A Critique of Tourism-Led Economic Growth Studies

Haiyan Song

School of Hotel and Tourism Management

The Hong Kong Polytechnic University

Hong Kong SAR, China

Chenguang (Doris) Wu*

Sun Yat-Sen Business School

Sun Yat-Sen University

Gangzhou, China.

* Corresponding author.

A Critique of Tourism-Led Economic Growth Studies

Abstract

During recent decades numerous academics have examined the tourism-led economic growth (TLEG) hypothesis, and a large number of related empirical studies have been published in the tourism literature. However, the research designs for many of these studies have not satisfactorily addressed the theoretical foundation that underpins the TLEG hypothesis. Their empirical analyses may therefore lead to unreliable or even misleading conclusions. This study critically evaluates these TLEG studies from a theoretical and empirical perspective and provides recommendations for future TLEG studies.

Keywords: tourism-led economic growth (TLEG); Granger causality, production function; factor input; tourism productivity

1. Introduction

Tourism-led economic growth (TLEG) has been considered an important macroeconomic concern for destination governments and industry practitioners as they make their decisions regarding policy and investment. The TLEG hypothesis suggests that tourism growth leads to economic growth in a destination. Since the first empirical study of TLEG conducted by Balaguer and Cantavella-Jordá (2002), this phenomenon has become a hot research topic in the tourism literature. The types of data, econometric techniques, destination characteristics, and selection of variables vary among TLEG studies. Thus, the empirical findings are diverse and inconclusive. Some studies have identified unidirectional causality, either from tourism to economic growth, or from economic growth to tourism. Other studies have found bidirectional causality between tourism and economic growth. In addition, some researchers have indicated that tourism is linked to economic growth in certain regions or in certain stages of development, and particularly in situations where the primary or secondary industries are less productive than the tourism industry (Liu, Song, and Blake 2018). Furthermore, some studies have failed to find any causal relationship between the economic phenomena of tourism and overall growth.

A number of authors have reviewed previous TLEG studies from a variety of perspectives. Brida, Cortes-Jimenez, and Puliona (2016) reviewed 95 studies published between 2002 and 2013 and concluded that the evidence generally supports the TLEG hypothesis. In considering a meta-regression analysis of 113 studies published between 1994 and 2007,

Nunkoo et al. (2019) concluded that the TLEG hypothesis is generally supported, but the findings contain biases due to the use of different methodologies and data sources. Pablo-Romero and Molina (2013) reviewed 87 studies and found that the degree of tourism specialization at a destination is an important factor that influences whether a causal relationship exists between tourism and economic growth. They concluded that whether the TLEG hypothesis is supported depends on the model specifications and the estimation techniques used. On the basis of a meta-regression analysis, Fonseca and Rivero (2019) concluded that the TLEG hypothesis is more likely to be confirmed when a destination's degree of tourism specialization is high, and the population of the focus area is small.

The Solow growth model (Solow 1956) is often applied as a theoretical foundation and framework in studies of the TLEG hypothesis. In this model, three factors are considered as the primary drivers of economic growth: capital stock, labor stock, and technical progress. A standard production function describes the functional relationship between economic output and these factors as inputs. Many studies, however, have included the tourism variable (measured by either tourist arrivals or tourism receipts) as a direct factor input in the standard production function to test the TLEG hypothesis. These studies have rarely considered the question of why tourism is considered a factor input that leads to economic growth.

In TLEG studies, economic growth is often measured by gross domestic product (GDP), GDP per capita, or the growth rate of GDP per capita in the destination. Income inequality and

industrial production indexes have also been used as proxies for economic growth (e.g., Uzar and Eyuboglu 2019; Tang 2011; Antonakakis, Dragouni, and Filis 2015). However, no clear or consistent definition of "tourism" has been applied in previous studies. The descriptive terms used include "tourism development," "tourism activity," "tourism growth," "tourism expansion," or just "tourism." However, whichever term is used, most researchers have measured tourist arrivals, tourist expenditures, or tourism receipts. Other measures such as "tourism specialization" (e.g., Vita and Kyaw 2017; Zuo and Huang 2018), "tourism attraction" (Faber and Gaubert 2019), and "tourism productivity" (Liu and Wu 2019) have also been used to identify the relationships between tourism and overall economic growth.

A considerable number of studies have considered only one-off event dummies or seasonal dummies as influencing factors in their TLEG models, without considering other important determinants of economic growth (see, for example, Kyophilavong et al. 2018; Tang and Tan 2013; Bento 2016). Scholars who take a more structural view of TLEG have considered variables such as exchange rates, population growth, human capital, political stability, technical process, physical capital, depreciation of capital stock, capital formation, capital investment, government consumption, foreign direct investment, the economic globalization index, labor forces, trade openness, inflation, financial depth, and R&D expenditures (see, for example, Chingarande and Saayman 2018; Pan, Liu, and Wu 2014; Paramati, Alam, and Chen 2017; Salifou and Haq 2017; Tang and Tan 2015; Vita and Kyaw 2017; Zhang and Cheng 2019). However, little attention has been paid to discussing the issue of variable

selection in TLEG studies.

In terms of econometric analysis, various modeling strategies have been applied to empirically test the TLEG hypothesis. These include the Granger (1969) causality test (e.g., Tang and Tan 2015; Lin, Yang, and Li 2019), autoregressive distributed lagged (ARDL) models (e.g., Katircioglu 2009; Perles-Ribes, Ramón-Rodríguez, Moreno-Izquierdo, and Rubia 2017), vector error-correction models (e.g., Jaforullah 2015; Surugiu and Surugiu 2013), spatial econometric models (e.g., Yang and Fit 2014; Jiao et al. 2019), dynamic general equilibrium models (e.g., Faber and Gaubert 2019; Liu and Wu 2019), and nonlinear modeling techniques such as the smooth transition model or threshold regression (e.g., Chiu and Yeh 2017; Deng, Ma, and Shao 2014; Wu, Liu, Hsiao, and Huang 2016; Zhang and Cheng 2019; Zuo and Huang 2018). Various types of data, such as time series, cross-sectional, and panel data (Pablo-Romero and Molina 2013), have also been used. The applied data frequency also has varied between monthly, quarterly, and annual periods. Many destinations have been empirically analyzed, mainly at country or regional levels (e.g., Zuo and Huang 2018; Deng, Ma, and Shao 2014).

