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Turistika: Tourism Impact Analysis in the absence of a TSA

'Small Island Tourism Economies in need of an empirical model'

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Abstract: Not all countries have already created an official TSA, but many of them are still in need for a model to establish the impact of tourism. This paper shows the relevant details of an econometric model for the small island tourism economy of Curacao called 'Turistika', and discusses drawbacks and advantages of our particular approach. Turistika is based on behavioural relations estimated on micro data, expenditure surveys among tourists. It identifies 49 different tourist groups with different demand patterns affecting 11 different sectors of the economy. The model is used to calculate the impact of implementing the Tourism Development Masterplan for Curacao.

JEL codes: C51, C53, D12, J49, O21.

Keywords: small island economy; economic modelling; tourism impact; policy instruments.

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1 Introduction

While the frontier of current research on the impact of tourism on national economies lies in the use of Tourism Satellite Accounts (TSA; see EU et al, 2001; Prado, 2001; Heerschap et al, 2005), mostly integrated in a Computable General Equilibrium (CGE) framework (Blake et al., 2001), such analyses are not always possible. Especially in some of the smaller economies statistics are not in harmony with all international standards such as SNA93 and TSA which is a clear disadvantage in establishing the economic impact of tourism. Among other restrictions related to size Wilkinson gives the 'microstate reality imperception' (Wilkinson, 1989). Small state governments have to except that in a globalising economic reality they are often subject to exogenous decision-making: because they lack power many decisions are made by other countries, or multinationals like airline companies and tourism operators. To stay in control of their national resources, an active strategy regarding tourism market development is inevitable. Therefore among small countries lacking a TSA there is still a need for tourism impact modelling, using other advanced econometric techniques and empirical analysis (Croes, 2006). The Bureau of Economic Affairs of the Caribbean island of Curacao has asked SEO Economic Research to develop such a model. This paper shows the relevant details of the resulting econometric model for a small tropical island economy called 'Turistika', and discusses drawbacks and advantages of our particular approach.

Small countries can have relative advantages too (see for instance Apostolopoulos & Gayle, 2002). Practical advantages in tourism modelling are:

- Tourist flows are relatively easy monitored; especially on island states where all tourists come by airplane or boat. The use of E/D-cards will generate high-quality statistics.
- Given the few access points, sampling for expenditure surveys is relatively easy.
- Often supply side developments are well known; occupancy rates, development plans etc.
- As Curacao is a 'small island tourism economy' we can focus strictly on inbound tourism.

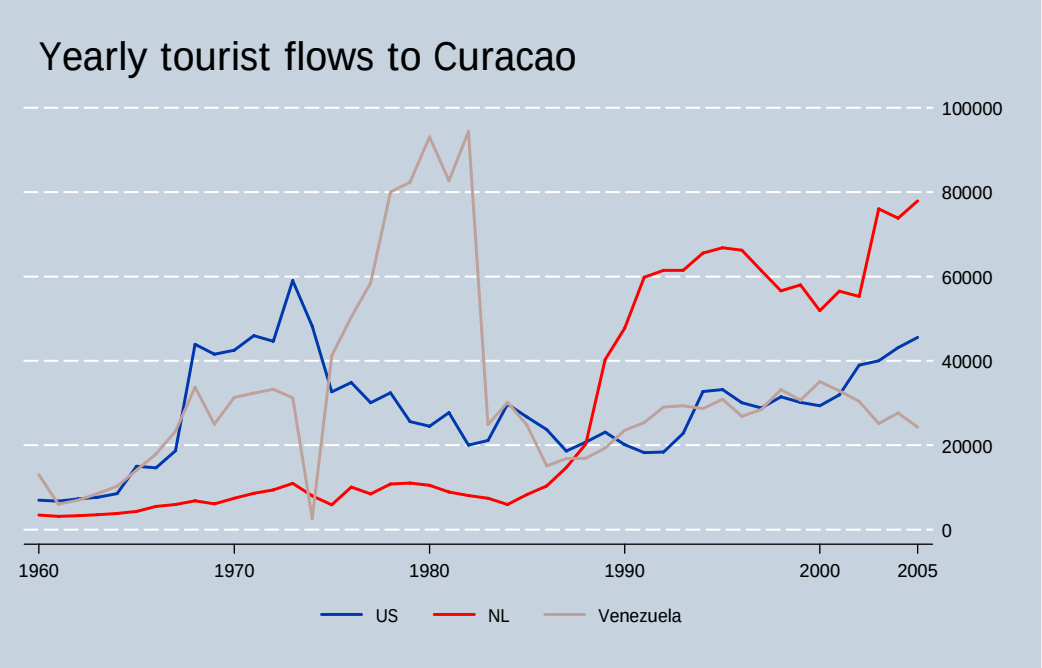
Turistika's predecessor was a tourist module in the Curalyse model (see Girigorie et al, 1996). Building on that module a stand-alone model evolved some years later (Berkhout et al, 2002). Currently the Curacao government is working with the second version of Turistika (Berkhout et al, 2005), an econometric model that we will discuss in this paper.

The growing importance of tourism for Curacao is shown in a short description of tourism inflow in the past decades, in Chapter 2. In Chapter 3 we discuss very briefly the characteristics of the Curacao expenditure surveys, the source of our empirical data set. In Chapter 4 we will elaborate on the structure of the Turistika model and the underlying economic and statistical theory. The empirical characteristics of the model are addressed in Chapter 5, followed by a practical demonstration of the possibilities of Turistika when we calculate the economic impact of the implementation of the Curacao Tourism Development Masterplan in Chapter 6. We conclude with some final remarks on the current version of the model and possible improvements.

2 Tourism development 1950-2004

The flow of stayover tourists to Curaçao has been measured since 1952, it is even possible to distinguish between the three traditionally largest countries of origin: US, Venezuela and the Netherlands. Figure 1 shows the trends since 1960.

Figure 1 Stayover tourist arrivals in Curaçao, 1960-2004



Source: CTB (2005).

In the early years tourism wasn't a very common in Curacao, but from the mid-sixties we can see different waves of tourism, originating from different countries. American tourists were the first to discover Curacao, in 1973 nearly 60 thousand came to the island. In the following years the number of visitors declined, remaining more or less constant at a level of 20 thousand per year during the eighties, but to rise again from 1993 onward to a current level of 45,563 (in 2005). Venezuelan tourism developed in a more volatile way: serious troughs in 1974 and 1983 marked a period in which Curacaos customs sometimes counted over 90 thousand visitors a year. After the monetary crisis in 1983 tourism to Curacao recovered only slowly, declining once again since

2000. The Dutch tourist flow was the latest to reach Curacao and became important only after a sharp rise between 1985-1991. This might be related to an income effect (Curacao holidays are clearly a luxury good in Europe) or maybe to increased family visits. A second sharp rise occurred during 2003 when Dutch tourism suddenly increased with 20 thousand visitors a year, and proved to be a permanent shift in the years after.

That sudden rise in the number of visitors was probably due to developments in aviation: monopoly on the Amsterdam-Willemstad route was undermined, capacity was increased sharply and prices dropped. The development in other substitute countries (i.e. the Bali bombings) could have also played an important role. What are the driving forces behind all tourist flows and what is their extent is not yet clear and exogenous to our model, but it is currently under study. Similar research has already been carried out for the neighbouring island of Aruba (Croes & Vanegas, 2005), resulting in significant income elasticities and no significant effect of price on tourist demand. Our analysis for Curacao is not mature yet, but will be published in a separate SEO-paper later this year (Berkhout & Berkhout, 2006). A difficult problem in the literature so far is the measurement of price elasticities (see Crouch, 1992 for an excellent overview); in small economies the local Consumer Price Index (CPI) is often not reflecting tourist prices, hopefully price elasticities for a Curacao Tourism Price Index (TPI) can be analysed.

