KOREA OUTBOUND TOURISM TO SEVEN COUNTRIES: VAR MODEL AND GRANGER CAUSALITY TEST

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Abstract

This paper investigates the causal relationship among Korean outbound tourism demand for seven countries such as United States, China, Hong Kong, Japan, Philippines, Singapore, and Thailand. Since there are no long-run relationships among Korean outbound tourism demand for those international destinations the vector autoregressive (VAR) model is used for testing such causality. From the causality results, we found United States is leading country for Korean outbound tourism demand. When Korean tourism demands for United States increase, those for the other countries get a raise. Also, tourism demand for Thailand is influenced by tourism demands for three countries such as Hong Kong, Singapore and United States.

Our results imply that government and managerial implications are recognized based on the empirical findings.

Key Word: Granger Causality; International Tourism demand; Vector Autoregressive Model (VAR); Forecasting Variance Decomposition Analysis.

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1. Introduction

Although the Korean and local governments have still recognized tourism as the most promising industry and have set policies aimed towards developing tourism sectors, the number of inbound tourists to Korea was 6.02 million while the number of Korean outbound tourists was 10.07 million, causing the tourism balance of payment to be a deficit of $6.29 billion in 2004 (KNTO, 2006). Korean outbound tourists are significantly biased toward a few countries such as China, Japan, US, Hong Kong, Thailand, and Philippines.

This study will examine outbound tourism demand from Korea to seven major destination countries during the monthly period January 1993 to June 2006. Although countries preferred by Korea outbound tourism have been changed after mid-1980s, seven countries have been consistently ranked as top overseas destinations by Korea tourists.

The purpose of this article was to investigate the nature of causal relationship between individual country and each relative country for Korea outbound tourists by using data from Korea National Tourism Organization (KNTO) and Bank of Korea (BOA). These top destinations include China, Japan, Hong Kong, Philippines, Singapore, Thailand, and United States. Taking an empirical test, it can be hoped at the analysis and comparison in terms of forecasting performance can be examined with regard to the relationship between individual country and each relative country in the tourism outbound demand of Korea. Where we know the causality between individual country and each relative country in major destination for Korea international tourism demand, this recognition of a causal relationship will give important implication for the development of different policy decision and marketing strategy in international tourism demand. Finally, if there is either an unambiguously directional causality or no causality relation between each country and relative countries, then strategies in both areas would be beneficial.

2. Method

The VAR model and cointegration model were estimated using monthly data over the period of the January of 1993 through the June of 2006. In this section, the Cointegration and Vector Autoregression (VAR) were used for estimating monthly data from 1975 to 2006. Engle and Granger(1987) explained that in a system of two variables, if a long run equilibrium relationship exists, the short term disequilibrium relationship between the two variables could be represented. The first step was to the order of integration of the variables since a wrong choice of data transformation gives biased results and has consequences for wrong interpretation. Stationarity of seasonal adjustments, which means constant through time, was done on all time series data and logarithmic transformation was performed on the data. We tested that the order of integration with Data analysis was conducted in the following

For unit root test, Dickey- Fuller (DF) and Augmented Dickey –Fuller (ADF) tests (Dickey and Fuller 1979), Phillips-Perron (PP) tests (Phillips & Perron, 1988) were used to test the non-stationarity of the variables. The optimal truncation lags and bandwidth are selected by the Schwarz Bayesian Criterion (SBC) and Newey-West automatic bandwidth for ADF and PP test, respectively. (Attach, Table 1)

$$SBC = T\log|\Sigma| + 2N,$$
$$AIC = T\log|\Sigma| + N\log(T),$$

The test results of the order of natural logarithm of each country are provided table as follows.

$$\begin{bmatrix} \Delta China_t \\ \Delta Japan_t \\ \Delta HongKong_t \\ \Delta Philippines_t \\ \Delta Singapore_t \\ \Delta Thailand_t \\ \Delta U.S_t \end{bmatrix} = \alpha_0 + \Pi_1 \begin{bmatrix} \Delta China_{t-1} \\ \Delta Japan_{t-1} \\ \Delta HongKong_{t-1} \\ \Delta Philippines_{t-1} \\ \Delta Singapore_{t-1} \\ \Delta Thailand_{t-1} \\ \Delta U.S_{t-1} \end{bmatrix} + \Pi_2 \begin{bmatrix} \Delta China_{t-2} \\ \Delta Japan_{t-2} \\ \Delta HongKong_{t-2} \\ \Delta Philippines_{t-2} \\ \Delta Singapore_{t-2} \\ \Delta Thailand_{t-2} \\ \Delta U.S_{t-2} \end{bmatrix}$$

$$+ \ldots + \Pi_p \begin{bmatrix} \Delta China_{t-p} \\ \Delta Japan_{t-p} \\ \Delta HongKong_{t-p} \\ \Delta Philippines_{t-p} \\ \Delta Singapore_{t-p} \\ \Delta Thailand_{t-p} \\ \Delta U.S_{t-p} \end{bmatrix} + \Pi_{p+1} \begin{bmatrix} D_{t-4} \\ D_{t-4} \\ D_{t-4} \\ D_{t-4} \\ D_{t-4} \\ D_{t-4} \\ D_{t-4} \end{bmatrix} + U_t$$

Before cointegration test, the long run relationships between two variables are estimated, and the residuals from the regressions are tested for stationarity. Based on unit root testing for the order of integration, if we could not reject the null hypothesis that the residual contains a unit root, we could estimate the two series with non cointegration.

