CGE ASSESSMENT OF TOURISM POLICIES IN TURKEY

K. Ali Akkemik and Erisa Dautaj Şenerdem[1]

Paper prepared for the 54th ERSA Congress in St. Petersburg, Russia, August 26-29, 2014.

Abstract

Turkey is among the leading countries in the world tourism market in terms of tourist arrivals and tourism revenues. Tourism sector has grown rapidly over the last three decades. It is generally argued that tourism sector creates opportunities for employment and contributes to economic growth and international tourism revenues compensate part of the current account deficit, which has traditionally been a major source of structural problems in Turkey. Acknowledging these, the government recently published a strategy paper for tourism titled "Tourism Strategy of Turkey - 2023". In this study, we critically analyze the tourism strategy of Turkey using a multi-sector dynamic applied computable general equilibrium (CGE) model. The model includes two separate tourism sectors and the sectoral disaggregation of the model emphasizes tourism-related activities. To create the social accounting matrix, we use GTAP 8 database and data from satellite accounts. Subsequently, we run policy simulations to assess alternative tourism strategies and the potential impacts of exogenous shocks.

Keywords: Turkey, tourism, general equilibrium model

JEL Classification: C68; L83

[1] Kadir Has University, Department of Economics, Turkey. Emails: ali.akkemik@khas.edu.tr, erisa.dautaj@gmail.com. K. Ali Akkemik acknowledges research grant provided by Kadir Has University (2013-BAP-06).

1. Introduction

Tourism has turned out to be one of the world economy's most vibrant sectors, employing 9 percent of world's GDP in 2013 through its direct, indirect and induced impact (UNWTO, 2013). The number of international tourists globally soared from 25 million in 1950 to 1,035 million in 2012 and is expected to reach 1.8 billion by 2030, according to long-term forecasts by the UNWTO (2013). The number of touristic destinations has increased ever since and the UNWTO forecasts that the market share of emerging economies is expected to increase from 47 percent in 2012 to 57 percent by 2030.

Turkey has recently emerged as a major destination for international tourism. According to UNWTO statistics, Turkey's share in total international tourism revenues in the world in 2013 was about 2.5percent. Both international and domestic tourism activities have expanded rapidly during the last three decades. Since the early 1980s, tourism sector has been deemed as a key growth engine for the Turkish economy. Tourism receipts (domestic and international combined) reached a level as high as 5.12 percent of Turkey's GDP in 2013. Despite the lack of official data on employment in the tourism sector, it is generally believed that the sector accounts for a considerably large share of total employment in Turkey. For instance, World Travel and Tourism Council estimates the share of travel and tourism sectors in total employment in Turkey in 2013 as 9.1 percent (WTTC, 2014).[2] Out of this, about 2 percentage points was due to direct employment and the rest was due to indirect and induced employment. In addition, WTTC (2014) estimates the direct contribution of travel and tourism sectors to GDP in 2013 at 4.6 percent.

UNWTO statistics rank Turkey sixth in the world tourism market in international tourist arrivals and 12th in international tourism receipts (UNWTO, 2013). Receipts from international tourism in 2013 reached 32.3 billion US dollars, while the figure was about 9.7 billion US dollars for domestic tourism. The total is about 4 percent of GDP, supporting the estimate by WTTC (2014). Economic policymakers often refer to the importance of the international tourism sector as an important foreign exchange earner for the country, contributing to finance the current account deficit.

The government deems the tourism sector as an earner of foreign exchange. Recently, the government published a strategy paper for tourism titled "Tourism Strategy of Turkey - 2023" and declared its own projections and targets for the 100th anniversary of the foundation of the Republic of Turkey.

Recently there is a surge on quantitative studies analyzing tourism policies in various countries using various techniques ranging from econometric methods input-output and applied general equilibrium analysis. With the incorporation of tourism satellite accounts into

[2] In calculating tourism employment, WTTC includes all goods and services produced by hotels, restaurants, travel agents, air transportation, land and maritime transportation services (except for commuters), and recreation services sectors.

the national accounts, multi-sector general equilibrium models became possible. Econometric studies generally examine the tourism-led growth hypothesis. Multi-sector input-output and general equilibrium studies are broader in their coverage and they incorporate the demand-input-supply-income relations by taking into interactions among production activities, households, firms, government, and the rest of the world. Therefore, they are superior to econometric methods.

Turkish government has an ambitious tourism strategy and a quantitative evaluation of this strategy as well as a general equilibrium analysis of various policy alternatives for turkey is necessary. Although there are a number of econometric studies on the importance of the tourism sector in the Turkish economy (e.g., Gunduz and Hatemi-J, 2005; Bahar, 2006; Kaplan and Celik, 2008; Zortuk, 2009), there are only two studies using a social accounting matrix analysis (Akkemik, 2012; Gül, 2013). However, such studies are linear in nature and a more comprehensive computable general equilibrium (CGE) analysis is necessary. To our knowledge, this paper is the first paper CGE analysis on tourism sector in Turkey. We critically analyze the tourism strategy of Turkey using a multi-sector dynamic CGE model with a 20-year horizon. The model includes two tourism sectors, domestic and international. We build a social accounting matrix using data from the GTAP 8 database and data from tourism satellite accounts and tourism expenditure statistics. Subsequently, we run policy simulations to assess alternative tourism strategies and the potential impacts of exogenous shocks. The results bear important policy implications for the economy.

The remainder of the paper is organized as follows. Section 2 summarizes the recent tourism policies in Turkey since 1980. The structure of the CGE model is presented in Section 3. The following section describes the policy simulations. The results are presented and interpreted in the fifth section. Finally, section 6 concludes the paper.

2. Tourism Sector Policies in Turkey

2.1. Current State of Tourism Sector in Turkey

Tourism sector has recorded a remarkable development performance after the early 1980s. This came at a time when Turkish policymakers have opened up the almost closed economy in 1980 after experimenting with inward-oriented import-substitution type of development policies for about two decades. International tourism sector has especially grown at remarkable rates. To put this in perspective, Table 1 shows that international tourism revenues, barely above 1 billion dollars in 1985 reached 10 billion in 2001 and 22 billion in 2008.

The number of foreign tourist arrivals also increased remarkably, especially after reaching 10 million in 2000 and almost 30 million in 2010. For both indicators, Turkey's share in international tourism revenues and in total foreign tourist arrivals in Europe exhibited remarkable increase from about 2 percent in 1990 to around 5 percent in 2008 (Akkemik,

2012). In incoming foreign tourist arrivals, German tourists topped the list in 2013 with 4.2 million, followed by tourists from Russia, the UK, Georgia and Bulgaria.

Figure 1 presents total international tourism revenues and gross domestic product (GDP) for Turkey over period 1980-2013. The figure reveals the rising trend for international tourism revenues expressed as percentage of GDP, especially after the late 1990s. The rising trend implies faster growth rate of tourism growth compared to GDP. However, after reaching 4.6 percent in 2003, this ratio fell afterwards and settled between 3.5-4.0 percent after 2009. The average growth rate of tourism revenues and Turkish GDP for the period 2003-2012 was 5.9 percent, while the annual average economic growth rate stood at 5.0 percent. In addition, Figure 2reveals that average expenditure per international tourists (including Turkish citizens residing abroad and vising homeland) did not vary much over the last decade.

Increasing international tourism revenues also came with a change in the composition of foreign tourists' expenditures. Figure 3 exhibits the evolution of foreign tourist expenditures' main items. One of the most significant changes in the past decade is the sharp rise in the share of international transport services provided by Turkish companies. The share of international transport provided by Turkish firms soared from 4 percent in 2002 to 17 percent in 2013. This is most likely a result of the successful business strategies of the airlines sector firms, especially the national carrier. Another noticeable change is the share of the "other" category, which speared up from 6 to 20 percent. Turkstat defines this category as expenses made on "personal care, gold bought for personal purposes, silver, books, magazines, etc." that are not mentioned anywhere else in the other categories. An interesting statistic is the declining share of foreign tourists' spending on sports, education and culture.

Most researchers emphasize that the international tourism sector stands out with its capability to finance the current account deficit, which is a chronic disease of the Turkish economy. We show in Table 4 Turkey's balance of payments for selected years between 2001 and 2013. Tourism services account is the major contributor to services balance in the balance of payments. Traditionally, this account is always in surplus and helps reduce the current account deficit by partially counterbalancing the large deficit arising from the goods balance.10th Development Plan prepared by the Ministry of Development estimates the international tourism receipts to increase to 40.8 billion US dollars in 2018, implying an annual average growth rate of 7.8 percent for the period 2014-2018 (Ministry of Development, 2013).

2.2. An Overview of Tourism Sector Policies

The remarkable development of the international tourism sector was accompanied by tourism policies of the government after the 1980s. A history of tourism policies of the government especially after 1980 is available elsewhere (Alp, 2009; Akkemik, 2012).Here we will briefly review these policies and focus our attention on the official tourism strategy paper.

International tourism became an integral part of the government's outward-oriented development strategy after 1980. The development of the sector gained momentum after the enactment of the law encouraging tourism activities in 1982. Various incentives were provided to entrepreneurs engaging with tourism activities, such as the provision of cheap land and various tax exemptions. International tourism investments by private entrepreneurs focused mainly on the western and southern coastal areas which are attractive for Western European tourists. For the most part of the 1980s and the 1990s, European tourists were the main sources of tourism revenues. Thanks to growing demand from Western Europe and the low costs, especially that of labor, the sector grew rapidly over the years as discussed in the previous subsection. In the 2000s, a new source of revenues emerged for the sector. Partly due to the government's efforts to integrate economically with the Middle Eastern and African economies, the revenues from tourists coming from Middle Eastern countries increased largely. This was further strengthened by Turkish cultural exports (such as TV soap operas) to the region.

With the rising tourism revenues, the size of the budget of the Ministry of Culture and Tourism was also strengthened by the government. According to official statistics by the Ministry of Finance, General Directorate of Budget and Fiscal Control, the expenditures of the Ministry of Culture and Tourism remained stable around 0.4 and 0.5 percent between 2006 and 2012. To put this statistic in perspective, the corresponding share of the Ministry for Energy and Natural Resources was less than half of a third of that for tourism ministry.

Turkish government currently supports the tourism sector through various incentive schemes, including support by Small and Medium Enterprises Development Organization (KOSGEB), investment incentives, financial support in the framework of the 1982 law on tourism incentives, tax exemptions, low-interest credits by Turkey's Export Loans Bank (Eximbank), special incentives to foreign investment as well as financial support for participation in international tourism fairs. An extended discussion on tourism incentives can be found in MCT (2009) and Özgen (2013).

The Turkish government has set targets and projections for the tourism sector in its *Tenth Development Plan: 2014-2018*, prepare by the Ministry of Development (MD) and the strategy paper prepared by the Ministry of Culture and Tourism (MCT) entitled *Tourism Strategy of Turkey: 2023*, the bible for the future of Turkey's tourism sector in the coming decade. The goals set in the development plan are to "become a global brand through quality labor force, facility and services in the tourism sector, diversify and improve tourism products and services in order to attract higher income tourists, … increase the sectoral value added; and make tourism a key sector for regional development based on the principle of sustainability" (MD, 2013).

The plan forecasts an increase of the number of international tourists to 48.3 million by 2018, which corresponds to an average annual growth of 4.6 percent for the plan period, 2014-2018. Also, tourism receipts are expected to grow at an average annual rate of 7.7

percent during the same period, while outbound expenditures are expected to grow by 9.9 percent. Total public sector fixed capital investment in tourism amounted to 2.1billion Turkish Liras for the period 2007-2013 and expected to reach 2.5billionLiras, or 0.6 percent of total public sector fixed capital investments in the period 2014-2018 (MD, 2013).

Long-term targets in the tourism strategy paper are based on the principle of sustainability. The main objectives are stated as enhancing employment and contributing to economic development by achieving the status of fifth largest tourism market in the world in terms of the number of international tourist arrivals and revenues by 2023. The strategy paper aims to attain these objectives through a number of tools including coordinated planning at both regional and national level, incentives to increase investment in tourism, and improvement of quality in human and physical capital and development of global brands.

