Econometric modelling of inbound tourist expenditure in South Africa

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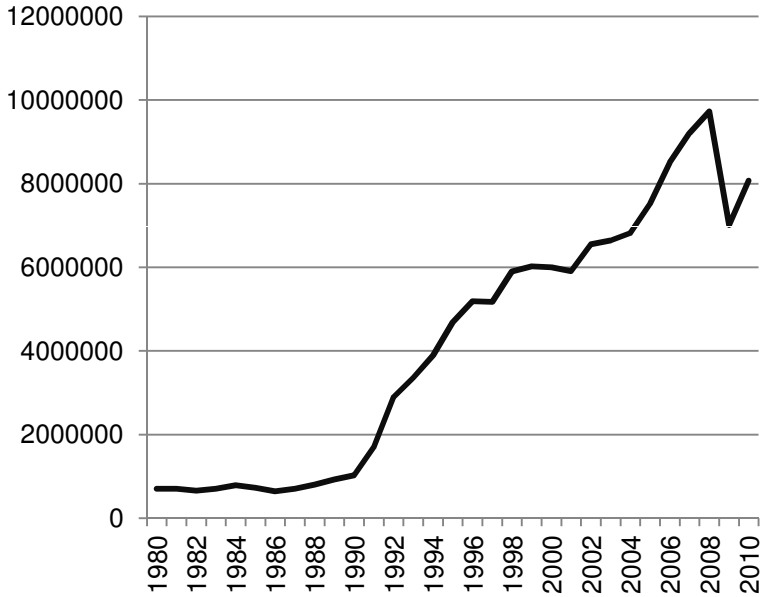
Agenda

- Introduction
- Literature Review
- Method of Research
  - Model and data
  - Econometric method
- Results
- Conclusion

Introduction

- South African government realise potential of tourism for development & growth
- Growth in arrivals since 1994
  - improve 20 positions on the most visited destination list
- Arrivals versus spending
  - Sustainability?
- Aim: to determine sensitivity of tourist spending to changes in income, prices



Literature Review

- Tourism demand:
  - Measure of visitors' use of goods and services (Fretchling, 2001)
  - Need to make use of service or acquire commodity and purchase takes place (Song *et al*., 2010)
- Difference between arrivals and spending
  - Data recording
  - Its application
  - Evolution of data series over time
- Most demand models focus on arrivals (Song & Li, 2008)
- Econometric modelling allows for economic interpretation, policy recommendations and evaluation
- Most popular independent variables – income, relative prices, quantitative factors, transport cost

Literature Review (2)

- Tourism demand for South Africa
  - Saayman & Saayman (2008) and Seetanah *et al.* (2010)
  - Arrivals is income elastic, but price inelastic
  - Low cross-price elasticities and distance/ transport cost plays significant role
- Song *et al*. (2010) – expenditure as dependent variable lead to more accurate elasticities for tourism to Hong Kong
  - Prices more prominent in explaining expenditure
  - Income more prominent in explaining arrivals
- Phakdisoth & Kim (2007) for Laos
- Lee *et al*. (1996) for South Korea

Method: Model and Data

- Follow a micro-economic approach:

$$D_{ij} = F\left(Y_i, P_i, P_j, P_j^s, Z\right)$$

- Demand is function of income, price, substitute prices, tastes and preferences
- In terms of relative prices:

$$D_{ij} = F\left(Y_i/P_i, P_j/P_i, P_j^s/P_i, Z\right)$$

- Demand measured as international tourist spending in SA per day (*SA Tourism*) – Jan 2003 to Dec 2010
- Models estimated for:
  - UK, USA, Germany, France, the Netherlands, Italy, Australia, Brazil, India, China, Botswana

Method: Model and Data

- Income of origin country – real GDP index (*IFS*)
- Witt & Witt (1995) – two prices or costs tourists encounter:
  - Transport cost – price of oil is used (*IFS*)
  - Cost of living in the destination – real exchange rate (*IFS*)

$$P_t = (CPI_{it} / CPI_{jt}) * e_t$$

- Substitute price – closest African competitors (*IFS*)

$$P_t^s = \left(P_{Bot,t} + P_{Ken,t} + P_{Tan,t}\right)/3$$

Econometric Method

- Linearised demand function:

$$\ln D_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln P_{it} + \beta_3 \ln P_t^s + \beta_4 TC_t + u_{it}$$

