

## DEVELOPING TOURISM CONSUMPTION ESTIMATES THROUGH VISITOR EXPENDITURE MODELS

A Paper Prepared by  
Dr. Douglas C. Frechtling, Professor of Tourism Studies,  
The George Washington University,  
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This paper summarizes the modeling approach to estimating visitor expenditures for an area. It argues that gathering visitor reports of activities engaged in while traveling produces more valid estimates than expecting them to report their expenditures. Moreover, multiplying activity levels by per-unit cost factors ensures that the supplemental activities that separate Tourism Consumption from the small magnitude of visitor expenditures are included in this variable required for the Tourism Satellite Account.

A great deal of research has been published over three decades or so on estimating visitor expenditures (see Frechtling 2006 for a recent summary). However, the advent of the Tourism Satellite account has rightly emphasized the concept of Tourism Consumption, a broader concept than traditionally covered in visitor expenditure studies.

The World Tourism Organization's (UNWTO) recent paper, "International Recommendations on Tourism Statistics (IRTS)(V.1)" reiterates "For the purposes of tourism analysis, we are interested in measuring *acquisition of consumption goods and service by visitors* rather than just the expenditure of visitors or physical use . . . . the interest is not specifically on the expenditure made by visitors out of their own resources, but also on the consumption resulting from expenditure made by others on their behalf." (p. 36; italics in the original)

UNWTO documents have detailed what comprises Tourism Consumption. For example, IRTS details the following supplements to what visitors actually spend while traveling away from home (pp. 36, 88):

- Costs paid by others
- Invitations and presents received during trips
- Implicit payments made by a public authority or a nonprofit organization serving households

- Subsidized costs of producing cultural events and services
- Employer-financed trip costs

I have noted elsewhere that most published research on visitor expenditures falls short of this concept by concentrating only on what visitors report they spent on travel away from home. (2006, p.27) Certainly the visitor survey approach relies heavily, if not exclusively, on what the sampled visitor recalls s/he spent. This popular technique then falls short of estimating Tourism Consumption.

### The Model Approach

Fortunately, there is another class of techniques that offers better promise of estimating Tourism Consumption: Expenditure Models. Through an exhaustive survey of the academic literature on visitor expenditure estimation I have identified four classes of expenditure models (2006, p. 29):

- a. Expenditure ratio models
- b. Supply side judgment models
- c. Seasonal difference models
- d. Cost factor models

These approaches share an approach to estimating visitor spending that goes beyond simply relying on what a sample of visitors reports spending on a trip or at a destination. They include assumptions that together result in the simulation of visitor spending and, it is argued herein, visitor consumption.

I propose in this paper to evaluate each by how well it can produce estimates of Tourism Consumption, rather than just visitor spending. The objective is to identify a class of models that is superior to the others in this regard. For citations of sources on these models, the reader is directed to my 2006 paper.

### Expenditure ratio model

These expenditure models rest on a foundation of certain expenditure-related data that are readily available and relatively sound. To this is added a superstructure of travel expenditure relationships that build up to a total of all travel spending in an area.

The simplest version of this approach comprises four steps. The first step is to gather administrative data on hotel/motel room receipts in an area, such as a county or metropolitan area. This can often be obtained from state or local tax agencies, particularly if the jurisdiction imposes a special sales tax on these receipts. The second step is to conduct a survey among visitors to the area to obtain estimates of the total amount spent in the area, and expenditures on lodging at hotels and motels specifically. In the third step, the ratio is computed of total visitor spending from the survey to the survey estimate of spending on hotel/motel room rental. Finally, the fourth step is to multiply this ratio by the hotel/motel room receipts gathered in step

one, and the product is a measure of total spending by visitors in the area.

The error leverage associated with this approach can be quite high. An error of as little as 5 percent in the ratio can be magnified into hundreds of millions of dollars of visitor spending. But more damaging here is the fact that the resulting estimates are founded on a visitor survey. This is likely at best to only supply accurate estimates of what the visitor him/herself spent and not the additional components of Tourism Consumption noted above.

### Supply Side Judgmental Model

A Canadian panel recommended an approach "to measure the overall contribution of tourism to the rest of the economy" (National Task Force on Tourism Data 1989, p. 18). It embodies three steps to determine the economic impact of the tourism industry: (1) identify the types of businesses comprising the tourism industry; (2) measure the output, GDP, and other measures of economic impact of these businesses; (3) estimate the proportion of these measures that can be attributed to tourism expenditures for each business type.