One of the most important proposals of the government in the strategy paper and the 10th Development Plan is the revival of physical investments and to regain its 1990s pace. For this purpose, the government plans to encourage investments through assisting small and medium-sized enterprises, making better use of European Union pre-accession funds, renovating tourism facilities in the short term, providing low-interest loans for the long term, and devising marketing policies for diversification of tourism. The strategy also targets the completion of the development of infrastructure along the Aegean and Mediterranean coasts by 2023 as a key target.

The government also emphasizes research and development in the sector, particularly focusing on the use of information technologies by tourism facilities and personnel, as well as on studies on the impact of tourism on the economy. The government also expects to develop and increase the visibility of prestigious Turkish brands through extensive use of new telecommunications technology by public and private sector players.

Overall, should the tourism strategy be implemented successfully, it is expected to benefit the Turkish economy by 86 billion US dollars in income from international tourism. The number of tourists in 2023 is estimated to rise to 63 million and the per-tourist expenditures to rise to 1350 US dollars, from its current level of slightly above 800 US dollars (MCT, 2007).

3. The Structure of the CGE Model

Most studies about the impact of the tourism sector and tourism policies on the economy use econometric and linear models such as social accounting matrix (SAM) modeling. While the econometric models have a more focused and narrow stance as they emphasize the partial equilibrium aspects, the input-output (I-O), SAM and CGE methods are broader in scope and take into account the relations across sectors and institutions in the economy. The econometric studies for Turkey generally test the tourism-led growth (TLG) hypothesis (e.g., Gündüz and Hatemi-J 2005, Bahar 2006, Kaplan and Celik 2008, Katircioglu 2009, Zortuk 2009). These are partial equilibrium analyses and ignore intersectoral relations.

Input-output, SAM, and CGE models provide general equilibrium assessment. Among these, I-O and SAM models are linear models and hence weak in technical terms. CGE model, on the other hand, adds more complication to general equilibrium analysis and incorporates nonlinearity into the behaviors of the sectors and institutions in general equilibrium.

CGE models are extended SAM models. SAM itself is an extended I-O table.[3] SAM is a square matrix exhibiting all transactions in an economy as depicted by the circular flow diagram. Specifically, it records the transactions regarding production activities, production factors, and institutions (i.e., households, firms, government, and the rest of the world). Detailed accounts of SAM and SAM modeling are available elsewhere (e.g., Sadoulet and de Janvry, 1995; Thorbecke, 2000). Hara (2008) presents an overview of the use of I-O and SAM modeling approaches in tourism research. For recent applications of the I-O modeling approach to analyze the economic impact of tourism for a variety of countries see Balaguer and Cantavella-Jorda (2002), Fayissa et al. (2008), and Oh (2005), and for recent applications of SAM modeling approach see Frechtling and Horvath (1999), West and Gamage (2001), Guo (2002), and Oosterhaven and Fan (2006). Multi-sector CGE models are widely used for policy analysis, especially for developing economies, since the 1970s. Our CGE model is based on the class of dynamic multi-sector CGE models developed by Dervis et al. (1982) and IFPRI (Lofgren et al., 2003). CGE models have also been used recently to analyze the impact of tourism expenditures on the economy and to analyze tourism policies in various countries (Adams and Parmenter, 1995; Zhou et al., 1997; Alavalapati and Adamowicz, 2000; Dwyer et al., 2000; Blake, 2000; Sugiyarto et al., 2003; Narayan, 2004). Dwyer et al. (2000), in particular, discusses in detail various issues related to the modeling of the tourism sector within the CGE framework, such as the closure rules (e.g., factor supply constraint, exchange rate regime).

While there are a number of I-O, SAM, and CGE studies about various economies, there are only two papers (Akkemik 2012 and Gül 2013) using the SAM modeling approach for Turkey. Akkemik (2012) found using a SAM model for the years 1996 and 2002 that unlike the general opinion among researchers, foreign tourists' expenditures have only a very limited impact on GDP and employment in Turkey. He also showed that domestic tourism contributed more to GDP. Gül (2013) used 2002 input-output tables and found that an increase in foreign tourist expenditures stimulates relatively more output in refined oil, agriculture, and textiles sectors, and tourism sector is labor-intensive.

To the best of our knowledge, there are no CGE studies evaluating the tourism sector and tourism policies in Turkey. CGE models are superior to I-O and SAM modeling due to nonlinearities in behavioral equations, substitutability, and flexibility in choosing the functional form of economic behavior, all of which are assumed to capture the relations

[3] See Miller and Blair (1985) and ten Raa (2005) for I-O tables and I-O modeling.

regarding economic behavior much better than the I-O and SAM models. I-O and SAM models are limited by various restrictions such as the existence of excess capacity which disregards the possibility of full or overemployment and they are demand-driven models by their nature.

We describe the salient features of the CGE model in this section. For brevity, we do not explain all details. The model is based on the Arrow-Debreu general equilibrium setting where the producers seeking profit maximization, and bound by constant returns to scale technologies, determine their demand for production factors and the institutions in the economy base their spending on goods and services on their preferences and their relevant budget constraints. In equilibrium demand and supply are equal to each other for each production activity. The model is solved through prices ensuring general equilibrium conditions which are explained in detail below.

We assume perfect competition in all goods and services markets (23 sectors in total) as well as in the markets for the factors of production, i.e., capital and labor markets. We reserve the "small country" assumption for the Turkish economy, which means that Turkey is unable to affect the world prices of tradable goods and services. As usual in most CGE models, we assume that domestic goods and imported foreign goods are imperfect substitutes of each other. In the factor markets, we assume that both capital and labor endowments are fixed per each period. Labor is mobile across sectors and wages are flexible in the labor market. Capital is also mobile across sectors and the sectoral rental rates of capital adjust in equilibrium.

3.1. Production, Factor Demand and Prices

We assume that each sector produces a representative good. Output by firms is modeled with a nested production with two stages. At the lower level, intermediate inputs from different sectors are aggregated using a Leontief production function. Capital and labor as the primary factors of production are aggregated using constant-returns-to-scale Cobb-Douglas production function to produce value added. At the second level, value added and intermediate inputs are aggregated in fixed proportions (i.e., Leontief function) to produce output.

The Leontief production function assumes that firms use material inputs (X) from various activities in fixed proportions (a) and no substitution is allowed, as follows:

$$X_i = \min\left(\frac{X_{ji}}{a_{ji}}\right) \quad (1)$$

where the subscripts i and j denote production activities, and a_{ji} are fixedinput-output coefficients. X_{ji} denotes purchase of intermediate inputs by sector i from sector j, and X_i isaggregate intermediate input demand by sector i. The coefficients a_{ji} sum up to 1.

Cobb-Douglas production function aggregates factors (F) into value-added (V) as follows:

$$V_i = \alpha_i^V \sum_f \left(F_i^f\right)^{\gamma_i^V} \quad (2)$$

where the subscript *k* refers to the type of primary factors, (i.e., *f*= capital, labor), and α_i^V,F_i^f, andγ_i^V refer to the shift factor for the production function, demand by firms for primary factor of type *f*, and the share (distribution) factor for the production factor, respectively. The share factors γ_i sum up to 1, implying constant returns to scale. In addition, the Cobb-Douglas production function imposes unitary elasticity of substitution between primary production factors, capital and labor. The value of output (*Q*) equals to the sum of the values of value-added and intermediate inputs and various indirect taxes related to production activities.

Firms employ capital and labor by equating the value of their marginal to their respective returns (w_i^k). The model computes the level of employment of labor and capital by taking the first order conditions of the Cobb-Douglas production function (i.e., by equating to zero the first derivatives of the production with respect to capital and labor). Consequently, the income shares of production factors can be found as follows:

$$w_i^f = \frac{\gamma_i^V V_i}{F_i^f} \quad (3)$$

3.2. International Trade

We assume that Turkey is a "small country" in world trade so that she cannot affect world prices. We also assume that, complying with the Armington assumption, imports (inclusive of tariffs) and domestic goods are imperfect substitutes. Producers aggregate domestic goods and exports to achieve output (*Q*). Likewise, to maximize their utility, consumers consume an Armington composite good (*Z*) aggregate domestic goods and imports according to constant elasticity of substitution (CES) type of aggregation functions. The CES Armington function for imported goods (*M*) and domestic goods (*D*) are as follows:

$$Z_i = \alpha_i^Z \left(\gamma_i^Z D_i^{-\rho_i^Z} + (1-\gamma_i^Z) M_i^{-\rho_i^Z}\right)^{-\frac{1}{\rho_i^Z}} \quad (4)$$

where α_i^Z, γ_i^Z, and ρ_i^Z are the well-known shift, share, and elasticity parameters, respectively.

The producers' aggregation function for exports (*E*) and domestic goods (*D*)is a constant elasticity of transformation (CET) function as follows:

$$Q_i = \alpha_i^T \left(\gamma_i^T E_i^{-\rho_i^T} + (1-\gamma_i^T) D_i^{-\rho_i^T}\right)^{-\frac{1}{\rho_i^T}} \quad (5)$$

α_i^T, γ_i^T, and ρ_i^T are the conventional shift, share, and elasticity parameters, respectively. The elasticity parameterρ_i^T determines how firms allocate their output between domestic supply and exports given the relative prices. The optimal levels of exports, imports, and domestic supply are calculated from the first order conditions of the CET and CES Armington functions yield.

3.3. Prices

Formation of prices follows the output structure of the model and complies with the standard practice in CGE modeling. The relations between the prices of exports (p_i^E), imports (p_i^M), domestically supplied goods (p_i^D), output (p_i^Q), and Armington composite good (p_i^Z) follow the SAM relationships between the values of exports, imports, and domestic supply as follows:

$$p_i^Z Z_i = p_i^M M_i + p_i^D D_i \quad (6)$$

$$p_i^Q Q_i = p_i^E E_i + p_i^D D_i \quad (7)$$

Other prices are calculated in a similar manner using SAM relationships. The price level of aggregated intermediate input is determined by the fixed-proportion Leontief relationship, and the price level of value-added is determined by the difference between the price level of aggregated input and the price of output net of production taxes. The prices of exports are exogenously determined, in line with the small country assumption, and the prices of imports are inclusive of the tariffs.

The numeraire is defined as a consumer price index (P) which is calculated as a weighted sum of consumer prices (p_i^C), as follows:

$$P = \sum_i \beta_i p_i^C \quad (8)$$

The weights (β_i) are the respective consumption shares of the sectoral products (i) in the representative household's basket. Due to homogeneity of degree zero, the model solves the levels of all other prices relative to this price index.

3.4. Income, Saving, and Spending

The institutions in the model, namely, households and government, are subject to respective budget constraints. Households are the owners of both capital and labor. They receive income for the delivery of capital and labor services, and from the government and the rest of the world in the form of transfers. They then allocate this income to consumption expenditures, direct taxes paid to the government, social security contributions, payments to the rest of the world, and household savings. Household consumption expenditures are determined by fixed proportions of their disposable income, i.e., their marginal propensity to consume is fixed. Saving rate of the households out of their disposable income is also a fixed parameter.

The government receives income from direct taxes (including payroll tax and corporate tax) paid by the households, import tariffs, and indirect taxes such as value-added tax paid by entities engaging in production activities. The government allocates this income to public consumption expenditures, subsidies and transfers to households, public savings, and the payments to the rest of the world. Similar to households, the sectoral shares in public consumption are fixed.

The model requires that total savings equal total investment (including changes in stocks) and total capital consumption allowances, i.e., depreciation. This macroeconomic requirement

is ensured by equating the sum of the savings by government (S_G) and households (S_H), and foreign savings (S_F) to total investments in the economy:

$$S_G + S_H + S_F = \sum_i I_i \quad (9)$$

where*I* denotes investment spending. Depreciation rate is a fixed ratio of capital consumption allowances to payments to capital. Government savings are negative, implying budget deficit. Saving rates of households and government are set as exogenously determined parameters in the model. Saving investment balance is achieved through adjustments in investment levels, i.e., investments in our model are savings-driven.[4]

3.5. Equilibrium Conditions

In this subsection, we specify the equilibrium conditions.

Equilibrium in goods and services markets: Total demand equals total supply in the goods and services markets, i.e., there is no excess supply, as follows:

$$Z_i = C_i + G_i + I_i + X_i \quad (10)$$

Total demand is the sum of spending by households (*C*) and government (*G*), firms' expenditures on investment (*I*) and intermediate inputs (*X*). Total supply equals total domestic goods plus imports, i.e., the Armington composite good (*Z*).

