ESRI
www.esri.ie

Working Paper No. 210

September 2007

Holiday Destinations: Understanding the Travel Choices of Irish Tourists

Seán Lyons[a*], Karen Mayor[a] and Richard S.J. Tol[a,b,c]

Subsequently published in S. Lyons, K. Mayor and R.S.J. Tol, 2009, "Holiday Destinations: Understanding the Travel Choices of Irish Tourists", Tourism Management, Vol. 30, No. 5, pp. 683-692.

Abstract: This paper uses a McFadden choice model to measure the importance of destination, household and seasonal characteristics on the tourism destination choices of Irish households. The analysis is based on quarterly survey data of Irish households' travel destinations between 2000 and 2006. In total, some 55 000 holiday trips were observed. Destination characteristics such as temperature, GDP and coastline are found to positively influence choice probabilities, while population density and distance have a negative effect on choice. Household specific characteristics such as the numbers of people over 60 and children in a household are found to be important. We also identify differences in preferences across seasons and a change over time of the effect of destination country GDP on Irish holiday destination choices.

Keywords: International Tourism, Ireland, Demand Modelling

JEL Classification: D12, L83

*Corresponding author: sean.lyons@esri.ie
[a] Economic and Social Research Institute, Whitaker Square, Sir John Rogerson's Quay, Dublin 2, Ireland
[b] Institute for Environmental Studies, Vrije Universiteit, Amsterdam, The Netherlands
[c] Department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, PA, USA

Holiday Destinations: Understanding the Travel Choices of Irish Tourists

1. Introduction

Tourism is one of the fastest growing sectors in the Irish economy. Economic prosperity and a substantial rise in disposable incomes, alongside the advent of low-cost carriers such as Ryanair, have meant that foreign holidays are no longer considered a luxury and many households go on more than one trip abroad in a year. Between January and March 2007, the number of trips made by Irish people abroad outstripped the number of visits by foreign tourists in Ireland for the first time. This represents a 17% growth in trips abroad compared to the corresponding period in 2006 (CSO, 2007). Faced with lower costs of getting to their destinations and higher incomes, Irish consumers have modified their travel patterns. But apart from the cost of flights, what attracts Irish consumers to international destinations? This paper attempts to highlight the variables that influence consumers' choices when picking a holiday destination.

The literature on tourism and destination choice is wide-ranging. Witt and Witt (1995) survey the earlier literature. Crouch (1994) conducts a meta-analysis examining international tourism demand. Over 85 empirical studies are included and the effects of factors deemed to influence tourism demand, namely, income, prices, marketing and trends and fashion are compared. Lim (1999) follows the same methodology and looks at the effects of income, transportation costs and tourism prices. She finds that a high proportion of all studies support the hypothesis that tourism demand is positively related to income and negatively related to prices.

The empirical analysis in this paper differs from most of the literature in two main ways. First, most studies rely on *aggregate* data (e.g., Bigano et al., 2006) as it is easier to collect and to handle econometrically, whereas we use micro-data of tourists from a particular country of origin. Use of aggregate data implicitly assumes that it is meaningful to model the behaviour of a 'representative tourist'. Below we show that this notion is flawed.

The second difference between this study and most others is that we examine a set of tourists from a particular country of origin. The more typical approach is to focus on tourists visiting a particular destination or a limited number of destinations that are close competitors. This is understandable from a policy perspective; for example, Irish policy-makers care about the number of visitors to Ireland, not about where the Irish spend their holidays. The number of Irish tourists abroad is too small to have much effect on most destinations. However, the holiday purchase decision involves a choice among destinations, so we can only understand competition between destinations by looking at the full range of choices available to a tourist.

We are not the first to look at origin-based tourist micro-data, but many such studies take a more qualitative approach than ours. Zhang et al. (2004) is a typical example. They show the stated preferences for certain destination characteristics. A few studies are more similar to ours and focus on revealed preferences. Maddison (2001) looks at the impact of climate change on international tourism and welfare. He uses a pooled travel cost model (PTCM) and data from the 1994 UK International Passenger Survey as well as climate variables to determine the reaction of British tourists to changes in destination characteristics because of climate change. He finds that low-cost destinations favoured by British tourists become more attractive from a climate perspective, which results in welfare gains for the tourists. Lise and Tol (2002) use a similar PTCM on data on Dutch tourists and compare their results to those of Maddison (2001). They find that certain characteristics that were important decision factors for British tourists, such as population density and temperature at the destination, are not important for Dutch tourists (who favour long-distance holidays). Lise and Tol (2002) also show that Dutch tourists are not homogenous. Hamilton *et al*. (2005) confirm this for tourists from Germany.

The studies mentioned above use OLS estimation, whereas we use a multinomial logit model. Correia *et al.* (2007) use a mixed logit model to determine what affects the decision of Portuguese tourists travelling to Latin America, taking into account tourist awareness and destination characteristics. Nicolau and Más (2006) focus on the motivations of Spanish tourists. Using a series of random coefficient multinomial logit models, they attempt to capture what motivates individuals to go on holiday. Motivations such as the “search for relaxation and a good climate”, “broaden culture and discover new places” and “visiting family and friends” are interacted with attributes of the destinations themselves, such as distance and prices. They find that the effects of the latter on choice could be moderated by a person’s motivation to go on a holiday. Nicolau and Mas (2006) focus on the type of holiday, whereas we look at the holiday destination.

The present study explores the factors influencing the destination choices of Irish tourists. Key questions include:

- What destination characteristics do people respond to when choosing their holiday destinations?
- What groups of people go on particular types of holidays, i.e. are there individual- or group-specific characteristics that determine destination choice?
- Do these relationships vary by the time of year a trip is taken?
- How have these relationships evolved between 2000 and 2006, a period characterised by rapid economic growth?

Considering the size and growth of the tourism industry, the travel patterns of Irish tourists not only have important implications for Ireland from an economic perspective but could also be central to Ireland's climate change policy. Accordingly we test a number of hypotheses set out in the papers outlined above to see whether they apply to Irish tourists. These hypotheses are detailed in Table 1 below.

[Insert Table 1 about here]

First, we check Irish tourists' responses to climatic and scenic variables such as temperature, rainfall, and length of coastlines, which cover hypotheses 1-2 above. Other characteristics of the destination country such as population density, cultural heritage, political stability, poverty levels and distance from the origin country will also be examined and relate to hypotheses 3-7. The second part of the paper focuses on the characteristics of the tourists themselves. Questions addressed in this section include whether the ages of those in the travelling party affects destination choice (Hypothesis 8). In the final section of the analysis we look at the effect of season and year specific changes on preferences (Hypotheses 9 and 10).

The remainder of this paper is set out as follows. Section 2 presents the methodology used in the analysis and the econometric issues underlying the model applied. Section 3 describes the data used in the study. Section 4 presents the results of a conditional logit model of the destination choices of Irish tourists. When presenting the results, we distinguish between destination characteristics and characteristics of the groups of persons travelling. Samples varying by quarter and year-specific coefficients are examined to check the stability of preferences across seasons and time. Finally, Section 5 provides a discussion and conclusions.

