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Estimating Tourism: Can the role of regional integration really be ignored?

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Introduction

In 2010 UK residents were the fourth highest global spenders on tourism and the second highest within the EU-27 (Eurostat and the World Tourism Organization). Destinations for UK residents are Intra-EU focused although extra-EU countries such as the USA, Australia and India are also popular (UK Office of National Statistics). The regional nature of tourism is an empirical regularity but the drivers of regional versus extra-regional tourism are less well understood beyond the traditional concerns including variations in exchange rates, strength of the 'spending economy'. The vast empirical tourism literature neglects the role of trade in goods and makes almost no mention of trade agreements as drivers of tourism, even more so with respect to the UK outgoing tourists. It is important to establish whether these neglected links are empirically valid and whether there is a simultaneity bias; tourism receipts are undoubtedly important and may deliver important gains following trade integration.

The majority of the tourism literature takes a standard approach to modelling tourism demand, utilising single estimating equations that are typically of a log-linear specification. Few studies include a 'trade in goods' variable and where this is included almost all ignore concerns regarding causality. This paper argues that the limited number of studies that attempt to generate reliable estimates in an endogenous context fail to specify appropriate variables. Therefore this paper considers selected UK tourist destinations and tests the direction of causality between trade in goods and tourism with appropriate variables, explaining the results with reference to trade agreements. Particular attention is paid to whether 'deeper' integration and 'regional' integration plays a particular role in explaining the patterns of causality.

Review

There is an extensive body of literature examining tourism demand as well as a significant number of reviews of this literature (Johnson and Ashworth, 1990; Crouch, 1994; Witt and Witt, 1995; Lim, 1997, 1999). Crouch (1994), and Lim (1997, 1999) all consider a substantial number of studies and focus on identifying the key determinants of the demand for tourism. The key determinants identified in this body of literature are namely income, relative prices, exchange rates and transport costs.

This literature highlights a number of issues regarding the variables used when modeling tourism demand. Firstly, the dependent variable is usually tourist arrivals/departures or tourist expenditure/receipts. Johnson and Ashworth (1990) suggest that while tourist arrivals/departures are more commonly used, policy makers are more likely to be concerned with tourist expenditure/receipts.

In terms of explanatory variables, various measurement issues arise when measuring income. The preference would be to include a measure of income after spending on necessities, but data on GDP is more readily available. Also the subject of some debate is the responsiveness of tourists to changes in exchange rates, compared to inflation. There is a significant body of literature (Gray, 1966; Artus, 1970; Little, 1980; Lin and Sung, 1983; Truett and Truett, 1987; Tremblay, 1989) suggesting that tourists tend to be better informed about changes in the exchange rate compared to the rate of inflation. However, this has been shown by Edwards (1987) to only matter in the short run, whereas changes in exchange rates and inflation have a similar impact in the long run. Therefore a significant number of studies include exchange rate as a separate variable. However, it is questionable to include both an exchange rate and relative price variables due to multicollinearity (Lim, 1997). As a result it is reasonable to include a relative price variable multiplied by the exchange rate, or a relative price variable or an exchange rate variable.

The literature makes little or no mention of the role of trade, and to an even lesser extent trade agreements. Recent studies concerning the tourism demand of UK residents similarly fail to consider trade in goods or trade agreements as a driver for tourism (Song, Romilly and Liu, 2000; De Mello, Pack and Sinclair, 2002).

The link between trade and tourism could be bi-directional in that international travel may encourage trade, particularly considering business travel that may include other people joining the business traveller for the purpose of holiday travel. The development of trade links may also lead to an increased awareness of a particular country and therefore travel to it. In addition, holiday travel may lead individuals to identify possible business opportunities. Only a small number of studies investigate the link between trade in goods and tourism (Kulendran and Wilson, 2000; Shan and Wilson, 2001). These studies find evidence of a long-term relationship between international trade in goods and travel flows.

Therefore the validity of previous results is questionable due to either simultaneity bias or the omission of a trade in goods variable altogether.

Kulendran and Wilson (2000) find one-way causality from business travel (UK to Australia) and real imports; real total trade and total travel (UK to Australia) as well as real total trade and business travel (UK to Australia). However, their approach fails to control for tourist origin income, host costs and exchange rate. Therefore, Shan and Wilson (2001) applied a multi-variable VAR model where they find bilateral causality between real trade and travel, where their study considers UK tourists travelling to China. This model includes both host cost and exchange rate variables, which has been highlighted as problematic in the earlier discussion. We also argue that using host costs rather than the CPI ratio (in the absence of a tourist price index) may have distorted the results. In addition, Shan and Wilson (2001) focus on China as a destination and therefore do not consider a range of destinations for UK residents. The studies by Kulendran and Wilson (2000) and Shan and Wilson (2001) consider tourist arrivals, opposed to tourist receipts, which is less than ideal for policy makers.

