



**World  
Travel & Tourism  
Council**

Methodology for producing the  
**2010**  
**WTTC/OE TRAVEL & TOURISM**  
**ECONOMIC IMPACT RESEARCH**  
using a simulated Tourism Satellite Account framework

**March 2010**

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## WTTC/OE TRAVEL & TOURISM ECONOMIC IMPACT RESEARCH

using a simulated Tourism Satellite Account framework

### Methodology and Documentation

March 2010

#### A) INTRODUCTION

2009 provided a clear demonstration of the complex environment in which Travel & Tourism (T&T) operates, confirming the **critical importance of timely information** for policy- and decision-makers. Moreover, developments in 2010 will no doubt serve to reinforce this argument. This explains why the economic impact research developed by the World Travel & Tourism Council (WTTC) and its partner Oxford Economics (OE), which was designed to adapt to the changing needs of the Travel & Tourism industry and government leaders in the light of the fast-changing operating environment, is an essential tool – whether for private – or public-sector decision-makers.

This comprehensive and comparative measure of the economic impact of Travel & Tourism developed by WTTC with its partners since 1990, which is highlighted in this year's published *Executive Summary* and the 181 individual *Country Reports*, is based on a simulated Tourism Satellite Account (TSA) framework. The methodology is analogous to that used for the production of national income accounts, following the key concepts of Tourism Satellite Accounts (TSAs) contained in the latest United Nations' *Tourism Satellite Account: Recommended Methodological Framework* (TSA:RMF 2008).

From the beginning, we have developed **practical real world models to illustrate Travel & Tourism's economic impact** based on the needs of private sector leaders, public sector policy-makers and industry researchers **for timely historic estimates on – and forecasts for – Travel & Tourism's contribution to economic activity and employment**. The WTTC/OE Travel & Tourism economic impact research uses the conceptual framework of the UN RFM standard for TSAs with a number of extensions, in order to produce an annual database (which runs from 1988 through to 2020) of simulated TSAs. To do this, the research combines the most sophisticated economic modelling and forecasts available from OE with the most up-to-date, publicly available data (from national statistics offices and central banks, and international bodies such as the Organization for Economic Co-operation and Development (OECD), International Monetary Fund (IMF) and United Nations World Tourism Organization (UNWTO))on, for example, the national accounts, balance of payments and specific tourism variables.

Since the economic impact research uses a simulated Tourism Satellite Account framework and so follows the conceptual structure approved by the UN, all readers interested in a detailed discussion of the rationale behind the conceptual structure should refer to the TSA:RMF (2008). However, this document is intended to illustrate

how WTTC and OE have practically applied the conceptual framework using simulation techniques. ***The TSA:RMF's Tourism Direct Gross Domestic Product (TDGDP) measure is broadly equivalent to the Travel & Tourism Direct Industry measures derived by WTTC/OE.*** Adding to this direct industry measures, the value added created indirectly in the industry's supply chain, plus investment, collective government and non-visitor (ie merchandise) export spending related to Travel & Tourism, one arrives at ***the broadest measure of the economic impact of Travel & Tourism – Travel & Tourism Economy GDP – which is directly comparable to the published national GDP measure.***

In addition to this annual economic impact research, ***detailed Tourism Satellite Accounts*** have been commissioned from WTTC by several countries, regions and cities – and these robust results derived for the respective countries ***are fully incorporated into the annual simulated framework.*** The detailed studies are produced with national TSA teams (usually with the National Statistics Office and Central Bank's balance of payments' division working closely with the National Tourism Administration) in order to maximise the use of existing tourism data and other statistical and survey information, and to build the local capacity to update and refine the measurement of Travel & Tourism's economic impact.

**The rest of this document is organised as follows:**

- **Section B** (p5) presents a conceptual overview of our approach, including definitions of key concepts used in the simulated accounts. The next sections describe in detail our approach to measuring the different elements of Travel & Tourism demand, viz:
  - **Section C** (p12) discusses personal Travel & Tourism consumption
  - **Section D** (p16) looks at measuring government Travel & Tourism consumption and investment
  - **Section E** (p20) focuses on private sector Travel & Tourism investment
  - **Section F** (p24) describes our measurement of foreign trade in Travel & Tourism
  - **Section G** (p27) explains our estimates of spending on business travel, both by corporate employees and public sector employees
  - **Section H** (p33) looks at our approach to measuring the supply-side of the Travel & Tourism economy
- **Section I** (p38) explains our less data-intensive approach to estimating the main Travel & Tourism concepts for non-OECD countries.

**Additional detail is provided in two annexes:** **Annex A** (p49) provides a detailed description of the basis of the US Travel & Tourism consumption shares used, while **Annex B** (p61) lists the detailed equations themselves used in the OE's system of models for producing the simulated TSAs for OECD countries.

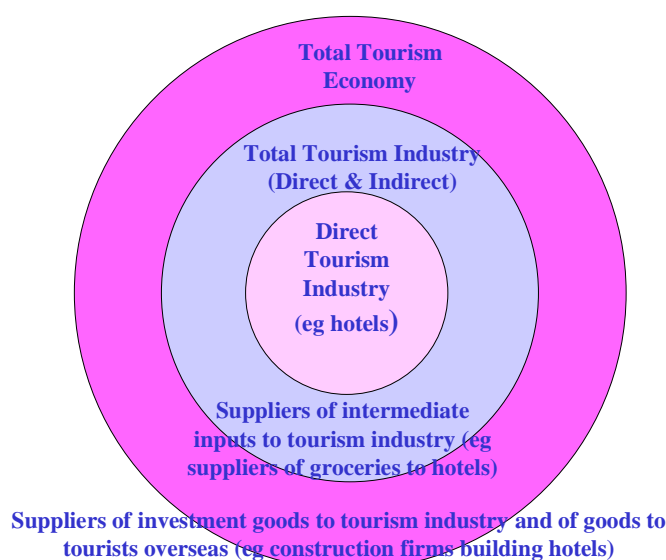
## B) CONCEPTUAL OVERVIEW

In practical terms, WTTC and OE have implemented the simulated Tourism Satellite Account framework by:

- Applying the definition of Travel & Tourism to develop a method for computing the demand-side components of GDP: consumption, investment, government and net exports;
- Employing input-output tables to translate demand-side into supply-side measures and to split total GDP and employment into direct and indirect: employment and compensation, depreciation, operating surplus and indirect taxes.

The objective is to be as comprehensive as possible – to ensure the importance of Travel & Tourism is not underestimated – and as consistent as possible – to allow cross-country and cross-regional comparisons – so that global estimates of the contribution to GDP and employment from Travel & Tourism can be derived.

## Key Concepts in TSA



### ***The demand-side perspective***

In defining Travel & Tourism activity, we have followed the TSA:RMF, and defined Travel & Tourism as “the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not remunerated from within the place visited”. The phrase “usual environment” is introduced to exclude from the concept of ‘visitor’ persons commuting every day between their home and place of work or study, or other places frequently visited.

Defining “usual environment” in terms of distance, duration or locality has obvious limitations. Travel to work, on the one hand, and travel on holiday, on the other, cover wide and overlapping ranges of distance and time. Therefore, the definition of what kinds of travel are included in Travel & Tourism may and do vary from time to time, place to place and country to country. To avoid this problem, we believe that the definition of Travel & Tourism must resist strict distance, duration or locality criteria and rest on the broader view of travel “beyond the usual environment” using statistical approaches where available to interpret “usual environment.” Our philosophy is to let those who travel determine with their data when and where to draw the line between “usual environment” and Travel & Tourism.

We approached this exercise in two ways:

- Where there are transportation surveys that divide trips by mode, distance and purpose, we interpret “usual environment” for each mode and purpose of travel as the mean distance travelled plus two standard deviations. Two standard deviations are generally recognized by statisticians to be outside the norm.
- Where consumer expenditure surveys ask questions as to the amount of an expenditure made “out of town”, “on a trip”, or “on vacation”, we take this to mean outside the “usual environment”.

This method allows “usual environment” to be defined by consumers, rather than by an arbitrary, and possibly inappropriate, distance cut-off.

Having operationalised Travel & Tourism, we then had to identify which economic activities of the traveller fall within the boundaries of the simulated TSA framework. The TSA:RMF implies that all personal consumption before, during and after a trip, which is directly associated with the trip, such as travel expenses, lodging, meals and various other purchases, should be included in the satellite account. Expenses incurred by friends, relatives and business associates on the travellers behalf are also included.

The most difficult issue concerns the treatment of consumer durable items in the TSA.<sup>1</sup> Such items have not traditionally been included in national studies of tourism’s economic impact, but the TSA:RMF now provides for the inclusion of certain durables. Specifically, it covers:

- a) tourism ‘single-purpose’ durables, ie those used almost exclusively on trips, such as luggage or skiing equipment
- b) multi-purpose durables, ie those also used within the usual environment such as cars or cameras, if and only if they are purchased during a trip.

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<sup>1</sup> A consumer durable is defined as “a consumption good which may be used repeatedly or continuously over a period of more than a year, assuming a normal or average rate of physical usage” (SNA1993, ¶9.38). A consumption good is defined as a good “that is used, without further transformation in production, by households, NPISHs or government units for the direct satisfaction of individual needs or wants or the collective needs of members of the community” (SNA1993, ¶9.41).

This research follows the approach WTTC has been advocating for a number of years for including within the TSA a proportion of spending on multi-purpose durables based on the relative use of those durables for T&T versus other purposes, rather than simply those bought while actually on a trip. (An alternative way of accounting for the otherwise under-recorded importance of tourism to spending on durables, based on imputed services, is being applied by the US Bureau of Economic Analysis (BEA)<sup>2</sup>.) However, spending on durables is separately recorded in the OECD simulated TSAs to allow comparisons with or without this spending included.

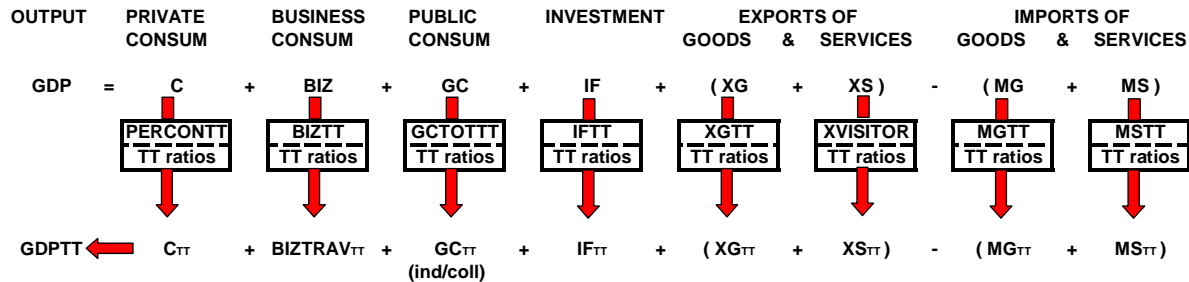
Based on this perspective, we have developed simulation models for measuring Travel & Tourism. On the demand side, the primary measure of Travel & Tourism activity is the share of each *final demand* component of total GDP that arises from Travel & Tourism expenditures less the imported component, namely the following categories:

<b>Demand-side components of T&amp;T Economy GDP</b>
Personal Consumption
Durables
Non-Durables
Services
Business Travel
Corporate
Government
Visitor Exports (mainly travel & passenger transportation earnings)
Government individual spending
<b>Tourism Consumption</b>
Government collective spending
Fixed investment
Merchandise T&T exports
<b>Total Tourism Demand</b>
<i>minus</i>
Merchandise T&T imports
Imported services (mainly residents' travel spend abroad & transportation fees)
<i>equals</i>
<b>Travel &amp; Tourism Economy GDP</b>
<b>Note:</b> Tourism consumption minus its associated imports equals Travel & Tourism Industry GDP

A major component of this demand-side perspective is an exhaustive analysis and formulation of Travel & Tourism shares or ratios to be applied to each published expenditure component of GDP. Initially, this formulation was based on data for the USA translated to other OECD countries using country specific Consumer Price Index

<sup>2</sup> 'Expanding US Travel and Tourism Satellite Accounts: Extension to Include Imputed Services of Motor Vehicles and Vacation Homes', Sumiyo Okubo, Barbara Fraumeni and Mahnaz Fahim-Nader, US Bureau of Economic Analysis, presented to Vancouver TSA Conference 2001.

(CPI) weightings. Subsequent research has incorporated shares derived from numerous country specific data sources. The diagram illustrates the application of this method. Our ultimate goal is to develop a fully representative set of country shares, as we do for each country’s detailed TSAs which have been commissioned.

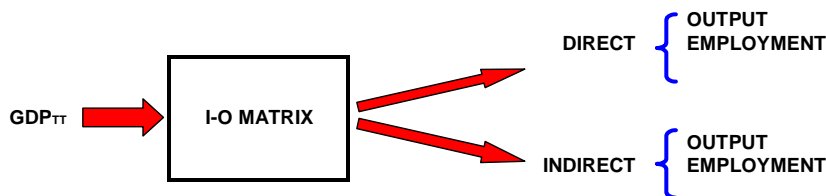


GDP T&T  
ECONOMY  
IMPACT

$$= \frac{\text{GDP}_{\text{TT}}}{\text{GDP}}$$

GDP T&T  
INDUSTRY  
IMPACT

$$= \frac{\left[ \text{GDP}_{\text{TT}} \cdot \left( \frac{\text{GC}_{\text{TT}}}{\text{IF}_{\text{TT}}} \right) - \text{MTT}^* \right]}{\text{GDP}}$$



**The supply-side perspective**

The TSA:RMF (2008) defines three supply-side economic aggregates that characterise the magnitude of tourism: gross value added of the characteristic tourism industries (GVATI); tourism direct gross value added (TDGVA); and tourism direct GDP (TDGDP). The first of these differs from the others in focusing on tourism-characteristic industries, so it includes the output of these industries, whether they are supplied to visitors, or not (eg restaurant meals consumed by locals) while excluding output of non-tourism-characteristic industries supplied to visitors (eg shopping while on holiday). The other two supply-side concepts focus on output supplied to visitors whatever industry – characteristic or not – produces it. These two differ in that value added is measured at basic prices while GDP is measured at purchasers’ prices (ie includes net taxes on products and imports). None of these three concepts includes the indirect value added created by Travel & Tourism along its supply chain.

The WTTC/OE approach essentially aims to measure the equivalent of the third of these concepts, that of tourism direct GDP (TDGDP). However, we also define a wider concept of the whole Travel & Tourism economy – called Travel & Tourism Economy GDP –



which includes not just tourism consumption and its associated supply-chain value added but also goods and services produced more widely on behalf of the tourist, ie from collective government spending, fixed investment and non-visitor (ie merchandise) exports. To distinguish the narrower from this wider concept of the tourism economy, we refer to TDGDP in this research as Travel & Tourism Direct Industry GDP.

To measure Travel & Tourism Economy GDP, we take advantage of the equivalence of the expenditure measure of GDP and the output measure when appropriately defined. So Travel & Tourism Industry GDP (direct plus indirect) is calculated as the sum of the demand components making up tourism consumption (personal T&T spending, business T&T spending, foreign visitor T&T spending and government individual T&T spending) minus the imported component of such consumption. And Travel & Tourism Economy GDP is calculated as total tourism demand (tourism consumption plus government collective T&T spending, T&T fixed investment and T&T non-visitor exports) minus its import component (imported services, mainly residents' travel abroad expenses, together with other imported goods associated with tourism demand).

To separate the direct and indirect value-added concepts that contribute to the Travel & Tourism share of GDP, we use an input-output approach relating the output of each industry to the components of tourism demand. By weighting together the ratio of value added to output in these industries, we can divide the Travel & Tourism Industry GDP into its own direct value added (and hence the equivalent of TSA:RMF concept of TDGDP) and the indirect value added of other industries in the supply chain generated by the intermediate purchases of the direct producers. The same direct/indirect split is made for the Travel & Tourism Economy GDP measure. *Neither in the TSA:RMF or the WTTC/OE methodology is there any attempt made to capture the multiplier or induced effects of Travel & Tourism, although some impact studies do include these.*

These supply-side computations provide the following concepts:

<b>Supply-side components of T&amp;T Industry</b>
<b>Split into direct and indirect (supply-chain) components for:</b>
Travel & Tourism Industry GDP
Travel & Tourism Industry Employment
Income counterparts of Travel & Tourism Industry GDP, vis:
Labour Compensation
Operating Surplus
Depreciation
Net indirect taxes and subsidies
<b>Supply-side components of T&amp;T Economy</b>
<b>Split into direct and indirect (supply-chain) components for:</b>
Travel & Tourism Economy GDP
Travel & Tourism Economy Employment
Income counterparts of Travel & Tourism Economy GDP (as listed above)
<b>Note:</b> Some estimates for Travel & Tourism's tax revenue contribution are also produced

Although it is important to develop the basic framework to estimate Travel & Tourism's economic importance, it is even more important to estimate Travel & Tourism's share of each entry in the national accounts. This is done via a combination of detailed research where data availability and resources allow – together with simulation techniques based on published international data sources – estimates to be made for every country in the world (subject to a few minimum data requirements).

### A numerical example

In order to illustrate the relationship between the demand- and supply-side concepts outlined above and the published national income accounts, the following table gives a numerical example.

WTTCland's Travel & Tourism Economy			WTTCland's national income accounts	
<i>Demand-side</i>	LC mn		<i>Expenditure-side</i>	LC mn
Personal consumption	2700	7.9% of private consumption	Private consumption	34000
Business travel	800		Households	33000
Corporate	650		Non-profit institutions	1000
Government	150	1.7% of govt consumption	General Govt consumption	9000
Visitor exports	2800	65.1% of service exports	Exports of services	4300
Govt individual spending	100	1.1% of govt consumption		
<b>Tourism consumption</b>	<b>6400</b>		Changes in inventories	2700
Govt collective spending	300	3.3% of govt consumption	Gross fixed capital formation	17000
Investment	2500	14.7% of investment	Exports of goods	30000
Merchandise TT exports	4000	13.3% of goods exports	<b>Total final expenditure</b>	<b>97000</b>
<b>Total Tourism Demand</b>	<b>13200</b>		Imports of goods & services	27000
/less imports	3500	13% of imports	<b>Gross Domestic Product</b>	<b>70000</b>
<b>Travel &amp; Tourism Economy GDP</b>	<b>9700</b>	<b>13.9% of GDP</b>		
Memo:			Total employment	500
<b>Travel &amp; Tourism Economy Employment (000s)</b>	<b>100</b>	<b>20% of total employment</b>		
<i>Supply-side</i>	Industry LC mn	Economy LC mn	<i>Income-side</i>	LC mn
<b>Travel &amp; Tourism GDP</b>	<b>4900</b>	<b>9700</b>		
Direct	3500	5700	Compensation of employees	35000
Indirect	1400	4000	Operating surplus of corporations	22000
<b>Components of T&amp;T GDP</b>			Capital consumption	10000
Labour compensation	2500	5000	Net taxes on products & production	3000
Operating surplus	1500	3000		
Depreciation	500	1400	<b>Gross value added (basic prices)</b>	<b>67000</b>
Subsidies/Indirect taxes	400	300		
<b>Travel &amp; Tourism imports</b>	<b>1500</b>	<b>3500</b>		
<b>Travel &amp; Tourism employment (000s)</b>	<b>50</b>	<b>100</b>		
Direct	30	55		
Indirect	20	45		

## Projections

Forecasts are based in the first instance on OE's World Forecasting Service. For each of the main countries, the OE models provide forecasts for economic series such as GDP, employment, private consumption, government consumption, fixed investment in the private and public sectors, and exports and imports of goods and services. And we have used this view of the global outlook to produce consistent forecasts of the key macroeconomic series for all 181<sup>3</sup> countries covered in the simulated TSAs. Using these forecast aggregates, additional variable detail required to calculate Travel & Tourism estimates is obtained by projecting the trends of the historical shares for each of the aggregates. The equation listing in Annex B gives comprehensive details of how forecasts for Travel & Tourism concepts are linked to OE's macroeconomic projections, but a brief summary is included as appropriate in each section below.

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<sup>3</sup> In 2004, the coverage of this project was extended to add models and results for the following countries: Lebanon, Qatar, UAE, Albania, Belarus, Bosnia & Herzegovina, Estonia, Latvia, Lithuania, Macedonia FYR, Russian Federation, Ukraine, Yugoslavia Fed. Rep. (Serbia & Montenegro). At the same time, with the separate identification of many of the former soviet republics, results for the Former Soviet Union as a whole are no longer needed. In 2007, Azerbaijan and Armenia were added and Serbia and Montenegro were treated separately. In 2009, five more countries were added: Mozambique, Mongolia, Moldova, Kazakhstan and Krygyzstan.

### C) PERSONAL CONSUMPTION OF TRAVEL & TOURISM

Personal consumption typically accounts for two-thirds of GDP. Therefore, much of the empirical efforts over the years has been to seek out and develop better measures for the shares of personal consumption expenditure that are attributable to Travel & Tourism. This section is devoted to an overview of the computation of US consumption shares, to indicate the general approach that we use for all countries.

Currently, the best source of detailed data on personal consumption for US Travel & Tourism is the US Department of Labour, Bureau of Labour Statistics (BLS), and Survey of Consumer Expenditures. While their definition of “out-of-town” is 75 miles, which is unduly limiting, their survey is very detailed and comprehensive.

The BLS survey covers several categories for “out-of-town” trips including:

Alcoholic beverages	Owned vacation homes
Boat and other rental	Recreation, sports events, movies, etc
Food and beverages	Utilities and services
Gasoline and motor oil	Vehicle rental

However, there are many categories for which BLS does not specifically provide expenditure data for out-of-town trips, but that do include purchases by visitors such as:

Airline/ship fares	Photographic equipment and supplies
Auto/vehicle rental	RV purchases and rentals
Boat purchases, rentals and chargers	Souvenirs
Clothing, luggage, footwear, etc	Sports, recreation and exercise equipment
Docking and landing fees	Telephone
Entertainment of out of town visitors	Tobacco products and smoking supplies
Food and beverages provided to out-of-town visitors	Travel guides, books and magazines
Inter/intra-city mass transit fares	Travel related financial/insurance services
Lodging	Vacation home housekeeping supplies
Meals and beverages at restaurants	Vacation home utilities
Miscellaneous fees, pari-mutuel losses	Vehicle expenses
Personal care products and services	Video equipment and supplies

While the BLS survey is detailed and well constructed, it also suffers from a difficulty that all surveys face. The respondents are necessarily a biased sample, in that they represent those people with sufficient free time to fill out diaries over a period of several weeks. Thus, they may not represent working people with little free time or people in higher income brackets. For example, air travel in the BLS survey is approximately half that reported by the airlines as personal travel, cruise travel seems to be largely missing, and auto use for touring is roughly half that reported by the US Department of Transportation. However, the survey is the best source available in the US at this time, and we have noted adjustments to the share analysis that are necessary to account for this bias. A comparison of the BLS survey data with national accounts data of the US

Department of Commerce, Bureau of Economic Analysis was provided by the BLS and has been used to adjust survey totals for this bias and under-reporting.

For the USA, we supplemented the BLS survey with data from private and public sources. Notable among these was the US Department of Transportation's Personal Transportation Survey, which was used to estimate Travel & Tourism auto use. By developing distributions of personal travel by distance and by purpose, we were able, as noted above, to determine that 36.8% of US personal auto use is generated by Travel & Tourism.

Because US Travel & Tourism consumption shares need not be typical of shares in other countries, WTTC and its economic consultants have embarked on a program to develop specific consumption shares for other countries. This programme was initiated in early 1994 as Phase Two of a Methodology Enhancement Program. Phase Two's work involves the collection of national account data and shares from participating research countries. Each year, we have added and intend to continue adding detailed shares analyses for individual countries. To date, detailed country research has been carried out for:

<ul style="list-style-type: none"> <li>▪ Argentina</li> <li>▪ Australia</li> <li>▪ Bahamas</li> <li>▪ Brazil</li> <li>▪ China</li> <li>▪ Croatia</li> <li>▪ Hong Kong</li> <li>▪ Hungary</li> <li>▪ India</li> <li>▪ Indonesia</li> </ul>	<ul style="list-style-type: none"> <li>▪ Israel</li> <li>▪ Malaysia</li> <li>▪ Philippines</li> <li>▪ Puerto Rico</li> <li>▪ Singapore</li> <li>▪ South Africa</li> <li>▪ Thailand</li> <li>▪ Turkey</li> <li>▪ UK</li> <li>▪ US</li> </ul>
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WTTC and OE are working with a number of other countries to structure and schedule similar shares analysis research to add to the growing information database.