Equilibrium in the labor and capital markets: Labor services of the households are paid marginal rate (wage rate) based on exogenously determined wage distortion factors, i.e., wage ratios across sectors are kept constant. Following from equation (2), this condition is formulated as follows:

$$w_i^L \tau_i^L F_i^L = (1 - \gamma_i^V) p_i^V Q_i \quad (11)$$

where $w_i^L, \tau_i^L, p_i^V,$ andQ_i refer to the price of labor (wage rate),wage distortion factors, price of value-added, and the level of output by sectors, respectively. The superscript *L* denotes labor. The term $p_i^V Q_i$ is equal to the level of value-added. We assume perfect mobility of labor across sectors. Total labor supply is equal to the sum of the sectoral labor demands. This requires the equilibrium in the labor market to be achieved through wage adjustments. Therefore, our closure for the labor market imposes perfect labor mobility with flexible wage rates.

In the case of the capital market, we fix sectoral physical capital stock levels in each period, i.e., capital is not mobile across sectors within period. Rental rate of capital then adjusts for the equilibrium. Accumulation of capital is determined in the dynamic module by investments and the depreciation rate. Similar to the wage distortion factors, the distortion

[4]In practice, in programming the CGE model, this is ensured by rewriting equation (9) as $S_G + S_H + S_F - \sum_i I_i = Walras$, where $Walras$ is a made-up variable. Walras' Law about market equilibrium requires that $Walras$ equals zero. When we solve the model, our objective is to minimize this variable.

factors for the rental rate of capital are also fixed. The first order condition can be written similar to that of labor in equation (11) as follows:

$$w_i^K \tau_i^K F_i^K = \gamma_i^V p_i^V Q_i \quad (12)$$

where w_i^K and τ_i^K refer to the price of capital (real rental rate of capital) and the distortion factor for the rental rate of capital by sectors, respectively, and the superscript *K* denotes capital.

The condition that sectoral labor and capital demands equal total labor and capital endowment in the economy is formulated as follows:

$$F^f = \sum_i F_i^f \quad (13)$$

where F^f represents total factor endowment and $f = K\ (\text{capital}), L\ (\text{labor})$.

Equilibrium in the external sector: The macroeconomic condition that current account equals saving-investment gap applies in the external sector equilibrium. The relevant equation for equilibrium dictates that import demand (*M*) is financed by export revenues (*E*), foreign savings (S_F) and net factor income (*NFI*) from abroad:

$$\sum_i E_i - \sum_i M_i + S_F + NFI = 0 \quad (14)$$

Net factor income is inclusive of all transfers from the domestic institutions (household and government) to the rest of the world and vice versa. Foreign savings and net factor income are fixed in the model.

3.6. Model Dynamics

We build a recursive dynamic CGE model, where model dynamics is ensured by accumulation of capital and labor across future periods. Three main pillars of the dynamic model are accumulations of capital and labor, and improvement in production efficiency.

Capital accumulation is achieved by adding investment and subtracting capital consumption allowances from the capital stock as follows:

$$K_{i,t+1} = K_{i,t}(1 - d) + I_{i,t} \quad (15)$$

where *t* denotes time, and *d* is the depreciation rate, which is fixed (7 percent).

We also update labor by increasing total labor supply in the economy by 1.0 percent every year, which is roughly equivalent to the average population growth rate. Finally, we also allow for TFP growth rate in production activities by 0.5 percent every year, by adjusting the shift factor in the production function.

The time horizon we set for the dynamic module is 20 years. Therefore, our solution for the dynamic model yields results for endogenous variables for the period 2008-2027.

3.7. Calibration

The calibration procedure is straightforward and follows the conventional method applied in CGE models. Given the SAM and the behavioral equations we first replicate the model for the benchmark year (2007) and calculate the exogenous parameters in the behavioral equations.

We then inject these parameters into model equations. Some parameters such as the elasticity parameters need to be injected from outside. We take these parameters from GTAP 8 database. The CGE model is solved using General Algebraic Modeling System (GAMS) software.[5]

4. SAM and the Disaggregation of the Tourism Sectors

The data used in the CGE model is organized into a social accounting matrix (SAM). For the purpose of this paper, we create a SAM using the GTAP database version 8. GTAP database is generally used for the GTAP model, which is a large-scale world model developed for the analysis of trade policies, but the database can also be used to extract a country's SAM as well.[6]The only missing part in the GTAP database, for the purpose of this paper is that tourism sector is not included in the activities. We add two tourism sectors and we explain how this was done below. A list of production sectors, which are listed in Table 2.

Tourism data to be included in the SAM are normally extracted from the tourism satellite accounts (TSA). These accounts incorporate the tourism sector by adding tourism expenditures. We deem it important to include two tourism accounts, international tourism and domestic tourism, for analytical purposes. In disaggregating the income and demand (spending) data for international and domestic tourism accounts in the SAM, we follow Akkemik (2012). While incorporating the international tourism expenditures, it is necessary to deduct them from foreigners' spending on exports. The latest international tourist expenditures by items are available only from the tourism surveys conducted for the years 2001-2003 (SIS, 2005). Aggregate international tourist expenditures, however, are available from the official statistics. Since we are bound by data availability, we get these data and assume that the composition of the international tourist expenditures in our SAM was the same as that in 2003. By doing so, we update the tourist expenditures using he aggregate figure and the sectoral composition.

In the case of tourism expenditures abroad by Turkish residents, a major problem is the unavailability of the data disaggregated into specific items although total outbound tourism expenditures are available from the official statistics. Hence, to distribute this aggregate figure to the specific sectors in the SAM, we follow Akkemik (2012) and assume that the composition of the outbound tourism expenditures is the same as that of the foreign tourists' expenditures in Turkey. The outbound tourism expenditures data are then deducted from the imports of the relevant sectors.

In the case of domestic tourism expenditures by domestic residents, these are available from Household Domestic Tourism Statistics published by Turkstat only for 2011 and 2012. We take the data for 2011 and readjust them for the base year (2007) by using the percentage

[5] See Brooke et al. (1998) for an overview of GAMS software.
[6] For details on GTAP model see Hertel and Tsigas (1997).

shares of the sectors in total household consumption expenditures. Due to their very nature, most of these expenditures accrue to services sectors such as trade and transport services.

Apart from the SAM, the CGE model also requires additional information for the employment of labor services. Although the employment data for all economic sectors are available from official statistics, the size of labor force employed in the tourism sectors is not readily available. This is a major difficulty in tourism studies because such statistics for the domestic and international tourism sectors are generally embedded in the statistics of various tourism-related services sectors such as hotels and restaurants, wholesale and retail trade, transport services, and so on. ILO/UNWTO (2008) provides guidelines for the calculation of employment in tourism. Following, we use tourism-industry ratios and use these ratios to calculate the number of workers employed for tourism activities in the tourism-related industries. Akkemik (2012) reports that the Association of Turkish Travel Agencies (TURSAB) sets the tourism-industry ratio at one half for restaurant and bar services, travel agencies, and auxiliary transport services, and also calculates the number of workers directly engaged in tourism activities in the transportation services sector.

5. Policy Simulations

In this section, we describe the simulations for a 20 year horizon. A list of the simulations is presented in Table 4. To analyze the tourism policies of the Turkish government, we look at the targets set forth in the strategy paper and the 10th Development Plan (MCT, 2007; Ministry of Development, 2013).From 2014 to 2018, the government expects the tourism revenues to increase by 7.1 percent and tourism expenditures to increase by 9.9 percent, and the public sector fixed capital investments in tourism to reach 0.6 percent of total public investments. The government also aims to stimulate higher levels of infrastructure investments in the tourism sector, e.g., public investment in roads and private investments in expansion of the facilities such as bed capacity.

Based on the government's abovementioned targets, in Simulation 1 (S1), we increase the demand for tourism activities for international tourism by 10 percent every year. This increase can be due to increase in the number of tourists, increase in per-person tourist expenditures, or a combination of both. In Simulations 2 (S2), we increase public and private investments in tourisms sectors by 10 percent every year to examine the combined economic impact of increase in total investments in tourism sector. We also conduct an additional simulation (S3) to examine the economic impact of government's support for tourism sectors by reducing indirect taxes (such as value-added tax) in the tourism sectors by 50 percent.

6. Empirical Results

In this section we summarize the results for variables of interest. We especially focus on the results for two tourism sectors. The simulations results are reported as percentage deviations

from the baseline solution. The baseline solution is the set of solutions for the 20-year horizon for the baseline scenario which uses the dynamic model equations with no shocks. In the baseline solution, the long-run real GDP growth rate (i.e., for the path 2008-2027) is about 5.3 percent, which is close enough to the officially growth rate in 2007 (4.7 percent).[7] This growth rate implies that most variables will be on a positive growth trend in the baseline solution, i.e., business as usual. Therefore, we do not focus on the levels of endogenous variables in the solution. To better view the structural changes the shock will bring about, we look at the deviations of the growth rates of the variables from the long-run growth path. A positive figure, for instance, implies that the variable of interest grew faster than in the baseline scenario. In the forthcoming subsections, we report the results for years 5, 10, 15, and 20 to show the trajectories.

6.1. Macroeconomic Results

Results from simulations show that scenario 2, i.e., incentivizing investment in tourism sectors, has the largest impact on the Turkish economy. As shown in Table 5, an annual increase by 10 percent in investments will lead to an increase by 1.5 percentage points in Turkey's real GDP in the first five years and an increase of 0.8 percentage points by the second decade after the shock, compared to the base year (2007). Figure 4 shows the contribution to real GDP growth as a deviation from the baseline growth trajectory. At eh beginning the shock increases real GDP growth rate by a higher amount but this effect flattens out over time. In the case of scenario 2, for instance, the immediate impact of an increase in tourism investments is to increase GDP growth rates by more than 2 percentage points. This effect is smoothed over time and drops to less than 1 percentage points after five years and changes only marginally after ten years, remaining below 0.5 percentage points. Meanwhile, the impact is smaller for scenarios 1 and 3 in the first five-year period, with GDP growth rate increasing by about 0.6 percentage points. For the twenty-year period after the initial shocks, the increase in GDP growth rate is close to 0.5 percentage points in scenarios 1 and 3.

The increase in the long-run economic growth rate resulting from all scenarios lead to an increase in firms' demand for labor, which, given the setup of our model, push wages up to reset equilibrium in labor markets. A rise in the average wage rates is reported for all three scenarios in Table 5. The increase in the growth rate of wages is especially high in the second scenario. The rental rate of capital, on the other hand, decreases relative to the baseline scenario in all simulations to clear capital markets.

An interesting finding is the similar impact in the long-run growth rates of endogenous variables a 10-percent annual increase in foreign tourism and a 50-percent reduction in

[7] Average annual growth rate for the period 2007-2013 is 3.5 percent. However, this figure includes the large slump during the global financial crisis in 2008-2009 (0.7 percent in 2008 and -4.8 percent in 2009).

indirect taxes in tourism sectors have on the Turkish economy. This implies that the choice between either larger marketing expenditures to attract foreign tourists or halving indirect taxes will have a similar impact and is a matter of government preferences. The difference between the two shocks is that taxes are more distortionary for market prices, thus, a tax reduction would be desirable for a competitive market. Government revenues increase slightly faster in scenario 1 compared to scenario 3, implying that reducing tax rates may be a less attractive option for the government. Government revenues are expected to grow 2.3 percentage points higher in the first five years and by 1.18 percentage points higher by the end of two decades compared to the base year values in scenario 2. Respective figures for the other two scenarios show a similar trend at lower magnitudes, as reported in Table 5.

Among the institutions in the economy, households benefit the most in all scenarios. In scenario 2, disposable household income is expected to grow faster by increase by 2.3 percentage points in the first five-year period and by 1.2 percentage points after 20 years, compared to the baseline growth trajectory. Meanwhile, respective figures for scenarios 1 and 3 are about 0.93-0.95 percentage points for the first five years and about 0.7 percentage points after 20 years following the initial shock, as shown in Table 5.

Private investments and consumption grow faster than the baseline solution in a similar fashion, by about 0.9 and 0.6 percentage points, respectively, during the first five years and by about 0.7 and 0.5 percentage points, respectively, after 20 years following the policy shock in scenario 2. Respective figures for the other scenarios are reported in Table 5.

