



Review of Evidence of Elasticities Relevant to Tourism in Scotland

A report by

Jason Li Chen, Gang Li, Anyu Liu, and Nigel Morgan

School of Hospitality and Tourism Management, University of Surrey
Guildford, United Kingdom

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Table of contents

Executive summary	3
1 Introduction	6
2 Methodology.....	7
2.1 Literature review search strategy	7
2.1.1 Sources to search.....	7
2.1.2 Search terms	8
2.1.3 Data screening	8
2.1.4 Data extraction	9
2.2 Cluster analysis methodology	9
2.3 Summary.....	14
3 Literature review of elasticities	15
3.1 Overview of literature	15
3.1.1 Price elasticities of inbound tourism demand for European destinations	16
3.1.2 Income elasticities of outbound tourism demand from European tourist- generating countries/regions.....	18
3.1.3 Income elasticities of outbound tourism demand from Scotland's top source markets.....	19
3.2 Demand elasticities for the most relevant destinations	20
3.2.1 UK.....	23
3.2.2 Belgium.....	23
3.2.3 Netherlands	24
3.2.4 Germany.....	25
3.2.5 France	25
3.2.6 Italy.....	26
3.2.7 Austria	27

3.2.8	Denmark	27
3.2.9	Ireland.....	28
3.2.10	Switzerland	29
3.2.11	Norway	30
3.2.12	Demand elasticities of visitors from Scotland’s top source markets for the most relevant destinations.....	30
3.3	Elasticities for commercial accommodation.....	32
3.4	Summary.....	34
4	Behavioural changes as a result of tourist taxation	35
4.1	Introduction	35
4.2	Review of Individual Studies	36
4.2.1	The impact of taxes on the competitiveness of European Tourism	36
4.2.2	Callaghan and Tol (2013)	38
4.2.3	Seetaram, Song and Page (2014)	39
4.2.4	Kristjánsdóttir (2020).....	39
4.3	Summary.....	40
5	Conclusion	41
5.1	Summary of findings	41
5.2	Limitations and future research agenda	42
	Glossary of key terms.....	44
	References.....	45
	Appendices	50
	Appendix A. Destination characteristics for cluster analysis	50
	Appendix B. Publications estimated elasticities of tourism demand.....	54
	Appendix C. Publications estimated elasticities for commercial accommodation .	64

Executive summary

Through a rapid systematic review of international literature, this report provides an overview of the existing estimates of the potential price elasticities of demand (PED) and income elasticities of demand (YED) for tourists to destinations that may be relevant to Scotland, and those using commercial accommodation; price elasticities of supply (PES) of commercial accommodation relevant to Scotland; and other factors influencing changes in demand and supply in tourism. The report also summarises available primary literature on tourists' behavioural responses to taxation. However, due to the unavailability of studies on Scotland, the evidence reviewed in this report was based on destinations that may be comparable to Scotland as identified in a cluster analysis. Therefore, the results provide a possible approximation rather than the actual elasticities for Scotland.

To provide an up-to-date overview of evidence, a systematic literature review was conducted to gather information from primary studies published post-2010. As a systematic approach, the pre-specific search methodology ensures comprehensive, transparent and replicable results. As no empirical study was found to estimate the elasticities for tourism in Scotland, studies on European destinations and Scotland's top source markets were firstly reviewed. A cluster analysis was then carried out to identify the most comparable tourism destinations to Scotland. As a result, 11 destinations were found most relevant. Elasticities for these destinations estimated by destination-specific studies were then considered as an approximation of tourism elasticities for Scotland.

Regarding the European destinations in general, it has been found that the overall median PED for inbound tourism is on the borderline between elastic and inelastic (-1.02), while the overall average PED indicates a relatively elastic demand (-1.26). Regarding the YED, outbound tourism is likely to be perceived as a luxury consumption by tourists from most European countries/regions as well as the top source markets for Scotland.

In terms of the most relevant destinations to Scotland as identified through cluster analysis, the overall median estimates suggest that inbound tourism is likely to be

price elastic and to be perceived as a luxury consumption. However, the findings are based on limited recent evidence of varying quality for destinations relevant to Scotland. The relatively wide ranges within the elasticities for destinations that might be relevant to Scotland indicate considerable uncertainties potentially caused by the difference in the modelling methods, explanatory variables, destination-source market pairs and data used in the literature. Cautions should be exercised when interpreting the findings.

In the search of recent literature on the price effect of taxation, only a limited number of primary studies have been identified. A general understanding is that an increase (or decrease) in tourism taxes may lead to a decrease (or increase) in the quantity of tourism demand, with other factors remain unchanged. This is consistent with the law of demand in economic theory. However, the impact of an increase in tourism taxation on tourists' expenditure would depend on the tax in question, consumers' PED, the PES, and other factors influencing both demand and supply. For instance, between VAT and accommodation occupancy taxes, past literature argues that the latter tend to have a more moderate effect on tourism demand, but they are likely to induce a psychological impact on tourists and could affect repeat tourism. As for different travel purposes, business travellers and non-coastal holidaymakers tend to have a price-inelastic demand, while leisure travellers particularly coastal holidaymakers are likely to have a price-elastic demand. Therefore, an increase in tourism taxation would likely result in higher tourism receipts from business travellers and non-coastal holidaymakers, but lower receipts from leisure travellers especially coastal holidaymakers. Additionally, while most of the studies on the impact of tourism taxation focused on the price effect of tourism taxes, tourist behaviour is also affected by non-price factors such as advertising and news, of which research is currently limited.

A significant gap in the existing literature is that there is no direct evidence for Scotland. To address this gap, future research on price effects could focus on conducting primary studies underpinned by rigorous modelling methods utilising various primary and secondary data sources. In addition, survey-based tourist behaviour research on non-price effects of tourism taxes is also necessary to reach

a fuller understanding of the overall effect of tourism taxation on tourist behavioural changes.

1 Introduction

This report aims to conduct a systematic literature review to provide a thorough and up-to-date overview of the existing estimates of the potential price elasticities of demand (PED) and income elasticities of demand (YED) for tourists to destinations that may be relevant to Scotland, and those using commercial accommodation; price elasticities of supply (PES) of commercial accommodation relevant to Scotland; and other factors influencing changes in demand and supply in tourism. This report also reviews the studies on behavioural changes as a result of tourist taxation.

To achieve this aim, this report seeks to answer the following research questions:

- What evidence, of relevance to Scotland, is available in this area?
- What are the main findings from this evidence base?
- What is the breadth, depth, and timeliness of this evidence base?
- What are the most important limitations and gaps in the existing evidence base?
- How might the evidence base be developed?

This report is intended to support policymakers' understanding of the potential responsiveness of visitors and tourism businesses to changes in prices of goods and services associated with tourism, with findings from destinations with similar conditions to those found in Scotland. This evidence base will be of interest to those involved in analysis and policy debate around tourism in Scotland.

The rest of the report is organised as follows: Section 2 describes the methodology of the search strategy for literature review and cluster analysis employed to identify relevant destinations to Scotland. Section 3 reviews the elasticities extracted from the literature. Section 4 reviews the literature on behavioural changes as a result of tourist taxation. Section 5 concludes the report.

2 Methodology

This section presents the methodology of this report. Section 2.1 describes the methodology used in the systematic literature review. As no empirical study was found to estimate the elasticities for tourism in Scotland, Section 2.2 proposes the methodology and results of a cluster analysis to identify the most comparable destinations for Scotland. Evidence on these identified destinations can then be considered as an approximation for tourism in Scotland. Section 2.3 provides a summary of Section 2.

2.1 Literature review search strategy

To provide an up-to-date overview of evidence, this report uses the approach of systematic literature review to gather information from primary studies published post-2010¹. As a systematic approach, the pre-specific search methodology ensures comprehensive, transparent and replicable results. This section describes the search strategy as to how the procedure of data search and extraction was performed. It consists of four sub-sections including the sources to search, search terms used, the data screening process to select relevant evidence, and the method to extract and appraise information in the screened literature.

2.1.1 Sources to search

Scopus, the Web of Science (previously known as Web of Knowledge) and Google Scholar were chosen as the sources to search for published academic and grey literatures. Scopus and the Web of Science complement each other as the main sources of academic literature including journal articles and book series. Google Scholar searches the full text of an article for keywords as well as a wider range of sources, such as conference proceedings and books that are not available in traditional databases, making it a good source to search for grey literature.

¹ As a result, secondary research and meta-analyses themselves such as Peng *et al.* (2015) were excluded, but any post-2010 primary studies referred to by those sources were included in this report.

2.1.2 Search terms

Relevant keywords and their variants were used to gather academic and grey literatures from international evidence published since 2010. The language of published literature is limited to English. Using the search terms below, 413 results were returned by Scopus and 306 by the Web of Science. Merging these two sets of results with grey literature, 558 unique publications were identified in total.

Scopus:

TITLE-ABS-KEY ((tourism OR hotel OR hospitality OR accommodation) AND (demand OR supply)) AND ALL ((price elasticity) OR (price elasticities) OR (income elasticity) OR (income elasticities)) AND PUBYEAR > 2009

Web of Science:

TS=((tourism OR hotel OR hospitality OR accommodation) AND (demand OR supply) AND elasticit*) AND PY=(2010-2020)

Refined by: Databases: WOS

Search language=Auto

2.1.3 Data screening

After building up the pool of literature, each of the 558 publications was screened to identify those empirically estimated tourism elasticities. The screening process identified 154 studies that estimated PED and/or YED for tourism or PES of commercial accommodation at 60 destinations worldwide (including 21 European countries/regions). In this process, no empirical study was found specifically about Scotland.

However, it would be reasonable to assume that destinations with similar profiling characteristics should exhibit similar relationships between tourism demand and its economic determinants such as prices and tourist income. Therefore, a cluster analysis was proposed to identify the destinations that are most comparable to Scotland. Empirical studies on these destinations can then serve as a possible

approximation for Scotland. The methodology of cluster analysis is detailed in Section 2.2.

2.1.4 Data extraction

Having identified similar destinations, relevant publications were reviewed to summarise the findings including the ranges of price elasticities of demand and supply; income elasticities of demand; other key explanatory variables involved; and the techniques, models and data sources used. The breadth, depth and rigour of the available evidence base as well as the future research direction were also discussed in this report.

The quality of relevant evidence was assessed based on the criteria including the methodological rigour and if relevant, the quality of journal published. To assess the quality of journals, the Academic Journal Guide (AJG) produced by Chartered ABS (2018a) was used. The AJG is a guide to the range and quality of journals in the area of business and management research. Based on expert judgements by the Scientific Committee, each of the 1,561 academic journals included in the AJG 2018 is awarded a rating of 1, 2, 3, 4 or 4* (Category 4* is the highest rating). Therefore, the rating provides a useful indicator of the quality of the journal where an article is published. For the journals not included on the AJG 2018, they were regarded as Category 0 in this report. As stated in the methodology of AJG, non-inclusion in the AJG "may reflect a wide range of factors, ranging from the aims and scope of the journal that lie outside the scope of business and management studies to, quite simply, the Scientific Committee and those they consulted, not encountering sufficient evidence on which to formulate an opinion" (Chartered ABS, 2018b, p.4).

2.2 Cluster analysis methodology

As set out above, the initial review of literature found no empirical study specifically on Scotland. This study conducted a cluster analysis to identify the tourism destinations that are most similar to Scotland among the 60 destinations identified in the literature.

Cluster analysis is an approach to grouping a set of objects (or tourism destinations in this report) so that objects within the same group (known as a cluster) are more similar to one another than to those in other groups (clusters). The similarity between destinations is evaluated with a distance measure² based on selected characteristics.

In this report, two sets of destination characteristics were used to ensure the results are reasonably robust to the selection of characteristics. The first set of characteristics consist of per capita measures including tourism intensity (calculated as tourist arrivals divided by the population at the destination) and tourism receipts per capita (calculated as tourism receipts divided by tourist arrivals). The second set of characteristics include overall measures of tourism demand consisting of tourist arrivals, tourism receipts and the population at destinations. Five additional characteristics of destinations are also included in both sets: the geographical area, average daily temperature, average monthly precipitation³, gross domestic product per capita (GDP per capita in current US\$) and shortest flight distance to Edinburgh (great circle distance). The data were collected from the United Nations World Tourism Organisation (UNWTO), World Bank, and United Nations Group of Experts on Geographical Names (UNGEGN) databases (as shown in Appendix A).

The results of the cluster analysis are illustrated in Figures 2.1 and 2.2. The dendrograms represent clusters of destinations and the distance between clusters. As shown in Figure 2.1, based on the first set of characteristics from the perspective of per capita measures, the most similar destinations to Scotland are the UK (including Scotland to be in line with the definition in the literature), Belgium, the Netherlands, Germany, France, Italy, Austria and Denmark. Figure 2.2 shows the results using the second set of characteristics from the perspective of overall volume and scale measures. In addition to the UK, Belgium, the Netherlands, Germany,

² This report adopted the widely used Euclidean distance as the distance measure, which was calculated as the square root of the sum of the squares of the distances between corresponding variables in the two destinations being considered. All variables were standardised to z-scores so that the measure of distance would not be overly influenced by the variables on a larger scale. To determine the distance between two clusters, the average linkage (between groups) method was used by calculating the average distance between all pairs of destinations in the two clusters.

³ The average daily temperature and average monthly precipitation are both 10-year averages from 2007 to 2016.

Austria and Denmark, which remain as the most similar destinations to Scotland, Ireland, Switzerland and Norway are also found in the same cluster. This shows a fairly robust clustering outcome where most destinations remain the same with different measures used for cluster analysis.

Combining the destinations from both sets of clustering results, the following 11 countries can be considered as the most similar tourism destinations to Scotland: the UK, Belgium, the Netherlands, Germany, France, Italy, Austria and Denmark, Ireland, Switzerland and Norway. The other European destinations can be generally classified in the next most relevant cluster. Therefore, the review of the literature is organised as follows. Section 3.1 overviews 40 publications that reported elasticities for 21 European destinations, 19 European source markets as well as Scotland's top source markets. Section 3.2 provides a more detailed review focusing on 10 articles reported elasticities for the most relevant 11 destinations to Scotland. Section 3.3 reviews four studies that estimated elasticities for commercial accommodation.

