Session D3

Does Denoising Search Volume Data Improve Its Performance in Forecasting Tourism Demand? - Mingming Hu, Siyao Wei and Richard Qiu

Accurate tourism demand forecasting provides essential references for planning, decision-making and resource management in tourism industry. Search engine data is proven to be effective in improving the forecasting accuracy for tourism demand and has been widely adopted in tourism or hotel demand forecasting practices (Pan et al., 2012; Bangwayo-Skeete and Skeete, 2015; Wu et al., 2017; Wen et al., 2019). Whilst containing useful information regarding tourism demand, search volume data also consists of noise (Li and Law, 2020). The effectiveness of denoising treatment has been proven in many forecasting fields such as road traffic flow (Chen et al., 2020), exchange rates (Zhao and Khushi, 2020), PM2.5 concentration (Xing et al., 2021), weather (Niu et al., 2021), and electronic load (Yaslan and Bican, 2017). Nevertheless, while search volume data is frequently adopted in forecasting tourism demand, denoising treatment has rarely been adopted. To close this gap, this study aims to develop a tourism demand forecasting method with denoising search volume and compare the performance of different denoising methods in forecasting tourism demand. Three commonly used denoising methods, namely wavelet denoising, moving average filtering, and median filtering, are applied to mitigate noise in search volume. Kulangsu, an AAAAA tourist attraction in Xiamen, China, is taken as the empirical case. Both the period before (July 4, 2016, to September 1, 2019) and during the COVID-19 pandemic (January 20, 2020, to February 28, 2021) are studied to examine the robustness of the model. Seasonal Autoregressive Integrated Moving Average with exogenous factors (SARIMAX) is taken to compare the performance of different explanatory variables. Empirical results indicate that (1) compared with the original search volume, denoising search volume of both PC and Mobile devices significantly improves tourism demand forecasting accuracy; (2) Compared with the denoising search volumes of PC, models with denoised search volumes from mobile devices can generate more accurate tourism demand forecasting; (3) The wavelet denoising method is more effective in eliminating noise from search volume in the period of COVID-19, while median filtering method is more effective in pre-COVID period in forecasting tourism demand.

This study makes the following contributions: First, this study pioneered the investigation of denoised search volume data in tourism demand forecasting by employing wavelet denoising, moving average filtering, and median filtering in data treatment. By examining the roles of denoising methods, the study developed an effective way to improve tourism demand when using search volume data. Second, this study expands the literature on data processing in tourism demand forecasting. Beyond the previous studies that have illustrated the effectiveness of dimension reduction (Li et al. 2017) and missing data imputation (Qiu et al. 2021), the findings of this study confirmed the necessity of denoising treatment in tourism demand forecasting practice.

Enormous retail tourism expenditures and where to find them Ying Liu, Richard T. R. Qiu and Haiyan Song

While shopping has long been a beloved activity for tourists, contributing significantly to tourism revenue and economic growth in destinations, academic research has rarely delved into the factors that shape tourist shoppers' consumption patterns. This study aims to fill this gap by systematically exploring the determinants of retail tourism demand through the lens of tourism demand theory. The insights gleaned from this research will prove invaluable for shaping tourism policies, crafting pricing strategies, and driving destination promotions. Moreover, understanding tourists' purchase behaviors and how they allocate their shopping budgets across product categories is crucial for the retail sector's success.

To unravel the complexities of tourist shopping behavior, this study introduces a two-stage approach to analyze retail tourism expenditure and the allocation of spending across different product categories. By incorporating various factors such as income, price levels, socio-demographics, and trip characteristics, the study provides a comprehensive framework for understanding the intricate decision-making processes behind tourists' overall retail tourism budgets and their distribution across product types. This examination of factors separately offers an understanding of the multifaceted nature of tourist shopping behavior.

Leveraging the pseudo-panel data model proposed by Deaton (1985), this study analyzes retail tourism demand across countries over time. The analysis draws upon a rich dataset from the retail tourism project conducted by the World Travel & Tourism Council (WTTC, 2023), encompassing a staggering 4,577 responses from 24 source markets spanning the years 2011 to 2022.