Although the TLEG hypothesis is generally supported in empirical studies, these have neglected some important theoretical and methodological issues. Tourism variables have been commonly included as factor inputs in production functions without justification. In addition, the TLEG hypothesis has often been confirmed using the Granger causality test, which does

not examine a real cause–effect relationship. Thus, these studies only demonstrate a sequential relationship between the variables (Song, Dwyer, Li, and Cao 2012). The mechanism through which tourism leads to economic growth has also rarely been established. These issues may limit the contributions of TLEG studies, and the conclusions drawn from them could mislead policy-makers aiming to formulate destination development strategies.

In this study, we critically evaluate previous TLEG research from both theoretical and empirical perspectives and provide recommendations for future research. Tourism variables have been commonly included without justification as factor inputs in production functions. Another concern is that the TLEG hypothesis has often been confirmed by using the Granger causality test, which does not enable a real cause–effect relationship to be examined. Studies using this test only examine a simple sequential relationship between the variables (Song, Dwyer, Li, and Cao 2012). In addition, the mechanism by which tourism leads to economic growth has rarely been determined. These issues may limit the contributions made by TLEG studies, and the conclusions drawn from them could mislead policy-makers who attempt to formulate destination development strategies., Thus, in this study we aim to provide further insights and research directions for TLEG research.

2. Spurious causality: A case study

As indicated above, most TLEG studies have started with a production function of some kind,

and added tourism variables as possible determinants of economic growth. In this section, we estimate a tourism-enhanced production function to test the TLEG hypothesis on the basis of a dataset needed to estimate the growth model. Three steps are adopted. First, the Solow model is used as the theoretical foundation and model specification. Second, we use the Pesaran, Shin, and Smith (2001) (PSS) bounds cointegration test to assess the long-term relationships between the variables involved in the production function. Third, we conduct the Granger causality test to identify causality between the variables concerned. Fourth, we apply the results of the PSS cointegration test to estimate the error-correction and autoregressive distributed lagged (EC-ADL) model, which allows us to look at both the short-term and long-term relationships within a single framework. We follow these steps as they are typical procedures adopted by most TLEG studies.

Our model specification starts with a production function in which economic growth is related to capital stock, labor force, and tourist arrivals, as shown below:

$$Y_t = \mathrm{f}(K_t, L_t, T_t) \tag{1}$$

where Y_t is an aggregate output variable measured by GDP; K_t is the capital input at time t as measured by capital formation; L_t is the labor input, as measured by the number of people employed at time t; and T_t is a tourism variable that is measured by tourist arrivals. The time series considered is annual, and it covers the period from 1995 to 2018. The tourist arrival data are obtained from the World Tourism Organization (UNWTO), and those on capital formation and the number of people employed are obtained from the International Monetary

Fund (IMF). All of the time series data are natural logarithms, transformed to linearize the model. Figure 1 shows the original data for the four variables under consideration.

----------Insert Figure 1 here----------

The Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test (Kwiatkowski, Phillips, Schmidt, and Shin 1992) and the augmented Dickey–Fuller (ADF) test (Dickey and Fuller 1979) are first used to test for the unit roots of all four variables. The null hypothesis for the KPSS test is that the variable is stationary, and the null hypothesis for the ADF test is that the variable contains a unit root. As shown in Table 1, the results of both tests indicate that the logarithms of K_t, Y_t, Lt, and $Arrivals_t$ contain unit roots at the 5% significance level.

----------Insert Table 1 here----------

The results of the Granger causality test for assessing the relationship between GDP and tourist arrivals are also shown in Table 1. For the lag numbers 1, 3, and 4, the Granger causality relationships between tourist arrivals and destination economic growth are verified for the destinations under consideration.

The PSS bounds test (Pesaran, Shin, and Smith 2001) is conducted to test the cointegration relationships between the variables in the growth model. Table 2 reports the PSS results, together with the short- and long-term coefficients of the ARDL model, based on the four

time series. The results of the *F*-test and the *t*-test indicate that the variables are cointegrated at a 0.01 significance level. The error-correction term (EC_{t-1}) is also statistically significant, which further verifies the cointegration relationship between the variables under consideration. On the basis of these results, an advocate for the TLEG hypothesis could easily conclude that tourist arrivals have a significant influence on GDP, and hence that the TLEG hypothesis can be confirmed.

----------Insert Table 2 here----------

In assessing these results, we should note that Y_t, K_t, and L_t are variables specific to France, whereas $Arrivals_t$ is the total number of tourist arrivals in Portugal. Thus, the apparent relationship between these variables is clearly spurious.

As the data used in many empirical studies tend to involve similar integration properties, the above results suggest that previous studies may have suffered from the problem of spurious regression. Without a strong theoretical underpinning, spurious causality is difficult to identify based on the current TLEG assumptions. In other words, although the empirical result may suggest that there is a causal relationship between tourism and economic growth, this relationship may not actually exist. The relationship observed is an effect of data mining, which considers the statistical properties of the data, but ignores the theory behind the economic models that are used to test various hypotheses, including the TLEG hypothesis. To

ensure the validity of empirical studies, it is necessary to start with a model specification in accordance with the relevant economic theory.

