Determinants of Visitor Expenditure at a Major Sports Event

Malcolm Greig with Ronald W McQuaid
Employment Research Institute
Napier University
Redwood House
66 Spylaw Road
Edinburgh
EH10 5BR
Scotland, UK

m.greig@napier.ac.uk

Abstract: This paper develops a model of the determinants of visitor expenditure at a one day repeated major sporting event in Edinburgh, Scotland. An econometric model is developed that combines both macroeconomic data and socio-economic information derived from over 1,000 visitor interviews. This allows us to control for individual characteristics and estimate the derived elasticities for the macroeconomic determinants of expenditure. The findings suggest that socio-economic characteristics of individuals may be more significant than macroeconomic indicators in explaining variations in visitor expenditure. Among individual characteristics, the region of origin, length of stay, type of accommodation, type of expenditure and personal income are associated with the level of per capita visitor expenditure. This should assist regional policy formulation in attracting higher spending visitors and thereby maximising the income and employment benefits from sporting events and other areas of tourism.

INTRODUCTION

This paper develops a model of the determinants of visitor expenditure at the Six Nations rugby tournament – an annual major sporting event in Edinburgh, Scotland taking place on 2 or 3 separate days in February and/or March. With the shift from dependence on manufacturing to tertiary sector industries, tourism and the ability to attract visitors is becoming increasingly important to the economy of many developed regions. Potential benefits of major events include income, employment, foreign exchange earnings, economic growth and improved physical infrastructure. Sports and event tourism in particular have been shown to have positive economic spin-offs for local and regional economies, particularly in the service industries (Daniels *et al*, 2004). The impact of repeated events such as the Six Nations has been shown to be greater than one-off events, due partly to the potential for greater embeddedness in the local economy (Jones, 2002).

It is desirable from an economic standpoint to attract people who will spend highly during their visit. This is particularly important in a popular tourist location such as Edinburgh, where accommodation is often at or near capacity, and attracting low-spending visitors may carry the risk of displacing higher-spending visitors. It is therefore vital to increase our understanding of how to target high spending tourists, and thereby move up the value chain of the industry. To do this requires an understanding of the determinants of, or factors associated with, visitor expenditure. This use of greater market segmentation to upgrade tourist quality has been proposed by Perez and Sampol (2000) in relation to the Balearic Islands, and Mules (1998) in relation to Australia. Understanding the expenditure patterns of visitors is also important in the strategic planning of facilities and amenities (Mok and Iverson, 2000).

There have been a number of useful studies engaged in estimating tourist demand, however the majority of research on tourist demand has used macroeconomic time series data rather than cross sectional data based on tourist interviews. Such analysis has naturally focused on macroeconomic determinants of tourist expenditure, most notably per capita income, relative prices and exchange rates. However, these models do not include other factors likely to influence personal expenditure. It has been argued that 'light' and 'heavy' spending tourists can also be distinguished by individual socio-economic and demographic characteristics.

Evidence therefore points to the fact that both macroeconomic conditions and personal characteristics may be potential determinants of tourist demand. This study combines cross-sectional sample data on individual characteristics, derived from over 1,000 visitor interviews, with macroeconomic data to develop a model that identifies the relative importance of each type of factor in determining visitor expenditure. By doing this we hope to shed light on whether regional and national tourist marketing bodies are justified in targeting higher spending visitors, or if differences between individuals are swamped by broader macroeconomic conditions that only central government can influence.

To test this hypothesis, an econometric model is developed incorporating both macroeconomic and socio-economic variables. This allows us to control for individual characteristics and estimate the derived elasticities for the macroeconomic determinants of expenditure.