The study unveils tourists' expenditure priorities and the factors that shape their spending decisions, including personal preferences, cultural influences, price points, and product categories. This invaluable understanding empowers businesses to develop targeted marketing strategies, diversify their product offerings in the retail tourism sector, and gain a competitive edge in this dynamic market.

The findings of this study hold profound practical implications for destination marketing organizations (DMOs) and industry practitioners alike. DMOs can leverage the research outcomes related to the overall retail tourism budget to promote retail tourism holistically and expand its magnitude. Meanwhile, individual practitioners can benefit from the insights on budget allocation for specific product categories, enabling them to enhance their competitive advantage and secure a larger market share.

Collaborative partnerships between tour operators, travel agencies, and retailers are essential for maximizing retail tourism revenues. Strategic alliances can be forged to offer tailored experiences and promotions that cater to diverse tourist shoppers' preferences. Retailers can customize their strategies based on tourists' characteristics and preferences, targeting specific product categories and adapting swiftly to changes in shopping behavior.

Notably, the study highlights regional heterogeneity in tourists' retail tourism expenditure and budget allocations. Retailers should provide high-quality services to both Western and Asian tourists while tailoring their offerings to attract visitors from different source markets. By capitalizing on these opportunities, businesses can better cater to the preferences of tourists from diverse backgrounds and enhance their competitive edge in the dynamic retail tourism market.

The Gravity Model for Tourism Flows: Taking into Account the Nonhomothetic Nature of Demand - Vincent Dropsy, Jean-Jacques Nowak, Sylvain Petit and Mondher Sahli

Since the 2000s, the gravity model has become very popular in tourism demand modeling as a tool to explain bilateral tourism flows between countries (Harb and Bassil 2020; Morley, Rossello and Santana-Gallego 2014; Nadal and Gallego 2022). The gravity model relies on many basic assumptions and notably the existence of iceberg-type trade costs, a weak separability and homotheticity of preferences (Anderson 2011). The consequence of the latter assumption is that Engel curves are straight lines going through the origin; in other words, income elasticities of demand are unity.

This is problematic because there is consistent and robust evidence that tastes cannot properly be considered to be homothetic, especially in tourism. There is broad consensus in the literature that international tourism is a luxury good (i.e. income elasticity higher than one) (Peng, Song, Crouch and Witt 2015; Untong, Ramos, Kaosa-Ard, and Rey-Maquieira, 2015), even if many authors observed a decreasing trend in tourism income elasticities over the last decades (Gunter and Smeral, 2016; Smeral, 2017). It follows that standard gravity models are not suitable to study tourism, or more generally any good or service featuring non-unitary income elasticities.

One consequence of nonhomothetic preferences is that within-country income distribution and income per capita become arguments for the aggregate demand function, in addition to aggregate income. Therefore they may be important determinants of international tourism flows.

Fajgelbaum and Khandelwal (2016) have derived a gravity equation of international trade that allows for nonhomotheticities in consumer demand. Their framework combines the Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980) with a multisector Armington (1969) trade model, resulting in nonhomothetic gravity equations that explicitly include within-country income distribution and income per capita as explanatory variables.

We hypothesize that Fajgelbaum and Khandelwal's model should be more appropriate to study international trade in tourism than standard homothetic gravity models. The aim of our paper is thus to propose a theoretical approach, adapted from Fajgelbaum and Khandelwal (2016), that takes into account the non-homotheticity of demand, to analyze the determinants of bilateral intra-European tourism flows. We obtain nonhomothetic gravity equations that, in addition to standard gravity variables, explicitly include within-country income distribution and income per capita as explanatory variables of tourism flows. They also allow us to estimate exporter-specific income elasticities of demand according to the source country of tourists.

To test our model, we use tourism import data (i.e. tourist spending) from 15 European countries, broken down by destination, for the period 2010-2019. These data come from the balance of payments of the countries considered, compiled by the OECD (2019).

Endogenous variables are based on distances (CEPII), populations, real incomes and income inequalities (World Bank data for these three other variables). These results will make it possible to better link tourist preferences with the macroeconomic characteristics of the countries of origin (distances to destinations, average income and income distribution).

In this way, these results will enable destination managers to better adapt their offers to the specific characteristics of tourists, which can vary according to their geographical origin.