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# **UK OVERSEAS VISITORS: SEASONALITY AND PERSISTENCE**

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**and**

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## **Abstract**

This paper analyses seasonality and persistence in the number of UK overseas visitors applying a fractional integration framework to (monthly and quarterly) data from 1986 to 2017. The results indicate that long memory is present in the series and the degree of persistence is higher for seasonally adjusted data, with shocks having transitory but long-lasting effects.

**JEL Classification:** C15; C22

**Keywords:** UK overseas visitors; seasonality; persistence; long memory

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## **1. Introduction**

This paper analyses seasonality and persistence in the number of UK overseas visitors applying a fractional integration framework to (monthly and quarterly) data from 1986 to 2017. These two features are very common in tourism-related series, and despite the existence of numerous studies analysing them there is still no consensus on the most appropriate empirical framework to apply. Seasonality can be modelled either deterministically (using seasonal dummy variables) or stochastically; in the latter case either stationary (ARMA) seasonal models or seasonal unit roots (as in Dickey, Hasza and Fuller, DHF, 1984 or Hylleberg et al., HEGY, 1990) can be used. Examples of tourism studies using these techniques are Kim and Moosa (2001), Alleyne (2006), Shen et al. (2009), etc. As for persistence, unit root methods (e.g., Dickey and Fuller,



### **3. Data and Empirical Results**

The series analysed are the number of UK overseas visitors (All visits, thousands), quarterly and monthly, non-seasonally adjusted (NSA) and seasonally adjusted (SA), for the time period 1986(m1/q1) –



## References

- Alleyne, D. (2006), 'Can seasonal unit root testing improve the forecasting accuracy of tourist arrivals?', *Tourism Economics* 12, pp 45–64.
- Bloomfield, P. (1973), An exponential model in the spectrum of a scalar time series, *Biometrika*, 60(2), 217–226.
- Cunado, J., L.A. Gil-Alana and F. Perez de Gracia, 2004, Seasonal fractional integration in the Spanish tourism quarterly time series, *Journal of Travel Research* 42, 4, 408-414.
- Dahlhaus, R. (1989) Efficient parameter estimation for self-similar process, *Annals of Statistics*, 17, 1749-1766.
- Dickey, D.A and Fuller, W. A. (1979) Distributions of the estimators for autoregressive time series with a unit root, *Journal of American Statistical Association*, 74 (366), 427-481.
- Dickey, D.A., D.P. Hasza and W.A Fuller, 1984, Testing for unit roots in seasonal time series, *Journal of the American Statistical Association* 79, 386, 355-367.
- Elliot, G., T.J. Rothenberg, and J.H. Stock, (1996), Efficient tests for an autoregressive unit root, *Econometrica* 64, 813-836.
- Gil-Alana, L.A., A. Mervar and J.E. Payne, 2015, Measuring persistence in Croatian tourism: evidence from the Adriatic region, *Applied Economics* 47,46, 4901-4917.
- Hylleberg, S., R.F. Engle, C.W.J. Granger and B.S. Yoo, (1990) Seasonal integration and cointegration, *Journal of Econometrics*, 44, (1,2), 215-238.
- Kim, J.H., and Moosa, I. (2001), 'Seasonal behaviour of monthly international tourist flows: specification and implications for forecasting models', *Tourism Economics* 7, 381–396.
- Lean, H.H. and R. Smyth, 2008, Are Malaysia's tourism market converging? Evidence from univariate and panel unit root tests with structural breaks, *Tourism Economics* 14, 1.
- Narayan, P.K., 2003, Tourism demand modelling: some issues regarding unit roots, cointegration and diagnostic tests, *International Journal of Tourism Research* 5, 5, 369-380.
- Nowman, K.B. and Van Dellen, S. 2012. Forecasting overseas visitors into the United Kingdom using continuous time and autoregressive fractional integrated moving average models with discrete data. *Tourism Economics*. 18 (4), 835-844.
- Perles-Ribes, J.F., A.B. Ramón-Rodríguez, A. Rubia-Serrano and L. Moreno-Izquierdo, Economic crisis and tourism competitiveness in Spain. Permanent effects or transitory effects, *Current Issues in Tourism* 19, Issue 12, 12101-1234.

Phillips, P.C.B. and P. Perron, (1988), Testing for a unit root in time series regression, *Biometrika* 75, 335-346.

Robinson, P.M. (1994) Efficient tests of nonstationary hypotheses, *Journal of the American Statistical Association* 89, 428, 1420-1437.

Shen, S., G. Li and H. Song, 2009, Effect of seasonality treatment on the forecasting performance of tourism demand model, *Tourism Economics* 15, 4, 693-708.



**Figure 1: Time series plots**

Non-seasonal monthly data	Seasonally adjusted monthly data
Non-seasonal quarterly data	Seasonally adjusted quarterly data

**Table 1: Estimated coefficients for the monthly data**

Monthly data	No terms	An intercept	A linear time trend
NSA: Non-Seasonally Adjusted	0.36 (0.29, 0.48) $s=12 = 0.906$	0.49 (0.46, 0.54) $s=12$	<b>0.36 (0.29, 0.43)</b>

