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The effect of selected international developments on the Greek economy

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ABSTRACT

We use a computable general equilibrium (CGE) model, based on the GTAP framework, to reveal how certain linkages and interactions affect Greece and neighboring countries, in a global context. In particular, the economy-wide effects on the Greek economy of a) China's economic growth, b) Turkey's economic growth, and c) the import tariff removals concomitant to the recent EU accession of Romania and Bulgaria, have been studied. Our analysis is based on aggregated data and parameters derived from the GTAP v6 database. The base year is 2001. We aggregated the 57 GTAP industries into 32 industries, 29 of which represent merchandise trade sectors. The analysis comprises five primary factors: land, unskilled labor, skilled labor, natural resources, and capital.

Our findings suggest that China's natural resources' factor growth yields a positive impact on Greece, whereas growth in China's capital, skilled and unskilled labor factors yields negative impacts to the Greek economy (although the overall sum is positive). Similar impact is manifested in the economies of South-European countries (with positive overall sum) and Bulgaria, Turkey and Albania (with negative overall sum for each of these countries). France, Germany, Rest of Europe, NAFTA, and Rest of Asia experience positive impacts only (with the exception of China's natural resources factor growth on the UK economy and of China's land factor growth on the NAFTA economies). Regarding specific Greek sectors, the Greek economy declines in 9 sectors, although 22 Greek sectors expand.

Regarding Turkey, its economic growth has a positive impact on Greece, most of the European countries, and the rest of the world, with the exception of North East Asia and South Asia regions, which experience a negative impact. Overall, 18 Greek sectors expand.

The economic impact of import barrier removals, following Romania's and Bulgaria's EU accession, on bilateral trade, income, welfare, and total imports/exports, on Greece, EU24 (that is, EU25 minus Greece), and the Rest of the World (ROW), show positive overall welfare effects, with total Greek exports increasing by 0.25% (due to exports to Romania and Bulgaria), total Greek imports increasing by 0.54%, and large output effects for Bulgaria and Romania.

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Introduction

Greece joined the European Union (EU) in 1981 as its 10th member state and has since been following an economic path leading to convergence to EU levels, with annual economic growth rates of ~ 3%-4%. Such an effect is manifested in the increase of entrepreneurship rates observed since the early 80's: the "young" firms (that is, firms established in the 80's and after) comprise more than 50% of the total number of Greek firms.

However, it is not only the number of Greek companies that is increasing, but the overall wealth they generate is increasing as well: the "young" Greek S.A. companies represent 72.69% of the total number of companies of that type and report 48.49% of the relevant income (receipts); they also represent 40% of the top 50 Greek S.A. companies. Regarding the Ltd companies, they represent 82.04% of the total number of companies of that type and report 75.27% of the relevant income (receipts). Net entrepreneurship rates, in Greece, run almost five times the USA ones- and tens of thousands of companies are expected to be established in the coming years.

Guiding such a "young ecosystem" to achieve the right global orientation and compete successfully requires a systematic study of the underlying economic linkages and impacts on the Greek economy and its sectors.

In this paper, we study the effect of selected international developments on the Greek economy, using a computable general equilibrium (CGE) model, based on the GTAP framework, to reveal linkages and interactions between China, Turkey, Bulgaria, Romania, Greece and other national economies in a global context.

In particular, the economic growth of countries such as China and Turkey, and the EU accession of neighboring countries such as Bulgaria and Romania, represent three distinct –and important- cases of economic linkages between Greece and the "rest" of the world. The economic impact of China on the Greek economy and sectors represents "globalization", literally, on purely economic terms. The economic impact of Turkey's growth represents the linkages, which are superimposed upon strong historical and political dynamics, on the neighboring country's course to join the EU. Finally, the impact of tariff removals in Bulgaria and Romania represents the outcome of a process ending at joining the EU.

Quantifying the economic impacts of these linkages will help reveal aspects, which might be occasionally obscured by emotionally charged environments, powered by media exaggerations and possible media bias. Studying the economic determinants of such discourse is of great interest to civil societies in general and to policy makers in particular.