ESTIMATING TOURIST DEMAND

Models of Tourist Demand

There have been a number of valuable studies that have estimated tourist demand in terms of: visitor numbers (Morley, 1998; Vanegas and Croes, 2000); expenditure (Lee *et al*, 1996; Mules, 1998; Seddighi and Shearing, 1997; Fleischer, 2000); length of stay (Mules, 1998; Zorba *et al*, 2003) and other measures, for example estimated elasticities

of factors, as employed by Crouch (1996). A useful review of tourism demand research is provided by Lim (1997). Both visitor numbers and total expenditure are valid measures of the total value of tourism to an economy, and are useful when performing comparative analysis, for example the importance of different countries of origin on the tourism industry in a particular destination. However, in order to target high spending tourists it is necessary to measure average expenditure per person, often referred to as yield (Mules, 1998:268). Studies that have included a measure of average expenditure include: Mules (1998) in a study of tourist expenditure in Australia, who found that there had been a decline in average expenditure for all known origins of visitor; Heung and Qu (1998), who studied average expenditure of different nationalities of visitors to Hong Kong; and Fleischer (2000), in a comparison of pilgrim and non-pilgrim expenditure in the Holy Land.

As mentioned above, the majority of research on tourist demand, regardless of how this is measured, has used macroeconomic time series data (Lim, 1997; Perez and Sampol, 2000), focusing primarily upon on determinants of tourist expenditure, most notably per capita income in the origin nation (Lee *et al*, 1996; Seddighi and Shearing, 1997; Morley, 1998; Vanegas and Croes, 2000), relative prices (Seddighi and Shearing, 1997; Lee *et al*, 1996) and exchange rates (Lee *et al*, 1996). Of these variables, per capita income is the most commonly used, and has proved to be the most significant in the majority of empirical studies where it has been included. Both travel and expenditure at the destination have been shown to be positive functions of income in a number of studies, and tourist expenditures have also been shown to be highly income elastic, Lee *et al* (1996:538).

It has been hypothesised that relative prices will be negatively correlated with tourist expenditure. In other words, the lower prices are in the destination country or region compared with the origin, the higher will be the level of demand to visit the region, and the higher the levels of expenditure once there. Nations with a lower cost of living should benefit from this. However, empirical evidence on this effect is mixed. While Lee *et al*, (1996) and Seddighi and Shearing (1997) find relative prices to be significant in determining tourist demand, Vanegas and Croes (2000) find it to be insignificant. There is also the issue that visitors may incorrectly perceive relative prices, as such information is not readily available. For example, Willetts and Kemp (1995:207) find evidence of an overestimate of New Zealand prices among Australian tourists, even though the reverse was actually the case.

In contrast to relative prices, information on exchange rates is readily available to visitors and therefore may be more likely to be used as a deciding factor of where to visit, and possibly how much to spend. Willets and Kemp (1995:207) find that, in contrast to relative prices, travellers accurately perceived exchange rates. Short-run exchange rate fluctuations in particular can provide tourists with a significant advantage in terms of purchasing power. A fall in the exchange rate of a destination should

therefore lead to an increase in tourist visits and expenditure in that destination. However, as with relative prices, evidence on exchange rates in mixed, with Lee *et al*, (1996) finding this factor to be significant in determining total real expenditure, but Vanegas and Croes (2000) find it to be insignificant.

Transport costs have also been used in a number of studies, often measured in terms of real airfare (Lim, 1997:844). The lower the travel costs to a destination, the higher the number of visitors and total and average expenditure are likely to be. Morley (1998:81) finds that in certain origin/destination pairs tourist demand, measured in terms of number of visitors, is airfare elastic. However, he also notes that elasticities differ between destinations and market segments.

However, as stated above, it has also been argued that 'light' and 'heavy' spending tourists can and should be distinguished by individual socio-economic, cultural and demographic characteristics (Crouch, 1994; Mok and Iverson, 2000). Some recent studies have examined characteristics such as: nationality (Heung and Qu, 1998); group size, profession and income (Legoherel, 1998); religion (Fleischer, 2000); age, duration of stay, group size and type of spend (Mok and Iverson, 2000); and profession, nationality and age (Perez and Sampol, 2000). Lim (1997:841) reports that although many studies include these 'qualitative' factors, they are individually less widely used than the core macroeconomic explanatory variables of income, relative prices, exchange rates and transport costs.

