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Regional Tourism Satellite Accounts for Denmark: Accounting and modelling

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Abstract:

AKF conducted the project “regional tourism satellite accounts (RTSA) for Denmark” recently in co-operation with the Denmark National Tourism Organization and the Statistics Denmark. Tourism satellite accounts, recommended by the Eurostat, OECD, WTO and the UN’s statistical division, have become the main accounting framework for measuring the economic impact of tourism. The purpose of this paper is to present the working procedures, the accounting and modelling methods and the results of the project.

AKF has, through several years, co-operated with the Denmark National Tourism Organization in analyzing regional tourism impact in Denmark. The Denmark National Tourism Organization is responsible for collecting the tourism data. AKF is responsible for processing the data, putting them into AKF’s interregional macroeconomic model, and then providing the Denmark National Tourism Organization with a regional tourism model. The latter applies the model for making regional tourism impact analyses. The RTSA project involves AKF also in the accounting process for the tourism data, in order to fill in some lacking data that can be estimated by the data from the national accounts.

The aims of the project are to make RTSA consistent with the national accounts, to make the regional tourism statistics, and eventually to use the RTSA data and the interregional model to analyze the regional tourism impact. Accounting methods in constructing RTSA become an important part of the project and the results of the RTSA should be allowed for the international comparison.

1. INTRODUCTION

The World Tourism Organization (WTO) and the Organization for Economic and Development (OECD) have issued several documents with regard to the travel and tourism statistics (WTO, 1999; OECD, 2000). More recently, "Tourism Satellite Account: Recommended Methodological Framework" (called as RMF document hereafter) (Eurostat /OECD /WTO /UN, 2001) was published and it gives guidelines and recommendations for compiling tourism statistics. Eurostat published another document for the European implementation on tourism satellite accounts (Eurostat, 2002).

Many countries world-wide have begun the process of developing tourism satellite accounts (TSA), either at national level or at regional level. Canada stands out among the countries which publish TSA tables, as well as the national tourism indicators (Delisle, 1999). Canada, Norway, France and Switzerland, among others, have already made their regional tourism satellite accounts (Frechtling, 1999; Rütter and Berwert, 1999; Brændvang, et al 2001, Statistics Canada, 2002).

The aim for making tourism satellite accounts is to measure the tourism contribution to the national or regional economies, including tourism value added, tourism GDP, and tourism employment. Tourism statistics plays a central role in the tourism analysis. The tourism statistics should be able to give credible, consistent, reliable and comparable statistics, and it should be consistent with the national accounts.

Since 1996, the Denmark National Tourism Organization (VisitDenmark) and the Institute of Local Government Studies (AKF) have started co-operation in collecting the tourism demand data in Denmark and in analyzing tourism impacts in the regional economies (Zhang, 2002). After many years of experiences in the tourism regional impact analysis by using AKF's interregional macroeconomic model, the Denmark National Tourism Organization and AKF have decided to start a project for developing a regional tourism satellite account for Denmark. The reason for starting a regional TSA, instead of the national TSA, is that tourist activities and tourism demand data in Denmark are already regionalized. Besides, the regional tourism consequences analysis in Denmark is far more

important than the total impact studies. Therefore, the regional TSA will be a new tool for analyzing tourism impact in Denmark.

The main purpose of this paper is to present the working procedures and methodologies in compiling TSA tables for Denmark. The methodologies are combined both “bottom-up” and “top-down” approaches. It implies that tourism statistics is constructed on the basis of the tourism survey data, while at the same time it should remain consistent with the national accounts. The methodologies are also combined both accounting and modeling methods that give us possibilities to bring the TSA time series up-to-date, when the national accounts have a few year time-lag. It is also possible to use the interregional model directly to calculate the economic consequences of tourism.

The paper is organized in the following sections. Section 2 describes the working procedures for constructing the Danish RTSA. Section 3 presents the data used in the model system for accounting and modeling. Section 4 gives a detailed description concerning accounting and estimation methods for RTSA and then it moves on to section 5, which gives a brief description about the Danish interregional macroeconomic model and shows how the RTSA is merged into the model system. Section 6 shows the results of the RTSA for Denmark. It concludes in the last section.

2. THE WORKING PROCEDURES

The World Tourism Organization defines travel & tourism as the “activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes”. Tourism can be divided into several categories according to the tourist origins, tourism purposes and the duration of the trips. The typical divisions are inbound tourism, domestic tourism and outbound tourism. The inbound tourism can be further divided into inbound same-day visits and inbound overnight tourism. The domestic tourism can be divided into domestic same-day visits, domestic overnight leisure tourism and domestic business tourism. The outbound tourism can also be divided into same-day visits, overnight leisure and business tourism. The Danish TSA is followed the above definition for tourism.

The working procedures for constructing the Danish RTSA are described in Figure 1.

