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IMPACT OF COVID-19 ON TOURISM: EVIDENCE FROM SAM ASSESMENTS OF HUNGARY AND TURKEY

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ABSTRACT
Due to the Covid-19 pandemic, international mobility was largely restricted, which led to severe declines in tourism activities. This paper estimates the economic impacts of this decline in Turkey and Hungary, using social accounting matrix modeling. The authors constructed social accounting matrices separately and estimated the macroeconomic impact of the decline. The results reveal that the decline in international tourism revenues reduced GDP by 2.6% in Turkey and 5.9% in Hungary, with 0.9% and 2.0% loss of employment in Turkey and Hungary, respectively. These figures are much larger compared to the economic gains from the fiscal rescue packages.

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INTRODUCTION

The recent coronavirus (Covid-19) outbreak, which started in Wuhan, China in December 2019, rapidly reached the pandemic size. It was initially thought to be a health crisis, but it soon became a social and economic crisis. As a result of measures taken by governments across the world, both domestic and international travel was soon restricted to prevent the further spread of the pandemic. In addition, due to social distancing restrictions, many stores and firms were closed, effectively putting a considerable number of workers at risk of unemployment. As a result of the losses in workers' incomes, aggregate demand was reduced largely, and economic activity slowed down. Such adverse effects turned the pandemic into a global economic crisis, with consequences much more significant than that

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of the 2008-2009 Global Financial Crisis. According to the World Economic Outlook Database of the IMF, global GDP shrank by 4.4% in 2020. The degree of decline in GDP was much more significant in advanced economies (-5.8%) compared to the emerging and developing economies (-3.3%).

The Covid-19 pandemic resulted in substantial economic costs, most notably in the advanced countries. Elgin et al. (2020) provide an overview of the economic policy measures adopted by 166 countries and regions during the pandemic. The pandemic resulted in a supply shock that eventually triggered a larger aggregate demand shock (Guerrieri et al., 2020). Covid-19 has also increased economic uncertainty about inflation as well as output. Baker et al. (2020), Binder (2020), Coibion et al. (2020), and Dietrich et al. (2020) argue that the decline in output in the US economy is reflected in this uncertainty. Governments provided large rescue packages as part of fiscal stimuli to cope with the pandemic and its vast potential economic losses. These packages targeted households that have lost income, and firms affected by the pandemic due to the decline in aggregate demand and the collapse of domestic and global supply chains.

The pandemic resulted in a considerable loss on the supply side, especially in contact-intensive sectors. Most governments have ordered restaurants, bars, cafes, and entertainment-related stores to close in an attempt to maintain social distancing. In addition, both domestic and international travel and transport services were halted, causing a significant decline in tourism demand. United Nations World Tourism Organization (UNWTO) published estimates on the impact of the pandemic on individual countries' economies as well as the global economy (UNWTO Covid-19 and Tourism Dashboard).[1] UNWTO reports that total international tourist arrivals in the world shrank by 73% in 2020. UNWTO also reports updated statistics about the change in international tourist arrivals and international tourism receipts.[2] In the first month of 2021, the decline in tourist arrivals compared to the same month in the previous year was 87%. These are large declines compared to the estimates at the beginning of the pandemic. For instance, Fotiadis et al. (2021) had estimated that total international tourist arrivals in the world would decline between 30.8-76.3% from July 2020 to June 2021. Therefore, the negative effect of the pandemic on international tourism seems to have been prolonged. Tourism

[1] https://www.unwto.org/international-tourism-and-covid-19 (accessed April 24, 2021).

[2] For instance, the loss in international tourism receipts in real terms in 2020 were 77%, 76%, 61%, 61%, 60%, 56%, 50% for Spain, Greece, Italy, USA, UK, China, and France, respectively. Tourism income loss was estimated between 22.8-29.1 billion US dollars in Hong Kong (Zhang et al., 2021).

has generally been sensitive to global crises as travelers can easily change or cancel their travel plans when uncertainties arise (Uğur & Akbıyık, 2020). UNWTO predicted in March 2021 that even with the major lifting of travel restrictions and significant improvement in traveler confidence, international tourist arrivals would not recover by the end of 2021, but stay 30% below the pre-pandemic level.

Quantitative assessment of the macroeconomic impacts (on GDP, employment, etc.) of the decline in international tourism is yet a relatively understudied area. While existing studies find a significant decline in tourism demand on a global scale, the estimated impacts on tourism are diverse. For instance, a rapid assessment by Gössling et al. (2020) listed the projected losses in international tourism revenues by international organizations ranging from 450 billion to 2.1 trillion US dollars. In April 2020, the Asian Development Bank predicted the loss in global GDP in 2020 to be 2.0 trillion US dollars (decline by 2.3%) in the shorter containment and small demand shock scenario, and 4.1 trillion US dollars (decline by 4.8%) in the longer containment and large demand shock scenario (ADB, 2020). Škare et al. (2021) estimated using data from 185 countries losses in global employment between 164-514 million jobs and global tourism revenues between 0.6-1.9 trillion US dollars in 2000 prices, based on different scenarios. Studies estimating the economic impact of the decline in tourism revenues in individual countries also point to large declines in GDP and employment in countries strongly dependent on tourism. Using input-output techniques, Mariolis et al. (2021) found that Greek GDP would decline between 2-6% and employment between 2.1-6.4%.

International organizations such as UNWTO, ILO, IATA, UNCTAD, etc. publish various statistics related to the economic changes after the breakout of the pandemic. These studies ignore complex linkages across economic sectors and the interactions between actors in the economy (households, government, firms, and the rest of the world) in a general equilibrium framework. The social accounting matrix (SAM) and computable general equilibrium (CGE) model are powerful in capturing such effects and estimating the economic impact of shocks such as Covid-19. Maliszewska et al. (2020) used a world CGE model to estimate the impact of Covid-19 on GDP and trade. Their preliminary results for the decline in world GDP were 2.1% for the short containment scenario and 3.9% for the long containment scenario. The authors of this paper choose to work with SAM, which allows for a wide-ranging quantitative assessment of a tourism sector shock on other sectors' output and employment levels

and the overall economy.[3] Only a handful of studies employ SAM modeling to estimate the economic impact of Covid-19. Diao et al. (2020), Pradesha et al. (2020), Andam et al. (2020), Amewu et al. (2020), and Zhang et al. (2020) studied the impact of Covid-19 on the economies of Myanmar, Indonesia, Nigeria, Ghana, and China, respectively, using SAM multipliers and various scenarios related to agri-food systems.[4]