Table 1 shows a comparison of the consumption shares for the USA for 1994 through 1999.

**Table 1: Travel & Tourism Consumption Shares for the US**

	1994	1995	1996	1997	1998	1999
Food, beverages and tobacco	4.01%	3.63%	3.64%	3.68%	3.76%	3.55%
Clothing and footwear	2.53%	2.53%	2.53%	2.53%	2.53%	2.53%
Gross Rent Fuel and Power	2.03%	1.61%	1.67%	1.83%	1.97%	1.96%
Furniture, Furnishings, Household Equipment	2.25%	2.28%	2.28%	2.29%	2.26%	2.25%
Medical care and health expenses	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Transport and communication	36.41%	35.68%	35.07%	34.28%	34.01%	34.09%
Recreational, entertainment, educational and	18.90%	19.26%	22.37%	23.92%	24.62%	23.94%
Miscellaneous Goods and Services	13.02%	13.04%	13.01%	12.75%	12.47%	12.12%

(Note that the WTTC/OE research does not count medical expenses incurred away from home as part of Travel & Tourism. However, in keeping with UNWTO definitions, the travel-related expenses associated with a medical trip are included.)

We will be incorporating expanded shares analyses into the WTTC/OE research as available. For countries where this expanded analysis is not yet available, the US Travel & Tourism consumption shares derived from the BLS consumer expenditure survey and other US trade surveys adjusted are used. These components are then reassembled to the original eight sectors to produce a new set of country Travel & Tourism shares. Thus, the different weightings of each category within total consumer spending determine the varying shares. Where T&T shares for different categories of consumption are based on weighting together US shares for detailed sub-categories, we have based the weights for the different sub-categories on detailed consumer spending data rather than on the CPI weights used in previous years. This enables us to ensure that the T&T estimates are not artificially affected by significant revisions to the OECD data on consumer spending by category that resulted from the reclassification of certain elements of consumer spending between categories in the switch to 'COICOP' classifications.

The following table illustrates the summary personal consumption shares calculated for each OECD country.

**Table 2. Personal Consumption Expenditure T&T Weights by Country**

	VCH1	VCH2	VCH3	VCH4	VCH5	VCH6	VCH7	VCH8
AUSTRALIA	0.038	0.027	0.016	0.014	0.000	0.210	0.056	0.206
AUSTRIA	0.036	0.025	0.014	0.014	0.000	0.248	0.061	0.364
BELGUM	0.034	0.033	0.015	0.023	0.000	0.212	0.069	0.306
CANADA	0.032	0.023	0.016	0.019	0.000	0.254	0.083	0.195
DENMARK	0.034	0.025	0.016	0.014	0.000	0.301	0.080	0.132
FINLAND	0.032	0.025	0.018	0.020	0.000	0.220	0.084	0.161
FRANCE	0.035	0.025	0.013	0.016	0.000	0.266	0.079	0.212
GERMANY	0.040	0.024	0.014	0.018	0.000	0.264	0.090	0.160
GREECE	0.039	0.015	0.009	0.011	0.000	0.240	0.092	0.117
ICELAND	0.036	0.026	0.017	0.015	0.000	0.287	0.097	0.235
IRELAND	0.042	0.023	0.016	0.011	0.000	0.233	0.076	0.066
ITALY	0.033	0.026	0.013	0.015	0.000	0.187	0.101	0.202
JAPAN	0.033	0.024	0.015	0.017	0.000	0.213	0.068	0.236
LUXEMBOURG	0.035	0.025	0.016	0.017	0.000	0.416	0.322	0.400
NETH.	0.033	0.027	0.016	0.016	0.000	0.256	0.095	0.141
NEW ZEALAND	0.038	0.025	0.017	0.013	0.000	0.213	0.090	0.278
NORWAY	0.031	0.025	0.018	0.016	0.000	0.207	0.101	0.162
PORTUGAL	0.038	0.024	0.011	0.013	0.000	0.222	0.105	0.144
SPAIN	0.032	0.028	0.014	0.013	0.000	0.273	0.051	0.235
SWEDEN	0.033	0.025	0.020	0.018	0.000	0.265	0.116	0.122
SWITZ.	0.034	0.025	0.019	0.014	0.000	0.441	0.277	0.493
TURKEY	0.035	0.025	0.017	0.013	0.000	0.264	0.242	0.319
UK	0.038	0.025	0.017	0.014	0.000	0.254	0.108	0.202
US	0.034	0.025	0.016	0.023	0.000	0.312	0.070	0.114

Where:

- VCH1: Food, beverages and tobacco
- VCH2: Clothing and footwear
- VCH3: Gross rent, fuel and power
- VCH4: Furniture, furnishings and household equipment and operation
- VCH5: Medical care and health
- VCH6: Transport and communication
- VCH7: Recreational, entertainment, education and cultural services
- VCH8: Miscellaneous goods and services (includes lodging and restaurants)

Forecasts of personal consumption on T&T are based on first projecting the breakdown of overall consumption into the above eight categories, and then applying the estimated T&T shares to each category.

## D) GOVERNMENT CONSUMPTION AND INVESTMENT

Consumer spending is only part, albeit the larger part, of GDP. To determine total Travel & Tourism Demand, we must make estimates of government purchases, capital investment (public and private) and foreign trade. In this section, we cover government current and capital expenditures.

Government current expenditures on Travel & Tourism fall into two categories:

- Expenditures to provide Travel & Tourism services to the public *on a collective basis* and
- Expenditures to provide Travel & Tourism services to the public *on an individual basis*.

A *collective* service is one that cannot be assigned to particular travellers. Highway expenditures are an example of such a service. An *individual* service, by contrast, has an identifiable consumer. Museum subsidy expenditures are an example of an individual service.

As with the other components of GDP, we have initiated a long-term programme to develop detailed government Travel & Tourism budgets for each OECD country and representative budgets for several countries in each of the major regions of the world. In the following section, we summarise the US analysis.

### **US Analysis**

The principal US data sources are:

- Federal government expenditures - *The Budget of the United States Government (1993-1998)*
- State and local government expenditures - *The Bureau of Census' Government Finances*

In determining what portion of each agency's expenditures to include as Travel & Tourism, we have been guided by the budget document's functional classification. Those agencies that are classified under recreational resources such as the National Park Service and Fish and Wildlife Service were determined to be 100% Travel & Tourism. Because the Federal Railroad Administration runs Amtrak, its entire budget was also counted as 100% Travel & Tourism.

For the remaining agencies, it was necessary to determine what portion of their services were related to Travel & Tourism in accordance with the TSA conceptual structure, classifications and definitions. The principal US Federal government agencies that have been determined to provide Travel & Tourism services, in whole or in part, to the travelling public and travel service companies include:

- |                                   |        |
|-----------------------------------|--------|
|                                   | Share  |
| • Federal Aviation Administration | 89.70% |



• Federal Highway Administration	22.47%
• Federal Railroad Administration	100.00%
• Immigration and Naturalization Service*	0.00%
• National Park Service	100.00%
• US Customs Service*	0.00%
• US Fish & Wildlife Service	100.00%

\* These agencies collect a user fee that offsets their costs associated with Travel & Tourism.

At the state and local government level, those agencies that were determined to provide Travel & Tourism services to the public or travel service companies in whole or in-part were:

• Air transportation	89.7%
• Highways	22.5%
• State Travel Offices	100.0%
• Parks and recreation	36.8%
• Libraries	5.9%
• Sewer	0.8%
• Sanitation	0.5%
• Utilities	1.0%

It should be noted that all expenditures are net of offsetting collections.

### ***Government Consumption - Other OECD Countries***

We have initiated a programme to develop similar government Travel & Tourism expenditure analyses for other OECD countries and other representative countries from all regions of the world. This work is proceeding. Until this work is completed for all countries, the simulated accounts use an estimate of government Travel & Tourism spending based on the US and UK models. (Prior to our 2002 update the US model alone was used for this purpose. However, while looking at shares of government spending excluding defence and social security allows for some areas of difference in composition of spending between countries, there will still be differences between, say, the US and European models of government that might make it misleading to apply the US share to Europe – for example, differences in the extent to which health and education are funded by government. So we now use UK rather than US shares of government spending excluding defence and social security for European countries and define the corresponding T&T intensity relative to the UK.)

The estimate involves developing a Travel & Tourism intensity factor for each OECD country relative to the US or UK. The intensity factor is computed as follows:

$$\text{T\&T Intensity Factor}_i = \frac{\text{T\&T Demand (Domestic Visitor Spending + Foreign Visitor Spending)}_i}{\text{Gross Domestic Product}_i}$$

$$\text{T\&T Intensity Factor}_i = \frac{\text{T\&T Demand (Domestic Visitor Spending + Foreign Visitor Spending)}_{\text{US or UK}}}{\text{Gross Domestic Product}_{\text{US or UK}}}$$

where i is each of the OECD countries.

Travel & Tourism government consumption was calculated as follows:

$$\text{T\&T Government Consumption}_i = \text{Non-defence, non-welfare expenditures} \times \text{US or UK Travel \& Tourism Government Share} \times \text{Intensity Factor}_i$$

The assumption here is that government spending on Travel & Tourism has a positive and proportionate relationship to total visitor spending's impact on the economy.

The split between collective and individual T&T spending is based on the split of overall government spending in each country between individual and collective spending, rather than on the US split between collective and individual T&T spending, since in the USA, these shares turn out to be relatively similar for overall spending and T&T spending.

### ***Government Capital Investment Expenditures***

These expenditures comprise T&T-related spending on 1) equipment and 2) land, buildings and infrastructure. Travel & Tourism public investments correspond to the investments made on programmes that form part of Travel & Tourism in government expenditures. The same shares attributed to Travel & Tourism in government spending have been used in public investment.

### ***US Analysis***

Federal investment shares for Travel & Tourism:

- Federal Aviation Administration 89.7%
- Federal Highway Administration 22.5%
- Federal Railroad Administration 100.0%
- Immigration and Naturalization Service 0.0%\*
- National Park Service 100.0%
- US Customs Service 0.0%\*
- US Fish & Wildlife Service 100.0%

State and local investment shares for Travel & Tourism:

- Air transportation 89.7%
- Highways 22.5%

\*See explanation under Government Spending.

***Government Capital Investment Expenditures - Other OECD Countries***

As discussed above, detailed work on government budgets for other OECD countries is in progress. For the simulated TSAs where this work has not yet been carried out, the Travel & Tourism government capital investment for OECD countries is estimated using the same Travel & Tourism intensity factors as have been used for government spending.

***Projections***

Forecasts for each component of government spending on Travel & Tourism in the USA are assumed to grow in line with the equivalent aggregate government spending component. Those for other countries are produced in a similar way to estimating the data, using shares of aggregate measures drawn from detailed US analysis, adjusted for a tourism intensity factor.

## E) PRIVATE INVESTMENT

Private investment includes both residential structures such as vacation houses and non-residential structures such as hotels, motels and convention centres. Investment in equipment includes such items as airplanes, passenger trains and ships, buses, taxis and rental cars.

In keeping with our philosophy of using primary source data to the greatest degree possible, we have obtained information on expenditures for transportation equipment (aircraft, car rental fleets) and hotel/motel construction on which estimates for total private investment by the Travel & Tourism industry can be based. The specific data are as follows:

- Information on commercial passenger aircraft purchases by country were provided by Boeing and Airbus. (Combi and convertible aircraft are treated as half passenger and half cargo.)
- Car rental fleet information was constructed from data obtained from the BEA and Fleet Magazine for the USA. While auto purchases is an identified line item in the OECD accounts, the data are not available. Instead, data from Fleet Magazine was used to separate out US rental car fleets (rental car company investment), to be included in our analysis, from the remainder of BEA auto fleet investment. This separation assumes that auto fleets bought by businesses are used for “normal” business activities, not Travel & Tourism (ie business travel purposes).
- Hotel and motel capital investment (construction) is available for the US, Canada, and the UK. We developed hotel construction in other countries from UNWTO data on hotel rooms by country and from relative construction cost per square foot data obtained from Hanscomb/Mean International. A net removal rate for decommissioned rooms in other OECD countries was developed from hard data on US net and gross number of rooms from Smith Travel Research. These results are calculated annually to create a time series from 1988 to 2003. The results for the year 1998 are provided in Table 3.

**Table 3. 1998 Hotel/Motel Construction Estimates**

	Number of hotel rooms		HMI	Hotel/Motel
	1997	1998	Est construction gross change	construction cost index expenditures
			Chicago=100	Bil. \$US
Northern Europe				
Denmark	38,182	38,386	254	\$0.102
Finland	54,364	55,714	1,422	\$0.511
Iceland	5,359	5,957	605	\$0.221
Ireland	51,696	57,000	5,372	\$1.733
Norway*	61,187	62,233	1,127	\$0.389
Sweden	93,629	94,266	760	\$0.277

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UK*	n.a.	n.a.		137.8	\$1.325
Total	304,417	313,556	9,540		\$4.558
Southern Europe					
Greece	296,096	304,232	8,526	108.8	\$2.788
Italy	948,656	949,805	2,400	105.9	\$0.764
Portugal	93,460	94,788	1,451	102.2	\$0.445
Spain	576,514	585,606	9,852	79.2	\$2.345
Turkey	148,844	149,186	538	72.2	\$0.117
Total	2,063,570	2,083,617	22,767		\$6.459
Western Europe					
Austria	301,479	302,388	1,307	118.0	\$0.463
Belgium	61,052	60,368	(603)	118.4	\$0.255
France	600,883	586,944	(13,147)	115.5	\$1.719
Germany	871,788	885,529	14,891	122.0	\$5.458
Luxembourg	7,683	7,676	3	118.4	\$0.001
Netherlands	75,935	89,120	13,285	105.1	\$4.194
Switzerland	141,826	141,056	(583)	144.5	\$0.095
Total	2,060,646	2,073,081	15,153		\$12.186
North America					
USA	3,325,000	3,374,868	54,253	100.0	\$14.817
Canada*	n.a.	n.a.			\$0.169
Total	3,325,000	3,374,868	54,253		\$14.986
Australasia					
Japan	1,564,792	1,564,792	2,064	136.0	\$0.843
Australia	172,334	182,061	9,954	93.3	\$2.791
New Zealand	22,837	22,645	1,838	82.4	\$0.455
Total	1,759,963	1,771,498	13,856		\$4.089
Total OECD	9,513,596	9,616,620	115,569		\$42.278

\* Data reported for Norway, UK and Canada is 1997 not 1998

Sources: UNWTO, Hanscomb/Means International, Smith Travel Research, UK Central Statistics Office, US Department of Commerce, Statistics Canada.

These capital investment purchases cover the major categories of hard Travel & Tourism private investment data available. All other important capital investment concepts must be estimated as shares of the available National Income Product Account (NIPA) investment data, usually limited to:

- Residential fixed investment
- Non-residential construction (other than hotels and motels)
- Non-residential equipment purchases (other than aircraft, cruise ships and autos)

Residential investment in vacation and holiday-use homes is obtained by applying the consumption weight for vacation homes to total residential construction for countries where residential fixed investment data are available.

### ***Non-Residential Construction and Equipment Purchases - US***

For US non-residential construction and equipment purchases, we developed the following approach using other unpublished BEA data to quantify the remaining portion of Travel & Tourism investment for the USA.

- Employment statistics on non-production and production workers are used to share out plant and equipment associated with offices, on the one hand, and production facilities, on the other. The procedure is to identify employment data for Travel & Tourism capital investment items, from food processing through consumer services. This assumes that most square footage and equipment use relates to the persons using it.
- To this data we apply the appropriate US consumption weights to estimate employment associated with Travel & Tourism goods and services. This differs from the overall Travel & Tourism employment in that this is primary employment in those areas for which both employment data and consumption weights exist. For example, agricultural employment data does not exist except in terms too crude for this application.
- The ratio of these employment values to total employment is 0.55% for production workers and 8.52% for non-production workers. These shares, as a surrogate measure of capital intensity, are then applied to capital investment data in the following categories:

#### Office plant and equipment

- Commercial construction
- Telecommunications construction
- Office and stores machinery
- Communication equipment
- Trucks and buses\*
- Furniture and fixtures
- Service industry machinery

#### Production plant equipment

- Industrial construction
- All other private construction
- Mining and oil field machinery
- Construction machinery
- Industrial equipment
- Miscellaneous equipment

\*An estimate for intercity bus purchases was obtained from *Bus Trader Magazine* and applied to this entry. The procedure was to subtract this estimate from the 'trucks and buses' PDE value and then add it back into the total.

### ***Non-Residential Construction and Equipment Purchases - Other OECD Countries***

For other OECD countries, we constructed private fixed business investment as follows:

- For construction, we began with our estimate of hotel/motel construction in each country. We then applied the ratio of US Travel & Tourism fixed business structures investment to hotel/motel construction. This ratio is 1.8056. Our working assumption is that investment in Travel & Tourism fixed business structure parallels investment in hotel/motel construction.
- For equipment net of aircraft and cruise ships, we first applied the US ratio of 5.05% of all private investment net of aircraft and cruise ships; then we applied the Travel & Tourism intensity factor based on overall visitor demand as described in the government consumption methodology.

### ***Projections***

Forecasts are produced in a similar way to other components of T&T demand, with each component of private investment spending on Travel & Tourism assumed to grow in line with the appropriate component of overall investment spending.

## F) FOREIGN TRADE

The following pages describe the procedures used in this research for measuring Travel & Tourism foreign trade. Domestic spending by foreign visitors and residents' spending abroad have traditionally been recorded in tourism statistics.

Expenditures of residents while abroad and of foreign nationals in the country are available for nearly all countries (Switzerland is the only example of the latter that is not separately accounted for) and form the services portions of the WTTC/OE accounts. Thus, Foreign Visitor Spending (FVS) represents T&T **services exports** and Resident Spending Abroad (RSA) represents T&T **services imports**.

UNWTO's data on foreign tourism spending and receipts once again cover spending on passenger fares, whether this consists of a country's residents buying air tickets on foreign airlines or foreign visitors buying tickets from domestic airlines, as well as residents' spending on goods and services while abroad and foreign visitors' spending on goods and services within the country in question. That is, the usual BOP definitions are being used again by UNWTO. We use this data from UNWTO but continue to crosscheck them against the detailed Balance of Payments statistics collated by the IMF. In the majority of cases, the two sources are consistent. In cases where there are conflicts, the most timely source (which is usually the IMF statistics) is used. Similarly, the UNWTO visitor arrival figures (split into overnights, day and cruise visitors) are checked against local sources and used with the BOP series on fares and travel spending to derive average fares and travel spending per trip.

As suggested by the TSA, WTTC/OE also includes **merchandise trade** as an item in the Travel & Tourism satellite account.

First, visitors buy imported goods - food, clothing, cameras; and

Second, travel businesses purchase imported materials and capital goods in order to provide travel services to their customers such as automobiles, aircraft, dinnerware, linens, etc

By implementing the TSA's notion of world tourism, the WTTC/OE research tracks the import and export of goods (consumption and capital) related to Travel & Tourism.

Unfortunately, we are not able to trace the specific origin of each souvenir T-shirt that the traveller purchases. However, if we know that half of all T-shirts sold in a country were imported, it makes sense to say that half of all souvenir T-shirts that travellers purchase in that country are imported, until we have more specific data.

As countries begin to develop Travel & Tourism accounts, the employment of this specific accounting can be rationalized. If this were done, they would know the country of origin, which would allow the export accounts to be more accurately developed as well. Until such data are available, it is clear that this kind of assumption is justified.



The WTTC/OE import and export merchandise trade accounts include the following:

- |                                  |                                 |
|----------------------------------|---------------------------------|
| - Alcoholic beverages            | - Luggage                       |
| - Aircraft                       | - Motorcycles                   |
| - Automobile & parts             | - Motor gasoline                |
| - Clothing & footwear            | - Motor oil                     |
| - Coal                           | - Other                         |
| - Crude oil                      | - Propane                       |
| - Food & non-alcoholic beverages | - Recorded music                |
| - Fuel oil                       | - Ships & boats                 |
| - Furniture & appliances         | - Sports & recreation equipment |
| - Home heating oil               | - Tobacco                       |
| - Housekeeping supplies          |                                 |
- The share of crude oil refined into gasoline in each country was determined and added to direct trade in gasoline. As one would expect, in terms of foreign trade, gasoline, autos and food are the most important items.

Among important items not covered in this research are equipment purchases for hotels, restaurants, and the like, as well as energy goods for space heating, food processing and food preparation.

WTTC/OE use detailed United Nations (UN) commodity trade data, sourced via Statistics Canada, to calculate T&T exports and imports. For a number of countries, because of definitional differences (customs versus SNA), total merchandise imports and exports in the UN data do not equal total merchandise imports and exports as reported in the official National Accounts of that country or region. To avoid definitional inconsistencies between trade accounts, individual T&T shares are applied to each category of exports that feeds into the final demand of Travel & Tourism. An average T&T share is then derived for total commodity exports/imports and this share is then applied to the National Account definition of exports/imports.

We use an I/O approach to estimate what proportion of T&T imports are used within the T&T industry, compared with what is used within the wider T&T economy. We also use these T&T shares when looking at imports, to reflect how important overall T&T demand is within an economy. So for countries where tourism accounts for a large part of aggregate demand in the economy, T&T is also assumed to account for a larger share of, for example, imports of clothing and footwear than for an economy where T&T is of only minor importance. To an extent, this differentiation is already allowed for in the use of the commodity breakdown of trade combined with different shares for different commodities. But our approach reflects the fact that in practice the commodity breakdown is not sufficiently detailed to pick up all the variation in import shares likely to result from the differing importance of T&T demand in different countries.

### ***Projections***

Forecasts for trade in T&T goods are based on first projecting the split of overall merchandise trade forecasts between the twenty-one categories analysed above, and then applying the estimated T&T share to each category.

Forecasts for visitor numbers (and so for T&T services trade) are based on a matrix of visitor demand derived from UNWTO statistics on the country of origin of foreign visitors (UNWTO Yearbook of Tourism Statistics 1995-99). In effect, a country-specific index (WTOUR) of the potential growth in each country's tourism source markets is derived, using information on the growth in real travel spending abroad from the country's most important sources of visitors and (as weights) the typical geographical source of the country's visitors. This allows us to take account of projections of visitor imports (ie residents' spending abroad) in the countries providing most of a country's visitors, when making our projections of that country's visitor exports. This forecasting methodology is particularly valuable in taking account of developments like those of 11 September 2001 that can be expected to have a differential impact on the propensity to travel abroad of consumers and business travellers in different countries.

## **G) BUSINESS TRAVEL**

In adherence with the TSA's guidelines, WTTC/OE include both government and corporate travel expenditures in the satellite account. We have chosen to categorize these expenditures under the heading Business Travel.

### ***Travel expenditures of government employees***

Travel & Tourism expenditure by the government is travel-related expenditures by government employees, excluding those travelling on military assignment.

Federal government's expenditures on travel and transportation of persons is collected from the Congressional Budget Office, Object Class Analysis, which is produced by the Office of Management and Budget Review and Concepts Division of the Budget Concepts Branch. State and local expenditures are taken from the Bureau of Economic Analysis.

Outside the US, government spending on employee travel is estimated by taking the ratio of government travel to corporate travel in the US, and adjusting for relative government intensity. We switched last year to basing this government intensity factor on the relative size of government spending (excluding defence and social security) rather than government employment as before. This is because big changes in the employment data have revealed variations between countries in terms of what is actually covered by the public sector employment data.

### ***Travel expenditures of corporate employees***

In the current research, Business Travel is divided into the following categories:

- Air travel
- Lodging
- Rental cars
- Meals
- Other travel
- Entertainment
- Other

These categories have been selected primarily because of available data. There are fairly good data on lodging, less so on air travel, and almost none on the other categories.

The sources for the air travel data are as follows:

- Air fare international payments                      UNWTO, Compendium of Tourism Statistics, 1988-97, Madrid.
- Air passenger sales and kilometres by airline      Civil Aviation Statistics of the World,  
International Civil Aviation Organization

(ICAO)

- Air Passenger Sales

Data from the accredited travel agencies participating in the International Air Transport Association (IATA) Bank Settlement Plan (BSP)

The sources for the lodging data are as follows:

- Hotel rooms, tourism payments

UNWTO, Compendium of Tourism Statistics, 1994-98, Madrid.

- Average room rates

PKF (Pannel Kerr Forster) International Consulting, 'International Hotel Trends', and 'Trends in the Hotel Industry USA edition'.