For the reasons explained above a multi-variable VAR model will be utilized, similar to Shan and Wilson (2001), where we apply the method developed by Toda and Yamamoto (1995). The advantage of this methodology is that tests for unit roots and cointegration rank are not required, as they have proved to be problematic. Hence, this methodology is applicable whether the variables are stationary, integrated or cointegrated. However, the previous literature that attempts to utilize a more appropriate methodological framework fails to incorporate appropriate variables. In other words, the existing literature is disjointed, either paying special attention to the construction of variables or an appropriate methodology, but not both. This paper attempts to bridge this gap.

Data and Model

The following VAR model will be utilized:

$$TRADE_t = \mu_1 + \sum_{i=1}^{k+d} \alpha_{1i} TRADE_{t-i} + \sum_{i=1}^{k+d} \beta_{1i} TE_{t-i} + \sum_{i=1}^{k+d} \theta_{1i} ER_{t-i} + \sum_{i=1}^{k+d} \sigma_{1i} GDP_{t-i} + \varepsilon_{1t}$$

$$TE_t = \mu_2 + \sum_{i=1}^{k+d} \alpha_{2i} TRADE_{t-i} + \sum_{i=1}^{k+d} \beta_{2i} TE_{t-i} + \sum_{i=1}^{k+d} \theta_{2i} ER_{t-i} + \sum_{i=1}^{k+d} \sigma_{2i} GDP_{t-i} + \varepsilon_{2t}$$

Where GDP, TE, TRADE, ER are, respectively, real UK GDP, real tourist expenditure, real UK imports/exports/total trade from the tourist destination, and real bilateral exchange rates. k is the optimal lag order and d is the maximal order of integration of the variables. Nine UK tourist destinations were selected on the basis of data availability: Australia, France, Germany, Italy, Netherlands, New Zealand, Portugal, South Africa, USA. Quarterly data was collected for the period 1993-2011[1]. The data has been obtained from *IMF Direction of Trade Database*, *OECD Main Economic Indicators Database* and the Bank of England.

The optimal lag length (k) is determined and the VAR(p) model (p=k+d) is estimated with additional d-max lags as long as d does not exceed k. The conventional Wald test is then applied on the first k coefficient matrices using the standard χ^2 statistics. The coefficient matrices of the last d_{max} lagged vectors in the model are ignored since they are assumed as zeros (Toda and Yamamoto, 1995). The causal relationships between the variables are determined by the joint significance of the lagged variables. For example, TE only Granger causes TRADE if the joint test of β_{1_i} are statistically different from zero and the joint test of α_{2_i} are zero ($i \le k$). TRADE only Granger causes TE if the joint test of α_{2i} are statistically different from zero and the joint test of β_{1_i} are zero ($i \le k$). If both α_{2_i} and β_{1_i} ($i \le k$) are statistically different from zero, a two-way causal link exists. If both α_{2_i} and β_{1_i} ($i \le k$) are zero, there is no causal link between the two variables.

Empirical Results

The ADF test has been carried out for each variable to establish the maximum order of integration for each VAR model (d) and the Akaike Information Criteria (AIC) is used to determine the optimal number of lags (k) for each VAR model as shown in Appendix 1 – Appendix 3. The size of the VAR is the optimum number of lags plus the maximum number of integration used in the model (k+d).

Table 1: Granger causality test results (Total Trade)

Country	Tourism → trade	Trade → tourism
Australia (k=8, d=2)	17.70** (0.0236)	29.05*** (0.0003)
France (k=4, d=2)	10.20** (0.0371)	0.54 (0.9699)
Germany (k=2, d=1)	5.57* (0.0619)	5.95* (0.0510)
Italy (k=5, d=1)	20.42*** (0.0010)	12.58** (0.0276)
Netherlands (k=4, d=2)	6.68 (0.1536)	4.65 (0.3249)
New Zealand (k=4, d=2)	3.34 (0.5028)	17.27*** (0.0017)
Portugal (k=5, d=1)	4.51 (0.4784)	12.46** (0.0290)
South Africa	43.69***	49.21***

[1] Tourist expenditure data was only available from 1995q1-2011q4 for Portugal.

(*k*=8, *d*=1)	(0.0000)	(0.0000)
US (*k*=8, *d*=1)	38.32*** (0.0000)	29.55*** (0.0003)
Note: ***, ** and * mean significant at 1%, 5% and 10% respectively.		

Table 2: Summary of Granger causality test results (Total Trade)

	Countries
Tourism → trade	France
Tourism ← trade	New Zealand, Portugal
Tourism ↔ trade	Australia, Germany, Italy, South Africa, US
No causality	Netherlands

Table 3: Granger causality test results (Imports)

Country	Tourism → imports	Imports → tourism
Australia (*k*=8, *d*=2)	38.81*** (0.0000)	17.88** (0.0222)
France (*k*=4, *d*=2)	9.04* (0.0602)	0.84 (0.9329)
Germany (*k*=2, *d*=1)	5.70* (0.0578)	5.21* (0.0739)
Italy (*k*=4, *d*=1)	19.84*** (0.0005)	8.85* (0.0650)
Netherlands (*k*=2, *d*=2)	2.26 (0.3238)	0.11 (0.9442)
New Zealand (*k*=4, *d*=2)	4.59 (0.3321)	17.60*** (0.0015)
Portugal (*k*=5, *d*=1)	5.61 (0.3461)	16.50*** (0.0056)
South Africa (*k*=8, *d*=1)	49.62*** (0.0000)	75.51*** (0.0000)
US (*k*=8, *d*=1)	22.00*** (0.0049)	25.82*** (0.0011)
Note: ***, ** and * mean significant at 1%, 5% and 10% respectively.		

