



Network behavior as driving forces for tourism flows[☆]



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ABSTRACT

This research focuses on the relationship between networks of tourism destinations and tourism flows. First, the authors propose a new model to demonstrate networks of tourism destinations using travel agency supplied tourism packages. They demonstrate how to build the network matrices using operating steps applied to tourism markets in China. Next, the authors construct a two-stage game model that assumes that the more links a tourism destination has with other destinations, the greater will be its tourism flows. Forming links between destinations can be seen as a strategy to increase the competitive advantage of destinations linked in the network while benefiting the tourism market as a whole by decreasing the intensity of market competition. The outcome of implementing this strategy is a distinctly hierarchical network of tourism destinations (NTD). Finally, using tourism data from China the authors found positive correlations between degree, closeness centrality, and betweenness centrality of a destination and its tourism flows. Based on these findings, propagating network linkages among tourism destinations can reduce intensity of competition among destinations within a tourism market, promote the competitive advantages of individual destinations, and improve positioning of destinations within NTD.

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1. Introduction

Within tourism studies, the literature on the driving forces of tourism flows is extensive. Destination image and specific characteristics of destinations are frequently studied factors driving tourism flows, but choices of multiple tourism destinations has not been treated independently or as separate activities. A tourism destination can be understood to be a composite product comprising tourism resources, tourism services, public services, social and cultural activities, and other destination offerings. Even though the product includes similar elements, an individual destination differentiates itself in order to compete for tourism flows in domestic and international markets. A specific type of interaction among tourism destinations arises from the fact that any action taken on the part of one destination stimulates responses from other destinations. The tourism destinations that stimulate and respond to other destinations form a network of tourism destinations (NTD).

The research here aims to demonstrate empirically how tourism network behaviors impact the competitive environment that a tourism destination faces and the tourism flow it receives. Contributions of this research include a new method to illustrate NTDs, construction of a two-stage game model to test effects of changes in links among

destinations on market equilibrium, and analysis of factors affecting tourism flows using tourism data from China.

First, the study here provides a new method to illustrate NTDs. A NTD is a geographical system connecting nodes (destinations) with links (routes between destinations). The networks in this study were developed using data from tourism packages supplied by travel agencies. Tourism researchers and practitioners are paying more attention to the network features of destinations where individual destinations are seen as being part of a larger NTD. Some research examines tourism networks at the micro-level where each individual destination is a dynamic complex system involving interconnected partnerships that strongly correlate with the function of product delivery (Bickerdyke, 1996). At the micro-level, a network is a useful way to illustrate the internal structure of a tourism destination or the relationships among individual units in the tourism sector. For example, Buhalis (2000) describes networks of suppliers and Morrison, Lynch, and Johns (2004) show how these networks make tourism destinations more profitable. The organization of facilities and services of a destination can also be viewed as a set of linkages and nodes (Baggio, 2008; Baggio & Cooper, 2010; Scott, Baggio, & Cooper, 2008a; Scott, Cooper, & Baggio, 2008b).

Different and interesting features appear when the unit of analysis moves beyond the individual destination (Candela & Figini, 2010, 2012). Analysis of specific features of destinations at the meso level (the intermediate level between the micro and macro levels) has received little attention, especially when multi-destination trips are involved (Parroco, Franco, DeCantis, & Ferrante, 2012). At least two studies depict the NTD with links represented by tourists' routes (D'Agata, Gosso, & Tomaselli, 2013; Shih, 2006). The research here,

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however, differs from these earlier studies in the way that tourism networks are derived. Both [Shih \(2006\)](#) and [D'Agata et al. \(2013\)](#) develop tourism networks based data obtain from face-to-face or telephone interviews with tourists whereas tourism networks in this study are developed from data from travel agency supplied tourism packages. (The appropriateness of using travel agency supplied data in this research is demonstrated in [section 2](#)).

Second, this research introduces a two-stage game model based on the Cournot model (c.f., [Zirulia, 2011](#)) to test how changes in links between destinations influence market equilibrium. Competition in the tourism industry occurs at two levels; tourism destinations compete among themselves (inter-destination competition), and firms offering similar goods or services within tourism destinations (intra-destination competition) compete for business ([Zirulia, 2011](#)). Most of the literature on tourism competition relates to intra-destination competition and includes strategic pricing of hotels ([Mudambi, 1994](#)), the effects of tourism growth on the local environment ([Pintassilgo & Silva, 2007](#)), the formation of hotel chains ([Calveras, 2007](#)), the vertical relationships between tour operators and hotels ([Calveras & Vera-Hernandez, 2005](#)), and the strategic interaction between hotels and airlines ([Wachsman, 2006](#)). Less is known about these competitive factors at the meso level.

Two paradigms dominate the inter-destination competition literature. One considers a dynamic model for destination competition in which the market for tourism is assumed to be an oligopoly with differentiated products ([Cellini & Candela, 2006](#)), and the other focuses on the degree of differentiation among and competition within destinations based on the Cournot model ([Zirulia, 2011](#)). However, neither of these analyzes competition and market equilibrium within the framework of networks as does this research here.