- Hotel occupancy rates

UNWTO, Compendium of Tourism Statistics, 1994-98, Madrid.

- Composition of the market

Horwath International, Worldwide Hotel Industry, New York 1994.

The source for other categories of expenditure is *The American Express Surveys of Business Travel Management*.

Business **air travel** is determined as the product of the following three concepts:

- Annual revenue passenger miles (RPMs)
- Average yield (price) per RPM
- Business share

Business travel in the accounts is the demand by domestic industries for personal travel. Thus, the focus must be on the consumption of the business traveller by country of residence. There are several ways of determining these amounts:

1. Obtain business travel directly from the input-output tables. This suffers the disadvantages of the dated nature of these tables, often 10-15 years out of date, and of the lack of a time series.
2. Use data on total airline ticket sales in a country and survey estimates or other sources for business share.
3. Use data on airline passenger revenue and adjust using international balance of payments data on airfare receipts and expenditures.

Our approach is a combination of the second and third methods, depending on the data available.

Specifically, passenger revenue data by airline derived from International Civil Aviation Organization (ICAO) is aggregated to the country level. Where revenue numbers are missing, passenger kilometres are multiplied by average revenue per mile for the region or country as available.

If ICAO data is not available for a given country, IATA passenger sales are used. IATA states that its membership covers approximately 80% of the market. Therefore, these numbers are scaled up accordingly.

For the USA, IATA provides passenger sales directly.

These total passenger sales are then multiplied by the business share of airline passenger revenue (source: survey data from IHS Global Insight).

For **lodging**, the UNWTO provides the number of rooms in hotels and similar establishments, and room occupancy, both annual averages, for most countries in the world. Private, and sometimes public sources, provide data on average room rates and the percentage of the total market that business represents. Thus lodging is given as the product of the following concepts:

- Average number of rooms (UNWTO)
- Average occupancy rate (UNWTO)
- Average room rate (PKF)
- Business share (Horwath)

Note that business use excludes government and conventions.

Since 2004, we have added additional information from Balance of Payments (BOP) statistics to enable us to refine our estimates of how much businesses spend on hotels. We continue to use data on the number of hotel rooms, estimated room rates and occupancy rates, and surveys of the business share of the market, to estimate overall business spending in a country. As usual, new data has led to some of these assumptions being updated/amended, and we have looked again at estimated room rates to ensure they look consistent across countries. But the main methodological change we made in 2004 was to incorporate BOP data to improve estimates of the extent to which spending by an individual country's businesses differs from spending by businesses on hotels within the individual country. Countries with detailed BOP statistics for services record imports and exports of travel and the business share of these, so that the net exports of travel attributable to businesses can be added to the estimated spending within the country or vice versa. As is common practice, where less detailed BOP statistics exist we had to estimate certain elements of this calculation.

The other categories of business travel are usually not available outside of an I-O table. For these categories, we have used American Express surveys of business travel. We

believe that this biases the results on the conservative side, because the surveys better cover, or are limited to, large corporations whom we assume use air travel more than smaller companies. We have attempted to correct this bias by using the survey relationships of other categories to lodging rather than to air travel or the sum of air travel.

Therefore, the final lodging equation looks like this:

$$\text{Occupancy Rate} * \text{Number of Rooms} * \text{Room Rate} * \text{Business Share} * 365 \text{ Days}$$

The sum of lodging and fare expenditures are then scaled up to account for other business travel expenditures using the American Express Survey.

$$\text{Business Travel} = (\text{Lodging} + \text{Fares}) / \text{L\&F share of total travel expenditures}$$

Therefore, if Hotel and Airfare are US\$100 and account for 80% of business travel expenditures then total business travel is equal to US\$125.

**Table 4:**  
**Business Travel by Country (US\$ bn)**

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<b>United States</b>														
Air travel	35.33	37.58	40.67	42.89	45.04	47.54	52.48	44.61	40.37	40.74	44.73	48.26	52.65	55.76
Lodging	17.03	18.80	20.59	22.91	24.38	24.86	28.03	27.69	26.85	27.60	28.89	31.47	34.06	36.87
Other	42.84	46.13	50.13	53.83	56.80	59.24	65.88	59.16	55.00	55.91	60.23	65.24	70.94	75.79
<b>Total</b>	<b>95.20</b>	<b>102.50</b>	<b>111.39</b>	<b>119.63</b>	<b>126.22</b>	<b>131.64</b>	<b>146.39</b>	<b>131.46</b>	<b>122.23</b>	<b>124.24</b>	<b>133.85</b>	<b>144.98</b>	<b>157.66</b>	<b>168.43</b>
<b>United Kingdom</b>														
Air travel	6.02	6.70	7.04	7.91	8.09	8.31	8.38	7.53	7.92	9.03	10.88	12.19	13.57	14.85
Lodging	4.29	4.48	5.47	5.36	6.22	6.04	6.76	6.88	6.57	6.65	6.89	7.33	7.39	8.24
Other	6.87	7.46	8.34	8.85	9.54	9.56	10.09	9.61	9.66	10.46	11.85	13.02	13.97	15.40
<b>Total</b>	<b>17.18</b>	<b>18.64</b>	<b>20.85</b>	<b>22.12</b>	<b>23.84</b>	<b>23.91</b>	<b>25.23</b>	<b>24.02</b>	<b>24.15</b>	<b>26.14</b>	<b>29.62</b>	<b>32.54</b>	<b>34.92</b>	<b>38.49</b>
<b>Austria</b>														
Air travel	0.37	0.37	0.37	0.36	0.33	0.36	0.36	0.36	0.37	0.40	0.47	0.53	0.59	0.64
Lodging	0.68	0.86	0.99	1.11	1.10	0.69	0.79	0.87	0.76	0.69	0.57	0.53	0.60	0.71
Other	1.05	1.23	1.36	1.47	1.43	1.05	1.14	1.23	1.13	1.10	1.05	1.07	1.19	1.35
<b>Total</b>	<b>2.10</b>	<b>2.46</b>	<b>2.72</b>	<b>2.94</b>	<b>2.87</b>	<b>2.09</b>	<b>2.28</b>	<b>2.46</b>	<b>2.26</b>	<b>2.19</b>	<b>2.10</b>	<b>2.13</b>	<b>2.38</b>	<b>2.70</b>
<b>Belgium</b>														
Air travel	0.36	0.41	0.41	0.40	0.40	0.42	0.43	0.40	0.42	0.48	0.58	0.63	0.69	0.78
Lodging	0.89	0.74	1.04	1.06	1.22	1.73	1.67	1.11	0.61	0.63	1.15	1.00	1.07	1.21
Other	1.25	1.15	1.45	1.46	1.62	2.15	2.10	1.52	1.03	1.11	1.72	1.62	1.76	1.99
<b>Total</b>	<b>2.50</b>	<b>2.31</b>	<b>2.89</b>	<b>2.92</b>	<b>3.25</b>	<b>4.30</b>	<b>4.20</b>	<b>3.04</b>	<b>2.07</b>	<b>2.23</b>	<b>3.44</b>	<b>3.25</b>	<b>3.53</b>	<b>3.98</b>
<b>Denmark</b>														
Air travel	0.71	0.83	0.85	0.79	0.82	0.88	0.87	0.83	0.87	0.98	1.18	1.28	1.42	1.60
Lodging	0.48	0.56	0.62	0.69	0.76	0.76	0.76	0.80	0.86	0.95	0.96	1.10	1.10	1.30
Other	0.79	0.93	0.98	0.98	1.05	1.09	1.09	1.06	1.11	1.23	1.42	1.50	1.67	1.93
<b>Total</b>	<b>1.98</b>	<b>2.31</b>	<b>2.44</b>	<b>2.46</b>	<b>2.63</b>	<b>2.73</b>	<b>2.73</b>	<b>2.65</b>	<b>2.78</b>	<b>3.08</b>	<b>3.55</b>	<b>3.74</b>	<b>4.19</b>	<b>4.84</b>
<b>France</b>														
Air travel	3.43	3.85	3.91	3.54	3.62	3.89	4.05	3.94	4.12	4.77	5.43	5.70	6.46	7.35
Lodging	3.61	4.02	4.48	5.02	5.32	5.48	5.97	6.36	6.08	6.07	6.56	7.31	7.82	8.66
Other	7.04	7.87	8.39	8.56	8.94	9.37	10.02	10.30	10.20	10.84	11.98	13.01	14.27	16.02
<b>Total</b>	<b>14.08</b>	<b>15.75</b>	<b>16.78</b>	<b>17.11</b>	<b>17.88</b>	<b>18.74</b>	<b>20.04</b>	<b>20.59</b>	<b>20.40</b>	<b>21.67</b>	<b>23.97</b>	<b>26.02</b>	<b>28.54</b>	<b>32.03</b>
<b>Germany</b>														
Air travel	3.64	4.25	4.18	3.71	3.84	4.12	4.14	3.99	4.06	4.82	6.08	6.55	7.14	8.11
Lodging	9.25	9.94	10.18	10.01	10.39	11.34	11.82	11.76	10.11	10.16	10.92	11.98	12.16	13.67
Other	12.89	14.19	14.36	13.72	14.23	15.46	15.96	15.75	14.17	14.98	17.00	18.53	19.30	21.78
<b>Total</b>	<b>25.77</b>	<b>28.39</b>	<b>28.73</b>	<b>27.43</b>	<b>28.45</b>	<b>30.93</b>	<b>31.92</b>	<b>31.50</b>	<b>28.33</b>	<b>29.95</b>	<b>34.00</b>	<b>37.06</b>	<b>38.60</b>	<b>43.56</b>
<b>Italy</b>														
Air travel	2.66	2.82	3.14	2.97	3.13	3.41	3.46	3.28	3.45	3.90	4.67	5.09	5.62	6.34
Lodging	4.56	4.86	4.23	4.54	5.26	5.88	6.41	6.88	6.75	7.09	6.65	7.47	7.64	8.65
Other	7.22	7.68	7.37	7.51	8.39	9.29	9.86	10.16	10.20	10.99	11.32	12.56	13.26	14.99
<b>Total</b>	<b>14.44</b>	<b>15.37</b>	<b>14.75</b>	<b>15.02</b>	<b>16.79</b>	<b>18.59</b>	<b>19.73</b>	<b>20.33</b>	<b>20.40</b>	<b>21.98</b>	<b>22.64</b>	<b>25.12</b>	<b>26.52</b>	<b>29.98</b>
<b>Luxembourg</b>														
Air travel	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.06
Lodging	0.06	0.07	0.07	0.09	0.10	0.09	0.08	0.08	0.05	0.03	0.04	0.04	0.05	0.05
Other	0.08	0.10	0.10	0.12	0.13	0.12	0.11	0.11	0.08	0.06	0.08	0.09	0.09	0.11
<b>Total</b>	<b>0.16</b>	<b>0.19</b>	<b>0.21</b>	<b>0.25</b>	<b>0.26</b>	<b>0.24</b>	<b>0.21</b>	<b>0.22</b>	<b>0.15</b>	<b>0.12</b>	<b>0.15</b>	<b>0.17</b>	<b>0.19</b>	<b>0.22</b>
<b>Netherlands</b>														
Air travel	1.95	1.95	1.94	1.95	1.98	2.06	2.03	1.88	2.21	2.40	3.30	3.59	3.97	4.48
Lodging	1.15	1.40	1.53	1.60	1.94	2.02	2.10	2.10	1.98	2.04	2.16	2.21	2.44	2.72
Other	2.07	2.23	2.31	2.37	2.62	2.72	2.76	2.65	2.80	2.96	3.64	3.87	4.27	4.80
<b>Total</b>	<b>5.16</b>	<b>5.58</b>	<b>5.79</b>	<b>5.92</b>	<b>6.54</b>	<b>6.81</b>	<b>6.89</b>	<b>6.63</b>	<b>6.99</b>	<b>7.40</b>	<b>9.09</b>	<b>9.67</b>	<b>10.68</b>	<b>12.00</b>
<b>Norway</b>														
Air travel	0.51	0.53	0.55	0.53	0.56	0.59	0.58	0.56	0.58	0.66	0.79	0.86	0.95	1.07
Lodging	0.72	0.79	0.86	0.90	0.99	1.02	1.03	1.03	1.05	1.19	1.42	1.68	1.47	1.64
Other	0.82	0.88	0.94	0.96	1.04	1.08	1.08	1.06	1.09	1.24	1.48	1.69	1.61	1.81
<b>Total</b>	<b>2.05</b>	<b>2.21</b>	<b>2.35</b>	<b>2.39</b>	<b>2.59</b>	<b>2.69</b>	<b>2.70</b>	<b>2.64</b>	<b>2.72</b>	<b>3.09</b>	<b>3.69</b>	<b>4.23</b>	<b>4.04</b>	<b>4.52</b>
<b>Sweden</b>														
Air travel	0.77	0.90	0.99	0.91	0.95	1.02	1.01	0.96	1.01	1.14	1.37	1.49	1.64	1.85
Lodging	0.92	1.00	1.15	1.24	1.49	1.65	1.55	1.41	1.36	1.42	1.64	1.66	1.66	1.82
Other	1.12	1.27	1.42	1.44	1.63	1.78	1.70	1.58	1.58	1.71	2.01	2.10	2.20	2.45
<b>Total</b>	<b>2.81</b>	<b>3.17</b>	<b>3.56</b>	<b>3.59</b>	<b>4.07</b>	<b>4.45</b>	<b>4.26</b>	<b>3.96</b>	<b>3.95</b>	<b>4.26</b>	<b>5.02</b>	<b>5.25</b>	<b>5.51</b>	<b>6.12</b>

## WTTC/OE 2010 Travel & Tourism Economic Impact Methodology

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<b>Switzerland</b>														
Air travel	1.39	1.66	1.61	1.39	1.45	1.53	1.55	1.47	1.55	1.63	1.57	1.55	1.72	2.21
Lodging	1.07	1.14	1.27	1.34	1.36	1.33	1.39	1.33	1.24	1.31	1.49	1.63	1.71	1.78
Other	2.46	2.80	2.88	2.73	2.81	2.86	2.94	2.80	2.79	2.93	3.05	3.18	3.43	3.99
<b>Total</b>	<b>4.92</b>	<b>5.60</b>	<b>5.76</b>	<b>5.47</b>	<b>5.63</b>	<b>5.73</b>	<b>5.89</b>	<b>5.60</b>	<b>5.58</b>	<b>5.87</b>	<b>6.10</b>	<b>6.37</b>	<b>6.87</b>	<b>7.99</b>
<b>Canada</b>														
Air travel	2.25	2.53	2.64	2.75	2.87	3.11	3.48	2.98	2.94	2.72	3.16	3.85	4.25	4.66
Lodging	1.99	2.08	2.60	2.66	2.83	2.86	3.24	3.14	2.95	2.95	3.01	3.22	3.49	4.00
Other	3.07	3.34	3.80	3.92	4.13	4.33	4.86	4.43	4.27	4.11	4.47	5.12	5.60	6.27
<b>Total</b>	<b>7.31</b>	<b>7.94</b>	<b>9.04</b>	<b>9.34</b>	<b>9.83</b>	<b>10.30</b>	<b>11.58</b>	<b>10.55</b>	<b>10.16</b>	<b>9.79</b>	<b>10.64</b>	<b>12.19</b>	<b>13.34</b>	<b>14.93</b>
<b>Japan</b>														
Air travel	7.82	8.45	7.50	6.94	6.87	7.63	8.16	6.75	7.08	7.50	8.97	8.67	8.82	9.10
Lodging	18.38	20.61	22.49	23.09	23.29	24.02	25.46	25.97	24.74	23.83	24.96	26.86	29.96	31.09
Other	14.74	16.35	16.87	16.89	16.97	17.80	18.91	18.41	17.90	17.62	19.08	19.98	21.81	22.61
<b>Total</b>	<b>40.94</b>	<b>45.41</b>	<b>46.86</b>	<b>46.92</b>	<b>47.13</b>	<b>49.45</b>	<b>52.54</b>	<b>51.13</b>	<b>49.71</b>	<b>48.95</b>	<b>53.01</b>	<b>55.50</b>	<b>60.59</b>	<b>62.80</b>
<b>Finland</b>														
Air travel	0.52	0.65	0.65	0.60	0.63	0.69	0.68	0.65	0.68	0.77	0.92	1.01	1.11	1.25
Lodging	0.29	0.44	0.49	0.50	0.55	0.71	0.73	0.75	0.67	0.64	0.61	0.79	0.91	0.89
Other	0.54	0.72	0.76	0.73	0.79	0.93	0.94	0.93	0.90	0.94	1.02	1.20	1.35	1.43
<b>Total</b>	<b>1.35</b>	<b>1.81</b>	<b>1.90</b>	<b>1.83</b>	<b>1.97</b>	<b>2.33</b>	<b>2.35</b>	<b>2.33</b>	<b>2.25</b>	<b>2.36</b>	<b>2.55</b>	<b>2.99</b>	<b>3.37</b>	<b>3.57</b>
<b>Greece</b>														
Air travel	0.34	0.35	0.37	0.36	0.37	0.39	0.40	0.38	0.39	0.45	0.53	0.58	0.64	0.73
Lodging	0.25	0.29	0.31	0.38	0.45	0.43	0.34	0.34	0.60	0.61	0.60	0.74	0.85	0.85
Other	0.40	0.42	0.45	0.49	0.55	0.55	0.49	0.48	0.67	0.71	0.76	0.88	0.99	1.05
<b>Total</b>	<b>0.99</b>	<b>1.06</b>	<b>1.13</b>	<b>1.23</b>	<b>1.37</b>	<b>1.36</b>	<b>1.22</b>	<b>1.19</b>	<b>1.66</b>	<b>1.77</b>	<b>1.89</b>	<b>2.21</b>	<b>2.48</b>	<b>2.63</b>
<b>Iceland</b>														
Air travel	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.12	0.13	0.11	0.13	0.17	0.18	0.21
Lodging	0.04	0.05	0.06	0.06	0.08	0.08	0.09	0.08	0.08	0.08	0.10	0.14	0.16	0.18
Other	0.07	0.08	0.09	0.09	0.10	0.10	0.10	0.09	0.10	0.09	0.11	0.15	0.16	0.18
<b>Total</b>	<b>0.23</b>	<b>0.24</b>	<b>0.27</b>	<b>0.28</b>	<b>0.30</b>	<b>0.31</b>	<b>0.33</b>	<b>0.30</b>	<b>0.30</b>	<b>0.29</b>	<b>0.34</b>	<b>0.45</b>	<b>0.50</b>	<b>0.56</b>
<b>Ireland</b>														
Air travel	0.22	0.24	0.25	0.26	0.26	0.29	0.29	0.28	0.29	0.33	0.40	0.43	0.48	0.54
Lodging	0.29	0.35	0.34	0.37	0.45	0.55	0.58	0.60	0.68	0.74	0.76	0.91	1.02	1.30
Other	0.34	0.39	0.39	0.42	0.47	0.56	0.58	0.59	0.65	0.72	0.77	0.90	1.00	1.23
<b>Total</b>	<b>0.84</b>	<b>0.98</b>	<b>0.98</b>	<b>1.04</b>	<b>1.18</b>	<b>1.41</b>	<b>1.46</b>	<b>1.47</b>	<b>1.62</b>	<b>1.79</b>	<b>1.93</b>	<b>2.24</b>	<b>2.50</b>	<b>3.07</b>
<b>Portugal</b>														
Air travel	0.37	0.42	0.44	0.40	0.42	0.45	0.46	0.43	0.46	0.51	0.62	0.67	0.74	0.84
Lodging	0.37	0.44	0.50	0.51	0.57	0.59	0.62	0.60	0.56	0.56	0.62	0.83	0.81	0.91
Other	0.49	0.57	0.63	0.61	0.66	0.69	0.71	0.69	0.68	0.72	0.82	1.00	1.03	1.16
<b>Total</b>	<b>1.24</b>	<b>1.43</b>	<b>1.56</b>	<b>1.52</b>	<b>1.65</b>	<b>1.74</b>	<b>1.79</b>	<b>1.72</b>	<b>1.70</b>	<b>1.79</b>	<b>2.06</b>	<b>2.50</b>	<b>2.59</b>	<b>2.91</b>
<b>Spain</b>														
Air travel	1.29	1.36	1.41	1.29	1.35	1.46	1.54	1.67	1.68	1.95	2.25	2.38	2.58	2.98
Lodging	1.85	1.93	2.06	2.33	2.54	2.91	3.14	3.30	3.13	3.10	3.57	4.34	5.01	5.53
Other	2.57	2.69	2.84	2.96	3.19	3.58	3.83	4.06	3.94	4.13	4.76	5.50	6.21	6.96
<b>Total</b>	<b>5.71</b>	<b>5.98</b>	<b>6.31</b>	<b>6.58</b>	<b>7.08</b>	<b>7.95</b>	<b>8.50</b>	<b>9.03</b>	<b>8.75</b>	<b>9.17</b>	<b>10.58</b>	<b>12.22</b>	<b>13.79</b>	<b>15.46</b>
<b>Australia</b>														
Air travel	1.47	0.90	1.00	0.99	1.06	1.13	1.22	1.12	1.14	1.17	1.36	1.48	1.62	2.24
Lodging	1.37	1.65	1.76	1.82	1.76	1.89	2.00	1.92	1.81	2.04	2.20	2.53	2.70	2.76
Other	1.46	1.31	1.42	1.45	1.45	1.56	1.66	1.57	1.52	1.65	1.83	2.06	2.22	2.57
<b>Total</b>	<b>4.30</b>	<b>3.86</b>	<b>4.19</b>	<b>4.25</b>	<b>4.28</b>	<b>4.58</b>	<b>4.88</b>	<b>4.61</b>	<b>4.46</b>	<b>4.85</b>	<b>5.38</b>	<b>6.07</b>	<b>6.54</b>	<b>7.57</b>
<b>New Zealand</b>														
Air travel	0.57	0.57	0.64	0.65	0.69	0.72	0.77	0.71	0.73	0.74	0.86	0.94	1.03	1.14
Lodging	0.23	0.22	0.27	0.22	0.19	0.17	0.21	0.15	0.12	0.07	0.14	0.15	0.18	0.16
Other	0.25	0.25	0.29	0.28	0.28	0.28	0.31	0.27	0.27	0.26	0.32	0.35	0.38	0.41
<b>Total</b>	<b>1.05</b>	<b>1.04</b>	<b>1.19</b>	<b>1.15</b>	<b>1.16</b>	<b>1.17</b>	<b>1.30</b>	<b>1.13</b>	<b>1.11</b>	<b>1.07</b>	<b>1.32</b>	<b>1.44</b>	<b>1.59</b>	<b>1.71</b>



## **H) MEASUREMENT OF SUPPLY-SIDE CONCEPTS**

The approach described thus far provides final consumption and foreign trade, but not of supply-side concepts such as employment and GDP. Determining the supply-side, ie namely the industries that supply these goods and services, requires an estimation method. The standard procedure when direct measurement is not possible is to use input-output tables.

An input-output table is a snapshot of the transactions among the industries of a country during a particular year. Each entry in the table measures the purchases (input) by one (column) industry of another (row) industry's production (output). Therefore, each column represents an annual expense statement for the column industry for the year for which the table was compiled.

Using restaurants as an example, to produce a year's worth of meals, the restaurants of a country must buy a variety of goods and services from other industries. In the input-output table, there would be a column of entries for the restaurant industry, representing these purchases: a certain amount directly from farmers; another amount from food processors; amounts from other manufacturers; and amounts from various service providers such as linen services, printers, and so forth.

The input-output table allows the economist to trace the restaurant expenditures as these expenditures flow through the economy from one producer to the next. The purchases the restaurant makes from a food processor, for example, generate business in food processing, which in turn generates purchases by the food processor from farmers, fuel producers, and others. Step by step these flows can be followed from one producer to the next.

Along each step of the way, industries add value to the economy. Part of this added value arises from the work of the employees in that industry and part from the industry's plant and equipment. Therefore, at each step in the economy, labour is used, requiring Labour Compensation, and plant and equipment are used, requiring 'Property Type' income. Labour Compensation, Property Type Income, and the Indirect Taxes imposed by government post-production make up 'Value Added'. Value Added is just what it says, the value added by the industry to the inputs from other industries in the production of the products it sells. The sum of Value Added across all of the producers in a country's economy is its Gross Domestic Product (GDP).

The flow of consumer expenditure through the economy thus generates employment and Value Added at each step in the production process. The US\$100 that a restaurant diner spends on a meal all eventually ends up in people's pockets. The input-output table allows one to trace this flow of expenditures to the pockets where it ends up – to the employers and employees in each industry.