3. Theoretical foundation of TLEG

3.1. Economic growth theories

Given that most studies on TLEG have been conducted with reference to previous theories of economic growth, it is important to first discuss these theories. A number of theories are related to the sources of economic growth. The following three theories are the most relevant to this study. The first is the classical theory of growth developed by Smith (1776) in his seminal work *The Wealth of Nations*. Smith proposed that the economic growth of a nation is mainly determined by (1) the market, which regulates demand and supply; (2) the productivity of labor, which reflects the efficiency of the labor market; and (3) the trade relations between one nation and other nations, which determine the specialization of the economy. The second theory of growth, which underpins most TLEG studies, is neoclassical growth theory, developed by Solow (1956) and Swan (1956). In the Solow–Swan model, the main driving forces of economic growth are capital input, labor input, and technological progress. Neoclassical growth theory assumes that long-term growth is determined by technological progress, with a diminishing return on capital input. In this model, technological progress is assumed to be exogenous. Therefore, the Solow–Swan model is also known as the exogenous growth model. The third growth theory, which is based on the

neoclassical model, is the endogenous growth model developed by Romer (1986) and Lucas (1988). In the Romer–Lucas model, technological progress is assumed to be an endogenous driver of long-run economic growth. It is also presumed that endogenous technological progress is mainly caused by indefinite investment in human capital, and this model does not assume diminishing returns on capital.

To simplify our discussion, we start with the Solow–Swan model:

$$\mathrm{Y} = \mathrm{A}K^{\alpha}L^{1-\alpha} \tag{2}$$

where *K* represents capital, *L* is labor, and *A* is defined as technological progress. In the Solow–Swan model, *K* refers to a physical capital stock, but this is extended by Romer and Lucas (in the endogenous growth model) to include both physical capital and human capital investments, and human capital investments are often measured by variables such as duration of education, experience, and health (Lucas 1988; Rebelo 1991; Cabelle and Santos 1993). In the Romer–Lucas model, technological progress is assumed to be a result of innovation or R&D. In both neoclassical and endogenous growth theories, it is generally believed that the key driving forces of economic growth are factor inputs, namely physical capital, human capital, and innovation. Some studies have identified product variety (Funk and Ruhwedel 2001), institutional governance (Rivera-Batiz 2002; Gradstein 2004), and finance (Robini and Sala-i-Martin 1992; King and Levine 1993) as the determinants of economic growth in the long run.

Most studies that have tested the TLEG hypothesis have been carried out on the basis of the above-mentioned theoretical frameworks, with the addition of a tourism variable in the growth model. One rationale for including tourism as a determinant of economic growth comes from Smith's classical theory of growth. Smith believed that trade—in this case international tourism considered as an export—enhances specialization, which further leads to improved productivity. This sectoral productivity enhancement can have spillover effects on other sectors of the economy (Oh 2005). However, two important questions should be raised at this point. First, is it appropriate to include tourism in the production function as a determinant of economic growth? Second, can tourism specializations due to tourism exports improve the overall productivity within a destination economy? We address these two questions in turn.

Theoretically, tourism (whether it is measured by arrivals or by receipts) is not compatible with the previous theories of growth for the following reasons. First, tourism is not a factor input like labor and capital, which are necessities for the production function. If the tourism variable is measured by either the number of visitors or by tourism receipts, then these measures should be considered as realized tourism demand (Song, Witt, and Li 2009, 2). These tourism variables do not necessarily lead to an increase in the factor input, nor do they necessarily lead the entire economy to improve its productivity and efficiency. An increase in demand may lead to economic growth in the short run when the supply can be stimulated,

which can be explained by Keynesian theory. However, we focus on long-term economic growth and its drivers, and in this context further demand cannot be realized without the input of other factors or innovation. Therefore, the tourism variable is incompatible with the other determinants of economic growth. Second, levels of capital, labor, and technological progress are stock variables, and in the production function these stock variables are used to explain the flow variables involved in economic growth. However, tourist arrivals and tourism receipts are flow variables and are incompatible by nature with factor inputs. This problem is known as the problem of incongruity in economic modeling. The incongruity in this case is that the variables in the model do not belong to the same system, or that the specified economic model is incongruous with reality (Stiglitz 2002). Third, the scopes of the determinants are different. Capital, labor, and technological progress are economy-wide variables, but tourism is a sectoral variable that covers only part of the economy, especially in destinations where tourism is not a pillar industry.

The TLEG hypothesis is also connected to the export-led economic growth (ELEG) literature (e.g., Emery 1967; Edward 1998), because inbound tourism is normally viewed as one type of export. In the ELEG literature, various researchers have argued that exports can bring about technological progress and can increase the total productivity factor, thereby leading to economic growth. Admittedly, outbound tourism is a form of export, but it is distinct from other types of exports, especially those that depend on technology and educated labor. Tourism exports are mostly service exports, which do not rely heavily on technology.

Therefore, it is difficult to argue that tourism improves total productivity and resource allocation to sectors associated with advanced technologies.

It should be noted that previous TLEG studies have aimed to determine if tourism is a driver of long-term economic growth. Keynesian economic theory proposes that the expansion of consumer demand drives economic growth (especially in periods of economic recession), as expansionary fiscal policies can stimulate the economy in the short term. In the long term, however, demand cannot be sustained if factor inputs or innovation are lacking. Therefore, researchers on TLEG should pay more attention to the long-term trajectory of economic growth, instead of focusing on short-term fluctuations in growth.

3.2 The mechanism of transmission from tourism to economic growth

Most previous studies have aimed to discover whether there is a causal relationship, either unidirectional or bidirectional, between tourism and economic growth. However, these studies have given little consideration to the mechanism of transmission from tourism to economic growth. As discussed previously, it is of doubtful value to examine TLEG directly by regressing tourist arrivals/tourism receipts on GDP, and vice versa. The examination should instead be based on solid theoretical foundations. Therefore, it is natural to ask the following question: if tourism can cause economic growth, then what is the mechanism of transmission from tourism to economic growth? In other words, what is the path by which

tourism growth leads to economic growth?