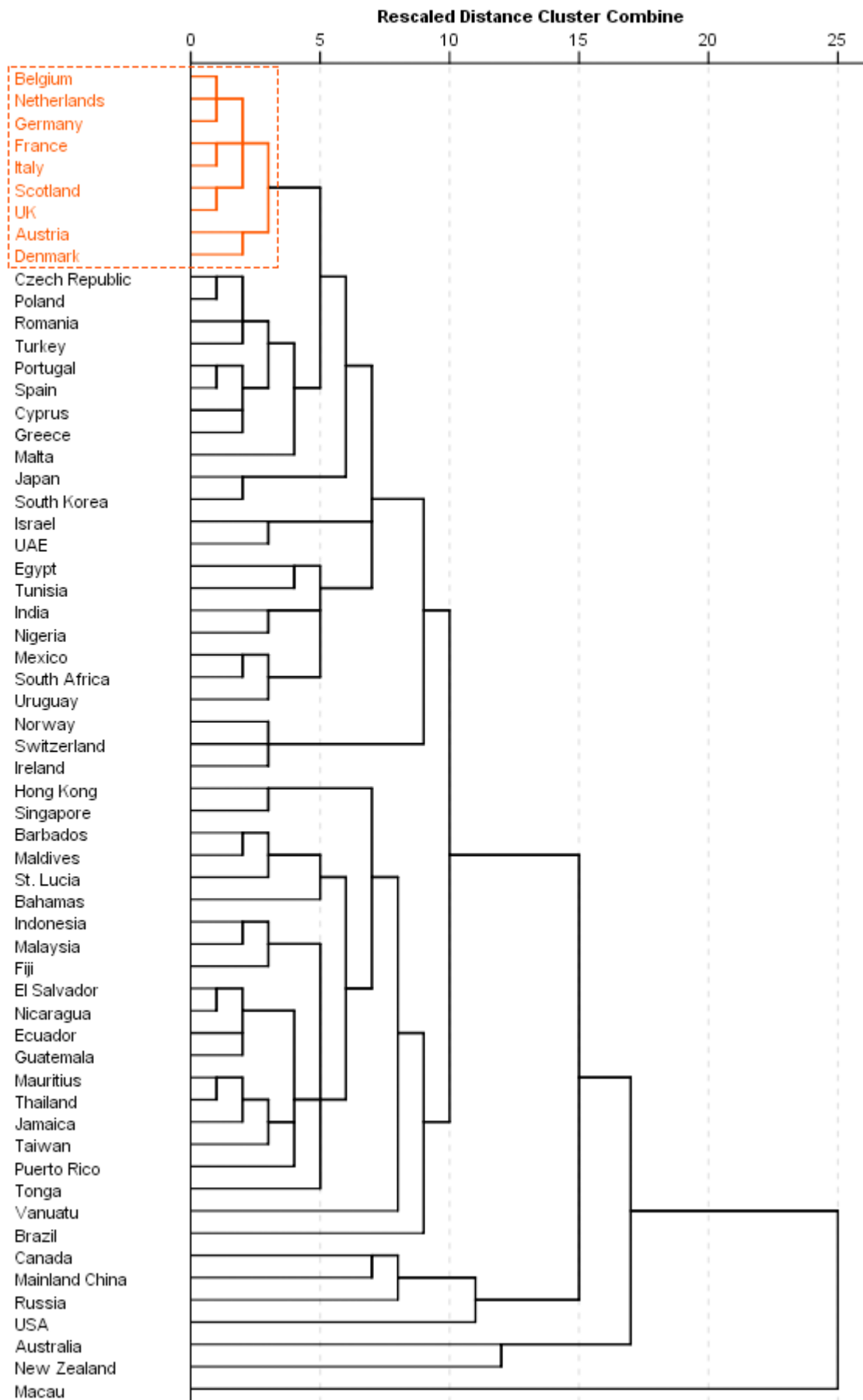


Figure 2.1 Outcome of cluster analysis based on per capita measures

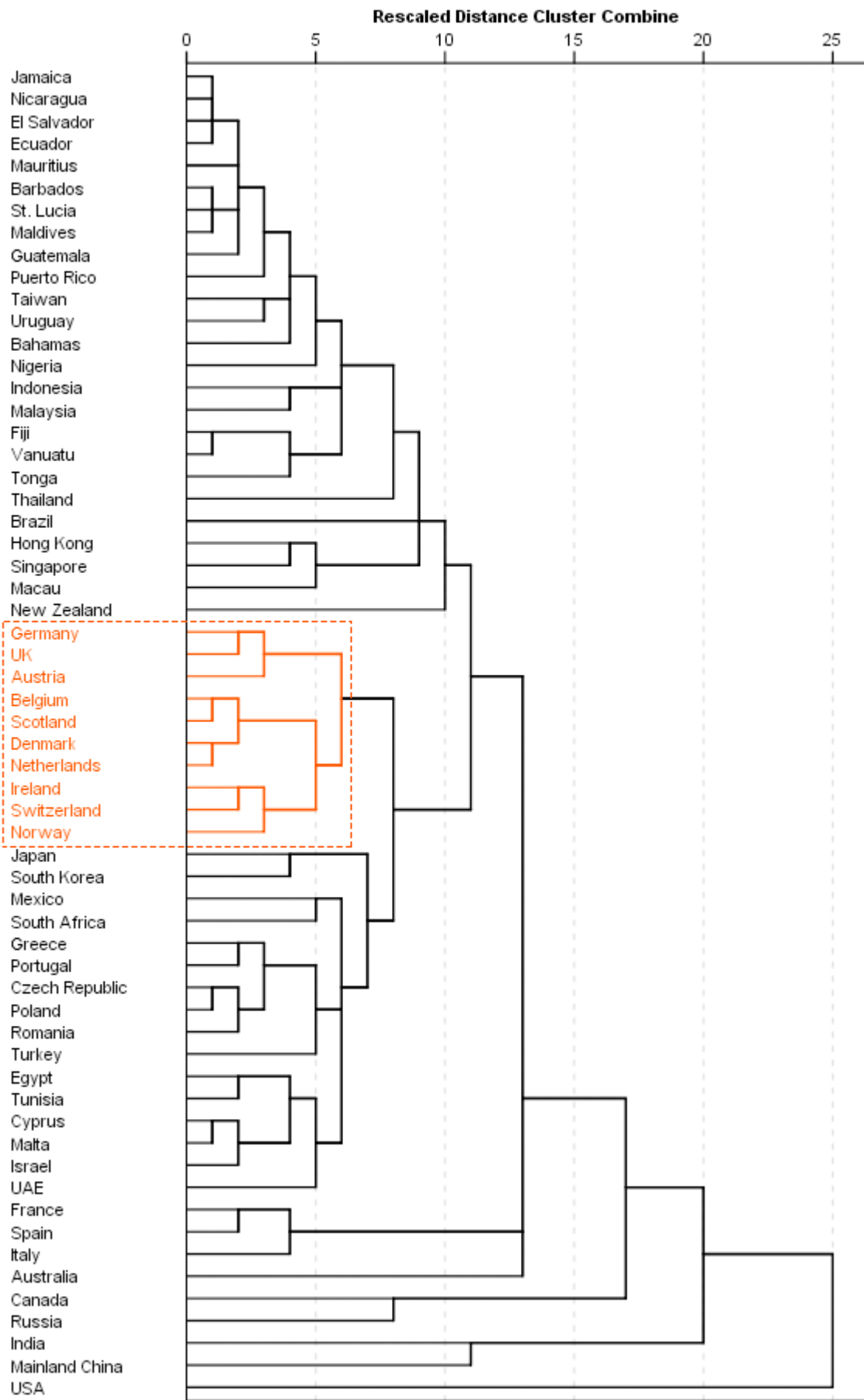


Figure 2.2 Outcome of cluster analysis based on overall measures

2.3 Summary

This section describes the methodology used in this report. The search strategy of the systematic literature review is described. As no empirical study was found to estimate the elasticities for tourism in Scotland, a cluster analysis was conducted to search for evidence from other destinations that are most comparable to Scotland. The analysis identified 11 relevant destinations which form the basis for the literature review in Section 3.

3 Literature review of elasticities

This section presents the findings of the literature review on elasticities. It is structured in five sub-sections. Section 3.1 overviews the literature on PED for European inbound tourism, YED for European outbound tourism as well as the YED for outbound tourism from Scotland's top source markets. Section 3.2 provides a more detailed review of the designation-specific literature on the relevant destinations to Scotland. Section 3.3 examines the PED, YED and PES for commercial accommodation. Section 3.4 provides a summary of Section 3.

3.1 Overview of literature

This section consists of three sub-sections: the price elasticities of demand of inbound tourists for European destinations; the income elasticities of outbound tourism demand from European tourist origins; and the income elasticities of outbound tourism demand from Scotland's top source markets.

The demand for tourism can be measured in different ways (Song *et al.*, 2010). In the literature reviewed in this report, most studies use the number of tourist arrivals (or nights) and the level of tourist expenditure (or receipts) as the measure of tourism demand.

As for the explanatory variables, exchange rate-adjusted relative consumer price indices are the most widely used proxy of tourism prices. Alternative measures such as the average trip prices, real exchange rates, and price competitive indices are also used as the price variable in some models. With regard to the income variables, real GDP (or real GDP per capita) of the source markets are the most widely used measure of tourist income. Other alternative measures such as business climate indices, indices of services, industrial production indices can also be found in research based on secondary data. Household income is often used in survey-based studies.

In addition to the price and income, some studies also include other influential factors of tourism demand. Examples include, among others, the population,

distance between the destination and source markets, climate variables, bilateral trade openness and human capital. Survey-based studies also include control variables such as demographic characteristics and travel size. Details of the variables used in the literature are summarised in Appendix B.

3.1.1 Price elasticities of inbound tourism demand for European destinations

The PED measures the responsiveness of the quantity demanded of a good or service to a change in its price. It is defined as the percentage change in quantity demanded divided by the percentage change in price. For example, a PED value of -1.5 indicates that when the price of the good or service increases by 1 per cent, the quantity demanded would decrease by 1.5 per cent. When the absolute value⁴ of the PED is larger than 1, the percentage change in demand is larger than the percentage change in price. Therefore, the demand is said to be elastic. When the absolute value of the PED is smaller than 1, the demand responds less than proportionately to a change in price, i.e., the demand is inelastic. When the absolute value of the PED is equal to 1, the demand is unitary (or unit) elastic where the demand changes in the same proportion to its price. For elastic demand, a decrease in price would tend to increase the total revenue, while an increase in price would tend to decrease revenue. This price effect is reversed for inelastic demand. While for unitary demand, the total revenue would likely to remain constant when the price changes (Tribe, 2016).

From the destination's perspective, 21 European countries/regions were identified in the literature that estimated PED for tourism destinations⁵. As shown in Figure 3.1, the estimates of PED for inbound tourism in these destinations range from -7.49 to 5.15 with an overall median of -1.02 and an overall average⁶ of -1.26. The overall median⁷ shows that the tourism demand for the European destinations is on the

⁴ Price elasticities are normally negative, although certain goods (such as Veblen and Giffen goods) which do not follow the law of demand could have a positive PED.

⁵ Unless specified otherwise, tourism demand is for the whole destination rather than a specific tourism sector.

⁶ The overall median (or average) is defined as the median (or average) of the all the median values across 21 destinations so that each destination carries an equal weight.

⁷ The median provides a more robust measure of central tendency as the average could be strongly influenced by extreme values.

borderline between price elastic and inelastic, while the overall average indicates an elastic demand. In terms of the median PED for each destination, 11 out of 21 destination estimates are elastic.

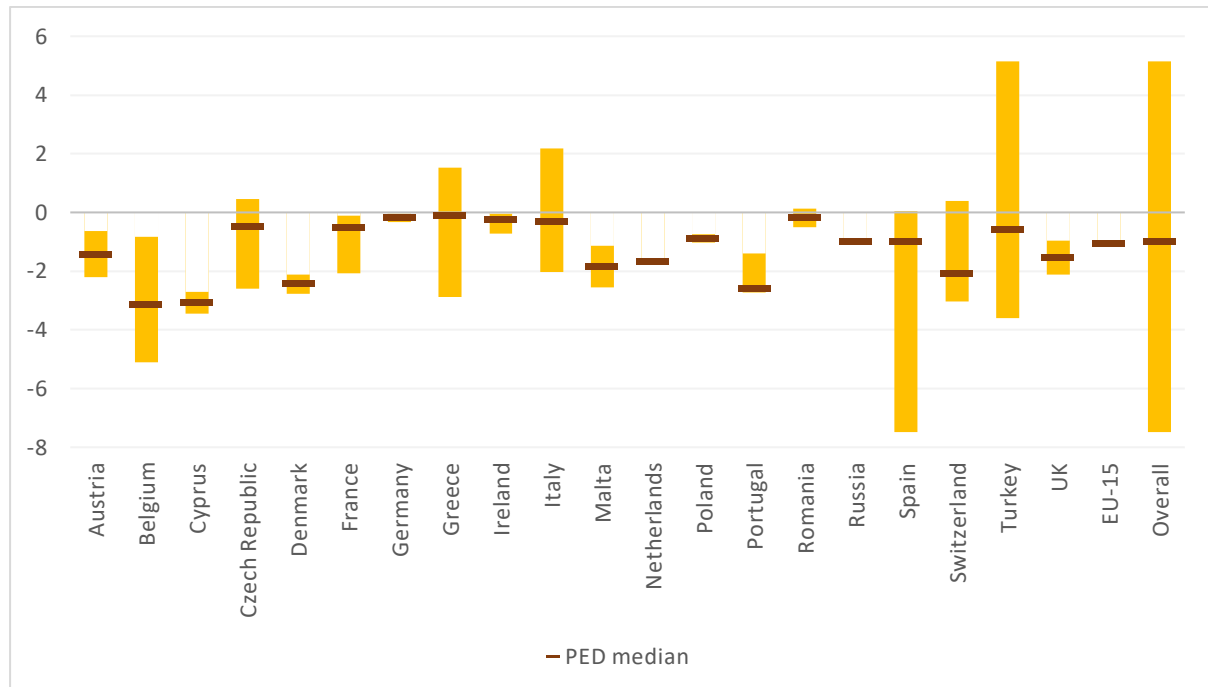


Figure 3.1 Range of price elasticities of inbound tourism demand for European destinations

The wide range of PED values suggests uncertainties in the estimation especially in the studies of Spain (Ordóñez, Ordóñez and Torres, 2010; Rey, Myro and Galera, 2011; Gatt and Falzon, 2014; Seetaram, Song and Page, 2014; Álvarez-Díaz, González-Gómez and Otero-Giráldez, 2015, 2019; Turrion-Prats and Duro, 2017; Dogru and Sirakaya-Turk, 2018) and Turkey (Ketenci, 2010; Altin and Uysal, 2014; Gatt and Falzon, 2014). The disparity was mainly caused by the difference in modelling methods, explanatory variables, destination-source market pairs and data used in the studies. For example, Ketenci (2010) estimated the PED for tourism in Turkey from 14 source markets including Austria, Belgium, Bulgaria, Denmark, France, Germany, Greece, Italy, Netherlands, Russia, Sweden, Switzerland, UK, USA. For each source market, 5 different methods were used for the estimation. As a result, 70 different PED estimates were generated for tourism in Turkey ranging from -3.59 to 5.15. This study was published in a Category 0 journal, which was not included in the AJG rating list.

Various explanatory variables were chosen in the literature as measures of the price and income variables or as control variables, which may also contribute to the differences in results. For instance, Altin and Uysal (2014), which was published in a Category 2 journal, used the economic sentiment indicator, interest rate and exchange rate as control variables, while none was used in Ketenci (2010).

Appendix B lists the full details of each publication including the destination, source market, PED, price variable, YED, income variable, other key variables influencing tourism demand, techniques/models, data sources, data range and the AJG rating.

3.1.2 Income elasticities of outbound tourism demand from European tourist-generating countries/regions

From the perspective of outbound tourism demand, 19 tourist-generating countries/regions were identified from the literature reporting the YED. The YED measures the responsiveness of outbound tourism demand to the changes in tourists' income. Similar to the PED, the YED is defined as the percentage change in quantity demanded divided by the percentage change in income. When the YED is positive, the goods are called normal goods meaning the demand would increase when the income increases. In particular, necessities (i.e., demand is insensitive to income change) have a YED value between 0 and 1, while the goods are considered a luxury when the YED is larger than 1. When the YED is negative, the demand falls as income rises which implies an inferior good (Tribe, 2016).

As shown in Figure 3.2, the estimated YED values vary from -26.42 to 25.13 with an overall median of 2.85 and an overall average of 3.78. The overall median indicates that a rise of tourists' income would potentially increase the outbound tourism demand by a larger proportion. Sixteen out of 19 median values are larger than 1 suggesting that outbound tourism tends to be perceived as a luxury consumption by tourists from most identified European countries/regions. However, like the case of PED, the vast variations of the estimates indicate a considerable level of uncertainties due to the use of different modelling methods, explanatory variables, destination-source market pairs and data in the estimation.

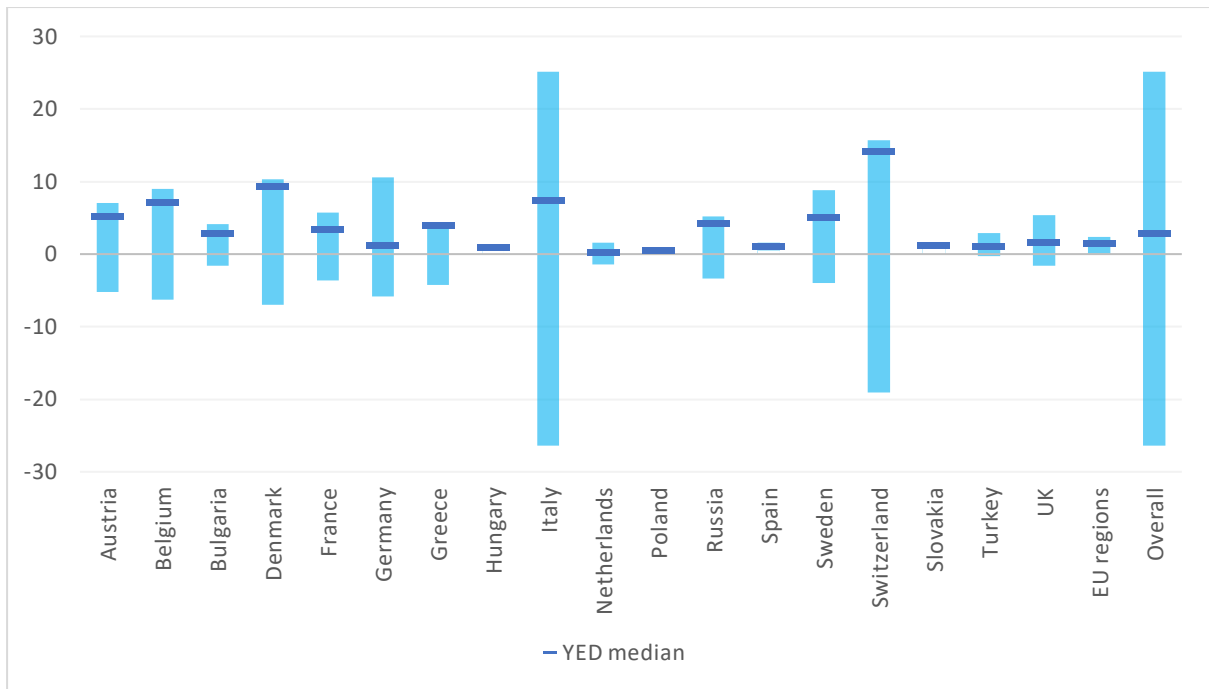


Figure 3.2 Range of income elasticities of outbound tourism demand for European tourist-generating countries/regions

3.1.3 *Income elasticities of outbound tourism demand from Scotland's top source markets*

Nine of Scotland's top ten international source markets (except for Norway) can be identified in the primary literature in terms of both tourist arrivals and expenditure in 2018 (VisitScotland, 2019). As shown in Figure 3.3, the YED estimates vary from -26.42 to 25.13 with an overall median of 1.32 and an overall average of 2.60. When the UK is included, the estimates range remain unchanged but with a slightly lower overall median of 1.30 and an overall average of 2.46. The overall median and average YED values imply that outbound tourism is generally regarded as a luxury consumption by tourists from these countries. The median YED values are larger than 1 in all source markets except for the Netherlands, which is in line with this finding. However, caution should be exercised when drawing firm conclusions due to the variations as explained in previous sections.

