degree of integration. Test results in Table 1 show that under the 5% significant level, the null hypothesis of all variables (ITA, FEI, FDI and GDP) in their level terms are not rejected, but are stationary in their first difference. This implies that all the four variables can be integrated of the same order and the cointegrated can be executed.

Table-1. ADF unit root test results

Variables	Level Term	First difference
ITA	2.89(1.02)	−1.38(0.02)***
FEI	1.68(0.94)	−2.54(0.00)***
FDI	8.64(1.52)	−2.41(0.05)**
GDP	6.42(1.02)	−3.68(0.01)***

Note: Numbers in the parentheses are referred to the selected lag orders of AIC rule. ** and *** represents the null is rejected under the 5% and 1% significant level.

3.2. Johansen's Cointegration Tests

Table 2 shows the cointegration test results on the basis of trace value (λ_{Trace}) and maximum eigenvalue (λ_{Max}).

Under the 5% significant level, both values of λ_{Trace} and λ_{Max} indicate two cointegrating equations and confirm that there exists a long-run relationship among all the four variables. Further, the cointegrated confirmation of a

long-run relationship also implies that there should be Granger causality at least in one direction (Granger, 1988).

Table-2. Johansen cointegration test results

Hypothesized No. of C.E(s)	λ_{Trace}	λ_{Max}
None*	66.58(0.00)*	33.36(0.00)*
At most 1*	34.84(0.00)*	28.72(0.01)*
At most 2	9.17(0.53)	6.13(0.69)

Note: (a) * denotes rejection of the hypothesis at the 0.05 significance level. (b) λ_{Trace} and λ_{Max} are the trace statistic and the maximum eigenvalue statistic, respectively.

3.3. Results of Causality Tests

The causality test results in Table 3 for ITA, FEI, FDI and GDP are as follows:

(1) There is bi-directional Granger causality between ITA and GDP.

(2) There is a unidirectional Granger causality running from ITA to FEI.

(3) There is a unidirectional Granger causality running from GDP to FDI.

(4) There is a unidirectional Granger causality running from FDI to FEI

(5) There is a unidirectional Granger causality running from FEI to GDP

Table-3. Granger causality test results

Variable	Causality Direction	F-Statistic
ITA	GDP => ITA	18.21(0.00)***
	ITA => GDP	9.94 (0.04)**
	ITA => FDI	1.56(0.49)
	FDI => ITA	3.26(0.18)
	ITA => FEI	10.73(0.03)**
	FEI => ITA	1.34(0.53)
FDI	GDP=> FDI	29.66(0.00)***
	FDI => GDP	3.94 (0.12)
	FEI=> FDI	3.56(0.39)
	FDI=>FEI	8.26(0.05)**
FEI	GDP => FEI	3.73(0.16)
	FEI => GDP	32.61(0.00) ***

Note: the number inside the parentheses is the P-value. *** and ** represent that the null is rejected under 1% and 5% significant level respectively.

4. CONCLUSION

There are many studies discussing issues pertaining to the relationship between economic performance and tourism activities, and indicate that economic performance may be derived from tourism activities, including foreign exchange accumulation, employment, and the benefits of goods and services (Davis *et al.*, 1988; Archer, 1995; Durbarry, 2002; Mill and Morrison, 2002). Although there has been evidence of tourism-led economic development, not many studies have considered the financial aspect corresponding to the effect of FDI brought from tourism expansion. This study attempts to fill this gap and examine the dynamics of causal relationships among ITA, FDI, FEI, and economic growth in Taiwan. In the first step, the ADF unit root test was used to justify the stationarity of all variables. Secondly, Johansen's cointegration test was employed to determine the long-run relationship, and the last step was to conduct the causal relationships test among these variables.

The main findings in this study are as follows: (1) the unit root test result proves the stationarity of all the variables, and the existence of long-run cointegrating relationship is confirmed as well. (2) as for all the variables - ITA, FEI, FDI and GDP, except for no causal relationship between ITA and FDI, there exists a unidirectional

Granger causality running from one to another in each pair among them; and (3) there is a bi-directional Granger causality between GDP and ITA. The above empirical results may offer policy makers a better understanding of the nexus between tourism, FDI and economic growth, to inform tourism and investment policies.

Practically, the FEI accumulation and the potential FDI sources came from tourism expansion that accompanied rapid economic growth. Policy makers should pay attention and understand the causal relationship among tourism, FDI, and economic growth to regularize appropriate tourism policies. Further evidence also suggests that, though there is no casualty between ITA and FDI, the Granger causal results may indicate that promoting a tourism expansion policy on relative tourism infrastructure, facilities, and friendly tourist surroundings could benefit the FEI, and indirectly encourage FDI. This could be a feasible policy to stimulate economic growth.

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