A number of previous studies have attempted to address this issue. For example, Du, Lew, and Ng (2016) used a cross-sectional dataset involving 109 countries. They identified a positive association between tourism and growth, if the determinants of income (such as capital accumulation) were not considered in the growth model. However, once the determinants of income were controlled, this relationship no longer existed. These researchers concluded that tourism affects economic growth through standard income determinants. Nowak, Sahli, and Cortés-Jiménez (2007) found that in Spain, tourism exports drive economic growth by improving imports of capital goods. However, this mechanism was not identified for Tunisia (Cortés-Jiménez, Nowak, and Sahli 2011). Using the Bayesian probit model with Chinese regional data, Lin, Yang, and Li (2019) found that the TLEG hypothesis was more likely to be supported in less developed regions of larger geographic and economic sizes. Furthermore, using the Chinese tourism area of Zhangjiajie as a case study, Zuo and Huang (2020) found that tourism development leads to economic growth by changing the less productive agricultural sector into a more productive tourism sector. Using a spatial equilibrium model to consider Mexican micro-level data, Faber and Gaubert (2019) found that tourism can increase local economic gains, especially in less touristic regions, through its significant positive spillover effects on manufacturing. However, these effects were offset by the effects of industry agglomeration at the national level. In Faber and Gaubert's study, tourism attractiveness was used as an instrumental variable.

By analyzing 116 articles published between 1995 and 2013, Chingarande and Saayman (2018) identified a number of critical factors for successful TLEG. These factors include safety and security for tourists, the quality of human resources, the destinations' openness (as measured by trade), protection of the environment, and financial and technological development. However, the question of how these factors influence the transmission from tourism to economic growth deserves further examination, based on solid theoretical foundations.

Liu and Wu (2019) used a Bayesian dynamic stochastic general equilibrium model to examine the ways in which improving tourism productivity can stimulate economic growth. They identified the spillover effects between tourism and other economic sectors as caused by the externalities of physical and human capital investments. Instead of focusing on tourist arrivals or tourism receipts, Liu and Wu (2019) focused on the improvement of tourism productivity, to examine how economic growth is brought about from a positive economics perspective. In their study, tourism productivity was measured by the Solow residual, which refers to outputs that are not derived from physical or human capital inputs. It is noteworthy that although Liu and Wu (2019) attempted to examine the mechanism of the relationship between tourism productivity and economic growth, the relationship between realized tourism demand and tourism productivity was omitted from their study. In other words, increased tourism development, as measured by realized tourism demand, does not

necessarily lead to higher tourism productivity. Therefore, the TLEG hypothesis was not completely tested or supported.

In reviewing the published studies on TLEG, we find that although some studies have attempted to disclose the mechanism of transition from tourism to economic growth, many researchers have failed to address the question of *how* tourism leads to economic growth.

3.3 The effects of tourism vs. the effects of TLEG

Some researchers on TLEG have argued that TLEG exists if tourism contributes positively to GDP. On the surface, this claim appears plausible, but this is not an absolute condition for economic growth. If tourism does indeed drive economic growth, then it has to contribute positively to destination GDP, but the reverse is not necessarily the case. The effect of tourism on the economy and the driver of economic growth are two completely different concepts. The effect of tourism on the economy concerns the contribution of tourism to the total economy, and it is measured by calculating the proportion of the total value added that is generated from the tourism sector during a given period. Therefore, tourism always contributes to the economy, or has an effect on the economy, if there are tourism activities in that economy. However, identifying a driver of economic growth involves demonstrating that a specific activity functions as an engine of long-term economic growth. If tourism does not lead to the increase of total productivity in the economy, then it cannot lead to continuous

economic growth.

In particular, we note that measuring the effect of tourism on a destination's economy requires to focus on the contributions that the tourism industry makes to the national economy. Generally, these contributions are of three types: direct, indirect, and induced contributions. Direct contributions are measured as the value added by tourism-related industries. Measures of indirect contributions include tourism capital investment, government collective spending on tourism, and value added resulting from various rounds of re-spending by tourism-related industries. The term "induced contributions" refers to the broader income generated in sectors other than tourism, which provide consumer goods and services for employees of the tourism industry (WTTC 2020).

Several methods can be used to measure the economic effects of tourism. The Tourism Satellite Account (TSA) is a standard national accounting system that is used to measure the direct contribution of tourism to a national economy. The TSA also measures tourists' consumption of various goods and services across different sectors, such as the accommodation, food and beverage, transportation, and retail sectors. Such consumption contributes a certain amount of value added to the economy of a given destination within a given period, and it accounts for a certain proportion of the GDP of the destination (Wu et al. 2019; Smeral, 2006). By using input–output tables, the indirect and induced effects of tourism on value added can be obtained. Tourism income multipliers, which are developed

using Keynesian principles of spending recirculation, are able to estimate the total income produced in an economy that is derived from an initial amount of tourism income (e.g., Auld and McArthur 2003; Tafel and Szolnoki 2020). According to how tourism multipliers are defined, they can capture the multiplier effects of tourism and fit into the effects of the tourism context from an income perspective.

Therefore, measuring the contribution of tourism to a destination's economy does not necessarily imply that tourism drives economic growth, which is normally propelled by technological progress. In other words, when tourism activities exist in a destination, then tourism makes some contribution to the local economy, or has some effect on the economy, but it does not automatically become a driving force of the destination's economic growth. This observation partially explains why, when researchers examine the TLEG hypothesis using regression-based models (with tourism demand as an explanatory variable and GDP as the dependent variable), the tourism demand variable always tends to be statistically significant in the production function, as tourism receipts contribute to GDP, or are part of the destination's GDP. However, this association does not necessarily imply causality.

4. Empirical issues associated with the TLEG hypothesis

4.1 Does the Granger causality test inform real cause–effect relationships?

Although the Granger causality test has often been used to examine the causal relationship

between tourism and economic growth, the validity of its application should be treated with caution.

The main reason for using the Granger causality test in examining TLEG has been its convenience, and not its academic rigor. The Granger causality test adopts the successionist view of causality, in which economic activity *X* is considered to cause *Y* if *X* temporarily happens before *Y*. The Granger causality test can only be used to confirm the existence of a real cause–effect relationship if this relationship is underpinned by theory. Many empirical studies of TLEG have nevertheless ignored the need for a theoretical foundation, and have drawn conclusions based purely on the statistical results of the Granger causality test. This is especially the case for studies that have focused on only two variables, namely tourism and economic growth.