2. Methodology

The object of this paper is to quantify the factors affecting Irish tourists when they choose holiday destinations. The analysis is restricted to holiday/tourism destination choices: business trips and trips abroad for the purpose of visiting friends and family are not included in the analysis. Indeed, the literature shows that travel for purposes other than holidays is driven by different factors and, as a consequence, trips of these types made by Irish households will be the subject of a future study.

We assume that when a household makes a decision about a holiday, this decision takes account of a variety of variables and aims to maximise the utility of those that will be travelling. Consequently the analysis is run at trip level as the destination characteristics will vary according to each destination and hence each trip. Each household then aims to maximise its utility U for each trip (available data do not allow us to consider the distribution of utility within the household). We assume each household has N destinations to choose from. Each destination, n, has a number of characteristics Y_n, for instance average temperature, average rainfall and political stability. From these characteristics, a household can see how much utility U_{in} it will gain by going to this destination and will only pick the destination where its utility is the highest. The household i making the choice also has a number of characteristics X_i, i.e. age, household size or gender so that utility will differ depending on the household. Consequently the following holds:

$$U_{in} = f(Y_n, X_i)$$

To model Irish households' choices using microdata, we apply a McFadden random utility model predicated upon the assumption that utility U_{in} has two components, observable utility V_{in} and an unobserved random component ε_{in}. Regression analysis with a conditional logit estimator is used to obtain parameter estimates. According to Morley (1991), logit models used for the estimation of transport demand have a convincing theoretical basis and yield reasonable results. The conditional logit model is very similar to the multinomial model except that the values of the explanatory variables vary across alternatives. McFadden's choice model is a particular form of the conditional logit where the data are grouped.

The McFadden model has been used for wide a variety of applications. For example, Long (2004) examines the college choices of individuals in the United States looking at the role of tuition fees, distance from college, and college quality variables (such as the student-faculty ratio) in the decision-making process. She finds that price is an important determinant in the choice of which college to attend but not necessarily in the choice of going to university. In the case of this paper we are examining the destination choices of Irish tourists and looking at the role that destination characteristics and household specific characteristics have on these choices.

To estimate the model, data are aggregated at trip level and sorted into pair-wise combinations for each travelling party *i* with each destination option *n*. Hendrickx (2001) calls the separate observations by respondent for each category of the dependent variable, "person/choice files". There are then *N* observations for each trip. In the case of this paper, each trip has 26 observations, as 26 destinations are being examined.

Because of the random component of utility, the final outcomes will be determined in terms of probabilities. We report odd-ratios from each conditional logistic regression, which are the exponentiated coefficients of the regression results or the probability of choosing destination *n* relative to all other alternatives. For instance, if the odds ratio of a dummy variable is 1.5, then the odds of the event are 50% greater when the dummy equals 1 than when the dummy equals zero (Gould, 2000).

3. Data and sources

The dataset used in this study consists primarily of data from the Irish Central Statistics Office's (2007) Household Travel Survey (HTS). This is a postal survey conducted quarterly since 2000 on 13 000 households in the Republic of Ireland asking them to state their destinations in the previous quarter. The purpose of the survey is to measure the domestic and international tourism travel patterns (tourism travel involves in this case overnight stays away from home excluding visiting friends and family or business trips) of Irish residents. Only 26 destinations are available throughout the full time series, i.e. until the last quarter of 2006. These countries are listed in Table 5 in the Appendix and are the countries used in this study.

The HTS provides statistics not only on how much Irish tourists travel but also on where and when they take holidays. The number of trips taken by survey respondents to the destinations examined in this study increased over the last 6 years. In 2000, the Irish households surveyed took 9 000 holidays to these countries (Ireland or abroad). At the end of 2006, this figure had gone up to nearly 11 000 — a 22% rise representing an increase from 1.44 to 1.53 trips per household per year. This equals a growth rate of 3.4% per year. Figure 1 below shows the distribution of these trips in 2006. It is clear that domestic travel is a popular option for Irish tourists. Holidays to Ireland as well as to the UK, the Mediterranean and Europe account for the highest proportion of trips taken (66%).

[Insert Figure 1 about here]

Figure 2 shows the same data per quarter; see also Table 13 in the Appendix. Irish holidays have become more spread out over the year. Quarter 3 remains the peak time for holiday travel, but since 2000 trips during other quarters have also become common. In fact, holidays in the third quarter declined somewhat, by 0.8% per year. This is more than compensated by growth in the other quarters: 4.4% in Q4, 5.1% in Q2, and 9.0% in Q1. There is a clear increase in winter holidays. The summer holiday is increasingly shifted towards spring or autumn. As different people are surveyed in each quarter, the data do no allow us to test whether this explains the entire increase in Q2 and Q4. It may also be that more and more Irish opt for a third holiday in spring or autumn, or split the traditionally long, mid-summer holiday into two shorter holidays in early and late summer.

Besides a seasonal shift, there is also a shift in destination. The number of visits to North America and Australia and New Zealand fell, in the case of North America by 3.9% per year. Domestic holidays increased by 2.0% per year, which is substantially less than the increase in total holidays. Other destinations expanded their market share. This holds for the traditional destinations, the UK (5.5% growth per year) and the Mediterranean (4.6%), but the rest of Europe gained most (9.3%). The growth rate for Eastern Europe is particularly large (20.8% per year), but this was from a low base.

[Insert Figure 2 about here]

The change in destination choice is not uniform over the year; see Table 13. There is a marked shift from summer to winter holidays in the Mediterranean, while the southern summer attracts Irish tourists to Australia and New Zealand. A drop in summer holidays in Ireland is consistent with the suggested preference for nice weather, but may also be explained by higher incomes. The increase in domestic holidays in the other quarters can be explained by the time constraints that bind short holidays.

The survey also contains information on a number of other variables. A purpose is given for each trip, and we use this to restrict the sample to only those trips identified as holiday travel. Respondents were asked about the destination, the number, age and sex of each person travelling and the duration of the trip. We would have liked to include an income variable in our model, but it was not covered in the HTS. Summary statistics for the household-level variables are given in Table 6 in the Appendix. Destination-specific variables were drawn from a wider range of sources (see Table 7). The total number of trips available for analysis is 55 011. Since each of these trips involved a choice among 26 possible destinations, the full dataset for our random utility analysis has 1 430 286 observations.

4. Analysis and Results

In this section, we present results of the random utility model described in Section 3 above. This is estimated using a conditional logistic regression for the 26 destination choices with explanatory variables that relate to destination characteristics as well as interactions of these destination characteristics with household specific variables.

The results are presented in Table 8 in the Appendix, where both coefficients and odds ratios are reported. All coefficients (except time) are significant at the 1% level. We first discuss the effects of destination characteristics, before turning to household characteristics. After summarising the results of these analyses, we re-estimate the model on “seasonal” (in fact, quarter-specific) sub-samples, and we test the possibility that coefficients may have changed over the years included in the sample period.

