Assessing the importance of international tourism for the Turkish economy: A social accounting matrix analysis

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ABSTRACT

The international tourism sector has grown rapidly in Turkey since the 1980s and Turkey ranks among the top ten countries in terms of tourist arrivals and receipts. Previous studies on international tourism in Turkey are partial equilibrium studies which emphasized the importance of the sector for foreign exchange earnings, employment creation, and economic growth. The social accounting matrix (SAM) modeling approach is superior to partial equilibrium analysis as it takes into account intersectoral linkages. This paper analyzes the contribution of international tourism to the Turkish economy using two SAMs for 1996 and 2002, respectively. Two analyses are conducted using the SAM impact model: (i) sectoral comparison of GDP elasticities, and (ii) SAM impact analysis of international tourism on output, value-added, and employment. The results show that the GDP elasticity of international tourism is relatively low and the impact of foreign tourist expenditures on domestic production, value-added (GDP), and employment in Turkey are modest. The results imply the possibility of leakage of foreign tourist expenditures out of the economy.

1. Introduction

International tourism has developed rapidly on the global scale since the late 1970s. According to the United Nations World Tourism Organization (UNWTO), total international tourist arrivals increased from 25 million in 1950 to 277 million in 1980, 439 million in 1990, 684 million in 2000, and 922 million in 2008 (UNWTO, 2009). Total tourism revenues worldwide increased to 944 billion US dollars in 2008. International tourism has also developed remarkably in Turkey since the 1980s and the country ranks among the top ten countries both in terms of tourist arrivals and tourism receipts.

Rapid development of international tourism has attracted the interest of scholars since the early 1980s, and a number of studies have tried to quantify the impact of tourism on the economy for various countries. The techniques used in these studies range from univariate and multivariate econometric techniques to input–output (I–O) models and its spin-offs, social accounting matrix (SAM) and applied computable general equilibrium (CGE) models. Econometric studies are partial equilibrium studies and have little to say about intersectoral connections in an economy. On the other hand, I–O, SAM, and CGE models have advantages over econometric analysis as they take into account intersectoral input–output relations and final demand (i.e. consumption, investment, exports, and imports) simultaneously (Archer, 1996; Briassoulis, 1991; Fletcher, 1989; Hara, 2008). The use of SAM modeling for tourism analysis became possible only after the introduction of tourism satellite accounts in the national accounting systems and I–O tables. Previously, tourism services were not regarded as a production activity in national I–O tables as they were included in various services (e.g. hotels, restaurants, transportation, and recreation). Using tourism sector surveys, tourism demand was incorporated into national accounts in the form of tourism satellite accounts (UNWTO, 2008).

Turkey is among the top ten countries on the international tourism market. A broad quantitative analysis of the economic impact of international tourism is necessary for such an important country and the current paper is the first attempt to fill this gap by using the SAM modeling technique. There are only a few quantitative studies examining the contribution of international tourism on the Turkish economy and they employ time series econometric techniques such as vector autoregressive model, vector error correction, and Granger causality. Among these, Gunduz and Hatemi-J (2005), Bahar (2006), Kaplan and Celik (2008), and Zortuk (2009) found that tourism had a positive impact on GDP growth whereas Katircioglu (2009) rejected the tourism-led

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growth hypothesis. In addition, Onder and Durgun (2008) found a positive impact of tourism on employment. These studies praise tourism as an earner of foreign exchange, contributor to employment creation, and facilitator of economic growth. However, they ignore intersectoral interactions despite backward linkages of the tourism sector found by input–output studies for various countries.

This paper builds on previous SAM studies (Defourney & Thorbecke, 1984; Oosterhaven & Fan, 2006) that examine the impact of tourism on the economy and aims to answer the following three research questions by using the SAM impact model: (i) to what extent did international tourism contribute to GDP in Turkey?; (ii) to what extent did international tourism contribute to employment growth in Turkey?; (iii) through what sort of intersectoral relations did international tourism contribute to employment and GDP? To this end, two SAMs are built for 1996 and 2002 through very careful treatment of the data obtained from input–output tables, tourism statistics, and related other data. Due to lack of data on transport and trade margins in the previous input–output tables, SAMs could be constructed only for 1996 and 2002.[1] The results obtained for these two years are compared to investigate if there were significant changes over time.

Macroeconomic consequences of changes in tourism demand may be significant for policymakers in a developing country like Turkey due to growth and development objectives of tourism policies. Successful tourism strategies are deemed as those that create jobs and lead to higher economic growth.

The remainder of the paper is organized as follows. In the next section, development of the international tourism sector and tourism policies in Turkey is briefly explained. Section 3 reviews the literature on the economic impacts of tourism. Section 4 sets out the methodology of the social accounting matrix analysis. The results of the analysis are presented and interpreted with a policy discussion in Section 5. Finally, Section 6 wraps up and concludes.

2. The development of international tourism in Turkey since 1980

Demand for international tourism services has grown rapidly in Turkey since the early 1980s (see Table 1). Recently, international tourism revenues reached more than 16 billion US dollars from less than one billion during the early 1980s, and tourist arrivals increased to more than 26 million from less than two million during the early 1980s. Turkey's share in total arrivals in the European region increased from 1.8% in 1990 to 2.4% in 2000 and 5.1% in 2008 (the corresponding shares in world total were 1.1%, 1.4%, and 2.7%, respectively). Likewise, its share in total receipts in the European region increased from 2.3% in 1990 to 3.3% in 2000, and 4.6% in 2008 (the corresponding shares in world total were 1.2%, 1.6%, and 2.3%, respectively).

The progress in international tourism was facilitated by tourism policies of the government in Turkey. Detailed accounts of tourism policies of the successive governments are available in Cimat and Bahar (2003), Tezcan (2004), and Alp (2009). A brief overview of the development of international tourism activities is presented in this section. Prior to 1980, there were attempts to establish an international tourism sector with large-scale tourism development projects in the southern coastal area as part of five-year development plans in the 1970s but these attempts were ineffective (Tezcan, 2004, pp. 59–64).

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[1] SAMs are based on official input–output tables and the latest I–O tables in Turkey date 2002. Examining the impacts of the developments after 2002 using the SAM impact modeling technique will be possible only after the publication of more recent I–O tables.

Table 1
Basic statistics about international tourism sector in Turkey (1970–2008).

	International tourism revenues ($ mln)	Tourist expenditures ($ mln)	Tourist arrivals (000 persons)
1970	52	48	724
1975	201	155	1148
1980	326	114	1057
1981	381	103	1158
1982	370	109	1148
1983	420	128	1507
1984	548	277	1855
1985	1094	324	2190
1986	950	313	2397
1987	1476	448	2906
1988	2355	358	4265
1989	2557	565	4516
1990	3225	520	5398
1991	2654	592	5553
1992	3639	776	7104
1993	3959	934	6525
1994	4321	866	6696
1995	4957	911	7747
1996	5650	1295	8539
1997	7002	1716	9725
1998	7177	1754	9431
1999	5203	1471	7487
2000	7636	1711	10,428
2001	8090	1738	11,620
2002	8481	1881	13,248
2003	9677	2113	13,956
2004	12,125	2524	17,548
2005	13,929	2872	21,125
2006	12,554	2742	19,819
2007	13,990	3260	23,340
2008	16,761	3507	26,336

Source: State Planning Organization, Economic and Social Statistics 1950–2006; Turkish Statistical Institute, Statistical Indicators 1923–2008.