This study aims to examine the macroeconomic impact of the observed large decline in international tourism demand due to the Covid-19 outbreak in tourism-dependent economies using SAM modeling. Before the pandemic, international tourism revenues in 2019 amounted to 10.2 and 42.4 billion dollars in Hungary and Turkey, respectively. On average, for the period 2015-2020, Hungary recorded a current account surplus of 1.96 billion US dollars, whereas Turkey had a large current account deficit of 24.57 billion US dollars. Therefore, international tourism revenues, which are part of the current account, are important for both countries. In addition, as discussed in the following section, tourism's share in total employment in both countries is as high as 9%. For this purpose, this paper takes the cases of Hungary and Turkey, two economies in Europe with a strong dependence on international tourism revenues. The research specifically interested in the impacts on tourism-related sectors. Authors constructed two SAMs for Hungary and Turkey and examine the impact of the declining international tourism revenues and the effect of the government's rescue packages on the economy and, in particular, on tourism-related sectors.

Most of the existing studies about the pandemic and tourism use econometric techniques. Demir et al. (2021) brought together a number of such studies evaluating the impact of the pandemic on the tourism industry in Turkey and various other countries. These studies point to significant income and employment losses in tourism industries. For instance, Çetin and Erdil (2021) and Dibo (2021) found that tourism revenues have declined between 60%-65% and estimated employment losses in tourism-related industries as high as 39%.

Econometric techniques present a partial equilibrium approach to analyze the impact of the pandemic on tourism and do not take into

[3] Other CGE studies have assessed the impacts of the pandemic with respect to wide range of issues such as the transport sector in China (Cui et al., 2021), global economy (McKibbin & Fernando, 2021), Brazilian economy (Porsse et al., 2020), American agriculture (Beckman & Countryman, 2021), tax policy in China (Xu & Wei, 2021), food prices and food security (Beckman et al., 2021), global supply chains (Guan et al., 2020), and tourism in Australia (Pham et al., 2021), and changes in labor productivity across regions (He et al., 2021), among others.

[4] There are also studies examining the economic impact of the pandemic using input-output techniques such as Eppinger et al. (2020), which estimated the impact on global value chains.

consideration the nature of the resource use, linkages across sectors, and the complex interactions among various actors in the economy. Input-output, SAM, and related techniques (e.g., applied general equilibrium models) fill in this gap and offer an opportunity to examine the effects of a shock, such as the pandemic, and the accompanying policy responses on the economy and individual sectors. There are few studies on the impact of the pandemic on tourism using such techniques. In an early study using input-output analysis, Taymaz (2020) found based on some assumptions[5] that GDP would decline by 10%, and value-added would decrease largely in accommodation and restaurants (-60%), air transport (-59%), cultural services (-51%), and recreation services (-38%) in Turkey. He also found that the loss in employment would be 717 thousand in the accommodation and restaurants sector and 595 thousand in retail trade. Another study using the CGE model by Voyvoda and Yeldan (2020) estimated the declines in GDP, total employment, and household income as 26.7%, 22.8%, and 46%, respectively.[6] In addition, Çakmaklı et al. (2020) employed an open-economy, multi-sector epidemiological macro model and estimated the economic cost of the pandemic between 4.5-11% of GDP based on different scenarios about the duration of the lockdown. Studies on the economic impact of Covid-19 on tourism in Hungary point to significant economic losses due to the adversely affected budget and spending patterns of the tourists during the pandemic, with a possible lower consumption in the future (Raffay, 2021). Raffay (2021) also compares the impact of the pandemic on tourism with that of the 2008-2009 financial crisis, where 46% of the EU-27 region households had to cut back tourism expenditures (Eugenio-Martina & Campos-Soria, 2014). Finally, Korinth (2021) showed that while there was a sharp decline in accommodation occupation rates during the pandemic in the Central European countries, Switzerland and Austria successfully restarted tourism activities.

The current paper contributes to the literature about the impact of Covid-19 on tourism in several aspects. First, authors utilize the SAM modeling technique, which has not been used in the literature about the impact of Covid-19 on tourism. Second, many of the existing studies were conducted amid the pandemic, and the scenario analyses were based on assumptions about projections about the decline in tourist arrivals or

[5] He assumed that consumption and exports would decline by 60% in highly-affected sectors, and 30% in others while increasing by 20% in pharma and telecom services sectors and by 5% in the food sector.
[6] They also showed that a policy package should contain permanent income support to workers (50% of wages), income support to SMEs, and an increase in government spending by 20%. Such a package would cost about 2.9% of GDP but offset 85% of the loss in labor income.

revenues. This paper uses official statistics for the decline in international tourism revenues.

The remainder of the paper is organized as follows: Section 2 overviews the tourism sectors in both countries; the data and method of analysis are explained in Section 3; the simulations and the results are presented in Section 4; and finally, Section 5 wraps up and concludes the study.

INTERNATIONAL TOURISM AND THE PANDEMIC

International tourism is an important economic activity in both Hungary and Turkey. To measure the importance of tourism in the national economy, it is a logical criterion look at the ratio of internal tourism spending (i.e., the sum of inbound and domestic tourism spending) to total domestic supply, i.e., tourism ratio, which is available from the tourism satellite accounts in the Eurostat database (Eurostat 2013; 2019). The latest editions of the tourism satellite accounts for Europe were published in 2013 for year 2010 and in 2019 for year 2016. Hungary is included only in the 2019 edition and Turkey only in the 2013 edition. The tourism ratio was 4.6% for Turkey in 2010 and 2.0% for Hungary in 2016. To put these figures in perspective, the EU average was 3.9% in 2010 and 3.4% in 2016. While these ratios seem moderate, tourism's share in employment is much larger. According to the Eurostat data above, tourism accounted for 442.5 thousand jobs in Hungary in 2016, equivalent to 10.2% of total employment, whereas no data were available for Turkey. World Travel and Tourism Council estimated the share of tourism in total employment in 2020 as 9.2% in Hungary and 9.3% in Turkey.[7]