4.1 Destination characteristics

The climatic variables included in the regression are monthly temperatures and monthly rainfall in millimetres for each destination country. The results confirm Hypothesis 1. Irish tourists are more likely to pick a destination as the temperature in the destination country increases and they will be 0.9% less likely to choose that destination for every extra millimetre of rainfall. Moreover, temperature squared was also included in the regression. This variable has a negative coefficient indicating that although Irish tourists are attracted to destinations as the monthly temperature at the location increases, very high temperatures are a deterrent. Temperature was not a significant factor for Dutch tourists (Lise and Tol, 2002) but was important to British tourists (Maddison, 2001). The optimal temperature is 41.7°C, averaged over the month. This optimum is outside the sample of holiday destinations considered here, so that we can only conclude that the Irish like hot destinations, and that Turkey, the hottest destination, is not too hot.

Hypothesis 2 is also confirmed, as Irish tourists are 0.9% more likely to pick a destination for every 1000 extra kilometres of coastline, and it also appears that Irish tourists prefer to avoid destinations with high population densities, confirming Hypothesis 3. Very crowded destinations are not seen as attractive holiday destinations and countries with a higher level of GDP are much more attractive as tourist destinations than lower income countries.

The two variables that produce counter intuitive results are those relating to Hypotheses 4 and 7, i.e. that areas of cultural heritage are attractive and political instability deters tourists. The heritage coefficient is negative, suggesting that Irish tourists do not see areas with a high number of World Heritage Sites per capita as attractive destinations – in fact, the contrary is true. This may reflect a weakness in our proxy for a destination’s endowment of heritage. Designation of World Heritage Sites is perhaps endogenous in a model of tourism, since areas with a relatively low level of tourism activity might see the designation of heritage sites as a way of attracting more tourism. Hence countries with numerous heritage sites may actually be countries that have little tourism traffic for other reasons.

An odds ratio of less than one on the political stability variable also seems counter-intuitive. As political stability in a destination country increases, the less likely it is that Irish tourists are going to choose to go to that particular country. This may be explained by the range of destinations included in our sample, which excludes most countries with serious problems with security or stability. The “stability” indicator therefore probably measures a preference for safe but somewhat exotic destinations such as the Czech Republic and Turkey over safe but staid Denmark and Germany.

Previous research into Hypothesis 6 (the effect that distance to a country has on destination choice) has yielded mixed results. Lise and Tol (2002) found that Dutch tourists prefer long-distance holidays and Maddison (2001) showed that British holiday-makers prefer to stay closer to home. The present results again show that Irish tourists react similarly to British tourists. Distance is negatively related to destination choice and Irish tourists will be 12% less likely to choose a destination with every extra 100 kilometres of travel.

4.2 Interactions and household specific characteristics

Two variables that were deemed important factors in destination choice (distance and temperature) were also interacted with a household level characteristic, namely age. The proportion of people in the household aged between 0 and 4 years of age, 5 and 12 years of age, 13 and 19 years of age and over 60 years of age were interacted with the distance and temperature variables. The omitted category is the proportion of people in the household who are aged between 20 and 59.

We find that with regard to distance, increasing the share of children and people over 60 in a travelling party reduces its tolerance for distance relative to groups made up predominantly of 20-59 year olds. All the coefficients for these interactions are negative and the odds-ratios are smaller than one. When looking at the relation between age and temperature at the destination country, we find that groups with children are more likely to pick a destination as its temperature increases, whereas groups with older members are more averse to high temperatures.

When conducting this analysis, we considered the inclusion of other variables such as the surface area of the destination country, the total reef area or the national density of world heritage sites.

These did not add anything to the analysis (e.g. Australia and New Zealand are the only countries included in the study that would have a significant area of reefs) and were consequently dropped. The mode of transport used was also dropped, as apart from domestic trips, most holidays were taken by air. The gender composition of the household was also not found to have a significant effect.

4.3 Summary

The results presented above have allowed us to verify whether the hypotheses presented in Section 1 are correct. The summary of these conclusions is presented in Table 2 below.

[Insert Table 2 about here]

4.4 Analysis of seasonal sub-samples

Ireland's Household Travel Survey is conducted as a set of quarterly cross-sections. As a result, it is difficult to segment it by traditional travel seasons (summer, winter). Nevertheless, as a test of robustness and to obtain indicative evidence of any seasonal variations, we split the sample according to the quarters in which holidays were taken by households and re-analysed each quarter separately. The results of these regressions are presented in Table 9-Table 12 in the Appendix and a summary of the results is available in Table 3 below.

The effect of population density, distance, coastline, and GDP are stable across quarters and remain significant throughout. The first noticeable difference between the main regression and the quarterly analysis is in relation to the precipitation variable. Indeed, the coefficient on monthly precipitation is negative, meaning that the more rainfall there is at a destination the less likely it is that a household will pick that destination. However, in Quarter 4 this variable is *positive* and significant at the 5% level. This indicates a preference for skiing holidays during the last quarter of the year.

[Insert Table 3 about here]

The relationship between monthly temperature and destination choice remains the same (positive and significant) throughout the year but the coefficient is bigger in Quarters 2 and 3 indicating that Irish tourists are more sensitive to temperature increases in (their) late spring-early autumn.

The temperature squared variable, which was negative in the pooled regression, becomes positive in Quarters 1 and 4. The optimal holiday temperatures in the winter quarters are -22.7°C (Q1) and -44.5°C (Q4). This is outside the sample. In winter, the Irish like the cold, as this guarantees snow; cf. the estimated coefficient for precipitation. In Quarter 3, the ideal temperature is 26.4°C. This is well in line with the preferences of other tourists (Bigano et al., 2007), and much more reasonable than the "it cannot be hot enough" result of the annual regression. In Quarter 2, the optimal holiday temperature is 2.8°C, a result we cannot interpret. It is clear, however, that holiday climate preferences vary with the seasons.

The interaction variables between age and distance also remain relatively stable across quarters with just the 13 to 19 age group losing significance in Quarters 1 and 2. However, there are significant differences for the age-temperature interactions. In the pooled model, the over 60s group had a negative coefficient in relation to temperature, indicating that higher temperatures in the destination country would reduce the likelihood of this group picking that country as a holiday destination. This relationship holds for Quarter 3, i.e. during Ireland's late summer-early autumn. However during late autumn-early spring, i.e. in Quarters 1 and 4, this relationship is reversed: The elderly do not like the heat of summer, but they dislike the cold of winter too, and seek places with mild climates.

4.5 Changes in coefficients over time

One of the advantages of using the HTS is that data are available for six years during which Ireland experienced massive economic growth and the consumption of Irish households shifted to luxury products such as travel. We extended the model to check for changes in each coefficient over time by including interactions of the explanatory variables with dummies for each of the years in our sample. A summary of the year-specific coefficients is presented in Table 4 below.

[Insert Table 4 about here]

While some coefficients in the unconstrained model are different from those in the model with constant coefficients over time, there is little evidence of trends across the sample period. One exception to this pattern is log GDP, for which the coefficient increased substantially from 2000 to 2006 (see Figure 3). It may be that as Irish tourists grow increasingly rich, they become increasingly averse to being confronted with poverty or are better able to afford the higher prices of rich destinations. Another exception is distance, which is particularly pronounced for families with for 0-4 year olds, and 20-59 year olds travelling without children. The coefficients became less negative over the latter half of the period. This probably reflects rising incomes and falling airfares.