Data and Method

It has now become standard practice to analyze the impacts of international economic developments within global trade models that rely on applied general equilibrium (AGE) methodologies [see, for example, Hertel (1997); McDougal and Tyers (1997); Tsigas, Gray and Hertel (2002); and Rae and Strutt (2003).] Several of these applied general equilibrium studies are based on the Global Trade Analysis Project or GTAP framework (Hertel 1997). We apply the GTAP framework to quantify impacts of a) China's economic growth, and b) Turkey's economic growth, and c) the import tariff removals concomitant to the recent Romania's and Bulgaria's EU accession, on the Greek economy and sectors.

The GTAP model is based on assumptions that are common in economic literature: perfect competition, constant returns to scale, and no change in the economy-wide employment of resources. Each regional economy consists of several economic agents: on the final demand side of the model, a utility-maximizing household purchases commodities and it saves part of its income, which consists of returns to primary factors and net tax collections. On the production side of the model, cost-minimizing producers employ primary factor services and intermediate inputs to supply commodities. In the model, intermediate (and final demand) users of commodities are assumed to differentiate a commodity by its region of origin (i.e., the *Armington* specification is applied).

In each region, aggregate investment in new capital goods is represented by the output of a capital goods sector. Globally, the sum of household savings is equal to

the sum of investment expenditures. Integrated into this treatment of production, demand, and trade, is a set of domestic support and trade policies, which are modeled as *ad valorem* equivalents. These policies affect the equilibrium computed by the model and when they change they induce changes by producers and consumers in all regions. The GTAP model is solved using the GEMPACK suite of software (Harrison and Pearson, 1994).

Data

Our analysis is based on aggregated data and parameters derived from the current GTAP database, version 6 (Dimaranan and McDougall, 2005). The base year in the current GTAP data is 2001. We aggregated the 57 GTAP industries into 32 industries, 29 of which represent merchandise trade sectors. There are five primary factors: land, unskilled labor, skilled labor, natural resources, and capital; and certain regions, which include China, Turkey, Greece, Bulgaria, Romania, France, Germany, UK, Portugal, Spain, Italy, Cyprus, Rest of the European Union, Albania, Australia and New Zealand, Japan, Rest of North East Asia, South East Asia, South Asia, North America and rest of the world (ROW). The above-mentioned regions have been grouped in clusters (which are presented in the next sections) in order to better highlight the economic impacts of the specific simulations.

Method

Our objective is to decompose the impacts of a) China's, b) Turkey's growth on the Greek economy, as well as c) the impacts of the tariff removal following Romania's and Bulgaria's recent EU accession.

We consider the effects of two types of economic growth. First, we examine the impacts of broad growth, which affects the entire China's or Turkey's economy. In five different simulations, we simulate growth stemming from each one of the five primary factors in the Turkish economy, i.e., land, unskilled labor, skilled labor, natural resources, and capital. Each economy in the model is endowed with five primary factors: land, unskilled labor, skilled labor, natural resources and capital. Land is used in farming. Natural resources represent stocks of minerals, forests, etc. Capital and labor are used in all sectors of the economy.

Second, we examine the impacts of industry-specific growth in China's and Turkey's economy on the Greek economy. We accomplish this objective by simulating industry-specific technological progress in China and Turkey. Even though industry-specific growth is not the same as industry-specific technological progress, the effects of the technological progress on Greece would reveal the sectoral implications of the Chinese and Turkish growth. We focus on the 29-sector merchandise trade industries and model each sector separately. The sector specific simulation conducted answers the following question: What would happen to Greece if the Chinese or the Turkish textile industry, for example, were to grow by

1 percent? Using 29 different experiments, we simulate industry-specific technical progress.

In both sets of simulations we apply shocks of 1 percent. This type of analysis would reveal all the linkages between either the Chinese or the Turkish and Greek economies with regard to growth. Our work can be used to analyze other growth rates. We discuss further this issue in the next section.

We also consider the effects of Romania's and Bulgaria's import barrier removals on bilateral trade, income, welfare, and total imports/exports, on Greece, EU24 (that is, EU25 minus Greece), and the Rest of the World (ROW), by decomposing them in 3 parts. The first part is the EU-Bulgaria/Romania tariff removal, the second part is the Bulgaria-Romania tariff removal, and the third part is the alignment of Bulgaria/Romania-ROW tariffs to those of the EU-ROW.

Factor Growth Results

The impacts of China's growth

Table 1 reports impacts from the factor growth simulations. We focus our discussion on factor returns and welfare in China, Greece, selected European and non-European countries, and the rest-of-Europe and rest-of-World regions.

