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The contribution of tourism development to economic growth in the Korean economy

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Abstract

This study investigates the causal relations between tourism growth and economic expansion for the Korean economy by using Engle and Granger two-stage approach and a bivariate Vector Autoregression (VAR) model. Two principle results emerge from this study. First, the results of a cointegration test indicate that there is no long-run equilibrium relation between two series. Second, the outcomes of Granger causality test imply the one-way causal relationship of economic-driven tourism growth. The hypothesis of tourism-led economic growth is not held in the Korean economy. This consequence is supported by testing the sensitivity of causality test under different lag selections along with the optimal lag.

Keywords: Tourism development; Economic growth; Cointegration; Causality

1. Introduction

Over the past several decades, international tourism has been steadily increasing, as well as the importance of the tourism industry for the economy of many countries. According to World Tourism Organization (2002), expenditures by 693 million international tourists traveling in 2001 totaled US $ 462 billion, roughly US $ 1.3 billion per day worldwide. In addition, tourist spending has served as an alternative form of exports, contributing to an ameliorated balance of payments through foreign exchange earnings in many countries. As such, tourism-generated proceeds have come to represent a significant revenue source, increasing employment, household income and government income in countries worldwide.

Given the aforementioned reasons, Korea has been especially eager to promote tourism. Although Korea's rapid economic growth has been a consequence of an export-oriented economy, the tourism industry has also been deemed a major contributing factor. According to McGahey (1995), when inbound tourism was growing quickly in the latter half of the mid-1980s and the Korean government controlled outbound travel, tourism earnings generated one of every five dollars in the trade balance. Also, an economic impact study by the Bank of Korea (2002) found that tourism expenditures contributed 3.2% of total final demand and, value-added revenue induced from tourism-related industries accounted for 3.5% of Gross Domestic Product (GDP) in 1998. The rapid growth of tourism led to a growth of household incomes and government revenues directly and indirectly by means of multiplier effects, improving balance of payments and provoking tourism-promoted government policies. As a result, the development of tourism has usually been considered a positive contribution to economic growth (e.g., Khan, Phang, & Toh, 1995; Lee & Kwon, 1995).

However, there is an unverified question of whether tourism growth actually caused the economic increase or, alternatively, did economic expansion strongly contribute to tourism growth instead. According to the studies of Kulendran and Wilson (2000) and Shan and Wilson (2001), their empirical analyses of Australia and China respectively observed a strong reciprocal relationship between international trade and international travel. Since economic growth in Korea also attracts much business travel, inductive logic suggests that economic expansion leads to tourism growth.

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Furthermore, despite ambiguity as to a causality relationship between international trade (especially exports growth) and economic expansion, numerous studies (e.g., Bahmani-Oskooee & Alse, 1993; Chow, 1987; Jin, 1995; Marin, 1992; Shan & Sun, 1998; Xu, 1996) likewise indicate that there is a strong correlation between international trade and economic development. For example, Marin (1992) supports the hypothesis of export-led economic growth in developed countries such as United States, Japan, United Kingdom and Germany; although research by Shan and Sun (1998) demonstrates a bidirectional causality between exports and economic growth in China. Furthermore, export promotion and economic growth have noticeably reinforced each other in the process of economic development through the tests with many developing countries in South American, African and Asia (Bahmani-Oskooee & Alse, 1993; Chow, 1987; Jin, 1995). Consequently, it is rationalized that the export-driven economic growth in the Korean economy can be the strong causal component of tourism growth, contrasting the presumption that tourism drives economic growth.

Tourism-led growth tends to occur when tourism demonstrates a stimulating influence across the overall economy in the form of spillovers and other externalities (Marin, 1992). However, empirical studies of the correlation between tourism and economic growth have been less rigorous in tourism literature. Although Balaguer and Cantavella-Jorda (2002) examined the role of tourism in the long-term economic development in Spain, it is uncertain whether their hypothesis of tourism-led economic growth is applicable to other countries. Tourism in Spain accounts for approximately 5.9% of its GDP, which represents the second largest recipient of international tourist earnings after the United States (World Tourism Organization, 2000). Therefore generalizing from the study to other countries such as Korea, whose tourism revenues are significantly much less, is questionable.