[Insert Figure 3 about here]

5. Conclusions and Discussion

This paper highlights the variables that influence Irish tourists when making their holiday destination choices. We find that destination characteristics such as temperature, GDP and length of coastline at the destination country are all attractive factors that positively influence the likelihood of choosing a given destination. Political instability also attracts Irish tourists, but it should be noted that none of the destinations included in this paper are particularly unstable. Other variables such as population density, cultural heritage and distance are deterrents that negatively influence destinations.

While most effects are broadly constant regardless of the travel season, we found evidence of seasonal differences in preferences. In particular, precipitation has a negative effect in summer, but a positive effect in winter, presumably because of winter sports. The effect of temperature also varies markedly over the year, and in fact the temperature coefficients estimated for the whole year are significant but hard to interpret. Older people tend to avoid hot destinations, while families with young children prefer such holidays. Both older people and families with young children are particularly averse to travelling far. Holiday destination preferences did not change much between 2000 and 2006, which is no real surprise giving the short period. However, two trends are significant. Irish tourists tend to travel to more distant countries and to richer countries than they used to.

Possible extensions of this analysis could include looking at whether the factors that influence trip choice are the same regardless of the purpose of the trip, i.e. whether visiting friends and relatives or business trips could be motivated by the same variables as those for holidays. An analysis of the length of holidays would also be a useful. Estimates of the destination demand functions for tourists from other countries are needed to build up a more complete picture of the competitive position of destinations. The results presented here show that “the Irish tourist” has changed between 2000 and 2006; one can therefore safely assume that “the Irish tourist” is different from “the English tourist” and the “the Nigerian tourist”.

There are several shortcomings in our data. The data are collected by quarter rather than by season. The sample is renewed every three months, so that we cannot link holidays taken by a given household over a full year. Household income is excluded from the survey, and holiday activities are omitted. The quality of the travel cost data is mixed, so that cost had to be dropped from the analysis.

Methodologically, the current paper treats destination as the only choice. In fact, tourists choose where to go, how long to go, who to go with, what to do, and how much to spend. These choices are interdependent. Our survey data do not allow us to model this, and the econometric challenges would be substantial. Further research is needed into these linked choice dimensions.

Acknowledgments

The authors are grateful to Sheona Gilsenan at the Central Statistics Office for help with the data and to Ireland’s Environmental Protection Agency for funding under the STRIVE Programme.

References

Bigano, A., Hamilton, J. M., & Tol, R.S.J. (2006). The Impact of Climate on Holiday Destination Choice. *Climatic Change*, 76 (3), 389-406.

Central Statistics Office (2007). *Household Travel Survey*. Quarterly data from 2000 to 2006. Cork: CSO.

Correia, A., Santos, C.M., & Pestana Barros, C. (2007). Tourism in Latin America: A Choice Analysis. *Annals of Tourism Research*, 34 (3), 610-629.

Crouch, G.I. (1994). A Study of International Tourism Demand: A Review of Findings. *Journal of Travel Research*, 33 (1), 12-23.

Gould, W. (2000). Interpreting logistic regression in all its forms. *Stata Technical Bulletin*, STB-53.

Hamilton, J.M., Maddison, D.J., & Tol, R.S.J. (2005). Climate Preference and Destination Choice: A Segmentation Approach. *Working Paper*, Research Unit Sustainability and Global Change, Hamburg University and Centre for Marine and Atmospheric Science. Hamburg: FNU-90.

Hendrickx, J. (2001). *Special restrictions in multinomial logistic regression*. At <http://www.xs4all.nl/~jhckx/>.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2006). *Governance Matters V: Governance Indicators for 1996-2005*. At < http://go.worldbank.org/W0DI8LZMD0>

Leemans, R., & Cramer, W. (1991). *The IIASA Database for Mean Monthly Values of Temperature, Precipitation and Cloudiness on a Global Terrestrial Grid.* Research Report RR-91-18, International Institute for Applied Systems Analysis, Laxenburg.

Lim, C. (1999). A Meta-Analytic Review of International Tourism Demand. *Journal of Travel Research*, 37 (2), 273-284.

Lise, W., & Tol, R.S.J. (2002). Impact of Climate on Tourist Demand. *Climatic Change,* 55 (4), 429-449.

Long, B.T. (2004). How have College Decisions Changed over Time? An Application of the Conditional Logistic Choice Model. *Journal of Econometrics*, 121 (1), 271-296.

Maddison, D. (2001). In Search of Warmer Climates? The Impact of Climate Change on Flows of British Tourists. *Climatic Change*, 49 (1), 193-208.

Morley, C. (1991). Modeling International Tourism Demand: Model Specification and Structure. *Journal of Travel Research*, 30 (7), 40-44.

New, M., Lister, D., Hulme, M., & Makin, I. (2002). A High-Resolution Data Set of Surface Climate over Global Land Areas. *Climate Research,* 21, 1-25**.**

Nicolau, J.L., & Más F.J. (2006). The Influence of Distance and Prices on the Choice of Tourist Destinations: The Moderating Role of Motivations. *Tourism Management*, 27 (5), 982-996.

Witt, S.F., & Witt, C.A. (1995). Forecasting Tourism Demand: A Review of Empirical Research. *International Journal of Forecasting*, 11, 447-475.

Zhang, H.Q., Qu, H., & Tang, V.M.Y. (2004). A Case Study of Hong Kong Residents' Outbound Leisure Travel. *Tourism Management*, 25, 267-273.

Appendix – Additional information on the dataset and results

[Insert Table 5 here]

[Insert Table 6 here]

[Insert Table 7 here]

[Insert Table 8 here]

[Insert Table 9 here]

[Insert Table 10 here]

[Insert Table 11 here]

[Insert Table 12 here]

[Insert Table 13 here]

Tables

Table 1: Hypotheses tested in this study

Hypothesis 1 –	Irish tourists prefer to travel to warm countries and do not like rain.
Hypothesis 2 –	Areas with long coastlines are attractive.
Hypothesis 3 –	Irish tourists avoid crowded destinations.
Hypothesis 4 –	Areas of cultural heritage attract Irish tourists.
Hypothesis 5 –	Irish tourists avoid areas with high levels of poverty.
Hypothesis 6 –	Irish tourists dislike travelling far.
Hypothesis 7 –	Irish tourists avoid travelling to areas where there is political unrest.
Hypothesis 8 –	Older households and those with children are constrained in their destination choices.
Hypothesis 9 –	Preferences for holiday destinations vary between the seasons
Hypothesis 10 –	Preferences for holiday destinations vary over the years

Table 2: Conclusions of the analysis

Hypothesis number	Hypothesis	Result
Hypothesis 1	Irish tourists prefer to travel to warm countries and do not like rain.	Positive relationship between temperature and choice, negative between precipitation and choice.
Hypothesis 2	Areas with long coastlines are attractive.	Positive relationship between coastline length and choice.
Hypothesis 3	Irish tourists avoid crowded destinations.	Negative relationship between crowds and choice.
Hypothesis 4	Areas of cultural heritage attract Irish tourists.	Negative relationship between cultural heritage areas and choice.
Hypothesis 5	Irish tourists avoid areas with high levels of poverty.	Negative relationship between high levels of poverty and choice.
Hypothesis 6	Irish tourists dislike travelling far.	Negative relationship between long-distance and choice.
Hypothesis 7	Irish tourists avoid travelling to areas where there is political unrest.	Relationship between political stability and choice is underdetermined.
Hypothesis 8	Older households and those with children are constrained in their destination choices.	Older households avoid long distances and high temperatures, households with children avoid long-distances but choose destinations with high temperatures.
Hypothesis 9	Preferences for holiday destinations vary between the seasons.	True for climate variables only.
Hypothesis 10	Preferences for holiday destinations vary over the years.	True for poverty aversion and distance aversion only.