Unskilled labor is the most abundant primary factor in China and thus growth in unskilled labor causes Chinese welfare to increases the most (0.4374 percent).

Impacts from 1 percent growth in all primary factors in China are roughly equal to the summation of results from the five factor-specific simulations (the GTAP model is a highly non-linear model; however, as with other AGE models, GTAP effects are roughly linear in the shocks.) Although we present results from the 1 percent growth in all primary factors, results from a simulation where primary factors increase by a different rate, for example 7 percent, are roughly 7 times as large as the effects from the 1-percent simulation. Thus, growth effects from this paper can be used in describing observed growth in China.

A comparison of the effects in Greece with those for other European countries and the Rest of EU25 suggests that the international linkages between China-Greece and between China and rest of Europe are different.

Our results show that only China's natural resources' factor growth yields a positive impact on Greece, with growth in China's capital, skilled and unskilled labor factors yields negative impacts to the Greek economy (although the overall sum is positive). Similar impact is manifested in the economies of South-European countries (with positive overall sum) and Bulgaria, Turkey and Albania (with negative overall sum for each of these countries). France, Germany, Rest of Europe, NAFTA, and Rest of Asia experience positive impacts only (with the exception of China's natural resources factor growth on the UK economy and of China's land factor growth on the NAFTA economies).

Each row in Table 2 reports welfare results for China and Greece stemming from a 1 percent industry-specific Hicks-neutral technical change in China. A comparison of the sectoral impacts in Table 2 reveals that the Greek economy experiences negative welfare gains in 9 sectors, although the rest of the Greek sectors experience positive welfare gains. The Chinese sectors whose growth causes the largest positive welfare impacts and the Chinese sectors whose growth causes the largest negative welfare impacts in Greece are presented in Table 6.) Table 3 focuses on the Greek economy and shows impacts on sectoral output.

The impacts of Turkey's growth

Table 4 reports impacts from the factor growth simulations in Turkey. We focus our discussion on factor returns and welfare in Turkey, Greece, selected European and non-European countries, and the rest-of-Europe and rest-of-World regions. Unskilled labor is the most abundant primary factor in Turkey and thus growth in unskilled labor causes Turkish welfare to increases the most (0.415 percent).

A comparison of the effects in Greece with those for other European countries and the Rest of EU25 suggests that the international linkages between Turkey-Greece and between Turkey and rest of Europe are not that different. The welfare effects in the selected European countries, Rest of EU25, and selected Accession countries suggest that Turkey's growth provide positive impacts (except Portugal). On the contrary, North-East Asia and South Asia countries are negatively impacted.

Each row in Table 5 reports welfare results for Turkey and Greece stemming from a 1 percent industry-specific Hicks-neutral technical change in Turkey. A comparison of the sectoral impacts in Table 5 reveals that out of 29 industries, there are 19 industries for which Greece experiences a welfare gain. The Turkish sectors whose growth causes the largest positive welfare impacts and the Turkish sectors whose growth causes the largest negative welfare impacts in Greece are presented in Table 6 (along with the corresponding results of the China's simulation.) When comparing Turkey and Greece sector-specific welfare, 29-sector specific simulations, Turkey experiences positive welfare impacts in all sectors. In several important sectors, notably textiles and wearing apparel, when Turkey grows, Greece experiences the largest welfare losses. However, Greece does not always suffer losses when Turkey grows. Greece grows when Turkey's petroleum and chemicals, machinery and equipment, transportation, metals, minerals, and fruits and vegetables grow. Finally, Table 7 focuses on the Greek economy and shows impacts on sectoral output.

Tariff Removal Results

Table 8 presents the effects of import barrier removals, following Romania's and Bulgaria's EU accession, on bilateral trade, income, welfare, and total imports/exports, on Greece, EU24 (that is, EU25 minus Greece), and the Rest of the World (ROW). As mentioned before, import barrier removals have been decomposed in 3 parts. The first part is the EU-Bulgaria/Romania tariff removal,

the second part is the Bulgaria-Romania tariff removal, and the third part is the alignment of Bulgaria/Romania-ROW tariffs to those of the EU-ROW.