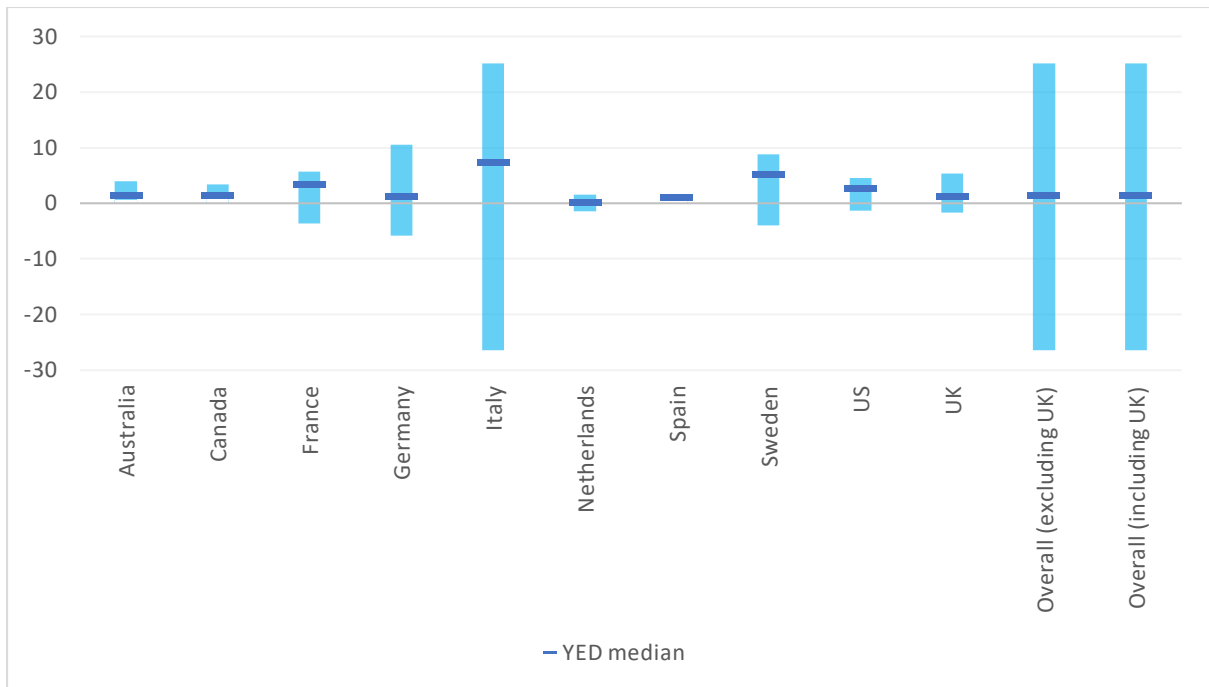


Figure 3.3 Range of income elasticities of outbound demand for Scotland's top source markets

3.2 Demand elasticities for the most relevant destinations

According to the results of the cluster analysis described in Section 2.2, 11 countries were identified as the most relevant destinations to Scotland. Ten studies estimated the PED and/or YED for the 11 destinations, among which 10 destinations were studied by 9 articles for PED, and all 11 were examined by 8 publications for YED. Relevant publications were marked in Appendix B. It should be noted that a main source for the PEDs and YEDs is a study estimated elasticities of visitors from Turkey to eight destinations (Dogru and Sirakaya-Turk, 2018). As the article was published in a lower quality journal (Category 0) and focused on Turkey which is not a substantial source market for Scotland and is also a lower-income country (visitors from poorer countries might be more price- and income-sensitive than Scotland's core markets), the results should be interpreted with caution.

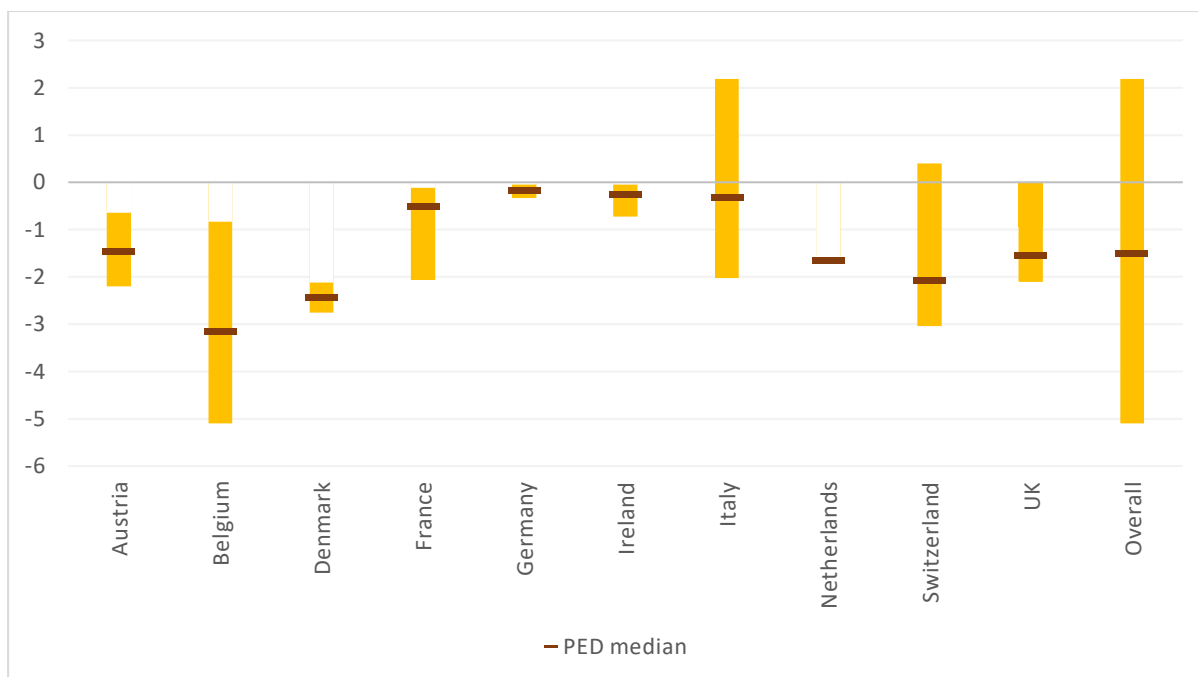


Figure 3.4 Range of price elasticities of inbound tourism demand for the most relevant destinations

As shown in Figures 3.4, the estimated PED values for the most relevant destinations range from -5.10 to 2.18 with an overall median of -1.50 and an overall average of -1.36,⁸ which are both elastic. The country-level median values suggest that the inbound tourism demand for 6 out of 10 destinations are elastic. The relatively wide overall range was mainly driven by three studies including a study for Brussels in Belgium (Santos and Cincera, 2018), a study for Italy (Emili, Figini and Guizzardi, 2019) and a study for Switzerland (Falk, 2013). The Belgium study estimated elasticities for different travel purposes with unspecified source markets. The Italy study estimated 12 PED and YED values for all the combinations of destinations (three Italian cities), source markets (the UK and Germany) and tourism demand measures (tourist arrivals and nights). The study on winter tourism demand in Switzerland also estimated 12 PED and YED values for 12 combinations of two regions (mountain and non-mountain regions), two demand measures (tourist arrivals and nights), and three different models. As these studies focused on specific regions of a country or specific time of a year, substantial caution should be used in the interpretation of the ranges of elasticities in other contexts.

⁸ If the study by Dogru and Sirakaya-Turk (2018) is excluded, the estimated PED would range from -5.10 to 1.92 with an overall median of -1.53 and an overall average of -1.34.

Figure 3.5 shows the income elasticities of inbound tourism demand⁹ for 11 most relevant destinations to Scotland. The YED estimates range from -0.52 to 4.45 with an overall median of 1.13 and an overall average of 1.20.¹⁰ The country-level median values suggest that inbound tourism in 8 out of 11 destinations is likely to be regarded as a luxury consumption. Yet again, the uncertainties remain in these findings as the estimates vary substantially caused by reasons stated in the above paragraph. Sections 3.2.1 – 3.2.11 provide a more detailed review of elasticities for each destination. Section 3.2.12 focuses on studies for the most relevant destinations and also related to Scotland’s top source markets.

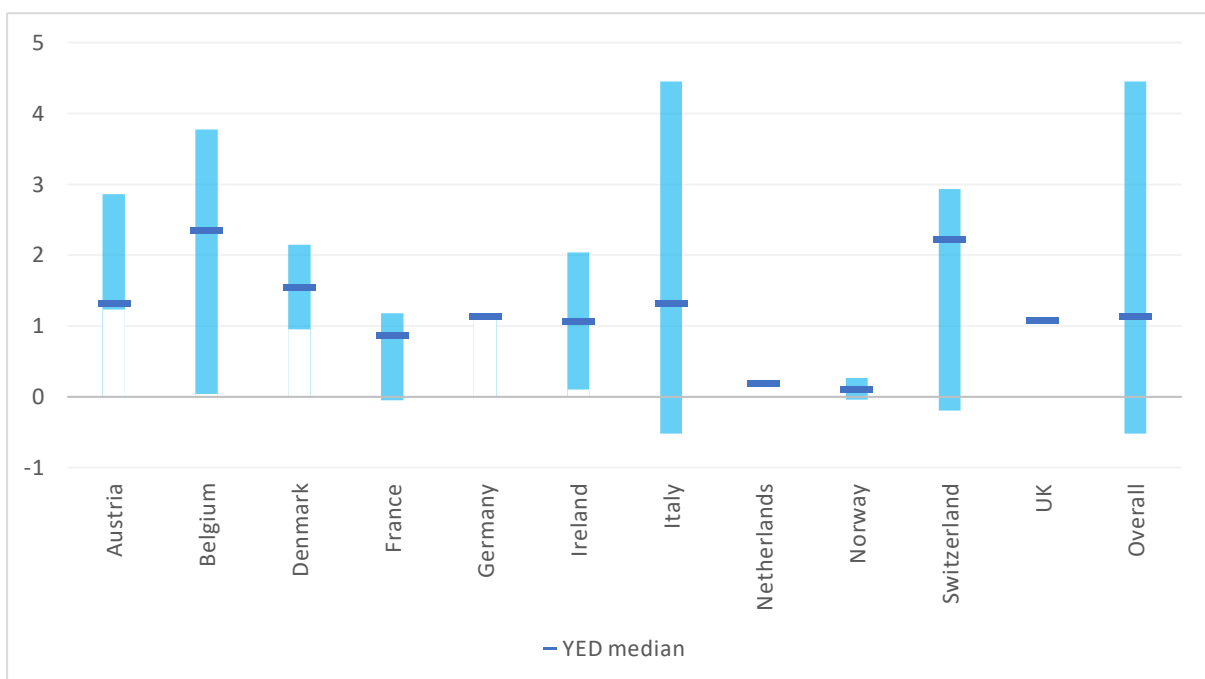


Figure 3.5 Range of income elasticities of inbound tourism demand for the most relevant destinations

⁹ Note that the YED discussed in this section and its sub-sections is for inbound tourism demand which is different from the income elasticities of outbound tourism demand presented in Section 3.1.2 and 3.1.3.

¹⁰ If the study by Dogru and Sirakaya-Turk (2018) is excluded, the estimated PED would range from -0.52 to 4.45 with an overall median of 1.28 and an overall average of 1.33.

3.2.1 UK

A small number of studies were identified for the UK, and of variable quality. Two empirical studies estimated PED (Athanasopoulos *et al.*, 2014; Dogru and Sirakaya-Turk, 2018) and one study estimated YED for the UK (Dogru and Sirakaya-Turk, 2018).

The PED values range between -2.11 (from Turkey) and -0.95 (from Australia), with an average/median of -1.53. The results imply that the demand for UK tourism is generally price elastic ($PED < -1$), but tourists' sensitivity to UK price variations is moderate.

The estimated Turkey-UK YED value is 1.08, suggesting that tourism in the UK is likely to be marginally perceived as a luxury consumption by Turkish tourists.

The difference of PED values across the two studies is likely to be explained by the source markets concerned and the modelling methods used. Australian tourists were less sensitive than Turkish tourists to price variations in the UK, as Turkey is a relatively poorer country. It would be reasonable to expect that visitors from poorer countries may have higher PEDs than richer ones. The Australia-UK study (Athanasopoulos *et al.*, 2014) used the almost ideal demand system (AIDS) model which has a more rigorous theoretical underpinning than the panel data analysis used in the Turkey-UK study (Dogru and Sirakaya-Turk, 2018). In addition, the Australia-UK study was published in a higher-quality journal (Category 4) than the Turkey-UK study (Category 0). It should be noted that the Turkey-UK study is an article in a lower quality journal, for a market that is not a main source market for Scotland, or the UK. This implies that not much weight should be attached to its findings in this context.

3.2.2 Belgium

Two empirical studies estimated PED and YED for Belgium (Dogru and Sirakaya-Turk, 2018; Santos and Cincera, 2018).

The PED values range between -3.27 (unspecified source markets) and -3.02 (from Turkey), with an average/median of -3.14. The results imply that the international tourism demand for Belgium is generally price elastic ($PED < -1$).

The YED values range from 2.19 (unspecified source markets) to 2.51 (from Turkey), with an average/median of 2.35, suggesting that tourism in Belgium is likely to be perceived as a luxury consumption by international tourists ($YED > 1$).

Considering travel purposes, the PED was estimated as -5.10 for leisure passengers and -0.83 for business travellers. The results imply that leisure visitors tend to be more sensitive to the price changes compared to business travellers visiting Belgium. The YED was estimated as 0.04 for leisure passengers and 3.77 for business travellers, which suggest that the business travellers' demand for visiting Belgium is more income-elastic than leisure visitors.

The estimates of PED and YED values across the two studies are fairly consistent albeit the use of different variables, data and modelling methods. Panel data analysis was used in the study by Dogru and Sirakaya-Turk (2018) which was published in a Category 0 journal. While a more basic regression was applied by Santos and Cincera (2018) which was published in a Category 2 journal.

3.2.3 Netherlands

Only one empirical study estimated PED and YED for Turkish tourists visiting the Netherlands (Dogru and Sirakaya-Turk, 2018).

The estimated PED was -1.66, which indicates that the Turkish tourists' demand for tourism in the Netherlands is likely to be price elastic ($PED < -1$).

The YED value was 0.19, suggesting that tourism demand for the Netherlands may not be sensitive to the change of income of Turkish tourists. This study was based on panel data analysis and published in a Category 0 journal.

3.2.4 Germany

Two empirical studies estimated both PED and YED for Germany (Seetaram, Song and Page, 2014; Dogru and Sirakaya-Turk, 2018).

The PED values range between -0.33 (from Turkey) and -0.05 (from the UK), with an average/median of -0.19. The results imply that the demand for German tourism tends to be price inelastic ($-1 < \text{PED} < 0$).

The YED values range between 1.11 (from Turkey) and 1.16 (from the UK), with a median of 1.13, suggesting that tourism in Germany is likely to be perceived as a luxury consumption at a moderate level.

The difference in the PED and YED values across the two studies is likely to be explained by the source markets concerned and the modelling methods in use. As discussed above, British tourists are likely to be less sensitive than Turkish tourists to price variations in Germany. The autoregressive distributed lag model (ADLM) was used in the UK-Germany case (Seetaram, Song and Page, 2014), and the panel data analysis was used in the Turkey-Germany study (Dogru and Sirakaya-Turk, 2018). The former has been more widely used for tourism demand analysis than the latter, and the results tend to be more compatible with other tourism demand studies. In addition, the UK-Germany study was published in a higher-quality journal (*Journal of Travel Research*, Category 4) than the Turkey-Germany study (Category 0).

3.2.5 France

Three empirical studies estimated PED and YED for France (Seetaram, Song and Page, 2014; Dogru and Sirakaya-Turk, 2018; Yamaura and Thompson, 2015).

The estimated PEDs range from -2.07 to -0.11 with a median of -0.52 and an average of -0.80, which indicates that in general, the demand for tourism in France tends to be price inelastic ($-1 < \text{PED} < 0$). Among the three studies, three source markets were concerned including Turkey, the UK and Germany. The estimated

Turkey-France PED is -2.07, which suggests that Turkish tourists may be sensitivity to the price change when they visit France ($PED < -1$).

The estimated YEDs vary from -0.05 to 1.18, with a median of 0.87 and an average of 0.72. Most of the YED estimates are close to unitary, which suggest that demand for tourism in France, in general, is likely to be marginally insensitive to the change of tourist income.

Different methods were used across the three studies. Dogru and Sirakaya-Turk (2018) used a panel model and the study was published in a Category 0 journal. The ADLM model was applied in Seetaram, Song and Page (2014) which was published in a Category 4 journal. Yamaura and Thompson (2015) applied the AIDS model to estimate PED and YED, and the study was published in a Category 2 journal.

3.2.6 Italy

Five empirical studies estimated PED and YED for Italy from three source markets including Turkey (Dogru and Sirakaya-Turk, 2018), Germany (Emili, Figini, and Guizzardi, 2019; Yamaura and Thompson, 2015) and the UK (Emili, Figini, and Guizzardi, 2019; Gatt and Falzon, 2014; Seetaram, Song and Page, 2014; Yamaura and Thompson, 2015).

The estimated PEDs range from -2.02 to 2.18 with a median of -0.32 and an average of -0.002. The results suggest that in general, the demand for Italy tourism tends to be price inelastic ($-1 < PED < 0$).

The estimated YEDs range from -0.52 to 4.45, with a median of 1.32 and an average of 1.50, suggesting that tourism in Italy is likely to be perceived as a luxury consumption at a moderate level by tourists from Turkey, Germany and the UK.

Different methods were used in the five studies. Dogru and Sirakaya-Turk (2018) applied a panel model and the study was published in a Category 0 journal. The ADLM model used in Seetaram, Song and Page (2014) which was published in a Category 4 journal. Emili, Figini, and Guizzardi (2019), Gatt and Falzon (2014) and

Yamaura and Thompson (2015) were all published in Category 2 journals, with the first study using ordinary least squares (OLS) for estimation, and the latter two both using the AIDS model.