Table 3: Summary of seasonal sub-sample results

	Main	Q1	Q2	Q3	Q4
	Coef (z)	**Coef (z)**	**Coef (z)**	**Coef (z)**	**Coef (z)**
Precipitation	-0.0091 (-28.53***)	-0.0135 (-14.93***)	-0.0160 (-17.4***)	-0.00401 (-6.34***)	0.00231 (2.37**)
Temperature	0.375 (83.83***)	0.357 (56.36***)	0.668 (39.3***)	0.850 (37.32***)	0.318 (40.25***)
$Temperature^2$	-0.0045 (-26.71***)	0.00787 (18.56***)	-0.0121 (-18.73***)	-0.0161 (-22.85***)	0.00357 (6.94***)
Age04tempm	0.127 (7.39***)	0.207 (4.3***)	0.277 (7.16***)	0.153 (4.29***)	0.0781 (1.68*)
Age512tempm	0.0387 (3.76***)	-0.0136 (-0.49)	0.135 (5.34***)	0.0944 (5.28***)	-0.0715 (-2.53**)
Age1319tempm	0.0856 (11.94***)	-0.0166 (-1.02)	0.0805 (4.52***)	0.129 (12.84***)	-0.00942 (-0.41)
Age60ptempm	-0.0118 (-2.58***)	0.0446 (4.57***)	0.00984 (0.85)	-0.0588 (-7.3***)	0.0215 (1.83*)

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively.*

Table 4: Comparison of annual coefficients to coefficients from pooled model (t-tests performed on the difference between the coefficient for each variable in each year and the relevant pooled coefficient)

	2000	2001	2002	2003	2004	2005	Pooled
heritagepop	-0.00180	-0.00178**	-0.00180***	-0.00157**	-0.00158	-0.00163***	**-0.0017**
precipm	-0.00883	-0.00849	-0.00847***	-0.0126	-0.0103	-0.00950***	**-0.0091**
tempm	0.380***	0.443***	0.408	0.360***	0.344	0.361***	**0.375**
popdens	-0.0109***	-0.0113	-0.00995***	-0.00939	-0.0102***	-0.0094***	**-0.0102**
distance	-0.00123***	-0.00129***	-0.00112***	-0.00129***	-0.00109***	-0.000888***	**-0.0012**
coastline	0.0000129	0.0000110***	0.00000542**	0.0000123***	0.00000541***	-0.0000023***	**0.00001**
lngdppp	1.47	1.74	1.85	1.72***	2.14***	2.31***	**1.80**
tempm2	-0.00418	-0.00640**	-0.00525***	-0.00394	-0.00360	-0.00481***	**-0.0045**
stability	-0.0130***	-0.230*	-0.0207	-0.0307**	-0.189	-0.0794***	**-0.137**
age04tempm	0.0995*	0.0584	0.199**	0.233	0.115	0.124***	**0.127**
age512tempm	-0.0210	0.0576	0.0601	0.0493	0.0500	0.0272***	**0.0387**
age1319tempm	0.101	0.0632	0.0779	0.0926	0.0785	0.0947***	**0.0856**
age60ptempm	-0.0291	-0.0182	-0.0260	-0.00759	0.00126	0.00416***	**-0.0118**
age04dis	-0.00174***	-0.00109***	-0.00211***	-0.00222**	-0.00188***	-0.000629***	**-0.0015**
age512dis	-0.000790	-0.000898	-0.000983*	-0.000823	-0.000895***	-0.00133***	**-0.001**
age1319dis	-0.000230***	-0.0000782	-0.000161	-0.000162	-0.000206	-0.000142***	**-0.0002**
age60pdis	-0.000304	-0.000342***	-0.000196***	-0.000277*	-0.000376	-0.000325***	**-0.0003**

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively.*

Table 5: List of countries used in the study

1. Australia	14. Italy
2. Austria	15. Japan
3. Belgium	16. The Netherlands
4. Canada	17. New Zealand
5. Czech Republic	18. Norway
6. Denmark	19. Poland
7. Finland	20. Portugal
8. France	21. Spain
9. Germany	22. Sweden
10. Greece	23. Switzerland
11. Hungary	24. Turkey
12. Iceland	25. United Kingdom
13. Ireland	26. United States

Table 6: Variable descriptions, sources and summary statistics for trip-specific variables (individual observations are for trip *i* in each case)

Variable	Description	Source	Mean	St Dev	Min	Max
$age01_i$	% of travelling party aged 0-1	HTS	0.009	0.059	0	1
$age24_i$	% of travelling party aged 2-4	HTS	0.022	0.090	0	2
$age512_i$	% of travelling party aged 5-12	HTS	0.065	0.170	0	4
$age1319_i$	% of travelling party aged 13-19	HTS	0.070	0.214	0	3
$age2059_i$	% of travelling party aged 20-59	HTS	0.678	0.397	0	3
$age60p_i$	% of travelling party aged 60+	HTS	0.153	0.347	0	2

Table 7: Variable descriptions, sources and summary statistics for destination-specific variables (some indexed by year or month)

Variable	Description	Source	Mean	St Dev	Min	Max
respfact	Response factor or intercept term	Generated from data	13.5	7.500	1	26
rtime	Time trend; quarterly; (Q1, 2000)=1	Generated from data	167.887	138.576	1	598
heritagepop	Number of world heritage sites per capita	CIA World Fact Book	667.975	393.234	0	1506.047
precipm	Average precipitation in month (MM)	New *et al.* (1999)	73.195	38.407	10.6	219
tempm	Average precipitation in month (degrees C)	Leemans and Cramer (1991)	10.836	8.020	-22.7	27.6
tempm2	$(\text{tempm})^2$	Generated from data	181.738	158.457	0	761.76
popdens	Population / Km	CIA World Fact Book	124.461	117.636	2.541	471.666
distance	Distance (as the crow flies) between capitals (km)	www.indo.com/distance	3335.21	4631.369	0	18661.25
coastline	Length of coastline (km)	www.wri.org	27648	55297	0	265523.2
lngdppp	Country-wise PPP-based per capita income (U.S. $ per year)	WDI	9.949	0.365	8.732	10.539
stability	Political stability index	Kaufman et al. (2006)	0.879	0.521	-1.264	1.694