Lim (1997) undertook a survey of over 100 published empirical studies of international tourism demand. Our review of literature supports her findings that models estimating tourist demand typically take the form

$$D_{ij} = f(Y_i, RP_{ij}, ER_{ij}, TC_{ij}, QF_j)$$

Where:
D_{ij} = demand in country/region j (destination) by visitors from country/region i (origin)
Y_i = per capita income in origin i
RP_{ij} = ratio of relative prices in destination j to origin i
ER_{ij} = exchange rate units of currency of destination j (£ Stg) per unit of currency of origin i
TC_{ij} = transport costs between origin i and destination j
QF_j = qualitative factors in destination j.

Of these, per capita income and relative prices are the most commonly used. These models are usually either linear or double loglinear single equations, often comparing both. The advantage of a double loglinear approach is that it allows estimation of derived elasticities of the logged parameters.
However, Lim (1997) recognises that fewer studies actually test this model, and our review has shown that the majority of research incorporates only macroeconomic or

socio-economic/qualitative explanatory variables when estimating tourist demand. This paper presents the hypothesis that visitor expenditure is dependant on both macroeconomic and personal socio-economic characteristics. The model aims to test two hypotheses: firstly whether socio-economic characteristics remain important while controlling for macroeconomic factors and; secondly, if so, which of these characteristics are associated with visitor expenditure.

A Holistic Model of Visitor Spending

Two alternative models are proposed to test the above hypotheses. These are:

$$E_{ij} = \beta_0 + \beta_1 Y_i + \beta_2 RP_{ij} + \beta_3 ER_{ij} + \beta_4 PER + \varepsilon \qquad (1)$$

$$lnE_j = \beta_0 + \beta_1 lnY_i + \beta_2 lnRP_{ij} + \beta_3 lnER_{ij} + \beta_4 PER + \varepsilon \qquad (2)$$

Where:

E_{ij} = expenditure per person in country/region j (destination) by visitors from country/region i (origin)

Y_i = per capita income in origin i

RP_{ij} = ratio of relative prices in destination j to origin i

ER_{ij} = change in £ Sterling (GBP) exchange rate over the past 12 months

PER_k = a vector of personal socio-economic characteristics for each individual k visiting destination j.

The dependent variable is total expenditure per person. This was calculated by summing each visitors' reported expenditure on food and drink, accommodation, shopping, travel within Scotland and other expenditure over the whole trip.

Income was measured using GDP per capita for each country of origin. Where visitors were from another region of the UK, GDP per capita was calculated on a regional basis, using UK Government Office Regions, comprising Wales, Northern Ireland and 9 English regions. Exchange rates were taken for the period of survey, and for the period 12 months before this and the percentage change calculated. Relative prices were calculated using the ratio of the UK Consumer Price Index (CPI) to the CPI in the destination country for the year of the survey. Travel costs to Scotland are proxied by the mode of travel, later versions of this paper will use a more sophisticated measure in addition to this. The personal characteristics included were: personal income; dummy variables for country of residence; number of nights stayed; dummies for type of accommodation; dummies for the largest component of expenditure; number of people in the visiting party; dummies for mode of travel; and controls for age and gender.

The data was taken from 1,057 face to face interviews with non-Scottish resident visitors at 8 different Six Nations rugby matches in Edinburgh, Scotland, during 2002 and 2003. This was part of a larger survey in which over 8,000 spectators were

interviewed. The majority of visitors were from England, with substantial numbers also from France, Wales, the Republic of Ireland, South Africa, Italy and Northern Ireland. A small number of visitors were resident in other countries, such as the USA, Australia and other European nations. 93% of visitors were in Edinburgh specifically for the rugby match, with the other 7% visiting for a variety of other reasons.