3.2.7 Austria

Two empirical studies estimated PED and YED for Austria from three source markets including Turkey (Dogru and Sirakaya-Turk, 2018), Germany and the UK (Yamaura and Thompson, 2015).

The PED values range between -2.20 (from the UK) and -0.64 (from Turkey), with a median of -1.46 and an average of -1.43. The results imply that the demand for Austrian tourism is generally price elastic ($PED < -1$), with the source market of Turkey as an exception.

The estimated YED values for Austria range between 1.24 and 2.86, with a median of 1.33 and an average of 1.81. The results suggest that tourism in Austria is generally perceived as a luxury consumption.

The differences in the PED and YED values across the two studies are likely to be explained by the source markets concerned and the modelling methods in use. Unlike the above cases, German and British tourists are more sensitive than Turkish tourists to price variations in Austria. This may be due to different tourism products purchased by different source markets (e.g., different star levels of hotels). The AIDS model used in the German and UK studies has a more rigorous theoretical underpinning than the panel data analysis used in the Turkey study. With regard to the journal quality, Dogru and Sirakaya-Turk (2018) was published in a Category 0 journal while the study by Yamaura and Thompson (2015) was published in a Category 2 journal.

3.2.8 Denmark

There is only one empirical study estimated PED and YED for Denmark from two source markets including the UK and Germany (Yamaura and Thompson, 2015).

The estimated PED values are -2.76 and -2.13 for the UK and Germany markets respectively, with an average/median of -2.44. The results imply that the international tourism demand for Denmark tends to be price elastic ($PED < -1$).

The YED estimates are 0.96 and 2.51 for the British and German tourists respectively, with an average/median of 1.55. The YED values suggest that tourism demand for Denmark is not very sensitive to the change in British tourists' income, while it may be perceived as a luxury consumption by the German tourists. This study was based on an AIDS model and published in a Category 2 journal.

3.2.9 Ireland

There is only one empirical study focused on the estimation of PED and YED of overseas visitors to Ireland (Divisekera and Deegan, 2010). Elasticities for six tourism-related sectors were estimated including food, lodging, transportation, shopping, sightseeing and miscellaneous.

The estimated PEDs range from -0.72 to -0.05 with a median of -0.25 and an average of -0.27. The median (and average) estimates of PED across all six sectors for visitors from the UK, North America, Mainland Europe and the rest of the world are -0.33 (-0.35), -0.29 (-0.26), -0.19 (-0.22) and -0.34 (-0.31), respectively. The absolute values of all the PEDs are smaller than one, indicating visitors may not be sensitive to the price change when they visit Ireland.

The estimated YEDs range from 0.10 to 2.04 with a median of 1.07 and an average of 0.99. The sectoral median (and average) values of YED for markets of the UK, North America, Mainland Europe and the rest of the world are 1.05 (1.00), 1.12 (0.95), 1.07 (0.99) and 1.14 (1.03) which are on the borderline between elastic and inelastic.

From the sectors' perspective, the average PEDs across all source markets range from -0.39 (food) to -0.12 (miscellaneous) which are all elastic. The lowest average YED is 0.70 for the transportation sector whereas the average YED for the lodging sector is 1.18 which is the highest. This suggests that compared to food,

accommodation is more likely to be perceived as a luxury consumption by tourists visiting Ireland. The study used the AIDS model and was published in a Category 2 journal in economics.

3.2.10 Switzerland

Three empirical studies presented PED and YED for Switzerland including Dogru and Sirakaya-Turk (2018), Falk (2013) and Yamaura and Thompson (2015).

The estimation of PED ranges from -3.04 to 0.39 with a median of -2.08. There are 15 elasticities presented in the three studies and 13 out of 15 are from Falk (2013) with three different methods using various measurements of tourism demand. The PEDs estimated by Falk (2013) range from -3.04 to -1.16. Yamaura and Thompson (2015) considered Germany and the UK as the source markets of Switzerland with a PED of -2.08 and -1.91, respectively. The positive PED is from Dogru and Sirakaya-Turk (2018) which recognized Switzerland as a key destination of the outbound tourism of Turkey. Overall, the findings of the above three studies indicate that visitors tend to be sensitive to the price change when they travel to Switzerland as most of PEDs are smaller than -1.

The estimated YEDs range from -0.20 to 2.93 with a median of 2.23. The YEDs presented in Falk (2013) are between 2.08 to 2.93. The YED of Turkish visitors is 0.12 whereas for German and British are -0.20 and 0.61, respectively. Overall, visitors tend to consider travelling to Switzerland as a luxury consumption, because most of the YED values are larger than 1. Considering the destination image and high general price level in Switzerland, the results are reasonable.

Different methods were applied across the studies. Dogru and Sirakaya-Turk (2018) used a panel model and Falk (2013) applied three estimation methods including the OLS, robust regression and median regression. Both studies were published in a Category 0 journal. Yamaura and Thompson (2015) used the AIDS model and the study was published in a Category 2 journal.

3.2.11 Norway

Only one empirical study (Engström and Kipperberg, 2015) estimated YED for Norway (the Western fjord region), and none estimated PED.

The estimated YED values range between 0.27 (estimated by OLS) and -0.04 (estimated by weighted least squares), with an average/median of 0.11, suggesting that the tourism in the Norwegian region is likely to be perceived as a necessary product. This study was based on a one-off survey, and source markets were not specified in the econometric analysis. This study was published in a Category 4 tourism journal.

3.2.12 Demand elasticities of visitors from Scotland's top source markets for the most relevant destinations

While the evidence of PEDs and YEDs analysed above are for destinations relevant to Scotland, the source markets in these studies are not always the substantial ones for Scotland. To further test the sensitivity, this section filters down the above evidence to only focus on studies for the most relevant destinations and also related to Scotland's top source markets.

Due to the small number of relevant studies, two out of Scotland's top ten international source markets (Australia and Germany) plus the UK were identified in six studies for eight out of 11 destinations that may be comparable to Scotland. Table 3.1 summarises the elasticities for these origin-destination pairs.

From the perspective of source markets, mixed evidence has been found from a very limited number of studies for Australia (Athanasopoulos *et al.*, 2014) and Germany (Yamaura and Thompson, 2015; Emili, Figini and Guizzardi, 2019). The PED for Australia-UK was estimated as -0.95 which is marginally inelastic. The PEDs of German tourists for five destinations (Austria, Denmark, France, Italy and Switzerland) range from -2.13 to 1.92 with an overall median of -1.46 (elastic) and an overall average of -0.93 (marginally inelastic). The YED values of these Germany-destination pairs range from -0.20 to 2.31 with an overall median of 0.96 and an

overall average of 1.02, suggesting demand for tourism in these destinations may be on the borderline between being sensitive and insensitive to the change of income of German tourists. As reviewed in Section 3.2.1, the method used in the Australia-UK study has a more rigorous theoretical underpinning and was published in a higher quality journal (Category 4) than the studies for Germany (both were published in Category 2 journals).

Table 3.1 Elasticities for the most relevant destinations from Scotland's top source markets

Destination	PED			YED		
	Source market			Source market		
	Australia	Germany	UK	Australia	Germany	UK
Austria		-1.46	-2.20		1.33	1.24
Denmark		-2.13	-2.76		2.15	0.96
France		-0.28	[-0.44] (-0.44) -0.77* -0.11+		0.86	[1.03] (1.03) 0.88* 1.18+
Germany			-0.05			1.16
Ireland			[-0.33] (-0.35) -0.72* -0.13+			[1.05] (1.00) 0.13* 2.04+
Italy		[1.28] (0.72) -0.59* 1.92+	[-0.41] (-0.43) -2.02* 0.49+		[0.96] (1.05) -0.09* 2.31+	[2.13] (1.93) -0.52* 4.45+
Switzerland		-2.08	-1.91		-0.20	0.61
UK	-0.95					
Overall	[-0.95] (-0.95) -0.95* -0.95+	[-1.46] (-0.93) -2.13* 1.92+	[-0.44] (-1.16) -2.76* 0.49+	N/A N/A N/A N/A	[0.96] (1.02) -0.20* 2.31+	[1.05] (1.17) -0.52* 4.45+

Note: values in square brackets and parentheses are medians and averages respectively; * denotes minimum values; and + denotes maximum values.

As the UK is not an international source market for Scotland, the results for the UK can be used as a benchmark to compare with the case of Germany. While the YEDs for both Germany and the UK are close to unitary, no clear patterns can be identified

regarding the overall PED since the median and average values across all destinations would lead to different conclusions. This is because the average values are more sensitive to the outliers and skewed distribution of estimates compared to the median values.

In terms of specific destinations, tourists from Germany and the UK tend to be sensitive to the price change when they visit Austria, Denmark and Switzerland. Traveling to Austria and Denmark may be considered as a luxury consumption by tourists from Germany. While British visitors would potentially perceive visiting Italy, Austria and Germany as a luxury consumption.

Among the five studies related to the UK as a source market, Seetaram, Song and Page (2014) was published in a Category 4 journal and the other four (Divisekera and Deegan, 2010; Gatt and Falzon, 2014; Yamaura and Thompson, 2015; Emili, Figini and Guizzardi, 2019) were all published in Category 2 journals.

Although both the destinations and source markets identified in this sub-section are relevant to Scotland, for the same reasons discussed in Section 3.2, the uncertainty level remains high, and no conclusive evidence can be found.

3.3 Elasticities for commercial accommodation

In the search of primary literature on elasticities for commercial accommodation, only five studies were found, where one estimated the PED and three estimated the YED. Tourist nights/days and average spending per night were used as the measures of demand for accommodation and the price variable respectively. The budget (expenditure) share on accommodation over the total budget (expenditure) was used to calculate the implied income (expenditure) elasticities.

Divisekera and Deegan (2010) estimated the PED for Ireland from four regions (Britain, North America, Mainland Europe and Rest of the World) with an aggregated value of -0.34, which indicates an inelastic demand for hotels in Ireland. This study was published in a Category 2 journal.

In the studies which reported YED (Divisekera, 2010; Divisekera and Deegan, 2010; Xie and Tveterås, 2020), the estimated values range from 0.50 to 1.46 with a median of 1.15 and an average of 1.13. This indicates that tourists from various source markets including the US and Europe may generally regard commercial accommodation as a luxury consumption at a moderate level. The study by Divisekera (2010) was published in a Category 4 journal and the other two studies were both published in Category 2 journals.

To measure how responsive the quantity supplied of commercial accommodation would be to a change in its price, the PES can be estimated. It is defined as the percentage change in quantity supplied divided by the percentage change in price. For example, a PES value of 1.5 indicates that when the price of the good or service increases by 1 per cent, the quantity supplied would increase by 1.5 per cent. When the absolute value of the PES is larger than 1, the percentage change in supply is larger than the percentage change in price. Therefore, the supply is said to be elastic. When the absolute value of the PES is smaller than 1, the supply responds less than proportionately to a change in price, i.e., the supply is inelastic. When the absolute value of the PES is equal to 1, the supply is unitary (or unit) elastic where the supply changes in the same proportion to the price (Tribe, 2016).

In the search of PES of commercial accommodation, only one relevant study was found in both academic and grey literatures. Nguyen (2015) estimated the PES of commercial accommodation in the UK. The quantity supplied was measured by the available room nights, and the price was measured by the average daily rates. The time-varying estimates range from -0.64 to 9 with a median of 0.31 and an average of 1.06. The PES in this study was simply calculated by dividing the annual percentage change of supply by the annual percentage change of price, lacking control variables and a sophisticated modelling method. Therefore, the results should be treated with great caution. The study was published in a Category 0 journal. More details of the publications reviewed in Section 3.3 are listed in Appendix C.

3.4 Summary

This section firstly overviews the literature on elasticities for European inbound and outbound tourism as well as the top source markets for Scotland. It then provides a more detailed review of the literature on the relevant destinations to Scotland. Evidence related to both Scotland's top source markets and most relevant destinations was also examined. Lastly, elasticities for commercial accommodation were reviewed. In general, the central tendency measures indicate that tourism demand tend to be price elastic and income elastic at a moderate level for destinations that may be comparable to Scotland. However, cautions need to be taken when interpreting the results due to considerable disparity in the evidence. The estimates of elasticities may vary significantly depending on factors such as the modelling methods, variables chosen, origin-destination pair in question and data used.

4 Behavioural changes as a result of tourist taxation

4.1 Introduction

This section reviews the existing literature on the impact of tourism taxes on tourism demand, including the number of tourist arrivals and tourist expenditure, in European contexts. A particular focus is placed on tourist tax, which is also called the hotel occupancy tax. Other tourism-related taxes such as tourism VAT and air passenger duty (APD, also called airport tax) are reviewed briefly too.

There has been very limited research on this topic. In total, five reports and four journal articles published since 2010 are identified. Among them, four reports (Aberdeen City Council, 2017; Greater London Authority, 2017; Scottish Government, 2019; All-Party Parliamentary Group for Hospitality, 2019) and one literature review article (Goktas and Polat, 2019) summarised existing evidence from the previous literature instead of carrying out primary research. Given the focus of the present report on primary research, the above reports are excluded, and this section will review the other identified literature. A summary of the primary research on the impacts of European tourism taxes is shown in Table 4.1.

Table 4.1 Summary of the primary research on European tourism taxes (2010-2020)

Organisation/ Author	Title	Type of literature	Country/ Region	Tax type
European Commission (2017)	The impact of taxes on the competitiveness of European tourism	Report	EU	Occupancy tax, air passenger duty, VAT, real estate tax, etc.
Callaghan and Tol (2013)	UK tourists, the Great Recession and Irish tourism policy	Journal article	Ireland	VAT, airport tax
Kristjánsdóttir (2020)	Tax on tourism in Europe: Does higher value-added tax (VAT) impact tourism demand in Europe?	Journal article	Europe	VAT
Seetaram, Song and Page (2014)	Air passenger duty and outbound tourism demand from the United Kingdom	Journal article	UK	Air passenger duty

According to the literature review by Goktas and Polat (2019), 19 EU countries have introduced a tourist tax. The tax rate varies between €0.10 (in Bulgaria) and €8.0 (Netherlands) per person per night, or between 1% (Romania) and 7%

(Netherlands). The rate also varies across municipalities within the same country. Three types of levy have been implemented in Europe: the progressive visitor levy option, the fixed-rate or flat-fee visitor levy option, and the tax liability visitor levy option (The Scottish Parliament, 2018).

4.2 Review of Individual Studies

4.2.1 The impact of taxes on the competitiveness of European Tourism

This is a comprehensive study on the impact of tourism-related taxes in Europe. Twenty-seven EU states (including the UK) were included in the study. A range of tourism-related taxes such as air passenger duty, VAT, real estate tax and occupancy tax in EU countries were reviewed. In particular, the impact of the proposed occupancy tax rate change on tourism spending and service providers' revenue was estimated.

Firstly, this study presented some theoretical arguments on the impact of tourism taxation. By distorting price signals, taxation can lead to a reduction of economic efficiency and welfare. After the application of taxation, the price of a product is increased, and the quantity consumed and supplied is both reduced. As a result, both consumer welfare and producer welfare fall, part of which can be captured by the government in the form of tax revenues. The size of the net loss to society depends on both the absolute level of the tax imposed and the price elasticities of demand and supply. On the other hand, some academics recommended that tourism taxation could be used as a means of correcting negative externalities caused by tourists such as environmental repercussions (e.g., Chang, Lu and Hu, 2011).

This study further summarised empirical evidence from past literature, which generally suggested that the income elasticity and price elasticity of tourism demand are relatively high compared to other sectors. Therefore, a small change in taxation could potentially have a disproportionate impact on tourism levels if the reduction or increase in taxes is passed onto tourists in the form of lower or higher prices. The actual impact depends on the level of the price elasticity and the extent of pass-through to tourists. Between VAT and accommodation occupancy taxes, this study

argues that the latter tend to have a more moderate effect on tourism demand, but they are likely to induce a psychological impact on tourists and could affect repeat tourism. However, the study finds inconclusive evidence from past literature on the overall effect of increased accommodation costs due to the occupancy tax. For instance, Bonham and Gangnes (1996) found that the impact of the charge levied in Hawaii on net hotel revenues was minimal, given inelastic demand for tourist accommodation. On the other hand, based on an econometric model supplemented with an input-output type of economic impact modelling, a study by American Economics Group (2004) suggested that a 2% increase in the combined tax on hotel and motel rooms could reduce room sales by 2.4%.

Similarly, this report showed inclusive evidence with respect to the impact of other tourism-related taxation. Using the Balearic Islands in Spain as a case study, this report revealed that, during the period between the announcement of the Eco-Tax in 2001 and its repeal, the Balearic Islands saw a 2-year decline to international tourist arrivals. The Eco-Tax was regarded to play a large role although other factors potentially contributed to this decline too. On the contrary, the Balearic Islands saw an 11.2% increase in international tourist arrivals in 2016 despite the introduction of the Sustainable Tourism Tax in 2015, and its official commencement on 1 July 2016. The statistics implied a minimal impact of this new tourism taxation.

This report pointed out that the existing research on the impact of tourism taxation was limited and less up to date. Therefore, further research is necessary to draw more robust conclusions.