Table 8: Conditional logistic regression results – age groups pooled

didep	Coef.	Odds Ratio	z	95% Conf. Interval	
respfact	0.0883	1.0923	50.79***	1.0886	1.0960
rtime	-0.00008	0.9999	-0.69	1.00E+00	1.00E+00
heritagepop	-0.0017	0.9983	-78.85***	9.98E-01	9.98E-01
precipm	-0.0091	0.9909	-28.53***	0.9903	0.9916
tempm	0.3749	1.4548	83.83***	1.4421	1.4676
popdens	-0.0102	0.9898	-130.66***	0.9897	0.9900
distance	-0.0012	0.9988	-126.97***	9.99E-01	9.99E-01
coastline	0.00001	1.000009	19.15***	1.000008	1.000009
lngdppp	1.7983	6.0391	55.92***	5.6702	6.4320
tempm2	-0.0045	0.9955	-26.71***	0.9952	0.9959
stability	-0.1367	0.8723	-8.05***	0.8437	0.9018
age04tempm	0.1266	1.1349	7.39***	1.0974	1.1737
age512tempm	0.0387	1.0395	3.76***	1.0187	1.0607
age1319tempm	0.0856	1.0894	11.94***	1.0742	1.1048
age60ptempm	-0.0118	0.9883	-2.58***	0.9795	0.9972
age04dis	-0.0015	0.9985	-22.37***	0.9984	0.9987
age512dis	-0.0010	0.9991	-25.16***	0.9990	0.9991
age1319dis	-0.0002	0.9998	-8.36***	0.9998	0.9999
age60pdis	-0.0003	0.9997	-20.49***	0.9997	0.9997

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Number of observations = 1,430,286; LR* χ^2 *(21) = 127'000; Prob>*χ^2 *= 0.000 Pseudo* R^2 *= 0.354*

Table 9: Regression sample split by quarter – Quarter 1 logistic

didep	Coef.	Odds Ratio	z	95% Conf. Interval	
respfact	0.06218	1.064154	14.88***	0.0539879	0.0703733
rtime	0.00065	1.000645	2.47**	0.0001323	0.0011577
heritagepop	-0.00200	0.9980044	-28.4***	-0.0021354	-0.0018598
precipm	-0.01350	0.9865912	-14.93***	-0.0152718	-0.0117273
tempm	0.35678	1.428714	56.36***	0.3443675	0.3691824
popdens	-0.00695	0.9930788	-42.9***	-0.0072626	-0.006628
distance	-0.00105	0.9989467	-57.49***	-1.09E-03	-1.02E-03
coastline	0.00002	1.000017	16.87***	0.0000148	0.0000187
lngdppp	3.40974	30.25724	22.3***	3.110057	3.709415
tempm2	0.00787	1.007898	18.56***	0.0070366	0.0086981
stability	0.13789	1.147852	3.15***	0.05209	0.2236946
age04tempm	0.20741	1.23049	4.3***	0.1127735	0.3020521
age512tempm	-0.01360	0.9864933	-0.49	-0.0677746	0.0405771
age1319tempm	-0.01664	0.9835008	-1.02	-0.0486294	0.0153558
age60ptempm	0.04464	1.045655	4.57***	0.0254907	0.063796
age04dis	-0.00050	0.9995007	-4.31***	-0.0007263	-0.0002725
age512dis	-0.00038	0.9996192	-5.21***	-0.0005242	-0.0002375
age1319dis	-0.00003	0.9999687	-0.88	-0.0001011	0.0000384
age60pdis	-0.00004	0.9999611	-2.18**	-0.0000739	-3.85E-06

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Number of observations = 259,402; LR $\chi 2$ (21) = 25'100; Prob>$\chi 2$ = 0.000; Pseudo R2 = 0.387*

Table 10: Regression sample split by quarter – Quarter 2 logistic

didep	Coef.	Odds Ratio	z	95% Conf. Interval	
respfact	0.12287	1.130733	34.44***	0.1158734	0.1298588
rtime	0.00029	1.000291	1.38	-0.0001227	0.0007055
heritagepop	-0.00208	0.997918	-41.6***	-0.0021824	-0.001986
precipm	-0.01599	0.9841362	-17.4***	-0.0177925	-0.0141895
tempm	0.66793	1.950192	39.3***	0.6346128	0.7012423
popdens	-0.01230	0.9877776	-72.75***	-0.012629	-0.0119663
distance	-0.00118	0.9988181	-52.5***	-0.0012268	-0.0011385
coastline	0.00000	0.9999965	-2.7***	-5.97E-06	-9.52E-07
lngdppp	2.47644	11.89887	32.95***	2.329121	2.623766
tempm2	-0.01205	0.9880207	-18.73***	-0.0133127	-0.0107905
stability	-0.05539	0.9461172	-1.67*	-0.1202605	0.0094829
age04tempm	0.27671	1.318789	7.16***	0.2009264	0.352501
age512tempm	0.13457	1.144048	5.34***	0.0852236	0.1839221
age1319tempm	0.08054	1.083875	4.52***	0.0456305	0.1154551
age60ptempm	0.00984	1.00989	0.85	-0.0129782	0.0326606
age04dis	-0.00117	0.9988356	-9.94***	-0.0013948	-0.0009353
age512dis	-0.00056	0.9994383	-8.32***	-0.0006942	-0.0004294
age1319dis	-0.00005	0.9999508	-1.33	-0.0001218	0.0000234
age60pdis	-0.00036	0.9996417	-11.45***	-0.0004197	-0.000297

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Number of observations = 388,076; LR $\chi2$ (21) = 35'000; Prob>$\chi2$ = 0.000; Pseudo R2 = 0.360*

Table 11: Regression sample split by quarter – Quarter 3 logistic

didep	Coef.	Odds Ratio	z	95% Conf. Interval	
respfact	0.09066	1.094893	32.1***	0.0851212	0.0961929
rtime	0.00035	1.000346	1.93*	-5.45E-06	0.0006982
heritagepop	-0.00185	0.9981499	-45.77***	-0.0019311	-0.0017725
precipm	-0.00401	0.9959938	-6.34***	-0.0052546	-0.0027739
tempm	0.84997	2.339582	37.32***	0.8053361	0.8946084
popdens	-0.01210	0.9879761	-84.78***	-0.0123765	-0.0118171
distance	-0.00150	0.9984962	-83.39***	-0.0015403	-0.0014695
coastline	0.00002	1.000016	22.14***	0.000015	0.0000179
lngdppp	1.12358	3.07583	22.9***	1.027407	1.219743
tempm2	-0.01611	0.9840157	-22.85***	-0.0174955	-0.0147315
stability	0.19959	1.220908	6.71***	0.1413146	0.2578749
age04tempm	0.15253	1.164774	4.29***	0.0827757	0.222279
age512tempm	0.09444	1.099045	5.28***	0.0593935	0.1294898
age1319tempm	0.12928	1.138004	12.84***	0.1095447	0.1490065
age60ptempm	-0.05877	0.9429218	-7.3***	-0.0745501	-0.0429937
age04dis	-0.00233	0.9976707	-14.49***	-0.0026474	-0.0020166
age512dis	-0.00129	0.9987089	-17***	-0.0014408	-0.001143
age1319dis	-0.00016	0.9998379	-5.49***	-0.00022	-0.0001043
age60pdis	-0.00034	0.9996632	-12.04***	-0.0003917	-0.0002821