In this study, three hypotheses are examined with regard to the relationship between tourism and economic development in Korea: (1) the tourism-led economic growth hypothesis; (2) the economic-driven tourism growth hypothesis; and (3) the two-way causal hypothesis which combines (1) and (2), where the causality between tourism and economic growth may run in either or both directions. Recognition of a causal relationship between international tourism and economic growth will have important implications for the development of different tourism marketing and policy decisions. For instance, if there is an unambiguously unidirectional causality from tourism growth to economic expansion, then tourism-led economic growth is practical. If results show the opposite causality, then the economic development may be necessary for the expansion of the tourism industry. Next, if the causative process is bi-directional, and tourism growth and economic growth have a reciprocal causal relationship, then a push in both areas would be beneficial. Finally, if there is no causality relation between tourism growth and economic development, then strategies such as enthusiastic tourism-promotion may not be as effective as tourism managers and decision-makers currently believe.

This study seeks to contribute to resolve the aforementioned questions on the tourism-led growth hypothesis by testing a cointegration, constructing a bivariate Vector Autoregression (VAR) model and consequently, setting up a long-run effect of these two variables (that is, tourism and economic growth) for the Korean economy. Section 2 describes the data, methodology, and results from this empirical analysis, which includes a unit root test for stationarity of time series and a test for cointegration for a long-run relationship. Finally, Section 3 presents the concluding discussion and further comments.

2. Methods and results

The VAR model and cointegration model were estimated using quarterly data over the period of the first quarter of 1975 through the first quarter of 2001. Because of its simplicity, a bivariate analysis was used in this study.[1] The model variables were derived from real aggregate tourism receipts (Tour) adjusted by the consumer price index as a proxy of tourism growth and real GDP for economic expansion. Since there is a concern of removing important information while adjusting for seasonality, unadjusted data were used from Korean National Tourism Organization and the Bank of Korea. Due to diverse measures of international tourism demands, it may not be prevalently granted to choose a variable of tourism demand with a measure of tourism receipts. For example, the periodic instability among the most commonly used measures of tourist arrivals and tourism receipts deters toward a single superior measure.[2] Despite these facts, the tourism receipts were used because of a universally measured consistent index collected by the national and international agencies and a monetary transaction values well corresponding with GDP. The variables are then transformed through the use of natural logarithm to ease interpretation of coefficients. Coefficients in log function are interpreted elasticities which are a percentage change in a dependent variable given a 1% change in an independent variable.

[1] Anonymous referees were questioned about the omission of important variables such as exchange rates. As indicated later, future studies with multivariate approach are needed to include more variables.

[2] Regarding measures of tourism arrivals and expenditures, more details are discussed in Sheldon (1993).

2.1. The order of integration and testing for cointegration

Before specification and estimation of cointegration and VAR, it is required to examine the stationarity of the variables. In brief, stationarity means that the mean and the variance of a series are constant through time and the autocovariance of the series is not time varying (Enders, 1995). Since a wrong choice of transformation of the data gives biased results and has consequences for wrong interpretation, a test of stationarity is important to set up the specification and estimation of the correct model (Engle & Granger, 1987). Therefore, the first step is to test the order of integration of the variables. Integration means that past shocks remaining undiluted affects the realizations of the series forever and a series has theoretically infinite variance and a time-dependent mean (Enders, 1995). Dickey–Fuller (DF), Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests were employed to test the non-stationarity of the variables (Phillips & Perron, 1988). The results of testing the order of natural logarithm of GDP and Tour are provided in Table 1. The tests strongly supported the null hypothesis of non-stationarity before differencing the variables and the first differenced series of GDP and Tour were stationary based on the unit root tests. Accordingly, the variables were expressed to be $I(1)$.