3 Curaçao expenditure surveys

Tourist expenditures are the key to calculating the direct economic impact of the tourism sector on the Curacao economy. To be able to model this impact, reliable expenditure data are essential. They should be collected regularly, systematically and reliably. In the past 10 years the Curacao Tourism Bureau (CTB) has collected expenditure data on both stayover visitors as well as cruise visitors. The data collection is based on a random sample of departing visitors and is evenly spread throughout the year. Prior to the year 2000 data were collected every three years, relying on the stylized fact that expenditure patterns within a period of three years remain more or less

the same. Nevertheless the Bureau has started to collect expenditure data from 2000 onwards on a yearly basis. However, the data from 2000-2002 have not been incorporated in this analysis due to the fact that the survey was modified in those years and the interview method was not in compliance with former years.

Data collection

The stayover visitors data are collected by the airport in the departure hall. Visitors are requested to fill in a questionnaire under the supervision of CTB employees. The same methodology is used in the cruise terminal with regard to the cruise passengers. The quality of the collected survey data have been checked by the Curacao Tourism Bureau, making sure that expenditures are only related to the amount spend on the island. Holiday package deals are checked with the tour operators and hotels so that the right amount is stored in the right category in the dataset.

From the stayover visitor survey we use the samples from 1996, 1999 and 2003 in our analysis; in the next model update we will incorporate the 2004-sample as well. After cleaning and deletion of some extreme outliers regarding expenditure we end up with respectively 3083, 2061 and 2526 observations. These samples represent between 1-2 % of the total stayover visitors population. In our analysis we pooled the three datasets, resulting in a 7670 record dataset, allowing for more detail than the separate years would.

From the cruise visitor survey we use the samples from 1996 and 1999. More recent data (the 2003 survey) was not readily available, but will be incorporated in future updates. These samples contain respectively 1499 and 1534 valid records, representing nearly 1% of the total cruise visitor population.

4 Theoretical structure of the model

In this chapter we will describe the structure of Turistika. The model. is not built in the tradition of general equilibrium models (Blake et al, 2001), nor is it based on input-output (Fletcher, 1989)

techniques. Our approach derives from the way micro simulation models are built (Mot, 1991). In such models behavioural relations are estimated on micro data. These relations are used to simulate the behaviour of individuals under hypothetical circumstances. That is, the dependent variables are calculated on the basis of regressor values set by researcher, reflecting for instance some policy measure. Weighted aggregation over individuals in the dataset then provides the researcher with an indication of its effect.

The Curacao model focuses on the demand side, since most of the available information is related to tourist behaviour. Two main aspects of tourist behaviour are modelled: the length of stay on the island and expenditures per day. On both aspects a dataset containing micro data on individual level are available (see Chapter 3). Empirical data on the behaviour of suppliers is not available in any form. We have chosen to model the supply side of the market on the basis of simple theoretical assumptions concerning the supplier's strategy to set price and capacity. Of course, according to theory, the supplier's mix of these instruments depends on market form. The strategy mix varies across sectors.

Both sides of the market interact as follows.[1] An exogenous scenario of (potential) tourist inflow in the next 10 years generates a yearly demand for the Curacao tourism product. Inflow is realized in actual visits if there are no capacity constraints in the accommodation sector or at the airport. Near full-capacity demand leads to upward price shifts and capacity investments. Effects of supply-side actions carry over to the next scenario year. Potential inflow in the next year adapts to changes in price and capacity, leading to new supply-side actions. A chain reaction is set in motion leading to a projection of realized tourism demand in Curacao in the near future. The impact of tourism is measured by translating tourist expenditures to employment outcomes (number of full time jobs) using productivity statistics per sector.

[1] The interaction design described in this paragraph will be implemented in the next version of Turistika.

Tourist behaviour is modelled from the moment a tourist in some tourism generating country has decided to visit Curacao. The question why she has chosen Curacao out of all her options are not addressed in the model. We define 49 market segments on the basis of country of origin (USA, The Netherlands, Venezuela etc.), reason of visit (vacation, business etc.) and age (three categories). We believe that these segments represent possibly different demand patterns; American elderly on a holiday trip might have different demands than Dutch youngsters visiting their family, for instance. These segments are further identified according to size, only relevant combinations are defined.[2] One 'all others' segment comprises roughly 8% of total tourist demand in the past years. Let indicator variable S_i point out to which segment tourist i belongs and let X_i be a vector of other individual characteristics such as gender, number of children, previous visits to Curacao etc.

The first decision after having chosen destination Curacao is the length of stay. The number of days N_i is assumed to be some unknown function of S_i and X_i. That is, $N_i = f(S_i, X_i, \varepsilon)$ where ε represents unexplained variation. Since we observe N_i as a discrete variable showing small numbers that are left truncated at one, we let N_i be described by a left censored Poisson distribution (for details, see for instance Winkelmann, 2000). Estimation of this model results in parameter estimates quantifying the relation between the intensity λ and regressor variables S_i and X_i. As the parameter space of λ is confined to the positive real numbers, the relation between λ and the regressors of the model is usually expressed by the exponential function. Or formally, $\lambda_i = \exp(\alpha S_i + \beta X_i)$ where α and β are parameter vectors. After these parameters are estimated, the expected number of days on the island conditional on S_i and X_i can be written as:

$$E(N \mid S, X; \alpha \beta) = \lambda [1 - \exp(-\lambda)]^{-1} \quad \textbf{(1)}$$

where index i is suppressed for convenience.

[2] Only combinations existing of at least 20 observations were used to forecome estimation problems. See Appendix A for a detailed description of all the 49 combinations used.

The second aspect of tourist behavior that is considered in our model are tourist expenditures. We assume that individual expenditures Y_i per day can be modelled conditionally on length of stay. So, N_i is decided upon at home, whereas Y_i materializes a few months later on the island. Although this seems reasonable from the point of view that these outcomes evolve sequentially, estimating N_i and Y_i separately relies on a rather strong assumption: N_i is determined independently from (intended) Y_i. As it is quite conceivable that both N_i and Y_i are partially driven by a common unobserved factor such as holiday budget, a seemingly unrelated regression (SURE) may seem more appropriate Testing whether such an approach would lead to different estimation results has been left as an issue for future research. Using OLS, the log of Y_i was regressed on S_i, N_i, N_i-squared, N_i^3 and a vector of individual characteristics Z_i:

$$\text{Log}Y=\gamma S+\delta_1 N+ \delta_2 N^2+ \delta_3 N^3+\mu Z+ \eta$$

where η represents unexplained variation. The expected expenditures per day are:

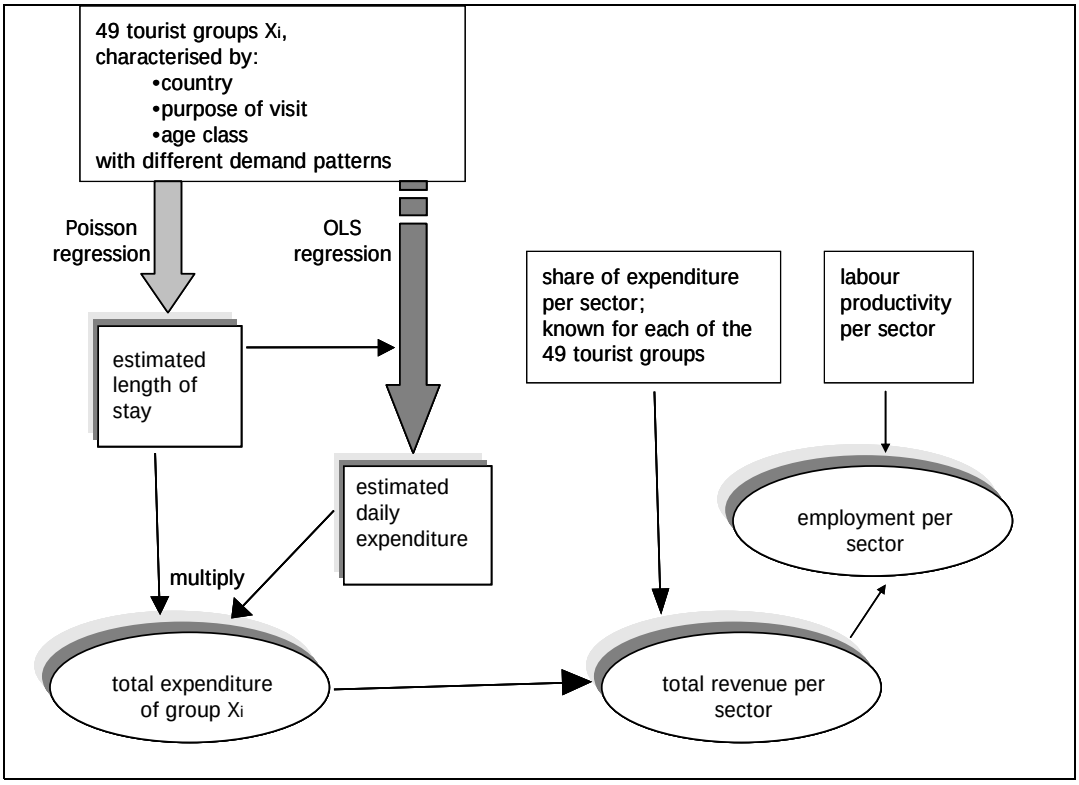
$$E(Y \mid S, N, Z; \gamma\, \delta_1\, \delta_2\, \mu)= \exp(\gamma S+\delta_1 N+ \delta_2 N^2+ \delta_3 N^3+\mu Z) \quad \textbf{(2)}$$