With the shift of the government's long-term economic development strategy from import-substitution type of industrialization to one emphasizing outward-oriented and export-led growth after 1980, policymakers deemed international tourism as a potential source of foreign exchange. Tezcan (2004, p. 64) argues that Turkey, as a newcomer, had a favorable head start in international tourism compared to the incumbents in the world tourism market, because the sector was relatively new and natural, cultural, and historical sources were preserved successfully. The incumbents in the world tourism market, on the other hand, had suffered from accumulated problems such as saturation and environmental degradation. In 1982, the government passed the Tourism Encouragement Law, which introduced regulations regarding land use, property rights, and incentives for private sector tourism investments. To tackle the lack of adequate infrastructure and modern facilities, the government initiated large-scale physical infrastructure (roads, waterworks, sewage, etc.) upgrading programs in the late 1980s in the newly emerging tourism sites in the western and southern coastal areas. In addition, various incentives, ranging from tax exemption to granting of public land, were provided to private entrepreneurs in order to develop the international tourism sector (Alp, 2009). These attempts envisaged the establishment of a tourism industry based on free market principles. Toker (2007) and MCT (2009) provide a list and evaluation of these incentives and support schemes.

The newly emerging but rapidly growing international tourism sector suffered from some negative shocks that affected foreign tourists' demand during the 1990s. These were the Gulf War in 1991, worsening security during the 1990s due to intensified terrorist activities of the Kurdish separatist organization, Kurdish Workers' Party (PKK), and a destructive earthquake that hit the

northwestern part of the country in 1999 (Tosun, Timothy, & Ozturk, 2003, pp. 150–153). The negative effects of the Gulf War and the earthquake are evident from declining tourism revenues in these years (see Table 1). Despite these negative shocks, tourism revenues and tourist arrivals continued to grow in the long-run, particularly after 2000–2001 financial crisis. Tourism revenues grew remarkably in the 1980s by 35.4%. In the 1990s, the growth rate of total tourism revenues slowed down to 12.7%.

After the 2000–2001 financial crisis the tourism sector continued to grow rapidly due to strong demand for international tourism services mainly in Western European countries, continued private investments and government subsidies. The figures in Table 1 reveal that tourism revenues, expenditures and arrivals almost doubled from 2002 to 2008. Recent tourism strategies of the government emphasize quality and efficiency in tourism services and sustainable tourism development (MCT, 2007, pp. 30–33). For this purpose, the government has put in place regulatory measures.

3. Review of the literature

Earlier studies examining the economic impact of international tourism focused on multiplier effects of tourist expenditures. See Frechtling and Horvath (1999) for a review. The literature is still dominated by econometric studies which use multivariate regression and causality techniques to examine the relationship between tourist expenditures and GDP or employment. These studies primarily aim at testing the validity of the tourism-led growth (TLG) hypothesis and generally emphasize the positive role of tourism demand on economic growth (e.g., Balaguer & Cantavella-Jorda, 2002; Cortes-Jimenez, Pulina, Riera i Prunera, & Artis, 2009; Fayissa, Nsiah, & Tadasse, 2008, 2009; Oh, 2005; Ruiz, 1985).

An alternative approach to quantify the impact of tourism on GDP and employment is I–O modeling and its extensions, SAM and CGE models which have been applied to a number of countries (e.g., Albqami, 2004; Archer, 1995; Archer & Fletcher, 1996; Guo, 2002; Heng & Low, 1990; Henry & Deane, 1997; Kweka, Morrissey, & Blake, 2001; Oosterhaven & Fan, 2006; West & Gamage, 2001). The impact of tourist expenditures on GDP found by I–O and SAM studies vary from 0.71% for China to 9% for Tanzania, and on employment varying from 0.73% for China to 5.73% for Ireland. CGE studies estimate the economic impact of tourist expenditures using behavioral equations of the model which specify demand, supply, resource constraint, and price determination in a general environment. CGE models have been used to examine various issues related to tourism policies in various countries, such as the impact of changing tourist expenditures on national welfare and environment (Adams & Parmenter, 1995; Alavalapati & Adamowicz, 2000; Narayan, 2004; Zhou, Yanagida, Chakravorty, & Leung, 1997), the effect of globalization and tourism policies on the economy (Sugiyarto, Blake, & Sinclair, 2003), crowding-out of other economic activities by tourism sector (Dwyer, Forsyth, Madden, & Spurr, 2000), and the economic impact of alternative forms of taxation (Blake, 2000).

Empirical studies that examine the importance of tourism demand for the Turkish economy are econometric studies. Tosun et al. (2003) claims that measuring full economic and developmental impacts of tourism is difficult due to various components of the tourism industry on both supply and demand sides. They argued further that there is no reliable method to assess the economic contribution of tourism to economic growth. This statement is true for most econometric studies since they are partial equilibrium studies by their very nature. However, I–O, SAM, and CGE modeling techniques incorporate intersectoral relations in an economy and they are superior to econometric techniques in quantitatively examining the economic contribution of tourism

demand to economic growth. In what follows, we assess the importance of the international tourism for the Turkish economy from a SAM modeling perspective.

4. Methodology

The choice of the method in tourism analysis is an important theoretical and empirical issue (Dwyer, Forsyth, & Spurr, 2004). Selection of the appropriate modeling technique depends on the research question. There are three issues regarding the choice of the appropriate method among the I–O, SAM, and CGE models. First, as discussed in Oosterhaven and Fan (2006), I–O models, as the simplest of the three, focus only on intersectoral interdependence and linkages.

Second, SAM models as extended I–O models incorporate linkages with institutions (households, firms, government, and the rest of the world) which cause indirect effects through the distribution of institutional incomes. When income is generated by a "production activity" in the SAM model, first it is distributed among "production factors" (capital and labor) and taxes which then become factor income for the owners of labor and capital services (households and enterprises) and the government. Households, enterprises, and the government are the "institutions." The main limitation of the SAM model is that it is a demand-driven model with an excess capacity assumption, i.e., any increase in demand is immediately met by increased supply due to availability of unemployed resources. Therefore, SAM models are generally justified for economies with high unemployment and unused capacity in all industries (Oosterhaven & Fan, 2006). Turkey fits this picture well since unemployment rate has continuously remained over 10% and manufacturing capacity utilization rate has historically been around 70%, and often below that level.

Third, and finally, CGE models relax the SAM model's assumptions on supply and demand and explicitly model all prices, quantities, incomes, and equilibrium conditions. CGE models allow complicated policy simulation analyses. However, the CGE model suffers from a number of disadvantages related to the problem of choosing the appropriate functional forms in modeling economic behavior and the selection of important parameters. In addition, the black-box nature of the CGE model makes it difficult to build practical policy recommendations.