International tourism activities suffered a severe setback with the outbreak of the pandemic and a rapid decline in tourism demand. Due to the high importance of international tourism in Hungary and Turkey, these economies were adversely affected. According to the official statistics provided by the Turkish Ministry of Culture and Tourism and Hungarian Central Statistical Office, international tourism revenues declined largely by 42% in Hungary (from 10.2 to 4.3 billion US dollars)[8] and by 60% in Turkey (from 42.4 to 12.1 billion US dollars)[9] in 2020 compared to the previous year. The decline in international tourist arrivals in Hungary and Turkey was 77% and 69%, respectively. In the case of Hungary, due to the

[7] See https://wttc.org/Research/Economic-Impact (accessed, December 14, 2021).
[8] https://www.ksh.hu/docs/hun/xstadat/xstadat_evkozi/e_ogt005b.html (accessed, April 7, 2021).
[9] https://www.e-unwto.org/toc/unwtotfb/current (accessed April 7, 2021).

difficulty in data collection during the pandemic, the actual decline in revenues is estimated to be around 48%.[10] Another estimate based on the EU's accommodation survey shows an overall drop of approximately 58% of guest nights spent in Hungary (EU average: 52%).[11]

In what follows, this study estimates the impact of this negative shock in the two countries using SAMs.

METHOD OF ANALYSIS

For the purpose of the analysis, current study constructed two SAMs for Hungary and Turkey. The structure of the SAM is provided in Table 1. A SAM is a square matrix in the form of an extended input-output table that portrays the transactions and interactions in an economy among production sectors (activities, a, and commodities, c), production factors (capital, k, and labor, l), institutions (households, h, and government, g), a savings-investment account (s), and the rest of the world (w). Columns represent payments, and rows represent receipts. Due to the assumption of the equality of payments and receipts, the column sum and the row sum are equal for each respective account. Payments made to the factors of production (rent and wages) accrue to households.

This paper adopts the conventional SAM modeling method for economic impact analysis.[12] At the outset, it is important to note the underlying assumptions of the SAM model. The SAM approach to modeling is based on a linearly homogeneous production function as in input-output modeling, and the assumption of constant returns to scale, i.e., any change in the inputs, results in a proportional change in the output level. It is assumed that there is no substitution among inputs used in production, i.e., the shares of inputs in output are fixed. There is no constraint on the available labor and capital. In addition, the SAM model is demand-driven, i.e., the exogenous shocks are specified in the form of changes in demand, implying no inherent unemployment of resources. With these characteristics, the value of output is specified as the sum of the weighted costs of inputs inclusive of taxes, and the weights are fixed. When t there is a change in demand, supply responds through an immediate change in resources.

[10] https://g7.hu/adat/20210309/ezermilliard-forinttal-kevesebbet-koltottek-magyarorszagon-a-kulfoldiek-tavaly/
[11] https://24.hu/fn/gazdasag/2021/03/15/koronavirus-turizmus-europa-magyarorszag-2020/
[12] For a detailed account of SAM and its use in policy analysis, see Thorbecke (2000). For an application to the tourism sector, see West and Gamage (2001) and Akkemik (2012), among others.

Table 1. *The structure of the SAM*

		a	*c*	*l*	*k*	*h*	*g*	*s*	*w*	TOTAL
a	Activities		Domestic sales T_{ac}						Exports T_{aw}	Total output Y_a
c	Commodities	Intermediate input demand T_{ca}				Private consumption T_{ch}	Government spending T_{cg}	Gross capital formation T_{cs}		Domestic demand Y_c
l	Labor	Payment to labor T_{la}								Value added Y_l, Y_k
k	Capital	Operating surplus T_{ka}								
h	Households			Labor income T_{hl}	Retained profits T_{hk}		Government transfers T_{hg}		Transfers T_{hw}	Household income Y_h
g	Government	Indirect taxes T_{ga}	Tariffs T_{gc}			Taxes T_{gh}				Government income Y_g
s	Saving - investment					Private savings T_{sh}	Public savings T_{sg}		Capital transfers T_{sw}	Total savings Y_s
w	Rest of the world		Imports T_{wc}				Transfers T_{ac}	Foreign savings T_{ac}		Foreign earnings Y_w
	TOTAL	Total supply Y_a	Domestic supply Y_c	Labor expenditure Y_l	Capital expenditure Y_k	Household expenditure Y_h	Government expenditure Y_g	Investments Y_s	Foreign flows Y_w	

Impact analysis in SAM modeling works through a shock given to an exogenous account in the SAM, which is carried to the endogenous accounts, as shown in Table 2. In this research, authors set government, saving-investment, and the external (rest of the world) accounts as exogenous and the remaining accounts as endogenous. It is useful to describe how the shock in tourism demand is transmitted to the endogenous accounts. When tourism demand decreases, as in the Covid-19 pandemic, various tourism-related sectors will halt operations, and production and employment will be reduced. The decline in production in these sectors will be transferred to other sectors providing inputs to these sectors. In the current pandemic, non-paid leaves and layoffs of workers are very frequent, with direct effects on employment and production. Subsequently, incomes of the households will decline, which will lead to a decline in consumption, and a further decline in production across the board, thereby resulting in indirect effects. The total impact is the sum of the direct and indirect effects.

Table 2. *SAM with endogenous and exogenous accounts*

				Spending		
				Endogenous (a, c, k, l, h)	Exogenous (g, s, w)	Total
Income	Endogenous	a, c	Production (activities, commodities)	T_{nn}	T_{nx} (Injections)	Y_n
		k, l	Factors (capital, labor)			
		h	Households			
	Exogenous	g	Government	T_{xn} (Leakages)	T_{xx}	Y_x
		s	Saving-investment			
		w	Rest of the world			
	Total			Y_n	Y_x	

To put the impact analysis in matrix notation, authors denote the transactions across SAM accounts as T. These are shown in Table 1. For instance, the transaction matrix T_{ca} shows the transaction running from the commodities row to the activities column, i.e., intermediate input demand. All other matrix notations in the table are denoted in a similar fashion, where the first item in the subscripts represents the row and the second item represents the column account in the SAM. Then, the endogenous section of the SAM can be shown as follows:

$$\begin{bmatrix} Y_a \\ Y_c \\ Y_l \\ Y_k \\ Y_h \end{bmatrix} = \begin{bmatrix} 0 & T_{ac} & 0 & 0 & 0 \\ T_{ac} & 0 & 0 & 0 & T_{ch} \\ T_{la} & 0 & 0 & 0 & 0 \\ T_{ka} & 0 & 0 & 0 & 0 \\ 0 & 0 & T_{hl} & T_{hk} & 0 \end{bmatrix} \begin{bmatrix} Y_a \\ Y_c \\ Y_l \\ Y_k \\ Y_h \end{bmatrix} + \begin{bmatrix} T_{ax} \\ T_{cx} \\ T_{lx} \\ T_{kx} \\ T_{hx} \end{bmatrix} \quad (1)$$