Expected total expenditures T_i of an individual with characteristics S_i, X_i and Z_i per visit to Curacao result from multiplying equations (1) and (2):

$$E(T \mid S, X, Z; \alpha\, \beta\, \gamma\, \delta_1\, \delta_2\, \mu)= \exp(\gamma S+\delta_1 N+ \delta_2 N^2+ \delta_3 N^3+\mu Z)\lambda\, [1 - \exp(-\lambda)]^{-1} \quad \textbf{(3)}$$

In Appendix B all estimates of parameters $\alpha, \beta, \gamma, \delta_1, \delta_2, \delta_3$ and μ are presented. A graphic representation is given in Figure 2 below.

Figure 2 Structure of the Turistika model



From equation (3) the model proceeds by assigning expected expenditures to various sectors on the supply side. Here, the observed expenditure patterns in the past years of segments S are incorporated as fixed coefficients in the model. Let π_s represent a vector of coefficients assigning the expected expenditures of segment s to the various sectors. Total expenditures in sector j are equal to

$$T^j = \sum_{s=1}^{S} \pi_s^j \cdot w_s \cdot T_s$$

where w_s is a weight expressing the size of segment s and π_s^j is the j-th element of vector π_s. Finally, expenditures are expressed in terms of tourism employment L^j by dividing total expenditures in sector j by labour productivity p_j in sector j:

$$L^j = T^j / p_j$$

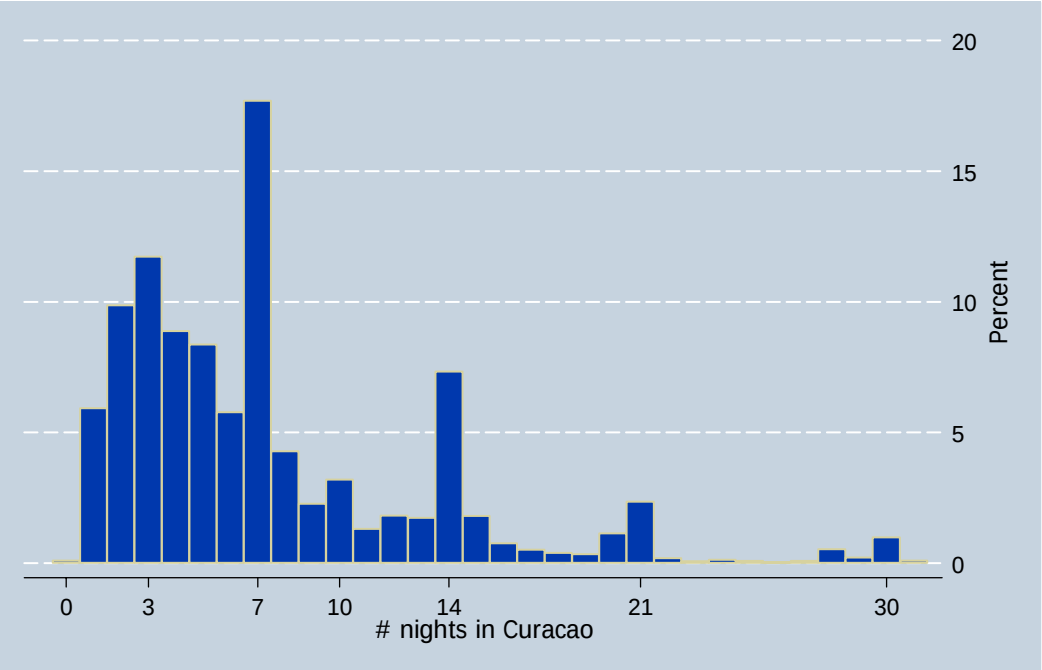
Aggregating over all sectors leads to total tourism employment L.

5 Empirical characteristics of the model

5.1 Behavioural parameters

The first step of our model is estimating the parameters that influence the decision on how long people want to stay in Curaçao. In Figure 3 we plot the distribution of the length of stayover spells in our data.

Figure 3 Length of stay



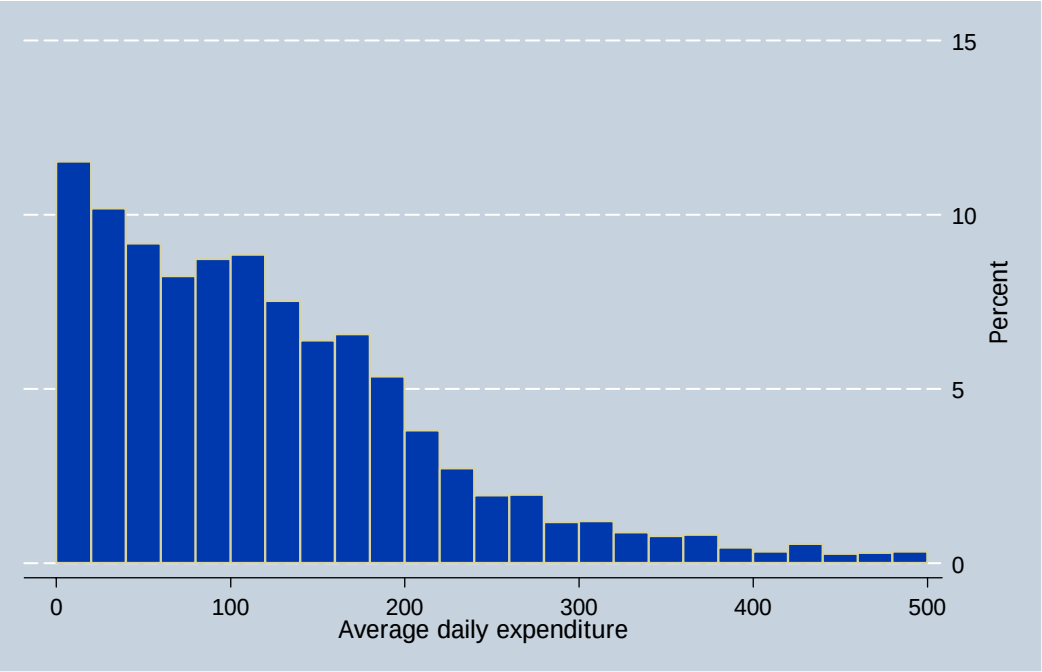
Source: SEO/CTB (2006).

The average length of stay in Curacao is 8,9 nights, the geometric mean is 5,9 nights, median and mode are 7, and there is an other important peak at 14 nights. Behind this are differences between US tourists who mostly stay 7 days (or otherwise less) and European tourists including the Dutch who mostly stay either 7 or 14 days. Visitors from the Caribbean or South America are less often bounded to a package deal and therefore more evenly distributed across the spectrum.

The second step then is estimating the parameters that influence the decision of adults on how much to spend per day on Curaçao. In Figure 4 we plot the distribution of the daily expenditures.