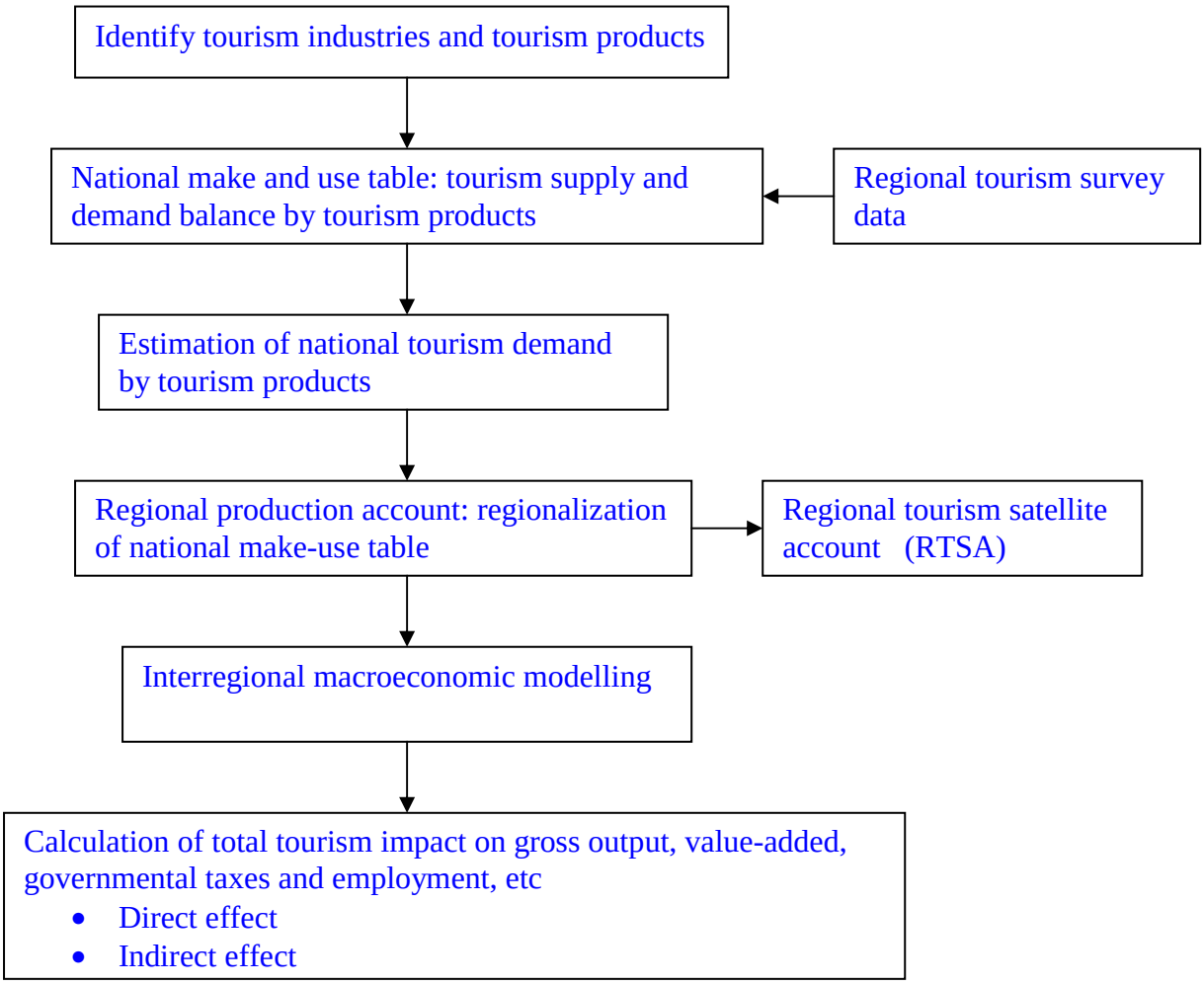

Figure1. Methodological procedure of making RTSA

Identify tourism industries and tourism products (step 1)

The RMF document gives a detailed description about the definition of tourism products and tourism industries. The tourism products can be classified as tourism specific products and non-tourism specific products. Tourism specific products are defined as those products that are consumed by tourists, and for those, in the absence of tourists, the level of consumption would be significantly reduced. Tourism product identification should be in accordance with each country's national accounts. Different countries normally have different categories for tourism specific products according to their accounting categories.

Tourism industry is defined as a group of establishments whose principle productive activity is a tourism characteristic activity, which means that a tourism industry supplies products and services to tourists.

Among the 2 800 detailed product categories in the national accounts, about 32 products are defined as tourism specific products in Denmark. The industries that supply these products and services are defined as tourism related industries. The tourism specific and non-specific products can be groups into the main categories as shown in Table 1.

Table 1 Tourism product categories: specific and non-specific tourism products

Tourism product categories	**Tourism products**
Tourism specific products:	
Accommodation	Hotel, camping, holiday centre, second home or summer cottage, etc.
Catering	Restaurant, night club and other forms of food services
Long-distance transport	Airplane, train, ferry or own car
Local transport	Sub-way train, bus, taxi, tourist bus and car rental
Travel service	Tourist bureau, tour operator, tourist guide, package tour
Entertainment	Amusement part, museum, zoo, botanical garden, sport events
Non-tourism specific products:	
Other services	Financial service, insurance, communication, private and personal services
Shopping	Food, clothes, footwear, electronic equipments, data processing equipments, gold, silver, watches, souvenirs, etc.

Balance the tourism supply and demand by tourism product (step 2)

The Danish national accounts can be presented by national make and use tables. From the national make table, the information about tourism products supplied by their corresponding industrial sectors can be obtained at basic prices. Domestic production plus import from aboard forms the total supply for every product. The national use table is

consisting of different components in the final demand, such as intermediate consumption, private consumption, public consumption, investment and export. Within the national accounts the total supply obtains a balance with the total demand at each product level. Although the information on supply for each tourism product is available, the tourism demand remains unknown from the national accounts. This is because in the national use table tourism product consumption is buried either in intermediate consumption or in private (or public) consumption. This means that the national use table cannot tell, for example for restaurant product, which amount of product is consumed by tourists and which amount is used by the local residents.