The fundamental assumption involved in using, throughout the period being studied, the input-output table for a given historical year is that the percentages of the purchases a given industry makes from each other industry in the economy does not change. In

our example, the assumption is that if dining expenditures rise by 10% the next year, each of the purchases of the restaurant industry rises by the same 10%.

Moreover, since the restaurant industry cannot be divided between visitors and their regular customers, the amounts that visitors contribute to the restaurant industry are assumed to produce the same proportion of the restaurant industry purchases from other industries as the industries regular customers do.

These turn out not to be very limiting assumptions, and the input-output methodology allows OE to trace with fair precision the employment and GDP generated by the Travel & Tourism expenditures that take place each year. The power of this approach is that it shows the degree that other, often higher-wage and higher-productivity industries that are involved in the total Travel & Tourism economy.

The precise implementation of input-output methodology used in this research is as follows.

Input-Output (I-O) begins with the familiar identity

$$(1) \quad X_i = \sum_j X_{ij} + D_i$$

Where:

$X_i$  = the output of industry  $i$ ;

$X_{ij}$  = the direct purchase from industry  $i$  by industry  $j$ ; and

$D_i$  = final demand for the output of industry  $i$ .

The fundamental I-O assumption is that direct purchases by an industry are proportional to the industry's output:

$$(2) \quad X_{ij} = a_{ij} X_j$$

where  $a_{ij}$  is a parameter, held constant in most I-O analysis and provided as the "A-matrix" in country input-output tables. Combining equations (1) and (2) yields:

$$(3) \quad X_i = \sum_j a_{ij} X_j + D_i$$

or

$$(4) \quad \sum_j (a_{ij} - \delta_{ij}) X_j = D_i$$

where  $\delta_{ij} = 1$  if  $i = j$   
 $\delta_{ij} = 0$  if  $i \neq j$

Written in matrix notation, (4) becomes

$$(5) \quad (1 - A) X = D$$

Equation (5) has the well-known solution:

$$(6) \quad X = (1 - A)^{-1} D$$

Using this methodology, we are able to calculate the T&T share by industry by substituting the final demand vector for Travel & Tourism ( $D_t$ ) where final demand for the total economy ( $D$ ) once stood.

$$(7) \quad X_t = (1 - A)^{-1} D_t$$

Therefore, if the industry output vector is computed using equation (6) for total final demand and for Travel & Tourism final demand, then the ratio of the two sets of results can be interpreted as the fraction of each industry that contributes to Travel & Tourism.

$$(8) \quad v_i = X_{it} / X_i$$

where  $v_i$  = the value-added weights for Travel & Tourism.

There is no survey-based method for determining these weights. They must be calculated by some method such as Input-Output. The precision of the value added weights depends not only on the precision of the final demand data, but also on the precision of the Input - Output method.

In order to calculate these T&T shares by industry, T&T final demand (eg PCE, Government expenditures, etc) is allocated across the range of industries to create the vector  $D_t$ . To this end, we have distributed both private consumption and business travel expenditures among the ten industries in each I-O table. This comprises the majority of demand expenditures and serves as an adequate estimate of the distribution of total T&T final demand among the ten industries.

The resulting set of weights is given in Table 5 at the one-digit level for each country. These weights have been used, in turn, to calculate employment, indirect taxes, wages and salaries, operating surplus and capital consumption which are all available at the same ten-industry level of detail.

To gain an appreciation for the difference between the expenditure (demand) side of the economy and the value-added (supply) side, compare the consumption weights in Table 2 and the value added weights in Table 5.

Since we do not have the appropriate I-O matrices available for all the countries we are analysing, we have assumed the coefficients applying in certain countries are broadly appropriate to use in certain other countries. There are actually two types of matrices used in this work, the 'A-matrix' described above, and the 'H-matrix'. The latter relates

the way in which consumption, investment, etc are classified in the industrial classification. That is, the sectors for which a breakdown of consumer expenditure is available differ markedly from the standard set of industrial sectors. The 'H-matrix' converts from one basis to the other. The country source of the I-O matrices used for each country is shown in Table 6.

**Table 5. Industry Sector Weights Corresponding to the PCE Weights**

	Australia	Austria	Belgium	Canada	Denmark	Finland
Agriculture	0.1085	0.0779	0.0841	0.1769	0.0679	0.0685
Mining	0.0895	0.0845	0.0989	0.1373	0.0690	0.0718
Manufacturing	0.0994	0.0953	0.0935	0.1705	0.0848	0.0859
Electricity, Gas & Water	0.0548	0.0618	0.0511	0.0652	0.0430	0.0457
Construction	0.0805	0.0975	0.1857	0.1054	0.0680	0.0742
W/R Trade, Hot. & Rest.	0.0653	0.1136	0.1131	0.1172	0.0936	0.0939
Transpt., Stor., & Comm.	0.1525	0.1959	0.2148	0.2165	0.1653	0.1659
Fin., Ins., R. Est., & Bus. Serv.	0.0474	0.2312	0.2850	0.0730	0.1285	0.1426
Community/Social/Personal	0.1803	0.1067	0.1038	0.1725	0.0695	0.0766
Government Services	0.0891	0.2355	0.2387	0.1051	0.1467	0.1544
	France	Germany	Greece	Iceland	Ireland	Italy
Agriculture	0.0859	0.0709	0.0923	0.0870	0.0755	0.1108
Mining	0.0923	0.0749	0.1198	0.0960	0.0914	0.1336
Manufacturing	0.0977	0.0872	0.1168	0.1095	0.0945	0.1303
Electricity, Gas & Water	0.0421	0.0514	0.1024	0.0673	0.0807	0.0949
Construction	0.0922	0.0781	0.1306	0.1054	0.0807	0.1140
W/R Trade, Hot. & Rest.	0.1069	0.0967	0.1538	0.1204	0.1129	0.1659
Transpt., Stor., & Comm.	0.1869	0.1747	0.1638	0.2120	0.1148	0.1772
Fin., Ins., R. Est., & Bus. Serv.	0.1743	0.1690	0.0719	0.1874	0.0800	0.0647
Community/Social/Personal	0.0931	0.0856	0.1591	0.1159	0.1240	0.1322
Government Services	0.1743	0.1875	0.2562	0.2178	0.1853	0.2557
	Japan	Lux.	Nether.	N. Zealand	Norway	Portugal
Agriculture	0.0682	0.0854	0.0696	0.1182	0.0768	0.0961
Mining	0.0723	0.0982	0.0753	0.0975	0.0838	0.1308
Manufacturing	0.0820	0.0964	0.0767	0.1195	0.0960	0.1189
Electricity, Gas & Water	0.0540	0.0474	0.0384	0.0466	0.0582	0.1236
Construction	0.0930	0.1684	0.1148	0.0723	0.0916	0.1452
W/R Trade, Hot. & Rest.	0.0917	0.1150	0.0837	0.0807	0.1052	0.1571
Transpt., Stor., & Comm.	0.1736	0.2076	0.1549	0.1646	0.1920	0.1708
Fin., Ins., R. Est., & Bus. Serv.	0.1419	0.2508	0.1581	0.0465	0.1736	0.1026
Community/Social/Personal	0.0794	0.0972	0.0741	0.1363	0.0987	0.1618
Government Services	0.1302	0.2324	0.1334	0.0781	0.1888	0.2340
	Spain	Sweden	Switz.	Turkey	UK	US
Agriculture	0.1258	0.0602	0.0665	0.0706	0.0774	0.1316
Mining	0.1484	0.0585	0.0734	0.1031	0.0797	0.1146
Manufacturing	0.1479	0.0747	0.0833	0.0941	0.0924	0.1360
Electricity, Gas & Water	0.1252	0.0335	0.0522	0.0797	0.0566	0.0603
Construction	0.1601	0.0559	0.0859	0.0954	0.0925	0.0780
W/R Trade, Hot. & Rest.	0.1964	0.0808	0.0979	0.1239	0.1051	0.0877
Transpt., Stor., & Comm.	0.1941	0.1438	0.1846	0.1353	0.1480	0.1900

Fin., Ins., R. Est., & Bus. Serv.	0.0913	0.1125	0.2272	0.0535	0.1281	0.0473
Community/Social/Personal	0.1838	0.0558	0.0891	0.1204	0.0870	0.1663
Government Services	0.2482	0.1355	0.2030	0.2066	0.1695	0.0940

**Table 6. Country Source of I-O Matrices Applied to Each Country**

Country	H-Matrix Source	A-Matrix Source
Australia	US	Australia
Austria	Germany	Germany
Belgium	Germany	Belgium
Canada	US	US
Denmark	Germany	Germany
Finland	Germany	Germany
France	Germany	France
Germany	Germany	Germany
Greece	Italy	Spain
Iceland	Germany	Germany
Ireland	Italy	UK
Italy	Italy	Italy
Japan	Germany	Japan
Luxembourg	Germany	Belgium
Netherlands	Germany	Belgium
New Zealand	US	US
Norway	Germany	Germany
Portugal	Italy	Spain
Spain	Italy	Spain
Sweden	Germany	Germany
Switzerland	Germany	Germany
Turkey	Italy	Italy
UK	Germany	UK
US	US	US

This input-output approach enables us to determine which industries are generating the value added required to meet tourism consumption and overall tourism demand. Calculating the share of each industry's value added this accounts for, then enables us apply this share to the production accounts of each industry to construct a production account for the 'tourism industry' and the 'tourism economy'. For example, we assume that the share of manufacturing's value-added accounted for by tourism demand is therefore the share of manufacturing's employment that can be attributed to tourism demand, and so on.

### **Projections**

OE's International Industry Service provides forecasts of the sectoral composition of output in the major economies, and this has been developed to cover the appropriate supply-side concepts for each industry used in the above analysis. Once we have projections of Travel & Tourism demand components, we are therefore able to construct projections of the supply-side of the tourism industry in exactly the same way as we construct the data for the industry's current contribution.

## I) NON-OECD COUNTRIES

For non-OECD countries, the research is based on a combination of detailed individual country studies and simulation based on:

- Basic Travel & Tourism statistics such as visitor arrivals, resident spending abroad and foreign visitor spending in the domestic economy;
- Basic socioeconomic statistics such as population and GDP.

Data covering both these areas is available for 145 non-OECD countries. For all 145 non-OECD countries covered, we collected national income accounts data, both on the supply and demand side, as well as historical data for population and employment. In addition, we compiled data on Travel & Tourism direct service imports/exports and hotel rooms from the UNWTO and merchandise trade from the UN, as described above for the OECD countries.

In order to estimate those indicators not available from public data sources, WTTC/OE developed cross-sectional pooled equations for Travel & Tourism consumption to create relationships between known and unknown variables which have been used for this year's research.

The procedure is based on results developed in the course of TSA country studies commissioned by governments around the world, with results drawn from studies of the following countries that WTTC/OE have done over recent years; also building on work previously executed by WTTC and IHS Global Insight's predecessor, Wharton Economic Forecasting Associates:

Brazil	Philippines
China	Puerto Rico
Hong Kong	Singapore
India	South Africa
Indonesia	Thailand
Turkey	

Turkey is an OECD country, but its per-capita GDP, US\$2,962, is well within the range of this set of countries, comparable to Brazil, Thailand and South Africa. Thus it is reasonable to include it in the data set.

There are only eleven countries in the data set. In order to expand the data set, a pooled time-series, cross-section estimation method was used to include annual data from 1990 through 1997 for each of the countries, giving a total of 88 observations.

To be useful, the estimated equations were designed to satisfy the following criteria.

- The equations satisfy basic reasonableness criteria such as spending per capita going to zero at zero GDP. This implies a linear equation with a zero intercept.

- The explanatory (right-hand side) variables in each equation had to be from the minimum data set noted above – for most developing countries, detailed consumption and other demand-related economic accounting statistics are not available.
- The estimated relationships – ie, the elasticities implied by the estimated coefficients in the equations – have to be reasonable.
- The fit of the equations to the data developed in the non-OECD country studies should be generally good. Where significant misses occur, they should be negative so as to give confidence that the resulting procedure will err on the conservative side – ie, the procedure can be expected to underestimate rather than overestimate Travel & Tourism concepts.

### ***Residents' Spending in the Domestic Economy***

The following is the equation estimated for Travel & Tourism spending by a country's residents domestically.

$$\text{rsdnp} = 0.02188 * \text{gdpdnp} - 0.30708 * \text{rsanp} - 5.96945 * \text{isdum}$$

(11.0695)                      (10.0825)                      (0.34709)

Sum Sq	127395	Std Err	35.6561	LHS Mean	46.1122		Res Mean	14.8207
R Sq	0.0790	R Bar Sq		F	3, 85	2.4319	%RMSE	1.9849

where:

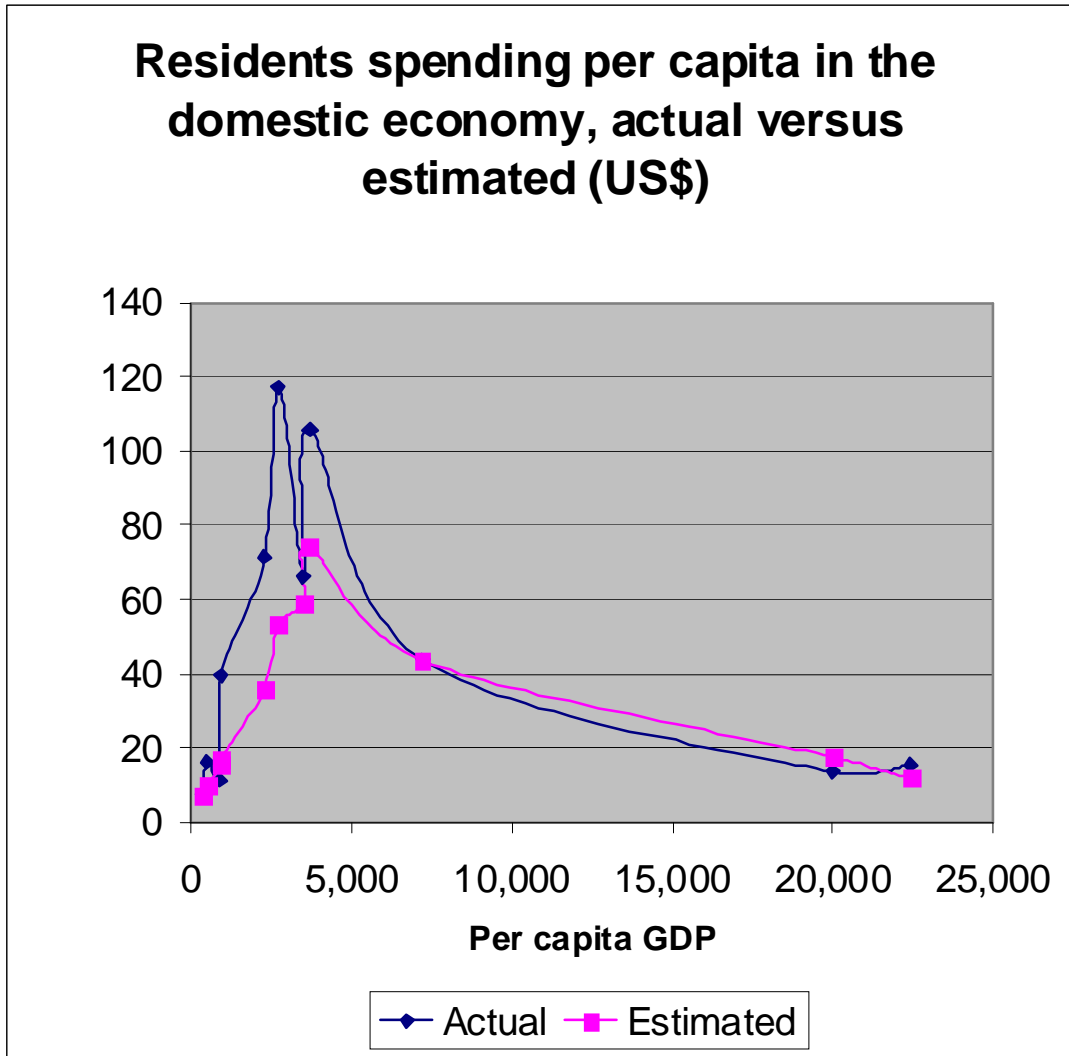
- rsdnp            =        per capita Travel & Tourism spending by residents in the domestic economy;
- gdpdnp        =        per capita GDP;
- rsanp          =        per capita Travel & Tourism spending abroad by residents,
- isdum          =        dummy variable for island economy
- =        1 for Singapore, Hong Kong and Puerto Rico, 0 for all others.

The numbers in parentheses are the t-statistics of the associated coefficients (equal to the estimated coefficient divided by the standard error of the estimate). The t-statistics indicate significant confidence in the values of the estimated coefficients, with the exception of the island dummy. The latter reduces the result for islands by US\$6, regardless of the size of the economy. However, the fit for the three islands is excellent.

The chart on the next page presents the actual and fitted data, where we have averaged the results for each country over the eleven years of historical data.

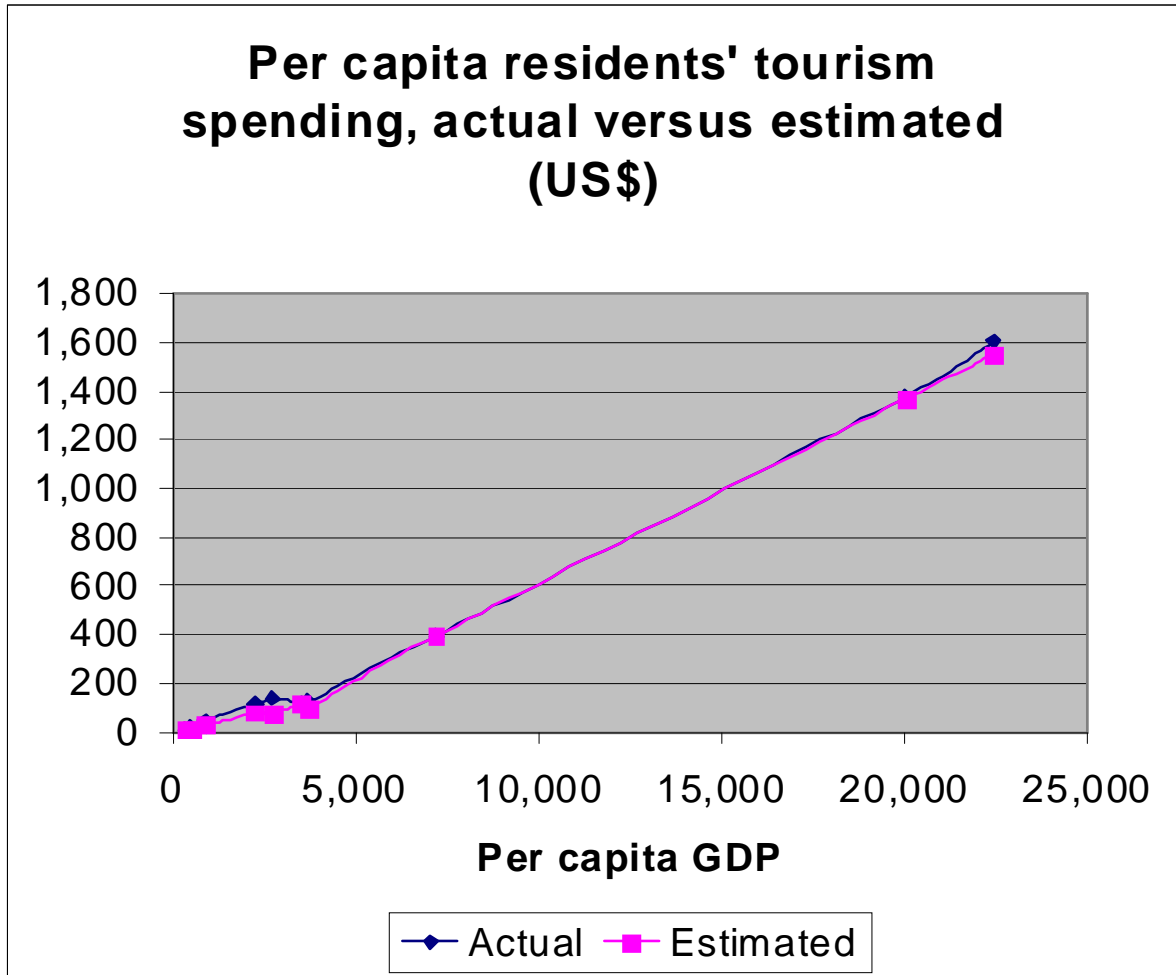
The equation fits well for the very low-income countries – China and India – and the above US\$5,000 income countries – Puerto Rico, Singapore and Hong-Kong. It generally understates the moderately low-income countries, those with per capita GDP between US\$500 and \$US5,000 – particularly the Philippines, Thailand, Turkey and Brazil. The sharp peak that the equation understates is apparently for countries where the majority of people cannot afford to travel abroad and therefore spend all of their

income at home. While a better fit would be preferable, the result assures that the estimates of the procedures will be on the conservative side.





The following chart provides the result of adding the estimates for residents' spending in the domestic economy to residents' spending abroad, giving total private consumption for Travel & Tourism.



Because the equation contains residents' spending abroad with a negative sign, this concept of total Travel & Tourism private consumption is closer to what the equation is actually estimating.

The final test is the reasonableness of the values of the estimated coefficients. Converting the values of the coefficients for per capita GDP and per capita spending abroad to elasticity terms gives 2.8 and -2.1 for the two elasticities, respectively.

The elasticity on income (measured as per capita GDP) is consistent with other studies. Income elasticities for spending on items for which there is good data – commercial transport and lodging – generally indicate elasticities of this magnitude.

The only comparable work we are aware of is a project by Thanos Mergoupis and Max Steuer of the Travel & Tourism Programme at the London School of Economics to

examine a broad category of travel, namely holiday taking (Thanos Mergoupis and Max Steuer, *Holiday Taking and Income*, Draft 26.7.99). The decision as to how much to spend on a trip consists of several steps. Initially, Mergoupis and Steuer considered the decision to take a trip. Using a probit model on data from Eurostat's *Eurobarometer*, giving the aggregate 1,985 holiday participation rates for the 12 countries that were in the European Commission at that time, they estimate the impact of a number of factors. They conclude that the income elasticity of the decision to take a trip is close to 1.0.

Given this result, it is not surprising that the decision of *how much to spend* once the trip is decided on provides an additional 1.8 to the income elasticity.

- The elasticity on residents' spending abroad explains the peaked nature of the first chart. It appears that as soon as a country's per capita income reaches a threshold in the vicinity of US\$3,000 to US\$4,000, its residents rapidly shift their spending to overseas trips, thus the high elasticity on residents' spending abroad.