Due to a high level of multicollinearity among the personal socio-economic explanatory variables, it was decided to perform a factor analysis to group together related variables. This procedure identifies variables that are highly correlated and groups them into independent uncorrelated factors. Factor analysis also has the advantage of illustrating profiles of 'typical' visitors, thus providing a more meaningful insight into the characteristics of heavy spending visitors. The factor analysis was performed using principal component extraction and varimax rotation, with 1,052 subjects and 22 variables, giving a subject to variable ratio of approximately 50:1, and produced 8 significant factors. The macroeconomic variables were kept separate and not included in the factor analysis. Table 1 illustrates the factors that were obtained by running factor analysis on the socio-economic variables.

Table 1. Socio-economic Factors

	Factor Description
Factor 1	French visitor, stays in Edinburgh, air traveller
Factor 2	Hotel resident, largest component of expenditure is accommodation
Factor 3	Long stay, air traveller
Factor 4	Older male, high income, not hostel resident
Factor 5	Irish visitor
Factor 6	Italian, largest component of expenditure is shopping
Factor 7	B&B (guest house) resident
Factor 8	Male, large coach party

The next stage involved testing the two estimated models above. The linear model (1) was tested using OLS linear regression conducted on the factor scores (values with respect to each observation for each factor identified) and macroeconomic variables using total expenditure per person as the dependent variable. The double loglinear model (2) was conducted on logged values of the macroeconomic variables and the factor scores, using the log of total expenditure per person as the dependant variable.

Results

The results of the linear model are shown in Table 2. This shows that the macroeconomic variables are not significant in the equation. Factors 1-5 and Factor 8 are significant and have positive coefficients, indicating a positive correlation with visitor expenditure. These results indicate in particular that visitors: from France; who stay in hotels; arrive by air; are older and male; have high earnings; arrive from Ireland;

and male coach party members (usually part of a large group) are associated with higher levels of expenditure.

Table 2. Linear Model (1)

	B	Sig.
FAC1 (French)	28.13	0.047**
FAC2 (hotel res.)	58.41	0.000***
FAC3 (long stay, air travel)	76.67	0.000***
FAC4 (older wealthy male)	27.71	0.011**
FAC5 (Irish)	51.62	0.001***
FAC6 (Italian shopper)	18.96	0.105
FAC7 (B&B res.)	10.72	0.336
FAC8 (male coach party)	50.23	0.000***
Y (GDP Per Capita)	0.00	0.584
RP (Relative prices)	154.10	0.391
ER (Change in £ Exch rate)	-7.91	0.243
(Constant)	133.65	0.452

The double loglinear model was then run, the results are shown in Table 3. The results are similar in that none of the macroeconomic variables are significant and Factors 1-5 and 8 are highly significant. The main difference between the two models is the inclusion of Factor 7 in the loglinear model. Table 3 also shows that tourist expenditure is very inelastic with respect to per capita income in the origin country and changes in exchange rates. Expenditure was were fairly elastic (-0.92) with respect to relative prices, indicating that a decrease in UK prices compared with those in the country of origin can increase visitor expenditure, although again this relationship was not significant at the 90% confidence level.

Table 3. Double Loglinear Model (2)

	B	Sig
FAC1 (French)	0.25	0.000***
FAC2 (hotel res.)	0.27	0.000***
FAC3 (long stay, air travel)	0.31	0.000***
FAC4 (older wealthy male)	0.06	0.049**
FAC5 (Irish)	0.13	0.003***
FAC6 (Italian shopper)	-0.02	0.583
FAC7 (B&B res.)	0.13	0.000***
FAC8 (male coach party)	0.12	0.000***
ln Y	-0.19	0.333
ln RP	-0.92	0.183
ln ER	0.50	0.145
(Constant)	5.40	0.010**

Of the two models, the double loglinear model appears to give the best set of results in terms of significance, and also provides useful information on the elasticities of macroeconomic variables. However, both models indicate that when run alongside personal characteristics of visitors, the macroeconomic factors that are often given prominence in tourist demand studies are proved to be less important as indicators of visitor expenditure. In particular, per capita income was found to be insignificant, contrary to our expectations. What this indicates is that although macro factors almost certainly have some influence on tourist expenditure, this expenditure varies more with personal characteristics. This implies that, for example, a wealthy older male visitor who enjoys staying good quality accommodation, or a French visitor who stays in Edinburgh are both likely to be heavy spenders, regardless of the average income in their home country or region.