Therefore, tourism survey data (called TØBBE) (Zhang, 2001; Danish Tourist Board, 2003) are introduced into the system. The purpose of inserting the tourism survey data here is to distinguish tourism consumption from the local residential consumption. Without changing the total demand for each product, it is simply to separate the private consumption into two parts: one is tourism consumption and another is local private consumption. It is the same for the intermediate consumption to separate Danish business consumption from the normal intermediate consumption.

Estimate the national tourism demand by tourism product (step 3)

In the step 2 it is seen that two data sources are merged and compared with each other. The one source is the national use table, showing tourism products consumed by intermediate consumption, private consumption and public consumption; the other source is the aggregated TØBBE data, showing the tourism consumption for each tourism product. In case that data are not compatible with each other, we have to decide which data should be applied in the estimation. When some tourism information are unavailable in the TØBBE data, the national make or use tables are used for the estimation. The detailed methodologies applied for estimation is presented in Section 4.

Regionalize the national make-use tables by the regional production accounts (step 4)

The Danish regional production accounts include the information of regional production value, regional intermediate consumption, gross domestic products at factor costs, and production taxes less subsidies on production, compensation to employees, gross operating surplus and number of employment. With the help of regional production accounts and

other survey information, the national make-use tables are disaggregated into regional make-use tables (Madsen et al. 2001a and Madsen et al. 2001b).

Construct the regional tourism satellite accounts (step 5)

The purpose of constructing the regional tourism satellite accounts is to compile the ten tables that are required by the Eurostat, WTO, OECD and UN statistical division (the RMF document, 2001). The following procedures and methods are adopted in order to compile TSA tables.

- Calculate regional tourism supply shares
- Estimate tourism supply at market prices
- Transform the consumption component to product categories for the tourism survey data
- Estimate regional tourism demand from the tourism survey data
- Estimate regional tourism demand from national supply and use tables

These procedures and methods are presented in Section 4 and detailed methodological documentation has been made in the report (Zhang, 2005).

The regional tourism satellite accounts enter into the interregional macroeconomic model (step 6)

The last step is to put the RTSA data into the Danish interregional model, LINE, so that the tourism statistics, after TSA estimations, merges into the modeling system. The advantages of merging accounting and modeling into one system are: 1) the interregional macroeconomic model can function as a forecasting model that brings the TSA time series up-to-date, when the national accounts have a few year time-lag. 2) The interregional model has a spatial dimension. When the regional make-use tables and regional tourism data are available, it is easy to make the regional tourism satellite accounts with one system. 3) It is also possible to directly use the model to calculate the economic consequences of tourism.

3. DATA

Data sources for the Danish interregional macroeconomic model, LINE, are mainly categorized as five different sources: (1) regional census data, covering population, income

and employment statistics; (2) regional production accounts; (3) national accounts: make-use tables; (4) national forecasting model: ADAM databank; (5) different survey data, for example, tourism survey, transport survey and trade survey. Three main data sources that are used in constructing the RTSA are described here.

Regional production accounts

It contains variables, such as regional gross production, regional intermediate consumption, regional gross domestic products at factor cost, and indirect production tax less subsidies on production, compensation to employees, implicit gross operating surplus and number of employees. All variables in the data set have the following dimensions (axes):

(a) Region at municipal level (276 municipalities in Denmark)

(b) Sector being classified by a standard SNA93 defined industries (132 industries)

(c) Yearly data cover the period 1993-2003 (updated every year)

(d) Price showing both fixed (1995) and current prices.

National make-use tables

It shows the relationships between the institution and products. In the make matrix, production data show the relationship between the industry and products, telling us which industries produce which commodities. The make matrix also contains import by industry and commodity. The use matrix shows all the variables in the demand side: intermediate consumption shows the relationship between the industries and commodities; private consumption, public consumption, investment, stocks and exports show the relationships between the relevant components and commodities.

Make-use tables also have a time dimension: yearly data cover the period 1988-2000 (updated every year). Make-use tables have not only axes for fixed and current prices; but they also contain basic prices, retailing and wholesaling margins, non-production tax and value-added tax. Production value in the make matrix is presented only in basic prices. Each commodity at basic prices obtains a balance between the make and use matrices.

Regional Tourism data

The tourism survey data from Denmark National Tourism Organization is also called TØBBE data. It includes the data of both number of tourist nights and tourists' daily

consumption. Number of tourist nights is based on the official tourist bed-night statistics from Statistics Denmark, supplemented with interviewing data from the Denmark National Tourism Organization for some special overnight forms. The tourists' average daily consumption is calculated based on a large tourist interview data.

Tourist interview activity in Denmark started in 1996 and is still carried on by the Denmark National Tourism Organization on the regular basis. During 1996-2003 about 90,000 tourists (both foreign and domestic tourists) were interviewed covering all the Danish regions, all kinds of nationalities and 16 different forms of accommodations (Denmark National Tourism Organization, 2003/2004). Therefore, both tourist nights and tourists' daily consumption data have the following axes: (a) regions by tourists' overnight counties; (b) form of accommodation; (c) nationalities for foreign tourists and regions of residence for domestic tourists; besides, the daily consumption is divided into different consumption groups. Therefore, the products of the two sets of data give the regional tourist consumption in Denmark.

4. REGIONAL TOURISM SATELLITE ACCOUNTS

According to the TSA documents the tourism statistics should be able to give information about tourism GDP and employment. It is necessary to estimate the regional tourism supply shares. It is required by the TSA documents to present the TSA tables by product category and eventually calculate the tourism ratio on supply for each product. As the tourism survey data are grouped by consumption components, the data have to be transformed into product categories that are consistent with both the model and the TSA product categories.