The average amount[3] is $ 122, the geometric mean is $ 79 and the median $ 104. Again differences exist between American and Dutch tourists, the former being on the high end of the distribution where the latter spend less per day; this may be related to the fact that Americans spend less days on the island. The second step of our model allows us to disentangle these effects and estimate the 'corrected' parameters.

Figure 4 Average daily expenditure of stayover tourists (current prices, $)



Source: SEO/CTB (2006).

Explanatory variables

Differences in length of stay depend not only on the country of origin, the age class and the purpose of visit, (incorporated through the nearly-full interaction design described in Appendix A) but also on the sort of travelling party (alone, with family, or with a group), whether people travel with children or not, the type of accommodation (hotel, apartment, with friends or elsewhere (on a boat, in private accommodation etc.)) and whether it is their first visit to Curacao or not. We assume the behavioural effects of these factors on the demand for tourism to be

[3] Excluding outliers caused by so-called 'trading tourists'.

constant over the years, which means that we can pool the three cross-sections of 1996, 1999 and 2003 and include year-dummies but no interaction effects. This allows us to get more stable, more reliable results and probably more significant results. The magnitude of the influence on the number of stayover nights is estimated using Poisson regression on a total number of 7796 observations. Except for the variables 'first visit?' and 'travelling with children?' all other parameters are significant on the 99%-level. The estimation results are displayed in the left columns of Table 1.

Table 1 Demand side parameters

	NIGHTS OF STAY		LOG (DAILY EXPENDITURES)
49 different dummies for combinations of region, age class & purpose of visit	*see appendix B*	*49 different dummies for combinations of region, age class & purpose of visit*	*see appendix B*
Travelling party (ref=family)	-	Travelling party (ref=family)	-
alone	0.181	*alone*	0.171
with friends or group	0.052	*with friends or group*	-0.063
Children accompanying	n.s.	Children accompanying	-0.285
Been to Curacao before	n.s.	Been to Curacao before	0.088
Accommodation (ref=hotel)	-	Accommodation (ref=hotel)	-
apartment/guesthouse	0.477	*apartment/guesthouse*	-0.287
friends or family	0.683	*friends or family*	-1.015
other	0.821	*other*	-0.764
Year (ref= 1996)	-	Year (ref= 1996)	-
1999	0.13	1999	-0.24
2003	0.07	2003	0.17
		# nights	-0.071
		# nights^2	0.001
		# nights^3	0.000

Source: SEO (2006).

The 49 dummies for combinations of age group, purpose of visit and country of residence or not included in this table, but can be found in Appendix A. Table 1 shows that people travelling with friends spend apparently 5% more time on the island than people travelling with family, and people travelling on their own even more. However, this is after controlling for differences in age, country of residence and purpose of visit. That means that if business travellers are both

travelling alone *and* staying fewer nights, this effect will be absorbed in the dummies reflecting business travellers and *not* in the dummy reflecting lonely travellers. The parameter in the table above is the 'net effect' of travelling alone, regardless of origin, age or purpose of visit. Visitors who stay in a hotel spend less nights in Curacao than people staying in apartments, guesthouses, with family or in other places. Once again, this is the 'net effect' after correction for the fact that younger Dutch tourists tend to stay longer and also tend to stay in apartments more often than older American tourists.

The same parameters are used in the second step, estimation of the average expenditure per person per night. As the estimated number of nights is also assumed to influence the average expenditure/day, this variable is also included in the model, as a third order term. The parameters are estimated in a loglinear regression on a total number of 7670 observations, all the reported parameters are significant on the 99%-level. The estimation results are shown in the right panel of Table 1. It can be read that on average people travelling alone spend more than people travelling with family, while tourist groups spend less. People with children spend less and people who 'know their way around' because they've been to Curacao before spend more. Hotel tourists spend considerably more than tourists in apartments (after correction for the number of nights, the origin country and age!). The average tourist expenditure in 1999 was less then in 1996 and 2003; the longer people stay the less they spend per day. Expenditures were measured in current prices.

5.2 Projected outcomes and supply side restrictions

Changing demand patterns is not all that matters, unlimited growth is impossible especially in a relatively small economy as that of Curacao. Therefore this paragraph describes the supply side module of Turistika (which is still subject to improvements), and therewith reveals the mid-term restrictions on tourism growth that should be dealt with. The coefficients from Table 1 are input for the model-core in which Turistika enables users to calculate the effect of changes in these

parameters, for instance 'what happens if the preference of Dutch tourists shifts to luxurious hotels instead of apartments?'. We can see from the table that such a shift will increase the total tourist expenditures *ceteris paribus*. At the same time, it would also cause a shift in revenues within the national economy, from the apartments sector to the hotel sector. What happens to employment depends on labour productivity rates, but is also one of the outputs of Turistika. But are those projections realistic? The extent to which they can be materialized depends on the existence of supply side restrictions.

The supply side of the tourism economy in Turistika consists of the following 10 sectors: large (luxurious) hotels, standard (smaller) hotels, bungalow resorts & apartments, restaurants, casino's, tourist attractions, city shops, free zone shops, car rental companies and taxis & other transport.
In all sectors three endogenous variables reflect the impact of the tourist inflow: employment, capacity and price level.

Employment

Given labor productivity rates per sector and total tourist expenditures per sector, the model calculates the number of full time jobs needed. The magnitude of the Curacao labor force amounts to say 60 thousand persons of which approximately 50 thousand are employed and 10 thousand are unemployed. According to our model 7 thousands jobs out of the total of 50 thousand can be attributed to tourism, corresponding to 14% of total employment. Croes et al (2001) find similar results for Aruba. Considering the high unemployment level of Curacao (16-18%) we abstain from modeling labor market restrictions. We assume that growth in tourism demand will increase demand for abundantly available low-skilled workers, without affecting wages and, as a result, tourism prices.

Capacity

One of the most important aims of Turistika is to monitor occupancy rates and to signal capacity restrictions as a consequence of the calculated *ceteris paribus* demand side developments. If the

occupancy rate in a sector rises to inappropriate levels, the entrepreneurs in that sector will have to make expansion investments and/or may increase prices. Turistika's supply side module allows for such expansion investments to be incorporated in the projection.

At this moment we've only incorporated supply side restrictions that are relevant *after* a tourist enters the island. However, one important factor is hereby neglected namely the capacity of the airport and the airlines. In future versions of the model we want to implement load factors of airlines and the airport into Turistika as well, thereby increasing both usefulness and reliability of the model. If we would succeed in incorporating airline prices in the model as well that would be almost ideal, but that would demand reliable airfares statistics and these are hard to get.

Prices

The role of prices in tourism demand is not yet very clear, most of the literature points out that most price elasticities of demand are insignificantly small or zero (Crouch, 1994; Croes & Vanegas, 2005). A lot of the problems in establishing price effects are due to the use of very different and often inappropriate definitions of price. Most research on tourism uses local CPI in one way or the other. We believe that, especially for a small island tourism economy as Curacao, differences between the expenditure pattern of local consumers and of tourists are very different (see a.o. Pérez Mira, 2002). This makes the CPI a less precise instrument to analyse price elasticities for tourists; to enable such research for Curacao tourism demand in the near future we want to construct a Tourism Price Index (TPI), based on expenditure patterns, insights from the sector itself and occupancy rates.

At the moment Turistika assumes tourist arrivals as exogenous and tourism prices as an endogenous outcome of the model, without feedback from rising prices to declining tourist arrivals. Hopefully we can include such feedback after our analysis of tourism flows in Curacao is published in another SEO-paper later this year (Berkhout & Berkhout, 2006).

6 Outcomes of the model: tourism projections 2005-2012

Turistika's main purpose is to establish the impact of tourism development in the near future. Economic effects of all kind of scenario's can be compared with a baseline scenario, in which the currently most plausible hypotheses are reflected. In this chapter we will give a demonstration of how Turistika operates, using a realistic alternative scenario.

The inputs for the baseline scenario are partly based on growth figures from the past and partly from discussions with experts from the Curacao tourist sector on a workshop in October 2005. This baseline scenario does not reflect an optimistic nor a pessimistic overview and the outcomes of this scenario can be realized without an extreme performance of the major destination markets and actors within the economy. This scenario should be considered only as a technical referential path, it is not intended to have significant predictive properties.