Given the results of a unit root in variables, cointegration was examined between tourism receipts and GDP using Engle–Granger two-stage approach (Engle & Granger, 1987). Since seasonal-unadjusted data series was used, a season dummy in Eq. (1) was included. According to Granger (1981), cointegration means that the non-stationary variables are integrated in the same order with the residuals stationary. If there is cointegration between two variables, there is a long-run effect that prevents the two time series from drifting away from each other and there exists a force to converge into long-run equilibrium. The Engle–Granger two-stage method is performed by two equations separately:

$$\text{Tour}_t = \beta_0 + \beta_1\ \text{GDP}_t + \beta_2 D_{t-4} + e_t \ \text{ or}$$
$$\text{GDP}_t = \delta_0 + \delta_1\ \text{Tour}_t + \delta_2 D_{t-4} + e_t, \tag{1}$$

$$\Delta\hat{e}_t = a_1\hat{e}_{t-1} + \varepsilon_t \ \text{or}$$
$$\Delta\hat{e}_t = a_1\hat{e}_{t-1} + \sum_i a_{i+1}\Delta\hat{e}_{t-i} + \varepsilon_t. \tag{2}$$

Test results of cointegration between two time-series are shown in Table 2. Based on DF and ADF tests on the residual sequence, the null hypothesis of non-stationarity was not rejected. Non-stationarity in the residuals means that the two series are not cointegrated in the long-run based on the critical value, −3.37 provided by Engle and Yoo (1987). Therefore, contrary to the general belief, long-run equilibrium did not exist between tourism receipts and the GDP series. This indicates that a linear combination of two variables is not cointegrated in the long-run. Consequently, VAR model needs to include first differenced series and no error correction terms are contained in the model.

2.2. VAR model and Granger causality test

When there is no confidence that *certain variables are exogenous*, the single equation method with an assumption of exogeneity of explanatory variables is not valid (Sims, 1980). According to Sims (1980), the VAR model was developed in which all variables are endogenous. Since long-run equilibrium did not exist between the two time-series, a short-run dynamic relationship can be investigated through the VAR estimation. Since the linear combination of the series was not stationary, first

Table 2
Test for the hypothesis of cointegration

Cointegration	Tour	GDP
Dickey–Fuller	−2.46	−2.41
Augmented D–F	−2.53	−2.28

Note: Two different equations, tour and GDP as a dependent variable, respectively, were tested for cointegration. The Dickey–Fuller and Augmented Dickey–Fuller test the null hypothesis of non-stationarity and should be compared to the critical value, −3.37 (Engle & Yoo, 1987). For Augmented Dickey–Fuller test, 5 lags were used to provide white noise in residuals. The hypothesis of cointegration is tested for both equations in (1). To reject the null hypothesis which is less than the critical value means that there is a cointegration relation between those two variables.

Table 1
Tests of hypotheses of non-stationarity and stationarity on tourism receipts and GDP

Variable	Dickey–Fuller Null of non-stationarity	Augmented Dickey–Fuller Null of non-stationarity	Phillip–Perron Null of non-stationarity
Tourism	−1.5893	−1.1225	−1.5194
ΔTourism	−14.0898	−2.8772	−13.6735
GDP	−1.9878	−1.3825	−1.6148
ΔGDP	−19.5874	−3.2575	−32.3585

Note: Δ indicates the first differencing of the variables. The Dickey–Fuller, Augmented Dickey–Fuller, and Phillips–Perron tests should be compared to the critical values which are −1.95, −2.89, and −3.45 for the original series and the differenced series at the 5% significance level. To reject the null hypothesis which is less than the critical value means that a variable is stationary or do not include a unit-root.

differencing is proper and error correction terms are not suitable in the VAR model. In order to test the aforementioned three hypotheses, a two-variable VAR system can be expressed as follows:

$$\begin{bmatrix}\Delta \mathrm{GDP}_t \\ \Delta \mathrm{Tour}_t\end{bmatrix} = \alpha_0 + \alpha_1 \begin{bmatrix}\Delta \mathrm{GDP}_{t-1} \\ \Delta \mathrm{Tour}_{t-1}\end{bmatrix} + \alpha_2 \begin{bmatrix}\Delta \mathrm{GDP}_{t-2} \\ \Delta \mathrm{Tour}_{t-2}\end{bmatrix} + \cdots + \alpha_p \begin{bmatrix}\Delta \mathrm{GDP}_{t-p} \\ \Delta \mathrm{Tour}_{t-p}\end{bmatrix} + \alpha_{p+1} \begin{bmatrix}D_{t-4} \\ D_{t-4}\end{bmatrix} + U_t, \quad (3)$$

where α_0 is a vector of constant term, α_i is the matrix of parameters and U_t is the innovation term.