6.2. Sectoral Results

How diversified output and input (capital and labor) structure becomes after the shock, i.e., structural changes are especially important for a developing economy because such changes affect the allocation of productive resources in the economy. We first look at the structural changes brought about by each scenario. In line with our expectations, the deviations from the baseline growth trajectories for the demand for the factors of production in Table 6 indicate that there is a shift in labor demand from manufacturing sectors to tourism sectors after the shocks. The largest impact occurs in scenario 2, consistent with the macro-economic impact reported in the previous section. Increase in investment in tourism sectors in scenario 2 leads to a decrease in labor demand in especially textiles and clothing, chemicals, metals, and machine manufacturing sectors to varying degrees. The opposite effect is observed in most service sectors following the same shock. Demand for labor in the domestic and foreign tourism sectors increases by 1.21 and 1.06 percent respectively, in the first five-year period after the shock in scenario 2. Similarly, labor demand in construction, trade, transport and finance sectors increases significantly. Demand for labor tourism sectors also increase but

only slightly faster compared to the baseline scenario. In those sectors experiencing a decrease in the demand for labor, wages are increasing and vice versa for other sectors.[8]

On the other hand, demand for physical capital increases in all three scenarios for all sectors following shocks. The increase is larger especially in the domestic services sectors, reflecting the larger increase in the growth rates of output in these sectors. Domestic and foreign tourism sectors' demand for capital goes up about 2.1 to 4 percentage points faster, and this figure is relatively higher than that of the remaining services sectors except construction services. The rise in physical capital demand in domestic trade, transport, communications, and finance services follow. Meanwhile, physical capital demand also increases but relatively more slowly in the long-run in the manufacturing sectors, textile and clothing, chemicals, metals, manufacturing of machines, in particular. In conjunction with the increase in the demand for physical capital, the real rental rate of capital declines in all sectors. Reflecting on the diminishing marginal returns to capital, the decline is especially faster in those sectors where the demand is higher.

Table 7 shows the deviation of the growth rates of sectoral value added from the baseline growth path for all scenarios. These figures help understand the contribution of the sectors to GDP growth in the long-run. It appears that the services sectors, among them the two tourism sectors in particular, generally contribute relatively largely to increase in total value-added (GDP). The sectors with the largest contribution in all scenarios is construction and tourism sectors, followed closely by transport equipment manufacturing, machinery and equipment manufacturing, wood and cork products, and financial services. Value-added grows by about 1.0-1.2 percentage points faster in the stated sectors during the first five years and by 0.5-0.6 percentage points faster at the end of the 20-year period.

In Table 8 we report the change in gross output and household consumption following initial shock for all scenarios. Consumption growth rate in the long-run increases in all cases, which is important as it may be translated into inflationary pressures for the overall economy. In line with previously reported results, scenario 2 exhibits the largest changes after the initial shock. In fact, inflation rate increases by 0.7 percentage points in the second scenario during the first five years, and in the long-run this increase reduces down to an additional 0.34 percentage points after 20 years. The respective figures for scenarios 1 and 3 are similar, an annual addition to inflation rate by about 0.3 percentage points during the first five years and 0.2 percentage points at the end of the 20-year horizon.

Private consumption expenditures for tourism sectors grow faster than the baseline scenario by 1.33 percentage points in the first five years for scenario 2. Related figures for

[8] The findings for average wages are not reported in Table 6. However, it is straightforward from the structure of the model that, since wage distortion factors (i.e., the levels of wages relative to the economy average) are constant over time, it is sufficient to look at the findings for the average wage rate in the economy.

scenario 1 are 0.54 percentage points for both tourism sectors meanwhile they are 0.68 percentage points for scenario 3. Notably, while shocks in the first two scenarios have a similar impact on household consumption of services in both tourism sectors, the rise in consumption of domestic tourism services is larger compared to foreign tourism in scenario 3.

Another interesting fact here is that in scenarios 1 and 2, tourism sectors are the ones with the smallest increase in household consumption growth rate after the shock, while this is not entirely true for scenario 3 that assumes the government halves indirect taxes related to tourism sectors. This is due to the proportional nature of indirect taxes compared to ad-valorem changes such as those reflected in the shocks in scenarios 1 and 2.

Gross output by each sector increases faster in all scenarios in a similar fashion as in the growth of household consumption. In the first five years following the shock, output of domestic and foreign tourism sectors grow about 0.5 percentage points faster in the first scenario, 1.3 percentage points in the second scenario, and 0.5-0.6 percentage points faster in the third scenario. The relevant figures for the 20-year horizon are, 0.4, 0.7, and 0.4 percentage points, respectively. As the results in Table 8 show, output growth in all other sectors is affected positively, in particular in mining, oil and coal products, water, electricity, and domestic services sectors such as construction, trade, transport, communications, finance, and other services sectors. This is in line with our expectations, given that a positive shock on tourism activities would be transferred to the energy and tourism-related services through linkage effects.

Finally, the change in export demand is especially important from a policy standpoint. If the change in the export composition after the policy experiments still favors traditional export industries, this may impede structural changes and resource allocation in a highly open economy such as Turkey. The results in Table 9 show that in all scenarios the growth rates of exports increase most notably in mining, refined oil products, agriculture, and food manufactures. In other words, export structure of Turkey evolves in the direction of these sectors. On the other hand, exports of chemicals, metals, transport equipment, electrical machines, and other machinery and equipment sectors are lower than in the baseline scenario. These sectors are deemed as important export industries with strong potential for technological progress and export earnings. Therefore, the results of the simulations reveal an important anomaly in the Turkish economy with regards to the external side of the economy. In addition, composition of imports is also important. The growth rates of imports are higher than in the baseline growth path for all sectors. The growth rates of imports increase largely in services sectors as well as upstream manufacturing industries such as machinery and metals. These findings for exports and imports have a strong policy implication. While the export performance is inferior in each scenario, imports are increasing in all sectors, giving rise to widening current account deficit. Turkish economy has for long suffered from large current

account deficits, thus such a considerable increase in imported goods is of concern for the country's balance of payments.

6.3.Results for the Tourism Sectors

In this subsection we focus our attention on the tourism sectors and review the results of the analyses for the two tourism sectors in Figure 5. The figure demonstrates the simulation results in the long-run, i.e., at the end of the 20-year horizon. Increase in investments in the tourism sectors (scenario 2) has the largest impact on tourism sectors. In this scenario, output of domestic and foreign tourism sectors grow between 0.4-0.7 percentage points faster than in the baseline. It is noteworthy that the impact on the growth of output of the domestic tourism sector is slightly larger than on that of foreign tourism. This implies that domestic tourism sector has a relatively stronger position in Turkey. However, this relative position is yet weak and exhibits only a weak implication for policy making in the tourism sectors.

The growth rate in the demand for physical capital assets are significantly larger compared to the growth rate of the demand for labor. Capital demand deviates from its baseline growth path by between 1.3-2.1 percentage points while the corresponding figure for the growth of the demand for labor is only about 0.4-0.8 percentage points. Accordingly, it naturally follows from our model structure that average wage rates do not increase much in these sectors but real rental rate of capital declines much faster than wage rates. Following the increase in the growth rate of the demand for capital assets, value added growth rate increases for both tourism sectors as well.

Private investments increase after any policy shock, with scenario 2 having the largest impact as expected. Thus, private investments in domestic and foreign tourism sectors grow 0.7 percentage points faster in each sector in this scenario. In addition, household consumption demand for tourism activities also increases for all shocks, with scenario 2 having a much larger impact on household consumption compared to the other two scenarios. Considering that higher demand will put upward pressure on inflation, it can be asserted that such adverse effects on inflation of increasing investments in tourism sectors (scenario 2) may be considered in related policy making.

What is more, the impact on imports is considerably higher in scenario 2 compared to scenarios 1 and 3. As indicated in Table 9, the growth rate of the demand for imports increases by 1.7 percentage points in scenario 2, compared to only 1.0 percentage points in the other two scenarios.

Other than the macroeconomic impacts of the tourism sectors on the domestic economy, we are also interested in how the competitiveness of these sectors gets affected in each policy experiment. In this sense, it is important to trace the changes in the supply prices of tourism sectors and also their relative growth rates compared to the changes in the general price level. The results are presented in Figure 6. Domestic prices in both sectors grow faster than in the

baseline scenario, much faster in scenario 2, compared to the other scenarios adding another 1.0 percentage point for the first five years and averaging about 0.5 percentage points over the 20-year horizon. The increases in the growth rates of prices in the other two scenarios are slightly less than half of that in scenario 2. The increases in the growth rate of prices in tourism sectors are higher than that in the general price level, implying relatively faster growth in tourism sectors' prices. It is clearly an evidence of worsening price competitiveness by these sectors. Therefore, we conclude that adverse effects of the expansion in tourism activities on price competitiveness of the tourism sectors should also be taken into account in policymaking.

6.4. Sensitivity Analysis

To check the consistency of the results and their sensitivity to key parameters of the model we conduct a sensitivity analysis. For this purpose we redo the analysis using an alternative set of parameters. For this purpose we use alternative values of CET and Armington substitution elasticities (ρ_i^T and ρ_i^Z) higher and lower 15 percent. Subsequently, we compare the resulting levels of some selected macro variables with the original baseline solution values. The results of this exercise are presented in Table 10. It is clear that our findings are reliable and robust to the choice of parameter estimates. For brevity, we do not present the sectoral results; however, results of the variables at the sectoral level do not change much qualitatively as well. Therefore, we can conclude that our results are reliable. This conclusion holds for simulation results as well. In addition, changing the depreciation rate (d) does not lead to qualitatively different results, although the results change quantitatively as the capital stocks get larger with a smaller d and vice versa.

7. Conclusion

International and domestic tourism has emerged as important service sectors in Turkey over the last three decades. Turkey is among major international tourism destinations in the world market. However, due to technical difficulties a general equilibrium analysis of tourism policies has not yet been undertaken. In this paper, we assess the tourism policies of Turkey with reference to the government's recent tourism strategy paper using a CGE model.

We found that any incentive to the tourism sectors will have a positive impact on the economy. Increasing investments has the largest impact, yet considerations about inflationary pressure and current account deficit. Inducing tourism sectors has a larger impact on tourism-related sectors, mostly services, compared to other sectors in the economy. Domestic tourism sector appears to have better linkages, thus a stronger position (although the difference is small) in the Turkish economy, compared to foreign tourism.

The model has certain limitations with regards to data availability for the tourism sectors. When the satellite accounts and the employment statistics for the tourisms sectors become available, they can be incorporated into the CGE analysis.

Due to our focus on only the macroeconomic effects, we did not extend our SAM and the CGE model to analyze other economic issues such as poverty, income distribution, and so on. How various shocks in the tourism sectors impact different categories of households is an interesting subject and can be undertaken by disaggregating the types of households and labor in detail.

References

Adams, P.D., Parmenter, B.R., 1995. An Applied General Equilibrium Analysis of the Economic Effects of Tourism in a Quite Small, Quite Open Economy. *Applied Economics* 27, 985-994.

Akkemik, K.A., 2012. Assessing the Importance of International Tourism for the Turkish Economy: A Social Accounting Matrix Analysis. *Tourism Management* 33 (4), 790-801.

Alp, E.A., 2009. Türkiye'de Turizm Sektörünün Tarihsel Gelişimi ve Turizm Talebi ile Hizmet Sektörü Arasındaki İlişkinin Analizi. Yıldız Technical University, Department of Economics Working Paper No. 23, Istanbul, Turkey.

Bahar, O., 2006. Turizm Sektörünün Türkiye'nin Ekonomik Büyümesi Üzerindeki Etkisi: VAR Analizi Yaklaşımı. *Yönetim ve Ekonomi* 13 (2), 137-150

Balaguer, L., Cantavella-Jorda, M., 2002. Tourism as a Long-run Economic Growth Factor: The Spanish Case. *Applied Economics* 34, 877-884.

Brooke, A., Kendrick, D., Meeraus, A., Raman, R., 1998. *GAMS: A User's Guide*. GAMS Development Corporation.

Dervis, K.,de Melo, J., Robinson, S., 1982.*General Equilibrium Models for Development Policy*, New York: Cambridge University Press.

Dwyer, L., Forsyth, P., Madden, J., Spurr, R., 2000. Economic Impacts of Inbound Tourism under Different Assumptions Regarding the Macroeconomy. *Current Issues in Tourism* 3, 325-363.