Oosterhaven and Fan (2006) argues that if the aim is to study the impact of changes in taxes (supply shock) or changes in the number of tourists (demand shock), CGE models are more useful. If the aim is to examine the importance of the tourism sector in an economy, as in this paper, SAM analysis is sufficient. As a result, we choose SAM modeling as the most appropriate approach to analyze the impact of international tourism on the Turkish economy. In this section, we explain the technical details of this approach.

4.1. Social accounting matrix

A social accounting matrix (SAM) is an extended input–output (I–O) table and demonstrates total transactions in an economy as depicted by the circular flow diagram. An I–O table demonstrates interdependence among production sectors in an economy. In addition to intersectoral links, a SAM shows the links between production sectors and all institutions in the economy (households, enterprises, government, and the rest of the world). Therefore, it is a useful tool to investigate the impact of a change in an exogenous account on all economic sectors and institutions. The structure and construction of a SAM is discussed in detail in Sadoulet and de Janvry (1995), Thorbecke (2000), and Akkemik (2009, pp. 221–231).

Table 2
The structure of the SAM.

		1	2	3	4	5	6	7	8	9	Total
1	Activities		Domestic sales							Exports	Production
2	Commodities	Intermediate demand					Household consumption	Government consumption	Investment		Domestic demand
3	Labor	Labor compensation									Total value-added
4	Capital	Operating surplus									
5	Enterprises				Non-distributed profits			Government transfers		ROW transfers to households and firms	Enterprise income
6	Households			Labor income		Transfers		Government transfers			Household income
7	Government	Indirect taxes	Tariffs			Corporate taxes	Direct taxes				Government income
8	Saving–investment					Corporate savings	Household savings	Government savings	Foreign savings	Capital transfers	Total savings
9	Rest of the world		Imports			Transfers to ROW		Transfers to ROW	Foreign savings		FX earnings
Total		Production	Domestic supply	Labor outlay	Capital outlay	Enterprise income	Household income	Government Income	Investment expenditures	FX earnings	

Note: ROW: rest of the world, FX: foreign exchange.

SAMs have been used extensively for policy analysis in developing countries. Typically, a SAM is a square matrix that records flows of all transactions in an economy. The structure of a SAM is portrayed in Table 2. A given cell a_{ij} refers to payment in the amount of a from account j (production activity, institution, production factor, etc.) to account i. Columns represent payments and rows represent receipts (income). Since total payments must equal total receipts in an economy, row sum equals column sum for the same account. The SAM is an accounting system and a snapshot of the economy for a given year (Thorbecke, 2000, pp. 2–15). A SAM model, in consequence, can be used to examine the impact of an exogenous shock in one of these accounts on the rest of the economic activities and actors. SAM models work with some assumptions. It is assumed that prices and technology coefficients (inter-industry input use) are fixed and the institutions' average propensities to spend are constant. To assess the impact of a shock, some accounts are set as exogenous and the remaining accounts are set as endogenous. The shock given to exogenous accounts result in changes in the incomes or production and consumption levels in the endogenous accounts through a multiplier process.

For the purpose of this study, two SAMs for 1996 and 2002 are constructed using the I–O tables. The construction of a SAM requires the availability of input–output (I–O) tables. I–O tables are generally published by national statistics departments once every five years at best in most countries. In the case of Turkey, recent I–O tables are available for 1985, 1990, 1996, and 2002; the latest I–O tables date 2002. As shown in Table 2, the SAMs have 9 types of accounts: two production accounts (activities and commodities), two factors of production (capital and labor), three institutions (households, firms, and government), a saving–investment account, and a rest of the world account. Production accounts (activities and commodities) are disaggregated into 19 sectors. The "activities" account represents production relations and the "commodities" account represents supply–demand relations. A list of these sectors with the corresponding I–O table codes is presented in Table 3.

Sectoral disaggregation in the SAM is based on the types of foreign tourist expenditures in the tourism satellite accounts (TSA). To ensure the compatibility between TSA and the SAM, sectoral classification in the SAM closely follows the sectoral disaggregation in the TSA, such as construction, food, hotel and restaurant services, different types of transportation services, etc. The remaining sectors which are relatively unimportant in tourism analysis are presented in aggregated form. There are two tourism accounts, namely international tourism and domestic tourism. Commodities accounts of tourism record payments from other sectors to the tourism accounts arising from intermediate use of tourism activities and households' tourism expenditures. Tourism activity column accounts represent payments from the tourism sectors to other sectors for purchases of intermediate inputs. The rest of the world column involves export receipts. International tourism receipts are split from exports by separating international tourism from the rest of the world account.

Tourism data for Turkey used in the SAMs are extracted from the officially published tourism satellite accounts (TSA) for 1996–1998 for the 1996 SAM (SIS, 2002) and from the report on the tourism surveys for the years 2001–2003 for the 2002 SAM (SIS, 2005). The construction of the SAMs is explained in detail in the Appendix. Table 4 exhibits aggregated macro-SAMs for 1996 and 2002.

Table 3
Classification of sectors in the micro–SAM.

	Industry description	Sectoral codes in the I–O tables	
		1996	2002
1	Agriculture	01–07	01–02, 05
2	Mining	08–12	10–14
3	Food, beverages and tobacco	13–25	15–16
4	Textile	26–27	17
5	Clothing and footwear	28–32	18–19
6	Other manufacturing	33–68	20–37
7	Electricity and gas	69–70	40
8	Water	71	41
9	Construction	72	45
10	Wholesale and retail trade	73–75	50–52
11	Hotel and restaurant services	76–77	55
12	Land transportation	78–79	60
13	Maritime transportation	80	61
14	Air transportation	81	62
15	Travel agencies	82	63
16	Post and communication	83	64
17	Banking and insurance	84–85	65–67
18	Culture and entertainment	94	92
19	Other services	86–93, 95–97	70–75, 80, 85, 90–91, 93, 95
20	Domestic tourism	–	–
21	International tourism	–	–

Table 4
Macro-SAMs for 1996 and 2002.

1996 (Trillion TL)		01	02	03	04	05	06	07	08	09	Total
01	Activities	0.0	23,540.5	0.0	0.0	0.0	0.0	0.0	0.0	2936.8	26,477.3
02	Commodities	11,783.7	0.0	0.0	0.0	0.0	10,556.1	1711.3	3623.5	0.0	27,674.6
03	Capital	2732.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2732.5
04	Labor	8820.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8820.7
05	Households	0.0	0.0	0.0	8820.7	0.0	0.0	234.4	0.0	282.0	9337.1
06	Enterprises	0.0	0.0	2732.5	0.0	7633.9	0.0	4022.9	0.0	287.6	14,676.9
07	Government	3140.4	709.7	0.0	0.0	1111.2	932.9	0.0	0.0	0.0	5894.2
08	Saving−investment	0.0	0.0	0.0	0.0	574.7	3187.9	−299.2	0.0	722.3	4185.7
09	Rest of the world	0.0	3424.4	0.0	0.0	17.3	0.0	224.8	562.2	0.0	4228.7
Total		26,477.3	27,674.6	2732.5	8820.7	9337.1	14,676.9	5894.2	4185.7	4228.7	