Finally, this research contributes to the literature by estimating the effects of tourism network behaviors on tourism flows. Very few scholars have examined how the structure of tourism networks affect behaviors and outcomes or how to identify these effects—whether at the micro-, meso-, or macro-level of the market. Extant research using network analysis provides empirical evidence of the topography of tourism networks ([Lee, Choi, Yoo, & Oh, 2013](#)) but not of their effects on flows or outcomes. Nevertheless, network analysis provides theoretical and empirical evidence that the structure of networks affect outcomes in many contexts including promoting education ([Bramouille, Djebbari, & Fortin, 2009](#); [Calvo-Armengol, Patacchini, & Zenou, 2008](#)), accelerating technological diffusion ([Conley & Udry, 2010](#)), and facilitating matching of individuals ([Fafchamps, Goyal, & van der Leij, 2010](#)). Network analysis should also be useful for understanding the forces driving tourism flows and the mechanism of how tourism networks function. A destination position and connectedness in the NTD affect its influence on competition and market equilibrium, and ultimately, on the tourism flows the destination accrues.

In the following section, the authors introduce a method to describe the NTD and apply data from the tourism industry in China to demonstrate the development and analysis of a specific NTD. The theoretical models in [section 3](#) illustrate how tourism network characteristics influence inter-destination competition and tourism market equilibrium. [Section 4](#) comprises the empirical framework, the variables and data used to test it, analysis of empirical results, and estimation issues. The report concludes in [section 5](#) with a discussion of limitations and implications of the research.

2. The method of describing NTD

2.1. Multi-destination trip and NTD

Tourists usually stop at multiple destinations along their travel routes rather than just one. People engage in multi-destination trips for four reasons ([Lue, Crompton, & Stewart, 1996](#); [Shih, 2006](#)). First, tourists enjoy variety when they travel just as same they do when they consume other products. In many cases, tourists like to engage in a variety of

activities throughout any given trip. Second, multi-destination travel decreases the probability of experiencing completely dissatisfactory trip. A disappointing experience at one destination can be made up for with a more positive experience at another destination. The cumulative experience of the trip is more likely to have at least some positive aspects when multiple destinations are involved in the trip experience. Third, multiple decision-makers typically are involved in planning and executing the journey. Fourth, the marginal cost (in time and money) per destination or activity for a multi-destination trip is usually less than that of a single destination or activity. Based on these four reasons, a multi-destination trip is a sensible alternative to a single destination trip for many tourists making travel plans. Furthermore, the distance between destinations has become less of a deterrent to visiting multiple destinations in the same trip due to the decreasing costs of transportation and communication between or among destinations. The multi-destination trip, therefore, generates a specific kind of interaction between tourism destinations over a broader spatial-domain.

The interactions between tourism destinations (or spillover effects), long an area of interest among researchers, is an issue addressed in this research. A NTD with nodes (destinations) and links (interactions between tourism destinations) can be constructed if interactions between destinations can be described with a specific indicator. A key problem in such a construction of a NTD is determining which indicator to adopt. The researchers here adopt a novel approach by deducing links from travel agency supplied data from tourism packages.

These indicators may be appropriate for reflecting interactions between destinations than others for the following reasons. Data from agency supplied tourism packages is compatible with extant analysis of interactions between tourism destinations. Most literature on this topic focuses on interactions between the origin and the destination ([Gil-Pareja, Llorca-Vivero, & Martínez-Serrano, 2007](#); [Khadaroo & Seetanah, 2008](#); [Um & Lee, 1998](#)), but methods used in these studies are not transferable to the research here. For example, the most frequently used method in this area of research, the gravity model, includes economic factors (e.g., GDP) and spatial variables (e.g., distance). Economic factors are included in the gravity model because interactions between the origin and the destination are contextually dependent. Economic growth in one region can stimulate tourism development in others because, for example, an increase in income among residents in the origin means they can afford to spend more in tourism destinations. The effect of GDP growth on tourism, however, is much smaller when economic factors in destinations only, rather than in both origins and destinations, are considered.

In addition, links proposed in this research can reflect integrated effects of interactions among tourism destinations. Spatial econometrics is a popular method used to analyze spillover effects. As a popular method in recent years, spatial econometrics has been utilized broadly to analyze spillover effects. For example, [Bai, Ma, and Pan \(2012\)](#) demonstrate that an increase of 10% in market potential increases the growth rate of regional GDP per capita by 3–5% based on a spatial error model; [Yang and Wong \(2012\)](#) confirm the existence of spillover effects in both inbound and domestic tourism flows using a spatial lagged model.

A spatial econometrics model, however, is not an entirely appropriate method to analyze interactions among tourism destinations, because distance/contiguity, the primary variable in spatial econometrics, is becoming less and less of a deterrent to multi-destination travel as the cost of transportation and communication between destinations decreases. One family recently traveled from Harbin to Hong Kong, Shenzhen, and Hangzhou. They covered about 7000 km in ten days—a rare feat in China twenty years ago. In this case, transportation cost was not the most important factor in determining where the family would visit on the trip.

Factors that influence tourism decisions are rather complex and may include the attributes of natural or cultural tourism resources, the differences or similarities of destinations, the public services capacity of local

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