### ***Travel & Tourism Public Consumption***

The following is the equation estimated for Travel & Tourism public consumption.

$$\text{cgtt\$} = 0.00759 * \text{cgd} + 0.12437 * \text{expstert\$} - 0.39305 * \text{islum}$$

(4.32772)            (7.25171)            (2.59779)

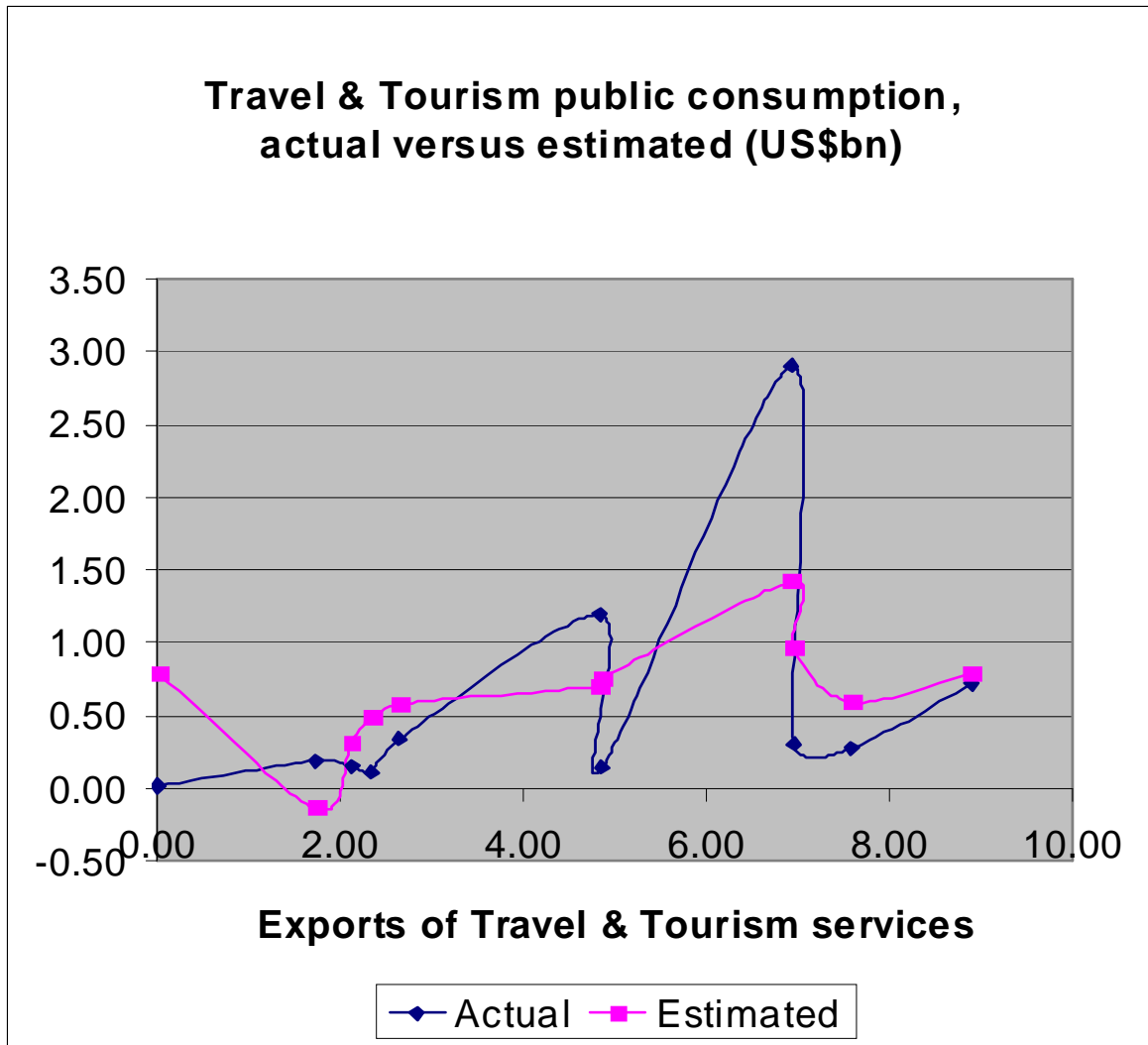
Sum Sq 44.2960 Std Err 0.6445 LHS Mean 0.5470 Res Mean -0.0495  
R Sq 0.3750 R Bar Sq 0.3632 F 3,106 21.2015 %RMSE 54.2465

where:

- cgtt\$ = Travel & Tourism public consumption (government spending);  
 cgd = total public consumption;  
 expstert\$ = Travel & Tourism services exports (foreign visitor spending plus international fare receipts);  
 islum = dummy variable for island economy  
       = 1 for Singapore, Hong Kong and Puerto Rico, 0 for all others.

The numbers in parentheses are the t-statistics of the associated coefficients (equal to the estimated coefficient divided by the standard error of the estimate). The t-statistics indicate significant confidence in the values of the estimated coefficients.

The following chart presents the actual and fitted data, where we have averaged the results for each country over the eleven years of historical data.



Unlike the equation for residents' spending in the domestic economy, most of the errors in the estimated equation for Travel & Tourism public consumption are positive. This is technically the result of the large outlier for China and forcing the equation through zero. In reality, government spending on Travel & Tourism varies from country to country in ways that are not explained by economics, but rather by politics. The actual and fitted points are plotted in the chart on the next page against Travel & Tourism services exports, the most important explanatory variable.

The elasticities implied by the coefficients in the equation are reasonable. The elasticity on total public spending is 0.37, implying that as the budgets of governments grow, spending on Travel & Tourism does not grow as fast. In other words, small countries spend more on Travel & Tourism relative to their total budget than do large countries. This is the experience in the OECD as well.

The elasticity implied by the coefficient on Travel & Tourism services exports, which is primarily foreign visitor spending, is 0.95, which again seems quite reasonable. Within the error of the estimate, the elasticity can be taken as 1.0. The direction of causality is not evident from a simple linear regression of this sort. One could interpret this result to say that government Travel & Tourism spending is increased in proportion to foreign visitor spending and international fare receipts. On the other hand, increased government spending on Travel & Tourism may proportionally increase foreign visitor spending and international fare receipts.

### ***Travel & Tourism Capital Formation***

The following is the equation estimated for Travel & Tourism capital formation.

$$\text{ifft\$} = 0.06712 * \text{ifd} + 0.35622 * \text{expser tt\$} - 1.05551 * \text{isl dum}$$

(43.6400)      (12.4328)      (4.91164)

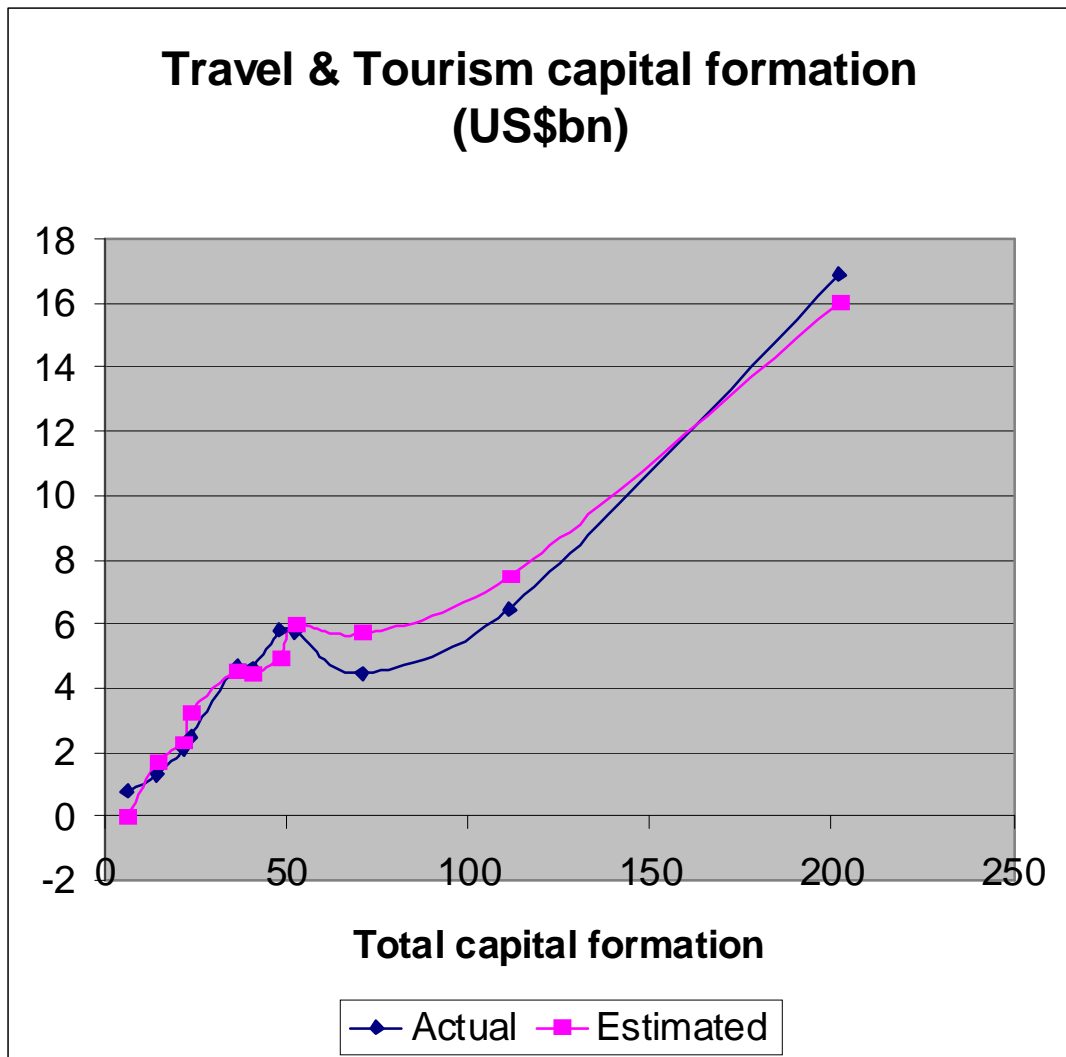
Sum Sq	79.9074	Std Err	0.8659	LHS Mean	4.6683	Res Mean	-0.0634
R Sq	0.9631	R Bar Sq	0.9624	F	3,106	%RMSE	38.3208

where:

- ifft\$            =      Travel & Tourism capital formation;
- ifd              =      total capital formation;
- expser tt\$     =      Travel & Tourism services exports (foreign visitor spending plus international fare receipts);
- isl dum           =      dummy variable for island economy
- =      1 for Singapore, Hong Kong and Puerto Rico, 0 for all others.

The numbers in parentheses are the t-statistics of the associated coefficients (equal to the estimated coefficient divided by the standard error of the estimate. The t-statistics indicate significant confidence in the values of all of the estimated coefficients.

The chart on the next page presents the actual and fitted data, where we have averaged the results for each country over the eleven years of historical data. The actual and fitted data are plotted against total capital formation, by far the most important variable in the equation



For this equation, the errors are split about equally – six positive and five negative. The average error is 2.4%, although some of the individual country errors are sizeable.

This equation fits the data better than any of the others, primarily because investment in Travel & Tourism infrastructure is such an important part of total capital formation. China is again the outlier because of the size of the economy. However, the China outlier does not distort the results in this case, as the degree of proportionality is so high. The elasticity is 0.76.

What deviation there is from direct proportionality between Travel & Tourism capital formation and total capital formation is apparently explained very well by Travel & Tourism services exports. The elasticity for this variable is 0.32.

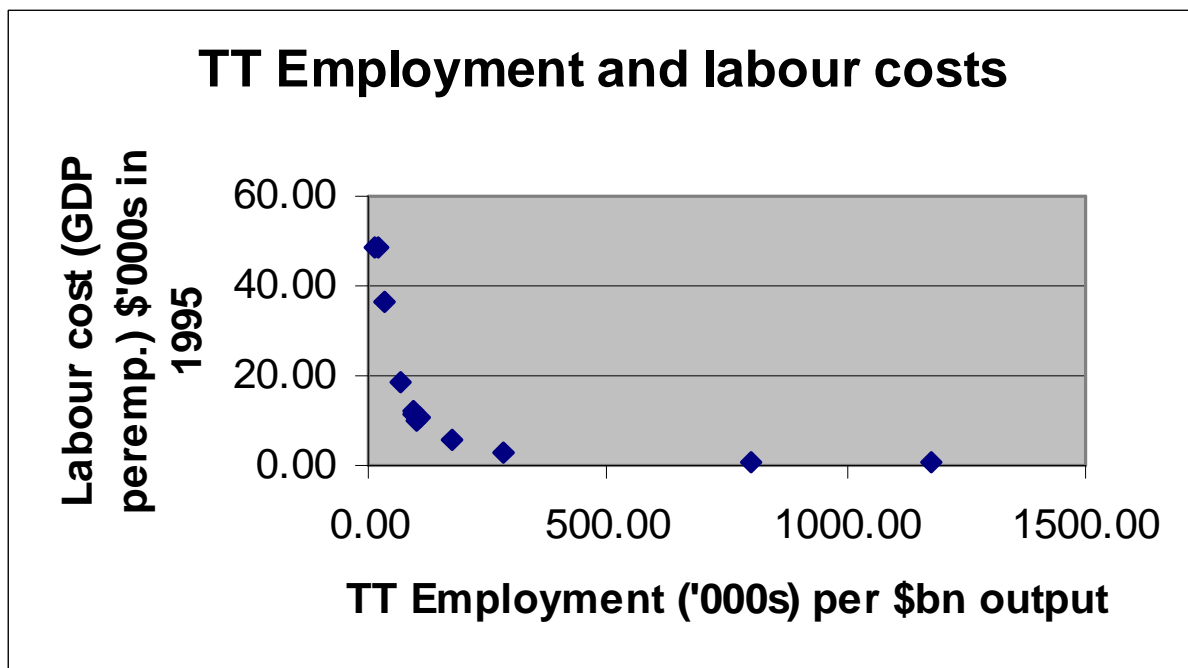
In addition, our detailed study of the trade data has revealed one enhancement to this where we have been able to incorporate specific data. This is derived from the data for

imports of aircraft, which generally have a high T&T content. Since the proportion of imported aircraft which is assessed to be for T&T use is deducted from T&T demand in arriving at our estimates of T&T GDP, it is clearly appropriate to ensure the corresponding demand for those imports is also included in our estimate of T&T demand, and it is equally clear in the specific case of aircraft that that demand is for investment. We have therefore improved our estimates of T&T investment by adding a specific element to the pool equation estimates to reflect the T&T element of imported aircraft.

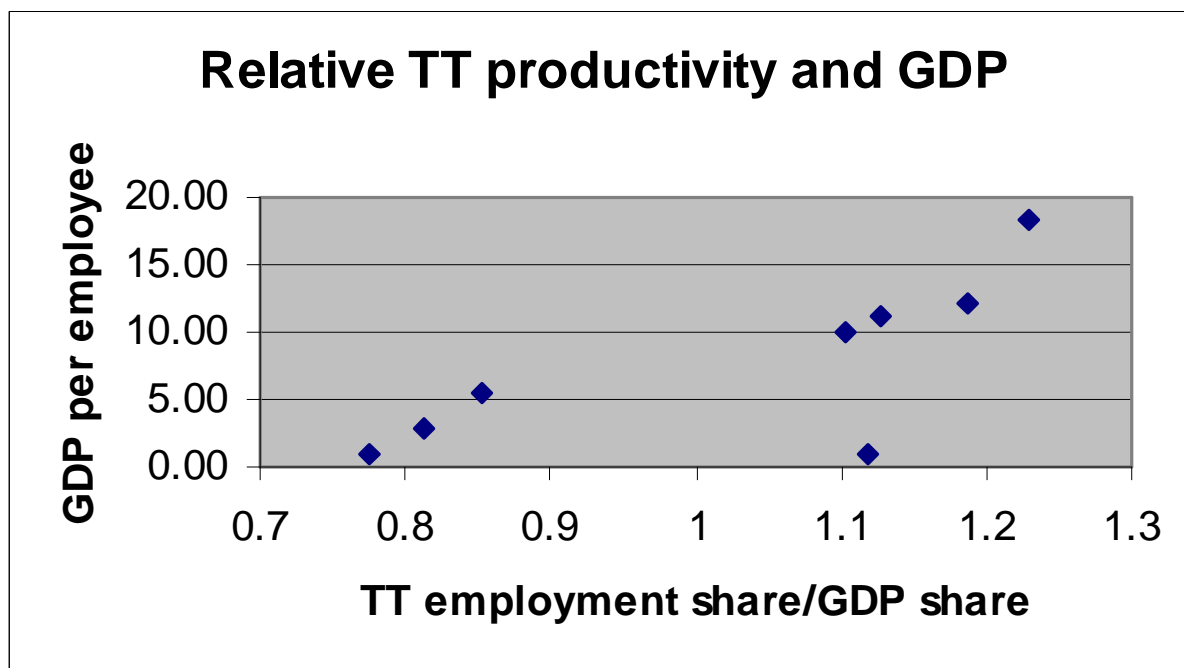
***Travel & Tourism Employment in the Economy, Direct and Indirect***

In the case of T&T employment, the most important driver of our estimate is T&T GDP. In this case, we have taken the opportunity provided by having completed a number of additional country studies since this relationship was last estimated (see the list on page 9) to look again at the best way of using the T&T GDP figures to estimate the corresponding employment.

Clearly, we would expect this relationship to depend on how expensive it is to employ someone – the cheaper labour is, the more workers are likely to be used to generate the same amount of GDP. This relationship is very clear in the chart below, which plots these data for the non-OECD countries where detailed country studies have been carried out by WTTC and its partners.



However, the same is true of other industries as well, and if we look at the number of workers used to generate a given level of output in Travel & Tourism **relative** to the same concept for the economy as a whole, a rather different picture emerges. The chart below compares this relativity with an indicator of how ‘advanced’ an economy is, measured here by GDP per employee.



It is clear from these figures that for poorer economies, Travel & Tourism is relatively productive compared with the average across the whole economy (though clearly we would not generally expect it to be productive relative to Travel & Tourism in richer economies, since cheaper labour will encourage relatively labour-intensive ways of delivering services). Conversely, for richer economies, Travel & Tourism has relatively lower productivity than the average across the whole economy. This is the relationship we have used to construct our revised estimates of T&T employment across different economies where we do not have more detailed results on which to rely.

### Merchandise Trade

Merchandise trade for the non-OECD regions is handled identically to the OECD analysis. Detailed UN Custom’s trade data is compiled for all tourism-related commodities and appropriate T&T shares are applied. See previous discussion of merchandise trade for more information.

### Business Travel

The research for business travel makes use of the following components:

- Hotel occupancy rates

- Average hotel room rates
- Percentage of air travel that is Business
- Percentage of Hotel spending that is Business
- Air passenger revenues

1) *Hotel occupancy rates* are taken from UNWTO.

2) *Average room rates* are taken from studies conducted by PKF International.

As with the OECD, government travel is estimated as a ratio to corporate travel. For the non-OECD countries, this is adjusted for the relative size of government spending in GDP.



## **ANNEX A: US TRAVEL & TOURISM CONSUMPTION SHARES**

Table A-1 and A-2 on the following pages illustrate those BLS line items that have been designated 100% Travel & Tourism and those that have been designated less than 100% Travel & Tourism, respectively. In the latter case, the method used to derive the Travel & Tourism portion is described in the notes that follow.

### **Table A-1 Travel & Tourism Shares = 100%**

---

Admin to sports events on out-of-town trips  
 Aircraft rental  
 Aircraft rental on out-of town trips  
 Airline fares  
 Alcoholic beverages purchased on out-of-town trips  
 Auto rental  
 Auto rental on out-of-town trips  
 Boat without motor and boat trailers  
 Boat/trailer rental on out-of-town trips  
 Bottle gas, rented vacation home  
 Bottled gas, owned vacation home  
 Coal, owned vacation home  
 Coal, rented vacation home  
 Docking and landing fees  
 Electricity, owned vacation home  
 Electricity, rented vacation home  
 Food on out-of-town trips  
 Food prepared on out-of-town trips  
 Fuel oil, owned vacation home  
 Fuel oil, rented vacation home  
 Gasoline on out-of-town trips  
 Intercity bus fares  
 Intercity train fares  
 Local transport on out-of-town trips  
 Lodging on out-of-town trips  
 Luggage  
 Motor oil on out-of-town trips  
 Motorcycle rental on out-of-town trips  
 Motorized camper coaches and other vehicles  
 Movie, other admin on out-of-town trips  
 Natural gas, owned vacation home  
 Natural gas, rented vacation home  
 Other entertainment services on out-of-town trips  
 Owned vacation houses  
 Participant sports on out-of-town trips  
 Purchase of boat with motor  
 Recreation expenses on out-of-town trips  
 Rental of boat

Rental of campers and other vehicles on out-of-town trips  
 Rental of campers, other RV's  
 Septic tank, owned vacation home  
 Septic tank, rented vacation home  
 Ship fares  
 Souvenirs  
 Taxi fares on trips  
 Tolls on out-of-town trips  
 Trailer and other attachable campers  
 Trash/garbage, owned vacation home  
 Trash/garbage, rented vacation home  
 Water/sewer, owned vacation home  
 Water/sewer, rented vacation home  
 Wood/other fuels, owned vacation home  
 Wood/other fuels, rented vacation home

**Table A-2 Travel & Tourism Shares < 100%**

---

Apparel and services	3.29%
Checking accounts, other bank services	3.29%
Club membership	2.05%
Credit Cards	19.18%
Diesel fuel	21.67%
Food and alcohol purchased at home	2.05%
Gasoline	25.67%
Household furnishings and equipment	2.34%
Household supplies and expenses	0.94%
Intra-city mass transit	3.80%
Life and other personal insurance	0.90%
Miscellaneous fees, pari-mutuel losses	51.45%
Motor oil	19.90%
Movie, theater, opera, ballet	2.05%
Other vehicle expenses	29.35%
Parking fees	29.35%
Personal care products and services	3.80%
Photographic equipment and supplies	52.50%
Reading	5.71%
Restaurants and bars	31.21%
Sporting events	2.05%
Sports, recreation and exercise equip.	38.48%
Telephone	4.74%
Tobacco products and smoking supplies	3.29%
Towing charges	29.35%
VCRs and video disk players	35.02%
Vehicle insurance	29.35%
Vehicle purchases	29.35%

**NOTES TO TABLE A-2.**

**Balance, Food at Home**

We have estimated the percentage of food purchased at home for visiting relatives and guests by determining how many person trip nights are spent visiting relatives and friends and comparing that to total person nights.

Reference: US Statistical Abstract, following years.

	1988	1989	1990	1991	1992	1993
Average person trips	425.8	476.5	523.3	496.5	350.8	338.4
Average nights per trip	4.6	4.4	4.4	4.0	4.3	4.0
Person trip nights	1958.7	2096.6	2302.5	1986.0	1508.4	1353.6
Res and civ population	245.0	247.3	249.9	252.6	253.5	256.3
Average person trip nights		1849.4				
Avg res. and civilian pop		251.9				

Bal. food at home = **2.01%**

**Meals at Restaurants**

We have estimated the amount of restaurant purchases attributable to Travel & Tourism factoring the National Restaurant Association's data on local/non-local purchases by cheque size into their data on total sales by cheque size. The weighted average is the percent of restaurant sales attributable to Travel & Tourism.

Reference: 'Food Service Numbers, August 1992' and 'Eating Places by Cheque Size, February 1991', National Restaurant Association

Cheque Size per Person  
(US\$)

	Local (%)	Non-Local (%)
<8.00	73.3	26.7
8.00-14.99	67.3	32.7
15.00-24.99	58.5	41.2
>25.00	57.0	43.0

	Sales (US\$bn)	Sales (%)
<7.00	32.000	48.22
7.00-14.99	24.454	36.85
15.00-29.99	7.977	12.02
>30.00	1.933	2.91
Total	66.364	100.00

Travel & Tourism Meals = (26.7% x 48.22%) +

$$\begin{aligned} \text{at Restaurants} & \quad (32.7\% \times 36.85\%) + \\ & \quad [(41.2\% + 43.0\%)/2 \times \\ & \quad (12.02\% + 2.91\%)] \\ & \quad = \quad \mathbf{31.21\%} \end{aligned}$$

Since the BLS has a separate category for Food on Out-of-Town trips that we assume is 100% purchased at restaurants, we need to subtract this amount from Travel & Tourism Meals at Restaurants before computing the final percentage of meals at restaurants for the Shares Analysis. Thus,

$$\begin{aligned} \text{Meals at Restaurants} & \quad = \quad [(31.21\% \times \text{Meals at Restaurants}) - \\ \text{(share)} & \quad \quad \quad (100\% \times \text{Food on Out-of-Town trips})] / \\ & \quad \quad \quad \text{Meals at Restaurants} \\ & \quad = \quad \mathbf{20.81\%} \end{aligned}$$

### **Alcoholic beverages away from home**

We have estimated the percentage of alcoholic beverages away from home using the same procedure as the percentage of Travel & Tourism Meals at Restaurants.

$$\begin{aligned} \text{Balance, Alcoholic Bev.} & \quad = \quad \text{Mean 1988-95 } [(31.21\% \times \text{Alcoholic Beverages} \\ \text{Away From Home (share)} & \quad \quad \quad \text{Away from Home}) - (100\% \times \\ & \quad \quad \quad \text{Alcoholic Beverages Purchased on} \\ & \quad \quad \quad \text{Trips})] / \text{Balance, Alco. Bev. Away From Home)} \\ & \quad = \quad \mathbf{13.93\%} \end{aligned}$$

### **Alcoholic beverages at home**

We have estimated the percentage of alcoholic beverages at home using the same procedure as Balance, Food at Home.

$$\text{Alcoholic Bev. at Home} \quad = \quad \mathbf{2.05\%}$$

### **Apparel and Services**

Although many clothing purchases are made in anticipation of a trip or during a trip itself, it is nearly impossible to determine what the total purchases are, or worse yet what portion of each purchase should be allocated to the trip since most clothing is worn long after the trip is concluded. Therefore, we have estimated the share of Apparel that is attributable to Travel & Tourism to be equal to that portion of leisure wear (as opposed to business wear) that is consumed during Travel & Tourism 'Time'. Travel & Tourism 'Time' is defined as the average percent of the year spent travelling.