2002 (Billion TRY)		01	02	03	04	05	06	07	08	09	Total
01	Activities	0.0	379.6	0.0	0.0	0.0	0.0	0.0	0.0	122.1	501.7
02	Commodities	272.9	0.0	0.0	0.0	0.0	164.0	29.8	63.9	0.0	530.7
03	Capital	83.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.2
04	Labor	135.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	135.8
05	Households	0.0	0.0	0.0	135.8	0.0	0.0	8.9	0.0	12.1	156.8
06	Enterprises	0.0	0.0	83.2	0.0	88.1	0.0	42.4	0.0	7.4	221.2
07	Government	9.8	22.5	0.0	0.0	27.3	17.5	0.0	0.0	0.0	77.1
08	Saving−investment	0.0	0.0	0.0	0.0	35.5	39.7	−9.9	0.0	8.8	74.0
09	Rest of the world	0.0	128.6	0.0	0.0	5.9	0.0	5.9	10.1	0.0	150.5
Total		501.7	530.7	83.2	135.8	156.8	221.2	77.1	74.0	150.5	

Note: Turkish Lira (TL) was denominated in January 2005 by removing six zeros. One unit of the new currency, New Turkish Lira (TRY), was equal to 1 million units of the old currency (TL).

4.2. Measuring the importance of the international tourism sector

The usefulness of SAMs for tourism analysis is presented in detail in Hara (2008, pp. 116−147). In a SAM model, some accounts are set as exogenous, but there is no standard procedure for selecting exogenous accounts. In most SAM modeling studies, government, enterprises, capital-investment, and rest of the world accounts are set as exogenous and the remaining accounts as endogenous.

In examining the importance of the international tourism for the Turkish economy, two analyses are carried out. First, sectoral GDP elasticities and the relative importance of international tourism activities is examined. Second, the impact of the international tourism sector on the economy is investigated using the SAM impact analysis.

4.2.1. GDP elasticities

The simplest way to examine the impact of a sector on economic growth is to measure its GDP elasticity. In this approach, the percentage change in GDP caused by a unitary (1%) increase in a given sector's output is calculated, i.e., $\Delta GDP/GDP/\Delta Y_i/Y_i$, where Y_i is the level of output (supply) in sector i and Δ is the difference

operator. The relative importance of a given sector is examined by comparing its GDP elasticity with other sectors.

4.2.2. SAM impact analysis

SAM impact analysis is a widely used method of policy analysis. In this approach the impact of a shock in a given exogenous account on endogenous accounts is measured and decomposed into direct and indirect effects. In this study, direct and indirect impacts of the expenditures of foreign tourists on the economy are examined. Direct impact runs through endogenous accounts. Changes in output lead to changes in government tax revenues, households' income, firms' income, intermediate input demand, and the demand for labor. Indirect impact results from subsequent changes in the same variables following the first-round effects of the direct impact. The total impact on the economy is a combination of the direct and indirect impacts. Direct and indirect impacts are reported separately.

SAM impact analysis follows Oosterhaven and Fan (2006). At the outset, domestic tourism, international tourism, enterprises, government, saving−investment, and the rest of the world accounts are designated as exogenous accounts. In this form, the SAM is restructured in the same fashion as in Defourney and Thorbecke (1984) as shown in Table 5. Let the subscript n

Table 5
SAM with endogenous and exogenous accounts.

			Expenditures									Total
			Endogenous accounts			Exogenous accounts						
			Production	Factors	Households	Domestic tourism	International tourism	Enterprises	Government	S−I	ROW	
Income	Endogenous accounts	Production Factors Households		T_{nn}				T_{nx} (injections)				Y_n
	Exogenous accounts	Domestic tourism International tourism Enterprises Government S−I ROW		T_{xn} (leakages)				T_{xx}				Y_x
	Total			Y_n				Y_x				

Note: n refers to endogenous and x refers to exogenous Y is income and T is transactions.

represent the endogenous accounts. The transactions matrix for these accounts (T_{nn}) is a square matrix. The elements of this matrix are denoted as t_{ij}, where i and j are individual sectors. Dividing each element t_{ij} in T_{nn} by the respective column sum for the endogenous accounts (Y_n) (i.e., total expenditures), we get the technical coefficients matrix (A_{nn}) for the endogenous accounts. The exogenous part of total expenditures (T_{nx}) refers to injections. Then, by definition:

$$Y_n = T_{nn} + T_{nx} = A_{nn}Y_n + T_{nx} \tag{1}$$

The solution for Y_n is computed as follows:

$$Y_n = (I - A_{nn})^{-1}T_{nx} \tag{2}$$

The matrix $(I - A_{nn})^{-1}$ is the well-known Leontief inverse matrix. Here I is the identity matrix, i.e., the matrix whose diagonal elements are all equal to 1.

Since total expenditures equal total receipts (i.e. total output) in a SAM, total output vector Y_n is made up of endogenous incomes (T_{nn}) and exogenous incomes (T_{nx}). The endogenous part is composed of intermediate demand (INT_n) and endogenous household consumption (C_n). The exogenous part consists of the incomes of the following accounts: domestic tourism (DT_x), international (foreign) tourism (FT_x), enterprises (ENT_x), government (G_x), capital (saving–investment) account (K_x), and the rest of the world (ROW_x). Therefore:

$$Y_n = (INT_n + C_n) + (DT_x + FT_x + ENT_x + G_x + K_x + ROW_x) \tag{3}$$

For convenience, the subscripts n (endogenous) and x (exogenous) are dropped hereafter. Further specifications are needed to compute the impact coefficients. We assume that direct impact coefficients (m) are associated with per unit monetary value of output (y) in a similar fashion as in Miller and Blair (1985, p. 447) and Oosterhaven and Fan (2006):

$$m = My \tag{4}$$

where M is the matrix of direct impact coefficients whose elements are denoted as m. In Equation (3), some terms can be rearranged. First, intermediate demand (INT) is defined per intermediate input coefficient matrix (A) and the output vector (y) in the standard fashion:

$$INT = Ay \tag{5}$$

Similarly, household consumption is defined by a coefficient matrix B whose elements are defined per unit of output (y). Following Oosterhaven and Fan (2006), endogenous household consumption demand is associated with y through the consumption coefficients matrix B.

$$C = By \tag{6}$$

Following Oosterhaven and Fan (2006), matrix B is constructed by putting together per unit labor income coefficients (k), the tax rate (t), the saving rate (s), consumption coefficients (con), and consumption import coefficients (mc): $B = (I - mc) \cdot con(1 - s - t)k'y$, where $\cdot$ denotes cell-by-cell multiplication and k' is the row vector of labor income coefficients.