The main overall economic impact can be summarized as follows:

Welfare effects (annual benefits to the total economy)

- Greece gains €81 million from the expansion, due mainly to the EU-Bulgaria/Romania tariff removal.
- The rest of the EU (that is, the EU24) gains €26 million.
- Romania gains €235 million, which is split almost equally between the EU-Bulg/Rom tariff removal and the Bulg/Rom-ROW tariff removal.
- Bulgaria gains €56 million
- The ROW loses €179 million.
- The world as a whole gains €219 million.

Export/Import effects

- Total Greek exports increase by 0.25%.
- Greek exports to the Rest of the EU (EU24) decline (-1.06%) but exports to Romania and Bulgaria expand (13.99% and 61.46%, respectively). These effects are mostly due to the EU-Bulg/Rom tariff removal.
- Total Greek imports increase by 0.54%.

Income effects

- Greek income increase by 0.30%.

Output effects by sector and economy

- Small effects for Greece and the rest of the EU.
- Larger effects for Bulgaria and Romania.

Other effects such as agricultural subsidies, development assistance, or policy reforms in Bulgaria and Romania, associated with the EU accession (such as competition policy, various regulations), will be considered in a subsequent paper.

Summary and conclusions

We have used a global, economy-wide CGE framework to decompose the impacts of China's and Turkey's growth on certain regions placing particular emphasis on sectoral impacts in the Greece economy. In addition, we have used this framework to quantify the impact of import barrier removals, following Romania's and Bulgaria's EU accession, on bilateral trade, income, welfare, and total imports/exports, on Greece.

Our findings suggest that only China's natural resources' factor growth yields a positive impact on Greece, whereas growth in China's capital, skilled and unskilled labor factors yields negative impacts to the Greek economy (although the overall sum is positive). Similar impact is manifested in the economies of South-European countries (with positive overall sum) and Bulgaria, Turkey and Albania (with negative overall sum for each of these countries).

On the other hand, France, Germany, Rest of Europe, NAFTA, and Rest of Asia experience positive impacts only (with the exception of China's natural resources factor growth on the UK economy and of China's land factor growth on the NAFTA economies).

Regarding Turkey, its economic growth has a positive impact on Greece, most of the European countries, and the rest of the world, with the exception of North East Asia and South Asia regions, which experience a negative impact.

The economic impact of import barrier removals, following Romania's and Bulgaria's EU accession, on bilateral trade, income, welfare, and total imports/exports, on Greece, EU24 (that is, EU25 minus Greece), and the Rest of the World (ROW), show positive overall welfare effects.

Our findings can help highlight Greek sectors, which are prone to be hurt or prosper. For example, when Turkey's light manufacturing (such as textiles, apparel) industries grow due to productivity increase, the respective Greek industries are expected to be hurt. Meanwhile, growth in other Turkish industries, such as petroleum products and chemicals, metals, machinery, transportation, minerals, and fruits and vegetables, has a beneficial effect on the respective Greek industries.

Certain sectors seem to be more exposed to negative impacts. Textiles, beverages and tobacco, plant fibers and wool are subject to negative impacts from both Chinese and Turkish economic growth.

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Table 1: Welfare effects of 1 percent factor-specific growth in China, 2001 base year

	1% growth in primary factor in China				
	Capital	**Unskilled labor**	**Skilled labor**	**Natural Resources**	**Land**
Welfare					
			----- percent change-----		
China	0,3169	0,4374	0,1275	0,0227	0,0389
Rest of Asia	0,0006	0,0009	0,0000	0,0017	0,0013
NAFTA	0,0010	0,0009	0,0002	0,0000	-0,0001
France	0,0009	0,0006	0,0000	0,0008	-0,0003
Germany	0,0010	0,0009	0,0002	0,0008	0,0003
UK	0,0008	0,0010	0,0002	-0,0007	0,0006
PorSpnIta	-0,0005	-0,0009	-0,0003	0,0024	-0,0004
Greece	**-0,0011**	**-0,0010**	**-0,0007**	**0,0036**	**0,0000**
RoEU	0,0012	0,0010	0,0002	0,0011	0,0001
Turkey	-0,0020	-0,0027	-0,0008	0,0055	-0,0006
Bulgaria	-0,0054	-0,0070	-0,0020	0,0133	-0,0005
Albania	-0,0001	-0,0023	-0,0003	0,0043	-0,0030
Rest of World (ROW)	0,0050	0,0051	0,0015	-0,0079	0,0005

Notes: The GTAP variable reported in this table is $u(r)$.
Each column reports results from a single simulation where a particular factor grows by 1 percent in China.