Here, the transactions matrices for endogenous accounts are written in the form of expenditure coefficients, i.e., the elements of each T matrix are obtained by dividing the elements of the matrix T by the elements of the respective column sum Y_n. In the case of exogenous accounts, authors add up the relevant expenditures and create the vector of exogenous demand, which is the second item on the right-hand side of equation (1)

For analytical purposes, authors denote endogenous accounts with the subscript n ($n = \{a, c, l, k, h\}$), exogenous accounts with the subscript x ($x = \{g, s, w\}$), the row or column sum of a given SAM account as Y, and the transactions across the elements of the SAM as T. Denoting the matrix of the transactions among endogenous accounts as T_{nn} and the respective transactions for the aggregated exogenous accounts as T_{nx}, equation (1) can be rewritten as follows:

$$Y_n = T_{nn} + T_{nx} \quad (2)$$

Equation (2) can be further rewritten as follows:

$$Y_n = A_{nn}Y_n + T_{nx} \quad (3)$$

where A_{nn} is the matrix of technical (expenditure) coefficients; Equation (3) is solved as follows:

$$Y_n = (I - A_{nn})^{-1}T_{nx} \quad (4)$$

where I is the identity matrix. The inverse matrix (multiplier matrix) $(I - A_{nn})^{-1}$ shows the total impact. The exogenous changes arising from the changes in T_{nx} (i.e., injections) lead to a change in endogenous accounts Y_n through the technical coefficients of the inverse matrix $(I - A_{nn})^{-1}$. The elements of the inverse matrix are the well-known SAM multipliers.

Data: Construction and Sources

The data has established from World Input-Output Database (WIOD) and various other sources in constructing the SAM. Details about WIOD are available in Timmer et al. (2015). The data for final demand (consumption spending of households and government, investments, exports, imports), intermediate input demand, value-added (factor payments), and indirect

taxes are obtained from WIOD. The data about government transfers, transfers from the rest of the world, and savings (household savings, public budget surplus, and foreign savings) are obtained from national accounts statistics, the flow of funds accounts, and public finance statistics of the national statistical offices of Hungary and Turkey. The main data source is WIOD, and the latest data available in WIOD dates 2014. Hence, data has collected for 2014 and this led to constructing two SAMs for Hungary and Turkey for 2014 in national currencies. Original SAMs were not balanced as data were collected from different sources, but this research balanced them using the RAS method, a widely used iterative method to adjust an unbalanced SAM.[1]

WIOD data are available for 56 sectors., SAM in this paper emphasizes tourism and related activities, and aggregated these sectors into 23 broad sectors, which are shown in Table 3. Input-output tables do not provide information about domestic and international tourism. Since most of the tourism demand is directed to transport, accommodation, and food services, this paper's sectoral classification emphasizes tourism-related service sectors.

Table 3. *List of sectors in the SAM*

Industry description	*Sector codes in WIOD*
Agriculture	1-3
Mining	4
Food	5
Textiles	6
Wood and paper	7-9
Refined oil and chemical	10-13
Metal and minerals	14-16
Machinery	17-19
Motor vehicles	20-21
Other manufacturing	22-23
Energy	24-26
Construction	27
Wholesale trade	28-29
Retail trade	30
Land transport	31
Water transport	32
Air transport	33
Other transport services	34
Accommodation and food services	36
Communication services	35, 37-40
Finance and insurance	41-43
Real estate	44-46
Other services	47-56

[1] For details about RAS, see Cardenete et al. (2017: 131-137).

It is noteworthy that the tourism-related services sectors, namely, land transport, water transport, air transport, other transport, accommodation and food services sectors account for a significant portion of total value-added and total employment in both Hungary and Turkey. According to the SAMs in the current study, the total share of these sectors in Hungary and Turkey in the benchmark year is 17.6% and 29.8%, respectively, for value-added and 23.1% and 23.9%, respectively, for employment.

Policy Simulations

Economic Policy Responses and the Decline in Tourism Demand

Based on the economic policy responses of the Hungarian and Turkish governments and the negative demand shock due to the considerable reduction in tourism demand, authors designed a set of simulations which are listed in Table 4.

Table 4. *List of simulations*

	Hungary	*Turkey*
Demand shocks	Reduction in international tourism revenues by 58.2%	Reduction in foreign tourism receipts by 73.6%
Fiscal policy response	245 billion HUF provided to the healthcare sector, and 150 billion HUF bond purchases by the Government to enhance bank lending	173 billion TRY support extended to households and firms

For the demand side, the reported declines in international tourism revenues in 2020 and the composition of the expenditures of foreign tourists in the previous year (particularly 2019) for both countries were taken. To put these figures in perspective, the macroeconomic impact of the government's rescue packages in both countries were estimated.

The results for the rescue packages indicate the difference in the governments' will and capacity to stabilize the economic downturn. According to the official statistics of 2020, Hungarian GDP shrank largely by 5.3% (grew by 4.6% in 2019) while Turkish GDP increased slightly by 1.8% (0.9% in 2019). Information on the governments' fiscal and monetary responses to the pandemic is available from the IMF.[2] The Hungarian government's measures to ease the financial burden of businesses included a support for the healthcare sector received in the amount of 245 billion

[2] https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

Hungarian Forint (around 785 million US dollars), roughly 0.6% of GDP, and support for the tourism industry in the form of development grants (OECD, 2020). 150 billion Hungarian Forint (around 480 million US dollars) was allocated for construction and renovation of hotels, small accommodations and campsites. In September, an additional 100 billion Hungarian Forint (around 320 million US dollars) was made available for SMEs as zero interest rate loans. The demand side of tourism was supported by a preferential tax rate program.