Fayissa, B., Nsiah, C., Tadasse, B., 2008. Impact of Tourism on Economic Growth and Development in Africa. *Tourism Economics* 14, 807-818.

Frechtling, D.C., Horvath, E., 1999. Estimating the Multiplier Effects of Tourism Expenditures on a Local Economy through a Regional Input-Output Model. *Journal of Travel Research* 37, 324-332.

Gül, H., 2013. Economic Impacts of an Increase in the Foreign Tourism Receipts: A Sam-based Income Multiplier Analysis for Turkey. *Advances in Hospitality and Tourism Research* 1(1), 1-20.

Gündüz, L., Hatemi-J, A., 2005. Is the Tourism-led Growth Hypothesis Valid for Turkey? *Applied Economics Letters* 12, 499-504.

Guo, S., 2002.Measuring the Economic Impact of Tourism in China. *Forum of International Development Studies* 21, 67-94.

Hara, T., 2008.*Quantitative Tourism Industry Analysis: Introduction to Input-Output, Social Accounting Matrix Modeling and Tourism Satellite Accounts*. Oxford: Elsevier.

Hertel, T.W., Tsigas, M.E., 1997.Structure of GTAP. Hertel, T.W. (ed.), *Global Trade Analysis: Modeling and Applications*, New York: Cambridge University Press, 13-73.

International Labor Organization (ILO)and UN World Tourism Organization (UNWTO), 2008.*Sources and Methods: Labour Statistics – Employment in the Tourism Industries Special Edition*. UNWTO, Madrid Spain.

Kaplan, M., Celik, T., 2008. The Impact of Tourism on Economic Performance: The Case of Turkey. *International Journal of Applied Economics and Finance* 2 (1), 13-18.

Katircioglu, S.T., 2009. Revisiting the Tourism-led Growth Hypothesis for Turkey Using the Bounds Test and Johansen Approach for Cointegration. *Tourism Management* 30 (1), 17-20.

Lofgren, H., Harris, R.L., Robinson, S., 2002. *A Standard Computable General Equilibrium (CGE) Model in GAMS*, Microcomputers in Policy Research 5, International Food Policy Research Institute.

Ministry of Culture and Tourism (MCT), 2007.*Tourism Strategy of Turkey – 2023*.T.R. Ministry of Culture and Tourism, Ankara, Publication no. 3090.

Ministry of Culture and Tourism (MCT), 2009. Incentives and support to the tourism sector in Turkey, [Türkiye'de Turizm Sektörüne Sağlanan Teşvik ve Destekler], Teşvik Çalışma Grubu, Ankara.

Ministry of Development, 2013. *Tenth Development Plan (2014-2018)* [Onuncu Kalkınma Planı (2014-2018)], 2 July 2013.

Miller, R.E., Blair, P.D., 1985. *Input-Output Analysis: Foundations and Extensions*. Englewood Cliffs, NJ: Prentice Hall.

Narayan, P.K., 2004. Economic Impact of Tourism on Fiji's Economy: Empirical Evidence from the Computable General Equilibrium Model. *Tourism Economics* 10, 419-433.

Oh, C.O., 2005. The Contribution of Tourism Development on Economic Growth in the Korean Economy. *Tourism Management* 26 (1), 39-44.

Oosterhaven, J., Fan, T., 2006. Impact of International Tourism on the Chinese Economy. *International Journal of Tourism Research* 8, 347-354.

Özgen, F.B., 2013. The Effectiveness of governmental incentives in the Turkish tourism sector and the relationship between incentives and tourism revenues. Paper presented at the 8th Silk Road International Conference: Development of Tourism in Black and Caspian Seas Regions, 24-26 May, Tbilisi-Batumi, Georgia.

Sadoulet, E., de Janvry, A., 1995. *Quantitative Development Policy Analysis*. Baltimore: Johns Hopkins Press.

SIS (State Institute of Statistics), 2005.*Tourism Statistics, 2002/2003*, Ankara.

ten Raa, T., 2010. *Input–Output Economics: Theory and Applications: featuring Asian Economies*, Singapore: World Scientific.

Thorbecke, E., 2000. The Use of Social Accounting Matrices in Modeling. Paper presented at the 26th General Conference of the International Association for Research in Income and Wealth, Krakow, Poland, August 27 - September 2.

Toh, M.H., Low, L., 1990. Economic Impact of Tourism in Singapore. *Annals of Tourism Research* 17, 246-269.

West, G., Gamage, A., 2001. Macro Effects of Tourism in Victoria, Australia: A Nonlinear Input-Output Approach. *Journal of Travel Research* 40, 101-109.

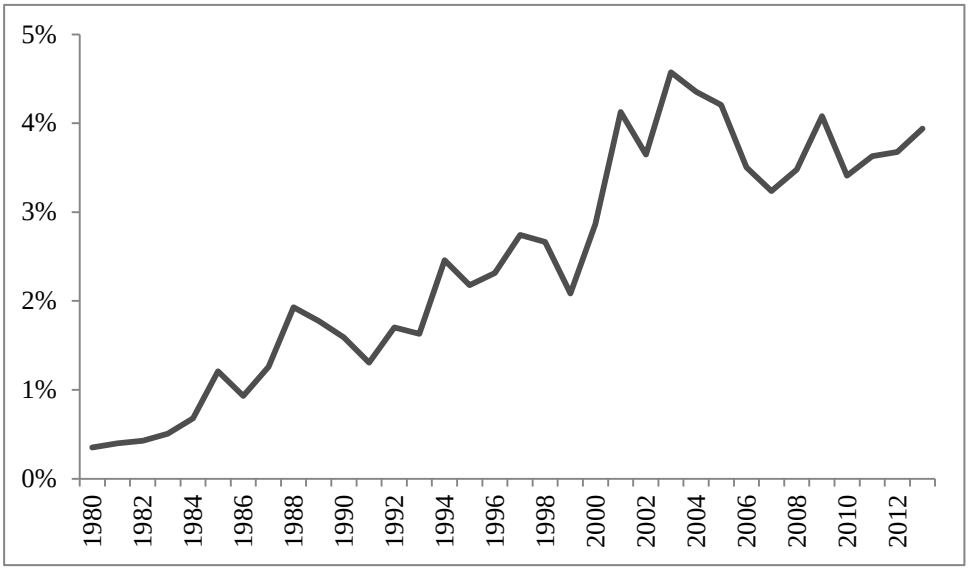
World Tourism Organization (UNWTO), 2013. *UNWTO Tourism Highlights 2013 Edition*.

World Travel and Tourism Council (WTTC), 2014. *Travel and Tourism Economic Impact 2014: Turkey*.

Zhou, D., Yanagida, J.F., Chakravorty, U., Leung, P., 1997. Estimating Economic Impacts of Tourism. *Annals of Tourism Research* 24, 76-89.

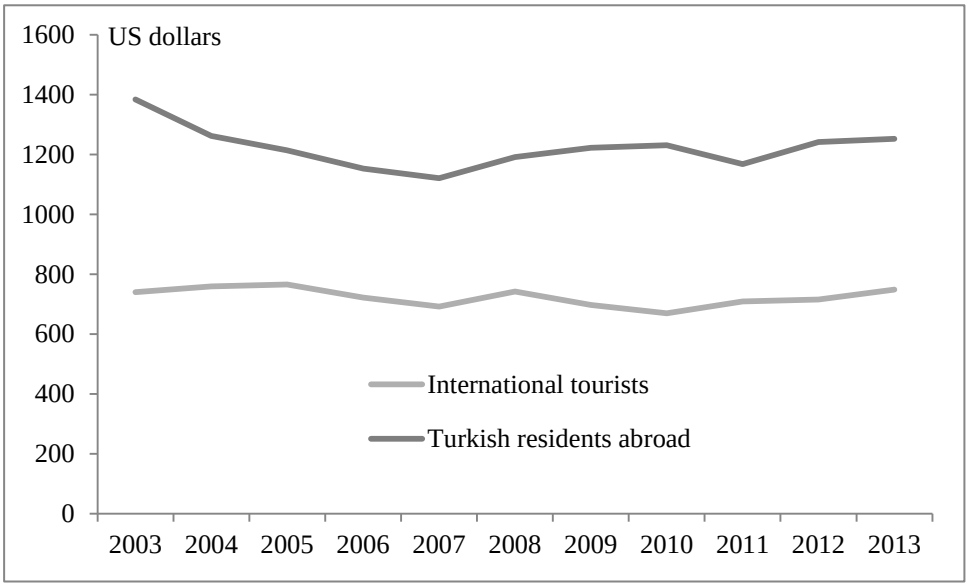
Zortuk, M., 2009. Economic Impact of Tourism on Turkey's Economy: Evidence from Cointegration Tests. *International Research Journal of Finance and Economics* 25, 231-239.

Figure 1. Tourism revenues as percentage of GDP in Turkey (2003-2013)



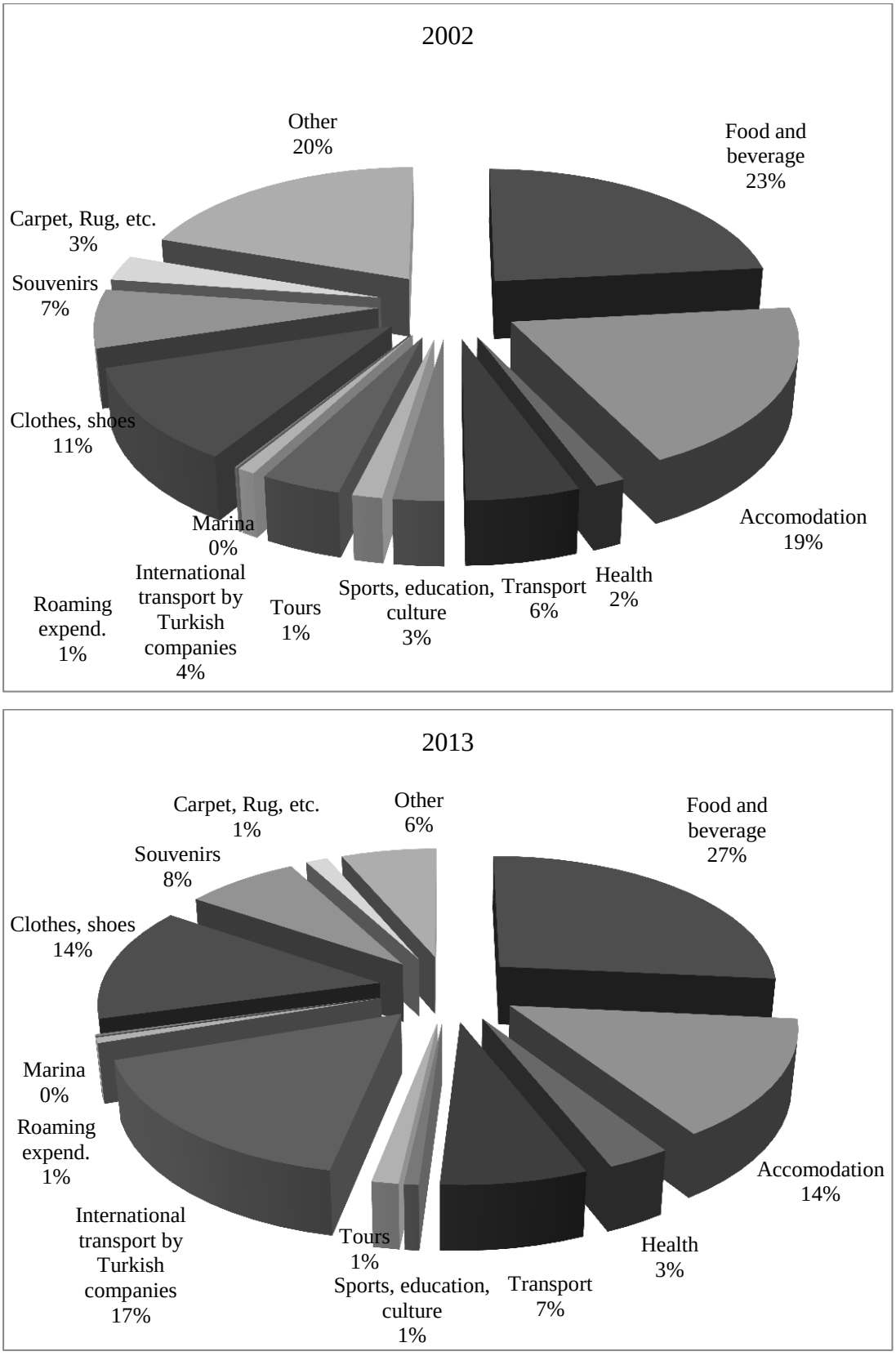
Source: Turkstat, authors' own calculations