Source: Authors' simulation results.

Table 2: Welfare effects of 1 percent industry-specific Hicks-neutral technological change in China, 2001 base year

	Simulated impacts on welfare	
Sector experiencing 1% Hicks neutral productivity growth	**Greece**	**China**
Paddy rice	-0,00001	0,0164
Wheat	0,00005	0,0081
Other grains	0,00003	0,0071
Fruits and vegetables	-0,00010	0,1032
Oil seeds	0,00027	0,0049
Sugar crops	0,00000	0,0010
Plant fibers	-0,00009	0,0061
Other crops	0,00012	0,0016
Cattle	0,00002	0,0067
Other livestock	0,00020	0,0753
Raw milk	0,00000	0,0023
Wool	-0,00002	0,0033
Forestry	0,00028	0,0163
Fishing	0,00051	0,0248
Minerals	0,00823	0,0861
Meats and products	0,00027	0,0150
Vegetable oils	0,00003	0,0050
Dairy products	0,00001	0,0011
Processed rice	0,00000	0,0003
Sugar	0,00020	0,0559
Other foods	-0,00021	0,0332
Beverages and tobacco	-0,00142	0,1376
Textiles	-0,00107	0,0658
Wearing apparel	0,00109	0,0349
Leather prods	0,00036	0,0790
Wood, paper products	0,00549	0,3536
Petro., chemicals	0,00313	0,1911
Metals and products	0,00255	0,0719
Autos and transport.	0,00666	0,4271
Other Manuf	-0,01367	0,3786
Trade and trans services	-0,00143	0,7202
Other services		

Notes: The GTAP variable reported in this table is $u(r)$.
Each row represents a simulation where a particular industry grows by 1 percent in China.
The columns report welfare impacts from each simulation.
Source: Authors' simulation results.

TABLE 3: Output effects of 1 percent factor-specific growth in China, 2001 base year

	1% growth in primary factor in China				
	Capital	Unskilled labor	Skilled labor	Natural resources	Land
Effect on Greek output (by sector)	***----- percent change -----***				
Paddy rice	0,0432	0,0138	0,0187	-0,0040	-0,1266
Wheat	0,0175	0,0123	0,0070	-0,0142	-0,0171
Other grains	0,0077	0,0042	0,0029	-0,0031	-0,0111
Fruits and vegetables	0,0076	0,0023	0,0026	-0,0004	-0,0167
Oil seeds	0,0153	0,0079	0,0059	-0,0001	-0,0251
Sugar crops	0,0040	0,0026	0,0013	-0,0022	-0,0031
Plant fibers	0,0130	-0,0007	0,0077	-0,0007	-0,0421
Other crops	0,0284	0,0115	0,0105	-0,0067	-0,0541
Cattle	0,0037	0,0016	0,0014	0,0008	-0,0065
Other livestock	0,0083	0,0024	0,0029	0,0016	-0,0185
Raw milk	0,0028	0,0026	0,0012	-0,0014	-0,0004
Wool	0,2431	0,0710	0,0777	0,0039	-0,5587
Forestry	0,0034	0,0016	0,0014	-0,0063	0,0025
Fishing	0,0013	0,0010	0,0003	-0,0019	0,0002
Minerals	0,0599	0,0671	0,0217	-0,1403	0,0169
Meats and products	0,0031	0,0011	0,0011	0,0015	-0,0060
Vegetable oils	0,0044	0,0017	0,0023	0,0023	-0,0079
Dairy products	0,0028	0,0030	0,0013	-0,0021	0,0008
Processed rice	0,0072	0,0064	0,0066	-0,0051	-0,0400
Sugar	0,0034	0,0026	0,0011	-0,0025	-0,0010
Other foods	0,0085	0,0056	0,0035	-0,0080	-0,0088
Bevs and tobacco	0,0006	0,0008	0,0001	0,0006	0,0004
Textiles	-0,0144	-0,0176	0,0002	0,0044	-0,0107
Wearing apparel	-0,0224	-0,0412	-0,0052	0,0142	0,0035
Leather prods	0,0055	-0,0428	0,0017	0,0226	-0,0757
Wood, paper products	-0,0003	-0,0008	0,0003	-0,0015	0,0032
Petro., chemicals	-0,0025	-0,0022	0,0001	0,0019	0,0028
Metals and products	0,0058	0,0053	0,0030	-0,0193	0,0093
Autos and transport.	0,0034	0,0059	0,0026	-0,0119	0,0093
Other Manuf	-0,0090	-0,0025	0,0004	-0,0042	0,0101
Trade and trans. Serv.	-0,0079	-0,0021	-0,0030	0,0040	0,0062
Other services	0,0014	0,0012	-0,0003	0,0012	0,0000