Examining the significant personal factors in more depth, Factor 1 profiles a visitor from France, who arrives by air and stays in Edinburgh as opposed to elsewhere in Scotland. The correlation of French origin and air travel is unsurprising, as this is the most convenient way to travel and recently has become relatively affordable. The combination of French origin and staying in Edinburgh is more interesting as only two thirds of French visitors stayed in Edinburgh and these appear to be the highest spenders. This does not necessarily reflect a higher cost of accommodation in the city, as the 'accommodation largest proportion of expenditure' variable was had an insignificant loading in this factor. It may therefore imply that French visitors who stay in Edinburgh are more predisposed to higher levels of spending across the board.

Factor 2 represents a visitor who stays in a hotel and who's largest component of expenditure is accommodation. This is straightforward to interpret as a visitor who stays

in good quality accommodation thus boosting total expenditure. Likewise, Factor 3 represents a visitor likely to spend more because their length of stay was longer. Factor 4 is a useful typology of a typical high spending visitor,: an older male; high earning and avoiding hostel (budget) accommodation. Factor 5 shows that visitors from Ireland are heavy spenders in general. It is interesting to note that although Irish and certain French visitors are associated with higher expenditure, this appears to be independent of national income, exchange rates or relative prices. This points to a cultural explanation of higher expenditure that may be specific to rugby matches, but may also represent spending patterns of visitors in general from these countries.

Factor 7 represents a visitor who stays in B&B accommodation. It is surprising that this type of visitor would be a heavy spender, as this type of accommodation is relatively inexpensive. However, the inclusion of both hotel and B&B residents as high spenders indicates that it could be that visitors who do not stay in hostels or with friends or family are higher spenders than those who do. The choice of either hotel or B&B accommodation is made by a visitor who is prepared to spend at least a moderate sum on accommodation.

The last significant factor was Factor 8, representing a male visitor as part of a large coach party. This is the traditional sporting event visitor in the UK that has always been associated with heavy expenditure. There is no specific type of expenditure variables loading in this factor, however anecdotal evidence suggests a large proportion of expenditure on drink!

The insignificance of Factor 6, represents a visitor from Italy for whom shopping is the largest component of expenditure. It may have been expected that this profile of visitor would be a heavy spender. However, this type of visitor may spend less on other items, particularly food, drink and accommodation, although the food/drink and accommodation variables did not load significantly negatively in Factor 6.

CONCLUSION

The econometric model used linear and double loglinear equations to estimate the relative significance of macroeconomic variables (namely per capita income, relative prices and exchange rates) and a set of personal socio-economic characteristics of visitors in explaining visitor expenditure at a one day repeated sporting event in Edinburgh, Scotland. Both models produced similar results and indicated that the personal characteristics of visitors may be more significant than wider country or region-specific macroeconomic influences in determining visitor expenditure. The double loglinear model indicated that expenditure was relatively inelastic with respect to per capita income and exchange rate fluctuations over a 12 month period. Expenditure was moderately elastic with respect to relative prices, indicating that a fall

in UK the price level may stimulate expenditure, although this relationship was not significant.

This research has implications for modelling the determinants of tourism expenditure. Firstly, the inclusion of both macroeconomic and personal characteristic variables is necessary to gain an understanding of the relative importance of each type of variable in explaining variations in expenditure. Secondly the factor analysis provides a useful insight into the profiles of tourists who actually visit, rather than isolated variables, in addition to removing the problem of multicollinearity between explanatory variables.

