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Research Paper

International Tourism and Economic Growth: A Panel Causality Analysis of the Three Northeast Asian Countries of China, Japan, and Korea

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Abstract: This study investigates the causal relationship between tourism development and economic growth in China, Japan, and South Korea; a topic that has not been extensively explored in the tourism literature. Although the contribution of tourism to the economy is generally low in these countries due to their export-oriented economies of industrial goods, the results of this study demonstrate that tourism development can stimulate economic growth in the long run.

Keywords: Tourism; economic growth; cointegration; causality; Northeast Asia

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Introduction

The three large economies of Northeast Asia, those of China, Japan, and South Korea, are closely interdependent. Geographically, these countries are neighbours to one another. Seoul, the capital of Korea, is located halfway between Beijing and Tokyo, the capitals of China and Japan, respectively. The three capital cities are located within a radius of about 1,300 miles. Economically, these three countries are at different developmental stages, but share the common feature of having export-oriented economies, with large shares of their domestic outputs coming from the

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economies of other countries. In particular, these three countries trade heavily with one another. As shown in Table 1, for each of these three countries, the other two countries are listed among its top five importing and exporting countries. Korea and Japan are the top two importing partners of China, with about 19% of China's imports coming from these two countries. China is the single most important trading partner of Korea, as more than 20% of Korea's imports and exports are exchanged with China. The Japanese economy also relies heavily on imports from and exports to China.

Table 1. Top 5 trading partners of China, Korea, and Japan

Countries	Import	%*	Export	%*
China	**Korea**	10.01	USA	18.38
	Japan	9.17	Hong Kong	13.69
	Other Asia, nes**	8.74	**Japan**	6.16
	USA	8.51	**Korea**	4.47
	Areas, nes***	8.12	Germany	3.11
Korea	**China**	21.41	**China**	25.11
	Japan	11.68	USA	13.47
	USA	10.68	Hong Kong	6.16
	Germany	4.65	Vietnam	6.58
	Other Asia, nes	4.03	**Japan**	4.92
Japan	**China**	25.79	USA	20.24
	USA	11.41	**China**	17.64
	Australia	5.01	**Korea**	7.16
	Korea	4.12	Hong Kong	6.09
	Other Asia, nes	3.78	Thailand	4.24

Source: United Nations Commodity Trade Statistics, 2016.
*% is the proportion of imports from or exports to each country relative to the total imports and exports of a specific country.
** Trade data for territories belonging to Asia but not specified by country. In practice, only the trade data of Taiwan, Province of China are included under this category, except for several countries (such as Saudi Arabia which reports all of its exports as unknown countries).
*** Used (a) for low-value trade and (b) if the partner designation was unknown to the country or an error was made in the partner assignment.
% is the proportion of imports from or exports to each country relative to the total imports and exports of a specific country.

In terms of tourism, these three countries are also strongly related. Due to the close geographic proximity of China, Japan, and Korea, most tourists from one country visit the other two countries. According to 2016 statistics from UNWTO,

China and Japan are the most popular outbound destinations for Koreans, and Japanese tourists mostly travel to short-haul destinations such as Korea and China. For Chinese tourists, the most popular destination is Thailand, followed by Korea and Japan. For all three countries, the other two countries are among the top five most popular destinations for outgoing tourists. In terms of outbound tourist volume, China recorded the largest market in Asia Pacific, with 40 million outbound tourists, followed by Japan (second largest, 17.3 million) and Korea (third largest, 15.5 million).

The economic contribution of tourism to these three countries differs according to the economic developmental stage, and is generally low because these countries have export-oriented economies of industrial goods. For example, the average ratios of tourism receipts to total exports over the last two decades were 5.2%, 3.4%, and 1.8%, for China, Korea and Japan, respectively (World Development Indicators, World Bank). However, in terms of receipts from international tourism, these three countries have a considerable share amongst the 217 countries from which the World Bank collects data. For example, in 2015, China ranked 2nd (after the United States) in terms of its tourism receipts, while Japan ranked the 13th, and Korea ranked 17th. Overall, these three countries account for about 11.6% of world tourism receipts (World Bank).

The purpose of this study is to contribute to the extant literature by empirically investigating the causal relationship between the the international tourism and economic growth of these three countries in Northeast Asia. Even though these three countries comprise a significant portion of world tourism, past studies have only examined this issue in each respective country. In particular, no study to our knowledge, has considered all three countries collectively in a panel framework.