Clothing purchases are categorised into business, leisure and other. We are only interested in leisure wear and the amount of other wear attributable to leisure.

To determine what portion of other wear is leisure related, we estimate the amount of time spent working.

$$\text{Working Time} = 40 \text{ hours [52 weeks per year - (10 Holidays + 12 vacation days)] / (52 x 7 x 24)}$$

We then estimate the amount of other clothing consumed by workers.

$$\text{Other consumed by workers} = \frac{\text{Working Pop.} \times \text{Other} \times \text{Working Time}}{\text{Total Pop.}}$$

We then can calculate the amount of other clothing left over for leisure

$$\text{Other consumed by leisure} = \text{Other} - \text{Other consumed by workers}$$

We then combine this with Leisure to obtain Total Leisure clothing

$$\text{Total Leisure Clothing} = \text{Other consumed by leisure} + \text{Leisure wear}$$

We then calculate the amount of the year spent travelling for leisure.

$$\text{Travel \& Tourism Time} = \frac{[(\text{Visit Friend \& Relatives person trips} + \text{Other pleasure person trips} + \text{Other person trips}) \times \text{Average nights per trip}] / (\text{Population} \times 365)}$$

And apply this rate to the Total Leisure clothing.

$$\text{Travel \& Tourism Clothes} = \text{Weighted T\&T Time} \times \text{Total leisure clothing}$$

Finally we calculate the Travel & Tourism Clothing share

$$\begin{aligned} \text{Travel \& Tourism Clothing Share} &= \frac{(\text{Travel \& Tourism Clothes})}{(\text{Business} + \text{Leisure total} + \text{Other})} \\ &= \mathbf{3.29\%} \end{aligned}$$

### Credit Card Purchases

We estimate the share of Travel & Tourism credit card interest charges to be equal to the share that Travel & Tourism expenditures are of total 'chargeable' expenditures. This assumes that of those purchases that are 'chargeable', consumers are just as likely to use a credit card for Travel & Tourism as they are for any other purchase.

Credit Card Purchases = **19.18%**

### Telephone

We estimate Travel & Tourism telephone expenditure to be equal to those calls made from vacation homes (owned or rented) plus calls made while travelling ( during Travel & Tourism Time).

Vacation Home Telephone = Mean 1988-95 [(Utilities Owned Vacation +  
Utilities Rented Vacation) / All Utilities]  
= 0.94%

Travel & Tourism Time = 3.80%

Travel & Tourism Telephone = Vacation Home Tel. + T&T Time  
= **4.74%**

### Other Household Expenses

We estimate Other Household Expenses attributable to vacation homes to be equal to the utilities used at those vacation homes. See Telephone.

Other Household Expenses = **0.94%**

### Housekeeping Supplies

We estimate Housekeeping supplies attributable to vacation homes to be equal to the utilities used at those vacation homes. See Telephone.

Housekeeping Supplies = **0.94%**

### Balance, Household Furnishing and Equipment

We estimate the percentage of household furnishings and equipment attributable to vacation homes to be the same as the percentage the total value of vacation homes is of the total value of all homes.

Reference: American Housing Survey for the US

Balance, Household Housing = Mean 1988 - 95 [  $w_t$  x (Median Value Seasonal Units x Number of Seasonal Housing Units) / Median Value all Housing Units x Number of all Housing Units)]

where  $w_t$  is 0.5 in 1996, 0.4 in 1993, 0.3 in 1991,

0.2 in 1987, and 0.1 in 1985.

$$= \mathbf{2.34\%}$$

### Vehicle Purchases

We estimate the percentage of vehicle purchases attributable to Travel & Tourism to be equal to the mileage driven for Travel & Tourism purposes.

Reference: 1997 Nationwide Personal Transportation Survey, US Department  
Of Transportation Centre for Transportation Analysis

$$\begin{aligned} \text{Vehicle Purchases} &= (100\% \times \text{Vacation miles travelled} + \\ &100\% \times \text{Pleasure miles travelled} \\ &+ \text{T\&T portion of Shopping miles travelled} \\ &+ \text{T\&T portion of VFR miles travelled} \\ &+ \text{T\&T portion of Other Social/Recr. miles} \\ &\text{travelled}) / \\ &\text{Total Vehicle Miles Travelled} \end{aligned}$$

To calculate the percentage of total travel miles attributable to Travel & Tourism, WTTC/OE used data for Travel Day Trips and Travel Period Trips from the US National Personal Transportation Survey. Using the weights provided by NPTS, WTTC/OE then computed the aggregate totals for miles travelled and total miles travelled for each of several different categories. These results were then checked against published data from the NPTS for consistency.

The T&T portion of Shopping, Visiting Friends/Relatives, Other Social/Recreational miles is determined by recording those trips whose mileage falls outside UNWTO's "usual environment" definition. In this analysis, "usual environment" is interpreted to include all trips over 75 miles.

<b>NPTS Travel &amp; Tourism Results</b>				
<i>Purpose of trip (1990 definition)</i>	<i>Miles, all Trips</i>	<i>Miles, Trips &gt;= 75 m</i>	<i>T&amp;T Share</i>	<i>Travel &amp; Tourism Miles</i>
To or from work	651,496,724,440	66,165,228,190	0	0
Work-related business	212,869,978,706	122,167,954,920	1	122,167,954,920
Shopping	287,133,550,961	40,921,431,098	1	40,921,431,098
Other family or personal business	484,214,348,798	126,142,100,093	1	126,142,100,093
School/church	92,644,100,762	22,926,681,710	1	22,926,681,710
Doctor/dentist	37,716,175,621	8,032,791,139	1	8,032,791,139
Vacation	75,931,955,160	72,431,424,141	1	72,431,424,141
Visit friends or relatives	331,082,227,483	186,767,994,670	1	186,767,994,670
Other social or recreational	365,160,112,191	160,953,810,156	1	160,953,810,156
Other	9,090,857,886	7,224,097,302	1	7,224,097,302
<b>All</b>	<b>2,547,340,032,008</b>	<b>813,733,513,420</b>		<b>747,568,285,230</b>
				<b>% of total</b>
				<b>0.2935</b>

### Gasoline

We estimate the amount of gasoline attributable to Travel & Tourism to be equal to the amount of Travel & Tourism miles driven adjusted by +5 MPH for better gasoline mileage on the highway.

References: 1990 Highway Statistics  
Table VM-1, p. 192  
1990 National Personal Transportation Survey

Average MPG for passenger cars = 20.92

We then assume that Travel & Tourism gets +5 MPG better mileage

T&T MPG = x  
Other MPG = x - 5

Using Travel & Tourism miles we solve for x

$$\frac{0.2935}{x} = \frac{(1 - 0.2935)}{x - 5} = \frac{1}{20.92}$$

$$\frac{x - 5(0.2935)}{x(x-5)} = \frac{1}{20.92}$$

$$20.92x - 38.53464 = x^2 - 5x$$

$$x^2 - 25.92x = 38.53464$$

$$x = 24.34$$



Travel & Tourism Gasoline Share	=	(.2935 / 24.34) (1 / 20.92)
	=	<b>25.67%</b>
Gasoline	=	[(25.67% x total gasoline) - (100% x gasoline on out-of-town trips)] / total gasoline
	=	<b>18.65%</b>

### Motor Oil

We estimate Travel & Tourism Motor Oil using the same procedure as for gasoline

Motor Oil	=	[(25.67% x total motor oil) - (100% x motor oil on out-of-town trips)] / total motor oil
	=	<b>19.90%</b>

### Diesel Fuel

We estimate Travel & Tourism Diesel Fuel to be equal to the Travel & Tourism gasoline share.

Diesel Fuel	=	<b>21.67%</b>
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### Other Vehicle Expenses

#### Vehicle Insurance

#### Parking Fees

#### Towing Charges

Like Vehicle Purchases, we estimate these expenditures to have the same relationship as Travel & Tourism miles travelled to total miles travelled.

Other Vehicle Expenses	=	<b>29.35%</b>
Vehicle Insurance	=	<b>29.35%</b>
Parking Fees	=	<b>29.35%</b>
Towing Charges	=	<b>29.35%</b>

### Intracity Mass Transit Fare

We estimate the amount of intracity mass transit to be equal to the time spend travelling. See Apparel.

Intracity Mass Transit Fare	=	<b>3.80%</b>
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### **Club Membership Dues and Fees**

Like food provided by friends and relatives at home to out-of-town visitors, we believe that friends and relatives also take their visitors to their club paying guest fees and the like. Therefore we estimate club membership dues and fees to be equal to the food provided by friends and relatives to their out-of-town guests. See Balance, Food at Home.

Club Membership Dues and Fees = **2.05%**

### **Movie, Theatre, Opera and Ballet Admission to Sporting Event**

We estimate these categories in the same way as Club Membership Dues and Fees.

Movie, Theatre, Opera and Ballet = **2.05%**  
 Admission to Sporting Event = **2.05%**

### **VCR's & Video Disk Players**

We believe this category acts much like photography, in that a share of the general public purchases Camcorders to make videos of their vacations and holidays. However, since this category also includes the VCR/Disk players we have estimated the portion of the category attributable to Camcorders only and have applied the Travel & Tourism photographic share (see below).

References: 1992 Consumer Photographic Survey, p. 92 Photo Marketing Association International

Travel & Tourism Photography Share = **52.5%** (see below)

Sales of Camcorders = 2.96 million units x \$968 avg per unit

= \$2,865.28 mn

Sales of VCRs etc = 96.968 million x \$44.32

= \$4,297.62 mn

VCR's & Video Disk Players =  $\frac{\$2,865.28}{\$4,297.62} \times 52.5\%$

= **35.02%**

### **Sports, Recreation and Exercise Equipment**

To estimate this category, we have applied judgmental weights to the BLS categories.

$$\begin{aligned}
 \text{Sports, Rec. and Ex. Equip.} &= \text{Average 1988 - 95 (10\% of bicycles +} \\
 & \text{100\% of camping equipment +} \\
 & \text{75\% of hunting and fishing +} \\
 & \text{100\% of water sports +} \\
 & \text{100\% of rental and repair of misc. sports} \\
 \text{equipment) /} & \\
 & \text{Total Sport Rec. and Exer. Equip.} \\
 & = \quad \mathbf{38.48\%}
 \end{aligned}$$

### Photographic Equipment and Supplies

To estimate this category we tallied information from the Photo Marketing Association International that categorizes picture taking by event, selecting out those events that are normally associated with Travel & Tourism. A judgmental weight of 50% was applied to some categories such as Holidays where Travel & Tourism is only responsible for a portion of the category.

- References:      (1) 1993 PMA US Consumer Photographic Survey  
                       (2) 1992 PMA Canadian Consumer Photographic Survey  
                       (3) 1994 PMA UK Consumer Photographic Survey

$$\text{Photographic Equipment and Supplies} \quad = \quad \mathbf{52.5\%}$$

### Personal Care Products and Services

We estimated this category using the analysis of Travel & Tourism Time developed in the Apparel category.

$$\text{Personal Care Products and Services} \quad = \quad \mathbf{3.80\%}$$

### Reading

We estimated reading material attributable to Travel & Tourism to include all guide and travel books and magazines as well as those non-travel related materials that are purchased to read on vacation/holiday, like a novel. We used the Travel & Tourism Time estimate for the latter portion.

Reference:      Statistical Abstract of the US, Table 402 and 403

Reading Calculation	1988	1989	1990	1991
Travel books				
New	669	701	495	492
Imported	52	39	48	57
Avg. Retail Price	26.22	31.93	30.41	32.08

All books				
New	55483	53446	46738	48146
Imported	8722	7315	6414	5867
Avg. Retail Price	39.00	40.10	42.12	43.52
Reading Share	5.95%	5.92%	5.82%	5.46%
Weighted Avg. =	<b>5.71%</b>			

### **Tobacco Products & Smoking Supplies**

We estimated this category in the same way as Personal Care Products and Services using the Travel & Tourism Time from Apparel.

Tobacco Products & Smoking Supplies = **3.29%**

### **Misc. Fees, Pari-mutuel Losses**

We estimated this category by taking the share all categories of gaming losses that are attributable to Casino or Riverboat gambling and Card Rooms. 30% of pari-mutuel losses were also included.

Reference: International Gaming & Wagering Magazine, "Gross Annual Wager", August issue.

Misc. Fees, Pari-mutuel Losses = **51.45%**

### **Chequing Accounts, Other Bank Service Charges**

We estimated this category based on information gathered from American Express Company on the size of the Traveller Cheques commissions paid each year.

Commissions on Travellers Cheques = \$77 M

Checking Accounts, = 77  
Other Bank Ser. Chg. 2339

= **3.29%**

### **Life and Other Personal Insurance**

We estimated this category based on the purchase of travellers insurance estimated at US\$300 mn.

Life and Other Personal Insurance = 300/33433

= **0.9%**

## ANNEX B: TRAVEL & TOURISM MODEL EQUATIONS

**Oxford Economics, March 2010**

This annex sets out the detailed equations used in the OE system to update the WTTC 2010 Travel & Tourism Satellite Accounts for OECD countries (note that we use additional sub-models to update the trade variables, and that a simplified version of this file is used for non-OECD countries).

### Notes on format:

- A '%' sign at the beginning of a line denotes a comment (ie it will not be read when the equations are read into the OE software).
- A '%' sign at the end of a line denotes that the next line is to be read as a continuation of the current line.
- '(-1)' represents the value of a variable lagged one period.
- 'D' represents the difference operator, ie  $D(x) = X - X(-1)$

### Notes on naming conventions:

- We aim to explain variable names when they are first used - names typically follow the same conventions as in OE's macro models.
- Names ending '!' are in current prices (local currencies);
- Names ending '!\$' are in current US dollars
- Names without a '!' are in constant (2000) prices – either in local currency, or US dollars if a "\$" is added.

## MACRO VARIABLES

% Aggregate consumption exogenous

EXOG(C!)

$C!\$ = C!/RXD$

%

% Aggregate government spending exogenous

EXOG(GC!)

$GC!\$ = GC!/RXD$

% Excluding defence and welfare spending....

$D(LN(GCX!)) = D(LN(GC!))$

%

% Aggregate exports exogenous

EXOG(X!)

$X!\$ = X!/RXD$

EXOG(XG!\\$)

$XG! = XG!\$*RXD$

$XS!\$ = X!\$ - XG!\$$

$XS! = XS!\$*RXD$

% Aggregate imports exogenous

EXOG(M!)

$M!\$ = M!/RXD$

EXOG(MG!\\$)

$MG! = MG!\$ * RXD$

$MS!\$ = M!\$ - MG!\$$

$MS! = MS!\$ * RXD$

%

% Aggregate investment exogenous

EXOG(IF!)

$IF!\$ = IF!/RXD$

% Government investment exogenous

EXOG(GI!)

% Note countries where GI! data is picked up from spreadsheet rather

% than macromodel have  $D(LN(GI!)) = D(LN(GI)) + D(LN(PIF))$ .

% Investment deflator exogenous

EXOG(PIF)

% Private investment

$IFPR! = IF! - GI!$

% Private residential investment exogenous

EXOG(IPRD!)

$IPNR! = IFPR! - IPRD!$

%

% Aggregate GDP exogenous

EXOG(GDP!)

$GDP!\$ = GDP!/RXD$

% GDP deflator exogenous

EXOG(PGDP)

$GDP = 100 * GDP! / PGDP$

EXOG(RXD)

EXOG(RXDBASE)

$PGDP\$ = PGDP * RXDBASE / RXD$

$GDP\$ = 100 * GDP!\$ / PGDP\$$

%

## **BUSINESS TRAVEL**

%

%(Private) company travel spending (historical data determined via spreadsheet

% calculations using fares data, hotels spending, etc)

$D(Ln(COMPTRAVTT!)) = D(Ln(C!))$

%

%Government spending on employee travel

$$\text{GOVTRAVTT!} = \text{GOVCOTRAVRATIO} * \text{GOVINTENSITY} * \text{BIZTRAVTT!}$$

% US ratio of gov't travel to company travel used

$$\text{EXOG}(\text{GOVCOTRAVRATIO})$$

% Modify by relative government spending

$$\text{GOVINTENSITY} = (\text{GCX!} / (\text{GDP!}) / \% (\text{GCX!}, \text{US} / \text{GDP!}, \text{US}))$$

%

$$\text{GOVTRAVTT\$} = 100 * \text{GOVTRAVTT!} / \text{PGDP\$}$$

$$\text{COMPTRAVTT\$} = 100 * \text{COMPTRAVTT!} / \text{PGDP\$}$$

$$\text{COMPTRAVTT!\$} = \text{COMPTRAVTT!} / \text{RXD}$$

$$\text{GOVTRAVTT!\$} = \text{GOVTRAVTT!} / \text{RXD}$$

$$\text{BIZTRAVTT!} = \text{COMPTRAVTT!} + \text{GOVTRAVTT!}$$

$$\text{BIZTRAVTT!\$} = \text{COMPTRAVTT!\$} + \text{GOVTRAVTT!\$}$$

$$\text{BIZTRAVTT\$\%YR} = 100 * (\text{BIZTRAVTT\$} / \text{BIZTRAVTT\$\%(-1)-1})$$

$$\text{BIZTRAVTT\$} = \text{COMPTRAVTT\$} + \text{GOVTRAVTT\$}$$

## PERSONAL CONSUMPTION

%General approach is to apply Travel & Tourism shares to 8 categories of

% personal consumer spending (PERCON1-8)

% PERCONC1 is the difference between 10-year average annual growth in C and

% 10 year average annual growth in PERCON1

%

$$D(\text{Ln}(\text{ZPERCON1!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC1}$$

$$D(\text{Ln}(\text{ZPERCON2!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC2}$$

$$D(\text{Ln}(\text{ZPERCON3!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC3}$$

$$D(\text{Ln}(\text{ZPERCON4!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC4}$$

$$D(\text{Ln}(\text{ZPERCON5!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC5}$$

$$D(\text{Ln}(\text{ZPERCON6!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC6}$$

$$D(\text{Ln}(\text{ZPERCON7!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC7}$$

$$D(\text{Ln}(\text{ZPERCON8!})) = D(\text{Ln}(\text{C!})) + \text{PERCONC8}$$

%

% PERCONSCALE is used to form the PERCON1!-PERCON8! series, ensuring that

%the sum of these is equal to macro total consumption in each country.

$$\text{PERCONSCALE} = (\text{C!} - \text{PERCONO!} + \text{PERCONI!}) / \% (\text{ZPERCON1!} + \text{ZPERCON2!} + \text{ZPERCON3!} + \text{ZPERCON4!} \% + \text{ZPERCON5!} + \text{ZPERCON6!} + \text{ZPERCON7!} + \text{ZPERCON8!})$$

% PERCONO! refers to resident spending abroad

% PERCONI! refers to foreign visitor spending domestic

%

% PERCONSCALE is now used to multiply ZPERCON1! etc

$$\text{PERCON1!} = \text{ZPERCON1!} * \text{PERCONSCALE}$$

$$\text{PERCON2!} = \text{ZPERCON2!} * \text{PERCONSCALE}$$

$PERCON_3! = ZPERCON_3! * PERCONSCALE$   
 $PERCON_4! = ZPERCON_4! * PERCONSCALE$   
 $PERCON_5! = ZPERCON_5! * PERCONSCALE$   
 $PERCON_6! = ZPERCON_6! * PERCONSCALE$   
 $PERCON_7! = ZPERCON_7! * PERCONSCALE$   
 $PERCON_8! = ZPERCON_8! * PERCONSCALE$   
 %  
 %  $PERCON_{1TT}SH - PERCON_{8TT}SH$  refer to consumption of T&T shares,  
 % in categories 1-8 calculated in spreadsheet (using disaggregated annual data for US)  
 % Note these are proportions rather than percentages  
 $PERCON_{1TT}SH = PERCON_{1TT}SH(-1)$   
 $PERCON_{2TT}SH = PERCON_{2TT}SH(-1)$   
 $PERCON_{3TT}SH = PERCON_{3TT}SH(-1)$   
 $PERCON_{4TT}SH = PERCON_{4TT}SH(-1)$   
 $PERCON_{5TT}SH = PERCON_{5TT}SH(-1)$   
 $PERCON_{6TT}SH = PERCON_{6TT}SH(-1)$   
 $PERCON_{7TT}SH = PERCON_{7TT}SH(-1)$   
 $PERCON_{8TT}SH = PERCON_{8TT}SH(-1)$   
 %  
 %  $PERCON_{1TT}! - PERCON_{8TT}!$  are the estimated consumption of Travel & Tourism  
 % in each category  
 $PERCON_{1TT}! = PERCON_1! * PERCON_{1TT}SH$   
 $PERCON_{2TT}! = PERCON_2! * PERCON_{2TT}SH$   
 $PERCON_{3TT}! = PERCON_3! * PERCON_{3TT}SH$   
 $PERCON_{4TT}! = PERCON_4! * PERCON_{4TT}SH$   
 $PERCON_{5TT}! = PERCON_5! * PERCON_{5TT}SH$   
 $PERCON_{6TT}! = PERCON_6! * PERCON_{6TT}SH$   
 $PERCON_{7TT}! = PERCON_7! * PERCON_{7TT}SH$   
 $PERCON_{8TT}! = PERCON_8! * PERCON_{8TT}SH$   
 %  
 % Consumers' expenditure on Travel & Tourism: services  
 $CSERTT! = PERCON_{3TT}! + PERCON_{5TT}! + 0.6 * PERCON_{6TT}! + PERCON_{7TT}! +$   
 $+ 0.3 * PERCON_{8TT}! + MSTT! - XVISITOR!$   
 %  
 % Consumers' expenditure on Travel & Tourism: non-durables  
 $CNDTT! = PERCON_{1TT}! + PERCON_{2TT}! + (0.3 * PERCON_{8TT}!)$   
 %  
 % Consumers' expenditure on Travel & Tourism: durable goods  
 $CDURTT! = PERCON_{4TT}! + (0.4 * PERCON_{6TT}!) + (0.4 * PERCON_{8TT}!)$   
 %  
 % Personal consumption of Travel & Tourism  
 $PERCONTT! = CSERTT! + CNDTT! + CDURTT!$   
 %  
 % Consumers' expenditure on services  
 $CSER! = PERCON_3! + PERCON_5! + (0.6 * PERCON_6!) + PERCON_7! +$   
 $+(0.3 * PERCON_8!)$   
 %



% Consumers' expenditure on non-durables  
 $CND! = PERCON1! + PERCON2! + (0.3 * PERCON8!)$   
 %  
 % Consumers' expenditure on durable goods  
 $CDUR! = PERCON4! + (0.4 * PERCON6!) + (0.4 * PERCON8!)$   
 %  
 $PERCONTT!\$ = PERCONTT! / RXD$   
 $PERCONTT!\%SH = 100 * PERCONTT!\$ / C!\$$   
 $PERCONTT!\%YR = 100 * (PERCONTT!\$ / PERCONTT!\$(-1) - 1)$   
 $PERCONTT!\$ = 100 * PERCONTT!\$ / PGDP\$$   
 %  
 $CDUR!\$ = CDUR! / RXD$   
 $CDURTT!\$ = CDURTT! / RXD$   
 $CDURTT!\%SH = 100 * CDURTT!\$ / CDUR!\$$   
 $CDURTT!\$ = 100 * CDURTT!\$ / PGDP\$$   
 %  
 $CND!\$ = CND! / RXD$   
 $CNDTT!\$ = CNDTT! / RXD$   
 $CNDTT!\%SH = 100 * CNDTT!\$ / CND!\$$   
 $CNDTT!\$ = 100 * CNDTT!\$ / PGDP\$$   
 %  
 $CSER!\$ = CSER! / RXD$   
 $CSERTT!\$ = CSERTT! / RXD$   
 $CSERTT!\%SH = 100 * CSERTT!\$ / CND!\$$   
 $CSERTT!\$ = 100 * CSERTT!\$ / PGDP\$$

## GOVERNMENT CONSUMPTION

% Note GCTTSHARE is not the same as %SH variable since a) needs to be multiplied by % intensity factor and b) share of GC excluding defence and welfare spending.

% GCTTSHARE based on US in majority of cases.