The scenario inputs are given in Table 2. Most important is the estimated growth of the three traditionally largest tourist markets for the island of Curacao: the Netherlands (+5% each year), North America (+8%) and Venezuela (+7%).[4] A modest growth of productivity and prices is expected.

[4] The latest statistics from the CTB show that in 2005 stayover tourism from the US has grown by 5.7%, from the Netherlands and the rest of Europe by 5%. Southern American and Caribbean tourism however dropped sharply, wiping out the positive results from the other continents. Total stayover tourism was 222,071, slightly less than in 2004. Cruise tourism increased by 25% in 2005.

Table 2 Baseline scenario input

	2005	2006	2007	2008	2009	2010	2011	2012
Inflation	2,6%	2,1%	2%	2%	2%	2%	2%	2%
Labour productivity (yearly change)	1%	1%	1%	1%	1%	1%	1%	1%
Arrivals STAYOVER								
US & Canada	8%	8%	8%	8%	8%	8%	8%	8%
Netherlands	5%	5%	5%	5%	5%	5%	5%	5%
Rest Europe	0%	0%	0%	0%	0%	0%	0%	0%
Aruba/Antilles	2%	2%	2%	2%	2%	2%	2%	2%
Rest Caribbean	1%	1%	1%	1%	1%	1%	1%	1%
Venezuela	7%	7%	7%	7%	7%	7%	7%	7%
Rest South America	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Rest world	0%	0%	0%	0%	0%	0%	0%	0%
Arrivals CRUISE								
VS	15%	2%	2%	2%	2%	2%	2%	2%
Rest	15%	2%	2%	2%	2%	2%	2%	2%

The inputs from the baseline scenario result in baseline estimates of revenues of the different sectors of the economy. If nothing else changes, the total revenues out of tourism will rise from $ 178 million in 2004 to $ 232 million in 2008, as is shown in Table 3. As American tourist stay in large hotels more often then Dutch tourists, and the American market is expected to grow more rapidly than the Dutch and other markets, this is reflected for example in a higher growth of revenues for large hotels than for resorts/apartments and standard hotels. The estimated employment per sector due to tourism expenditures under the baseline scenario is shown in Table 4.

Table 3 Revenues from tourism expenditures (baseline scenario; current prices, mln $US)

	1996	1999	2003	2004	2005	2006	2007	2008
large hotels	26.0	22.7	29.2	29.8	32.1	34.6	37.2	40.0
standard hotels	7.2	6.1	7.4	7.4	7.9	8.4	8.9	9.5
resorts/apartments	3.5	3.2	4.0	3.8	4.0	4.3	4.6	4.8
restaurants	34.4	32.5	42.0	40.2	44.0	46.9	49.9	53.1
casino's	6.9	7.2	8.9	8.1	9.1	9.7	10.2	10.8
attractions	8.2	7.6	10.3	9.8	10.7	11.4	12.1	12.9
shopping	27.5	25.8	30.3	29.5	32.0	33.9	36.0	38.2
free zone	15.0	21.9	21.4	20.6	21.6	22.5	23.5	24.5
car rental	8.0	7.0	9.2	9.1	9.8	10.5	11.2	12.0
taxi & misc. transport	2.8	2.6	3.0	3.1	3.3	3.5	3.8	4.1
government (taxes)	14.4	14.3	17.5	16.6	18.1	19.2	20.4	21.6
TOTAL	**154.0**	**150.9**	**183.1**	**177.9**	**192.7**	**204.8**	**217.7**	**231.6**

Source: Turistika (2006).

Table 4 Employment related to tourism (baseline scenario)

	1996	1999	2003	2004	2005	2006	2007	2008
large hotels	1,722	1,349	1,466	1,461	1,522	1,587	1,656	1,730
standard hotels	476	359	370	362	373	384	396	409
resorts/apartments	232	191	200	185	191	197	203	209
restaurants	2,280	1,929	2,111	1,973	2,085	2,152	2,223	2,298
casino's	370	346	365	324	352	361	370	380
attractions	441	369	420	390	412	425	439	454
shopping	1,077	907	902	859	897	923	951	980
free zone	589	771	636	598	605	612	620	628
car rental	145	114	126	122	127	132	137	142
taxi & misc. transport	51	42	41	41	43	45	46	48
TOTAL	**7,383**	**6,378**	**6,639**	**6,314**	**6,607**	**6,817**	**7,041**	**7,278**

Source: Turistika (2006).

The projections from the last two tables however, can only be realised if the supply side does not impose any capacity restraints. In Table 5 we show the resulting occupancy rates per sector from the baseline scenario. The 2004 occupancy rates of the tourism sectors have been calibrated and discussed with some major stakeholders within these sectors. If no adjustments are implemented on the supply side, the occupancy of large hotels will rise to dangerously high level of 92% on average in 2012. Given that the tourist arrival pattern differs throughout the year this would

imply that limits will be reached and the calculated revenues can not be fully realized without increasing the capacity on the supply side of the tourist sector.[5]

Table 5 Occupancy rates (baseline scenario)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
large hotels[6]	*60%*	63%	66%	70%	74%	78%	82%	87%	92%
standard hotels	*60%*	62%	65%	68%	70%	74%	77%	80%	84%
resorts/apartments	*60%*	62%	65%	68%	71%	74%	77%	80%	84%
restaurants	*60%*	64%	67%	70%	73%	76%	79%	83%	87%
casino's	*60%*	66%	68%	71%	73%	76%	79%	82%	85%
attractions	*40%*	43%	45%	46%	49%	51%	53%	55%	58%
shopping	*40%*	42%	44%	46%	48%	50%	52%	54%	56%
free zone	*40%*	41%	42%	43%	44%	45%	46%	47%	48%
car rental	*60%*	63%	66%	69%	73%	77%	81%	85%	89%
taxi & misc. transport	*60%*	63%	66%	69%	73%	77%	81%	85%	90%

Source: Turistika (2006).

Alternative outcomes: the CTB Masterplan

Apart from the baseline scenario other scenarios can be thought of as well. In 2005, the Curacao Tourist Board presented its so called 'Masterplan' for the 2005-2009 development of the islands infrastructure, necessary for a more rapid tourism growth making better use of Curacao's tourism market potential. The Masterplan gives a detailed description of how the tourism product can be developed between 2005 and 2009. This plan has an aggressive approach if compared to former plans written in the early nineties. The main focus of this plan is directed to the North American market, which has to grow annually by 15-25%. The other two main markets of the island will be consolidated by a marginal growth of 3% each. All predictions are presented in Table 6; the expected growth in 2009 has been extended over the last three years.

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5 Currently Turistika is modelling only on a yearly basis. However, monthly arrival statistics are available and in the next years we will extend the model by including monthly patterns, allowing for different peaks for different tourist groups. In the past, US tourist arrivals peaked in February/March whereas Dutch tourist arrivals peaked in July. The highest peaks were nearly 40% above the yearly average.

6 CBS (www.cbs.an) estimates Curacao's hotel occupancy in 2003 on 50.6%. Latest estimates from CHATA (www.chata.org) show that the average occupancy for their members was 62% in 2003, 70% in 2004 and 75% in 2005. That would imply that for the sectors 'large hotels' and/or 'resorts' our coefficients are probably somewhat lower than in reality, depending on how the average is calculated exactly and which hotels/resorts are taken into account. In the next version of Turistika we will revise the accomodation categories, and at the same time update as much statistics as possible. However, already in the current version new reference values can be inputted by the user very easily if needed.