The first two steps are straightforward and follow commonly accepted principles of definition and input-output model data collection. The third step, however, relies on the judgment of "experts." Apparently, such a panel has developed a set of ratios of business revenues attributable to tourists to total revenues for each type of business. These "tourism ratios" are then applied to the supply-side measures of revenues to derive estimates of visitor spending in an area. This, then, estimates visitor consumption from the suppliers' side and the judgments of experts.

This adds a large element of subjectivity to what should basically be an objective accounting process. It is not possible to assess the accuracy of these estimates at the national level. If this were possible, the actual tourism ratios would be used rather than the judgmental ones. Moreover, a different panel of experts might arrive at significantly different ratios. How these would change over time to reflect industry reality is a mystery. And the technique cannot separate out visitor expenditures by inbound visitors from those of domestic visitors.

Finally, it is likely the experts would not include the supplements to visitor spending enumerated for the TSA as this spending is not transparent to the recipients in the way that direct visitor spending is.

### Seasonal Difference Model

Another proposed expenditure estimation method requires examining the monthly distribution of the receipts of a type of travel-related business (e. g., hotels/motels, eating and drinking places, amusement and recreation services) over a year's time to determine the month with the lowest total. This monthly total is assumed to represent average monthly sales to local residents in the absence of any visitors. This amount is subtracted from the totals for each of the 11 other months in

the year, and the residual is visitor spending.

This method has not gained acceptance in the literature on visitor expenditure studies, perhaps because of its structural flaws. It tends to underestimate tourist spending to the extent that the low month receipts include some traveler spending. A summer resort area's hotel/motel receipts in February (lowest monthly total), for example, surely includes the spending of some business travelers. When these receipts are subtracted from other months, this spending is not accounted for.

This method tends to overestimate traveler spending to the extent that receipts in the peak months are inflated by non-visitor purchases. For example, amusement and recreation service receipts are higher in the summer in many areas because local residents spend more time out of doors than or take vacations at home. Sales of restaurants and other establishments may be higher in July than February because of non-tourist, weather-related business activity, such as construction or water freight transportation. Building and highway construction employment soars in the summer in many climates, and this would provide a boost to restaurant sales that is not tourism-related.

The method also ignores the impact of trend on the monthly distribution of receipts. If the local economy is growing over time, then July sales of many businesses will be somewhat higher than February's due to trend growth in local activity rather than tourism. Finally, conceptually the method only works in an area with a clearly defined tourist season. The theory cannot apply in areas that have high seasons in both summer and winter, such as major U.S. ski resort areas.

For these reasons, it is unlikely to accurately capture the supplements to visitor spending required for estimating Tourism Consumption

### Cost Factor Model

The cost factor model for estimating travel expenditures has a history dating back nearly 40 years (Church 1969). The most prominent example is the Travel Expenditure Component of the Travel Industry Association (TIA) Travel Economic Impact Model (TEIM) for the U.S. Through this model, visitor expenditures are estimated for 18 different items in six basic expenditure categories: public transportation, auto transportation, lodging, food, entertainment/recreation and incidental purchases. (Table 1) Total travel expenditure is the sum of all expenditure categories.

Table 1: Travel Expenditure Categories in the Travel Expenditure Component

A. Public transportation

1. Air, both commercial and general aviation
2. Intercity bus and motorcoach
3. Intercity rail (Amtrak)
4. Cruise ship
5. Taxi/limousine service

B. Auto/truck/RV transportation

1. Own vehicles
  - a. Operating costs
  - b. Attributable fixed costs
2. Rental vehicles

C. Lodging

1. Hotels, motels, motor hotels, resort hotels
2. Rented condominiums and vacation homes
3. Camper, trailer or recreational vehicle (RV)
4. Own second home

D. Food

1. Prepared food and beverages from restaurants and other eating and drinking places
2. Unprepared food and beverages from grocery stores and other food and beverage stores

E. Entertainment/recreation

1. Admission fees at theme and amusement parks
2. Snow ski lift tickets and lessons
3. Casino gaming
4. Other entertainment and recreation expenditures

F. Incidental purchases, such as medicine, cosmetics, clothing, personal services and souvenirs.

The Travel Expenditure Component (TEC) can be thought of as a set of equations for each state where the independent variables are the levels of various travel activities (e.g., miles traveled by automobile, nights spent in hotels), the coefficients are the costs per unit of each activity (called "per-unit cost factors"), and the dependent variables are travel expenditures for certain categories of travel-related goods and services ("expenditure items").