$EXOG(GCTTSHARE)$   
 $GCTOTTT! = 0.01 * GCTTSHARE * TTINTENSITY * GCX!$   
 $GCTOTTT!\$ = GCTOTTT! / RXD$   
 %  
 $GCTOTTT!\%SH = 100 * GCTOTTT!\$ / GC!\$$   
 $GCTOTTT!\%YR = 100 * (GCTOTTT!\$ / GCTOTTT!\$(-1) - 1)$   
 $GCTOTTT!\$ = 100 * GCTOTTT!\$ / PGDP\$$   
 %  
 $GCCOLTT! = 0.01 * GCCOLINDSH * GCTOTTT!$   
 $GCCOLTT!\$ = GCCOLTT! / RXD$   
 %  
 $GCCOLTT!\%YR = 100 * (GCCOLTT!\$ / GCCOLTT!\$(-1) - 1)$   
 $GCCOLTT!\$ = 100 * GCCOLTT!\$ / PGDP\$$

%

$$\text{GCINDTT!} = \text{GCTOTTT!} - \text{GCCOLTT!}$$

$$\text{GCINDTT!\$} = \text{GCINDTT!}/\text{RXD}$$

%

$$\text{GCINDTT\$\%YR} = 100 * (\text{GCINDTT\$/GCINDTT\$\text{(-1)-1}})$$

$$\text{GCINDTT\$} = 100 * \text{GCINDTT!\$/PGDP\$}$$

%

%Aggregate GC also needs splitting between collective & individual

% GCCOLINDSH based on OECD data where available

$$\text{GCCOL!} = 0.01 * \text{GCCOLINDSH} * \text{GC!}$$

$$\text{GCIND!} = \text{GC!} - \text{GCCOL!}$$

$$\text{GCCOL!\$} = \text{GCCOL!}/\text{RXD}$$

$$\text{GCIND!\$} = \text{GCIND!}/\text{RXD}$$

$$\text{GCCOLTT!\%SH} = 100 * \text{GCCOLTT!\$/GCCOL!\$}$$

$$\text{GCINDTT!\%SH} = 100 * \text{GCINDTT!\$/GCIND!\$}$$

## TOTAL T&T CONSUMPTION

$$\text{CONTOTTT!} = \text{PERCONT!} + \text{BIZTRAVTT!} + \text{GCINDTT!} + \text{XVISITOR!}$$

%

$$\text{CONTOTTT!\$} = \text{CONTOTTT!}/\text{RXD}$$

$$\text{CONTOTTT\$\%YR} = 100 * (\text{CONTOTTT\$/CONTOTTT\$\text{(-1)-1}})$$

$$\text{CONTOTTT\$} = 100 * \text{CONTOTTT!\$/PGDP\$}$$

## EXPORTS

% There is a separate trade sub-model that calculates the Travel & Tourism components

% of trade in goods by applying appropriate shares to 22 components of trade by

% commodity. Travel & Tourism trade in services is based primarily on UNWTO

% data. (Note trade module is in US\$)

%

$$\text{XTT!\$} = \text{XGTT!\$} + \text{XVISITOR!\$}$$

$$\text{XTT!} = \text{XTT!\$} * \text{RXD}$$

$$\text{XTT!\%SH} = 100 * \text{XTT!\$/X!\$}$$

$$\text{XTT\$\%YR} = 100 * (\text{XTT\$/XTT\$\text{(-1)-1}})$$

$$\text{XTT\$} = 100 * \text{XTT!\$/PGDP\$}$$

%

% T&T Exports of goods exogenous (from T&T trade model)

$$\text{EXOG(XGTT!\$)}$$

%

$$XGTT! = XGTT!\$ * RXD$$

$$XGTT\$\%YR = 100 * (XGTT\$/XGTT\$\text{(-1)} - 1)$$

$$XGTT\$ = 100 * XGTT!\$/PGDP\$$$

%

% T&T Visitor Exports (exports of T&T services) is scaled sum of travel spending and passenger %fares spending

$$XVISITOR!\$ = XFVS!\$ + XFARES!\$$$

% Travel spending (passenger fares) is the product of the number of foreign visitors and average %spending (fare)

$$XFVS!\$ = (TOURF * AVESPEND!\$) / 1000000$$

$$XFARES!\$ = (TOURF * AVEFARE!\$) / 1000000$$

% Total foreign visitors are either overnight, day or cruise ship visitors

$$TOURF = TOURFSTAY + TOURFDAY + TOURFCRU$$

% Number of visitors depends upon growth in source markets for country's visitors

$$\text{eg } TOURFSTAY = TOURFSTAY\text{(-1)} * WTOUR / WTOUR\text{(-1)}$$

% Growth in markets is the weighted sum of growth in real spending abroad in countries which

% typically supply visitors to the modelled country

$$WTOUR = WTOUR\text{(-1)} * \text{wted sum (MSTT\$ region x / MSTT\$ region x (-1))}$$

% Average spend (fares) grows in line with consumer price inflation in US\$

$$\text{eg } AVESPEND!\$ = AVESPEND!\$\text{(-1)} * (CPI/RXD) / (CPI\text{(-1)}/RXD\text{(-1)})$$

$$XVISITOR! = XVISITOR!\$ * RXD$$

$$XVISITOR\$\%YR = 100 * (XVISITOR\$/XVISITOR\$\text{(-1)} - 1)$$

$$XVISITOR\$ = 100 * XVISITOR!\$/PGDP\$$$

$$FVSEXGS\% = 100 * XVISITOR!\$/X!\$$$

%

## TOTAL T&T DEMAND

$$DEMANDTT! = CONTOTTT! + GCCOLTT! + IFTT! + XGTT!$$

$$DEMANDTT!\$ = DEMANDTT! / RXD$$

$$DEMANDTT\$\%YR = 100 * (DEMANDTT\$/DEMANDTT\$\text{(-1)} - 1)$$

$$DEMANDTT\$ = 100 * DEMANDTT!\$/PGDP\$$$

## INVESTMENT

% Residential Investment accounted for by Travel & Tourism

% (share based on US, currently (2001) = 2.34%)

$$IFPRRESTT! = 0.01 * IFPRRESTT\%SH * IPRD!$$

$$V(IFPRRESTT\%SH)881 100 * 2.34$$

% Investment in hotels (all assumed to be due to T&T)

$$IFPRHOT! = IFPR! * (IFPRHOT!\text{(-1)} + IFPRHOT!\text{(-2)} + IFPRHOT!\text{(-3)} + \% \\ IFPRHOT!\text{(-4)}) / (IFPR!\text{(-1)} + IFPR!\text{(-2)} + IFPR!\text{(-3)} + IFPR!\text{(-4)})$$

% Other construction investment

% (ratio to hotels investment based on US)

$$\text{IFPRNRESTT!} = \text{NRES2HOTRATIO} * \text{IFPRHOT!}$$

% Investment in aircraft (all assumed to be due to T&T)

$$\text{IFPRAIR!} = \text{IFPR!} * (\text{IFPRAIR!}(-1) + \text{IFPRAIR!}(-2) + \text{IFPRAIR!}(-3) + \text{IFPRAIR!}(-4)) / \% (\text{IFPR!}(-1) + \text{IFPR!}(-2) + \text{IFPR!}(-3) + \text{IFPR!}(-4))$$

% Investment in cruise ships (all assumed to be due to T&T)

$$\text{IFPRCR!} = \text{M!} * (\text{IFPRCR!}(-1) + \text{IFPRCR!}(-2) + \text{IFPRCR!}(-3) + \text{IFPRCR!}(-4)) / \% (\text{M!}(-1) + \text{M!}(-2) + \text{M!}(-3) + \text{M!}(-4))$$

% Investment on other durables/plant&machinery accounted for by T&T

% (US share adjusted by T&T intensity factor)

$$\text{IFPRODTT!} = \text{IFPR!} * (\text{IFPRODTT!}(-1) + \text{IFPRODTT!}(-2) + \text{IFPRODTT!}(-3) + \text{IFPRODTT!}(-4)) / (\text{IFPR!}(-1) + \text{IFPR!}(-2) + \text{IFPR!}(-3) + \text{IFPR!}(-4))$$

$$\text{IFPRTT!} = \text{IFPRRESTT!} + \text{IFPRHOT!} + \text{IFPRNRESTT!} + \text{IFPRAIR!} + \text{IFPRCR!} \% + \text{IFPRODTT!}$$

% Government investment

% (US shares used for all countries except UK, Australia and New Zealand)

$$\text{GITT!} = 0.01 * \text{GITTSHARE} * \text{TTINTENSITY} * \text{GI!}$$

$$\text{IFTT!} = \text{GITT!} + \text{IFPRTT!}$$

$$\text{IFTT!\$} = \text{IFTT!} / \text{RXD}$$

$$\text{IFTT!\%SH} = 100 * \text{IFTT!\$} / \text{IF!\$}$$

$$\text{IFTT!\%YR} = 100 * (\text{IFTT!\$} / \text{IFTT!\$}(-1) - 1)$$

$$\text{IFTT!\$} = 100 * \text{IFTT!\$} / \text{PGDP\$}$$

$$\text{GITT!\%SH} = 100 * \text{GITT!} / \text{GI!}$$

$$\text{IFPRTT!\%SH} = 100 * \text{IFPRTT!} / \text{IFPR!}$$

## IMPORTS

% (Calculated as exports. Note trade module is in US\$)

$$\text{MTT!} = \text{MTT!\$} * \text{RXD}$$

$$\text{MTT!\$} = \text{MGTT!\$} + \text{MSTT!\$}$$

$$\text{MTT!\%SH} = 100 * \text{MTT!\$} / \text{M!\$}$$

$$\text{MTT!\$} = 100 * \text{MTT!\$} / \text{PGDP\$}$$

%

$$\text{MGTT!} = \text{MGTT!\$} * \text{RXD}$$

%

% T&T imports of goods exogenous (from T&T trade sub-model)

$$\text{EXOG}(\text{MGTT!\$})$$

%

$$\text{MSTT!} = \text{MSTT!\$} * \text{RXD}$$

%  
% T&T imports of services exogenous (from T&T trade sub-model)  
EXOG(MSTT!\$)  
%  
% T&T industry imports exogenous (from T&T trade sub-model)  
% (Made up of visitor imports plus industry imports of goods)  
EXOG(MTTITOT!\$)  
MTTITOT! = MTTITOT!\$\*RXD  
MTTITOT\$ = 100\*MTTITOT!\$/PGDP\$  
%

%%%%%%%%%  
%%%%%%%%% **SUPPLY-SIDE MODELLING** %%%%%%%%%  
%%%%%%%%%

% EXOGENOUS INPUTS  
%%%%%%%%%

%Net output (value-added) by sector  
EXOG(NYAGR!)  
EXOG(NYMIN!)  
EXOG(NYMAN!)  
EXOG(NYUTL!)  
EXOG(NYCST!)  
EXOG(NYDIS!)  
EXOG(NYTRA!)  
EXOG(NYFIN!)  
EXOG(NYCOM!)  
EXOG(NYGOV!)

%Ratio of gross output to net output  
EXOG(GNRATIOAGR!)  
EXOG(GNRATIOMIN!)  
EXOG(GNRATIOMAN!)  
EXOG(GNRATIOUTL!)  
EXOG(GNRATIOCST!)  
EXOG(GNRATIODIS!)  
EXOG(GNRATIOTRA!)  
EXOG(GNRATIOFIN!)  
EXOG(GNRATIOCOM!)  
EXOG(GNRATIOGOV!)

%Employment  
EXOG(EMPAGR)  
EXOG(EMPMIN)  
EXOG(EMPMAN)

EXOG(EMPUTL)  
EXOG(EMPCST)  
EXOG(EMPDIS)  
EXOG(EMPTRA)  
EXOG(EMPFIN)  
EXOG(EMPCOM)  
EXOG(EMPGOV)

%Labour compensation

EXOG(LCAGR!)  
EXOG(LCMIN!)  
EXOG(LCMAN!)  
EXOG(LCUTL!)  
EXOG(LCCST!)  
EXOG(LCDIS!)  
EXOG(LCTRA!)  
EXOG(LCFIN!)  
EXOG(LCCOM!)  
EXOG(LCGOV!)

%Operating surplus

EXOG(OSAGR!)  
EXOG(OSMIN!)  
EXOG(OSMAN!)  
EXOG(OSUTL!)  
EXOG(OSCST!)  
EXOG(OSDIS!)  
EXOG(OSTRA!)  
EXOG(OSFIN!)  
EXOG(OSCOM!)  
EXOG(OSGOV!)

%Depreciation

EXOG(CCAAGR!)  
EXOG(CCAMIN!)  
EXOG(CCAMAN!)  
EXOG(CCAUTL!)  
EXOG(CCACST!)  
EXOG(CCADIS!)  
EXOG(CCATRA!)  
EXOG(CCAFIN!)  
EXOG(CCACOM!)  
EXOG(CCAGOV!)

%Indirect taxes (net of subsidies)

EXOG(TCIAGR!)  
EXOG(TCIMIN!)

EXOG(TCIMAN!)  
 EXOG(TCIUTL!)  
 EXOG(TCICST!)  
 EXOG(TCIDIS!)  
 EXOG(TCITRA!)  
 EXOG(TCIFIN!)  
 EXOG(TCICOM!)  
 EXOG(TCIGOV!)

## GROSS OUTPUT

GYAGR! = GNRATIOAGR!\*NYAGR!  
 GYMIN! = GNRATIOMIN!\*NYMIN!  
 GYMAN! = GNRATIOMAN!\*NYMAN!  
 GYUTL! = GNRATIOUTL!\*NYUTL!  
 GYCST! = GNRATIOCST!\*NYCST!  
 GYDIS! = GNRATIODIS!\*NYDIS!  
 GYTRA! = GNRATIOTRA!\*NYTRA!  
 GYFIN! = GNRATIOFIN!\*NYFIN!  
 GYCOM! = GNRATIOCOM!\*NYCOM!  
 GYGOV! = GNRATIOGOV!\*NYGOV!

%

## TRAVEL & TOURISM INDUSTRY GROSS OUTPUT

% Formed from I/O analysis  
 % coefficients differ by country so equations read in separately  
 % The form of the equations is similar to the examples given under the  
 % Travel & Tourism economy gross output, except that there are only terms  
 % in components of PERCON1TT to PERCON8TT

## TRAVEL & TOURISM INDUSTRY NET OUTPUT

% Note NY and SH variables are formed here before scaling to  
 % demand-side measure of T&T, so need to be scaled whenever they are used.

NYAGR<sub>TTI</sub>! = 0.01\*TTIAGR%SH\*NYAGR!  
 TTIAGR%SH = 100\*GYAGR<sub>TTI</sub>!/GYAGR!

%

NYMIN<sub>TTI</sub>! = 0.01\*TTIMIN%SH\*NYMIN!  
 TTIMIN%SH = 100\*GYMIN<sub>TTI</sub>!/GYMIN!

%

NYMAN<sub>TTI</sub>! = 0.01\*TTIMAN%SH\*NYMAN!  
 TTIMAN%SH = 100\*GYMAN<sub>TTI</sub>!/GYMAN!

%

NYUTL<sub>TTI</sub>! = 0.01\*TTIUTL%SH\*NYUTL!  
 TTIUTL%SH = 100\*GYUTL<sub>TTI</sub>!/GYUTL!

%

$$\text{NYCSTTTI!} = 0.01 * \text{TTICST\%SH} * \text{NYCST!}$$

$$\text{TTICST\%SH} = 100 * \text{GYCSTTTI!} / \text{GYCST!}$$

%

$$\text{NYDISTTI!} = 0.01 * \text{TTIDIS\%SH} * \text{NYDIS!}$$

$$\text{TTIDIS\%SH} = 100 * \text{GYDISTTI!} / \text{GYDIS!}$$

%

$$\text{NYTRATTI!} = 0.01 * \text{TTITRA\%SH} * \text{NYTRA!}$$

$$\text{TTITRA\%SH} = 100 * \text{GYTRATTI!} / \text{GYTRA!}$$

%

$$\text{NYFINTTI!} = 0.01 * \text{TTIFIN\%SH} * \text{NYFIN!}$$

$$\text{TTIFIN\%SH} = 100 * \text{GYFINTTI!} / \text{GYFIN!}$$

%

$$\text{NYCOMTTI!} = 0.01 * \text{TTICOM\%SH} * \text{NYCOM!}$$

$$\text{TTICOM\%SH} = 100 * \text{GYCOMTTI!} / \text{GYCOM!}$$

%

$$\text{NYGOVTTI!} = 0.01 * \text{TTIGOV\%SH} * \text{NYGOV!}$$

$$\text{TTIGOV\%SH} = 100 * \text{GYGOVTTI!} / \text{GYGOV!}$$

%

$$\text{GDPTTIDIR!} = \text{GDPTTITOT!} * \text{TTIDIR\%SH}$$

$$\text{GDPTTIIND!} = \text{GDPTTITOT!} - \text{GDPTTIDIR!}$$

%Ratio of direct to indirect output

$$\text{TTIDIR\%SH} = 100 * \%$$

$$\frac{(\text{NYAGR\%TTI!} + \text{NYMINT\%TTI!} + \text{NYMANT\%TTI!} + \text{NYUTL\%TTI!} + \text{NYCST\%TTI!} + \% \\ \text{NYDIST\%TTI!} + \text{NYTRAT\%TTI!} + \text{NYFIN\%TTI!} + \text{NYCOM\%TTI!} + \text{NYGOV\%TTI!})}{(\text{GYAGR\%TTI!} + \text{GYMINT\%TTI!} + \text{GYMANT\%TTI!} + \text{GYUTL\%TTI!} + \text{GYCST\%TTI!} + \% \\ \text{GYDIST\%TTI!} + \text{GYTRAT\%TTI!} + \text{GYFIN\%TTI!} + \text{GYCOM\%TTI!} + \text{GYGOV\%TTI!})}$$

## TRAVEL & TOURISM ECONOMY GROSS OUTPUT

% Formed from I-O analysis

% coefficients differ by country so equations read in separately.

% Examples given below for an individual country:

$$\text{GYAGR\%TTE!} = 0.221633 * \text{PERCON1\%TT!} + 0.110524 * \text{PERCON2\%TT!} + \% \\ 0.031091 * \text{PERCON3\%TT!} + 0.122436 * \text{PERCON4\%TT!} + \% \\ 0.071347 * \text{PERCON5\%TT!} + 0.073143 * \text{PERCON6\%TT!} + \% \\ 0.068219 * \text{PERCON7\%TT!} + 0.036388 * \text{PERCON8\%TT!} + \% \\ 0.002756 * \text{GCTO\%TTT!} + \% \\ 0.055024 * (\text{IFPRHOT!} + \text{IFPRNRESTT!} + \text{IFPRRESTT!} + \text{GITT!}) + \% \\ 0.138380 * (\text{IFPRAIR!} + \text{IFPRCR!} + \text{IFPROD\%TT!}) + 0.138380 * \text{XG\%TT!}$$

$$\text{GYMINT\%TTE!} = 0.080863 * \text{PERCON1\%TT!} + 0.080531 * \text{PERCON2\%TT!} + \% \\ 0.069183 * \text{PERCON3\%TT!} + \% \\ 0.082693 * \text{PERCON4\%TT!} + 0.052096 * \text{PERCON5\%TT!} + \% \\ 0.055087 * \text{PERCON6\%TT!} + \% \\ 0.049467 * \text{PERCON7\%TT!} + 0.028570 * \text{PERCON8\%TT!} + \% \\ 0.002383 * \text{GCTO\%TTT!} + \% \\ 0.040126 * (\text{IFPRHOT!} + \text{IFPRNRESTT!} + \text{IFPRRESTT!} + \text{GITT!}) + \%$$



$$0.099415*(IFPRAIR!+IFPRCR!+IFPRODIT!) + 0.099415*XGIT!$$

$$\begin{aligned} GYMANTTE! = & 1.462607*PERCON1TT! + 1.466781*PERCON2TT! + \% \\ & 0.343381*PERCON3TT! + \% \\ & 1.206096*PERCON4TT! + 0.904833*PERCON5TT! + \% \\ & 0.949836*PERCON6TT! + \% \\ & 0.871654*PERCON7TT! + 0.443857*PERCON8TT! + \% \\ & 0.032050*GCTOTTT! + \% \\ & 0.734696*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GIT!) + \% \\ & 1.873721*(IFPRAIR!+IFPRCR!+IFPRODIT!) + 1.873721*XGIT! \end{aligned}$$

$$\begin{aligned} GYUTLTTE! = & 0.060050*PERCON1TT! + 0.059856*PERCON2TT! + \% \\ & 0.235000*PERCON3TT! + \% \\ & 0.055337*PERCON4TT! + 0.045260*PERCON5TT! + \% \\ & 0.046236*PERCON6TT! + \% \\ & 0.041083*PERCON7TT! + 0.031704*PERCON8TT! + \% \\ & 0.002835*GCTOTTT! + \% \\ & 0.030252*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GIT!) + \% \\ & 0.064370*(IFPRAIR!+IFPRCR!+IFPRODIT!) + 0.064370*XGIT! \end{aligned}$$

$$\begin{aligned} GYCSTTTE! = & 0.009283*PERCON1TT! + 0.009760*PERCON2TT! + \% \\ & 0.038926*PERCON3TT! + \% \\ & 0.045813*PERCON4TT! + 0.022201*PERCON5TT! + \% \\ & 0.016718*PERCON6TT! + \% \\ & 0.024248*PERCON7TT! + 0.019342*PERCON8TT! + \% \\ & 0.002685*GCTOTTT! + \% \\ & 1.010202*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GIT!) + \% \\ & 0.008431*(IFPRAIR!+IFPRCR!+IFPRODIT!) + 0.008431*XGIT! \end{aligned}$$

$$\begin{aligned} GYDISTTE! = & 0.321295*PERCON1TT! + 0.371865*PERCON2TT! + \% \\ & 0.072367*PERCON3TT! + \% \\ & 0.384726*PERCON4TT! + 0.365202*PERCON5TT! + \% \\ & 0.267077*PERCON6TT! + \% \\ & 0.207342*PERCON7TT! + 0.241365*PERCON8TT! + \% \\ & 0.006915*GCTOTTT! + \% \\ & 0.068164*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GIT!) + \% \\ & 0.108369*(IFPRAIR!+IFPRCR!+IFPRODIT!) + 0.108369*XGIT! \end{aligned}$$

$$\begin{aligned} GYTRATTE! = & 0.067259*PERCON1TT! + 0.067370*PERCON2TT! + \% \\ & 0.031757*PERCON3TT! + \% \\ & 0.063701*PERCON4TT! + 0.055089*PERCON5TT! + \% \\ & 0.296400*PERCON6TT! + \% \\ & 0.048284*PERCON7TT! + 0.141082*PERCON8TT! + \% \\ & 0.003427*GCTOTTT! + \% \\ & 0.042748*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GIT!) + \% \\ & 0.062573*(IFPRAIR!+IFPRCR!+IFPRODIT!) + 0.062573*XGIT! \end{aligned}$$

$$GYFINTTE! = 0.032070*PERCON1TT! + 0.033452*PERCON2TT! + \%$$

$$\begin{aligned}
 &0.036460*PERCON3TT! + \% \\
 &0.035176*PERCON4TT! + 0.037673*PERCON5TT! + \% \\
 &0.035199*PERCON6TT! + \% \\
 &0.142150*PERCON7TT! + 0.415212*PERCON8TT! + \% \\
 &0.003797*GCTOTTT! + \% \\
 &0.021767*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GITT!) + \% \\
 &0.026580*(IFPRAIR!+IFPRCR!+IFPRODTT!) + 0.026580*XGTT!
 \end{aligned}$$

$$\begin{aligned}
 GYCOMTTE! = &0.084871*PERCON1TT! + 0.106806*PERCON2TT! + \% \\
 &0.833730*PERCON3TT! + \% \\
 &0.206155*PERCON4TT! + 0.424858*PERCON5TT! + \% \\
 &0.279196*PERCON6TT! + \% \\
 &0.476193*PERCON7TT! + 0.354153*PERCON8TT! + \% \\
 &0.019456*GCTOTTT! + \% \\
 &0.089608*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GITT!) + \% \\
 &0.070810*(IFPRAIR!+IFPRCR!+IFPRODTT!) + 0.070810*XGTT!
 \end{aligned}$$

$$\begin{aligned}
 GYGOVTTE! = &0.000000*PERCON1TT! + 0.000000*PERCON2TT! + \% \\
 &0.000000*PERCON3TT! + \% \\
 &0.000000*PERCON4TT! + 0.028231*PERCON5TT! + \% \\
 &0.000964*PERCON6TT! + \% \\
 &0.030357*PERCON7TT! + 0.048574*PERCON8TT! + \% \\
 &1.000000*GCTOTTT! + \% \\
 &0.000000*(IFPRHOT!+IFPRNRESTT!+IFPRRESTT!+GITT!) + \% \\
 &0.000000*(IFPRAIR!+IFPRCR!+IFPRODTT!) + 0.000000*XGTT!
 \end{aligned}$$

## TRAVEL & TOURISM ECONOMY NET OUTPUT

% Note NY and SH variables are formed here before scaling to  
 % demand-side measure of T&T, so need to be scaled whenever  
 % they are used.