Table 4: Summary of Granger causality test results (Imports)

	Countries
Tourism → imports	France
Tourism ← imports	New Zealand, Portugal
Tourism ↔ imports	Australia, Germany, Italy, South Africa, US
No causality	Netherlands

Table 5: Granger causality test results (Exports)

Country	Tourism → exports	Exports → tourism
Australia (k=8, d=2)	26.01*** (0.0010)	28.03*** (0.0005)
France (k=4, d=2)	7.43[a] (0.1149)	0.40 (0.9821)
Germany (k=2, d=1)	5.65* (0.0593)	5.49* (0.0641)
Italy (k=5, d=1)	6.81 (0.2354)	11.87** (0.0366)
Netherlands (k=4, d=2)	4.35 (0.3602)	6.10 (0.1920)
New Zealand (k=4, d=2)	11.76** (0.0192)	19.21*** (0.0007)
Portugal (k=5, d=1)	3.44 (0.6332)	6.14 (0.2932)
South Africa (k=4, d=1)	16.24*** (0.0027)	5.53 (0.2367)
US (k=7, d=1)	40.95*** (0.0000)	10.32 (0.1712)
Notes: (1) ***, ** and * mean significant at 1%, 5% and 10% respectively. (2) [a] means marginally significant at 10% level.		

Table 6: Summary of Granger causality test results (Exports)

	Countries
Tourism → exports	France, South Africa, US
Tourism ← exports	Italy
Tourism ↔ exports	Australia, Germany, New Zealand
No causality	Netherlands, Portugal

Tables 1, 3 and 5 show the causality test results and Tables 2, 4 and 6 summarize the causal relationship between tourism and total trade/imports/exports in turn. The results indicate a one-way relationship from tourism to total trade/imports in one country (France), a one-way relationship from total trade/imports to tourism in two countries (New Zealand and Portugal), a two-way relationship in five countries (Australia, Germany, Italy, South Africa and US) and no causal relationship in one country (Netherlands). In terms of the link between tourism and exports, the causal link runs from tourism to exports for three countries (France, South Africa and US), reverse causality is found in one country (Italy), bi-directional causality exists for three countries (Australia, Germany and New Zealand) and no causality is found in two countries (Netherlands and Portugal).

Concluding Remarks

This paper clearly indicates that there is bilateral causality between trade in goods and the tourism expenditure of UK residents. More broadly, this calls into question the findings of a large amount of the tourism literature due to simultaneity bias as well as the omission of a trade in goods variable.

Whilst there is generally a regional focus to tourism flows we do not find a stronger link between trade in goods and tourism expenditure for countries that are engaged in 'deeper' forms of integration with the UK, such as EU membership. However, our results suggest that UK imports of goods and the tourism expenditure of UK residents have a stronger bilateral relationship than exports and tourism. Hence, a tentative policy conclusion is that countries attempting to attract larger volumes of UK tourists may wish to develop trade in goods links, particularly exports to the UK market.

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Appendices

Appendix 1 ADF test results for all variables

Country	Exchange rate	Tourism	UK GDP	Trade	Imports	Exports
Australia	I(2)	I(1)	I(1)	I(0)	I(1)	I(1)
France	I(2)	I(2)	I(1)	I(2)	I(1)	I(1)
Germany	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
Italy	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)
Netherlands	I(1)	I(2)	I(1)	I(2)	I(1)	I(1)
New Zealand	I(2)	I(1)	I(1)	I(1)	I(1)	I(2)
Portugal	I(1)	I(1)	I(1)	I(0)	I(0)	I(1)
South Africa	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
US	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)

Appendix 2 Maximum number of integration order for the VAR model (Total Trade/Imports/Exports)

Country	ADF test
Australia	2
France	2
Germany	1
Italy	1
Netherlands	2
New Zealand	2
Portugal	1
South Africa	1
US	1

Appendix 3 Optimum number of lags

Country	AIC (Total Trade)
Australia	8
France	4
Germany	2
Italy	5
Netherlands	4
New Zealand	4
Portugal	5
South Africa	8
US	8
Country	AIC (Imports)
Australia	8
France	4
Germany	2
Italy	4
Netherlands	2
New Zealand	4
Portugal	5
South Africa	8
US	8
Country	AIC (Exports)
Australia	8
France	4
Germany	2
Italy	5
Netherlands	4
New Zealand	4
Portugal	5
South Africa	4
US	7
Note: The maximum number of lags is set as 7 for Portugal (68 observations) and it is set as 8 for other countries (76 observations).	