Studies of the tourism-growth nexus have relied on four different theoretical arguments. The first is the tourism-led growth hypothesis, which asserts that tourism causes economic development. The second is the growth-led tourism hypothesis, which indicates that economic development stimulates tourism. The third is the feedback hypothesis, which states that tourism and economic development are interdependent. The last is the neutrality hypothesis, which argues that there is no causal relationship between tourism and economic development. The results of past studies have differed depending on the countries covered and the methodologies used, and have been extensively reviewed by Comerio and Strozzi (2019), Brida, Cortes-Jimenez, and Pulina (2016), Castro-Nuño, Molina-Toucedo, and Pablo-Romero (2013), and Pablo-Romero and Molina (2013). In this study, the four hypotheses are estimated using the Granger causal test within the panel framework of China, Japan and Korea.

Model and data

This paper adopts the two-sector growth model of Feder (1983) by assuming the two-sector economy of tourism and non-tourism. This type of model has been widely used to explore the export-economic growth nexus (e.g. Hansen, 1994; Sharma & Panagiotidis, 2005) and the tourism-economic growth nexus (e.g. Modeste, 1995; Tang & Tan, 2015; Tang, Chaem & Ong, 2017). The model is specified as follows:

$$GDP_t = \beta_0 + \beta_1 \text{ tourism}_t + \beta_2 \text{capital}_t + \varepsilon_t \quad (1)$$

where GDP is the gross domestic product, tourism is international tourism measured by the two proxies of international tourism receipts and international tourist arrivals, and capital is gross capital formation. All variables are measured on a per capita basis, and real variables are calculated based on 2010 US dollars. The annual data for the period from 1995 to 2015 were retrieved from the World Development Indicators (WDI) found in the online database of the World Bank for the three Northeast Asian countries of China, Japan, and Korea. In the empirical estimations, the natural logarithm of the variables were used.

Econometric Methodology and Results

In this section, we examine the dynamic causal relationship among the variables of GDP, tourism, and capital formation. The testing procedure is as follows. The first step is to test whether the variables contain a unit root. If the variables contain a unit root, the second step is to test whether there is a long-run relationship among the variables. If a long-run relationship among the variables is found, the final step is to perform the Granger causality test within a panel vector error correction framework to infer the causal dynamics among the variables.

Three panel unit root tests were conducted: LLC (Levin, Lin, & Chu, 2002), IPS (Im, Pesaran, & Shin, 2003), and PP-Fisher (Maddala & Wu, 1999). The LLC test assumes that the unit root process for the panel is common or homogenous while the IPS and PP-Fisher tests allows for heterogeneity in the dynamics of autoregressive coefficients. The null hypothesis of each test is that the variable is non-stationary, which means that it contains a unit root. Thus, rejection of the null signifies that the variable in question is stationary. The test results in Table 2 demonstrate that the variables in this study become panel-stationary in their first differences. Based on these results, we proceed to test whether there is a long-run relationship among the variables with panel co-integration tests.

Table 2. Panel unit root tests

Variables	Methods		
	LLC	IPS	Fisher ADF
Panel A: Level			
Tourism			
Receipts	0.938	2.399	0.541
Arrivals	0.064	2.193	2.832
GDP	–1.551*	–1.046	12.241*
Capital	0.698	1.828	1.610
Panel B: First difference			
Tourism			
Receipts	–6.628***	–5.854***	38.02***
Arrivals	–2.025**	–5.973***	39.77***
GDP	–4.235***	–4.367***	30.15***
Capital	–4.702***	–4.149***	27.13***

Note: *, **, and ** denote 10%, 5%, and 1% significance level, respectively.

The Johansen Fisher panel co-integration test, a panel version of the individual Johansen (1988) co-integration test, is used to examine the long-run relationships among the variables. The test is proposed by Maddala and Wu (1999), and Hanck's (2009) simulation study reveals that it performs well relative to alternative tests proposed by Kao (1999) and Pedroni (2004). Hanck (2009) argued that the Johansen Fisher's panel co-integration test is flexible, simple to implement, and intuitively appealing. The test results in Table 3 indicate that the variables of receipt (arrivals), GDP, and capital are co-integrated and have a long-run equilibrium relationship. Therefore, the appropriate next step is to estimate the Granger causality based on the vector error correction model (VECM).