Estimate the regional tourism supply shares

It is necessary to have statistical data with very detailed industrial sectors (i.e. 820 sectors in the data bank) at a municipal level on employment and primary income from Statistics Denmark. These data are used as the distribution keys to redefine the tourism activities within the traditional standard sectors. For example, in the traditional standard sectors, hotel is presented as one sector. But from the detailed sectors information, the hotel sector in Denmark is divided into 7 sub-sectors, such as 'hotels with restaurants', 'conference centre',

‘hotels without restaurants’, ‘youth hostel’, ‘camping’, ‘holiday centre’ and ‘other facilities for short-period stay’.

The detailed industry data are simply put into the model system in the data section. The data are used to calculate a supply share for a tourism industry. The shares of both employment and primary income in each sub-sector are calculated as

$$QAEQ = qae / Tqae \quad (1)$$

$$YLRAEQ = ylrae / Tylrae \quad (2)$$

Where a = 1, 2, …, 16; e = 1, 2, …, 32.
QAEQ and YLRAEQ are supply shares estimated by employment and income respectively. qae is employment, and ylrae is primary income data with a regional dimension (a) and detailed sectors (e). Tqae or Tylrae are the aggregated data for the standard sectors, respectively.

The *supply share* represents a portion of each sub-sector in the aggregated standard sector within a region. For example, supply share for sub-sector ‘hotels with restaurants’ is the share of this sub-sector in the traditional hotel sector. The supply shares in these 7 hotel sub-sectors will add up to one within each region.

Estimate tourism supply at market prices

The total domestic supply by tourism product is calculated by adding up the total domestic production with the total import at each product level. The production and import are presented by the basic prices. The total supply at basic prices is balanced with the total demand at basic prices. This means that at each commodity level, supply equals demand at basic prices. Implicitly, the total demand at market prices can represent the total supply for commodities at market prices, as there is no information of supply at market prices. In other words, if there is information of the VAT and commodity taxes for each commodity and add these together with the wholesale and retailing margins to the total supply at basic prices for commodities, the total supply at market prices is obtained. The total supply for tourism commodities at market prices is the basis for calculating the tourism ratio on supply.

The tourism ratio on supply represents a share of the tourism demand in the total domestic supply at each product category. For example, for the product of 'camping site' and 'holiday centres', it is assumed that the tourism ratios on supply are quite high, or close to one. This means that most of the services in these sectors are relevant to the tourism demand; their supply is simply to meet the tourism demand. On the other hand, tourism ratio on supply in the other hotel forms, catering sectors and transport sectors cannot be one, as these sectors also have to meet the demand from the local residents.

Estimate regional tourism demand from the tourism survey data

Tourism demand at national and regional level should be estimated by both the tourism survey information and the national make and use matrices. In the use matrices, there is information about the use of tourism commodities. Tourism commodities are mainly used by private consumption. The private consumption consists of local private consumption, domestic tourism consumption and foreign tourism consumption. However, the national use matrix has neither information concerning tourism consumption versus local private consumption, nor information of regional tourism and local private consumption. Therefore, the tourism survey data is very important information, which is available to identify some tourism consumption components, and it has regional tourism consumption information.

The tourism survey data is presented by consumption components, namely, by the groups of commodities. It needs to be spilt up into commodities, i.e. TSA products. Most non-specific tourism components can be transformed directly into the corresponding products. The tourism specific components are transformed following some statistical surveys, such as private household consumption survey.

Estimate regional tourism demand from national supply and use tables

The tourism consumption data in TØBBE can be different with the data shown from the national private consumption as the average daily consumption in TØBBE is estimated by the tourist interviewing samples. The tourism consumption is part of the private consumption in the model and it cannot exceed the private consumption. Therefore, the tourism consumption data at hotel and other accommodation will be adjusted by the national private consumption in these categories in order to have the consistency. Besides, the tourism demand in some

important tourism product categories, such as “travel agency”, “tourist bureau” and “car rental” is unavailable in the survey data. Several tourism consumption data have to be supplemented by the tourism supply data.

In order to give an accurate estimation of the tourism demand that covers all the tourism products, it is necessary to use a method that combines both the demand estimation from the survey data (bottom-up approach) and the demand estimation from the national make-use tables (top-down approach). The national make matrix shows production output by industrial and service sectors for each product. For those tourism products that have no information from the tourism survey data, we can estimate them from the supply data.

The TSA documents provide us with the methodology for constructing tourism demand data. With regards to the methodology, the documents suggest to have three ways to collect information on internal tourism consumption: a) direct information from suppliers (information on their classes of customers); b) from visitors (sample surveys of expenditure by products); c) from opinions of experts familiar with the relationships (RMF, 2001).

The principles for applying the mixed methodology to estimate the tourism demand are: a) when the tourism survey data are available, the tourism survey data are applied as the tourism demand; b) when the tourism survey data are not consistent with the national use table, especially when the tourism demand data from the survey exceed the national private consumption data, the tourism survey data are adjusted in accordance with the national use data; c) when the tourism demand data are not available in some important tourism product categories, the tourism supply information is used to estimate the tourism demand.

5. REGIONAL MODELING

LINE is an interregional general equilibrium model for the Danish local economy developed by AKF (see Madsen et al. 2002a, 2002b, 2004). The LINE model is built in the computable general equilibrium framework; though, several features are added in the model. Firstly, spatial dimensions are built into the model, distinguished by place of production, place of residence and place of demand. Because of this feature, sub-models for commuting, tourism, shopping and inter-regional trade can be constructed inside the LINE model.