Table 6 Masterplan scenario input

	2006	2007	2008	2009	2010	2011	2012
Inflation	4%	4%	4%	4%	4%	4%	4%
Labour productivity (yearly change)	2%	2%	2%	2%	2%	2%	2%
Arrivals STAYOVER							
US & Canada	25%	25%	15%	15%	15%	15%	15%
Netherlands	3%	3%	3%	3%	3%	3%	3%
Rest Europe	2%	2%	2%	2%	2%	2%	2%
Aruba/Antilles	2%	2%	2%	2%	2%	2%	2%
Rest Caribbean	2%	2%	2%	2%	2%	2%	2%
Venezuela	3%	3%	3%	3%	3%	3%	3%
Rest South America	2%	2%	2%	2%	2%	2%	2%
Rest world	2%	2%	2%	2%	2%	2%	2%
Arrivals CRUISE							
VS	1%	1%	1%	1%	1%	1%	1%
Rest	1%	1%	1%	1%	1%	1%	1%

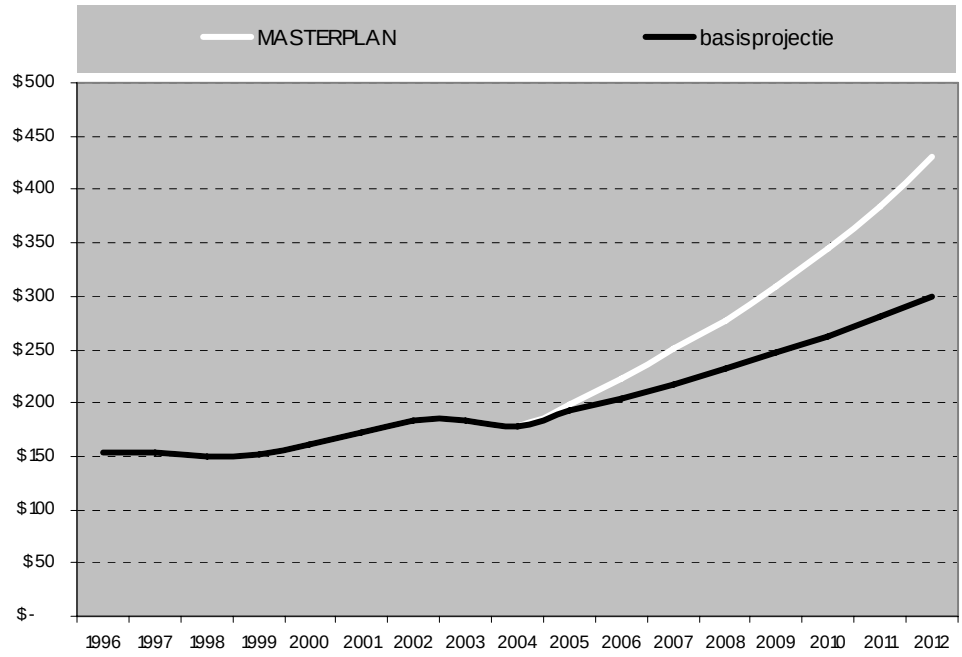
Source: SEO/DEZ (2005).

In order to calculate the impact of this alternative scenario an interpretation has to be made within the framework of the model: plans have to be translated into numerical, consistent assumptions. This assumptions have to be kept in mind when discussing results:

- general labour productivity within the tourism sector will increase annually by 4%,
- growing occupancy rate of resources will translate into a rising consumption price index by 4% annually,
- airline seats capacity from the major destination markets will not restrict the expected growth of those markets.

In Figure 5 and Figure 6 we present the impact of the Masterplan on total expenditure and employment. By implementing the master plan the numbers of visitors to the island will growth to the level of 665,000 by 2012 on annual basis, more than 50,000 additional visitors as compared to the baseline projection. The will expenditures reach 430 million US$. The percentage growth of expenditure is greater than the growth in number of visitors. This can be attributed to the relatively high expenditure pattern of the American tourist, which is the predominant group in this Masterplan scenario.

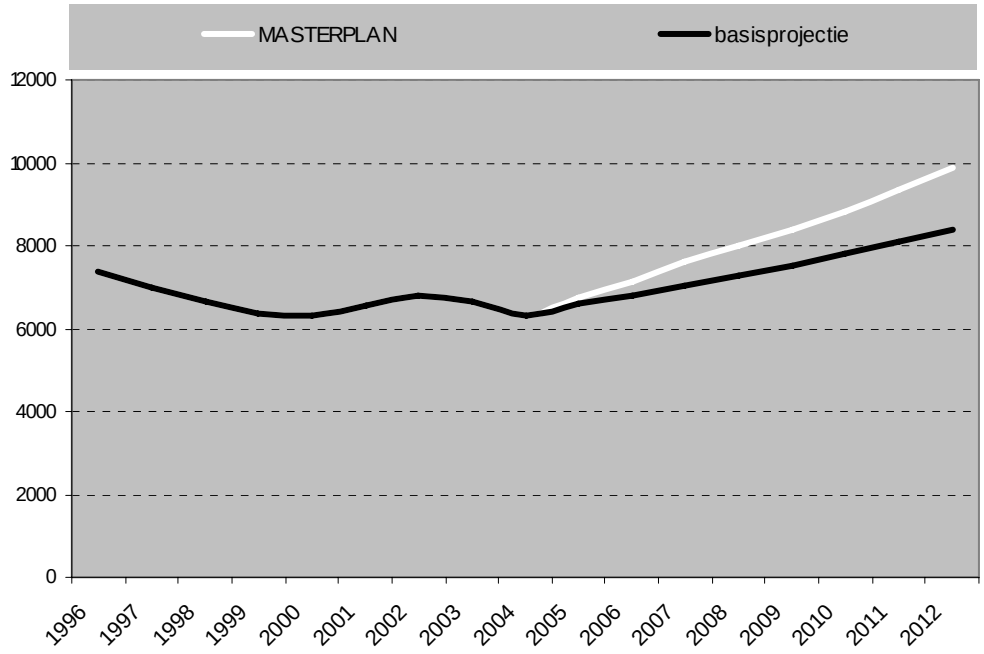
Figure 5 Total expenditure in the Masterplan scenario (current prices; mln $US)



Source: Turistika (2006).

Additionally, an extra 1,500 jobs will be created in 2012 on top of the 8400 jobs in the reference projection. In order to be able to allocate that amount of local workers the government has to formulate a human resource development plan. This exercise shows how this instrument can be used by policy makers to identify certain bottle necks with regards to an eventually growth of the visitors within the sector.

Figure 6 Employment in the Masterplan scenario (FTE)



Source: Turistika (2006).

Besides the above mentioned bottle neck regarding labour market resources, the capacity of the sector to allocate the number of visitors is also of crucial importance. The occupancy rates after implementation of the Masterplan are presented in Table 7. They give a clear indication that the projected growth can only be accommodated if capacity investments are made. As shown the branch 'large hotels' will experience capacity problems already in 2008 as the occupancy rate rises to 92%. This can result in increased prices with might result mitigation of the number visitors.[7]

This exercise shows that the implementation of the master plan can only be successfully if in the next four years the capacity some sectors will substantially be increased. Mainly the branches large hotels, restaurants and taxis have to increase their capacity on relative short term in order to accommodate the visitors.

[7] This effect is not yet incorporated in the model. In future version a price effect on demand might be incorporated, however the scientific literature is not decisive on whether such an effect is significantly large. The income effect of demands appears to be much greater than the price effect, see Crouch (1994)

Table 7 Occupancy rates (Masterplan scenario)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
large hotels	*60%*	66%	74%	84%	92%	**101%**	**111%**	**123%**	**136%**
standard hotels	*60%*	63%	68%	73%	77%	81%	87%	92%	99%
resorts/apartments	*60%*	62%	64%	67%	69%	72%	74%	77%	80%
restaurants	*60%*	65%	71%	77%	82%	88%	94%	**101%**	**109%**
casino's	*60%*	68%	72%	78%	83%	88%	94%	**101%**	**108%**
attractions	*40%*	44%	47%	51%	54%	58%	62%	67%	72%
shopping	*40%*	43%	46%	50%	53%	56%	59%	64%	68%
free zone	*40%*	41%	42%	43%	44%	45%	46%	47%	48%
car rental	*60%*	64%	69%	76%	81%	87%	94%	**101%**	**109%**
taxi & misc. transport	*60%*	65%	73%	82%	89%	97%	**106%**	**116%**	**128%**

Source: Turistika (2006).