Notes: The GTAP variable reported in this table is *qo(i,r)*. Each column reports results from a single simulation where a particular factor grows by 1 percent in China. Source: Authors' simulation results.

Table 4: Welfare effects of 1 percent factor-specific growth in Turkey, 2001 base year

	1% growth in primary factor in Turkey				
	Capital	Unskilled labor	Skilled labor	Land	Natural resources
Welfare					
			----- percent change-----		
Australia, NZ	0,00038	0,00015	0,00009	-0,00015	-0,00009
North East Asia	-0,00032	-0,0001	-0,00001	0,0001	0,00003
Japan	0,00016	-0,00014	-0,00004	0,00003	0,00001
South East Asia	-0,00004	0,00008	0,00008	0	0
South Asia	-0,0004	-0,00017	-0,00002	0,00012	0,00001
North America	0,00016	-0,00004	-0,00001	0	0
France	0,00041	-0,00003	0	0,00002	0,00001
Germany	0,00068	0,00012	0,00003	0,00001	0,0001
UK	0,00043	0,00013	0,00002	-0,00004	0,00006
Netherlands	0,00057	0,0001	0,00007	0,00006	-0,00008
Austria	0,00058	0,00013	0,00003	0,00001	0,00014
Portugal	-0,00024	-0,00009	-0,00003	0,00012	0,0001
Spain	0,00014	-0,00004	0,00003	0,0001	-0,00006
Italy	0,00031	0,00009	0,00004	0,00011	0,00002
Greece	**0,00027**	**0,00024**	**0,00005**	**0,00019**	**0,00002**
Cyprus	0,00381	0,00103	-0,00021	0,00016	0,00045
Rest of EU25	0,00038	0,00009	0,00004	0,00006	0,00004
Turkey	0,34174	0,41525	0,15077	0,00916	0,00802
Bulgaria	0,00108	0,00235	0,00068	0,00098	0,00042
Albania	0,00445	0,00085	-0,00015	-0,0001	0,0005
Rest of world (ROW)	0,00122	0,00058	0,00017	-0,00036	0,00005

Notes: The GTAP variable reported in this table is *u(r)*.
Each column reports results from a single simulation where a particular factor grows by 1 percent in Turkey.

Source: Authors' simulation results.

Table 5: Welfare effects of 1 percent industry-specific Hicks-neutral technological change in Turkey, 2001 base year

	Simulated impacts on welfare	
Sector experiencing 1% Hicks neutral productivity growth	**Greece**	**Turkey**
Paddy rice	0,000000	0,0002
Wheat	0,000065	0,0132
Other grains	-0,000006	0,0054
Fruits and vegetables	0,000047	0,0710
Oil seeds	0,000020	0,0029
Sugar crops	0,000013	0,0042
Plant fibers	*-0,000177*	0,0225
Other crops	0,000098	0,0106
Cattle	*-0,000020*	0,0108
Other livestock	-0,000015	0,0071
Raw milk	-0,000012	0,0118
Wool	-0,000005	0,0005
Forestry	0,000019	0,0086
Fishing	0,000083	0,0071
Minerals	0,000245	0,0218
Meats and products	0,000006	0,0063
Vegetable oils	-0,000016	0,0087
Dairy products	0,000017	0,0240
Sugar	0,000095	0,0562
Other foods	0,000055	0,0090
Beverages and tobacco	*-0,000047*	0,0188
Textiles	*-0,001156*	0,1207
Wearing apparel	*-0,000538*	0,0484
Leather prods	0,000006	0,0102
Wood, paper products	0,000043	0,0416
Petro., chemicals	0,000080	0,2792
Metals and products	0,002241	0,1059
Autos and transport.	0,000285	0,1011
Other Manuf	0,000449	0,1144

Notes: The GTAP variable reported in this table is $u(r)$.
Each row represents a simulation where a particular industry grows by 1 percent in Turkey.
The columns report welfare impacts from each simulation.