Secondly, make and use matrices are appropriately applied in the LINE model. The make matrix shows which productive sectors produce what kinds of commodities; and the use matrix shows which commodities are bought by sectors from intermediate demand, and which commodities are demanded by different components of final demand. Therefore, sectors on the production side and components of the final demand side can be linked with each other by commodities in the commodity market. The third feature is that data construction is based on a social accounting matrix (SAM). The SAM for Danish municipalities (SAM-K) contains five accounts: "productive sectors"; "qualification groups", such as age, gender and education; "institutions", such as households, firms, government and others; "components of final demand" and "commodities". The fourth feature is that the model structure is represented by two circles: a real circle, in accordance with the Keynesian demand theory, and a price-cost circle, in accordance with moving from production cost to market price. The fifth feature is that the model has a time dimension. The data of production and final demand are built based on the data from Statistics Denmark. With some historical input-output data, the model can be extended to more than a thirty-year period from 1970 to the present (2003). In addition, the model applies the Danish national forecasting model, ADAM, to forecast this interregional model to the year 2020.

Figure 2 illustrates the LINE model by its real circle. The structure of the LINE model is described by two dimensions. The horizontal dimension shows the spatial dimension: "place of production" (A), "place of residence" (B) and "place of demand" (D). The vertical dimension shows the SAM-K structure by "sector" (E), "qualification group" (G), "institution" (H), "component" (W) and "commodities" (V).

The real circle goes clockwise, as shown in Figure 2, corresponding to the Keynesian demand theory. It starts from the upper left corner, where production generates factor incomes in basic prices including the part of income used to pay commuting costs. The factor income is transformed from place of production by sector (AE) to place of production by group (AG), then further to place of residence by group (BG) through a commuting model. Employment follows the same path from place of production by sector (AE) to place of production by group (AG), then eventually to place of residence by group

(BG). Employment and unemployment, earned income and income transfers, taxes and disposable income are determined in this quadrant.

Disposable income is calculated in current prices where taxes are deducted, and income transfers and other incomes are added. Disposable incomes are distributed from factors (BG) to households and firms (BH). Disposable income is the basis for determination of private consumption in market prices, by place of residence (BW). Private consumption is assigned to place of demand (DW) by use of a shopping model. Private consumption, together with intermediate consumption, public consumption and investment, constitute the total local demand for commodities (DV) in basic prices through a use matrix. In this transformation from market prices to basic prices (from DW to DV), commodity taxes, value-added taxes and trade margins are subtracted from the market prices. Local demand is met by imports from other regions and abroad in addition to local production. Through a trade model, export to other regions and production for the region itself are determined, i.e. from DV to AV. Adding export abroad, gross output by commodity is determined. Through a reverse make matrix the circle returns to the production by sector (AV to AE).

The price-cost circle goes anti-clockwise, corresponding to a mark-up procedure where additional cost elements are added to the price of the commodity en route from place of production to the market and the buyer.

The tourism sub-model is fully integrated into the LINE model, as tourist consumption, covering both domestic tourism and foreign tourist expenditure in Denmark, is part of the private consumption. Private consumption by residence is determined by the disposable income of residential households. The model for private consumption is composed of four sub-models: 1) residential local private consumption, 2) Danish tourist consumption, 3) foreign ordinary tourist expenditure in Denmark, and 4) foreign same-day tourist expenditure in Denmark. The document for tourism sub-model in LINE can be found in Zhang (2001).

When the tourism demand data enter into the interregional macroeconomic model system, the tourism statistics is merged into the final demand by the different components. Through interregional trade model and by subtracting the trade margins, commodity taxes and value-

added taxes, the tourism demand by commodity together with other final demand is met by the commodity supply from the production side.

The LINE model actually functions as both a forecasting model and a solution model. The forecasting part means the model applies Danish national forecasting model, ADAM, to bring the time-series of the model from the data year (such as 2000-2002) to the present (2005) or onward. The solution part means that the model can calculate the economic consequences of any economic activity (such as tourism) at regional level.

6. RESULTS

Outbound tourism (i.e. Danish tourist consumption outside the territory of Denmark) has not been included in the Danish tourism survey data; therefore, TSA table 3 is not available at present. With this exception, TSA tables 1 – 7 are presented as the results of the RTSA project.

TSA table 1 (Table 2) shows the inbound tourism consumption in Denmark in 2000. The table shows the tourism consumption by products (row) and categories of visitors (column). The products are classified by two types: tourism specific products and non-specific tourism products. The categories of visitors are foreign same-day visitors and foreign overnight tourists. The total inbound tourism consumption in Denmark in 2000 is 28 239 million DKK (3 800 million EURO). The tourism consumption from the foreign same-day visitors accounts for 41% of the total consumption, while the foreign overnight tourism consumption accounts for 59% of the total inbound tourism consumption.

TSA table 2 (Table 3) shows the domestic private tourism consumption in 2000, by products and types of tourism. The domestic private tourism consumption covers only the Danish private tourism consumption; it does not include the consumption from the domestic business visitors. The domestic private consumption is also classified by two types: the domestic same-day visitors and the domestic overnight tourists. The data for the domestic same-day visitors are not available at the moment; however, Denmark national tourism organization has started the data collection from 2004.

The tourism consumption from Danish private overnight tourists in 2000 is 14 685 million DKK (1 978 million EURO). The domestic private overnight tourists consumed 55% of non-specific tourism products and 45% of the tourism specific products.