Based on the above theoretical framework and available empirical evidence, this report further presents their study. With respect to the methodology, this study estimated the current tourism spending and service providers' revenue based on some assumptions of the demand structure (leisure vs business travellers) and the type of destinations (coastal vs non-coastal). Then different PED values from the previous literature were applied to different segments above. For the PED for business travellers, the report referred to the estimate of Peng *et al.* (2015)'s meta-

analysis¹¹ (-0.35); for leisure travellers, the report used the PED for Spain (-1.39) as a representative for coastal holidays and the PED for Germany (-0.43) for non-coastal holidays, both estimated by Smeral (1994). In addition, different from previous reports, different rates (60% and 100%) of the levy pass-through (to tourists) were assumed.

Regarding the impact of occupancy tax rate increase on tourism spending, this study found that the effect could be either positive or negative, depending on the relative shares of different tourist segments (business, coastal leisure and non-coastal leisure). In countries with a large share of coastal tourism such as Cyprus, Greece and Spain, an increase in occupancy taxes would lead to a decrease in tourism spending. On the other hand, for countries with a larger share of non-coastal or business tourism, an increase in taxes would increase total spending. In the case of these countries, the decrease in demand as a result of the higher price is not enough to offset the impact of the higher price paid per unit. Therefore, the impact on total spending is positive, despite the fall in demand. In the case of the UK, a new 3% occupancy tax would lead to a 0.32% increase in tourism spending but a 1.37% decrease in hotel revenues, assuming a pass-through rate of 60%.

4.2.2 Callaghan and Tol (2013)

Callaghan and Tol (2013) used a pooled travel cost model for UK travellers to estimate price elasticities of tourism demand and estimated the impacts of the proposed VAT and airport tax reductions in Ireland on visitor numbers and expenditure, as well as tax revenue. Given the average estimated PED value between -1 and 0 (i.e. price -inelastic), the effect of the abolition of the €3 airport tax would lead to a moderate tourism demand increase of 0.92%, and a reduction of the VAT rate (from 13.5 per cent to 9.0 per cent) would lead to a moderate tourism demand increase of 1.17%; in comparison, the increase in expenditure was small compared to the foregone tax revenue. The authors then concluded that “the Irish government is wrong to seek to stimulate inbound tourism through tax breaks. While

¹¹ It should be noted the study by Peng *et al.* (2015) was a meta-analysis on tourism demand, and the reported elasticities were general price elasticities of tourism demand, rather than specific elasticities of tourism taxation.

effective, the costs exceed the benefits. It would be better, in fact, to increase travel taxes and VAT for tourism products. This would harm visitors and the tourism industry, but it would benefit the general population in the form of an increased tax take” (Callaghan and Tol, 2013, pp.113-114).

4.2.3 Seetaram, Song and Page (2014)

Seetaram, Song and Page (2014) estimated the impact of air passenger duty (APD) on UK outbound tourism demand. Based on the estimated ADLMs, both PED and demand elasticities of tax were calculated. According to the calculated PED values, UK tourists were found to be more responsive to changes in tourism prices at short-haul destinations than at long-haul destinations (-0.89 versus -0.37). With regard to tax elasticities, UK’s outbound tourism demand did not appear to be responsive to tax changes regardless of long-haul destinations (-0.78) or short-haul destinations (-0.17) being concerned. Therefore, this study concluded that the effectiveness of APD was *marginal* in terms of reducing travel and the associated environmental impact.

It should be noted that the inclusion of both the tourism price and tourist taxation variables into the econometric models may affect the magnitude of the estimated elasticities due to the possible problem of multicollinearity in the estimated models. Although this was acknowledged in the article, the authors did not carry out any statistical test on the existence of multicollinearity or estimate the potential effect on the magnitude of the estimated elasticities.

4.2.4 Kristjánsdóttir (2020)

Kristjánsdóttir (2020) estimated the relationship between VAT rates and tourist flows in Europe. Based on a basic regression analysis, the author did not find any negative relationship, but the author did not report the elasticities. Given the model specification and the available information presented in the article, it is not possible to calculate the elasticities. It should be noted that the regression model omitted key economic variables such as tourism prices and tourist income, and therefore the

estimated effect of VAT was likely to be biased. This is evidenced by the extremely low model fits ($R^2 < 0.04$).

4.3 Summary

This section reviews empirical evidence in the literature on the behavioural impact of tourism taxation, with a particular focus on primary research. There is limited academic and grey literature available. One European Commission report and three academic articles were identified and reviewed. A general understanding is that an increase (or decrease) in tourism taxes tends to lead to a decrease (or increase) in the quantity of tourism demand, with other factors held unchanged. Considering the price effect of taxation, this is in line with the law of demand in economic theory, which reveals the inverse relationship between the price of a product and the quantity demanded. However, the impact of an increase in tourism taxation on tourists' expenditure would depend on the tax in question, consumers' PED, the PES, and other factors influencing both demand and supply. For example, different groups of tourists face different price elasticities. In general, business travellers and non-coastal holidaymakers tend to have a price-inelastic demand, while leisure travellers particularly coastal holidaymakers are likely to have a price-elastic demand. Therefore, an increase in tourism taxation would likely result in more tourism spending by business travellers and non-coastal holidaymakers, but less spending by leisure travellers especially coastal holidaymakers. It should be noted that most of the studies on the impact of tourism taxation focused on the price effect of tourism taxes. Tourist behaviour is affected by many non-price factors as well, such as advertising and news. More comprehensive research is necessary, which takes account of these multiple effects, in order to reach a fuller understanding of the overall effect of tourism taxation on behavioural changes.

5 Conclusion

5.1 Summary of findings

Through a systematic literature review, this report provides an overview of recent estimates of elasticities for tourism destinations, tourist-generating markets and commercial accommodation. Empirical evidence in the literature on tourists' responses to changes in taxation was also reviewed. However, due to the unavailability of studies on Scotland, the evidence reviewed in this report was based on similar destinations identified in a cluster analysis. The results should be regarded as a possible approximation rather than the actual elasticities for Scotland.

It has been found that the overall median PED for European destinations is on the borderline between elastic and inelastic (-1.02), while the overall average indicates an elastic demand (-1.26). In terms of the YED, outbound tourism is likely to be perceived as a luxury consumption by tourists from most European countries/regions as well as Scotland's top source markets. As for the most relevant destinations to Scotland, the results based on the overall median estimates suggest that the inbound tourism demand is likely to be price elastic and to be perceived as a luxury consumption. However, the findings are based on limited recent evidence for destinations relevant to Scotland. The relatively wide ranges within the elasticities for destinations that might be relevant to Scotland indicate considerable uncertainties potentially caused by the difference in the modelling methods, explanatory variables, destination-source market pairs and data used in the studies. Cautions should be exercised when interpreting the findings.

In the search of recent literature on the price effect of tourism taxation, only a limited number of primary studies were identified. In line with the law of demand, a general understanding of the price effect of taxation is that an increase (or decrease) in tourism taxes may lead to a decrease (or increase) in the quantity of tourism demand, with other factors remain unchanged. However, the impact of an increase in tourism taxation on tourists' expenditure would depend on the tax in question, consumers' PED, the PES, and other factors influencing both demand and supply. For instance, between VAT and accommodation occupancy taxes, past literature

argues that the latter tend to have a more moderate effect on tourism demand, but they are likely to induce a psychological impact on tourists and could affect repeat tourism. As for different travel purposes, business travellers and non-coastal holidaymakers tend to have a price-inelastic demand, while the demand of leisure travellers particularly coastal holidaymakers is likely to be price elastic. Therefore, an increase in tourism taxation would likely result in higher tourism receipts from business travellers and non-coastal holidaymakers, but lower receipts from leisure travellers especially coastal holidaymakers. In addition, most of the studies on the impact of tourism taxation focused on the price effect of tourism taxes. Tourist behaviour is also affected by non-price factors such as advertising and news, of which research is currently scant.

5.2 Limitations and future research agenda

Due to the unavailability of studies on Scotland, the evidence reviewed in this report was based on similar destinations identified in the cluster analysis. The results provide a possible approximation rather than the actual elasticities for Scotland. Moreover, only the literature published in English and indexed by the three main databases (Scopus, the Web of Science and Google Scholar) was included in the search. Studies available in other databases and other languages were excluded. There are also limitations in the evidence itself. The source markets within the evidence only cover two of Scotland's top ten international source markets. The inconsistent levels of theoretical and methodological rigour in the modelling methods, variables and data caused uncertainties in the results summarised.

A significant gap in the existing literature is that there's no direct evidence for Scotland. To address this gap and build a more reliable and relevant evidence base for tourism in Scotland, future research could focus on primary research underpinned by rigorous modelling methods utilising various primary and secondary data sources.

To estimate the price and income elasticities, the AIDS and time-varying parameter (TVP) modelling are well-established approaches to analysing tourism demand. The AIDS model is a system-of-equations approach examining tourism expenditure shares across a group of alternative destinations for a source market. As the cross-

price elasticities associated with the estimated equations within the system have a strong theoretical base, the relationships between alternative destinations can be effectively evaluated. With the TVP approach, the estimates of elasticities are allowed to vary over time so the behavioural change of tourists can be traced (Song and Wong, 2003). Spatial econometric modelling (Yang and Fik, 2014; Li *et al.*, 2016) can also be used to study the competitive or complementary effect of price changes across neighbouring destinations of Scotland.

In terms of the variables, tourist arrivals or expenditure, own and substitute relative consumer price indices (CPIs) adjusted by exchange rates, real GDP can be used as the measures of tourism demand, price levels in Scotland and substitute destinations, and tourist income, respectively (Song *et al.*, 2010). Control variables such as dummy variables of one-off events (e.g., financial crises and disease outbreaks), the distance and climate difference between origins and destinations can also be included. The time series data of tourist arrivals or expenditure can be found from the UNWTO and VisitBritain databases. CPIs, exchange rates, real GDP, climate data including average temperature and precipitation are available from the World Bank Open Data and Office for National Statistics (ONS). The distance between capital or major cities can be calculated using the UNGEGN database.

In addition to research on price effects, survey-based tourist behaviour research on non-price effects of tourism taxes is also necessary to reach a fuller understanding of the overall effect of tourism taxation on tourist behavioural changes. The psychological effects of multiple external and internal factors such as advertising and news about the tourism taxes on tourist satisfaction which eventually leads to destination loyalty. The structural equation modelling (SEM) is often used to investigate the relationships between both observed and latent variables.

Glossary of key terms

Price elasticity of demand (PED) measures the responsiveness of the quantity demanded of a good or service to a change in its price.

Income elasticity of demand (YED) measures the responsiveness of the quantity demanded of a good or service to a change in income.

Price elasticity of supply (PES) measures the responsiveness of the quantity supplied of a good or service to a change in its price.

Cluster analysis is a method aims to classify a set of objects such that objects in the same cluster (or group) are more similar to each other than to those in other clusters.