In the case of Turkey, the initial response to the declining economic activity was a rescue package of 75 billion Turkish liras (around 12 billion US dollars) along with raising the credit guarantee limit for failing businesses in the amount of 25 billion Turkish liras (around 4 billion US dollars). There was harsh criticism since measures that amount to only 2% of GDP were inadequate. Given the weak fiscal stance of the government, it was deemed almost impossible to launch a large-scale rescue package. The IMF reports that these packages amounted to 646 billion Turkish liras in January 2021, equivalent to 12.8% of GDP, while only 173 billion Turkish liras (3.4% of GDP) were provided directly from the central government budget.

Next, it is examined how adversely international tourism demand was affected in both countries. According to the official statistics of Hungary, in 2020, guest nights at accommodations were reduced by 77.2% for foreign guests and by 38.9% for domestic guests compared to the previous year. The overall number of guests at accommodations declined by 57.8%. Before the Covid-19 outbreak, the Hungarian Central Statistical Office (CSO) forecasted a 7.6% growth in total guest nights by foreign tourists in March 2020. The substantial decline in international tourism demand in Hungary was both unanticipated and destructive for the economy as inbound tourism amounted to around 24% of service exports and 4.5% of GDP.[3] The reduction in international tourists resulted in a large loss. According to CSO, compared to the respective quarter of the previous period, international tourism revenues declined by 7.9% in the first quarter, 54.1% in the second quarter, and 49.0% in the fourth quarter. Due to the pandemic, no data were collected in the second quarter. Given these figures and considering the fact that the borders were closed and international tourists amounted to negligible amounts (between 1.3% - 6.8%) in the

[3] https://www.portfolio.hu/gazdasag/20200515/sosem-latott-zuhanas-kulfoldiek-nelkul-egyszeruen-osszeroppan-a-magyar-turizmus-431826

second quarter of 2020 (compared to the same period in 2019), it is concluded that international revenues declined by 58.2% in 2020.

Covid-19 hit international tourism demand in Turkey adversely as well. According to the statistics published by the Ministry of Culture and Tourism, foreign tourist arrivals and revenues declined largely in 2020, more significantly after the first case was reported in March. Total foreign tourist arrivals instantly declined to 718 thousand in March 2020 (from 2.232 million in March 2019), and by the end of the year, it declined by 71.7%. The decline was more severe during the April-June period (98% compared to the same period of the previous year). Tourism receipts declined sharply by 73.6%, from 42.4 billion US dollars in 2019 to 11.2 billion US dollars in 2020.

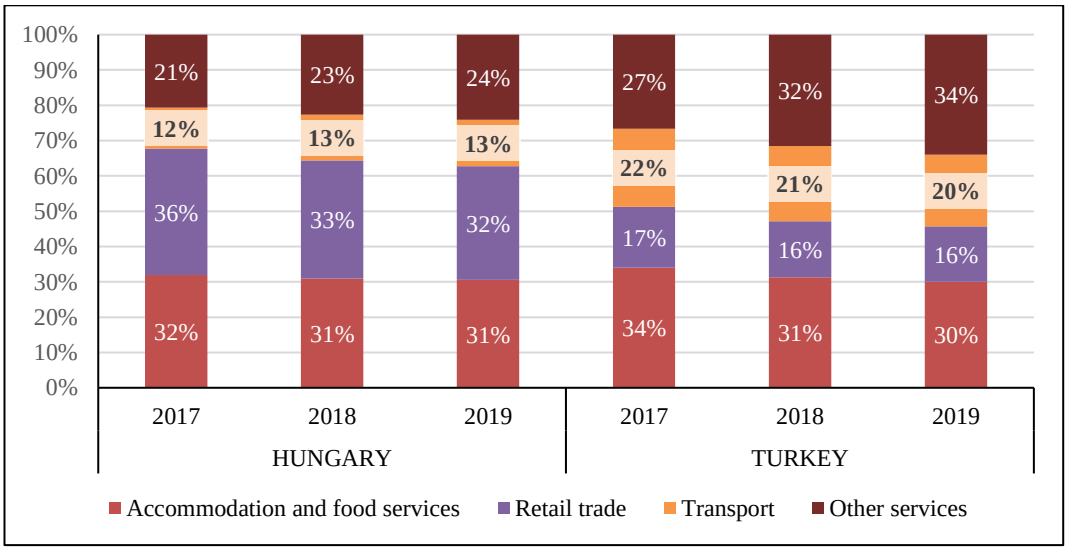

Figure 1. *Sectoral composition of foreign tourist expenditures in Hungary and Turkey (2019)*
[Source: Turkish Statistical Institute (Turkstat), Hungarian Central Statistical Office (KSH)]

Assuming that the percentage composition of the tourist expenditures prevails, authors reduced the final demand (consumption expenditures) of the relevant sectors in the simulation. The sectoral composition of foreign tourist expenditures in both countries during 2017-2019, adjusted to the sectoral classification adopted in this study, is presented in Figure 1. While the share of accommodation and food services has been around three-tenths, the share of retail trade (including souvenir shops, cloth stores, and retail stores) has been relatively higher in Hungary (30%) than in Turkey (16%). On the other hand, the share of transport services was higher in Turkey (20%, compared to 13% in Hungary), mainly because of its geographical location. The "other services" in the figure include health services (spa, wellness, and medical treatment), sports,

education, culture, and amusement services. Based on these figures, authors give shocks to the following sectors: (i) accommodation and food services, (ii) retail trade, (iii) transport services (land, air, and water), and (iv) other services. In doing so, this research assumes that the percentage composition of foreign tourist expenditures in 2019 prevails, based on the observation that the shares of expenditure items in Figure 1 have not changed significantly from 2018 to 2019.

Simulation Design

As stated above, authors give two shocks to the respective SAMs of Hungary and Turkey, a demand shock in the form of a reduction of tourism revenues and a fiscal policy shock in the form of increased government spending and transfers. This paper specifically interested in the changes in output and employment at the sectoral as well as the macro level. It is straightforward to calculate the change in output in a given sector i (Y_i) from equation (4) as follows:

$$\Delta Y_i = (I - A_{nn})^{-1} \Delta T_{xi} \quad (5)$$

where Δ is the change operator and the term T_{xi} refers to the respective exogenous demand (e.g., government spending) for industry i to which the shock has given. The change in output works through the SAM multipliers, i.e., the inverse matrix. Using equation (5), the change in output by sector has calculated. The change in final demand results in changes in payments to capital (T_{hk}) and labor (T_{hl}), and indirect taxes on production, the sum of which is equal to total value-added. Since total value-added in the economy is equal to the GDP, the changes in total factor payments is equal to the change in GDP. The percentage change in output and GDP has computed this way.