Finally, exogenous international tourism demand (IT) and domestic tourism demand (DT) are expressed per output. For this purpose, tourism survey data are used and the shares of tourism incomes in the income from the corresponding sectoral output are presented as a coefficient vector (J). For the international tourism account,

$$IT = JT_x \tag{7}$$

The solution for Y is found from Equations (3)–(6) as follows:

$$Y = (I - A - B)^{-1}(IT + DT + ENT + G + K + ROW) \tag{8}$$

Then, the solution for the impact variable, v, is found from Equation (8) as follows:

$$v = Z(I - A - B)^{-1}(IT + DT + ENT + G + K + ROW) \tag{9}$$

The change in the expenditures of foreign tourists, then, impacts on the economy through the following formula for the impact variable for international tourism (v^{IT}):

$$v^{IT} = Z(I - A - B)^{-1}IT \tag{10}$$

Equation (10) is a special version of the generalized input–output analysis in Miller and Blair (1985, p. 447). The term $Z(I - A - B)^{-1}$ is the impact coefficient matrix.

Since SAM models are demand-driven models, the inverse matrix $(I - A - B)^{-1}$ measures the sum of the direct, indirect, and induced impacts of unitary increase in exogenous demand. Since, by definition, the Leontief inverse matrix measures backward linkages, the inverse matrix $(I - A - B)^{-1}$ measures backward linkages by sectors, i.e., the dependence of a given sector on other sectors for their supplies of intermediate inputs. By pre-multiplying this inverse matrix with Z, the impact on production (in this special case, $Z = I$), value-added, and employment can be computed. The sectors with the largest backward linkages are culture and entertainment, agriculture, land transportation, other manufacturing, and hotel and restaurant services in 1996, and travel agencies, culture and entertainment, electricity and gas, food manufacturing, air transportation, and trade in 2002.[2]

5. Empirical results

5.1. GDP elasticities

Sectoral GDP elasticities for 1996 and 2002 are presented in Table 6. The sector with the highest impact on GDP in both years is the various domestic services (other services) sector. It is followed by other manufacturing, agriculture, and trade sectors in 1996 and by agriculture, construction, hotel and restaurant services, and wholesale and retail trade sectors in 2002. The sectors with the lowest GDP elasticity are culture and entertainment, air transportation, and international tourism sectors in 1996, and banking, clothing, international tourism, and maritime transportation sectors in 2002. GDP elasticity of international tourism sector was 0.001 in 1996 and 0.011 in 2002. In other words, 1% increase in the output (supply) of international tourism sector led to only 0.001% and 0.011% increase in GDP in respective years. Accordingly, out of 21 sectors, international tourism ranked 21st in 1996 and 20th in 2002. It can be asserted that international tourism was by no means an important sector for generating GDP in Turkey.

5.2. Results of the SAM impact analysis

GDP elasticity is a rough measure. In this section, the impact of international tourism (foreign tourist expenditures) on aggregate output (supply), aggregate value-added (GDP), and aggregate employment are examined. At the outset, it is important to note

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[2] For brevity, backward and forward linkages are not reported here. For details of backward and forward linkages see Miller and Blair (1985, pp. 317–325).

Table 6
GDP elasticities by sectors.

	1996	Rank (1996)	2002	Rank (2002)
Agriculture	0.236	3	0.200	2
Air transportation	0.010	20	0.024	17
Banking and insurance	0.076	9	0.019	19
Clothing and footwear	0.029	16	0.040	13
Construction	0.111	7	0.170	3
Culture and entertainment	0.011	19	0.044	12
Domestic tourism	0.050	11	0.048	11
Electricity and gas	0.048	12	0.051	10
Food, beverages and tobacco	0.152	6	0.107	6
International tourism	*0.001*	*21*	*0.011*	*20*
Hotel and restaurant services	0.039	15	0.136	4
Land transportation	0.062	10	0.078	8
Maritime transportation	0.028	17	0.009	21
Mining	0.193	5	0.027	16
Other manufacturing	0.267	2	0.021	18
Other services	0.284	1	0.245	1
Post and communication	0.042	14	0.058	9
Textile	0.079	8	0.033	14
Travel agencies	0.043	13	0.031	15
Water	0.024	18	0.083	7
Wholesale and retail trade	0.199	4	0.121	5

that official statistics do not report data for tourism-related employment due to inherent difficulty in defining the labor employed for tourism and other purposes.[3] Estimating the portion of labor employed for international tourism activities is an important problem. Tourism employment statistics published by the Association of Turkish Travel Agencies (TURSAB), assume that half of the labor force in the restaurant and bar services sector is employed for tourism activities.[4] TURSAB also estimates the level of employment in travel agencies and auxiliary transport services. Adding to these figures the labor force in transportation services sector, TURSAB estimates the direct employment in the tourism sector between 3.4% and 5.1% of total labor force in the economy for the period 1992–2001. This figure is likely to overestimate the level of total employment in the tourism sector. TURSAB estimates indirect tourism-related employment by multiplying direct employment by 1.5. Then, direct plus indirect employment increases to between 8.6% and 12.8% of the total labor force. In this paper, we take TURSAB employment estimates for travel agencies and auxiliary transport activities due to lack of such data in official statistics.

The estimates of the impact of the international tourist expenditures on output, value-added, and employment are presented in Fig. 1. The total foreign tourist expenditures were 105,395 billion Turkish Liras (TL), about 1.3 billion US dollars in 1996, and 2832.4 million New Turkish Liras (TRY), about 1.9 billion US dollars in 2002.[5] The total impact of international tourism expenditures on output was 1.054% of aggregate output (279,072.4 billion TL) in 1996 and 1.049% of aggregate output (5262.0 million TRY) in 2002. The total impact of international tourism demand on aggregate value-added (GDP) was 0.896% of GDP (131,658 billion TL) in 1996 and 1.325% of GDP (3031.5 million TRY) in 2002. Thus, there was an

improvement from 1996 to 2002. Finally, the impact on employment as percentage of total labor force was 0.58% in 1996 and 0.61% in 2002. In terms of the number of jobs, these mean 117.983 jobs in 1996 and 130,541 jobs in 2002. 1 billion TL of foreign tourist expenditures generated 0.9 jobs in 1996. The equivalent of 1 billion TL in 1996 is 16,743 TRY in 2002.[6] This amount of tourist expenditures in 2002 created 0.8 jobs, which is close to the 1996 figure. However by using the tourist expenditure data in Table 1, it can be found that the number of foreign tourists required to generate one extra job increased from 90.7 tourists in 1996 to 152.8 tourists in 2002.

The total impact of international tourism can be decomposed into direct and indirect effects. Direct effects result from the first-round effects of foreign tourist expenditures on sectoral output levels and employment as well as imports of goods and services. Indirect effects measure the additional impact of the first-round effects on the economy and work through institutional incomes and purchases of other sectors' outputs (mostly from financial, insurance, and retail trade services). With additional business opportunities, new jobs are created and new expenditures are stimulated. Indirect effects are reflected in the linkages between sectors. Tourism is known to have significant backward linkages and virtually no forward linkages. Table 7 shows that indirect effects are generally larger than direct effects in the case of output impact. The number of sectors in which indirect effects were smaller than direct effects decreased from eight in 1996 to three in 2002.