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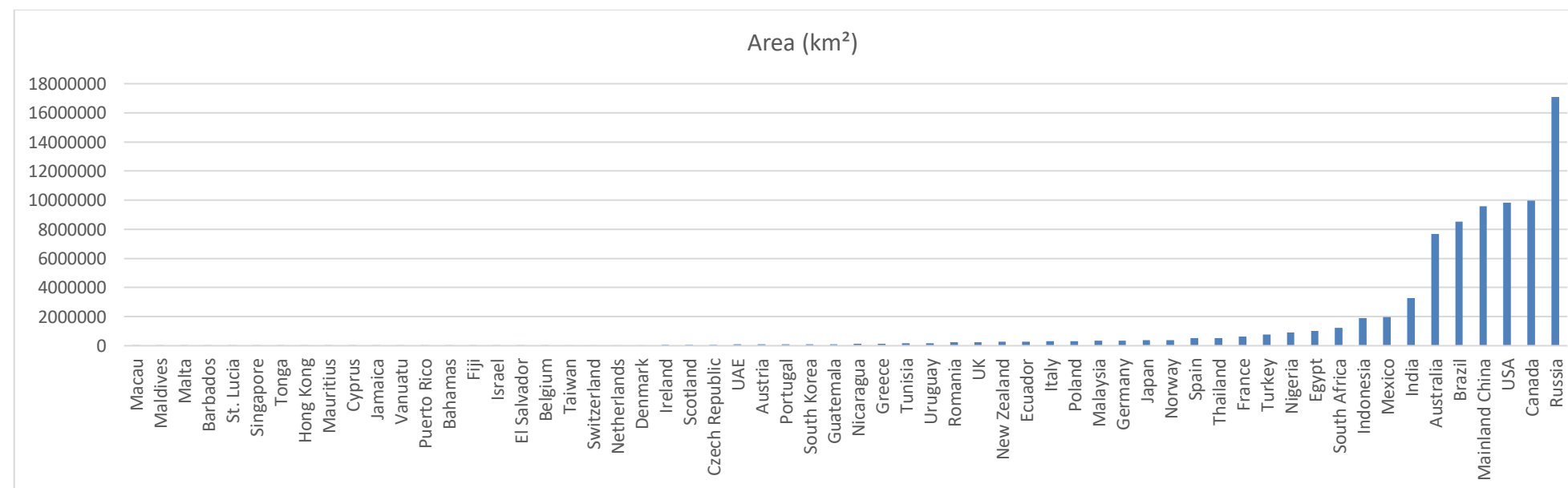
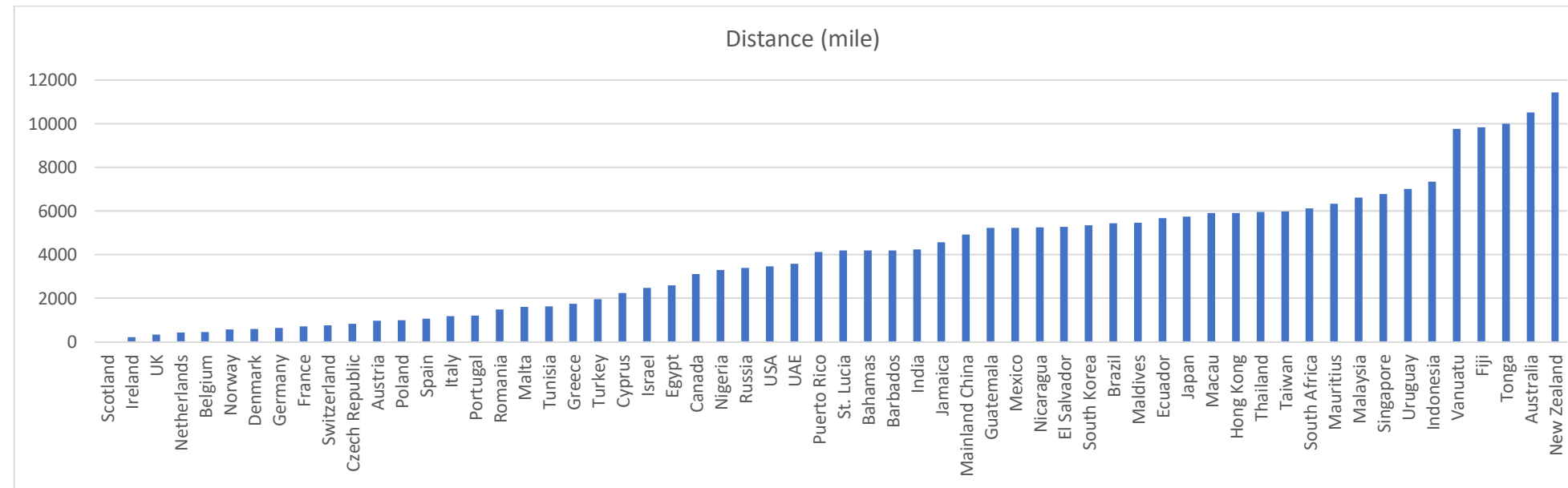
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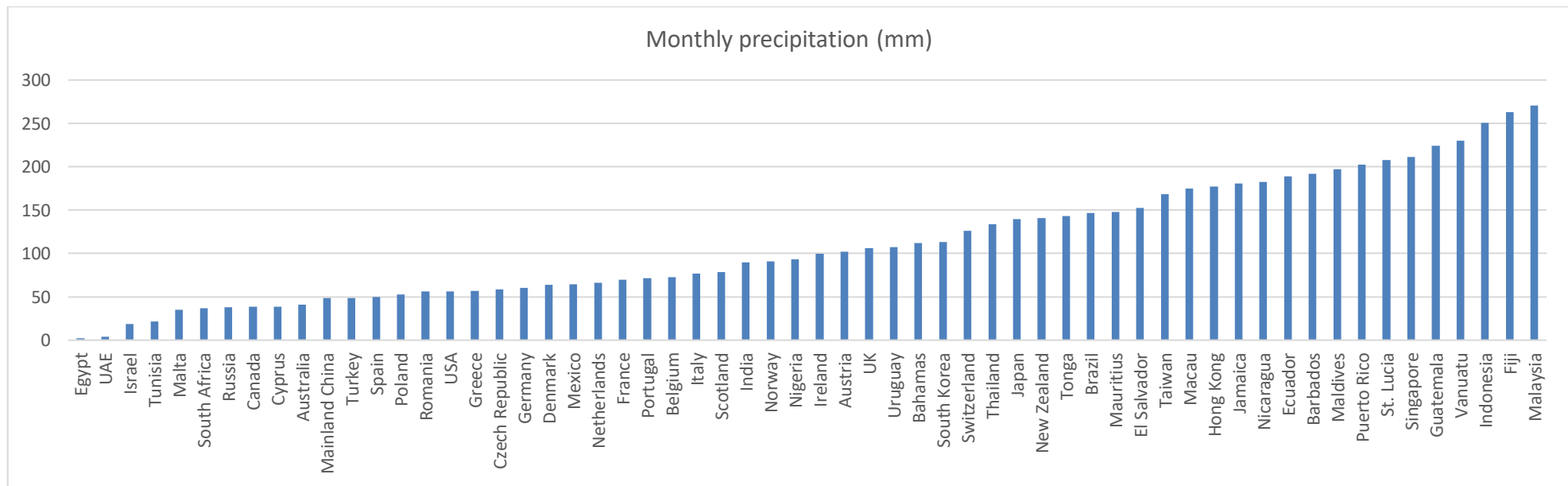
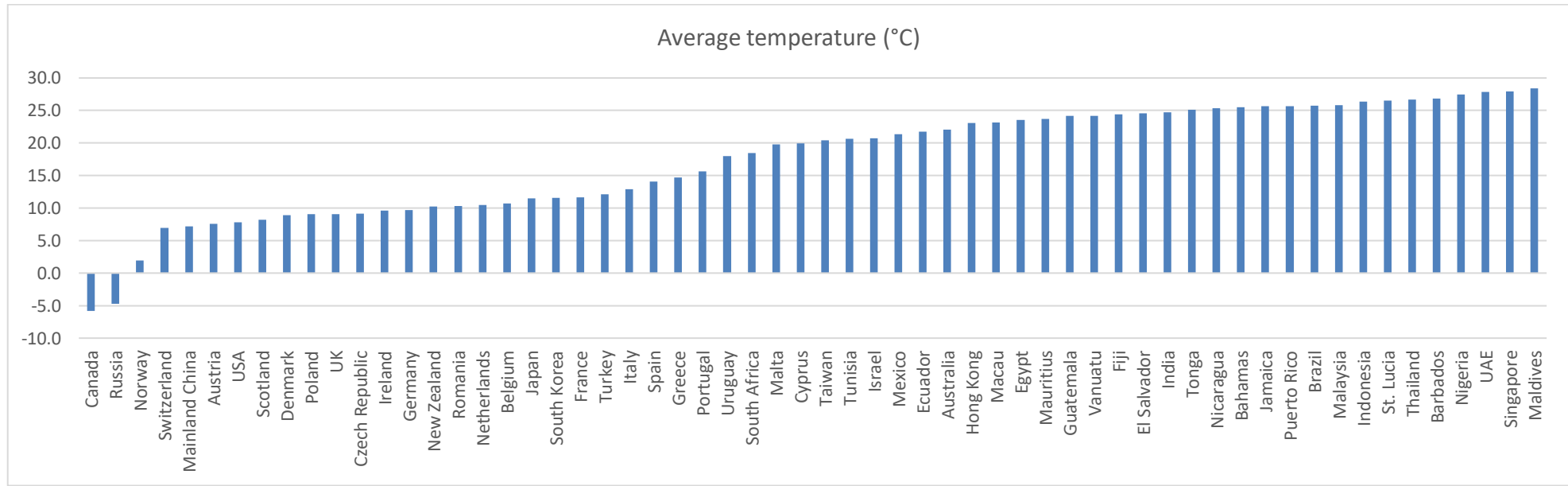
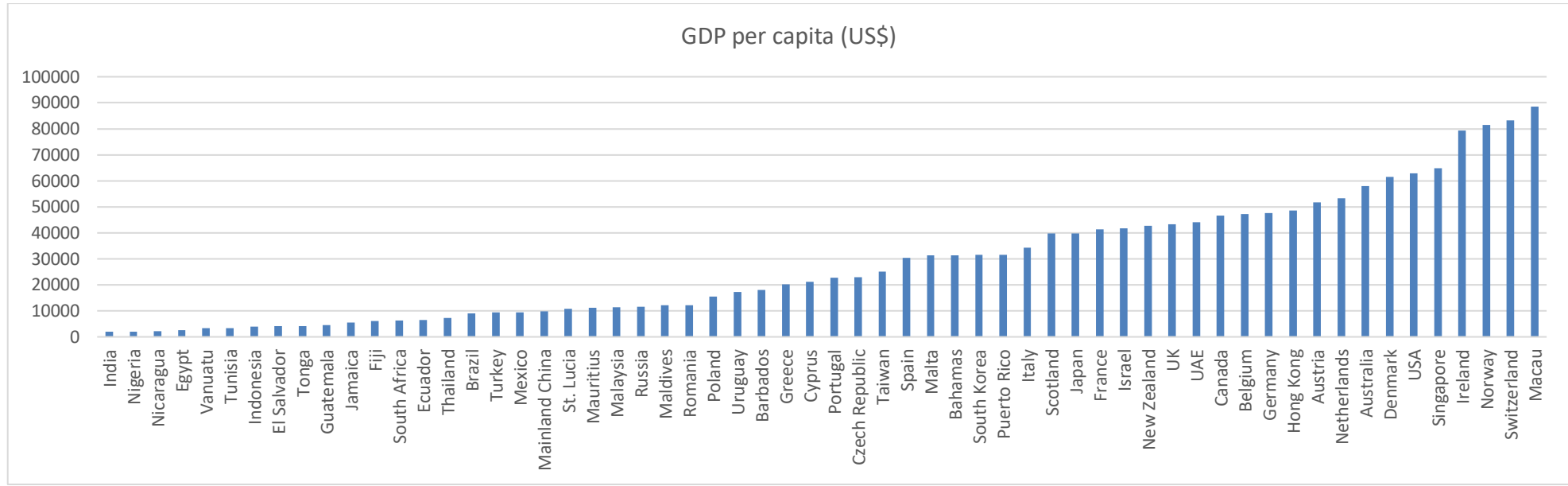
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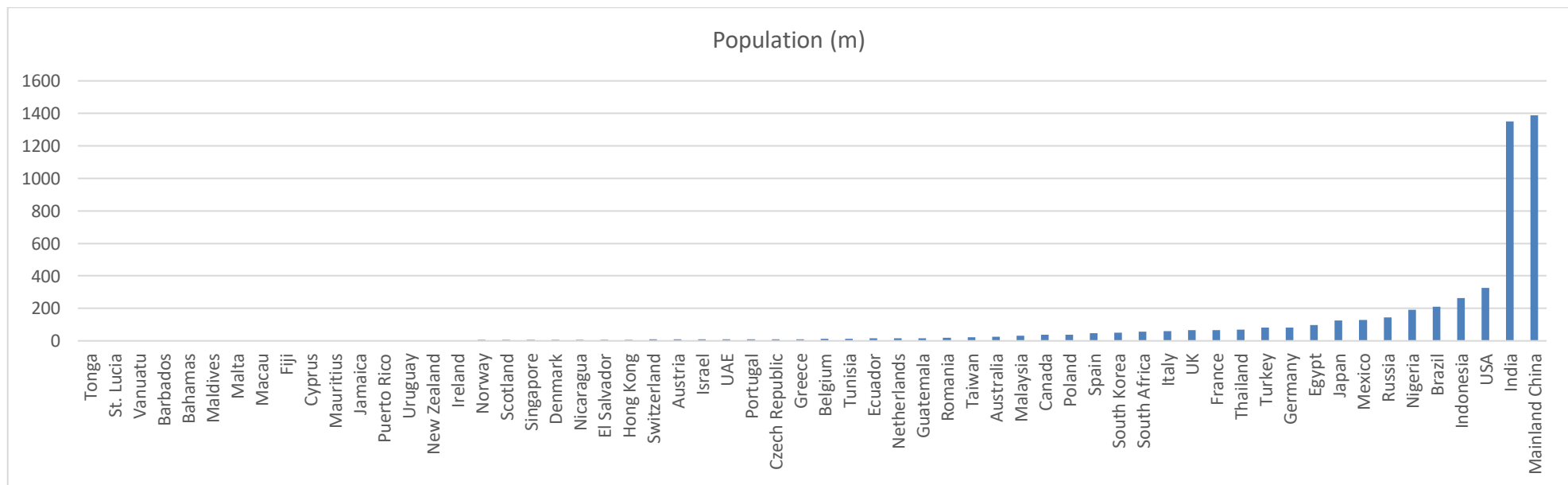
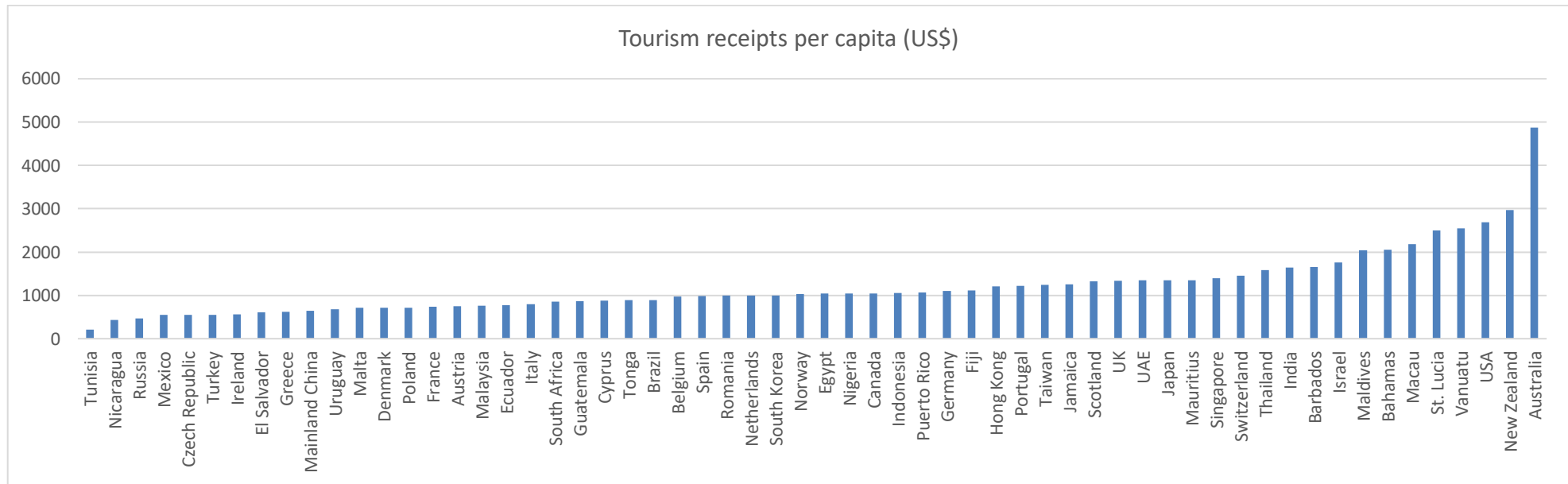
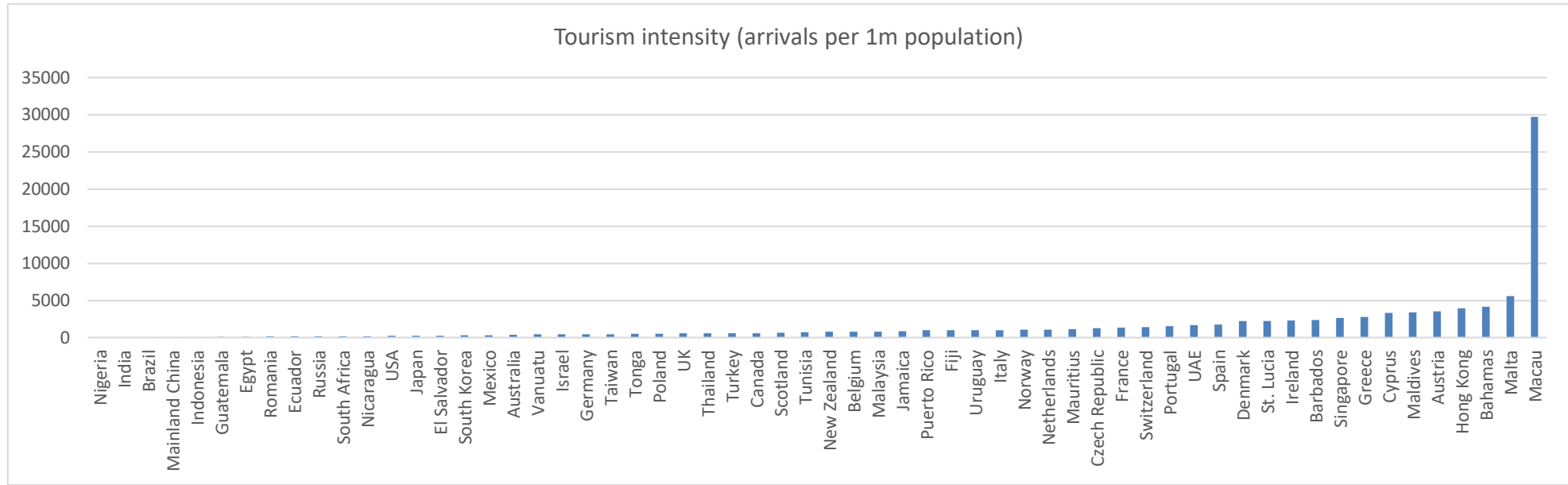
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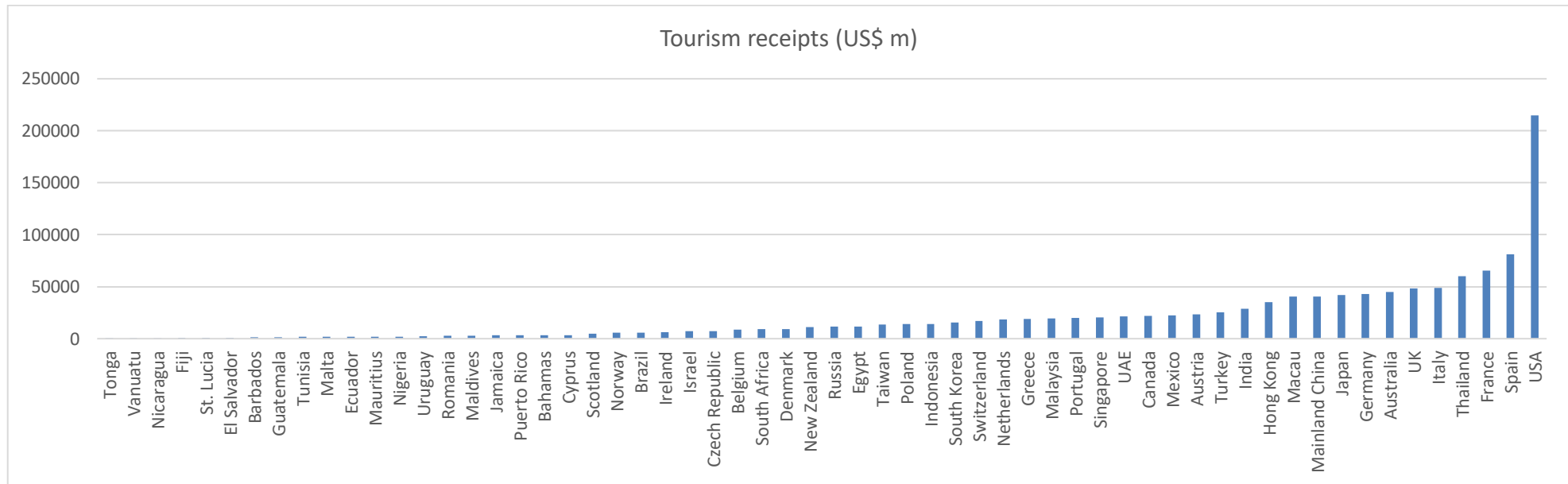
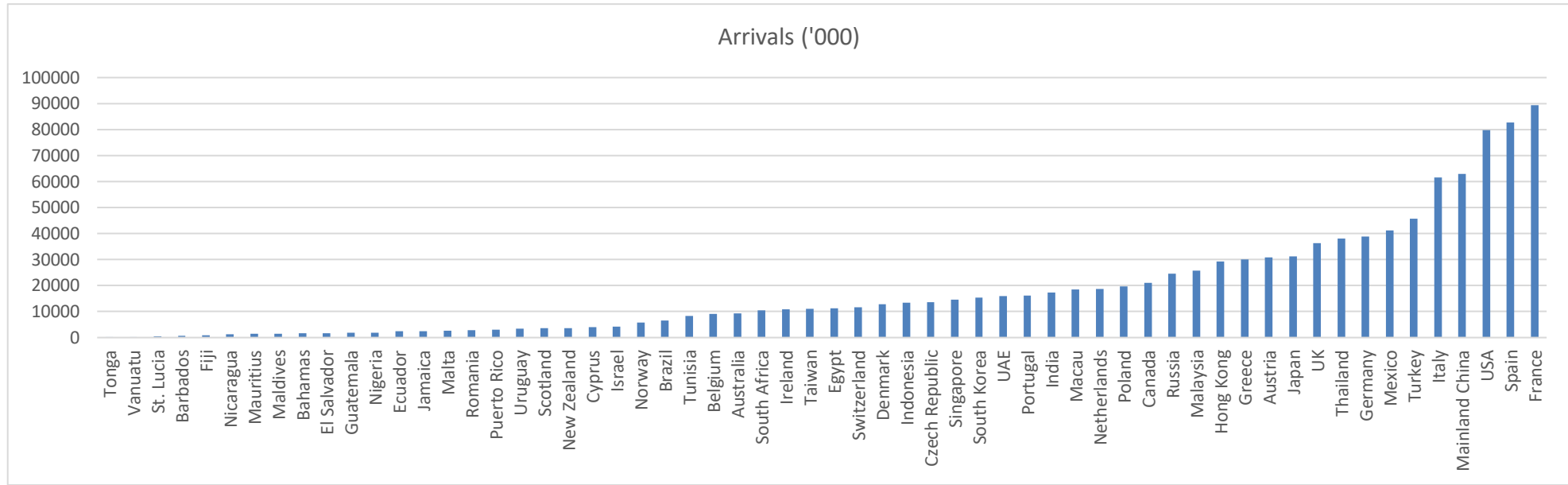
Appendices