%

$$\begin{aligned}
 NYAGRTTE! &= 0.01*TTEAGR\%SH*NYAGR! \\
 TTEAGR\%SH &= 100*GYAGRTTE!/GYAGR!
 \end{aligned}$$

%

$$\begin{aligned}
 NYMINTTE! &= 0.01*TTEMIN\%SH*NYMIN! \\
 TTEMIN\%SH &= 100*GYMINTTE!/GYMIN!
 \end{aligned}$$

%

$$\begin{aligned}
 NYMANTTE! &= 0.01*TTEMAN\%SH*NYMAN! \\
 TTEMAN\%SH &= 100*GYMANTTE!/GYMAN!
 \end{aligned}$$

%

$$\begin{aligned}
 NYUTLTTE! &= 0.01*TTEUTL\%SH*NYUTL! \\
 TTEUTL\%SH &= 100*GYUTLTTE!/GYUTL!
 \end{aligned}$$

%

$$\begin{aligned}
 NYCSTTTE! &= 0.01*TTECST\%SH*NYCST! \\
 TTECST\%SH &= 100*GYCSTTTE!/GYCST!
 \end{aligned}$$

%

NYDISTTE! = 0.01\*TTEDIS%SH\*NYDIS!  
 TTEDIS%SH = 100\*GYDISTTE!/GYDIS!  
 %  
 NYTRATTE! = 0.01\*TTETRA%SH\*NYTRA!  
 TTETRA%SH = 100\*GYTRATTE!/GYTRA!  
 %  
 NYFINTTE! = 0.01\*TTEFIN%SH\*NYFIN!  
 TTEFIN%SH = 100\*GYFINTTE!/GYFIN!  
 %  
 NYCOMTTE! = 0.01\*TTECOM%SH\*NYCOM!  
 TTECOM%SH = 100\*GYCOMTTE!/GYCOM!  
 %  
 NYGOVTTE! = 0.01\*TTEGOV%SH\*NYGOV!  
 TTEGOV%SH = 100\*GYGOVTTE!/GYGOV!  
 %  
 %  
 % Direct - indirect split  
 GDPTTEDIR! = 0.01\*GDPTTETOT!\*TTEDIR%SH  
 GDPTTEIND! = GDPTTETOT! - GDPTTEDIR!  
 TTEDIR%SH =  
 100\*(NYAGRTE!+NYMINTTE!+NYMANTTE!+NYUTLTTE!+NYCSTTTE!+%  
 NYDISTTE!+NYTRATTE!+NYFINTTE!+NYCOMTTE!+NYGOVTTE!)/%  
 (GYAGRTE!+GYMINTTE!+GYMANTTE!+GYUTLTTE!+GYCSTTTE!+%  
 GYDISTTE!+GYTRATTE!+GYFINTTE!+GYCOMTTE!+GYGOVTTE!)  
 %  
 % Scaling factors  
 TTISCALE = GDPTTITOT! / %  
 (NYAGRTE!+NYMINTTE!+NYMANTTE!+NYUTLTTE!+NYCSTTTE!+%  
 NYDISTTE!+NYTRATTE!+NYFINTTE!+NYCOMTTE!+NYGOVTTE!)  
 %  
 TTESCALE = GDPTTETOT! / %  
 (NYAGRTE!+NYMINTTE!+NYMANTTE!+NYUTLTTE!+NYCSTTTE!+%  
 NYDISTTE!+NYTRATTE!+NYFINTTE!+NYCOMTTE!+NYGOVTTE!)  
 %  
 GDPTTITOT! = CONTOTTT! - MTTITOT!  
 GDPTTETOT! = DEMANDTT! - MTT!  
 %  
 %  
 % Employment - T&T industry  
 %  
 EMPPTITOT=TTISCALE\*(.01\*TTIAGR%SH\*EMPAGR+%  
 .01\*TTIMIN%SH\*EMPMIN+%  
 .01\*TTIMAN%SH\*EMPMAN+%  
 .01\*TTIUTL%SH\*EMPUTL+%  
 .01\*TTICST%SH\*EMPCST+%  
 .01\*TTIDIS%SH\*EMPDIS+%  
 .01\*TTITRA%SH\*EMPTRA+%

```

.01*TTIFIN%SH*EMPFIN+%
.01*TTICOM%SH*EMPCOM+%
.01*TTIGOV%SH*EMPGOV)
%
EMPTTIDIR = 0.01*TTIDIR%SH*EMPTTITOT
EMPTTIIND = EMPTTITOT - EMPTTIDIR
%
%
% Labour compensation - T&T industry
LC! = LCAGR!+LCMIN!+LCMAN!+LCUTL!+LCCST!+LCDIS!+LCTRA!+ %
LCFIN!+LCCOM!+LCGOV!
%
LCTTITOT!=TTISCALE*(.01*TTIAGR%SH*LCAGR!+%
.01*TTIMIN%SH*LCMIN!+%
.01*TTIMAN%SH*LCMAN!+%
.01*TTIUTL%SH*LCUTL!+%
.01*TTICST%SH*LCCST!+%
.01*TTIDIS%SH*LCDIS!+%
.01*TTITRA%SH*LCTRA!+%
.01*TTIFIN%SH*LCFIN!+%
.01*TTICOM%SH*LCCOM!+%
.01*TTIGOV%SH*LCGOV!)
%
LCTTIDIR! = 0.01*TTIDIR%SH*LCTTITOT!
LCTTIIND! = LCTTITOT! - LCTTIDIR!
%
%
% Operating surplus - T&T industry
OS! = OSAGR!+OSMIN!+OSMAN!+OSUTL!+OSCST!+OSDIS!+OSTRA!+ %
OSFIN!+OSCOM!+OSGOV!
%
OSTTITOT!=TTISCALE*(.01*TTIAGR%SH*OSAGR!+%
.01*TTIMIN%SH*OSMIN!+%
.01*TTIMAN%SH*OSMAN!+%
.01*TTIUTL%SH*OSUTL!+%
.01*TTICST%SH*OSCST!+%
.01*TTIDIS%SH*OSDIS!+%
.01*TTITRA%SH*OSTRA!+%
.01*TTIFIN%SH*OSFIN!+%
.01*TTICOM%SH*OSCOM!+%
.01*TTIGOV%SH*OSGOV!)
%
OSTTIDIR! = 0.01*TTIDIR%SH*OSTTITOT!
OSTTIIND! = OSTTITOT! - OSTTIDIR!
%
%
% Depreciation - T&T industry

```

$$\text{CCA!} = \text{CCAAGR!} + \text{CCAMIN!} + \text{CCAMAN!} + \text{CCAUTL!} + \text{CCACST!} + \text{CCADIS!} + \% \\ \text{CCATRA!} + \text{CCAFIN!} + \text{CCACOM!} + \text{CCAGOV!}$$

%

$$\text{CCATTITOT!} = \text{TTISCALE} * (.01 * \text{TTIAGR}\% \text{SH} * \text{CCAAGR!} + \% \\ .01 * \text{TTIMIN}\% \text{SH} * \text{CCAMIN!} + \% \\ .01 * \text{TTIMAN}\% \text{SH} * \text{CCAMAN!} + \% \\ .01 * \text{TTIUTL}\% \text{SH} * \text{CCAUTL!} + \% \\ .01 * \text{TTICST}\% \text{SH} * \text{CCACST!} + \% \\ .01 * \text{TTIDIS}\% \text{SH} * \text{CCADIS!} + \% \\ .01 * \text{TTITRA}\% \text{SH} * \text{CCATRA!} + \% \\ .01 * \text{TTIFIN}\% \text{SH} * \text{CCAFIN!} + \% \\ .01 * \text{TTICOM}\% \text{SH} * \text{CCACOM!} + \% \\ .01 * \text{TTIGOV}\% \text{SH} * \text{CCAGOV!})$$

%

$$\text{CCATTIDIR!} = 0.01 * \text{TTIDIR}\% \text{SH} * \text{CCATTITOT!} \\ \text{CCATTIIND!} = \text{CCATTITOT!} - \text{CCATTIDIR!}$$

%

%

% Taxes - T&T industry

$$\text{TCI!} = \text{TCIAGR!} + \text{TCIMIN!} + \text{TCIMAN!} + \text{TCIUTL!} + \text{TCICST!} + \text{TCIDIS!} + \text{TCITRA!} + \% \\ \text{TCIFIN!} + \text{TCICOM!} + \text{TCIGOV!}$$

%

% 'Exogenous' tax variables

$$\text{EXOG(TY!)}$$

$$\text{EXOG(TC!)}$$

$$\text{D(LN(TP!))} = \text{D(LN(GDP!))}$$

$$\text{TTOT!} = \text{TCI!} + \text{TY!} + \text{TC!} + \text{TP!}$$

%

$$\text{TCITTITOT!} = \text{TTISCALE} * (.01 * \text{TTIAGR}\% \text{SH} * \text{TCIAGR!} + \% \\ .01 * \text{TTIMIN}\% \text{SH} * \text{TCIMIN!} + \% \\ .01 * \text{TTIMAN}\% \text{SH} * \text{TCIMAN!} + \% \\ .01 * \text{TTIUTL}\% \text{SH} * \text{TCIUTL!} + \% \\ .01 * \text{TTICST}\% \text{SH} * \text{TCICST!} + \% \\ .01 * \text{TTIDIS}\% \text{SH} * \text{TCIDIS!} + \% \\ .01 * \text{TTITRA}\% \text{SH} * \text{TCITRA!} + \% \\ .01 * \text{TTIFIN}\% \text{SH} * \text{TCIFIN!} + \% \\ .01 * \text{TTICOM}\% \text{SH} * \text{TCICOM!} + \% \\ .01 * \text{TTIGOV}\% \text{SH} * \text{TCIGOV!})$$

%

$$\text{TCITTIDIR!} = 0.01 * \text{TTIDIR}\% \text{SH} * \text{TCITTITOT!}$$

$$\text{TCITTIIND!} = \text{TCITTITOT!} - \text{TCITTIDIR!}$$

$$\text{TYTTIDIR!} = (\text{LCTTIDIR!} / \text{LC!}) * \text{TY!}$$

$$\text{TCTTIDIR!} = (\text{OSTTIDIR!} / \text{OS!}) * \text{TC!}$$

$$\text{TPTTIDIR!} = (\text{GDPTTIDIR!} / \text{GDP!}) * \text{TP!}$$

$$\text{TTOTTTIDIR!} = \text{TYTTIDIR!} + \text{TCTTIDIR!} + \text{TPTTIDIR!} + \text{TCITTIDIR!}$$

$$\text{TYTTITOT!} = (\text{LCTTITOT!} / \text{LC!}) * \text{TY!}$$

$$\text{TCTTITOT!} = (\text{OSTTITOT!} / \text{OS!}) * \text{TC!}$$

$$TPTTITOT! = (GDPTTITOT!/GDP!)*TP!$$

$$TTOTTTITOT! = TYTTITOT!+TCTTITOT!+TPTTITOT!+TCITTITOT!$$

%  
%

% Employment - T&T economy

%

$$EMPTTETOT = TTESCALE * (.01 * TTEAGR \% SH * EMPAGR + \% .01 * TTEMIN \% SH * EMPMIN + \% .01 * TTEMAN \% SH * EMPMAN + \% .01 * TTEUTL \% SH * EMPUTL + \% .01 * TTECST \% SH * EMPCST + \% .01 * TTEDIS \% SH * EMPDIS + \% .01 * TTETRA \% SH * EMPTRA + \% .01 * TTEFIN \% SH * EMPFIN + \% .01 * TTECOM \% SH * EMPCOM + \% .01 * TTEGOV \% SH * EMPGOV)$$

%

$$EMPTTEDIR = 0.01 * TTEDIR \% SH * EMPTTETOT$$

$$EMPTTEIND = EMPTTETOT - EMPTTEDIR$$

%

%

% Labour compensation - T&T economy

%

$$LCTTETOT! = TTESCALE * (.01 * TTEAGR \% SH * LCAGR! + \% .01 * TTEMIN \% SH * LCMIN! + \% .01 * TTEMAN \% SH * LCMAN! + \% .01 * TTEUTL \% SH * LCUTL! + \% .01 * TTECST \% SH * LCCST! + \% .01 * TTEDIS \% SH * LCDIS! + \% .01 * TTETRA \% SH * LCTRA! + \% .01 * TTEFIN \% SH * LCFIN! + \% .01 * TTECOM \% SH * LCCOM! + \% .01 * TTEGOV \% SH * LCGOV!)$$

%

$$LCTTEDIR! = 0.01 * TTEDIR \% SH * LCTTETOT!$$

$$LCTTEIND! = LCTTETOT! - LCTTEDIR!$$

%

%

% Operating surplus - T&T economy

%

$$OSTTETOT! = TTESCALE * (.01 * TTEAGR \% SH * OSAGR! + \% .01 * TTEMIN \% SH * OSMIN! + \% .01 * TTEMAN \% SH * OSMAN! + \% .01 * TTEUTL \% SH * OSUTL! + \% .01 * TTECST \% SH * OSCST! + \% .01 * TTEDIS \% SH * OSDIS! + \% .01 * TTETRA \% SH * OSTRA! + \% .01 * TTEGOV \% SH * OSGOV!)$$

```

.01*TTEFIN%SH*OSFIN!+%
.01*TTECOM%SH*OSCOM!+%
.01*TTEGOV%SH*OSGOV!)
%
OSTTEDIR! = 0.01*TTEDIR%SH*OSTTETOT!
OSTTEIND! = OSTTETOT! - OSTTEDIR!
%
%
% Depreciation - T&T economy
%
CCATTETOT!=TTESCALE*(.01*TTEAGR%SH*CCAAGR!+%
.01*TTEMIN%SH*CCAMIN!+%
.01*TTEMAN%SH*CCAMAN!+%
.01*TTEUTL%SH*CCAUTL!+%
.01*TTECST%SH*CCACST!+%
.01*TTEDIS%SH*CCADIS!+%
.01*TTETRA%SH*CCATRA!+%
.01*TTEFIN%SH*CCAFIN!+%
.01*TTECOM%SH*CCACOM!+%
.01*TTEGOV%SH*CCAGOV!)
%
CCATTEDIR! = 0.01*TTEDIR%SH*CCATTETOT!
CCATTEIND! = CCATTETOT! - CCATTEDIR!
%
%
% Taxes - T&T economy
%
TCITTETOT!=TTESCALE*(.01*TTEAGR%SH*TCIAGR!+%
.01*TTEMIN%SH*TCIMIN!+%
.01*TTEMAN%SH*TCIMAN!+%
.01*TTEUTL%SH*TCIUTL!+%
.01*TTECST%SH*TCICST!+%
.01*TTEDIS%SH*TCIDIS!+%
.01*TTETRA%SH*TCITRA!+%
.01*TTEFIN%SH*TCIFIN!+%
.01*TTECOM%SH*TCICOM!+%
.01*TTEGOV%SH*TCIGOV!)
%
TCITTETOT!%SH = 100*TCITTETOT!/TCI!
TCITTEDIR! = 0.01*TTEDIR%SH*TCITTETOT!
TCITTEIND! = TCITTETOT! - TCITTEDIR!
TYTTEDIR! = (LCTTEDIR!/LC!)*TY!
TCTTEDIR! = (OSTTEDIR!/OS!)*TC!
TPTTEDIR! = (GDPTTEDIR!/GDP!)*TP!
TTOTTEDIR! = TYTTEDIR!+TCTTEDIR!+TPTTEDIR!+TCITTEDIR!
TYTTETOT! = (LCTTETOT!/LC!)*TY!
TYTTETOT!%SH = 100*TYTTETOT!/TY!

```

%

$$\begin{aligned} \text{TCTTETOT!} &= (\text{OSTTETOT!}/\text{OS!}) * \text{TC!} \\ \text{TCTTETOT!}\% \text{SH} &= 100 * \text{TCTTETOT!}/\text{TC!} \end{aligned}$$

%

$$\begin{aligned} \text{TPTTETOT!} &= (\text{GDPTTETOT!}/\text{GDP!}) * \text{TP!} \\ \text{TPTTETOT!}\% \text{SH} &= 100 * \text{TPTTETOT!}/\text{TP!} \\ \text{TTOTTTETOT!} &= \text{TYTTETOT!} + \text{TCTTETOT!} + \text{TPTTETOT!} + \text{TCITTETOT!} \\ \text{TTOTTTETOT!}\% \text{SH} &= 100 * \text{TTOTTTETOT!}/(\text{TY!} + \text{TC!} + \text{TP!} + \text{TCI!}) \end{aligned}$$

%

%

% Supply-side variables needed for output

% - shares and US\$ terms

%

$$\begin{aligned} \text{EMPTTIDIR}\% \text{SH} &= 100 * \text{EMPTTIDIR}/\text{EMP} \\ \text{EMPTTETOT}\% \text{SH} &= 100 * \text{EMPTTETOT}/\text{EMP} \\ \text{GDPTTIDIR!}\% \text{SH} &= 100 * \text{GDPTTIDIR!}/\text{GDP!} \\ \text{GDPTTETOT!}\% \text{SH} &= 100 * \text{GDPTTETOT!}/\text{GDP!} \\ \text{LCTTIDIR!}\% \text{SH} &= 100 * \text{LCTTIDIR!}/\text{LC!} \\ \text{LCTTETOT!}\% \text{SH} &= 100 * \text{LCTTETOT!}/\text{LC!} \\ \text{OSTTIDIR!}\% \text{SH} &= 100 * \text{OSTTIDIR!}/\text{OS!} \\ \text{OSTTETOT!}\% \text{SH} &= 100 * \text{OSTTETOT!}/\text{OS!} \\ \text{CCATTIDIR!}\% \text{SH} &= 100 * \text{CCATTIDIR!}/\text{CCA!} \\ \text{CCATTETOT!}\% \text{SH} &= 100 * \text{CCATTETOT!}/\text{CCA!} \\ \text{GDPTTIDIR!}\$ &= \text{GDPTTIDIR!}/\text{RXD} \\ \text{GDPTTIDIR}\$ &= 100 * \text{GDPTTIDIR!}\$/\text{PGDP\$} \\ \text{GDPTTIDIR}\%\text{YR} &= 100 * (\text{GDPTTIDIR}\$/\text{GDPTTIDIR}\$(-1)-1) \\ \text{GDPTTETOT!}\$ &= \text{GDPTTETOT!}/\text{RXD} \\ \text{GDPTTETOT}\$ &= 100 * \text{GDPTTETOT!}\$/\text{PGDP\$} \\ \text{GDPTTETOT}\%\text{YR} &= 100 * (\text{GDPTTETOT}\$/\text{GDPTTETOT}\$(-1)-1) \\ \text{EMPTTIDIR}\%\text{YR} &= 100 * (\text{EMPTTIDIR}/\text{EMPTTIDIR}(-1)-1) \\ \text{EMPTTETOT}\%\text{YR} &= 100 * (\text{EMPTTETOT}/\text{EMPTTETOT}(-1)-1) \\ \text{TCITTETOT}\$ &= 100 * (\text{TCITTETOT!}/\text{RXD})/\text{PGDP\$} \\ \text{TYTTETOT}\$ &= 100 * (\text{TYTTETOT!}/\text{RXD})/\text{PGDP\$} \\ \text{TCTTETOT}\$ &= 100 * (\text{TCTTETOT!}/\text{RXD})/\text{PGDP\$} \\ \text{TPTTETOT}\$ &= 100 * (\text{TPTTETOT!}/\text{RXD})/\text{PGDP\$} \\ \text{TTOTTTETOT}\$ &= 100 * (\text{TTOTTTETOT!}/\text{RXD})/\text{PGDP\$} \end{aligned}$$

%

$$\begin{aligned} \text{LC!}\$ &= \text{LC!}/\text{RXD} \\ \text{OS!}\$ &= \text{OS!}/\text{RXD} \\ \text{CCA!}\$ &= \text{CCA!}/\text{RXD} \\ \text{TCI!}\$ &= \text{TCI!}/\text{RXD} \\ \text{TY!}\$ &= \text{TY!}/\text{RXD} \\ \text{TC!}\$ &= \text{TC!}/\text{RXD} \\ \text{TTOT!}\$ &= \text{TTOT!}/\text{RXD} \\ \text{GDPTTITOT!}\$ &= \text{GDPTTITOT!}/\text{RXD} \\ \text{LCTTITOT!}\$ &= \text{LCTTITOT!}/\text{RXD} \\ \text{OSTTITOT!}\$ &= \text{OSTTITOT!}/\text{RXD} \end{aligned}$$



CCATTITOT!\$ = CCATTITOT!/RXD  
 TCITTITOT!\$ = TCITTITOT!/RXD  
 GDPTTIDIR!\$ = GDPTTIDIR!/RXD  
 LCTTIDIR!\$ = LCTTIDIR!/RXD  
 OSTTIDIR!\$ = OSTTIDIR!/RXD  
 CCATTIDIR!\$ = CCATTIDIR!/RXD  
 TCITTIDIR!\$ = TCITTIDIR!/RXD  
 GDPTTIIND!\$ = GDPTTIIND!/RXD  
 LCTTIIND!\$ = LCTTIIND!/RXD  
 OSTTIIND!\$ = OSTTIIND!/RXD  
 CCATTIIND!\$ = CCATTIIND!/RXD  
 TCITTIIND!\$ = TCITTIIND!/RXD  
 TYTTIDIR!\$ = TYTTIDIR!/RXD  
 TCTTIDIR!\$ = TCTTIDIR!/RXD  
 TTOTTIDIR!\$ = TTOTTIDIR!/RXD  
 GDPTTETOT!\$ = GDPTTETOT!/RXD  
 LCTTETOT!\$ = LCTTETOT!/RXD  
 OSTTETOT!\$ = OSTTETOT!/RXD  
 CCATTETOT!\$ = CCATTETOT!/RXD  
 TCITTETOT!\$ = TCITTETOT!/RXD  
 GDPTTEDIR!\$ = GDPTTEDIR!/RXD  
 LCTTEDIR!\$ = LCTTEDIR!/RXD  
 OSTTEDIR!\$ = OSTTEDIR!/RXD  
 CCATTEDIR!\$ = CCATTEDIR!/RXD  
 TCITTEDIR!\$ = TCITTEDIR!/RXD  
 GDPTTEIND!\$ = GDPTTEIND!/RXD  
 LCTTEIND!\$ = LCTTEIND!/RXD  
 OSTTEIND!\$ = OSTTEIND!/RXD  
 CCATTEIND!\$ = CCATTEIND!/RXD  
 TCITTEIND!\$ = TCITTEIND!/RXD  
 TYTTETOT!\$ = TYTTETOT!/RXD  
 TCTTETOT!\$ = TCTTETOT!/RXD  
 TTOTTETOT!\$ = TTOTTETOT!/RXD

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- British Tourist Authority
- BST Associates
- Bus Trader Magazine
- Cards International Magazine
- Caribbean Tourism Organization
- Census & Statistics Department, Hong Kong
- Central Bureau of Statistics, Israel
- Central Statistical Office, UK
- China Statistical Information & Consultancy Service Center
- Chirstiensen & Cummins
- Department of National Heritage, UK
- Department of Transport, UK
- Diners Club
- EIA Marketing Services
- Embratur, Brazil
- Eurostat
- Fairplay Information Services
- Fleet Magazine
- Hong Kong Tourist Association
- International Gaming & Wagering Business Magazine
- Gardner & Theobald, Chartered Surveyors
- Hanscomb/Means International
- Horwath Consulting
- Hotels Magazine
- HVS International
- Hungarian Tourist Board
- International Air Transport Association
- International Civil Aviation Organization
- International Energy Agency
- International Monetary Fund
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- Ministerio de Economía Y Obras Y Servicios Públicos, Argentina
- Ministry of Tourism, Israel
- Ministry of Tourism, Montenegro
- National Motor Coach Network
- National Restaurant Association
- The National Tourism Administration of The People's Republic of China
- The Nilson Report
- OECD
- Photo Marketing Association International
- PKF Consulting
- Smith Travel Research
- Spon's Building Magazine and European Construction Cost Handbook
- Sporting Goods Manufacturers Association
- Statistics Canada
- Tourism Canada
- US Bureau of Labor Statistics
- US Bureau of the Census
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