Figure 2. Tourism receipts per tourist (2003-2013)



Source: Turkstat

Figure 3. The composition of foreign tourist expenditures in Turkey, 2002 and 2013



Source: Turkstat

Figure 4. Contribution to real GDP growth rate: deviation of the growth rate from the baseline growth path (unit: % points)

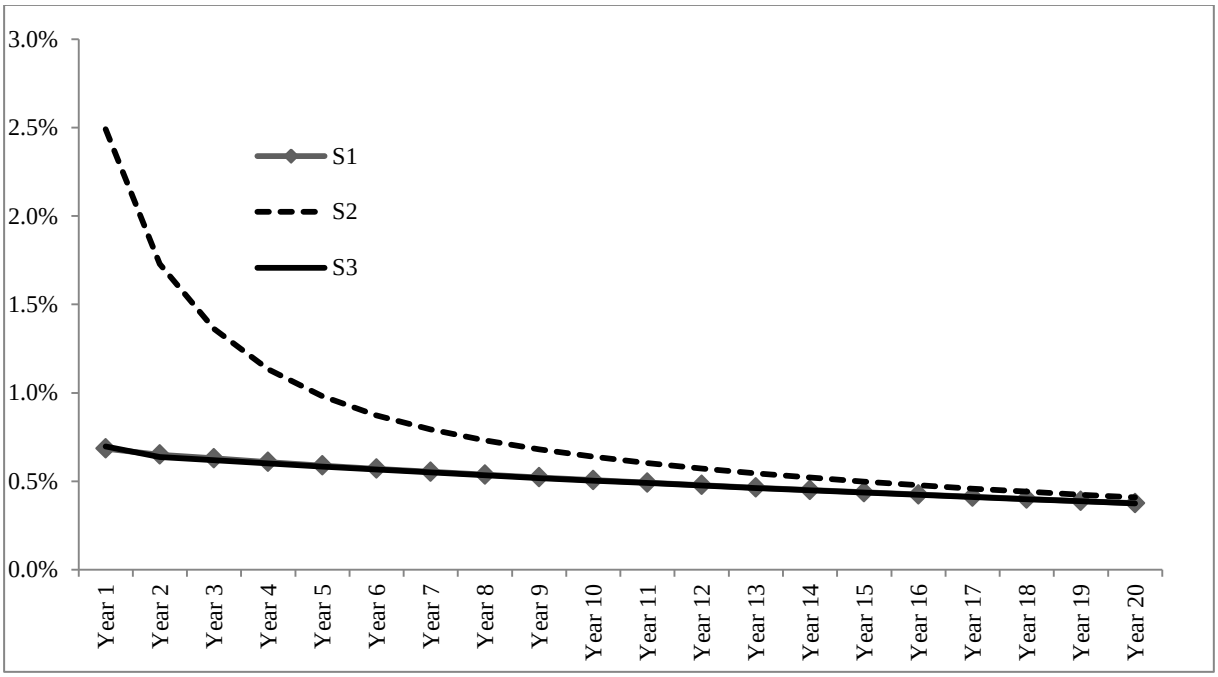


Figure 5. Selected results for tourism sectors: deviation of the implied annual average growth rates from the baseline growth trajectory (unit: %)

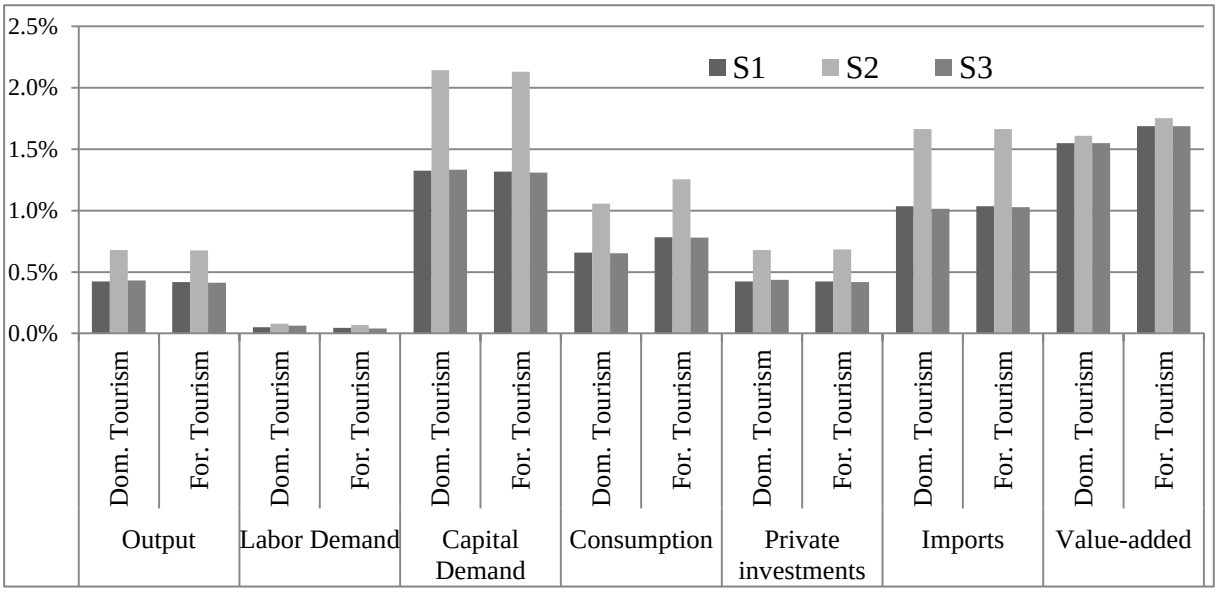


Figure 6. Deviation of the growth rates of the domestic prices and the general price level from the baseline growth trajectory (unit: %)

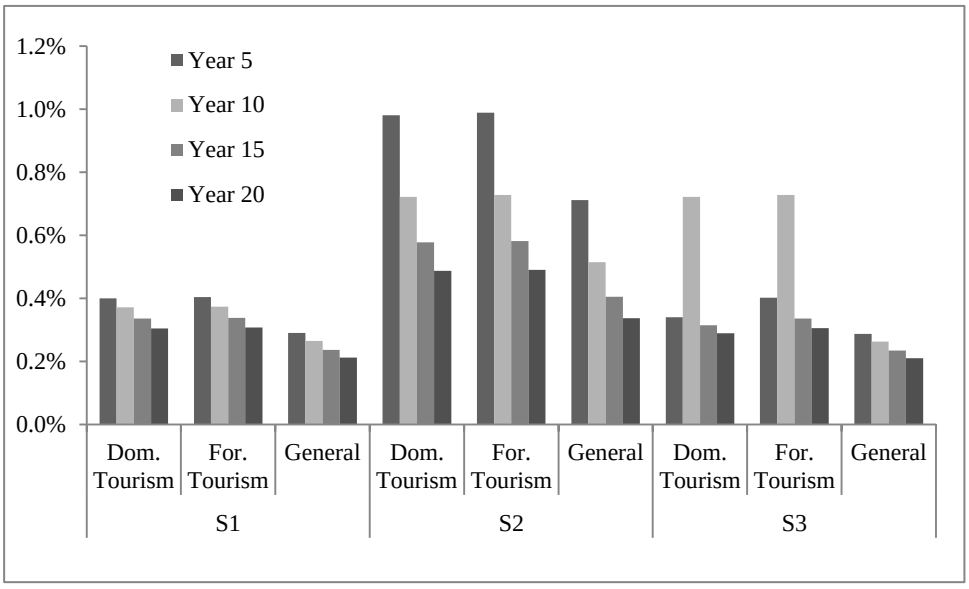


Table 1.International tourism revenues, expenditures, and foreign tourist arrivals in Turkey (1970-2013)

	Revenues (million US dollars)	Expenditures (million US dollars)	Foreign tourist arrivals (1000 persons)
1980	326	115	1288
1985	1482	324	2615
1990	3225	520	5389
1995	4957	912	7727
2000	7636	1711	10428
2001	7386	1738	11277
2002	9236	1880	12922
2003	10141	2425	13701
2004	13061	2954	17203
2005	15726	3395	20523
2006	13919	3271	19276
2007	15936	4043	23017
2008	19612	4266	26431
2009	19064	5090	27348
2010	19110	5875	28511
2011	22222	5531	31325
2012	22410	4593	31342
2013	25322	5254	33827

Source: Turkstat

Table 2. List of sectors

	Acronym	Industry description	Sectoral codes in GTAP 8 Database
1	AGR	Agriculture	1-14, 19-20
2	MIN	Mining	15-18
3	FOOD	Processed food products, beverages and tobacco	21-26
4	TEX	Textiles, wearing apparel, and leather products	27-29
5	WOOD	Wood products	30
6	PAPER	Paper products and publishing	31
7	OIL	Petroleum and coal products	32
8	CHEM	Chemicals, rubber, and plastic products	33
9	METAL	Ferrous metals and metal products	35-37
10	TRNEQ	Transport equipment, motor vehicles, and parts	38-39
11	ELEC	Electronic equipment	40
12	OTHMAN	Other manufacturing	42
13	MACH	Machinery and equipment	41
14	WATER	Water supply	45
15	ELEC	Electricity and gas supply	43-44
16	CONST	Construction	46
17	TRADE	Wholesale and retail trade (incl. hotel and restaurant services)	47
18	TRAN	Land transport, sea transport, and air transport	48-50
19	COMM	Communication services	51
20	FIN	Financial services and insurance	52-53
21	OTHSER	Other services	54-57
22	DOMTOUR	Domestic tourism	-
23	FORTOUR	International tourism	-

Table 3. Tourism revenues and the balance of payments in Turkey, 2001-2013

(Million US dollars)	2001	2003	2005	2007	2009	2010	2011	2012	2013
Current Account Balance	3760	-7554	-21449	-37781	-12124	-45420	-75082	-48497	-65061
Goods balance	-3363	-13489	-33080	-46852	-24850	-56413	-89137	-65331	-80016
Services balance	9136	10472	16016	13954	18625	16684	20152	22562	23124
Tourism	6352	11051	16087	15781	18405	17391	20171	21251	23180
Other services	2784	-579	-71	-1827	220	-707	-19	1311	-56
Income balance	-5000	-5557	-5839	-7108	-8308	-7214	-7855	-7161	-9349
Current transfers	2987	1020	1454	2225	2409	1523	1758	1433	1180

Note: The figures in the table are somewhat smaller than those reported by Turkstat. This is because the Central Bank treats revenues from transportation and communication sectors separately. Tourism's net balance may overweigh the services balance due to the presence of other services which exhibit net deficit.