TSA table 4 (Table 4) is the internal tourism consumption by products and types of tourism. The first column of the table is the same as the total inbound tourism consumption from Table 1, and the second column is the same as the total domestic private tourism consumption from Table 2. The third column combines the inbound and domestic private tourism consumption, showing the internal tourism consumption within the final consumption expenditure in Denmark. By definition, the visitors' consumption during their business travels is also tourism consumption, but this expenditure is not private consumption. The domestic business tourism consumption is a part of intermediate consumption. According to the RMF document, the domestic business tourism consumption should be included in TSA Table 4; therefore this information is put at column 4. The last column shows the total tourism consumption in Denmark. It shows that the tourism specific products accounted for 49% and non-specific tourism products accounted for 51% of total tourism consumption.

TSA table 4 provides data on tourism consumption which can be directly entered into TSA table 6 where tourism product supply and consumption can be compared.

TSA table 5 (Table 5) is the production accounts of tourism industries and other industries. It shows the relationships between the tourism industries and the products (both tourism specific and non-specific products). The columns are tourism industries, from hotels and other accommodation sectors to recreation and cultural activities; then the total tourism industries, tourism connected, non-tourism industries and the last column is the total output by product. The rows are products divided by three blocks. The first block is the tourism specific products; the second block is the non-specific tourism products; and the third block is the total production output and the relationships between the intermediate consumption and the gross value added of production activities.

The last row of the first block shows the total tourism specific products produced by each sector, for example, hotels and other accommodation sectors produce 7 565 million DKK of hotel service, 1 486 million DKK of other accommodation services and 700 million DKK of

restaurant services. In total, the hotel and other accommodation sector produce 9 751 million DKK of tourism specific products.

The last row of the second block shows the total non-specific tourism products. The tourism industries also produce some non-specific tourism products, such as general service and other transport services. The non-specific tourism products are mainly produced by the non-tourism industries.

In the third block, the total production output is obtained by adding up the tourism specific products with the non-specific tourism products at each industry. The third block also gives the information of intermediate consumption and gross value added of production activities by industry. After the row of gross value added of activities, it gives the contents of the gross value added, such as compensation of employees, other production taxes less subsidies on production, and gross operating surplus. These rows show the relationships among the production outputs, intermediate consumption, gross value added and other factors in industries.

TSA table 6 (Table 6) shows both the domestic supply by each aggregated product and the total tourism consumption by product. The purpose of Table 6 is to calculate the tourism ratios on supply. The first column in Table 6 is the output of domestic production at basis prices, the second column is import, the third column is net commodity taxes less subsidies, VAT, and trade margins by product. When these three columns are added up, it is the market prices for each product, representing the product supply at purchase prices. The total tourism consumption is also in purchase prices. The tourism ratio on supply for each product category, shown in the last column, is calculated by dividing the total tourism consumption by the total supply at purchase prices.

The tourism ratios on supply in Table 6 are quite different for different products. It is shown that the hotels, other accommodation and holiday cottage rental have higher ratios than other TSA products. Travel agency and transport services, restaurant and catering service have relative higher ratios.

TSA Table 7 (Table 7) presents the employment in the tourism related industries. The total employment in the sectors that corresponds to tourism consumption is estimated to 148 449 persons. The estimation takes supply shares of the aggregated sectors into account; therefore it shows the direct jobs in the tourism-related industries. The tourism employment accounts for 5.3% of total employment in Denmark. According to the RMF document, the indicator for the size of employment should be the number of jobs and the number of employed persons having at least one job in these tourism industries. The employment presented in this table is the average number of employed persons. The national accounts in Statistics Denmark define employment by the term "average number of employed persons". That is to say a person, who worked during the whole accounting period, is counted as one employment; a person, who worked during the half of the accounting period, is counted as a half employment. By this way the problem of seasonality will be solved. But this employment accounting method will not show how many working hours the persons have been employed. For example, a part-time employed person, if he (or she) worked for the whole accounting period, is counted as one employment. Furthermore, it has the rule of primary employment: a person who has committed himself to more than one employment relation is registered as just one employment within his primarily employed industry.

The RMF suggests a breakdown of the employment according to the gender. TSA table 7 shows the employment by 11 tourism-related industries (rows) and by gender (columns). The last two columns show the share of male workers and female workers in each industry. Only in the hotels and restaurants industries do female employees account for more than half of employment; in the transport industries, as clearly shown, the male employment account for large shares of sectors employment. Female accounted for a little more than half of employment in the recreational, cultural and sport sectors.

7. CONCLUSION

The purpose of this paper is to present the working procedures and the methodologies for constructing the regional tourism satellite accounts in Denmark. The paper gives a detailed description of data, estimation methods for accounting and modelling, and finally the results of the project, TSA tables.

To conclude the Danish regional TSA project, it is found that the advantages for this work are:

a) It is made in accordance with the official documents and recommendations.

b) It merges the TSA accounting part with the modelling part, and both of them are built based on the national accounts. The Danish TSA is consistent with the Danish national accounts

c) It has time series and it has possibility for forecasting the TSA tables to the present year.

d) It is regionalised TSA, therefore it is easier to be applied for the tourism regional economic analysis.

Several aspects in the TSA work have to be improved in the future work. Apart from what has been mentioned above, for example, the data for the Danish same-day visitors is under the construction; the Danish outbound tourism and domestic business tourism still have rooms for further improvement. The final adjustment is still needed in order to have better consistency between the data from the national accounts and tourism survey data. Besides, some information is still unavailable from the tourism survey, such as the tourism consumption in car rental and in use of tourism bureaus; the domestic tourists (or visitors) use of private car for the tourism purposes. The future work still requires the co-operation among Denmark national tourism organization, Statistics Denmark, and AKF.