For example, the TEC of the TEIM estimates what each traveler spends on meals in restaurants and other eating and drinking establishments. This is estimated as shown in the following equation:

$$TFSS_s = TRLPN_s * fscf_s \quad (1)$$

s = one of the 50 states or the District of Columbia

n = nationwide

TFSS = traveler spending for prepared meals

TRLPN = traveler person-nights spent lodging in hotels, motels and rental vacation homes and condominiums

fscf = average cost per person per day of three meals

Equation (1) states that traveler spending in a state on meals in eating and drinking establishments equals the product of person-nights spent in the state in rental accommodations and the average cost of three meals in the state. This reflects research that indicates that those lodging in hotels and other forms of paid accommodations purchase most of their food from eating and drinking places and very little from grocery stores (Travel Industry Association of America 2002). The person-nights magnitude is derived from TIA's monthly survey of U.S. travel activity. The average cost for three meals in each state is obtained from travel cost databases, such as Runzheimer International, a business travel cost measurement firm. The number of days each visitor remains in a given state is assumed equal to the number of person-nights (one person spending one night on a trip in a state).

$$TGSS_s = TOLPN_s * gscf_n \quad (2)$$

s = one of the 50 states or the District of Columbia

n = nationwide

TGSS = traveler spending on unprepared food/beverages

TOLPN = traveler person-nights spent with friends/relatives, in campgrounds, and in own second homes

gscf = average cost per-day of groceries on trips away from home

Equation (2) indicates that traveler spending in a state for unprepared food and beverages equals the number of person-nights spent in the state in the homes of friends and relatives, in campgrounds and in own second homes multiplied by the average expenditure per person per day of U.S. residents traveling away from home as estimated by the annual U.S. Department of Labor Consumer Expenditure Survey. Again, the propensity of these types of travelers to purchase food from grocery and other retail food and beverage stores is informed by Travel Industry Association of America (2002) and other sources.

Similar equations simulate travel spending for 14 of the expenditure items. For five of the expenditure items, direct estimates of annual traveler spending in each state are available and are incorporated directly in the model. These include hotel/motel room revenue (from Smith Travel Research), Amtrak passenger sales

(from Amtrak), cruise ship passenger sales (industry sources), admission fees at theme and amusement parks (International Association of Amusement Parks and Attractions), and casino gaming expenditures (Las Vegas Convention and Visitors Authority).

The TEC model allocates travel expenditures to states by simulating where visitor consumption of goods or services actually took place. According to their nature, some travel expenditures are assumed to occur at the traveler's origin, some at his destination, and some enroute. Table 2 summarizes the allocations for the individual expenditure categories.

Table 2: Allocation of Travel Expenditures by Category in the Travel Expenditure Component

- A. To the origin State
  - 1. Auto/truck/RV fixed costs
  - 2. Air transportation fares and expenses (part)
  - 3. Taxi/limousine fares (part)
  - 4. Intercity bus/motorcoach fares (part)
  - 5. Intercity rail fares (part)
  - 6. Cruise ship fares
  - 7. Auto rental expenses (part)
  
- B. To the destination State
  - 1. Air transportation fares and expenses (part)
  - 2. Taxi/limousine fares (part)
  - 3. Intercity bus/motorcoach fares (part)
  - 4. Intercity rail fares (part)
  - 5. Auto rental expenses (part)
  
- C. To States visited (including destination State)
  - 1. Auto/truck/RV variable costs
  - 2. Hotel/motel lodging expenses
  - 3. Campground rental and hook-up expenses
  - 4. Own second home imputed rent
  - 5. Food expenses
  - 6. Entertainment/recreation expenses
  - 7. Incidentals purchases

The TEC model also produces estimates of traveler spending for individual counties and cities in a state. The statewide estimate for each expenditure item is allocated to a county based on a relevant indicator of travel activity in the county. For example, traveler spending on meals in foodservice facilities in a county is that

proportion of statewide spending on these meals equal to the county's proportion of statewide receipts from rentals of hotel/motel rooms and vacation homes.

### Conclusion

The Cost Factor Model as described above joins estimates of travel activities reported by visitors that they can readily and accurately recall (e.g., nights spent at hotels, trip origin and destination, mode of transport, season of the year, type of transport) with measures of the per-unit (e.g., night, mile) costs of these activities derived from industry sources or other respected sources. These per-unit cost factors reflect market prices for these activities, regardless of who is paying the costs. Since they do not depend on visitor reporting of expenditures, they capture the supplemental elements of Tourism Consumption that the visitor may not, or cannot, report. All the Cost Factor Model requires from visitors is that they accurately report activities they participated in while traveling out of their usual environment. And it requires sources of mean costs per unit derived from the operating accounts of businesses or collected by government.

### References

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