To calculate the impact of a given shock (ΔT_{xi}) on employment, a bit more elaboration is needed. It is the first to calculate that the ratio of employment (i.e., number of employees) per output, e_i, for each sector i. Then a diagonal matrix E whose diagonal elements are the ratios e_i has created. The employment multipliers are found by multiplying the diagonal matrix E by the SAM inverse matrix, i.e., $E(I - A_{nn})^{-1}$. Change in employment in a given industry i (E_i) after a shock in exogenous demand is then found as follows:

$$\Delta E_i = E(I - A_{nn})^{-1} \Delta T_{xi} \quad (6)$$

Using equation (6), the percentage change in employment by sector and the aggregate level has calculated.

Estimation Results

Simulation results for output, GDP, and household income are presented in Figure 2 for Hungary and Figure 3 for Turkey. The structure of the losses is similar in both countries, while the magnitude is much more prominent in Hungary. Here, authors suffice to discuss the main macroeconomic results. Detailed sectoral results of the simulation analysis are available in Annex A.

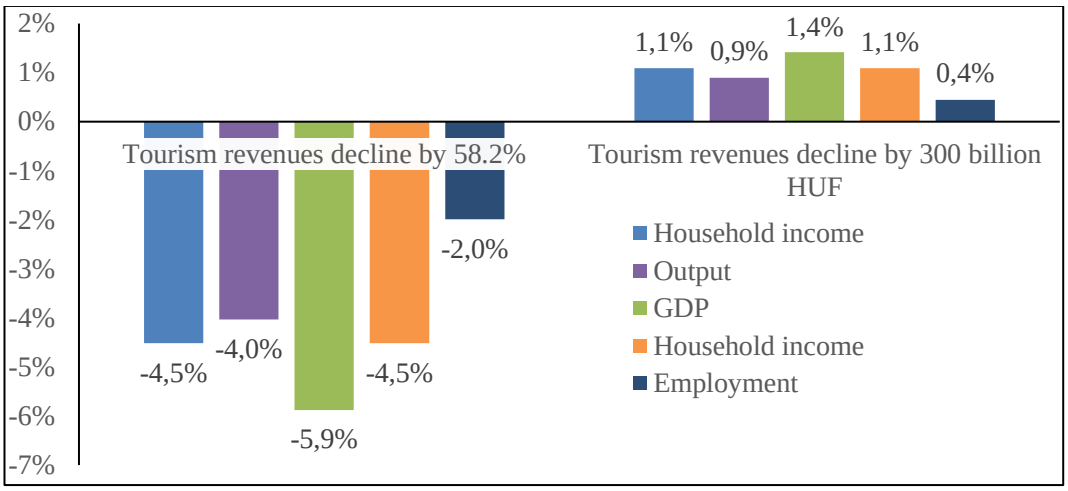

Figure 2. *Simulation results for Hungary*

In Hungary, the simulation of declining tourism revenues shows a 4.5% loss in household income, with a 5.9% loss in GDP, along with a 4.0% and 2.0% loss in output and employment, respectively. Compared to the decline in tourism revenues, the economic effects of the government's rescue packages are smaller, with a rise of 1.4% and 1.1% in GDP and household income, respectively, coupled with 0.9% and 0.4% increase in output and employment.

Similar simulations for Turkey (Figure 3) yield slightly different results. The decline in international tourism revenues results in a loss in output of 2.2%. The decline in GDP is 2.6%, while employment loss is 0.9%. Household income decreases by 2.1%. The government's rescue package in Turkey has a more or less similar impact to that of Hungarian, with a 0.9%, 1.0% and 0.4% increase in output, GDP and employment, respectively, with a formidable 2% rise in household income. The losses in household incomes and employment due to the pandemic are related. Lockdowns and closing

down of certain businesses immediately reduced employment and household incomes, albeit temporary.

Next, it is important to turn to the sectoral results presented in Annex A. The sectoral interlinkages in both countries influence the degree of losses and gains discussed above. In the case of the decline in tourism revenues scenario, the sectors affected the most are the tourism-related services sectors, as expected. The decline in output is the largest in land transport (-21%) and to a lesser degree in the other services, accommodation and food services, other services, and other transport services sectors. The decrease in employment is the largest in the other services (-18.7 thousand) and to a smaller extent in the services sectors in general. In the case of Turkey, the largest decline in output is observed in the air transport (-12.5%), other transport services (-10.6), land transport (-6.6%), and retail trade (-5.9%) sectors. The decline in output in the remaining sectors is modest, albeit higher in the services sectors. The largest decline in employment is observed in agriculture (-64.9 thousand), other services (-51.7 thousand), and wholesale trade (-45.2 thousand), and to a smaller extent in land transport, water transport, other transport services, and accommodation and food services sectors. The percentage change in employment in the case of the decline in tourism revenues scenario is generally larger in tourism-related sectors than in other sectors in both countries. Especially, the decline in employment in the other transport services sector is 8.1% in Hungary and 4.7% in Turkey. The percentage decline in employment in Turkey is relatively smaller than in Hungary.

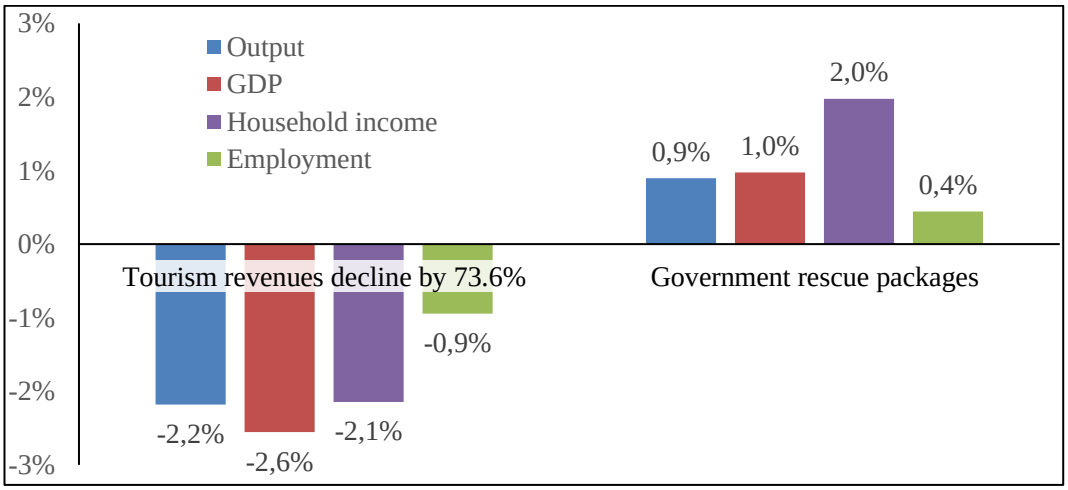

Figure 3. *Simulation Results for Turkey*

The sectoral impacts of the governments' fiscal rescue packages are generally smaller than that of the previous scenario of decline in tourism