Source: Central Bank of the Republic of Turkey

Table 4. List of simulations

Simulation	Description
S1	Increase in foreign tourism demand by 10 percent every year
S2	Increase in total investments in tourism sectors by 10 percent every year
S3	Reduction in indirect taxes in tourism sectors by 50 percent

Table 5. Macroeconomic results: deviation of the implied annual average growth rates of selected macroeconomic variables from the baseline growth trajectory (unit: %)

	S1				S2				S3			
	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20
Average wage rate	0.92	0.86	0.79	0.73	2.26	1.68	1.37	1.18	0.92	0.85	0.79	0.73
Rental rate of capital	-0.59	-0.57	-0.55	-0.53	-1.43	-1.12	-0.97	-0.87	-0.59	-0.57	-0.55	-0.53
Real GDP	0.63	0.59	0.55	0.51	1.55	1.15	0.95	0.82	0.63	0.58	0.54	0.51
Household income	0.95	0.87	0.79	0.73	2.32	1.69	1.37	1.17	0.93	0.86	0.79	0.72
Consumption	0.63	0.58	0.54	0.51	1.55	1.14	0.94	0.82	0.64	0.58	0.54	0.51
Investments	0.95	0.87	0.79	0.73	2.32	1.69	1.37	1.17	0.93	0.86	0.79	0.72
Government revenues	0.94	0.87	0.79	0.73	2.32	1.69	1.38	1.18	0.92	0.85	0.79	0.72
Government expenditures	0.94	0.87	0.80	0.73	2.31	1.70	1.38	1.18	0.91	0.85	0.79	0.73
Sales taxes	0.90	0.85	0.78	0.73	2.21	1.66	1.36	1.17	0.86	0.82	0.77	0.71
Value-added taxes	0.95	0.87	0.80	0.73	2.33	1.70	1.38	1.18	0.83	0.81	0.75	0.70

Table 6. Demand for labor and capital by sectors: deviation of the implied annual average growth rates from the baseline growth trajectory (unit: %)

	S1				S2				S3			
	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20
Demand for labor												
AGRIC	-0.23	-0.21	-0.19	-0.18	-0.56	-0.41	-0.33	-0.28	-0.24	-0.22	-0.20	-0.18
MINING	0.40	0.04	-0.07	-0.12	0.89	0.04	-0.14	-0.20	0.38	0.03	-0.07	-0.12
FOODMNF	-0.13	-0.12	-0.11	-0.10	-0.31	-0.23	-0.18	-0.16	-0.13	-0.12	-0.11	-0.10
TEXTILE	-0.33	-0.22	-0.18	-0.15	-0.78	-0.42	-0.30	-0.23	-0.34	-0.23	-0.18	-0.15
WOOD	-0.12	-0.08	-0.07	-0.06	-0.28	-0.16	-0.11	-0.09	-0.14	-0.09	-0.07	-0.06
PAPER	-0.13	-0.10	-0.09	-0.08	-0.31	-0.19	-0.15	-0.12	-0.14	-0.11	-0.09	-0.08
REFOIL	0.03	-0.10	-0.14	-0.16	0.04	-0.21	-0.26	-0.27	0.02	-0.11	-0.15	-0.16
CHEMICAL	-0.46	-0.35	-0.28	-0.24	-1.11	-0.66	-0.48	-0.38	-0.47	-0.35	-0.29	-0.25
METAL	-0.35	-0.27	-0.23	-0.20	-0.84	-0.52	-0.39	-0.31	-0.36	-0.28	-0.23	-0.20
TRNSPEQP	-0.26	-0.17	-0.13	-0.11	-0.61	-0.32	-0.22	-0.17	-0.27	-0.18	-0.14	-0.11
ELECMNF	-0.58	-0.38	-0.30	-0.25	-1.36	-0.72	-0.50	-0.39	-0.59	-0.39	-0.30	-0.25
OTHERMN	-0.13	-0.11	-0.10	-0.09	-0.31	-0.21	-0.17	-0.14	-0.14	-0.12	-0.10	-0.09
MACHEQP	-0.23	-0.16	-0.13	-0.11	-0.55	-0.30	-0.22	-0.17	-0.24	-0.16	-0.13	-0.11
WATER	-0.07	-0.07	-0.07	-0.07	-0.17	-0.13	-0.12	-0.11	-0.10	-0.08	-0.08	-0.07
ELECTRI	-0.19	-0.19	-0.19	-0.18	-0.46	-0.37	-0.32	-0.29	-0.20	-0.20	-0.19	-0.18
CONSTRU	0.16	0.13	0.11	0.10	0.38	0.25	0.19	0.16	0.14	0.12	0.11	0.10
TRADE	0.06	0.05	0.04	0.04	0.14	0.10	0.08	0.06	0.05	0.05	0.04	0.04
TRANSP	0.03	0.03	0.03	0.02	0.07	0.05	0.05	0.04	0.02	0.02	0.02	0.02
COMMUNI	-0.17	-0.17	-0.16	-0.15	-0.42	-0.33	-0.28	-0.25	-0.19	-0.17	-0.16	-0.16
FINANCE	0.07	0.06	0.05	0.05	0.16	0.12	0.09	0.08	0.06	0.05	0.05	0.05
OTHERSE	0.02	0.01	0.01	0.01	0.05	0.02	0.01	0.01	0.01	0.01	0.00	0.00
DOMTOUR	0.10	0.07	0.06	0.05	0.24	0.14	0.10	0.08	0.15	0.10	0.08	0.06
FORTOUR	0.09	0.06	0.05	0.04	0.21	0.12	0.09	0.07	0.07	0.06	0.05	0.04
Demand for capital												
AGRIC	1.28	1.22	1.16	1.09	3.16	2.41	2.02	1.77	1.27	1.21	1.15	1.09
MINING	1.92	1.48	1.28	1.16	4.66	2.87	2.21	1.85	1.90	1.46	1.27	1.15
FOODMNF	1.39	1.32	1.25	1.17	3.42	2.59	2.17	1.90	1.38	1.31	1.24	1.17
TEXTILE	1.18	1.21	1.18	1.12	2.93	2.39	2.06	1.82	1.16	1.20	1.17	1.11
WOOD	1.40	1.35	1.29	1.21	3.45	2.67	2.25	1.97	1.37	1.34	1.28	1.21
PAPER	1.39	1.33	1.27	1.20	3.42	2.63	2.21	1.94	1.37	1.32	1.26	1.19
REFOIL	1.55	1.34	1.21	1.11	3.78	2.61	2.09	1.79	1.53	1.32	1.20	1.10
CHEMICAL	1.05	1.08	1.07	1.03	2.59	2.14	1.87	1.67	1.03	1.07	1.06	1.02
METAL	1.16	1.16	1.12	1.07	2.87	2.29	1.96	1.74	1.14	1.15	1.11	1.06
TRNSPEQP	1.25	1.26	1.22	1.16	3.10	2.50	2.13	1.88	1.23	1.25	1.21	1.15
ELECMNF	0.93	1.05	1.05	1.02	2.32	2.08	1.85	1.66	0.91	1.04	1.04	1.01
OTHERMN	1.38	1.32	1.26	1.18	3.41	2.61	2.19	1.92	1.36	1.31	1.25	1.18
MACHEQP	1.28	1.28	1.22	1.16	3.17	2.52	2.14	1.88	1.26	1.26	1.22	1.15
WATER	1.45	1.37	1.29	1.21	3.56	2.69	2.24	1.95	1.41	1.35	1.27	1.20
ELECTRI	1.32	1.24	1.17	1.09	3.26	2.44	2.03	1.76	1.30	1.23	1.16	1.08
CONSTRU	1.68	1.57	1.47	1.38	4.13	3.08	2.56	2.22	1.66	1.56	1.46	1.37
TRADE	1.57	1.49	1.40	1.31	3.88	2.93	2.44	2.12	1.56	1.48	1.39	1.31
TRANSP	1.54	1.46	1.38	1.30	3.81	2.88	2.41	2.10	1.53	1.45	1.37	1.29
COMMUNI	1.34	1.27	1.19	1.12	3.30	2.49	2.07	1.81	1.32	1.25	1.18	1.11
FINANCE	1.58	1.50	1.41	1.32	3.91	2.95	2.45	2.14	1.57	1.48	1.40	1.31
OTHERSE	1.54	1.45	1.36	1.28	3.79	2.85	2.37	2.07	1.52	1.44	1.35	1.27
DOMTOUR	1.62	1.51	1.41	1.32	3.99	2.97	2.46	2.14	1.66	1.53	1.43	1.33
FORTOUR	1.61	1.50	1.41	1.32	3.96	2.95	2.45	2.13	1.58	1.49	1.40	1.31

Table 7. Change in the growth rate of value-added by sectors: deviation of the implied annual average growth rates from the baseline growth trajectory (unit: %)

	S1				S2				S3			
	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20
AGRIC	0.07	0.05	0.03	0.02	0.16	0.09	0.05	0.02	0.07	0.05	0.03	0.02
MINING	-0.30	-0.30	-0.30	-0.29	-0.73	-0.59	-0.52	-0.48	-0.30	-0.30	-0.30	-0.29
FOODMNF	0.18	0.16	0.14	0.12	0.45	0.31	0.23	0.18	0.18	0.16	0.14	0.12
TEXTILE	0.38	0.35	0.31	0.28	0.93	0.68	0.54	0.45	0.38	0.35	0.31	0.28
WOOD	0.43	0.40	0.36	0.32	1.06	0.77	0.62	0.52	0.43	0.40	0.36	0.32
PAPER	0.37	0.34	0.30	0.27	0.91	0.66	0.52	0.44	0.37	0.34	0.30	0.27
REFOIL	-0.12	-0.13	-0.14	-0.14	-0.29	-0.25	-0.24	-0.23	-0.12	-0.13	-0.14	-0.14
CHEMICAL	0.27	0.25	0.22	0.19	0.67	0.48	0.37	0.30	0.27	0.24	0.21	0.19
METAL	0.36	0.33	0.29	0.26	0.88	0.64	0.50	0.42	0.36	0.33	0.29	0.26
TRNSPEQP	0.46	0.43	0.39	0.35	1.14	0.83	0.66	0.56	0.46	0.43	0.38	0.35
ELECMNF	0.28	0.25	0.22	0.20	0.68	0.49	0.38	0.31	0.28	0.25	0.22	0.19
OTHERMN	0.30	0.27	0.24	0.21	0.73	0.52	0.41	0.33	0.30	0.27	0.24	0.21
MACHEQP	0.46	0.43	0.39	0.35	1.13	0.83	0.66	0.56	0.46	0.42	0.38	0.35
WATER	0.18	0.15	0.13	0.11	0.43	0.30	0.22	0.17	0.18	0.15	0.13	0.11
ELECTRI	-0.04	-0.05	-0.07	-0.08	-0.10	-0.11	-0.12	-0.13	-0.04	-0.05	-0.07	-0.08
CONSTRU	0.48	0.44	0.40	0.36	1.17	0.86	0.69	0.58	0.48	0.44	0.40	0.36
TRADE	0.38	0.35	0.31	0.28	0.94	0.68	0.54	0.45	0.38	0.35	0.31	0.28
TRANSP	0.36	0.33	0.30	0.27	0.89	0.65	0.51	0.42	0.36	0.33	0.30	0.27
COMMUNI	0.07	0.06	0.04	0.02	0.18	0.11	0.06	0.03	0.07	0.06	0.04	0.02
FINANCE	0.41	0.38	0.34	0.31	1.01	0.74	0.59	0.49	0.41	0.38	0.34	0.31
OTHERSE	0.33	0.30	0.27	0.24	0.81	0.58	0.46	0.38	0.33	0.30	0.27	0.24
DOMTOUR	0.47	0.44	0.39	0.36	1.16	0.85	0.68	0.57	0.47	0.43	0.39	0.36
FORTOUR	0.47	0.43	0.39	0.36	1.15	0.84	0.67	0.57	0.47	0.43	0.39	0.35

Table 8. Output and household consumption by sectors: deviation of the implied annual average growth rates from the baseline growth trajectory (unit: %)