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively. Number of observations = 572’494; LR χ2(21) = 55’600; Prob>χ2 = 0.000 Pseudo R2 = 0.388*

Table 12: Regression sample split by quarter – Quarter 4 logistic

didep	Coef.	Odds Ratio	z	95% Conf. Interval	
respfact	0.06387	1.065955	12.36***	0.0537388	0.0740029
rtime	0.00004	1.000041	0.12	-0.0006445	0.0007259
heritagepop	-0.00210	0.9979021	-32.23***	-0.0022278	-0.0019724
precipm	0.00231	1.00231	2.37**	0.0003966	0.004219
tempm	0.31771	1.37398	40.25***	0.3022407	0.3331829
popdens	-0.00910	0.9909367	-44.38***	-0.0095066	-0.0087025
distance	-0.00098	0.9990238	-36.37***	-0.0010293	-0.0009241
coastline	0.00002	1.000016	14.16***	0.0000141	0.0000186
lngdppp	1.88486	6.585458	18.56***	1.685869	2.083859
tempm2	0.00357	1.003579	6.94***	0.002564	0.0045813
stability	-0.03248	0.9680434	-0.68	-0.1261291	0.0611723
age04tempm	0.07811	1.081246	1.68*	-0.0132804	0.1695089
age512tempm	-0.07146	0.9310368	-2.53**	-0.1267274	-0.0161856
age1319tempm	-0.00942	0.9906257	-0.41	-0.0545376	0.0357005
age60ptempm	0.02145	1.021685	1.83*	-0.0015574	0.0444646
age04dis	-0.00061	0.9993938	-4.87***	-0.0008504	-0.0003624
age512dis	-0.00046	0.9995363	-5.94***	-0.0006167	-0.0003109
age1319dis	-0.00013	0.999874	-2.32**	-0.0002325	-0.0000196
age60pdis	-0.00012	0.999881	-4.52***	-0.0001707	-0.0000674

*Note: *, ** and *** denote significant at the 10%, 5% and 1% level respectively.* Number of observations = 210’314; LR $\chi^2(21)$ = 20’400; Prob>χ^2 = 0.000; Pseudo R^2 = 0.387

Table 13: Annual growth rate of the number of holiday trips by quarter and destination

	All destinations	Ireland	UK	Europe	Mediterranean	Eastern Europe	Northern Europe	North America	Australia and New Zealand
Annual	3.4	2.0	5.5	9.3	4.6	20.8	5.2	-3.9	-1.0
Q1	9.0	5.0	8.7	17.8	16.5	26.9	7.7	0.5	13.0
Q2	5.1	5.1	3.3	7.6	5.8	26.0	15.6	-4.4	-9.3
Q3	-0.8	-1.6	3.7	4.1	-0.6	13.2	-2.0	-10.7	-8.7
Q4	4.4	2.3	7.2	12.6	6.7	20.1	2.9	0.7	-0.8