In methodological terms, experimentation using random assignment is a useful approach to detect causality among human subjects. However, purely experimental methods cannot be used to examine macroeconomic problems. It is impossible for researchers to carry out experiments concerning tourism destinations through random assignments. Other causality identification strategies include regression discontinuity, the difference-in-differences technique, and instrumental variable methods. Each of these methods requires the application of various strict assumptions. For example, difference-in-differences analysis requires two main assumptions regarding parallel trends and common shocks in two destinations, which

may be difficult to implement in empirical research. However, attempts should still be made to detect causality between tourism and economic growth by using these approaches.

4.2 The definition and scope of tourism in TLEG studies

As the TLEG hypothesis proposes that tourism leads to economic growth, the first and most important issue to address is the definition or boundary of "tourism." However, as discussed previously, there is no consistent or commonly accepted definition of tourism in TLEG studies. Although the terms "tourism development," "tourism activity," "tourism growth," "tourism expansion," or just "tourism" have all been used as the objects of TLEG studies, most relevant empirical studies have used tourist arrivals, tourism expenditures, or tourism receipts to measure tourism.

According to the UNWTO, tourism is "a social, cultural and economic phenomenon related to the movement of people to places outside their usual place of residence, pleasure being the usual motivation" (2010, 1). Tourism can be quantitatively measured from either the demand side or the supply side. From the demand perspective, tourism is usually divided into three types, domestic, inbound, and outbound, and is often measured by tourist arrivals and tourism expenditures. From the supply perspective, tourism generally refers to tourism industries composed of establishments serving the same main tourism activity (UNWTO 2008, 30). These industries often include sectors such as accommodation for visitors, food and beverage

services, passenger transportation, travel agencies, and other reservation services. The measures of tourism from the supply side may include the sum of businesses outputs, value added, employees, and employee compensation.

Most previous studies have measured tourism from the demand perspective, using tourist arrivals and tourism expenditures. Tourism attractions (Faber and Gaubert 2019) and tourism productivities (Liu and Wu 2019) have also been used in some studies to measure tourism from a supply perspective. No matter how tourism is measured, in TLEG studies, it is important to clarify the definition and scope of tourism that is being considered.

It is also important to note that economic growth and economic development are two different concepts and that their scopes are different. Economic growth refers to the quantitative change in the total output of an economy during a given period, which is often measured by the growth rate of GDP or the growth rate of per capita in an economy. The magnitude of economic growth indicates the material well-being of an economy's people (Aghion and Howitt 2009). The meaning of the term "economic development," which concerns the status or the quality of an economy, is much wider than that of "economic growth." Similarly, in testing the TLEG hypothesis, if tourism is defined as "tourism development," then both the quantity and quality of tourism should be measured. Using tourist arrivals or tourism expenditures as the measure for tourism development provides only a quantitative measure of tourism. Increased tourist arrivals or tourism expenditures do not

necessarily indicate higher levels of tourism development. Therefore, we suggest that the term “tourism development” be used with caution when conducting studies to test TLEG hypotheses.

5. Conclusion

5.1 Concluding remarks

This study critically evaluates TLEG studies from a theoretical and empirical perspective. Theoretically, TLEG studies fall within the scope of economics, so the previously developed economic theories, especially those concerning economic growth, should be used to guide empirical TLEG studies. However, discussion of the theoretical foundation of TLEG has been largely ignored to date, and in many cases the tourism variable has been added to econometric models as a factor input, without adequate explanation. Furthermore, although some studies have used positive economic methods (as when dynamic equilibrium models have been used to examine the relationship between improved tourism productivity and economic growth), descriptions of the mechanism by which tourism affects overall economic growth have remained limited. Further research aimed at identifying how tourism can improve either factor inputs into the economy in general or technological progress, such as innovation, is therefore required.

In such studies, it is important to clarify that measuring the economic effect of tourism is not

equivalent to measuring TLEG. The economic effect of tourism is the proportion of the value added to the whole economy that is generated from tourism. TLEG refers to the causal effect of tourism on economic growth. From an empirical perspective, it is important to realize that the Granger causality test should be used with caution, as this test does not verify "real" cause and effect relationships, but merely shows sequential relationships between tourism and economic growth. The Granger causality test can only be applied to verify causality from an empirical perspective if there is strong theoretical support for causality.

In previous studies, tourist arrivals, tourism receipts, and tourism expenditures (which are flow variables) have been commonly used as measures of tourism. However, the labor, capital, and technological progress variables in production functions are all stock variables. The flow variables in production functions can only have short-term transitional effects on economic growth. Only stock variables that are known as factor inputs can be considered to have long-term effects on economic growth. The links between tourist arrivals/tourism receipts and the factor inputs in the growth model are therefore vague and difficult to demonstrate. Finally, TLEG studies have paid insufficient attention to the definition and scope of tourism.

One reason for studying TLEG is to provide useful recommendations for destination governments, to help them formulate their long-term tourism and economic growth strategies (Du, Lew, and Ng 2016). However, given the flaws of previous studies in terms of theoretical

support and methodological rigor, it is very difficult for destination governments to draw practical implications from the empirical findings of TLEG studies. For example, in a developed economy with well-established manufacturing, finance, and high-tech sectors, it is difficult to demonstrate that higher tourism leads to economic growth, as the productivity of the tourism sector tends to be much lower than that of the other previously mentioned industries.