The number of lags is determined by Akaike Information Criteria (AIC), Schwartz Bayesian Criteria (SBC), and Likelihood Ratio (LR) test.

$$\mathrm{AIC} = T \log|\Sigma| + 2N,$$

$$\mathrm{SBC} = T \log|\Sigma| + N \log(T),$$

where $|\Sigma|$ = determinant of the variance/covariance matrix of the residuals from (3):

N = total number of parameters estimated in all equations.

$$\mathrm{LR} = (T - c)(\log|\Sigma_p| - \log|\Sigma_{p+k}|),$$

where T is the number of time points, c is the total number of parameters estimated in the each equation in (3), and the two log determinants are the logs of the determinants of the two disturbance covariance matrices. The optimal lag is selected with the lowest values of AIC and SBC criteria and with the rejection of the null hypothesis in LR test that parameter values at lag k are equal to zero (Enders, 1995). LR test was performed using a 1% critical value suggested by Lutkepohl (1985) for the rigorous lag selection. The results of lag selection are presented in Table 3. All test results indicated lag 5 as an optimal lag selection for the VAR model.

Table 3
VAR lag selection

	AIC	SBC	LR (p-value)
Lag0	−360.04	−349.35	0.0000
Lag1	−813.14	−791.84	0.0000
Lag2	−901.75	−869.90	0.0000
Lag3	−978.47	−936.15	0.0000
Lag4	−1072.81	−1020.11	0.0000
Lag5	−1140.37[a]	−1077.37[a]	0.3406[a]
Lag6	−1125.60	−1052.38	0.0292
Lag7	−1116.62	−1033.26	0.0329
Lag8	−1104.72	−1001.32	0.0770

Note: The likelihood ratio statistic is compared to a chi-distribution with degrees of freedom equal to the number of restrictions. The p-value is presented in the table and 1% significance level is appropriate based on Lutkepohl (1985).

[a] Indicates the optimal lag selection.

2.3. Granger causality test

The three hypotheses—tourism growth affects economic expansion, economic expansion affects tourism growth, and both demonstrate a reciprocal relationship—were tested using the Granger causality approach. This method is best suited to determine whether the lags of one variable enter into the equation for another variable (Enders, 1995).

Granger causality tests the restriction that all lags of the variable do not enter significantly into VAR model specification. This is done by a conventional F test. Consider equation system (3) in a different way as follows:

$$\Delta \mathrm{GDP}_t = \alpha_1 + \sum_{p=1}^{4} \beta_{1p}\, \Delta \mathrm{Tour}_{t-p} + \sum_{p-1}^{4} \delta_{1p}\, \Delta \mathrm{GDP}_{t-p} + \gamma_1 D_{t-4} + \varepsilon_{1t}, \quad (4)$$

$$\Delta \mathrm{Tour}_t = \alpha_2 + \sum_{p=1}^{4} \beta_{2p}\, \Delta \mathrm{Tour}_{t-p} + \sum_{p-1}^{4} \delta_{2p}\, \Delta \mathrm{GDP}_{t-p} + \gamma_2 D_{t-4} + \varepsilon_{2t}. \quad (5)$$

In other words, to test whether tourism growth Granger causes GDP expansion in the above system, the joint significance of the coefficients, $\beta_{11} = \beta_{12} = \beta_{13} = \beta_{14} = 0$ in (4) was tested with F-statistic. A similar testing procedure was applied to test the hypothesis of GDP-driven tourism growth, $\mathrm{H_o}: \delta_{21} = \delta_{22} = \delta_{23} = \delta_{24} = 0$ in (5). Previously, three different criteria indicated 5 as the optimal lag selection. Since the variables were differenced, 4 lags were employed for the Granger causality test. However, as Pindyck and Rubinfeld (1991) and Shan and Sun (1998) pointed out, it is crucial to perform the testing procedure for a different lag selections and the results should not be sensitive to the different lag structures. For this reason, the Granger causality test with different lag selections was also conducted to examine the sensitivity of the test.