Figures

Figure 1: Distribution of holidays taken by Irish tourists in 2006

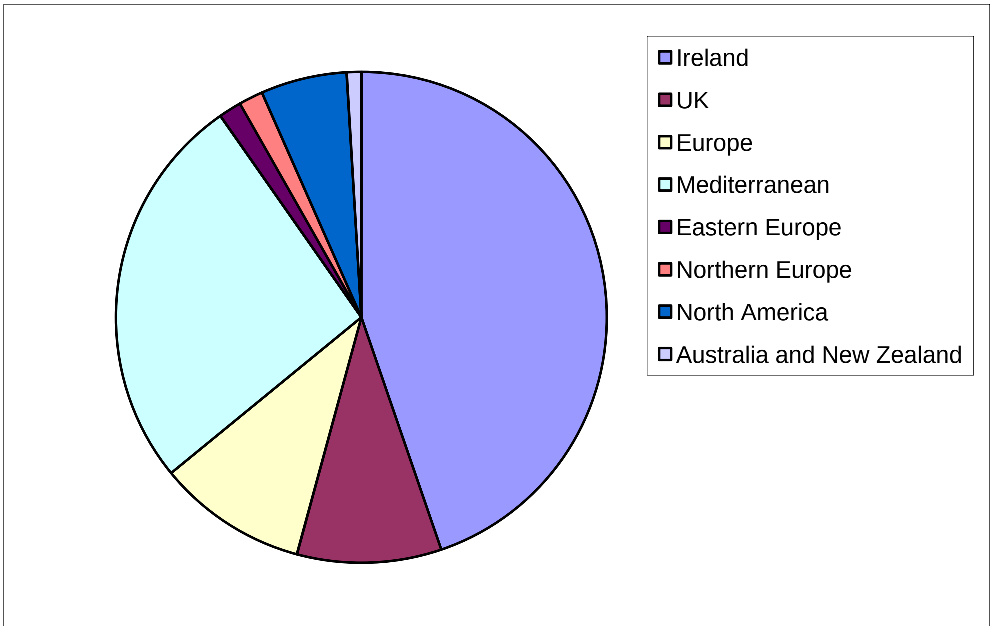


Figure 2: Holidays taken by Irish tourists between 2000 and 2006 – by quarter

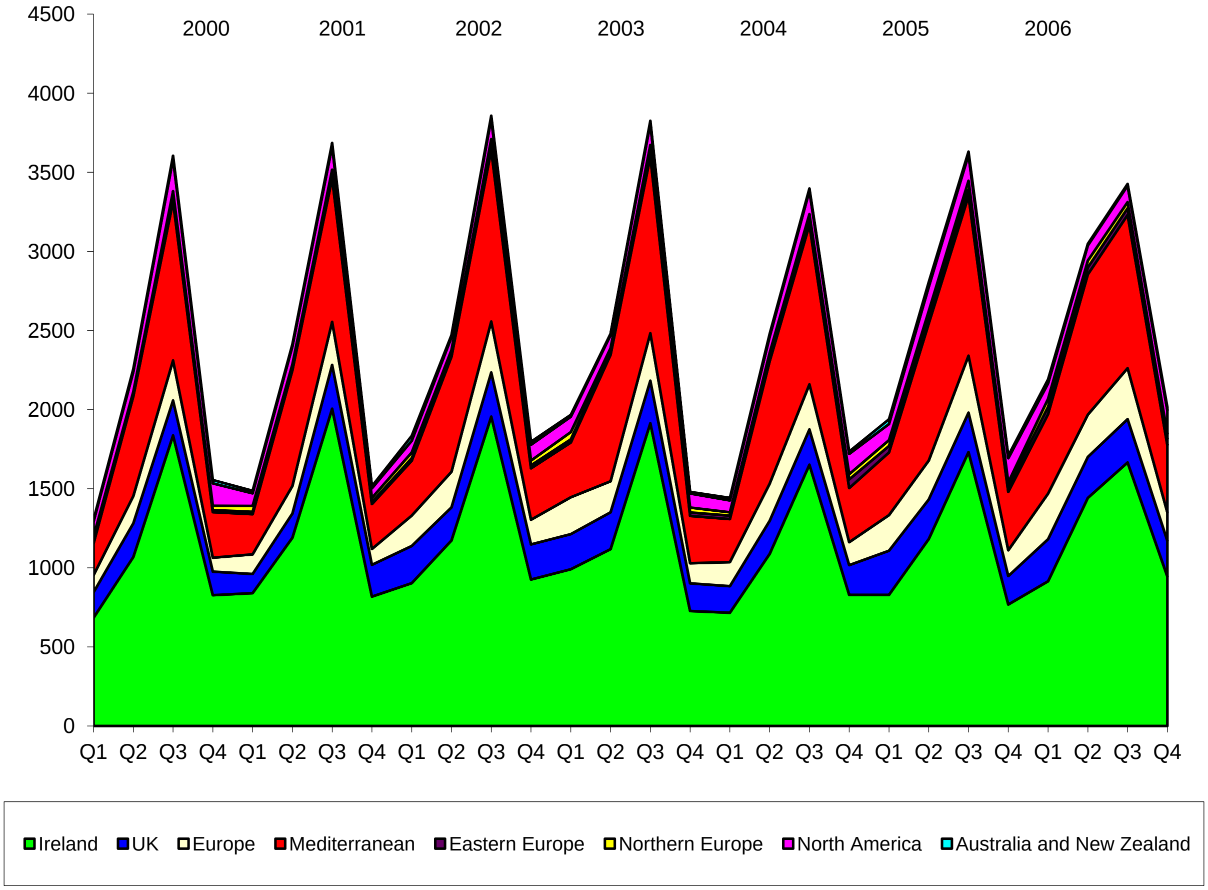
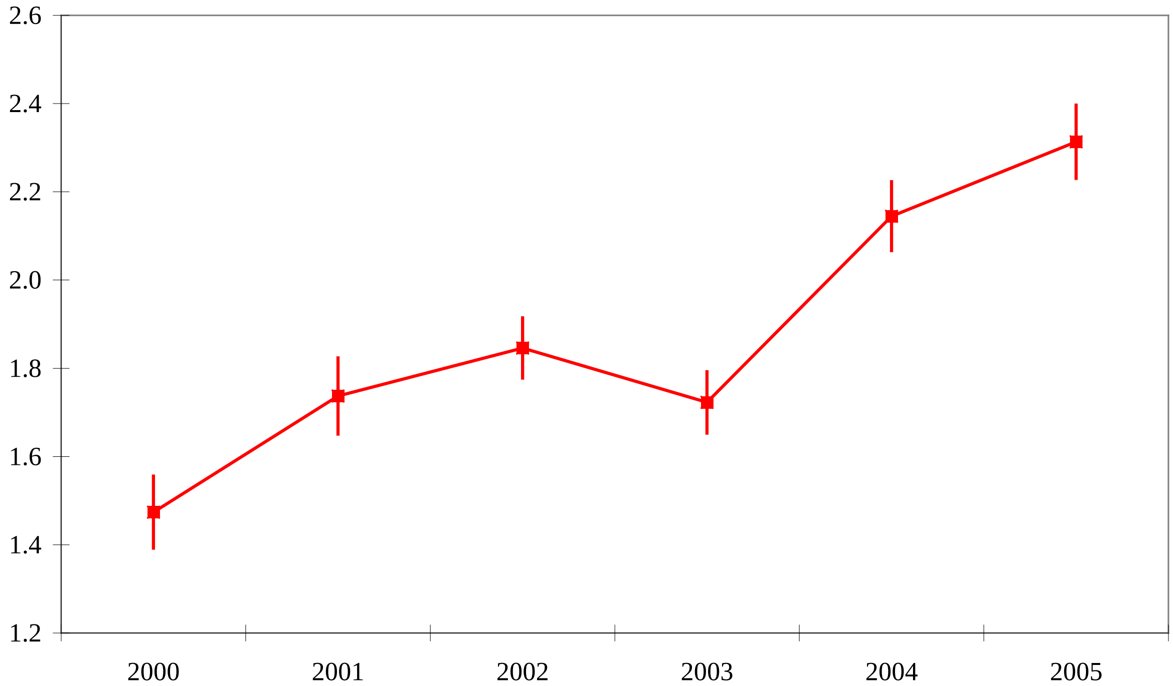


Figure 3: Coefficient on log GDP between 2000 and 2005 (vertical lines are 67% confidence intervals)



Year	**Number**	**Title/Author(s)** **ESRI Authors/Co-authors Italicised**
2007	209	The Effectiveness of Competition Policy and the Price-Cost Margin: Evidence from Panel Data Patrick McCloughan, *Seán Lyons* and William Batt
	208	Tax Structure and Female Labour Market Participation: Evidence from Ireland *Tim Callan,* A. Van Soest, *J.R. Walsh*
	207	Distributional Effects of Public Education Transfers in Seven European Countries *Tim Callan,* Tim Smeeding and Panos Tsakloglou
	206	The Earnings of Immigrants in Ireland: Results from the 2005 EU Survey of Income and Living Conditions *Alan Barrett* and *Yvonne McCarthy*
	205	Convergence of Consumption Patterns During Macroeconomic Transition: A Model of Demand in Ireland and the OECD *Seán Lyons, Karen Mayor* and *Richard S.J. Tol*
	204	The Adoption of ICT: Firm-Level Evidence from Irish Manufacturing Industries *Stefanie Haller* and *Iulia Traistaru-Siedschlag*
	203	EU Enlargement and Migration: Assessing the Macroeconomic Impacts Ray Barrell, *John Fitz Gerald* and Rebecca Riley
	202	The Dynamics of Economic Vulnerability: A Comparative European Analysis *Christopher T. Whelan* and *Bertrand Maître*
	201	Validating the European Socio-economic Classification: Cross-Sectional and Dynamic Analysis of Income Poverty and Lifestyle Deprivation *Dorothy Watson, Christopher T. Whelan* and *Bertrand Maître*

200	The 'Europeanisation' of Reference Groups: A Reconsideration Using EU-SILC *Christopher T. Whelan* and *Bertrand Maître*
199	Are Ireland's Immigrants Integrating into its Labour Market? *Alan Barrett* and *David Duffy*
198	"Man Enough To Do It"? Girls and Non-Traditional Subjects in Lower Secondary Education *Emer Smyth* and *Merike Darmody*
197	Analysing the Effects of Tax-benefit Reforms on Income Distribution: A Decomposition Approach Olivier Bargain and *Tim Callan*
196	Heterogeneous Exporter Behaviour: Exploring the Evidence for Sunk-Costs and Hysteresis *Frances Ruane*
195	The Regional Dimension of Taxes and Public Expenditure in Ireland *Edgar Morgenroth*
194	Do Consultation Charges Deter General Practitioner Use Among Older People? A Natural Experiment *Richard Layte*, Hannah McGee and Ann O'Hanlon
193	An Analysis of the Impact of Age and Proximity of Death on Health Care Costs in Ireland *Richard Layte*
192	Measuring Hospital Case Mix: Evaluation of Alternative Approaches for the Irish Hospital System Chris Aisbett, *Miriam Wiley*, *Brian McCarthy*, *Aisling Mulligan*
191	The Impact of the EU-US Open Skies Agreement on International Travel and Carbon Dioxide Emissions *Karen Mayor* and *Richard S.J. Tol*