The variables are regressed against lagged values of all the variables in the equation. In order to test VAR model, a seven variable VAR system can be shown as attachment1. We use the Schwartz Bayesian Criteria (SBC) (Song and Witt, 2000), and Akaike Information Criteria (AIC) parameter tests that can estimate the lag length of the VAR model, and in most cases 4 lags are included in the forecasting models.

The VAR model can be set in terms of the levels of data (Engle & Granger, 1987). Also, The Granger causality tests the restriction all lags of variable do not enter into VAR model specification. The causality tests between variables can be explained in a different way as the following bivariate regressions. We can test an individual country of tourism demand and each relative other country of tourism demand.

$$\Delta CountryA_t = \mu_1 + \sum_{i=1}^{l} \alpha_{1i} CountryA_{t-i} + \sum_{i=1}^{l} \beta_{1i} CountryB_{t-i} + e_{1t}$$

$$\Delta CountryB_t = \mu_2 + \sum_{i=1}^{l} \alpha_{2i} CountryB_{t-1} + \sum_{i=1}^{l} \beta_{2i} CountryA_{t-i} + e_{2t},$$

Where μ is the deterministic component, country A and country B are an individual country, and e_t is white noise and an individual country and each relative other country, respectively.

3. Finding and Application of Results

The test results (table 2) were consistent with different lag selections. For the monthly data, the null hypothesis regarding no causation of outbound tourism demand of the individual country from Korea to each relative country's significance level; for China and U.S case, the null hypothesis regarding no causation of U.S demand of Korea outbound to China tourism demand is rejected at the 1% significance level, but the null concerning no causation of China demand of Korea outbound to U.S tourism demand is also rejected at the 5% significance level. Also, the null hypothesis regarding no causation of Japan demand of Korea outbound to Philippines tourism demand is rejected at the 1% significance level, but the null concerning no causation of Philippines demand of Korea outbound to tourism demand of Japan is also rejected at the 5% significance level.

Also, the results of method tests can imply that tourism demand of Korea in many cases does not have reciprocal relationship between individual country and each relative country. However, the coexistence of U.S tourism demand of Korea always can be reciprocal relationship between each country. Therefore, the results of Granger causality tests can be robust to different lag selections. For monthly data, empirical results are almost identical with exception to the causality test running from individual country to each relative country.

4. Conclusion and Implications

This may cause difficulties for governments and tourism businesses in setting up policies and plans. As in recent cases, there have been sudden numbers of tourists visiting Asian countries. Governments and tourism businesses can execute proper decision-makings by implementing a multivariate analysis on these Asian countries. As our study has shown, determinants of relations each country for tourism demand are different for each country. Therefore, various policies and plans need to include an examination of individual market characteristics rather than those of a whole tourism demand market.

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APPENDIX

Table 1) Unit Root Test

	ADF	P-P	Diff. ADF	Diff. P-P
China	-3.43725	-4.53435	-3.91212	-13.8744
	< P value(0.0504)* >,[Lag length: 12]	< P value(0.0018)*** >,[Bandwidth: 13]	< P value(0.0025)*** >,[Lag length: 11]	< P value(0) >,[Bandwidth: 30]
Hong Kong	-4.51824	-4.47171	-9.37813	-37.595
	< P value(0.0019)*** >,[Lag length: 0]	< P value(0.0023)*** >,[Bandwidth: 9]	< P value(0) >,[Lag length: 3]	< P value(0.0001)*** >,[Bandwidth: 161]
Japan	-1.63111	-6.55498	-3.78252	-36.031
	< P value(0.7765)>,[Lag length: 12]	< P value(0) >,[Bandwidth: 2]	< P value(0.0038)*** >,[Lag length: 11]	< P value(0.0001)*** >,[Bandwidth: 31]
Philippines	-2.46012	-6.19108	-3.46003	-17.6007
	< P value(0.3475)>,[Lag length: 16]	< P value(0) >,[Bandwidth: 25]	< P value(0.0103)** >,[Lag length: 15]	< P value(0) >,[Bandwidth: 25]
Singapore	-3.0223	-4.81899	-4.17333	-41.2705
	< P value(0.1294)>,[Lag length: 13]	< P value(0.0006)*** >,[Bandwidth: 7]	< P value(0.001)*** >,[Lag length: 12]	< P value(0.0001)*** >,[Bandwidth: 161]
Thailand	-2.56564	-4.99527	-4.87757	-28.3077
	< P value(0.2967)>,[Lag length: 15]	< P value(0.0003)*** >,[Bandwidth: 7]	< P value(0.0001)*** >,[Lag length: 12]	< P value(0) >,[Bandwidth: 66]
United States	-3.52726	-4.28489	-2.98636	-17.4962
	< P value(0.0398)**>,[Lag length: 12]	< P value(0.0043)*** >,[Bandwidth: 69]	< P value(0.0383)** >,[Lag length: 12]	< P value(0) >,[Bandwidth: 25]

Table 2) Test Result