7 Concluding remarks

The Turistika model is presently in it's second phase. It is presently capable of making realistic projections of revenues, employment and occupancy on the meso-economic level, given tourist arrival predictions as exogenous inputs. It functions to calculate the effects of possible policy plans beforehand, while instantly testing it for realism. It thereby helps the users in the complex process of decision making. We're planning a third phase to start in the second half of 2006 and last for about two years. On the agenda for improvement are the incorporation of a Tourism Price Index, probably more interaction between the demand side (projected potential revenues) and the supply side restrictions (especially tourism prices and capacity). If available we will estimate the indirect effect of tourism using I/O-analysis. Another expansion of the model will be the inclusion of an 'aviation sector', addressing capacity restrictions of airport and airlines, and if available air transport prices. We like to discuss the pro's & contra's of our approach with other tourism economists at the Second International Conference on Tourism Economics in May 2006, and hopefully gain some extra insights that we can use for future improvement in our contribution to scientifically based tourism economics research.

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Appendix A – 50 different tourist groups

Country	Purpose	Age class	variable	freq
US/Canada	holiday	15-30	e_vs_vak1	190.8
US/Canada	holiday	31-50	e_vs_vak2	589.5
US/Canada	holiday	51+	e_vs_vak3	371.4
US/Canada	other	15-30	e_vs_ove1	74.6
US/Canada	other	31-50	e_vs_ove2	276.7
US/Canada	other	51+	e_vs_ove3	116.3
Netherlands	holiday	15-30	e_nl_vak1	401.6
Netherlands	holiday	31-50	e_nl_vak2	779.3
Netherlands	holiday	51+	e_nl_vak3	377.4
Netherlands	family visit	15-30	e_nl_fam1	125.6
Netherlands	family visit	31-50	e_nl_fam2	183.5
Netherlands	family visit	51+	e_nl_fam3	147.2
Netherlands	other	15-30	e_nl_ove1	82.4
Netherlands	other	31-50	e_nl_ove2	184.5
Netherlands	other	51+	e_nl_ove3	59.6
Europe	holiday	15-30	e_eu_vak1	92.3
Europe	holiday	31-50	e_eu_vak2	174.8
Europe	holiday	51+	e_eu_vak3	61.4
Europe	other	15-30	e_eu_ove1	38.3
Europe	other	31-50	e_eu_ove2	72.1
Aruba	holiday	31-50	e_an_vak2	65.2
Aruba	family visit	15-30	e_an_fam1	47.9
Aruba	family visit	31-50	e_an_fam2	70.3
Aruba	trading tourist	31-50	e_an_koo2	49.1
Aruba	other	15-30	e_an_ove1	38.9
Aruba	other	31-50	e_an_ove2	117.3
Caribbean	holiday	15-30	e_ca_vak1	62.9
Caribbean	holiday	31-50	e_ca_vak2	129.6
Caribbean	family visit	15-30	e_ca_fam1	50.1
Caribbean	family visit	31-50	e_ca_fam2	75.5
Caribbean	trading tourist	15-30	e_ca_koo1	115.9
Caribbean	trading tourist	31-50	e_ca_koo2	295.9
Caribbean	other	15-30	e_ca_ove1	53.8
Caribbean	other	31-50	e_ca_ove2	112.1
Venezuela	holiday	15-30	e_ve_vak1	165.8
Venezuela	holiday	31-50	e_ve_vak2	306.8
Venezuela	holiday	51+	e_ve_vak3	60.9
Venezuela	family visit	15-30	e_ve_fam1	43.2
Venezuela	family visit	31-50	e_ve_fam2	98.0
Venezuela	family visit	51+	e_ve_fam3	44.7
Venezuela	trading tourist	31-50	e_ve_koo2	62.0
Venezuela	other	15-30	e_ve_ove1	92.7
Venezuela	other	31-50	e_ve_ove2	222.4
Venezuela	other	51+	e_ve_ove3	41.6
South America	holiday	15-30	e_za_vak1	93.4
South America	holiday	31-50	e_za_vak2	169.8
South America	holiday	51+	e_za_vak3	51.6
South America	family visit	31-50	e_za_fam2	48.3
South America	other	31-50	e_za_ove2	73.4
restgroup	-	-	-	604.0
				7,862.4

Appendix B – estimation results

Poisson regression — Number of obs = 7796; LR chi2(58) = 18426.54; Prob > chi2 = 0.0000; Log likelihood = -37761.94; Pseudo R2 = 0.1961

nachten	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
e_vs_vak1	-.1091499	.0409729	-2.66	0.008	-.1894552	-.0288446
e_vs_vak2	-.0834757	.0245932	-3.39	0.001	-.1316774	-.035274
e_vs_vak3	.0120435	.0264781	0.45	0.649	-.0398526	.0639396
e_vs_ove1	-.09913	.0515146	-1.92	0.054	-.2000969	.0018368
e_vs_ove2	-.0848731	.0285466	-2.97	0.003	-.1408235	-.0289228
e_vs_ove3	-.454672	.0490409	-9.27	0.000	-.5507903	-.3585536
e_nl_vak1	.1769572	.0247106	7.16	0.000	.1285252	.2253891
e_nl_vak2	.218469	.0196686	11.11	0.000	.1799192	.2570187
e_nl_vak3	.3354048	.0229897	14.59	0.000	.2903458	.3804638
e_nl_fam1	.1770392	.0290636	6.09	0.000	.1200755	.2340029
e_nl_fam2	.1785547	.0260357	6.86	0.000	.1275257	.2295838
e_nl_fam3	.4537962	.0252375	17.98	0.000	.4043315	.5032608
e_nl_ove1	.8924565	.0314252	28.40	0.000	.8308642	.9540488
e_nl_ove2	.2220561	.0282925	7.85	0.000	.1666039	.2775084
e_nl_ove3	.6713847	.0393661	17.05	0.000	.5942285	.7485408
e_eu_vak1	.0855676	.045204	1.89	0.058	-.0030305	.1741657
e_eu_vak2	.2125887	.0321627	6.61	0.000	.1495509	.2756265
e_eu_vak3	.2799953	.050903	5.50	0.000	.1802274	.3797633
e_eu_ove1	.4963709	.0545977	9.09	0.000	.3893614	.6033803
e_eu_ove2	-.0116056	.0467103	-0.25	0.804	-.1031561	.0799448
e_an_vak2	-.8255324	.0635541	-12.99	0.000	-.9500961	-.7009687
e_an_fam1	-.9878156	.0686539	-14.39	0.000	-1.122375	-.8532565
e_an_fam2	-1.333486	.0689218	-19.35	0.000	-1.46857	-1.198402
e_an_koo2	-.9219235	.0715615	-12.88	0.000	-1.062181	-.7816655
e_an_ove1	-.8613504	.0859057	-10.03	0.000	-1.029723	-.6929783
e_an_ove2	-.9814836	.0521348	-18.83	0.000	-1.083666	-.8793012
e_ca_vak1	.1091224	.0425297	2.57	0.010	.0257657	.1924792
e_ca_vak2	.140687	.0301377	4.67	0.000	.0816181	.1997558
e_ca_fam1	.5996018	.0318857	18.80	0.000	.537107	.6620967
e_ca_fam2	.4888393	.0281973	17.34	0.000	.4335735	.5441051
e_ca_koo1	-.3314629	.0373032	-8.89	0.000	-.4045758	-.2583499
e_ca_koo2	-.5943862	.0283262	-20.98	0.000	-.6499045	-.538868
e_ca_ove1	-.0940801	.0499898	-1.88	0.060	-.1920584	.0038982
e_ca_ove2	-.7695955	.0504026	-15.27	0.000	-.8683828	-.6708083
e_ve_vak1	-.4198512	.0393423	-10.67	0.000	-.4969607	-.3427418
e_ve_vak2	-.4725283	.0307983	-15.34	0.000	-.5328918	-.4121648
e_ve_vak3	-.4326371	.0723448	-5.98	0.000	-.5744304	-.2908438
e_ve_fam1	-.1117958	.0485477	-2.30	0.021	-.2069475	-.016644
e_ve_fam2	-.2984693	.0358389	-8.33	0.000	-.3687122	-.2282263
e_ve_fam3	.0574444	.0434485	1.32	0.186	-.0277131	.1426019
e_ve_koo2	-.6732559	.0630096	-10.68	0.000	-.7967525	-.5497592
e_ve_ove1	-.0522179	.0420698	-1.24	0.215	-.1346731	.0302374
e_ve_ove2	-.56118	.0349547	-16.05	0.000	-.6296899	-.49267
e_ve_ove3	-.9005246	.0911179	-9.88	0.000	-1.079113	-.7219368
e_za_vak1	.0611654	.0395804	1.55	0.122	-.0164108	.1387415
e_za_vak2	.0329588	.0315627	1.04	0.296	-.0289029	.0948205
e_za_vak3	-.0915428	.0574231	-1.59	0.111	-.2040899	.0210044
e_za_fam2	.5148985	.0348258	14.78	0.000	.4466412	.5831558
e_za_ove2	.0392217	.0444155	0.88	0.377	-.0478311	.1262744
_Ireispart~1	.19767	.01004	19.69	0.000	.177992	.217348
_Ireispart~3	.0713007	.0131057	5.44	0.000	.045614	.0969874
kinderen	.0216774	.0143733	1.51	0.132	-.0064938	.0498486
eerder	-.0019834	.0087367	-0.23	0.820	-.0191071	.0151402
_Iaccomoda~2	.4855995	.0131696	36.87	0.000	.4597874	.5114115
_Iaccomoda~3	.6872224	.0106627	64.45	0.000	.6663239	.7081208
_Iaccomoda~4	.7734557	.0213109	36.29	0.000	.7316871	.8152244
_Iyear_1999	.1340004	.0098623	13.59	0.000	.1146706	.1533302
_Iyear_2003	.0695817	.0098796	7.04	0.000	.0502181	.0889453
_cons	1.757133	.0161859	108.56	0.000	1.725409	1.788857