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Table 2 TSA Table 1 – Inbound tourism consumption in 2000, by products and categories of visitors (in million DKK, 2000 current price)

Tourism specific products:	**Same-day visitors**	**Share (%)**	**Tourists**	**Share (%)**	**Total visitors**
Hotels	0	0	1 653	9.9	1 653
Other accommodation	0	0	457	2.7	457
Restaurants and other caterings	1 321	11.4	2 606	15.6	3 927
Local transport (subway, bus and taxi)	451	3.9	258	1.6	709
Long distance transport (railway, water and air)	488	4.2	1 040	6.2	1 528
Travel agency and transport services	0	0	1 064	6.4	1 064
Holiday cottage and car rental	0	0	2 632	15.8	2 632
Cultural and recreational services	135	1.2	405	2.4	540
Tourism specific products, sub-total:	*2 395*	*20.7*	*10 116*	*60.7*	*12 511*
Non-specific tourism products:					
Petroleum	1 835	15.9	1 058	6.4	2 894
Food, drinks and tobacco	3 256	28.2	2 319	13.9	5 575
Clothes and footwear	1 144	9.9	1 070	6.4	2 214
Consumer's electronics	87	0.8	95	0.6	181
Jewellery and watches	148	1.3	213	1.3	361
Other services	2 704	23.4	1 800	10.8	4 503
Non-specific tourism products, sub-total:	*9 173*	*79.3*	*6 555*	*39.3*	*15 728*
Tourism consumption, total:	**11 569**	**100.0**	**16 671**	**100.0**	**28 239**

Source: own calculation is taken on the basis of the data sources from Statistics Denmark and VisitDenmark.

Table 3 TSA Table 2 – Domestic private tourism consumption in 2000, by products and types of tourism (in million DKK, current price)

Tourism specific products:	**Same-day visitors**	**Tourists**	**Share (%)**	**Total visitors**
Hotels	na	564	3.8	564
Other accommodation	na	873	5.9	873
Restaurants and other caterings	na	1 696	11.6	1 696
Local transport (subway, bus and taxi)	na	613	4.2	613
Long distance transport (railway, water and air)	na	1 115	7.6	1 115
Travel agency and transport services	na	943	6.4	943
Holiday cottage and car rental	na	437	3.0	437
Cultural and recreational services	na	393	2.7	393
Tourism specific products, sub-total:	*na*	*6 634*	*45.2*	*6 634*
Non-specific tourism products:				
Petroleum	na	836	5.7	836
Food, drinks and tobacco	na	3 738	25.5	3 738
Clothes and footwear	na	940	6.4	940
Consumer's electronics	na	164	1.1	164
Jewellery and watches	na	572	3.9	572
Other services	na	1 802	12.3	1 802
Non-specific tourism products, sub-total:	*na*	*8 051*	*54.8*	*8 051*
Tourism consumption, total:		**14 685**	**100.0**	**14 685**

Source: own calculation is taken on the basis of the data sources from Statistics Denmark and VisitDenmark.
Note: na means that data are not available at moment.

Table 4 TSA Table 4 – Internal tourism consumption in 2000, by products and types of tourism (in million DKK, current price)

Tourism specific products:	Inbound tourism consumption	Domestic tourism consumption	Internal tourism consumption	Danish business visitors	Total tourism consumption
Hotels	1 653	564	2 216	2 149	4 366
Other accommodation	457	873	1 330	0	1 330
Restaurants and other caterings	3 927	1 696	5 623	453	6 076
Local transport (subway, bus and taxi)	709	613	1 322	28	1 350
Long distance transport (railway, water and air)	1 528	1 115	2 643	476	3 118
Travel agency and transport services	1 064	943	2 008	577	2 584
Holiday cottage and car rental	2 632	437	3 069	228	3 297
Cultural and recreational services	540	393	934	19	953
Tourism specific products, sub-total:	*12 511*	*6 634*	*19 145*	*3 930*	*23 075*
Non-specific tourism products:					
Petroleum	2 894	836	3 729	256	3 985
Food, drinks and tobacco	5 575	3 738	9 314	107	9 420
Clothes and footwear	2 214	940	3 154	100	3 254
Consumer's electronics	181	164	345	5	349
Jewellery and watches	361	572	932	2	935
Other services	4 503	1 802	6 305	79	6 384
Non-specific tourism products, sub-total:	*15 728*	*8 051*	*23 779*	*548*	*24 328*
Tourism consumption, total:	**28 239**	**14 685**	**42 924**	**4 478**	**47 402**

Source: own calculation is taken on the basis of the data sources from Statistics Denmark and VisitDenmark.

Table 5 TSA Table 5 – Production accounts of tourism industries and other industries, 2000 (in million DKK)