The large share of indirect effects implies the importance of intersectoral input–output linkages. Accordingly, the total impact of foreign tourist expenditures is decomposed into sectors of origin. The impact of the demand of foreign tourists is channeled to the economy through intersectoral linkages. Table 8 presents the percentage sectoral distribution of the impacts of foreign tourist expenditures for 1996 and 2002. The impact of foreign tourist expenditures was lower on output due mainly to stimulated production in the manufacturing sector (43.6% of the total in 1996 and 58% in 2002) and, to much smaller degree, in agriculture. In addition, from 1996 to 2002, hotel and restaurant services and air transportation services became important channels through which the impact of foreign tourist expenditures on the economy worked. These findings are reflected in the composition of foreign tourist expenditures. According to TSA, foreign tourists spent mostly on manufactured goods such as food, beverages, clothing, souvenirs, carpets, jewelry, etc., which make up about 40% of their expenditures in 1996 (SIS, 2002, p. 4) and 50% in 2002 (SIS, 2005, pp. 95–97). The second and third largest expenditure items were accommodation services (20% in 1996 and 27% in 2002), and transportation services (12% in 1996 and 6% in 2002).

Sectoral disaggregation of the impact of foreign tourist expenditures on aggregate value-added (GDP) is presented in Table 8. About half of the impact on GDP in 1996 was captured by agriculture (22.8%), other domestic services (14.5%), and food manufacturing (10.9%) sectors. In 2002, 42% of the impact on GDP was occupied by other domestic services (15.8%), agriculture (13.7%), and construction (12.2%) while food and agriculture accounted for 33.7% of foreign tourist expenditures demand in 1996, it declined to only 15.9% in 2002. Various domestic services (most notably, construction and retail/wholesale trade) accounted for the large part of the remaining portion of the impact on GDP.

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[3] For technical issues on this matter, see ILO/UNWTO (2008). US tourism satellite accounts, published by the Bureau of Economic Analysis, also use a tourism-industry ratio to estimate tourism employment in the tourism-related industries (Okubo & Planting, 1998).

[4] These statistics are published online on http://www.tursab.org.tr (accessed Aug 31, 2010).

[5] Turkish Lira (TL) was denominated in January 2005 by removing six zeros, effectively transforming 1 million Lira into 1 New Turkish Lira (TRY). Therefore, TL 1 billion is equal to TRY 1000.

[6] This is because GDP deflator (1987 = 100) increased from 14,119.63 in 1996 to 236,408.79 in 2002. Average price level increased 16.743 times from 1996 to 2002. Therefore, 1 billion TL in 1996 translates to 16.743 billion TL, or equivalently 16,743 TRY, in 2002.
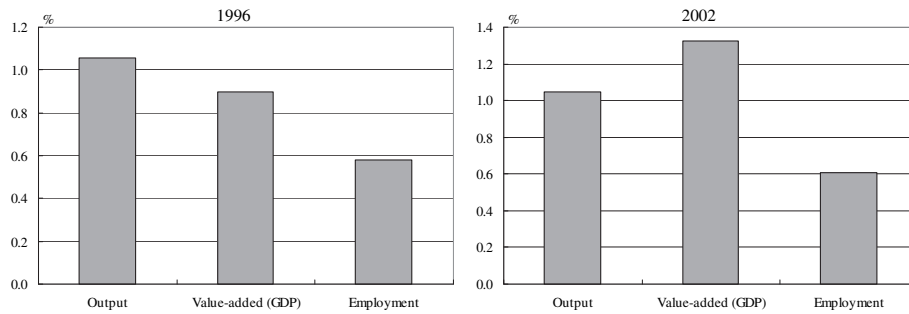
Fig. 1. Total impact of the international tourism sector on aggregate output, value-added (GDP), and employment.

Table 7
Direct and indirect effects of international tourism on output.

	1996 (Trillion TL)				2002 (Billion TRY)			
	Direct effect	Indirect effect	Total effect	Indirect/direct	Direct effect	Indirect effect	Total effect	Indirect/direct
Agriculture	73.6	549.1	622.7	7.46	329.2	700.7	1029.9	2.13
Mining	171.9	78.2	250.2	0.45	83.6	249.6	333.2	2.98
Food, beverages, tobacco	59	223.5	282.5	3.79	424.6	498.1	922.7	1.17
Textile	5.7	34.5	40.3	6.05	304.0	256.4	560.5	0.84
Clothing and footwear	1.7	7.1	8.8	4.18	139.7	152.3	291.9	1.09
Other manufacturing	1529.7	689.4	2219.2	0.45	207.9	633.2	841.2	3.05
Electricity and gas	18.5	6.3	24.8	0.34	21.2	73.5	94.8	3.46
Water	0.9	1.5	2.3	1.67	25.4	39.4	64.9	1.55
Construction	0.1	0.2	0.3	2.00	159.4	229.4	388.8	1.44
Wholesale and retail trade	37	324	361	8.76	677.4	519.5	1196.9	0.77
Hotel and restaurant services	20.9	16.9	37.8	0.81	31.9	94.0	125.9	2.95
Land transportation	18.4	44.4	62.8	2.41	209.9	160.9	370.9	0.77
Maritime transportation	8.7	4.7	13.4	0.54	46.3	72.1	118.5	1.56
Air transportation	2	1.3	3.2	0.65	8.6	44.6	53.1	5.21
Travel agencies	0.3	12.9	13.2	43.00	80.4	86.6	167.0	1.08
Post and communication	4.1	7.5	11.6	1.83	91.5	85.0	176.6	0.93
Banking and insurance	20.7	25.8	46.5	1.25	108.7	151.3	260.0	1.39
Culture and entertainment	32.5	1.3	33.7	0.04	11.7	48.3	60.0	4.14
Other services	322.6	180.4	503	0.56	389.4	537.9	927.2	1.38
Total	15,995.3	10,171.6	26,166.8	0.64	18,785.4	10,955.8	29,741.2	0.58

The share of hotel and restaurant services also rose remarkably from 1996 to 2002.

The impact of foreign tourist expenditures on sectoral employment levels was led by agriculture (48.1%), followed by other domestic services (15.4%) and wholesale and retail trade (12.4%) sectors in 1996. Agriculture led all sectors also in 2002, but to a smaller extent (27.9%), followed by other domestic services (18.5%), wholesale and retail trade (15.3%), and other

Table 8
Total impact of international tourism sector, sectoral percentage shares in total impact.