Table 4 provides the results of the Granger causality test for three hypotheses. The hypothesis of tourism-led economic growth was not accepted based on the failure to find causation of tourism growth to economic development. The results were consistent with different lag selections. The F-statistics for the second hypothesis of economic-driven tourism growth indicated that the null hypothesis was rejected. The results were robust to different lag selections. That is, economic development leads to international travel and an increase in tourism growth. The coefficient value in Table 4 denoted that 1% increase of GDP produce 0.19% growth of tourism in Korean economy. However, this relationship was

Table 4
Causality tests for tourism and GDP

	Tour does not cause GDP		GDP does not cause Tour	
Optimal lag	4		4	
F-statistic	1.2090		6.2762	
p-value	0.3124		0.0002	
Sum of lagged coeff.			0.1853	
VAR order	*F*-statistic	*p*-value	*F*-statistic	*p*-value
2	1.8205	0.1674	28.3486	0.0000[a]
3	0.8755	0.4567	13.7666	0.0000[a]
5	1.3005	0.2709	3.5176	0.0060[a]
6	1.7586	0.1173	2.6681	0.0201[a]

Note: Optimal lag is determined by AIC, SBC, and LR test in Table 3. Different lag structures were tested for the examination of result sensitivity.

[a] Indicates that the null hypothesis is rejected at the 5% significance level.

maintained only in the short run. Since tourism growth did not influence increases in the economy in the short-run, there was no reciprocal feedback between two series. The combination of results pointed to a one-way causality for economic-driven tourism growth in the Korean economy.

3. Conclusive remarks

It is commonly believed that tourism has contributed positively to economic growth as exports have strongly triggered economic expansion. However, in spite of the robust verification of the hypothesis of exports-led economic growth from numerous studies, there have also been a number of empirical studies that failed to support this hypothesis (Darrat, 1986; Dodaro, 1993; Hsiao, 1987). Since tourism may have a comparable role on the economy of each country, it is valuable to examine that question, that is, whether tourism has contributed positively to the economy as it is commonly believed. Moreover, the scientifically verified information is crucial for the private, public and governmental sectors to manage the tourism operations and planning in order to maximize the tourism earnings.

Therefore, this study was intended to help examine the question of causality between tourism and economic growth. It used the time series methods of causality test for the hypotheses of tourism-led growth for the Korean economy. Using the concepts and methods of the cointegration and Granger causality test, this study explored the short-term dynamic relations as well as long-run equilibrium conditions. Unlike the results by Balaguer and Cantavella-Jorda (2002) using the data in Spain, a cointegration between tourism and economic growth did not exist in Korea and therefore the long-run equilibrium relation was found to be invalid. In addition, causality tests did not support the hypothesis of tourism-driven economic growth in the short run. As a result, the testing results imply that the rapid economic expansion in Korea tends to attract more international travel only in the short run. Since it is well known that international trade is closely tied to economic expansion, it is rational to believe that tourism is strongly affected by economic increases although there are surprisingly no long-run effects.

These results point to several research directions in the future. First, a simple bivariate VAR model was used in this study. Important variables such as exchange rates which play a critical role in model specifications might not be fully considered. This can be improved to adopt a multivariate approach of multivariate cointegration (Johansen, 1988) including important variables such as income, exchange rates and international trade. Second, in place of a series of tourism receipts was used, the more accurate measure of tourism growth generated from economic impact data will produce the more precise causal relations. Finally, it is necessary to investigate the hypotheses in numerous destination countries for the generalization.

In conclusion, based on the results in this study, enthusiastic tourist-attracting policies as a means of economic development may not be fully effective in that economic expansion leads to tourism growth, rather than the other way around. This may further suggest redirecting appropriate tourism policies towards meeting the demand created by the increase in travelers for tourism-related industries.

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