

MSc in Applied Economics

Department of Economics

Modelling and Forecasting
Economic Time series
Course work assignment

Submission deadline: Last week of the course

The abilities to evaluate accurately the existing tourism market conditions and to identify the future directions, are skills for a successful manager. In other words, the capacity to spot trends in the market and the ability to explain the reasons for observed changes within the same market, undeniably constitute strong competing advantages with respect to other managers. Developing these skills requires constant examination of the market conditions by using real data, along with the appropriate statistical analysis.

In more detail, forecasting tourism demand is essential for practitioners and policy makers. Accurate forecasts provide valuable aid for: a) the development of medium- to long-run marketing and tourism strategies, b) the formation of pricing policies, c) the appropriate scheduling of investments in the sector (Clerides and Adamou, 2010), and d) the effective allocation of the limited resources (Song *et al.*, 2006; Yang *et al.*, 2015). Nowadays, several leading indicators and econometric specifications are used (i.e. web search engines constitute one major tool in planning vacations) to improve demand forecasting for the tourism product.

The empirical studies on tourism demand introduce an extensive set of explanatory factors to model arrivals. Using a diverse set of criteria, several researchers have grouped these factors (see Frechtling, 2001; Middleton *et al.*, 2009). Frechtling (2001) groups tourism demand factors into: 1) push, 2) pull, and 3) resistance factors. All groups above embrace both quantitative and qualitative factors, with the former being most frequently used in the empirical analysis since they are easily measurable and accessible effortless. In contrast, while qualitative attributes play a very crucial role in determining arrivals, rarely are these incorporated in demand specifications as their quantification is an arduous task.

Assume yourself as a highly ranked manager in a large competitive company in the tourism sector. Additionally, most of the income for your company is coming from the arrivals of tourists in the entire country and the

company is market leader. Hypothesizing that subject of interest is the forecasting of the tourist's arrivals for the entire country, write a short report to the Managing Director of your company explaining your results (and the implied practical usefulness) and the approach you followed in order to obtain your forecasts.

For a given country (you are free to select your own country) you are expected to provide accurate 3-year forecasts for the arrivals of tourists, implementing a wide range of techniques. Furthermore, you are expected to compare the delivered forecasts by each econometric specification and to identify the model/models that perform better in terms of forecasting accuracy. Peng *et al.* (2014) summarize two broad categories of techniques: time-series econometrics and artificial intelligence methods. The former category includes econometric models ranging from very simplistic univariate specifications (Geurts and Ibrahim, 1975; Martin and Witt, 1989) to more advanced multivariate specifications (Halicioglu, 2010; or Bangwayo-Skeete and Skeete, 2015). The latter category comprises more advanced models ranging from artificial neural networks (Burger *et al.*, 2001) to genetic algorithms (see among others, Chen and Wang, 2007).

For instance, Yang *et al.* (2015) implement an ARMA -Autoregressive Moving Average- specification and the standard Granger non-causality test and affirmed that query volume data from two search engines - Google and Baidu - contribute significantly to decreasing forecasting errors when predicting the number of visitors to Hainan (a Chinese province). Bangwayo-Skeete and Skeete (2015) direct their interest to international visitors to five Caribbean destinations (Jamaica, Bahamas, Dominican Republic, Cayman, and St. Lucia). They conduct their analysis by implementing a simple AR-MIDAS model, a SARIMA model (Seasonal Autoregressive Integrated Moving Average), and a benchmark AR model (Autoregressive). The former model appears to perform best in most of the conducted pseudo-forecasting experiments.

Overall, the expected structure of the report for the Managing Director should contain: a) a short introduction, b) a short literature review c) the methodological frameworks used, d) data sources and presentation (figures) of the variables used, e) the estimation results, f) brief comments on the results, g) conclusions and finally, h) references. Keep in mind that if a student wishes to submit a course work for her/his own benefit, a simple summary report is not acceptable. Also, simply copying and pasting some parts of the source article is not acceptable. Presenting only tables and figures is not acceptable. It is expected that the student delivers a well-written report. The paper should not be longer than 30 pages (font size 12 and single-spaced).

Good Luck!

Always Deliver More than expected ! (Remember: Quantocracy)

References

- Bangwayo-Skeete, P.F. and R.W. Skeete (2015). Can Google data improve the forecasting performance of tourist arrivals? Mixed-data sampling approach. *Tourism Management* **46**(1), 454-464.
- Burger, C., M. Dohnal, M. Kathrada and R. Law (2001). A practitioners guide to time-series method for tourism demand forecasting - a case study of Durban, South Africa. *Tourism Management* **22**(4), 403-409.
- Chen, K.Y. and C.H. Wang (2007). Support vector regression with genetic algorithms in forecasting tourism demand. *Tourism Management* **28**(1), 215-226.
- Clerides, S. and A. Adamou (2010). Prospects and Limits of Tourism-Led Growth: The International Evidence. *Review of Economic Analysis* **2**(3), 287-303.
- Frechtling, D.C. (2001). *Forecasting Tourism Demand: Methods and Strategies*.: Butterworth-Heinemann. Oxford, UK.
- Geurts, M.D. and I.B. Ibrahim (1975). Comparing the Box-Jenkins approach with the exponentially smoothed forecasting: model application to Hawaii tourists. *Journal of Marketing Research* **12**(2), 182-188.
- Halicioglu, F. (2010). An econometric analysis of the aggregate outbound tourism demand of Turkey. *Tourism Economics* **16**(1), 83-97.
- Martin, C.A. and S.F. Witt (1989). Forecasting tourism demand: a comparison of the accuracy of several quantitative methods. *International Journal of Forecasting* **5**(1), 7-19.
- Middleton, VTC, A. Fyall and M. Morgan (2009). *Marketing in travel and tourism*, 4th edition, Butterworth-Heinemann, Oxford, UK.
- Peng, B., H. Song and G. Crouch (2014). A meta-analysis of international tourism demand forecasting and implications for practice. *Tourism Management* **45**(1), 181-193.
- Song, H., S.F. Witt and T.C. Jensen (2006). Forecasting international tourist flows to Macau. *Tourism Management* **27**(2), 214-224.
- Yang, X., B. Pan, J. Evans and B. Lv (2015). Forecasting Chinese tourist volume with search engine data. *Tourism Management* **46**(1), 386-397.