revenues. Fiscal rescue packages lead to very modest sectoral output increases in both countries. In the case of Hungary, the largest increase in output is in the finance and insurance sector (10%), followed by the other services sector (2.5%). These are the targeted sectors in the government's fiscal rescue packages. Employment increases are also the largest in these two sectors. In the case of Turkey, output increases by less than 2%. Employment increases the most in agriculture (51.5 thousand), wholesale trade (18.8 thousand), other services (18.1 thousand), land transport (9.2 thousand, and water transport (5.9 thousand) sectors. The percentage increase in employment is larger in other services (5.9%) and finance and insurance (2.4%) in Hungary, whereas the increase in employment is less than 1% in all sectors in Turkey. The small increase in employment in Turkey is related to the small amount of fiscal support by the government. The fiscal package in Hungary was larger, and hence, the employment creation effect was stronger.

It is important to consider the unit multiplier effects in evaluating the sectoral results. Annex B presents the unit multipliers for the scenario of declining tourism revenues by sector in both countries. The multipliers effects of both output and GDP are larger in Turkey than in Hungary. The multipliers also show that a reduction in tourism revenues by one unit in Hungary has a higher impact than the government transfers as the output and GDP multipliers are larger. In the case of Turkey, since the government transfer shock is given to the households account, which is also exogenous, the multipliers could have not been computed.

Finally, an interesting case would be a hypothetical total collapse of international tourism revenues. While the results are not reported here, authors deem it interesting to compare the results with this hypothetical case. The total collapse of international tourism would result in much more substantial losses in GDP (7.5% in Hungary and 7.3% in Turkey), output (5.4% in Hungary and 6.4% in Turkey), household income (5.8% in both countries), and employment (126.5 thousand in Hungary and 961.2 thousand in Turkey, equivalent to 3.0% of the total employment in both countries). These simulations also reveal the importance of the international tourism sector, as evident from the potential severe losses in all analyzed indicators.

DISCUSSION AND CONCLUSION

In this paper, it is estimated that the potential impacts of the declining demand in international tourism by examining the cases of Hungary and

Turkey. The main findings are as follows: The observed decline in international tourism revenues and arrivals potentially result in a decline in GDP by 2.6% in Turkey and 3.0% in Hungary. The relevant losses in employment in Turkey and Hungary are 305.1 thousand and 59.8 thousand, respectively. These figures are much larger than the positive gains from the respective governments' fiscal rescue packages. Therefore, it is crucial for the governments to turn a hand towards international tourism as part of the normalization efforts after the destructive effects of the pandemic fade away. One option to counter the impact of the negative demand shock on tourism-related service sectors is purchasing such services by the government as the purchaser of last resort, as argued by Özatay and Sak (2020). They argue that the government can help avoid the break-up of the value chain arising from input-output linkages in the economy. In other words, the government can save suffering firms by buying their services and simultaneously maintaining the continuation of the operations of other firms through forward and backward linkages.

The pandemic changed the tourism industry, and the proposals to revive international tourism activities emphasize the need for institutional changes, which imply a significant departure in the way of doing business. Sharma et al. (2021) point out that the new normal in the tourism industry will be established with a new global economic order after the pandemic. In this new order, local communities are expected to play a much more significant role because the effects of the pandemic may be prolonged. Polyzos et al. (2021) estimated that the recovery of tourist arrivals after the pandemic might take more than six months, which would exacerbate the negative impact on tourism. In addition, environmental concerns are also expected to play a central role in the reshaping of tourism, particularly in Hungary (Várhelyi & Árva, 2020).

An important lesson from Covid-19 is that countries were caught unprepared. However, there are also valuable lessons to be learned from this bitter experience. The pandemic caused a multi-faceted economic crisis, i.e., the current crisis is both a supply and demand crisis. The pandemic has shown that those who are most vulnerable to such large shocks are wage-earners. Therefore, proactive government intervention is needed to remedy the structural problems in the economy, including those responsible for income inequality. Poverty levels in both countries may also have increased during the pandemic despite the governments' rescue packages because the positive impact of the fiscal response on employment and household incomes is smaller than the destructive effects of the pandemic. The results of this study show that sectoral impacts are diverse, and government

measures to respond to the pandemic should incorporate a sectoral perspective as well.

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Annex A. *Detailed estimation results*

Sectors	*HUNGARY*						*TURKEY*					
	Decline in tourism revenues			Fiscal rescue packages			Decline in tourism revenues			Fiscal rescue packages		
	Output (%)	Emp (000)	Emp (%)	Output (%)	Emp (000)	Emp (%)	Output (%)	Emp (000)	Emp (%)	Output (%)	Emp (000)	Emp (%)
Agriculture	-1.9%	-4.7	-1.7%	0.4%	0.9	0.3%	-1.3%	-60.7	-0.8%	1.2%	51.5	0.7%
Mining	-2.1%	-0.2	-3.1%	0.3%	0.0	0.5%	-1.0%	-2.2	-1.3%	0.5%	1.1	0.7%
Food	-2.0%	-1.7	-1.4%	0.4%	0.3	0.2%	-1.4%	-3.5	-0.5%	1.3%	2.6	0.4%
Textiles	-0.6%	-0.5	-0.9%	0.1%	0.1	0.2%	-0.7%	-6.6	-0.4%	0.6%	4.7	0.3%
Wood and paper	-2.1%	-1.3	-2.5%	0.6%	0.4	0.6%	-1.1%	-4.2	-1.1%	0.6%	1.8	0.5%
Refined oil and chemical	-2.1%	-2.2	-2.5%	0.3%	0.3	0.3%	-1.7%	-8.1	-1.7%	0.8%	3.6	0.8%
Metal and minerals	-0.9%	-1.5	-1.3%	0.2%	0.3	0.2%	-0.7%	-7.6	-0.7%	0.3%	4.8	0.5%
Machinery	-0.5%	-1.3	-0.7%	0.1%	0.2	0.1%	-0.6%	-4.3	-0.6%	0.3%	2.0	0.3%
Motor Vehicles	-0.2%	-0.3	-0.3%	0.0%	0.0	0.0%	-0.5%	-1.9	-0.5%	1.3%	1.0	0.3%
Other manufacturing	-1.9%	-1.6	-2.2%	0.3%	0.2	0.3%	-0.2%	-0.9	-0.2%	0.1%	0.4	0.1%
Energy	-3.9%	-2.7	-3.4%	0.8%	0.5	0.8%	-1.5%	-4.4	-1.5%	1.0%	2.4	0.8%
Construction	-1.0%	-3.0	-1.1%	0.2%	0.6	0.2%	-0.1%	-3.0	-0.1%	0.1%	1.6	0.1%
Wholesale trade	-2.8%	-6.2	-2.7%	0.5%	1.0	0.5%	-1.8%	-42.7	-1.5%	1.0%	18.8	0.7%