OLS Regression

Source	SS	df	MS		Number of obs	= 7670
Model	5638.75267	61	92.4385683		F(61, 7608)	= 119.85
Residual	5868.15698	7608	.771314009		Prob > F	= 0.0000
					R-squared	= 0.4900
Total	11506.9096	7669	1.5004446		Adj R-squared	= 0.4859
					Root MSE	= .87824

lnexp_pvpn	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
e_vs_vak1	.1594109	.0953503	1.67	0.095	-.0275019	.3463237
e_vs_vak2	.1313186	.0586477	2.24	0.025	.0163528	.2462843
e_vs_vak3	.096377	.064798	1.49	0.137	-.0306449	.223399
e_vs_ove1	.1765069	.1194396	1.48	0.140	-.0576276	.4106414
e_vs_ove2	.0926786	.0677721	1.37	0.172	-.0401735	.2255307
e_vs_ove3	-.0872353	.0968313	-0.90	0.368	-.2770513	.1025807
e_nl_vak1	-.0647245	.0693351	-0.93	0.351	-.2006405	.0711914
e_nl_vak2	.0283544	.0555453	0.51	0.610	-.0805296	.1372384
e_nl_vak3	-.0710946	.0674113	-1.05	0.292	-.2032392	.0610501
e_nl_fam1	-.205892	.098044	-2.10	0.036	-.3980854	-.0136987
e_nl_fam2	-.00217	.0836829	-0.03	0.979	-.1662117	.1618717
e_nl_fam3	-.3119413	.0891749	-3.50	0.000	-.4867488	-.1371338
e_nl_ove1	.0762035	.118762	0.64	0.521	-.1566028	.3090098
e_nl_ove2	.0354266	.081284	0.44	0.663	-.1239126	.1947657
e_nl_ove3	-.0864649	.1394078	-0.62	0.535	-.3597427	.1868129
e_eu_vak1	.0845689	.115557	0.73	0.464	-.1419547	.3110925
e_eu_vak2	-.0425157	.0855626	-0.50	0.619	-.210242	.1252106
e_eu_vak3	.1507654	.1359673	1.11	0.268	-.115768	.4172988
e_eu_ove1	.126634	.1660986	0.76	0.446	-.198965	.452233
e_eu_ove2	.2097438	.1190878	1.76	0.078	-.0237011	.4431887
e_an_vak2	-.1213482	.1228693	-0.99	0.323	-.3622059	.1195094
e_an_fam1	-.7742146	.137255	-5.64	0.000	-1.043272	-.5051568
e_an_fam2	-.677898	.1175225	-5.77	0.000	-.9082745	-.4475216
e_an_koo2	-.3762674	.1323847	-2.84	0.004	-.6357779	-.116757
e_an_ove1	-.8035278	.1636255	-4.91	0.000	-1.124279	-.4827766
e_an_ove2	-.1712329	.0967971	-1.77	0.077	-.3609819	.0185162
e_ca_vak1	-.2640178	.1239446	-2.13	0.033	-.5069834	-.0210522
e_ca_vak2	.0262957	.0877255	0.30	0.764	-.1456706	.1982619
e_ca_fam1	.0726891	.1336001	0.54	0.586	-.1892039	.3345821
e_ca_fam2	-.5898343	.1119485	-5.27	0.000	-.8092844	-.3703843
e_ca_koo1	.7887106	.0912913	8.64	0.000	.6097545	.9676666
e_ca_koo2	1.300421	.0643888	20.20	0.000	1.174201	1.426641
e_ca_ove1	.056024	.1385975	0.40	0.686	-.2156654	.3277134
e_ca_ove2	.1269362	.103067	1.23	0.218	-.0751036	.328976
e_ve_vak1	.1328875	.0830762	1.60	0.110	-.0299647	.2957397
e_ve_vak2	.0408783	.0662601	0.62	0.537	-.0890097	.1707663
e_ve_vak3	.2154025	.1331511	1.62	0.106	-.0456103	.4764153
e_ve_fam1	-.7199655	.1447949	-4.97	0.000	-1.003803	-.4361276
e_ve_fam2	-.34117	.0993822	-3.43	0.001	-.5359864	-.1463535
e_ve_fam3	-.8381348	.1416567	-5.92	0.000	-1.115821	-.5604487
e_ve_koo2	1.093486	.1188172	9.20	0.000	.8605712	1.3264
e_ve_ove1	.0059252	.1078534	0.05	0.956	-.2054972	.2173476
e_ve_ove2	.0351311	.0756576	0.46	0.642	-.1131787	.1834408
e_ve_ove3	.0504057	.1592497	0.32	0.752	-.2617676	.3625791
e_za_vak1	-.0296094	.1020161	-0.29	0.772	-.2295891	.1703703
e_za_vak2	.118962	.0806179	1.48	0.140	-.0390714	.2769954
e_za_vak3	-.0011198	.1370902	-0.01	0.993	-.2698545	.2676149
e_za_fam2	-.499628	.136394	-3.66	0.000	-.7669979	-.2322581
e_za_ove2	.0742847	.1165663	0.64	0.524	-.1542175	.3027869
_Ireispart~1	.172882	.0273145	6.33	0.000	.1193379	.226426
_Ireispart~3	-.0609679	.0338306	-1.80	0.072	-.1272853	.0053494
kinderen	-.2915086	.0365095	-7.98	0.000	-.3630773	-.2199399
eerder	.0869047	.0235615	3.69	0.000	.0407176	.1330918
_Iaccomoda~2	-.2853982	.0376423	-7.58	0.000	-.3591875	-.2116089
_Iaccomoda~3	-1.013814	.0316608	-32.02	0.000	-1.075878	-.9517496
_Iaccomoda~4	-.7842126	.0743091	-10.55	0.000	-.9298788	-.6385463
nachten	-.0708309	.0026065	-27.17	0.000	-.0759404	-.0657214
nachten2	.0005413	.0000407	13.31	0.000	.0004616	.000621
nachten3	-1.13e-06	1.45e-07	-7.82	0.000	-1.42e-06	-8.50e-07
_Iyear_1999	-.2397793	.0263697	-9.09	0.000	-.2914712	-.1880875
_Iyear_2003	.1620787	.0257632	6.29	0.000	.1115757	.2125816
_cons	5.155005	.0449544	114.67	0.000	5.066882	5.243128