- Inspected unit root properties using ADF and PP
  - Some variables I(0), others I(1)
- Follow an ADLM specification

$$y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i y_{t-i} + \sum_{j=0}^{n} \beta_j x_{t-j} + u_t$$

  - Useful with short time series
  - Expand with an error-correction term to account for long-run

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta y_{t-1} + \sum_{j=0}^{n} \beta_j x_{t-j} + \lambda z_{t-1} + u_t$$

Econometric Method

- Since all variables not integrated of the same order, we follow Bound test approach for cointegration (Pesaran *et al.*, 2001)
- ADLM is estimated with an EC component
- Wald test determine whether coefficients of EC significantly different from 0
- F-critical values provided by Pesaran *et al.* (2001)

	BOT	BRA	AUS	USA	CHI	IND	UK	FRA	GER	NL	ITA
Test statistic	8.409	9.729	12.23	28.42	17.54	22.14	40.04	34.98	13.24	26.01	16.13

Results:
Long run elasticities

	BOT	BRA	AUS	USA	CHI	IND	UK	FRA	GER	NL	ITA
Price	1.00	-0.66	-0.31	-0.80	0.83	-0.65		-1.37	-0.46	0.93	-3.68
Income	6.72	0.67	-3.40	6.78	1.13	0.76	0.40	5.78	3.75	0.45	6.52
Fuel				-0.60	-1.84	-0.86	-0.30	-0.76	-0.29		
Substitute Price		4.34	-1.73	0.82	-8.14		-1.18	-0.83	-1.03	-1.67	3.17

- Tourist spending is relatively price inelastic, except for tourists from France and Italy
- Demand is income elastic, except for tourists from Brazil, India, UK and the Netherlands
- Fuel elasticity also generally less than -1
- Relative high substitute price elasticities
- Destinations are complements except for tourists from Brazil, USA and Italy where they are substitutes

Results:
Short-run elasticities

- Short run elasticities mainly confirm long-run elasticities
- Price changes:
  - Influence spending for up to 3 quarters
  - Show elasticities around unity
  - Chinese tourists have higher price elasticities
  - Transport cost is relative inelastic
- Income changes:
  - Mostly greater than unity – tourism is a luxury good
- Substitute price elasticities:
  - Mainly negative and inelastic – complementary destinations
  - Italians view Botswana, Kenya, Tanzania as substitutes – positive elasticity

Results: Model diagnostics

Country	BOT	BRA	AUS	USA	CHI	IND	UK	FRA	GER	NET	ITA
Adj R^2	0.823	0.899	0.818	0.917	0.834	0.803	0.918	0.909	0.789	0.901	0.768
Akaike	-1.049	-1.032	-2.088	-2.287	-0.919	-0.644	-3.042	-0.503	-1.705	-1.649	-1.239
Schwarz	-0.577	-0.513	-1.574	-1.578	-0.165	-0.223	-2.388	0.058	-1.145	-1.078	-0.725
Jarque-Berra	0.672 [0.71]	0.899 [0.63]	1.649 [0.43]	0.961 [0.61]	0.874 [0.64]	1.408 [0.49]	0.663 [0.71]	0.430 [0.80]	0.130 [0.98]	0.494 [0.78]	0.947 [0.62]
LM	0.305 [0.85]	4.778 [0.09]	1.158 [0.56]	2.643 [0.26]	1.311 [0.51]	0.415 [0.81]	5.312 [0.07]	0.587 [0.74]	1.574 [0.45]	2.355 [0.30]	1.066 [0.58]
ARCH	1.988 [0.37]	0.758 [0.68]	0.310 [0.85]	0.656 [0.72]	3.317 [0.19]	0.225 [0.89]	2.046 [0.35]	0.988 [0.61]	1.910 [0.38]	0.977 [0.61]	2.062 [0.35]

- Optimal lags between 1 and 3
- Insignificant variables excluded for parsimony
- Price variables sometimes excluded due to multicollinearity problems

Conclusion

- Aim was to determine sensitivity of inbound tourists' expenditure in South Africa to changes in price, income and substitute prices
- Main findings:
  - Some elasticities different than that of arrivals
  - SA still relative price inelastic destination
  - Tourism spending in SA is a luxury good
  - Other similar African destinations are rather compliments than substitutes
- Implications:
  - International economic condition will influence tourism to SA significantly
  - Price competitiveness remains paramount – some destinations are already showing substitution
  - Southern Africa must start thinking about marketing and positioning the region – not just a country

Thank you