Industries	***T1***	***T2***	***T3***	***T4***	***T5***	***T6***	***T7***	***T8***	***Total tourism***	***Tourism connected***	***Non-tourism industry***	***Total output of domestic production***
Tourism specific products												
Hotels	7 565								7 565			7 565
Other accommodation	1 486								1 486			1.486
Restaurants and other caterings	700		25 886						26 586			26 586
Local transport				14 622					14 622			14 622
Long distance transport					30 630				30 630			30 630
Travel agency and transport services						10 156			10 156			10 156
Holiday cottage and car rental		1 771					2 117		3 888			3 888
Cultural and recreational services								9 976	9 976			9 976
Tourism specific products, total	9 751	1 771	25 886	14 622	30 630	10 156	2 117	9 976	104 909			***104 909***
Non-specific tourism products												
Agricultural products									***0***	***0***	***70 589***	***70 589***
Petroleum									***0***	***383***	***54 724***	***55 107***
Food, drinks and tobacco									***0***	***0***	***114 989***	***114 989***
Clothes and footwear									***0***	***0***	***15 346***	***15 346***
Consumer's electronics									***0***	***0***	***38 975***	***38 975***
Jewellery and watches									***0***	***0***	***4 648***	***4 648***
Other manufacturing									***0***	***0***	***314 331***	***314 331***
Housing and energy									***0***	***0***	***39 250***	***39 250***
Construction										***0***	***146 192***	***146 192***
Business and private services		***4 994***					***7 887***	***24 111***	***36 992***	***67 613***	***271 786***	***339 399***
Public services						***2***		***50***	***53***	***54***	***357 729***	***357 783***
Other services	***31***	***42***	***3 935***	***9***	***89 905***	***20 944***	***51***	***204***	***115 121***	***137 934***	***230 873***	***368 807***
Domestic retailing and wholesaling margins											***220 287***	***220 287***
Non-specific tourism products, total	***31***	***5 036***	***3 935***	***9***	***89 905***	***20 946***	***7 938***	***24 365***	***152 165***	***205 983***	***1 879 719***	***2 085 702***
Total output at basic price	*9 782*	*6 807*	*29 821*	*14 631*	*120 535*	*31 102*	*10 055*	*34 341*	*257 074*	*32 830*	*1 900 706*	*2 190.611*
Total intermediate consumption	***5 121***	***3 971***	***15 166***	***7 745***	***93 728***	***13 832***	***5 623***	***14 007***	***159 193***	***17 407***	***921 929***	***1 098 529***
Total gross value added of activities	***4 662***	***2 836***	***14 655***	***6 886***	***26 807***	***17 270***	***4 432***	***20 334***	***97 881***	***15 424***	***978 777***	***1 092 082***
Compensation of employees	***3 006***	***2 225***	***7 356***	***5 820***	***12 645***	***9 099***	***1 388***	***11 303***	***52 872***	***8 202***	***619 297***	***630 371***
Other taxes less subsidies on production	***-12***	***364***	***-35***	***-1 197***	***-317***	***25***	***-5***	***-787***	***-1 964***	***46***	***4 525***	***2 607***
Gross operating surplus	***1 668***	***216***	***7 333***	***2 263***	***14 479***	***8 146***	***3 050***	***9 818***	***46 973***	***7 176***	***358 765***	***412 913***

Note for Table 5: T1– hotels and similar; T2 – second home; T3 – restaurants and caterings; T4 – local transport service; T5 – long distance transport; T6 – travel agency and other transport services; T7 – transport equipment rental; T8 – recreational, cultural and sport activities.

Table 6 TSA Table 6 – Domestic supply and internal tourism consumption in 2000, by products (in million DKK, 2000 current price)

Tourism specific products:	**Domestic production**	**Import**	**Taxes and others**	**Domestic supply**	**Tourism**	**Tourism ratios**
Hotels	7 565		1 832	9 396	4 366	46.5
Other accommodation	1 486		346	1 832	1 330	72.6
Restaurants and other caterings	26 586		5 384	31 970	6 076	19.0
Local transport (subway, bus and taxi)	14 622		-1 827	12 795	2 002	15.7
Long distance transport (railway, water and air)	30 630	1 966	-4 579	28 018	2 467	8.8
Travel agency and transport services	10 156		258	10 414	2 584	24.8
Holiday cottage and car rental	3 888		570	4 458	2 757	61.9
Cultural and recreational services	9 976		582	10 557	953	9.0
Tourism specific products, sub-total:	*104 909*		*2 565*	*109 440*	*22 535*	*20.6*
Non-specific tourism products:						
Agricultural products	70 589		11 927	95 072	0	0
Petroleum	55 107		30 014	110 956	3 985	3.6
Food, drinks and tobacco	114 989		65 110	214 404	9 420	4.4
Clothes and footwear	15 346		25 025	71 730	3 254	4.5
Consumer's electronics	38 975		25 050	116 584	349	0.3
Jewellery and watches	4 648		6 909	16 216	935	5.8
Other manufacturing	314 331		146 284	663 127	0	0
Housing and energy	39 250		24 149	63 960	526	0.8
Construction	146 192		19 419	165 610	0	0
Business and private services	339 399		20 738	366 164	6 384	1.7
Public services	357 783		4 692	362 474	0	0
Other services	368 807		7 317	454 917	14	0
Domestic retailing and wholesaling margins	220 287		2 937	17 970	0	0
Non-specific tourism products, sub-total:	*2 085 702*		*389 572*	*2 719 183*	*24 867*	*0.9*
Total output	**2 190 611**		**392 137**	**2 828 624**	**47 402**	**1.7**

Table 7 TSA Table 7 – Employment in the tourism industries

Tourism industry	Male	Female	Total	Share of male (%)	Share of female (%)
1. Hotels and similar	8 364	12 268	20632	40.5	59.5
2. Second home	439	435	874	50.2	49.7
3. Restaurants and similar	24 190	30 118	54 308	44.5	55.4
4. Railway passenger transport	7 436	2 371	9 807	75.8	24.2
5. Road passenger transport	10 493	2 486	12 979	80.8	19.2
6. Taxi and other road transport	11 647	1 913	13 560	85.9	14.1
7. Water passenger transport	2 368	570	2 938	80.6	19.4
8. Air transport	6 899	4 162	11 061	62.4	37.6
9. Travel agency	6 841	3 984	10 825	63.2	36.8
10. Transport equipment rental	718	337	1 055	68.1	31.9
11. Recreation, cultural and sport	5 196	5 214	10 410	49.9	50.1
Total employment in the tourism industries	84 591	63 858	148 449		