Retail trade	-3.8%	-4.9	-1.3%	1.0%	0.9	0.2%	-5.6%	-15.8	-0.8%	1.1%	9.2	0.4%
Land transport	-27.9%	-3.6	-2.5%	0.4%	0.6	0.4%	-6.2%	-18.8	-1.7%	1.2%	5.9	0.5%
Water transport	-4.4%	-0.1	-5.2%	0.7%	0.0	0.8%	-2.3%	-2.9	-2.5%	0.7%	0.9	0.8%
Air transport	-2.4%	-0.1	-2.7%	0.4%	0.0	0.5%	-11.8%	-1.0	-2.0%	1.2%	0.2	0.4%
Other transport services	-7.3%	-4.6	-8.1%	0.5%	0.3	0.5%	-10.1%	-11.0	-4.7%	1.1%	2.0	0.8%
Accommodation and food services	-8.5%	-2.4	-1.6%	1.0%	0.5	0.3%	-2.6%	-16.7	-1.0%	1.8%	3.2	0.2%
Communication services	-3.8%	-5.5	-3.4%	1.1%	1.7	1.0%	-2.5%	-4.9	-1.7%	1.4%	1.6	0.5%
Finance and insurance	-5.2%	-3.9	-4.2%	10.0%	2.4	2.6%	-2.6%	-8.3	-2.2%	1.1%	2.7	0.7%
Real estate	-4.7%	-7.1	-3.6%	1.2%	1.8	0.9%	-2.3%	-9.2	-0.7%	1.8%	2.8	0.2%
Other services	-11.2%	-24.8	-1.8%	2.5%	5.9	0.4%	-2.0%	-48.9	-0.8%	0.6%	18.1	0.3%
TOTAL	-4.0%	-84.2	-2.0%	0.9%	18.8	0.4%	-2.3%	-287.7	-0.9%	0.9%	142.8	0.4%

Note: Emp refers employment

Annex B. *The multiplier effects of declining tourism revenues by one unit of domestic currency*

	HUNGARY					*TURKEY*				
	Change in tourism demand by sector				Fiscal rescue package	Change in tourism demand by sector				Fiscal rescue package
	Retail trade	Land Transport	Accomm. and food services	Other services		Retail trade	Land Transport	Accomm. and food services	Other services	
Agriculture	0.033	0.027	0.130	0.029	0.029	0.093	0.086	0.204	0.097	
Mining	0.002	0.002	0.002	0.001	0.001	0.017	0.014	0.018	0.016	
Food	0.032	0.025	0.230	0.031	0.031	0.109	0.101	0.253	0.114	
Textiles	0.001	0.001	0.001	0.001	0.001	0.069	0.065	0.071	0.074	
Wood and paper	0.024	0.009	0.012	0.011	0.011	0.023	0.018	0.022	0.031	
Refined oil and chemical	0.052	0.116	0.047	0.041	0.041	0.069	0.100	0.082	0.078	
Metal and minerals	0.014	0.015	0.012	0.012	0.012	0.028	0.025	0.028	0.034	
Machinery	0.019	0.020	0.015	0.015	0.015	0.024	0.020	0.02	0.029	
Motor vehicles	0.007	0.016	0.005	0.005	0.005	0.028	0.029	0.026	0.029	
Other manufacturing	0.005	0.013	0.004	0.007	0.007	0.004	0.004	0.005	0.003	
Energy	0.072	0.045	0.058	0.045	0.045	0.076	0.051	0.106	0.084	
Construction	0.017	0.016	0.013	0.019	0.019	0.011	0.007	0.009	0.012	
Wholesale trade	0.063	0.075	0.078	0.048	0.048	0.116	0.140	0.127	0.116	
Retail trade	1.062	0.055	0.067	0.055	0.055	1.048	0.067	0.103	0.079	
Land transport	0.059	0.947	0.036	0.025	0.025	0.194	1.252	0.203	0.171	
Water transport	0.000	0.001	0.000	0.000	0.000	0.037	0.012	0.011	0.01	
Air transport	0.003	0.006	0.003	0.005	0.005	0.017	0.022	0.015	0.023	
Other transport services	0.027	0.116	0.018	0.019	0.019	0.055	0.123	0.057	0.055	
Accomm. and food services	0.030	0.024	0.989	0.033	0.033	0.08	0.080	1.067	0.078	
Communication services	0.068	0.049	0.047	0.061	0.061	0.07	0.042	0.045	0.056	
Finance and insures	0.087	0.061	0.062	0.057	0.057	0.063	0.062	0.069	0.069	
Real estate	0.204	0.105	0.124	0.133	0.133	0.221	0.150	0.170	0.159	
Other services	0.181	0.147	0.144	1.043	1.043	0.173	0.140	0.163	1.205	
Total output multiplier	*2.061*	*1.889*	*2.100*	*1.697*	*1.697*	*2.623*	*2.610*	*2.874*	*2.623*	
Government	0.550	0.442	0.480	0.510	0.510	0.444	0.467	0.435	0.441	
GDP	1.027	0.832	0.856	0.940	0.940	1.45	1.354	1.379	1.448	