	S1				S2				S3			
	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20
						Output						
AGRIC	0.62	0.60	0.57	0.54	1.52	1.17	0.99	0.87	0.61	0.59	0.56	0.53
MINING	1.63	1.20	1.02	0.91	3.93	2.32	1.76	1.45	1.61	1.19	1.02	0.90
FOODMNF	0.61	0.58	0.55	0.52	1.48	1.13	0.95	0.83	0.60	0.57	0.54	0.51
TEXTILE	0.21	0.28	0.30	0.30	0.52	0.57	0.53	0.49	0.19	0.27	0.29	0.30
WOOD	0.37	0.38	0.37	0.35	0.90	0.74	0.64	0.57	0.35	0.37	0.36	0.34
PAPER	0.42	0.41	0.40	0.38	1.02	0.81	0.70	0.62	0.40	0.40	0.39	0.38
REFOIL	1.07	0.88	0.78	0.71	2.60	1.72	1.35	1.14	1.05	0.87	0.78	0.71
CHEMICAL	0.18	0.26	0.29	0.30	0.45	0.53	0.52	0.49	0.16	0.25	0.28	0.29
METAL	0.21	0.25	0.27	0.27	0.51	0.50	0.47	0.44	0.19	0.24	0.26	0.26
TRNSPEQP	0.19	0.26	0.27	0.27	0.49	0.52	0.48	0.44	0.18	0.25	0.27	0.27
ELECMNF	0.06	0.22	0.27	0.28	0.17	0.45	0.48	0.47	0.04	0.21	0.26	0.28
OTHERMN	0.49	0.48	0.45	0.43	1.19	0.93	0.79	0.70	0.47	0.47	0.45	0.43
MACHEQP	0.22	0.27	0.28	0.27	0.55	0.54	0.49	0.44	0.21	0.26	0.27	0.27
WATER	0.67	0.63	0.59	0.56	1.64	1.24	1.03	0.90	0.64	0.62	0.58	0.55
ELECTRI	0.77	0.72	0.67	0.63	1.89	1.41	1.17	1.01	0.75	0.71	0.66	0.62
CONSTRU	0.60	0.55	0.51	0.47	1.46	1.07	0.88	0.76	0.58	0.54	0.50	0.47
TRADE	0.59	0.56	0.52	0.49	1.45	1.09	0.90	0.79	0.58	0.55	0.52	0.48
TRANSP	0.58	0.55	0.52	0.49	1.42	1.08	0.90	0.79	0.57	0.54	0.52	0.49
COMMUNI	0.67	0.63	0.59	0.56	1.64	1.24	1.03	0.90	0.65	0.62	0.59	0.55
FINANCE	0.57	0.54	0.50	0.47	1.40	1.05	0.87	0.76	0.56	0.53	0.50	0.47
OTHERSE	0.61	0.57	0.53	0.50	1.49	1.11	0.92	0.80	0.59	0.56	0.53	0.49
DOMTOUR	0.54	0.49	0.46	0.42	1.33	0.96	0.79	0.68	0.59	0.52	0.47	0.43
FORTOUR	0.53	0.49	0.45	0.42	1.30	0.95	0.78	0.68	0.52	0.48	0.44	0.41
						Household consumption						
AGRIC	0.83	0.76	0.70	0.66	2.02	1.49	1.22	1.06	0.81	0.75	0.70	0.65
MINING	1.11	0.96	0.86	0.78	2.72	1.86	1.48	1.26	1.10	0.95	0.85	0.78
FOODMNF	0.74	0.69	0.64	0.60	1.81	1.34	1.11	0.96	0.73	0.68	0.63	0.59
TEXTILE	0.76	0.72	0.67	0.62	1.87	1.41	1.16	1.00	0.75	0.71	0.66	0.62
WOOD	0.64	0.60	0.56	0.53	1.56	1.18	0.98	0.85	0.63	0.59	0.56	0.52
PAPER	0.67	0.63	0.58	0.54	1.64	1.22	1.01	0.88	0.66	0.62	0.58	0.54
REFOIL	1.13	0.95	0.85	0.77	2.75	1.86	1.46	1.23	1.12	0.95	0.84	0.77
CHEMICAL	0.79	0.74	0.69	0.64	1.94	1.45	1.19	1.03	0.78	0.73	0.68	0.63
METAL	0.78	0.72	0.67	0.62	1.90	1.41	1.16	1.00	0.77	0.71	0.66	0.62
TRNSPEQP	0.79	0.74	0.69	0.64	1.93	1.45	1.19	1.02	0.77	0.73	0.68	0.63
ELECMNF	0.78	0.74	0.69	0.64	1.91	1.45	1.20	1.04	0.77	0.73	0.69	0.64
OTHERMN	0.70	0.65	0.61	0.57	1.71	1.27	1.05	0.91	0.69	0.64	0.60	0.56
MACHEQP	0.76	0.71	0.66	0.62	1.85	1.40	1.15	0.99	0.74	0.71	0.66	0.61
WATER	0.72	0.66	0.61	0.57	1.76	1.29	1.06	0.92	0.71	0.65	0.61	0.56
ELECTRI	0.89	0.79	0.73	0.67	2.17	1.55	1.26	1.08	0.88	0.79	0.72	0.67
CONSTRU	0.58	0.52	0.48	0.44	1.40	1.02	0.83	0.72	0.56	0.51	0.48	0.44
TRADE	0.60	0.55	0.51	0.48	1.47	1.08	0.89	0.77	0.59	0.55	0.51	0.47
TRANSP	0.66	0.60	0.56	0.52	1.61	1.17	0.96	0.83	0.65	0.59	0.55	0.51
COMMUNI	0.78	0.71	0.66	0.62	1.90	1.39	1.15	0.99	0.76	0.70	0.65	0.61
FINANCE	0.58	0.53	0.49	0.46	1.41	1.04	0.86	0.74	0.56	0.52	0.49	0.46
OTHERSE	0.63	0.58	0.54	0.50	1.54	1.13	0.93	0.81	0.62	0.57	0.53	0.50
DOMTOUR	0.54	0.49	0.45	0.42	1.33	0.96	0.79	0.68	0.60	0.52	0.47	0.43
FORTOUR	0.54	0.49	0.46	0.42	1.33	0.96	0.79	0.68	0.53	0.49	0.45	0.42

Table 8. Export and imports by sectors: deviation of the implied annual average growth rates from the baseline growth trajectory (unit: %)

	S1				S2				S3			
	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20	Year 5	Year 10	Year 15	Year 20
						Exports						
AGRIC	0.36	0.36	0.38	0.38	0.88	0.72	0.66	0.62	0.35	0.36	0.37	0.37
MINING	1.73	1.24	1.05	0.93	4.16	2.40	1.80	1.49	1.71	1.23	1.04	0.93
FOODMNF	0.20	0.21	0.23	0.24	0.48	0.42	0.41	0.39	0.19	0.21	0.23	0.23
TEXTILE	-0.32	-0.19	-0.12	-0.08	-0.76	-0.35	-0.19	-0.11	-0.34	-0.20	-0.12	-0.08
WOOD	-0.28	-0.22	-0.17	-0.13	-0.68	-0.41	-0.27	-0.20	-0.30	-0.22	-0.17	-0.14
PAPER	-0.20	-0.14	-0.10	-0.06	-0.48	-0.27	-0.16	-0.09	-0.21	-0.15	-0.10	-0.07
REFOIL	1.32	0.99	0.85	0.76	3.18	1.92	1.46	1.22	1.30	0.98	0.84	0.76
CHEMICAL	-0.25	-0.13	-0.06	-0.01	-0.60	-0.24	-0.08	0.00	-0.27	-0.14	-0.06	-0.02
METAL	-0.28	-0.20	-0.14	-0.10	-0.69	-0.38	-0.23	-0.15	-0.30	-0.21	-0.15	-0.10
TRNSPEQP	-0.36	-0.25	-0.18	-0.15	-0.87	-0.47	-0.31	-0.22	-0.38	-0.25	-0.19	-0.15
ELECMNF	-0.40	-0.18	-0.08	-0.02	-0.94	-0.31	-0.11	-0.02	-0.42	-0.18	-0.08	-0.03
OTHERMN	-0.02	0.01	0.05	0.07	-0.04	0.04	0.09	0.12	-0.03	0.01	0.04	0.06
MACHEQP	-0.42	-0.32	-0.25	-0.21	-1.00	-0.60	-0.42	-0.33	-0.43	-0.32	-0.26	-0.21
WATER	0.22	0.22	0.23	0.24	0.54	0.44	0.42	0.39	0.19	0.21	0.22	0.23
ELECTRI	0.66	0.58	0.54	0.51	1.60	1.13	0.94	0.83	0.64	0.57	0.54	0.51
CONSTRU	-0.14	-0.14	-0.12	-0.10	-0.35	-0.27	-0.19	-0.15	-0.15	-0.14	-0.12	-0.10
TRADE	-0.09	-0.07	-0.04	-0.01	-0.22	-0.13	-0.06	-0.01	-0.10	-0.07	-0.04	-0.02
TRANSP	0.01	0.00	0.02	0.04	0.00	0.01	0.05	0.07	0.00	0.00	0.02	0.04
COMMUNI	0.33	0.33	0.33	0.33	0.81	0.65	0.58	0.54	0.32	0.32	0.33	0.32
FINANCE	-0.19	-0.16	-0.12	-0.09	-0.47	-0.31	-0.20	-0.14	-0.20	-0.17	-0.13	-0.10
OTHERSE	-0.02	-0.01	0.02	0.04	-0.06	0.00	0.05	0.08	-0.03	-0.01	0.02	0.04
DOMTOUR	-0.26	-0.25	-0.22	-0.19	-0.63	-0.48	-0.37	-0.29	-0.09	-0.16	-0.16	-0.14
FORTOUR	-0.27	-0.26	-0.22	-0.19	-0.67	-0.50	-0.38	-0.30	-0.28	-0.27	-0.23	-0.20
						Imports						
AGRIC	0.92	0.86	0.78	0.72	2.26	1.67	1.35	1.15	0.91	0.85	0.78	0.71
MINING	0.69	0.69	0.65	0.61	1.71	1.36	1.13	0.98	0.67	0.68	0.64	0.60
FOODMNF	1.09	0.99	0.90	0.82	2.67	1.94	1.55	1.32	1.07	0.98	0.89	0.82
TEXTILE	0.95	0.88	0.81	0.75	2.33	1.73	1.41	1.21	0.93	0.87	0.80	0.74
WOOD	1.16	1.05	0.95	0.87	2.84	2.05	1.65	1.40	1.14	1.04	0.94	0.87
PAPER	1.11	1.02	0.93	0.85	2.74	2.00	1.61	1.37	1.09	1.01	0.92	0.85
REFOIL	0.48	0.59	0.59	0.57	1.21	1.18	1.04	0.92	0.46	0.58	0.58	0.56
CHEMICAL	0.87	0.82	0.76	0.70	2.13	1.60	1.31	1.13	0.85	0.81	0.75	0.69
METAL	0.84	0.80	0.74	0.69	2.06	1.56	1.28	1.10	0.82	0.79	0.73	0.68
TRNSPEQP	0.98	0.90	0.83	0.76	2.40	1.76	1.43	1.22	0.96	0.89	0.82	0.75
ELECMNF	0.85	0.81	0.75	0.70	2.08	1.59	1.30	1.12	0.83	0.80	0.74	0.69
OTHERMN	1.11	1.02	0.92	0.84	2.74	1.98	1.59	1.35	1.10	1.00	0.91	0.83
MACHEQP	1.10	0.99	0.90	0.82	2.69	1.93	1.56	1.32	1.08	0.98	0.89	0.82
WATER	1.13	1.05	0.96	0.88	2.77	2.05	1.66	1.41	1.09	1.03	0.95	0.87
ELECTRI	0.89	0.87	0.81	0.75	2.20	1.70	1.40	1.20	0.87	0.86	0.80	0.74
CONSTRU	1.34	1.24	1.13	1.04	3.31	2.42	1.96	1.67	1.33	1.23	1.12	1.03
TRADE	1.29	1.19	1.09	1.00	3.18	2.33	1.88	1.60	1.28	1.18	1.08	0.99
TRANSP	1.24	1.15	1.06	0.97	3.06	2.26	1.83	1.55	1.23	1.15	1.05	0.96
COMMUNI	1.03	0.95	0.87	0.79	2.54	1.86	1.50	1.27	1.01	0.94	0.86	0.79
FINANCE	1.36	1.25	1.14	1.05	3.35	2.45	1.97	1.68	1.35	1.24	1.13	1.04
OTHERSE	1.26	1.16	1.05	0.96	3.10	2.26	1.82	1.54	1.25	1.15	1.04	0.96
DOMTOUR	1.35	1.24	1.13	1.04	3.32	2.43	1.96	1.66	1.28	1.20	1.10	1.02
FORTOUR	1.35	1.24	1.13	1.04	3.32	2.43	1.96	1.67	1.33	1.23	1.12	1.03

Table 10. The results of sensitivity analysis for selected macro variables (Baseline: 1.00)

	CET and Armington CES elasticities 15% higher			CET and Armington CES elasticities 15% lower		
	Year 5	Year 10	Year 20	Year 5	Year 10	Year 20
Average wage rate	0.89	0.85	0.85	1.04	1.20	1.35
Rental rate of capital	0.97	0.94	0.90	1.40	1.34	1.25
Real GDP	0.74	0.73	0.75	1.12	1.19	1.27
Household income	0.88	0.84	0.85	0.99	1.13	1.26
Consumption	0.71	0.71	0.72	1.27	1.35	1.43
Investments	0.89	0.85	0.85	1.00	1.13	1.27
Government revenues	0.90	0.86	0.86	0.98	1.11	1.25
Government expenditures	0.91	0.86	0.87	0.92	1.05	1.18