5.2 Suggestions for further research

According to the above discussion, the need for several new directions in research on TLEG is apparent. From a theoretical perspective, researchers should place their studies in direct relation to previously articulated economic theories. Identifying how tourism increases either factor inputs or technological progress is essential to establish its connections with economic growth. Given that the factors affecting economic growth are mainly related to technological progress (which is achieved through investment in physical and human capital and in R&D), it is important to consider what role tourism can play in improving technological progress and the productivity of capital and labor. In other words, the mechanism of transmission between tourism and economic growth must be clearly identified. Some studies have provided useful insights into this. For example, Zuo and Huang (2020) found in a region in China that tourism development leads to economic growth through changing the less productive agricultural sector into a more productive tourism sector. Faber and Gaubert (2019) found that along Mexico's coastline, tourism can improve the local economy, particularly in less touristic

regions, through its significant positive spillover effects on manufacturing. More empirical evidence for this connection would be of value.

From a methodological perspective, various identification methods can be applied to test the causality between tourism and economic growth, and Granger causality testing should be used only as a supplementary method. A quasi-experimental method could be used to compare the effects of similar tourism shocks (such as implementations of similar tourism policies) on a number of tourism destinations, such as destinations in the European Union or the Guangdong-Hong Kong-Macau Greater Bay Area, to see how these policies affect the long-term path of economic growth in these destinations.

Another potential research direction is to examine whether big data derived from tourism activities, such as those generated by tourists online, can be applied to test the TLEG hypothesis, as the development of internet technologies and the associated big data can provide the industry with useful information for improving productivity. Tourism-related big data could thus be regarded as a new kind of capital.

References

Auld, T. and S. McArthur. 2003. “Does Event-driven Tourism Provide Economic Benefits? A Case Study from the Manawatu region of New Zealand.” Tourism Economics 9 (2): 191–201.

Aghion, P. and P. Howitt. 2009. The Economics of Growth. Cambridge, MA: The MIT Press.

Antonakakis, N., M. Dragouni, and G. Filis. 2015. “How Strong Is the Linkage Between Tourism and Economic Growth in Europe?” Economic Modelling 44: 142–155.

Balaguer, J. and M. Cantavella-Jordá. 2002. “Tourism as a Long-Run Economic Growth Factor: The Spanish Case.” Applied Economics 34 (7): 877–884.

Bento, J. P. 2016. “Tourism and Economic Growth in Portugal: An Empirical Investigation of Causal Links.” Tourism & Management Studies 12 (1): 164–171.

Brida, J. G., I. Cortes-Jimenez, and M. Pulina. 2016. “Has the Tourism-Led Growth Hypothesis Been Validated? A Literature Review.” Current Issues in Tourism 19 (5): 394–430.

Cabelle, J. and M. S. Santos. 1993. “On Endogenous Growth with Physical and Human Capital.” Journal of Political Economy 101 (6): 1042–1067.

Chingarande, A. and A. Saayman. 2018. “Critical Success Factors for Tourism-Led Growth.” International Journal of Tourism Research 20: 800–818.

Chiu, Y. B. and L. T. Yeh. 2017. “The Threshold Effects of the Tourism-Led Growth Hypothesis: Evidence from a Cross-Sectional Model.” Journal of Travel Research 56 (5): 625–637.

Cortés-Jiménez, I., J. J. Nowak, and M. Sahli. 2011. “Mass Beach Tourism and Economic Growth: Lessons from Tunisia.” Tourism Economics 17 (3): 531–547.

Deng, T., M. Ma, and S. Shao. 2014. “Has International Tourism Promoted Economic Growth in China? A Panel Threshold Regression Approach.” Tourism Economics 20 (4): 911–917.

Dickey, D. A. and W. A. Fuller. 1979. “Distribution of the Estimators for Autoregressive Time Series with a Unit Root.” Journal of the American Statistical Association 74 (366): 427–431.

Du, D., A. A. Lew, and P. T. Ng. 2016. “Tourism and Economic Growth.” Journal of Travel Research 55 (4): 454–464.

Edwards, S. 1998. “Openness, Productivity and Growth: What Do We Really Know?” Economic Journal 108 (2): 383–398.

Emery, R. F. 1967. “The Relation of Exports and Economic Growth.” Kyklos 20 (4): 470–486.

Faber, B. and C. Gaubert. 2019. “Tourism and Economic Development: Evidence from Mexico’s Coastline.” American Economic Review 109 (6): 2245–2293.

Fonseca, N. and M. S. Rivero. 2019. “Granger Causality Between Tourism and Income: A Meta-Regression Analysis.” Journal of Travel Research. Published online, June 5. doi: 10.1177/0047287519851189.

Funk, M. and R. Ruhwedel. 2001. “Product Variety and Economic Growth: Empirical Evidence for the OECD Countries.” IMF Staff Paper 48 (2): 225–242.

Gradstein, M. 2004. “Governance and Growth.” Journal of Development Economics 73 (2):

505–518.

Granger, C. 1969. “Investigating Causal Relations by Econometric Models and Cross-Spectral Methods.” Econometrica 37 (3): 424–438.

Jaforullah, M. 2015. “International Tourism and Economic Growth in New Zealand.” Tourism Analysis 20 (4): 413–418.

Jiao, S., W. Gong, Y. Zheng, X. Zhang, and S. Hu. 2019. “Spatial Spillover Effects and Tourism-Led Growth: An Analysis of Prefecture-Level Cities in China.” Asia Pacific Journal of Tourism Research 24 (7): 725–734.

Katircioglu, S. T. 2009. “Revisiting the Tourism-Led-Growth Hypothesis for Turkey Using the Bounds Test and Johansen Approach for Cointegration.” Tourism Management 30: 17–20.

King, R. G. and R. Levine. 1993. “Finance and Growth: Schumpeter Might Be Right.” Quarterly Journal of Economics 108: 717–737.

Kwiatkowski, D., P. C. B. Phillips, P. Schmidt, and Y. Shin. 1992. “Testing the Null Hypothesis of Stationarity Against the Alternative of a Unit Root.” Journal of Econometrics 54: 159–178.

Kyophilavong, P., J. L. Gallup, T. Charoenrat, and K. Nozaki. 2018. “Testing Tourism-Led Growth Hypothesis in Laos?” Tourism Review 73 (2): 242–251.