	1996			2002		
	Output	Value-added	Employment	Output	Value-added	Employment
Agriculture	13.4	22.8	48.1	10.4	13.7	27.9
Mining	3.6	9.7	0.5	1.1	1.7	0.5
Food, beverages and tobacco	10.2	10.9	1.1	4.0	2.2	2.5
Textile	5.3	5.4	1.2	0.0	5.8	3.7
Clothing and footwear	4.4	0.3	1.2	0.8	7.2	2.4
Other manufacturing	23.7	5.1	4.0	53.2	1.9	13.9
Electricity and gas	1.7	1.9	0.3	6.3	4.1	0.6
Water	0.5	1.2	0.0	0.0	3.5	0.0
Construction	6.1	4.7	8.8	0.0	12.2	4.8
Wholesale and retail trade	9.2	5.9	12.4	0.0	7.9	15.3
Hotel and restaurant services	2.7	1.4	1.1	9.4	6.8	3.0
Land transportation	4.1	3.4	3.6	0.2	6.9	3.1
Maritime transportation	1.3	1.5	0.1	0.2	1.3	0.1
Air transportation	1.5	0.9	0.1	5.5	1.4	0.1
Travel agencies	1.6	2.7	0.1	0.0	0.4	0.3
Post and communication	1.1	2.6	1.1	0.0	2.6	1.5
Banking and insurance	2.7	3.8	0.8	0.6	1.6	1.0
Culture and entertainment	1.5	1.5	0.2	3.1	3.1	0.7
Other services	5.4	14.5	15.4	5.0	15.8	18.5
Services total	37.7	44.1	43.7	24.0	63.5	48.4
Manufacturing total	43.6	21.7	7.5	58.0	17.1	22.5

manufacturing (13.9%). The large figure for wholesale and retail trade reflects the large share of various domestic manufactures in total foreign expenditures, because a large part of the products demanded by foreign tourists in the coastal areas and Istanbul takes place in manufacturing production centers (e.g., Istanbul, Ankara, Izmir, and Bursa). The role of wholesale and retail trade is the coordination of production in manufacturing industries. Hence, wholesale and retail trade services receive a large portion of induced employment.

It is seen from the combined shares of services and manufacturing sectors, shown in the bottom two rows of Table 8, that there was an imbalance between actual shares in total output and the sectoral shares in the impact of international tourism on output and value-added. Despite its lower share in total output, manufacturing occupied a larger share in output and employment impact. On the other hand, the share of services in GDP impact increased largely from 44.1 to 63.5% while the increase in employment impact was smaller. The share of services in employment impact is related to its share in total employment in the economy whereas the share of manufacturing in employment impact was below its share in total labor force in 1996 and above it in 2002. Relatively low share in value-added impact and relatively high share in employment impact indicate low productivity. In this regard, the low level of productivity in agriculture is evident from Table 8. Manufacturing is more productive and services productivity is, as well-known, far lower.

6. Conclusion

In this paper, the importance of international tourism for the Turkish economy is investigated from two perspectives: (i) sectoral comparisons of GDP elasticities, and (ii) calculation of the impact of the international tourism sector on output, value-added (GDP), and employment. These analyses were conducted using the SAMs for 1996 and 2002.

The findings draw a somewhat negative picture for the contribution of international tourism to the economy, but the results of the analyses have important policy implications. Although international tourism was generally deemed as an important sector in previous studies, the impact of foreign tourist expenditures on domestic production, value-added (GDP), and employment in Turkey can be best described as modest. In addition, compared to international tourism, domestic tourism activities are found to be more important in terms of GDP elasticity, which indicates the need to diversify tourism activities. Tosun et al. (2003, pp. 154–155) argued that domestic tourism can be used as a cushion to overcome a possible crisis due to unexpected negative demand shocks. In addition, Seckelmann (2002) argued that the development of domestic tourism may help improve inter-regional inequalities. More attention should be paid by the government to domestic tourism. Domestic tourism can be seen as a substitute for international tourism on the condition that domestic tourists have a smaller propensity to spend on imported goods and services than foreign tourists. Another important policy recommendation is to put in place effective long-term strategies to promote domestic resource use in order to reap the benefits of foreign tourist expenditures.

The reason for a weak contribution of international tourism to the economic growth can also be sought in structural problems related to the role played by tour operators and the problems related to the way of doing business. Foreign tour operators in Europe control the demand side of the international tourism business by promoting the western and eastern coasts, which are endowed with rich natural resources for the sun-sea-sand tourism (Tosun et al., 2003, pp. 134–135). Turkey's comparative advantage in international tourism sector is the low costs of providing various

services which helps attract more tourists from Europe through package tours offered by foreign tour operators. As a result, the government favors coastal regions in allocating incentives and funds devoted to the development of tourism to the detriment of the other segments of international tourism, such as culture tourism in which Turkey is also well-endowed.

Empirical studies tend to emphasize the positive contribution of foreign tourist expenditures on the economy through backward linkages which increase domestic production and demand for domestic inputs. The results of this paper imply that this mechanism largely fails to work in Turkey. This brings about the possibility of the leakage of foreign tourist expenditures out of the economy albeit only partially. In this regard, it is important to examine the relation between goods and services imports and foreign tourist expenditures. If part of foreign tourist expenditures, such as accommodation, restaurants, daily necessities, and transportation, are directed to imported goods and services, then part of the revenues from international tourism leak out and fail to have a favorable impact on domestic production and employment. Due to lack of data on the expenditures of foreign tourists on imported goods, at this stage, it is not possible to quantify the extent of the leakage of tourist expenditures.

This paper examines the importance of tourism demand for the Turkish economy by using SAM impact analysis. Applied general equilibrium assessment of the government's international tourism policies such as those reported in the strategy paper of the Turkish Ministry of Culture and Tourism titled *Tourism Strategy of Turkey – 2023* (MCT, 2007) remains a future research topic. Furthermore, regional impacts of foreign tourist expenditures can be investigated using the currently unavailable regional SAMs. Empirical analysis of poverty and income distribution across different types of households is beyond the scope of this paper, but they remain as important future research areas.

The empirical results of this paper should be interpreted with caution due to several limitations regarding the assumptions of the SAM model data availability. The SAM model is an extended version of the linear I–O model where changes stimulated by exogenous shocks are average rather than marginal changes. In addition, lack of longitudinal tourism data, especially tourism satellite accounts, poses an important limitation to tourism studies in Turkey. Tourism satellite accounts are available only for 1996–1998 and 2001–2003, and I–O tables are available for 1996 and 2002. Economic conditions have changed since 2002 and it is necessary to analyze more recent developments in international tourism activities. For this purpose, there is a need for a more recent I–O table which has a higher level of sectoral disaggregation, especially regarding tourism and tourism-related sectors. In particular, it is important to note that construction of the missing international tourism data was possible only by making several assumptions such as the tourism ratio. With the availability of more recent data, the analysis can be extended beyond 2002.

Appendix. Social accounting matrix: construction and data sources

A.1. Structure of the SAM and data sources

The SAMs for 1996 and 2002 are constructed by first preparing the aggregated macro-SAMs and then disaggregating the activities

and commodities accounts into 19 sectors. The most recent I–O table for Turkey is the 2002 I–O table. In the macro-SAM there are nine accounts: two production accounts (activities and commodities), two factors of production (capital and labor), three institutions (households, government, and enterprises), a capital-investment account, and a rest of the world account.

In this section, each cell in the macro-SAM and the data sources are explained. I–O table is the main database for the SAM. Two most important tables in the I–O table are supply and use tables. The supply table (ST) exhibits primary and other production activities of industries and imports of goods and services. The use table (UT) exhibits all costs of production by industries: intermediate input use across industries, components of value-added, and indirect taxes. In addition, the UT reports components of final demand: private consumption, public consumption, fixed capital formation (investment), changes in stocks, and exports.

Turkish I–O tables for 1996 and 2002 are available at basic values, i.e., producers' prices less commodity taxes. The I–O tables prior to 1996 do not include supply and use tables. They are measured at market (purchasers') prices, including the cost of goods and services to the point of delivery to purchasers. This is equal to producers' prices inclusive of transaction costs, i.e., any cost incurred during the supply of goods or services to the market such as transportation and trade margins and value-added tax.