Appendix A. Destination characteristics for cluster analysis









Appendix B. Publications estimated elasticities of tourism demand

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
Agiomirgianakis, Bertsatos and Tsounis	2018	Turkey	65 origin countries	x	x	0.353	GDP of origin country	PPP; RERV; TO; HC; ICT	Panel DOLS	Turkish Ministry of Tourism web pages	1996Q1-2014Q4	0
		Turkey	65 origin countries	x	x	0.37	GDP of origin country	PPP; RERV; TO; HC; ICT	Panel FMOLS	Turkish Ministry of Tourism web pages	1996Q1-2014Q4	
Altin and Uysal	2014	Turkey	Austria	0.016	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	2
		Turkey	Belgium	-0.419	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Denmark	-0.126	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	UK	0.89	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Finland	-0.203	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Germany	-0.022	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Greece	-0.676	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Ireland	-0.996	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Italy	-0.377	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Luxembourg	-0.597	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Portugal	-0.299	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Spain	-2.79	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
		Turkey	Sweden	0.549	RP	x	x	ESI (O); IR (O); EX (O-D)	ADLM	Turkish Ministry of Tourism web pages	2001-2007 M	
Álvarez-Díaz, D'Hombres, Ghisetti and Pontarollo	2020	Spain	Spain (Domestic)	-5.50	RP	0.13	GDP of origin country	POP; DIST; Dependence etc.	Gravity model	Domestic and Outbound Tourism Survey	2011-2013	2
				-6.44	RP	0.21	GDP of origin country	POP; DIST; Dependence etc.	SAR	Domestic and Outbound Tourism Survey	2011-2013	
				-6.09	RP	1.21	GDP of origin country	POP; DIST; Dependence etc.	SE	Domestic and Outbound Tourism Survey	2011-2013	
				-7.59	RP	0.2	GDP of origin country	POP; DIST; Dependence etc.	SD	Domestic and Outbound Tourism Survey	2011-2013	
				-7.32	RP	0.4	GDP of origin country	POP; DIST; Dependence etc.	SDE	Domestic and Outbound Tourism Survey	2011-2013	
				-7.59	RP	-0.01	GDP of origin country	POP; DIST; Dependence etc.	SLX	Domestic and Outbound Tourism Survey	2011-2013	
Álvarez-Díaz, González-Gómez and Otero-Giráldez	2015	Spain	Germany	-0.91	RP	1.23	Business Climate Index	x	ADLM	Spanish Statistical Institute	Jan1999-Dec2011	2
			UK	-0.53	RP	1.08	Index of Services	x	ADLM	Spanish Statistical Institute	Jan1999-Dec2011	
			Netherlands	-1.52	RP	1.55	IPI	x	ADLM	Spanish Statistical Institute	Jan1999-Dec2011	
			Italy	-1.02	RP	1.05	IPI	x	ADLM	Spanish Statistical Institute	Jan1999-Dec2011	
Álvarez-Díaz, González-Gómez and Otero-Giráldez	2019	Spain	EU	-7.49	CPI (North Portugal)	2.33	IPI of origin country	Number of LLC passengers	ECM	Euro stats	Jan2005-Dec2016	1
			EU	-5.33	CPI (Galicia)	1.69	IPI of origin country	Number of LLC passengers	ECM	Euro stats	Jan2005-Dec2016	
Athanasopoulos, Deng, Li and Song	2014	Australia	Australia (Domestic)	-0.303	RP	x	x	x	EC-AIDS	Tourism Research Australia	2000Q1-2010Q3	4
		Asia	Australia	-0.397	RP	x	x	x	EC-AIDS	Tourism Research Australia	2000Q1-2010Q3	
		USA	Australia	-1.003	RP	x	x	x	EC-AIDS	Tourism Research Australia	2000Q1-2010Q3	
		UK	Australia	-0.951	RP	x	x	x	EC-AIDS	Tourism Research Australia	2000Q1-2010Q3	
		New Zealand	Australia	-1.36	RP	x	x	x	EC-AIDS	Tourism Research Australia	2000Q1-2010Q3	
Balli, Balli, and Jean Louis	2016	Whole sample	Worldwide	x	x	0.36	GDP of origin country	Colony; DIST; EX etc.	Dynamic panel model	UNWTO; WDI etc.	1995-2010	4
		Asian-pacific	Worldwide	x	x	0.54	GDP of origin country	Colony; DIST; EX etc.	Dynamic panel model	UNWTO; WDI etc.	1995-2010	
		Latin America	Worldwide	x	x	0.94	GDP of origin country	Colony; DIST; EX etc.	Dynamic panel model	UNWTO; WDI etc.	1995-2010	
		Africa	Worldwide	x	x	0.46	GDP of origin country	Colony; DIST; EX etc.	Dynamic panel model	UNWTO; WDI etc.	1995-2010	
		Europe	Worldwide	x	x	0.54	GDP of origin country	Colony; DIST; EX etc.	Dynamic panel model	UNWTO; WDI etc.	1995-2010	
Callaghan and Tol	2013	Unspecified	UK (Holiday)	-0.655	Average trip price	x	x	DIST; EX; GDP(D) etc.	Univariate regression	UK Office of National Statistics (ONS)	1996-2010	1
		Unspecified	UK (Business)	-0.576	Average trip price	x	x	DIST; EX; GDP(D) etc.	Univariate regression	UK Office of National Statistics (ONS)	1996-2010	
		Unspecified	UK (1-3 nights)	-1.11	Average trip price	x	x	DIST; EX; GDP(D) etc.	Univariate regression	UK Office of National Statistics (ONS)	1996-2010	
		Unspecified	UK (4-13 nights)	-0.869	Average trip price	x	x	DIST; EX; GDP(D) etc.	Univariate regression	UK Office of National Statistics (ONS)	1996-2010	
		Unspecified	UK (14-27 nights)	-0.565	Average trip price	x	x	DIST; EX; GDP(D) etc.	Univariate regression	UK Office of National Statistics (ONS)	1996-2010	
		Unspecified	UK (28-90 nights)	-0.002	Average trip price	x	x	DIST; EX; GDP(D) etc.	Univariate regression	UK Office of National Statistics (ONS)	1996-2010	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
Divisekera	2010	Australia	New Zealand (Food)	-0.77	Price level	1.19	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	4
			New Zealand (Trans)	-0.54	Price level	0.85	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			New Zealand (Shop)	-0.41	Price level	0.91	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			New Zealand (Entmt.)	-0.32	Price level	0.82	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	Japan (Food)	-0.54	Price level	1.27	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			Japan (Trans)	-0.51	Price level	0.98	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			Japan (Shop)	-0.7	Price level	0.92	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			Japan (Entmt.)	-0.32	Price level	1.03	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	UK (Food)	-0.34	Price level	0.86	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			UK (Trans)	-0.11	Price level	1.09	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			UK (Shop)	-0.29	Price level	0.82	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			UK (Entmt.)	-0.37	Price level	1.19	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	US (Food)	-0.42	Price level	0.8	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			US (Trans)	-0.36	Price level	0.97	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			US (Shop)	-0.5	Price level	0.77	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			US (Entmt.)	-0.32	Price level	0.75	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	Aggregated (Food)	-0.54	Price level	0.96	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
			Aggregated (Trans)	-0.16	Price level	0.9	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
Aggregated (Shop)	-0.3		Price level	1.01	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1			
Aggregated (Entmt.)	-0.13		Price level	0.86	Income	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1			
Divisekera and Deegan	2010	Ireland	UK (Food)	-0.39	Spending per night	0.61	Income	x	AIDS	Irish Tourist Board Survey	N/A	2
			UK (Trans)	-0.27	Spending per night	1.1	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			UK (Shop)	-0.72	Spending per night	2.04	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			UK (Sightseeing)	-0.13	Spending per night	0.13	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			UK (Misc.)	-0.15	Spending per night	1.04	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			UK (Lodging)	-0.41	Spending per night	1.05	Income	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	North America (Food)	-0.33	Spending per night	1.12	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			North America (Trans)	-0.29	Spending per night	0.1	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			North America (Shop)	-0.29	Spending per night	0.95	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			North America (Sights)	-0.22	Spending per night	1.13	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			North America (Misc.)	-0.05	Spending per night	1.11	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			North America (Lodging)	-0.38	Spending per night	1.27	Income	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	Europe (Food)	-0.38	Spending per night	1.08	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Europe (Trans)	-0.17	Spending per night	0.85	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Europe (Shop)	-0.2	Spending per night	0.76	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Europe (Sights)	-0.18	Spending per night	1.06	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Europe (Misc.)	-0.13	Spending per night	1.07	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Europe (Lodging)	-0.27	Spending per night	1.09	Income	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	Rest of World (Food)	-0.47	Spending per night	1.21	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Rest of World (Trans)	-0.46	Spending per night	0.86	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Rest of World (Shop)	-0.22	Spending per night	0.32	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Rest of World (Sights)	-0.09	Spending per night	1.4	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Rest of World (Misc.)	-0.15	Spending per night	1.07	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Rest of World (Lodging)	-0.49	Spending per night	1.32	Income	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	Aggregated (Food)	-0.38	Spending per night	1.09	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Aggregated (Trans)	-0.07	Spending per night	0.59	Income	x	AIDS	Irish Tourist Board Survey	N/A	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
			Aggregated (Shop)	-0.18	Spending per night	0.83	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Aggregated (Sights)	-0.15	Spending per night	1.22	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Aggregated (Misc.)	-0.14	Spending per night	1	Income	x	AIDS	Irish Tourist Board Survey	N/A	
			Aggregated (Lodging.)	-0.34	Spending per night	1.15	Income	x	AIDS	Irish Tourist Board Survey	N/A	
Dogru and Sirakaya-Turk	2018	France	Turkey	-2.066	RP	-0.053	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	0
		Netherlands	Turkey	-1.661	RP	0.186	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
+++		Germany	Turkey	-0.328	RP	1.109	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Italy	Turkey	2.181	RP	1.190	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		UK	Turkey	-2.111	RP	1.084	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Greece	Turkey	1.516	RP	2.198	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Spain	Turkey	-0.431	RP	-0.264	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Belgium	Turkey	-3.019	RP	2.509	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Austria	Turkey	-0.643	RP	2.857	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Switzerland	Turkey	0.392	RP	0.122	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Russia	Turkey	-0.984	RP	0.934	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		United States	Turkey	-1.361	RP	0.588	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
		Aggregated	Turkey	-0.380	RP	0.764	GDP of origin country	x	Panel FMOLS	Turkish Ministry of Tourism web pages	2003-2013	
Dwyer, Seetaram, Forsyth and King	2014	Australia	Unspecified (Total)	-0.380	RP	0.764	GDP of origin country	x	OLS	Australian Bureau of Statistics	1991	4
		Australia	Unspecified (VFR)	-0.216	RP	1.424	GDP of origin country	x	OLS	Australian Bureau of Statistics	1991	
		Australia	Unspecified (Non-VFR)	-0.134	RP	1.058	GDP of origin country	x	OLS	Australian Bureau of Statistics	1991	
		Australia	Unspecified (Total)	-0.295	RP	1.551	GDP of origin country	x	OLS	Australian Bureau of Statistics	2006	
		Australia	Unspecified (VFR)	-0.927	RP	0.977	GDP of origin country	x	OLS	Australian Bureau of Statistics	2006	
		Australia	Unspecified (Non-VFR)	-0.158	RP	0.797	GDP of origin country	x	OLS	Australian Bureau of Statistics	2006	
		Unspecified	Australia (Total)	-1.005	RP	1.009	GDP of origin country	x	OLS	Australian Bureau of Statistics	1991	
		Unspecified	Australia (VFR)	-0.232	RP	1.19	GDP of origin country	x	OLS	Australian Bureau of Statistics	1991	
		Unspecified	Australia (Non-VFR)	-0.221	RP	0.851	GDP of origin country	x	OLS	Australian Bureau of Statistics	1991	
		Unspecified	Australia (Total)	-0.155	RP	1.291	GDP of origin country	x	OLS	Australian Bureau of Statistics	2006	
		Unspecified	Australia (VFR)	-0.61	RP	0.8	GDP of origin country	x	OLS	Australian Bureau of Statistics	2006	
		Unspecified	Australia (Non-VFR)	-0.28	RP	0.59	GDP of origin country	x	OLS	Australian Bureau of Statistics	2006	
Emili, Figini and Guizzardi	2019	Catania	Germany (Arrivals)	-0.589	RP	2.310	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	2
		Catania	Germany (Nights)	-0.313	RP	2.240	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Catania	UK (Arrivals)	-0.194	RP	3.786	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
+++		Catania	UK (Nights)	0.494	RP	4.454	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Florence	Germany (Arrivals)	1.286	RP	0.963	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Florence	Germany (Nights)	1.275	RP	1.445	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Florence	UK (Arrivals)	-0.322	RP	2.568	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Florence	UK (Nights)	-0.171	RP	2.208	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Milan	Germany (Arrivals)	1.849	RP	-0.093	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Milan	Germany (Nights)	1.922	RP	-0.068	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Milan	UK (Arrivals)	-0.393	RP	-0.029	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
		Milan	UK (Nights)	-0.421	RP	-0.519	GDP of origin country	Climate; Google trends	OLS	the Italian Statistics Office	Jan2004-Dec2014	
Engström and Kipperberg	2015	Norway	Unspecified	x	x	0.265	Household income	LOS; Travel size	OLS	Survey data	N/A	4
+++		Norway	Unspecified	x	x	-0.036	Household income	LOS; Travel size	WLS	Survey data	N/A	
Eugenio-Martin and Campos-Soria	2011	Domestic	EU-15	x	x	0.0002	Household income	Demographic info; Climate	Regression	Survey data	N/A	2
		Abroad	EU-15	x	x	0.0005	Household income	Demographic info; Climate	Regression	Survey data	N/A	
Falk	2013	Swiss Mount	Unspecified (Nights)	-3.02	RP to competitors	2.34	GDP of origin country	EX	Median regression	the Swiss Federal Statistics Office	07-08;10-11	0