Lin, V. S., Y. Yang, and G. Li. 2019. “Where Can Tourism-Led Growth and Economy-Driven Tourism Growth Occur?” Journal of Travel Research 58 (5): 760–773.

Liu, A., H. Song, and A. Blake. 2018. “Modelling Productivity Shocks and Economic Growth Using the Bayesian Dynamic Stochastic General Equilibrium Approach.” International Journal of Contemporary Hospitality Management 30 (11): 3229–3249.

Liu, A. and D. C. Wu. 2019. “Tourism Productivity and Economic Growth.” Annals of Tourism Research 76: 253–265.

Lucas, R. E. 1988. “On the Mechanics of Economic Development.” Journal of Monetary Economics 22: 3–42.

Nowak, J. J., M. Sahli, and I. Cortés-Jiménez. 2007. “Tourism, Capital Good Imports and Economic Growth, Theory and Evidence for Spain.” Tourism Economics 13 (4): 515–536.

Nunkoo, R., B. Seetanah, Z. R. K. Jaffur, P. G. W. Moraghen, and R. V. Sannassee. 2019. “Tourism and Economic Growth: A Meta-Regression Analysis.” Journal of Travel Research. Published online, May 29. doi: 10.1177/0047287519844833.

Oh, C. 2005. “The Contribution of Tourism Development to Economic Growth in the Korean Economy.” Tourism Management 26 (1): 39–44.

Pablo-Romero, M. P. and J. A. Molina. 2013. “Tourism and Economic Growth: A Review of Empirical Literature.” Tourism Management Perspectives 8: 28–41.

Pan, S. C., S. Y. Liu, and P. C. Wu. 2014. “Re-testing the Tourism-Led Growth Hypothesis Using Panel Smooth Transition Regression Models.” Tourism Economics 20 (1): 39–50.

Paramati, S. R., M. S. Alam, and C. F. Chen. 2017. “The Effects of Tourism on Economic

Growth and CO2 Emissions: A Comparison Between Developed and Developing Economies." Journal of Travel Research 56 (6): 712–724.

Perles-Ribes, J. F., A. B. Ramón-Rodríguez, A. Rubia, and L. Moreno-Izquierdo. 2017. "Is the Tourism-Led Growth Hypothesis Valid After the Global Economic and Financial Crisis? The Case of Spain 1957–2014." Tourism Management 61: 96–109.

Pesaran, M. H., Y. Shin, and R. J. Smith. 2001. "Bounds Testing Approaches to the Analysis of Level Relationships." Journal of Applied Econometrics 16 (3): 289–326.

Rebelo, S. 1991. "Long-Run Policy Analysis and Long-Run Growth." Journal of Political Economy 99 (3): 500–521.

Romer, P. M. 1986. "Increasing Returns and Long-Run Growth." Journal of Political Economy 94 (5): 1002–1037.

Roubini, N. and X. Sala-i-Martin. 1992. "Financial Repression and Economic Growth." Journal of Development Economics 39 (1): 5–30.

Rivera-Batiz, F. L. 2002. "Democracy, Governance, and Economic Growth: Theory and Evidence." Review of Development Economics 6 (2): 225–247.

Salifou, C. K. and I. U. Haq. 2017. "Tourism, Globalization and Economic Growth: A Panel Cointegration Analysis for Selected West African States." Current Issues in Tourism 20 (6): 664–667.

Smeral, E. 2006. "Tourism Satellite Accounts: A Critical Assessment." Journal of Travel Research 45(1): 92–98.

Smith, A. 1776. The Wealth of Nations. London: W. Strahan and D. Cadell.

Solow, R. M. 1956. “A Contribution to the Theory of Economic Growth.” Quarterly Journal of Economics 70 (1): 65–94.

Song, H., L. Dwyer, G. Li, and Z. Cao. 2012. “Tourism Economics Research: A Review and Assessment.” Annals of Tourism Research 39 (3): 1653–1682.

Song, H., S. F. Witt, and G. Li. 2009. The Advanced Econometrics of Tourism Demand. London: Routledge.

Stiglitz, J. 2002. “Information and the Change in the Paradigm in Economics.” American Economic Review 92 (3): 460–501.

Surugiu, C. and M. R. Surugiu. 2013. “Is the Tourism Sector Supportive of Economic Growth? Empirical Evidence on Romanian Tourism.” Tourism Economics 19 (1): 115–132.

Swan, T. W. 1956. “Economic Growth and Capital Accumulation.” Economic Record 32 (2): 334–361.

Tafel, M. and G. Szolnoki. (2020). “Estimating the Economic Impact of Tourism in German Wine Regions.” International Journal of Tourism Research 1–12. https://doi.org/10.1002/jtr.2380

Tang, C. F. 2011. “Is the Tourism-Led Growth Hypothesis Valid for Malaysia? A View from Disaggregated Tourism Markets.” International Journal of Tourism Research 13: 97–101.

Tang, C. F. and E. C. Tan. 2013. “How Stable is the Tourism-Led Growth Hypothesis in Malaysia? Evidence from Disaggregated Tourism Markets.” Tourism Management 37: 52–57.

Tang, C. F. and E. C. Tan. 2015. “Does Tourism Effectively Stimulate Malaysia’s Economic Growth?” Tourism Management 46: 158–163.

UN and UNWTO. 2010. International Recommendations for Tourism Statistics 2008. New York, NY: UN.

UNWTO. 2008. Tourism Satellite Account: Recommended Methodological Framework. Madrid: UNWTO.

Uzar, U. and K. Eyuboglu. 2019. “Can Tourism Be a Key Sector in Reducing Income Inequality? An Empirical Investigation for Turkey.” Asia Pacific Journal of Tourism Research 24 (8): 822–838.

Vita, G. D. and K. S. Kyaw. 2017. “Tourism Specialization, Absorptive Capacity, and Economic Growth.” Journal of Travel Research 56 (4): 423–435.

World Travel and Tourism Council, 2020. “Travel and Tourism Global Economic Impact and Trends 2020.” World Travel and Tourism Council.