In addition to I–O tables, data for the government account are obtained from the consolidated budget accounts which are available in the Central Bank of the Republic of Turkey Data Electronic Data Dissemination Service (EDDS), annual issues of the Statistical Yearbook of Turkey published by Turkish Statistical Institute (Turkstat, formerly State Institute of Statistics), and the State Planning Office. The accounts of municipalities are included in these figures. Balance of payments accounts (reported under "Rest of the World" in the national accounts) were obtained from Turkstat and EDDS. Balance of payments figures are converted from US dollar to Turkish Lira using average annual exchange rates reported by Turkstat. Macro-SAMs for 1996 and 2002 in Telli, Voyvoda, and Yeldan (2007) were also used. For the household account, we used the household budget (income) and consumption surveys published by Turkstat in 1994 and 2002.

In what follows, each cell in the macro-SAM is explained. The position of each cell in the SAM is indicated by the respective row number (R) and column number (C) in Table 2. For instance, (R2, C1) corresponds to the second row (commodities) and the first column (activities). This cell represents intermediate input demand.

Domestic sales (R1, C2): Domestic sales are calculated by deducting the value of total exports from total output (column sum of the activity account).

Exports (R1, C9): Exports of goods and services refer to purchases of goods and services by non-residents. Foreign tourists' purchases of goods and services are excluded from exports. Exports are measured on free-on-board (f.o.b.) basis and obtained from the UT.

Intermediate input demand (R2, C1): Intermediate input demand data are obtained from the UT.

Household consumption (R2, C6): Household consumption expenditures refer to private consumption of residents and they are obtained from the UT.

Government consumption (R2, C7): Government consumption demand data refer to government's purchases of goods and services and are obtained from the UT.

Investment (R2, C8): Investment demand refers to additions to stocks of fixed assets and includes expenditures on residential buildings, machinery and equipment, repairs, and changes in inventories. Investment demand data are obtained from the UT.

Labor compensation (R3, C1): Compensation refers to total cost of employment to employers and includes wages and salaries of employees, employers' payments to pension fund, and other welfare payments. Labor compensation data are obtained from the UT.

Gross operating surplus (R4, C1): Operating surplus refers to payments made to capital services and it is derived by deducting compensation of employees, and indirect taxes except commodity taxes from gross output intermediate demand,. Capital consumption allowance is included. These data are obtained from the UT.

Non-distributed profits (R5, C4): Retained corporate income of enterprises refers to gross operating surplus exclusive of production taxes, intermediate demand, and compensation of employees. It includes gross factor income arising from the use of capital inclusive of capital consumption allowance and received remittances of profits from the rest of the world. This statistic is not directly available from official statistics and it was calculated as a residual that balances the row and column sums of the capital account.

Government transfers to enterprises (R5, C7) *and households* (R6, C7): Current transfers to households from the government refer to social security payments. Firms also receive transfers from the government. These are computed from the statistical yearbook.

Transfers from the rest of the world to enterprises (R5, C9) *and households* (R6, C9): Transfers from the rest of the world to households, firms, and government are adopted from Telli et al. (2007).

Labor income (R6, C3): Labor income accruing to households refers to compensation in return for labor services. These data are obtained from the UT.

Enterprise transfers to households (R6, C5): Corporate dividends are indirect capital payments by firms to households. These statistics are adopted from Telli et al. (2007).

Indirect taxes (R7, C1) *and import tariffs* (R7, C2): Commodity taxes (e.g., excise duties) and indirect taxes (e.g., property taxes, license fees, etc.) as indirect taxes are levied as a proportion of the quantity produced and sold, respectively. Import tariffs (customs) are paid per unit of imports. These statistics are obtained from the UT and the ST.

Direct taxes on enterprises (R7, C5) *and households* (R7, C6): Firms and households pay taxes to the government from the income they earn. These values are reflected in the tax accounts of the government. These statistics are obtained from the budget accounts.

Corporate savings (R8, C5) *and household savings* (R8, C6): Corporate savings of firms are computed as a residual balancing item in the enterprises account. Similarly, total savings of households is computed as the excess of household income over total household expenditures. Corporate savings refer to savings of enterprises and property income.

Government saving (R8, C7): Government saving is calculated as the current surplus of the consolidated government budget and it is obtained from the budget accounts.

Transfers to the rest of the world (R8, C9): Factor transfers to the rest of the world refer to international transfers of capital profits and labor income. They are computed from the balance of payments statistics.

Imports (R9, C2): Goods and services imports are measured on c.i.f. (cost, insurance, and freight) basis. They are obtained from the ST.

Current transfers abroad (R9, C5): Firms make transfers to the rest of the world in the form of factor payments, i.e., remittance of profits. This statistic is calculated from the balance of payments statistics.

Foreign savings (R9, C8): This cell refers to current account balance, i.e., the excess of receipts from abroad over expenditures abroad, and it is obtained from the balance of payments statistics.

A.2. International tourism account

International tourism receipts are generally included in export receipts in the I–O tables. Outbound tourism expenditures, on the other hand, are included in import payments. For the purpose of this paper, it is necessary to split international tourism receipts and payments from international trade. Therefore, international tourism account needs to be split from the rest of the world account in the SAM. Foreign tourist expenditure statistics for 1996 and 2002 are available in *Tourism Satellite Accounts 1996–1998* and *Tourism Statistics 2001–2003,* both published by Turkstat (SIS, 2002, 2005). Tourist expenditures are originally classified into 26 categories in *Tourism Satellite Accounts 1996–1998* and 29 categories in *Tourism Statistics 2001–2003*. These are aggregated into the following 12 categories: food (including beverages and tobacco), hotel and restaurant services health services, land transportation (including railway transportation), maritime transportation, air transportation, culture and entertainment, communication, tours, clothing and footwear, and other services. These figures are then allocated to the corresponding production accounts in the micro–SAM.

Due to lack of data on outbound tourism expenditures, these data are estimated in the following manner. The sum of total outgoing tourism expenditures is readily available in the official statistical yearbook. Taking this sum as a benchmark, outgoing tourist expenditures are estimated by assuming that the sectoral shares are the same as international (inbound) tourism. Since total outgoing tourism expenditures are very small compared to inbound tourism revenues, it is assumed that this adjustment does not create a significant bias.

A.3. SAM balancing procedure

In constructing the SAM, data obtained from different sources are gathered. Therefore, initially the SAM was unbalanced as expected, i.e., the row and column sums did not match. The unbalanced SAM was balanced using the cross-entropy method (Robinson, Catteano, & el-Said, 2000). In this method, first, various data on intersectoral transactions and institutions accounts are put together. Then, the cross-entropy distance between the estimated SAM and the original unbalanced SAM is minimized. In doing this, some restrictions are applied. The figures obtained from the I–O tables (intermediate input use, production factor accounts, composition of value-added, taxes, imports, and final demand by institutions) are fixed. Domestic sales and transactions across institutions (transfers among households, government, and the rest of the world) are then estimated using the cross-entropy method.

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