Table 3. Johansen Fisher panel co-integration tests

Hypothesized No. of CE(s)	**trace test**	**Prob.**	**Max-Eigen test**	**Prob.**
Panel A: Receipts-GDP-Capital	23.00***	0.0008	14.90***	0.0211
None	13.43**	0.0367	12.20***	0.0577
At most 1	8.83	0.1831	8.83	0.1831
At most 2				
Panel B: Arrivals-GDP-Capital	25.59***	0.0003	17.48***	0.0077
None	14.30***	0.0264	13.20***	0.0400
At most 1	8.39	0.2104	8.39	0.2104
At most 2				

Note: *, **, and ** denote 10%, 5%, and 1% significance level, respectively.

The presence of a long-run co-integration vector indicates the existence of Granger causality, at least in one direction although it does not reveal the direction of causality (Granger, 1980, 1988). Thus, to estimate the directionss of Granger causality among the variables, the VECM is specified as follows:

$$\Delta GDP_{it} = \pi_{1i} + \sum_p \pi_{11ip} \Delta GDP_{it-p} + \sum_p \pi_{12ip} \Delta tourism_{it-p} + \sum_p \pi_{13ip} \Delta capital_{it-p} + \phi_{1i} ECT_{it-1} + \varepsilon_{1it} \quad (2a)$$

$$\Delta tourism_{it} = \pi_{2i} + \sum_p \pi_{21ip} \Delta GDP_{it-p} + \sum_p \pi_{22ip} \Delta tourism_{it-p} + \sum_p \pi_{23ip} \Delta capital_{it-p} + \phi_{2i} ECT_{it-1} + \varepsilon_{2it} \quad (2b)$$

$$\Delta capital_{it} = \pi_{1i} + \sum_p \pi_{31ip} \Delta GDP_{it-p} + \sum_p \pi_{32ip} \Delta tourism_{it-p} + \sum_p \pi_{33ip} \Delta capital_{it-p} + \phi_{3i} ECT_{it-1} + \varepsilon_{3it} \quad (2c)$$

Within the VECM, two sources of short- and long-run causality are present. Short-run causality can be estimated from the joint significance of first-difference lagged explanatory variables using the Wald test. That is, in Equation (2a) if the joint null hypothesis $\sum_p \pi = 0$ is rejected, then short-run Granger causality runs from tourism to economic growth, whereas in Equation (2b), if $\sum_p \pi = 0$ is rejected, then causality runs from economic growth to tourism. Long-run causality is tested through the lagged co-integrating vectors, ECT_{it-1}. In this case, long-run Granger causality is determined through a t-test to assess the statistical significance of the lagged co-integrating vectors. For example, in Equation (2a), economic growth is said to Granger-cause tourism if the coefficient of ECT_{1it-1} is negative and statistically significant (i.e. $\phi_{1i} \neq 0$). Similarly, in Equation (2b) tourism is said to Granger-cause economic growth if $\phi_{2i} \neq 0$.

Within this VECM framework, the panel Granger causality tests were conducted. Panel A of Table 4 displays the estimation results for GDP and tourism receipts. The results of Equation (2a) are in the row in which GDP is the dependent variable, while the results of Equation (2b) are in the next row. With respect to Equation (2a) (the GDP equation), the coefficient of ECT is negative and statistically significant at the 1% level. This implies that tourism receipts Granger-cause GDP in the long-run. The corresponding Chi-square statistic for the receipt variable is not statistically significant, indicating that the Granger causal relationship does not hold between tourism receipts and GDP in the short-run. The results of the receipt equation in the second row demonstrate that the coefficients of both the long-run ECT and short-run GDP variable are not statistically significant. This implies that GDP does not Granger-cause tourism receipts over either the short-run or the long-run. In Panel B, the tourist arrival variable is used instead of tourism receipts, and the results are

the same, except the short-run causality running from GDP to tourist arrivals at the 5% level. Overall, we find evidence that the tourism-led growth hypothesis is valid in the long-run for the three Northeast Asian countries of China, Japan, and Korea.