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
		Swiss Mount	Unspecified (Nights)	-2.99	RP to competitors	2.23	GDP of origin country	EX	OLS	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Nights)	-3.04	RP to competitors	2.11	GDP of origin country	EX	Robust regression	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Arrivals)	-2.1	RP to competitors	2.13	GDP of origin country	EX	Median regression	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Arrivals)	-2.16	RP to competitors	2.08	GDP of origin country	EX	OLS	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Arrivals)	-2.46	RP to competitors	2.39	GDP of origin country	EX	Robust regression	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Nights)	-1.49	RP to competitors	2.8	GDP of origin country	x	Median regression	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Nights)	-1.16	RP to competitors	2.4	GDP of origin country	x	OLS	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Nights)	-3.04	RP to competitors	2.11	GDP of origin country	x	Robust regression	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Arrivals)	-1.49	RP to competitors	2.93	GDP of origin country	x	Median regression	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Arrivals)	-1.41	RP to competitors	2.42	GDP of origin country	x	OLS	the Swiss Federal Statistics Office	07-08;10-11	
		Swiss Mount	Unspecified (Arrivals)	-1.5	RP to competitors	2.81	GDP of origin country	x	Robust regression	the Swiss Federal Statistics Office	07-08;10-11	
Gatt and Falzon	2014	Cyprus	UK (estimated without Malta)	-3.44	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	2
+++		Cyprus	UK (estimated without Turkey)	-2.7	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Greece	UK (estimated without Malta)	-2.87	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Greece	UK (estimated without Turkey)	-2.89	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Italy	UK (estimated without Malta)	-2.02	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Italy	UK (estimated without Turkey)	-1.72	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Malta	UK (estimated without Malta)	-2.56	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Malta	UK (estimated without Turkey)	-1.13	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Portugal	UK (estimated without Malta)	-2.6	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Portugal	UK (estimated without Turkey)	-2.73	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Spain	UK (estimated without Malta)	-1.46	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Spain	UK (estimated without Turkey)	-1.46	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Turkey	UK (estimated without Malta)	-0.76	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
		Turkey	UK (estimated without Turkey)	-0.76	RP	x	x	Expenditure shares in alternative destinations	AIDS	Statistics Institutes	1963-2009	
Gounopoulos, Petmezas and Santamaria	2012	Greece	UK	-0.031	Relative CPI	x	x	Consumer confidence; Unemployment	VAR	Hellenic Statistical Authority	1977-2009	4
		Greece	Germany	-0.172	Relative CPI	x	x	Consumer confidence; Unemployment	VAR	Hellenic Statistical Authority	1977-2009	
		Greece	Italy	-0.095	Relative CPI	x	x	Consumer confidence; Unemployment	VAR	Hellenic Statistical Authority	1977-2009	
		Greece	USA	0.106	Relative CPI	x	x	Consumer confidence; Unemployment	VAR	Hellenic Statistical Authority	1977-2009	
		Greece	France	0.066	Relative CPI	x	x	Consumer confidence; Unemployment	VAR	Hellenic Statistical Authority	1977-2009	
		Greece	Netherlands	-0.026	Relative CPI	x	x	Consumer confidence; Unemployment	VAR	Hellenic Statistical Authority	1977-2009	
Gunter and Smeral	2017	Unspecified	EU-15	-0.916	Relative tourism import prices	1.441	GDP of origin country	x	OLS	IMF; OECD	1981Q1-2014Q1	2
		Unspecified	EU-28	-0.548	Relative tourism import prices	1.473	GDP of origin country	x	OLS	IMF; OECD	1996Q1-2014Q1	
		Unspecified	Central and Eastern Europe	-0.768	Relative tourism import prices	1.329	GDP of origin country	x	OLS	IMF; OECD	1996Q1-2014Q1	
Halicioglu	2010	Unspecified	Turkey	-0.18	RP	1.42	GDP of origin country	x	ADLM	IFS	1970-2005	2
		Unspecified	Turkey	-0.19	RP	1.49	GDP of origin country	x	ADLM	IFS	1970-2005	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
Jeřábek	2019	Czech Republic	France	-0.416	RER	1.27	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	0
		Czech Republic	Austria	-0.183	RER	1.47	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	The Netherlands	-0.783	RER	1.497	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Germany	-1.114	RER	0.9	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	the Slovak Republic	-0.793	RER	0.908	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Spain	-0.965	RER	1.541	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Italy	0.035	RER	0.65	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Sweden	-0.655	RER	0.007	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Israel	-1.885	RER	1.777	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Japan	0.0401	RER	0.003	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	USA	-0.202	RER	0.803	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Poland	-0.72	RER	0.722	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Hungary	-0.445	RER	0.473	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	France	-1.437	RER	0.781	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Austria	-1.844	RER	2.047	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	The Netherlands	-1.225	RER	0.563	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Germany	-2.587	RER	1.27	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	the Slovak Republic	-1.165	RER	1.575	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Spain	0.465	RER	0.49	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Italy	-0.485	RER	1.293	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Sweden	-0.48	RER	0.577	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Israel	-0.13	RER	0.453	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Japan	-0.395	RER	-0.143	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	USA	0.415	RER	0.463	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Poland	-0.345	RER	0.323	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
		Czech Republic	Hungary	-0.055	RER	1.293	GDP of origin country	outbound tourists	CGE	Czech statistical office; FRED etc.	2013Q1-2017Q4	
Ketenci	2010	Turkey	Austria	-2.44	RP	7.01	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	0
		Turkey	Austria	-2.32	RP	6.49	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Austria	-2.25	RP	6.25	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Austria	-1.09	RP	5.18	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Austria	1.14	RP	-5.24	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Belgium	-1.83	RP	8.96	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Belgium	-1.6	RP	8.33	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Belgium	-0.88	RP	7.17	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
		Turkey	Belgium	-0.38	RP	6.79	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Belgium	-0.03	RP	-6.27	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Bulgaria	0.25	RP	3.22	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Bulgaria	0.3	RP	2.85	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Bulgaria	0.21	RP	4.1	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Bulgaria	0.05	RP	1.55	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Bulgaria	-0.65	RP	-1.57	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Denmark	-3.21	RP	10.28	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Denmark	-2.82	RP	9.22	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Denmark	-3.11	RP	10.04	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Denmark	-1.33	RP	7.4	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Denmark	1.19	RP	-7	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	UK	-1.71	RP	5.36	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	UK	-1.4	RP	4.89	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	UK	-0.07	RP	3.94	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	UK	0.86	RP	2.62	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	UK	-1.61	RP	-1.64	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	USA	-0.87	RP	3.48	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	USA	-0.72	RP	3.29	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	USA	-0.33	RP	3.07	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	USA	-0.52	RP	2.71	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	USA	-0.42	RP	-1.3	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	France	-1.21	RP	5.69	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	France	-0.97	RP	5.11	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	France	-0.01	RP	3.39	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	France	-0.22	RP	4.39	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	France	-0.33	RP	-3.61	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Germany	-1.91	RP	10.56	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Germany	-1.71	RP	9.56	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Germany	-1.71	RP	9.66	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Germany	-0.95	RP	8.08	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Germany	0	RP	-5.85	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Greece	-0.58	RP	4.02	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Greece	-0.56	RP	3.99	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Greece	-0.79	RP	4.16	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Greece	-0.35	RP	3.98	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Greece	0.13	RP	-4.23	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Netherlands	0.75	RP	-1.41	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Netherlands	0.64	RP	-0.88	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Netherlands	0.7	RP	-0.71	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Netherlands	0.65	RP	-0.24	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Netherlands	-0.65	RP	0.98	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Italy	-0.4	RP	17.47	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Italy	-0.47	RP	18.17	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Italy	-0.78	RP	25.13	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Italy	-0.26	RP	13.44	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
		Turkey	Italy	0.92	RP	-26.42	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Russia	-0.65	RP	5.16	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Russia	-0.59	RP	4.52	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Russia	-0.53	RP	4.22	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Russia	-0.45	RP	3.93	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Russia	0.09	RP	-3.39	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Sweden	-3.59	RP	8.78	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Sweden	-3.21	RP	7.93	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Sweden	-2.9	RP	7.66	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Sweden	-1.26	RP	5.11	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Sweden	0.63	RP	-3.99	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Switzerland	-2.5	RP	14.87	GDP of origin country	x	OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Switzerland	-2.35	RP	14.12	GDP of origin country	x	FM-OLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Switzerland	-2.93	RP	15.71	GDP of origin country	x	DOLS	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Switzerland	-2.07	RP	12.82	GDP of origin country	x	ADLM	Turkish Statistical Institute	Jan1996-Dec2006	
		Turkey	Switzerland	5.15	RP	-19.11	GDP of origin country	x	JOH-ML	Turkish Statistical Institute	Jan1996-Dec2006	
Massidda and Etzo	2012	Italy	domestic	-8.974	RP	1.4274	GDP of origin country	POP; DIST etc.	GMM	Italian National Institute of Statistics (ISTAT)	2004-2007	4
Ordóñez, Ordóñez and Torres	2010	Spain	Unspecified	-0.82	RP	2.3	GDP of origin country	Distance	OLS	Yearbook of Tourism Statistics etc.	1987-2004	2
		Spain	Unspecified	-0.99	RP	2.42	GDP of origin country	Distance	GLS	Yearbook of Tourism Statistics etc.	1987-2004	
Otero-Giráldez, Álvarez-Díaz and González-Gómez	2012	Spain	domestic	-5	CPI (Tourism)	0.76	IPI	Climate data	ADLM	Spanish Statistical Institute	Jan1999-Dec2010	4
Rey, Myro and Galera	2011	Spain	Unspecified	0.05	RP	2.73	GDP of origin country	Transport price; Infrastructure quality	the Balestra estimator	Tourism studies institute of Spain; IMF	2000-2009	1
		Spain	Unspecified	0.022	RP	1.31	GDP of origin country	Transport price; Infrastructure quality	the AB estimator	Tourism studies institute of Spain; IMF	2000-2009	
Salmasi, Celidoni and Procidano	2012	Domestic	Italy Q 0.1	-1.28	RP (Tourist service)	0.02	GDP of origin country	Demographic data	CQRM	Survey on business and leisure	2002-2008	2
		Domestic	Italy Q 0.25	-1.1	RP (Tourist service)	30.02	GDP of origin country	Demographic data	CQRM	Survey on business and leisure	2002-2008	
		Domestic	Italy Q 0.5	-1	RP (Tourist service)	0.02	GDP of origin country	Demographic data	CQRM	Survey on business and leisure	2002-2008	
		Domestic	Italy Q 0.75	-0.85	RP (Tourist service)	0.02	GDP of origin country	Demographic data	CQRM	Survey on business and leisure	2002-2008	
		Domestic	Italy Q 0.9	-0.21	RP (Tourist service)	0.02	GDP of origin country	Demographic data	CQRM	Survey on business and leisure	2002-2008	
Santos and Cincera	2018	Brussels		-3.271	RP	2.189	GDP of origin country	Market share of LCC; EX etc.	Regression	OECD; Euro stats etc.	2002-2014	
+++		Brussels		-0.827	RP	3.771	GDP of origin country	Market share of LCC; EX etc.	Regression	OECD; Euro stats etc.	2002-2014	
		Brussels		-5.096	RP	0.0368	GDP of origin country	Market share of LCC; EX etc.	Regression	OECD; Euro stats etc.	2002-2014	
Seetaram	2012	Unspecified	Australia	0.11	RER	3.63	Real average income	Real average airfare;	the AB estimator	Reserve bank of Australia; ABS	1991-2008	2
		Unspecified	Australia	0.13	RER	3.96	Real average income	Real average airfare;	CLSDV	Reserve bank of Australia; ABS	1991-2008	2
Seetaram, Forsyth and Dwyer	2016	Unspecified	Australia	-0.003	RER	2.773	Real average income	Migration variable; transportation cost etc.	DOLS	Reserve bank of Australia; ABS	1990-2008	4
		Unspecified	Australia	-1.402	PCI	3.132	Real average income	Migration variable; transportation cost etc.	DOLS	Reserve bank of Australia; ABS	1990-2008	
Seetaram, Song and Page	2014	France	UK	-0.11	RP	1.18	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	4
		Germany	UK	-0.05	RP	1.16	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
+++		Spain	UK	-1.12	RP	1.68	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		Italy	UK	-1.14	RP	2.05	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		Greece	UK	-2.02	RP	0.36	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		Turkey	UK	x	RP	1.65	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		Egypt	UK	-0.5	RP	4.11	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		USA	UK	-0.09	RP	0.76	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		HK	UK	-0.19	RP	2.21	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
		Australia	UK	-0.69	RP	1.63	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		Aggregate (Long-haul)	UK	-0.89	RP	1.35	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
		Aggregate (Short-haul)	UK	-0.37	RP	2.18	Real aggregated income	Tax	ADLM	Office for National Statistics	1994Q4-2010Q4	
Serra, Correia and Rodrigues	2014	Portugal	Six main origins	x	x	0.89	GDP of origin country	Unemployment rate; final household consumption	The AB estimator	Euro stats	2000-2011	1
		Portugal	Six main origins	-1.3875	HCPI	x	x	Unemployment rate; final household consumption	The AB estimator	Euro stats	2000-2011	
		Portugal	Six main origins	x	x	2.15	GDP of origin country	Unemployment rate; final household consumption	The AB estimator	Euro stats	2000-2011	
		Portugal	Six main origins	x	x	5.7	GDP of origin country	Unemployment rate; final household consumption	The AB estimator	Euro stats	2000-2011	
Smeral	2012	Australia (Fast growth)	Unspecified	-0.96	Price index of tourism imports	1.96	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1978-2009	4
		Australia (Slow growth)	Unspecified	-0.96	Price index of tourism imports	2.67	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1978-2009	
		Canada (Fast)	Unspecified	-1.42	Price index of tourism imports	0.91	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1978-2009	
		Canada (Slow)	Unspecified	-1.42	Price index of tourism imports	1.24	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1978-2009	
		EU-15 (Fast)	Unspecified	-1.05	Price index of tourism imports	2.35	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1978-2009	
		EU-15 (Slow)	Unspecified	-1.05	Price index of tourism imports	1.46	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1978-2009	
		Japan (Fast)	Unspecified	-0.73	Price index of tourism imports	2.19	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1985-2009	
		Japan (Slow)	Unspecified	-0.73	Price index of tourism imports	4.49	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1985-2009	
		USA (Fast)	Unspecified	-0.84	Price index of tourism imports	2.53	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1985-2009	
		USA (Slow)	Unspecified	-0.84	Price index of tourism imports	2.01	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1985-2009	
Smeral	2014	Australia		-1.19	Price index of tourism imports	3.857	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1979-2015	2
		Canada		-1.43	Price index of tourism imports	0.98	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1979-2015	
		EU-15		-1.07	Price index of tourism imports	2.07	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1979-2015	
		Japan		-0.8	Price index of tourism imports	2.78	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1979-2015	
		USA		-0.75	Price index of tourism imports	1.578	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	1979-2015	
Smeral	2019	Canada		-0.940	Price index of tourism imports	Insignificant	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q1)	2
		Canada		-0.950	Price index of tourism imports	1.230	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q2)	
		Canada		-2.442	Price index of tourism imports	3.442	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q3)	
		Canada		-1.280	Price index of tourism imports	1.400	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q4)	
		EU-15		-2.800	Price index of tourism imports	2.160	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q1)	
		EU-15		-0.148	Price index of tourism imports	0.599	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q2)	
		EU-15		Insignificant	Price index of tourism imports	0.618	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q3)	
		EU-15		Insignificant	Price index of tourism imports	1.700	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q4)	
		Japan		-5.533	Price index of tourism imports	5.400	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q1)	
		Japan		-1.240	Price index of tourism imports	4.970	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q2)	

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	Other key variables	Method/Model	Data source	Data range	AJG rating
			Japan	-0.910	Price index of tourism imports	3.520	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q3)	
			Japan	-0.870	Price index of tourism imports	1.940	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q4)	
			USA	-0.850	Price index of tourism imports	3.020	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q1)	
			USA	-1.060	Price index of tourism imports	4.540	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q2)	
			USA	-0.990	Price index of tourism imports	2.660	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q3)	
			USA	-1.150	Price index of tourism imports	2.460	GDP of origin country	x	ADLM	IMF; OECD; UNWTO	2000-2015(Q4)	
Surugiu, Leitão and Surugiu	2011	Romania	USA	-0.51	PPP	1.353	GDP of origin country	Trade; POP; DIST	Fixed effects	World bank	1997-2008	0
		Romania	USA	0.122	PPP	0.931	GDP of origin country	Trade; POP; DIST	Tobit model	World bank	1997-2008	
Thompson	2013	Greece	USA	-2.01	RP	2.62	GDP of origin country	EX; air cost index	ECM	National Tourism Organization of Greece; IMF etc.	1975-2009	2
Turrión-Prats and Duro	2017	Spain	Eight sources	-1.526	RP	-1.104	GDP of origin country	Transport cost; EX	GMM-DIFF	N/A	2000-2014	2
Yamaura and Thompson	2015	France	Germany	-0.275	RP	0.864	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	2
		Italy	Germany	-0.399	RP	0.571	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
+++		Austria	Germany	-1.46	RP	1.328	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Switzerland	Germany	-2.084	RP	-0.197	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Poland	Germany	-0.743	RP	0.752	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Denmark	Germany	-2.126	RP	2.147	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		France	UK	-0.765	RP	0.881	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Italy	UK	-1.293	RP	0.945	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Austria	UK	-2.195	RP	1.238	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Switzerland	UK	-1.905	RP	0.61	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Poland	UK	-1.021	RP	1.685	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	
		Denmark	UK	-2.761	RP	0.958	GDP of origin country	x	AIDS	Yearbook of Tourism Statistics	1994-2012	

Notes: +++ indicates the most relevant destinations to Scotland;

Long-run elasticities were selected or calculated for lagged models;

Unless specified, the demand is for the whole destination rather than a specific tourism sector.

Abbreviations

AB	Arellano-Bond
ADLM	Autoregressive distributed lag model
CGE	Computable general equilibrium
CLSDV	Corrected least square variable technique
CPI	Consumer price index
CQRM	Count quantile regression
DIFF	Difference
DIST	Distance
DOLS	Dynamic OLS
EC-AIDS	Error correction-Almost Ideal Demand System
ECM	Error correction method
ESI	Economic sentiment indicator
EX	Exchange rate
FMOLS	Fully modified OLS
GDP	Gross domestic product
GLS	Generalised least square
GMM	Gaussian mixture model
HC	Human capital

HCPI	Harmonised CPI
ICT	Information, communication and technology
IMF	International monetary fund
IPI	Industrial Production Index
IR	Interest rate
JOH-ML	Multivariate maximum likelihood procedure of Johansen
LCC	Low cost carriers
LOS	Length of Stay
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
PCI	Price competitive index
POP	Population
PPP	Power purchasing parity
RER	Real exchange rate
RERV	Real exchange rate volatility
SAR	Spatial autoregressive model
SD	Spatial Durbin model
SDE	Spatial Durbin error model
SE	Spatial error model
SLX	Spatial lag X model
TO	Bilateral trade openness
VAR	Vector autoregression
VFR	Visiting friends and relatives
WDI	World development indicator
WLS	Weighted least square

Appendix C. Publications estimated elasticities for commercial accommodation

Author	Year	Destination	Source market	PED	Price variable	YED	Income variable	PES	Other key variables	Method/Model	Data source	Data range	AJG rating
Divisekera	2010	Australia	New Zealand	-0.52	Spending per night	1.13	Budget share	x	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	4
		Australia	Japan	-0.61	Spending per night	0.89	Budget share	x	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	UK	-0.31	Spending per night	1.21	Budget share	x	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	US	-0.52	Spending per night	1.46	Budget share	x	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
		Australia	Aggregated	-0.51	Spending per night	1.33	Budget share	x	x	AIDS	Surveys by tourism research Australia	1990Q1-2007Q1	
Divisekera and Deegan +++	2010	Ireland	UK	-0.41	Spending per night	1.05	Budget share	x	x	AIDS	Irish Tourist Board Survey	N/A	2
		Ireland	North America	-0.38	Spending per night	1.27	Budget share	x	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	Mainland Europe	-0.27	Spending per night	1.09	Budget share	x	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	Rest of the World	-0.49	Spending per night	1.32	Budget share	x	x	AIDS	Irish Tourist Board Survey	N/A	
		Ireland	Aggregated	-0.34	Spending per night	1.15	Budget share	x	x	AIDS	Irish Tourist Board Survey	N/A	
Nguyen +++	2015	UK	x	x	Average daily rate	x	x	[-0.64, 9]	x	Percentages division	Industry sources	2003-2013	0
Xie and Tveterås +++	2020	Norway	Unspecified	x	x	0.5	GDP of origin country		EX; Hotel Price	Regression	Statistics Norway	N/A	2

Notes: As Appendix B.