From a policy perspective the implication of this research is that there is benefit to be gained by targeting specific types of visitors. The data here applies only to a particular sporting event, and it may be that results are not generaliseable to all visitors. However, each match attracts between 10,000 and 20,000 visitors, and the combined impact of this event alone has been estimated at over £20m per match to Scotland and over £10m to the city of Edinburgh (Scottish Rugby Union, 2002, 2003). The scale of these events suggests that there are considerable gains to be made by exploiting the pull of this, and similar events, to ensure that visitors are heavy spenders who can provide the maximum possible contribution to the local and regional economy. This is particularly true in popular tourist destinations and during busy periods, as is the case here, to avoid displacing potential heavy spending visitors. Practical measures may include targeting of specific regions to attract future visitors (in this case Ireland and France) and ensuring an adequate supply of infrastructure required by heavy spending tourists, in this case hotel accommodation and flight connections appear important. This information will provide guidance to allow regional planners and tourist boards to maximise the potential of sporting and other major events, including music events, conferences and festivals.

Further research could include an analysis of the determinants of specific items of expenditure, such as food/drink and accommodation. Inclusion of travel costs to Scotland could be included as a separate variable and integrated into the model. Future research could also be conducted at other events in Scotland, or in different European regions to test the validity of these findings.

References

Crouch, G. (1994) "A meta-analysis of tourist demand", *Annals of Tourism Research*, 22: 606-638

Crouch, G. (1996) "Demand elasticities in international marketing" *Journal of Business Research*, 36, pp.117-136

Daniels, M., Norman, W. and Henry, M. (2004) "Estimating income effects of a sport tourism event" *Annals of Tourism Research*, 31: 180-199

Fleischer, A. (2000) "The tourist behind the pilgrim in the Holy Land" *Hospitality Management*, 19, pp. 311-326

Heung, V. and Qu, H. (1998) "Tourism shopping and its contributions to Hong Kong" *Tourism Management*, 19, 4, pp. 383-386.

Jones, C. (2002) "Major Events, Networks and the 'New Regionalism'" WERU Discussion Paper, Cardiff Business School

Lee, C., Var, T. and Blaine, T. (1996) "Determinants of inbound tourist expenditures" *Annals of Tourism Research*, 23, 3, pp. 527-542

Legoherel, P. (1998): "Toward a market segmentation of the tourism trade: Expenditure levels and consumer behavior instability". *Journal of Travel and Tourism Marketing*, 7,3, p.19-39.

Lim, C. (1997) "Review of international tourism demand models" *Annals of Tourism Research*, 24, 4, pp. 835-849.

Mok, C. and Iverson, T. (2000) "Expenditure-based segmentation: Taiwanese tourists to Gaum", *Tourism Management*, 21, pp.299-305

Morley, C. (1998) "A dynamic international demand model" *Annals of Tourism Research*, 25, 1, pp.70-84.

Mules, T. (1998) "Decomposition of Australian tourist expenditure" *Tourism Management*, 19, 3, pp.267-271

Perez, E.A., and Sampol, C.J. (2000) "Tourist expenditure for mass tourism markets" *Annals of Tourism Research*, 27, 3, pp. 624-637.

Scottish Rugby Union (2002) *The Economic Impact of the Six Nations Rugby Tournament on Edinburgh and Scotland: Phase 1 Spring 2002*, SRU Commissioned Report, Edinburgh.

Scottish Rugby Union (2003) *The Economic Impact of the Six Nations Rugby Tournament on Edinburgh and Scotland: Phase 3 Spring 2003*, SRU Commissioned Report, Edinburgh.

Seddighi, H.R. and Shearing, D.F. (1997) "The demand for tourism in North East England with special reference t Northumbria: an empirical analysis" *Tourism Management*, 18, 8, pp. 499-511.

Vanegas, M. and Croes, R. (2000) "Evaluation of demand US tourists to Aruba" *Annals of Tourism Research*, 27, 4, pp. 946-963

Willetts, K. and Kemp, S. (1995) "Foreign Price Perception" *Annals of Tourism Research*, 22: 205-217

Zorba, E., Mollaogullari, H., Ackakoyun, F. and Teli, A. (2003) "The examination of sports, recreation and animation activities of selected lodging types on sales services in Turkey", *Journal of Sport Tourism*, 8, 1, pp. 48-56.