Wu, D. C., J. Liu, H. Song, A. Liu, and H. Fu. 2019. “Developing a Web-Based Regional Tourism Satellite Account (TSA) Information System.” Tourism Economics 25 (1): 67–84.

Wu, P. C., S. Y. Liu, J. M. Hsiao, and T. Y. Huang. 2016. “Nonlinear and Time-Varying

Growth-Tourism Causality.” Annals of Tourism Research 59: 45–59.

Yang, Y. and T. Fik. 2014. “Spatial Effects in Regional Tourism Growth.” Annals of Tourism Research 46: 144–162.

Zhang, J. and L. Cheng. 2019. “Threshold Effect of Tourism Development on Economic Growth Following a Disaster Shock: Evidence from the Wenchuan Earthquake, P. R. China.” Sustainability 11: 371–392.

Zuo, B. and S. S. Huang. 2018. “Revisiting the Tourism-Led Economic Growth Hypothesis: The Case of China.” Journal of Travel Research 57 (2): 151–163.

Zuo, B. and S. S. Huang. 2020. “Structural Change and Productivity Perspective of Tourism's Contribution to Economic Growth: The Case of Zhangjiajie in China.” Journal of Travel Research 59 (3): 465–476.

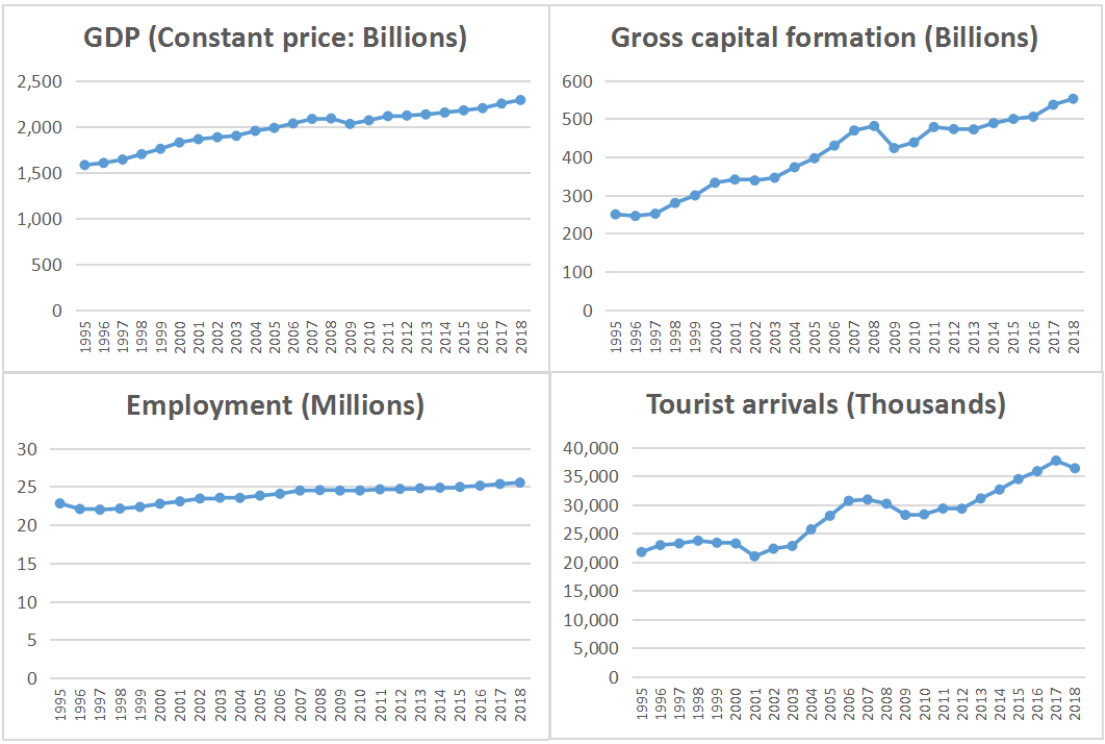

Figure 1. Original time series of GDP, gross capital formation, employment, and tourist arrivals

Table 1. KPSS and ADF unit root tests and Granger causality test

	Y_t	Arrivals_t	K_t	L_t
KPSS test statistics				
Level	0.684**	0.125	0.678**	0.663**
Difference	0.357	0.245	0.198	0.130
ADF test statistics				
Level	-2.351	-2.873	-2.392	0.040
1st difference	-3.127**	-4.016***	-4.242***	-6.079***
	1 ag = 1	1 ag = 2	1 ag = 3	1 ag = 4
Granger causality F test statistics				
Arrivals_t does not cause Y_t	5.266**	1.799	5.945***	4.847**
Y_t does not cause Arrivals_t	0.100	0.112	0.069	1.653

Note: All of the variables are transformed into natural logarithms.

The null hypothesis for the KPSS test is that the variable is stationary.

The null hypothesis for the ADF test is that the variable contains a unit root.

** and *** indicate significance at the 0.05 and 0.01 levels, respectively.

Table 2. ARDL model estimates and PSS bounds test

Long-run level model (Dependent variable: Y_t)			
	Estimates	Std. error	*t*-statistic
Arrivals_t	0.045	0.023	1.937*
K_t	0.327	0.147	2.222**
L_t	0.212	0.847	0.250
Short-run model (Dependent variable: ΔY_t)			
	Estimates	Std. error	*t*-statistic
Intercept	1.456	0.246	5.930***
ΔY_{t-1}	-0.140	0.063	-2.244**
$\Delta\text{Arrivals}_t$	0.009	0.005	1.713
$\Delta\text{Arrivals}_{t-1}$	0.009	0.005	1.673
ΔK_t	0.251	0.015	17.070***
EC_{t-1}	-0.318	0.054	-5.907***
PSS bounds test			
	Statistics	I(0) for α = 0.01	I(1) for α = 0.01
F-bounds test	7.089	4.290	5.610
t-bounds test	-5.907	-3.430	-4.370

Note: *, **, and *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.