Table 4. Panel Granger causality tests based on VECM

Dependent Variables	**Independent Variables**		
	Long-run	**Short -run**	
Panel A	ECT	GDP	Receipts
GDP	–0.065[0.002]***		1.032(0.596)
Receipts	0.001[0.412]	0.994(0.608)	
Panel B	ECT	GDP	Arrivals
GDP	–0.065[0.004]***		0.060(0.971)
Arrivals	0.002[0.265]	7.144(0.03)**	

Note: For the long-run, coefficients of the ECT are reported, and the figures in parentheses [ ] are t-statistics. For the short-run, figures denote Chi-square statistics and the figures in ( ) are p-values. *, **, and ** denote 10%, 5%, and 1% significance level, respectively.

Conclusion

This study investigates the causal relationship between tourism development and economic growth in China, Japan, and Korea, a topic that has not been extensively explored in the extant tourism literature, despite the fact these countries comprise a significant portion of world tourism receipts. The results of this study demonstrate that tourism development stimulates economic growth in the long-run. Therefore, given that these three countries are closely interrelated in terms of trade partners and tourist destinations, they should develop policies to increase the trade and tourism coming from the other trading partner countries. Indeed, policymakers of one country need to promote the bilateral trade activities with the other two countries, which will in turn lead to develop the tourism sector and to boost economic growth. In addition, it would be helpful for the tourism industry of one country to make promotional activities targeting the tourists from the other two countries. Specifically, products and services designed for customers of the neighbouring countries would help to increase the tourists from the other two countries. The performances of Korean pop singers for the Japanese and/or Chinese fans seem to be a good example. The result of this study, however, should be interpreted with caution because the Granger causality for the non-tourism sector would be far more significant to the GDPs of the three countries. Moreover, the contribution of tourism to the economy is generally low in these countries due to their export-oriented economies of industrial goods. Therefore, a polies to increase tourist arrivals from each other may not be cost-effective.

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References

Brida, J. G., Cortes-Jimenez, I., & Pulina, M. (2016). Has the tourism-led growth hypothesis been validated? A literature review. *Current Issues in Tourism*, 19(5), 394–430.

Castro-Nuño, M., Molina-Toucedo, J. A., & Pablo-Romero, M. P. (2013). Tourism and GDP: A meta-analysis of panel data studies. *Journal of Travel Research*, 52(6), 745–758.

Comerio, N., & Strozzi, F. (2019). Tourism and its economic impact: A literature review using bibliometric tools. *Tourism Economics*, 25(1), 109–131.

Feder, G. (1983). On exports and economic growth. *Journal of Development Economics*, 12(1–2), 59–73.

Granger, C. W. (1980). Testing for causality: a personal viewpoint. *Journal of Economic Dynamics and Control*, 2, 329–352.

Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of Econometrics*, 39(1-2), 199–211.

Hanck, C. (2009). A meta analytic approach to testing for panel co-integration. *Communications in Statistics-Simulation and Computation*, 38(5), 1051–1070.

Hansen, P. (1994). The government, exporters and economic growth in New Zealand. *New Zealand Economic Papers*, 28(2), 133–142.

Im, K. S., Pesaran, M. H. & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53–74.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12(2-3), 231–254.

Kao, C. (1999). Spurious regression and residual-based tests for co-integration in panel data. *Journal of Econometrics*, 90(1), 1–44.

Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1–24.

Maddala, G. S. & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61(S1), 631–652.

Modeste, N. C. (1995). The impact of growth in the tourism sector on economic development: the experience of selected Caribbean countries. *Economia Internazionale*, 48, 375–386.

Pablo-Romero, M. d. P. & Molina, J. A. (2013). Tourism and economic growth: A review of empirical literature. *Tourism Management Perspectives*, 8, 28–41.

Pedroni, P. (2004). Panel co-integration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric Theory*, 20(3), 597–625.

Sharma, A. & Panagiotidis, T. (2005). An analysis of exports and growth in India: Co-integration and causality evidence (1971–2001). *Review of Development Economics*, 9(2), 232–248.

Tang, C. F., Cheam, C. L. & Ong, S. C. (2017). Comparing the contributions of tourism and non-tourism exports to economic growth in Malaysia. *Current Issues in Tourism*, 20(12), 1232–1245.

Tang, C. F. & Tan, E. C. (2015). Does tourism effectively stimulate Malaysia's economic growth? *Tourism Management*, 46, 158–163.

United Nations. (2016). *United Nations Commodity Trade Statistics*. Retrieved from http://comtrade.un.org/data.

World Bank. (2016). *World Development Indicators*. Retrieved from http://data.worldbank.org/data-catalog/world-development-indicators.