Sources: Authors' simulation results.

Table 6: Chinese and Turkish sectors whose growth causes large welfare impact in Greece (in descending order of impact)

Chinese sectors with positive impact	Turkish sectors with positive impact	Chinese sectors with negative impact	Turkish sectors with negative impact
Minerals	Metals and products	Other manuf	Textiles
Autos and transport.	Other manuf	Trade and trans services	Wearing apparel
Wood, paper products	Autos and transport	Beverages and tobacco	Plant fibers
Petro., chemicals	Minerals	Textiles	Bevs and tobacco
Metals and products	Other crops	Other foods	Cattle
Wearing apparel	Sugar	Fruit and vegs	Vegetable oils
Fishing	Fishing	Plant fibers	Other livestock
Leather products	Petro, chemicals	Wool	Raw milk
Forestry	Wheat	Paddy rice	Other grains
Oil seeds	Other foods		Wool
Meats and products	Fruits and vegetables		
Sugar	Wood, paper products		
Other livestock	Oil seeds		
Other crops	Forestry		
Wheat	Dairy products		
Other grains	Sugar crops		
Vegetable oils	Meats and products		
Cattle	Leather products		

Source: Authors' simulations.

TABLE 7: Output effects of 1 percent factor-specific growth in Turkey, 2001 base year

	1% growth in primary factor in Turkey				
	Capital	Unskilled labor	Skilled labor	Natural resources	Land
Effect on Greek output (by sector)	***----- percent change -----***				
Paddy rice	0,0013	-0,0014	-0,0011	-0,0009	0,0028
Wheat	0,0035	-0,0033	0,0021	-0,0003	-0,0110
Other grains	0,0010	0,0013	0,0004	-0,0002	-0,0001
Fruits and vegetables	0,0005	-0,0026	0,0017	0,0003	-0,0086
Oil seeds	-0,0067	-0,0017	-0,0008	0,0007	0,0001
Sugar crops	-0,0046	-0,0009	0,0010	0,0005	-0,0026
Plant fibers	0,0625	0,0829	0,0296	0,0034	-0,0186
Other crops	0,0017	-0,0028	0,0012	-0,0003	-0,0066
Cattle	0,0010	-0,0001	-0,0002	-0,0001	0,0003
Other livestock	0,0006	0,0052	0,0016	0,0002	-0,0003
Raw milk	0,0009	-0,0004	-0,0001	-0,0002	0,0000
Wool	0,0215	-0,0031	0,0034	-0,0010	-0,0183
Forestry	0,0009	0,0001	0,0002	-0,0004	0,0007
Fishing	0,0003	0,0003	0,0001	-0,0003	0,0000
Minerals	0,0091	0,0051	0,0016	-0,0053	0,0005
Meats and products	0,0009	0,0000	-0,0001	0,0000	0,0002
Vegetable oils	-0,0132	-0,0045	-0,0018	0,0012	0,0001
Dairy products	0,0010	-0,0004	-0,0003	-0,0003	0,0007
Sugar	-0,0049	-0,0007	0,0008	0,0005	-0,0016
Other foods	0,0005	0,0000	0,0001	-0,0003	-0,0002
Bevs and tobacco	0,0013	0,0014	0,0004	0,0000	0,0002
Textiles	-0,0359	-0,0012	0,0007	0,0017	0,0011
Wearing apparel	-0,0181	-0,0033	0,0001	0,0010	0,0021
Leather prods	-0,0018	0,0002	0,0001	-0,0002	0,0005
Wood, paper products	0,0000	-0,0001	0,0000	-0,0001	0,0008
Petro., chemicals	0,0023	0,0012	0,0002	0,0002	0,0007
Metals and products	-0,0003	-0,0039	-0,0006	-0,0004	0,0018
Autos and transport.	0,0049	-0,0014	-0,0008	-0,0008	0,0009
Other Manuf	0,0007	-0,0004	-0,0003	-0,0003	0,0009
Utilities	0,0034	-0,0002	-0,0001	0,0003	-0,0003
Trade and trans. Serv.	-0,0008	0,0001	0,0000	0,0001	0,0007
Other services	0,0005	0,0002	-0,0002	0,0000	0,0002

Notes: The GTAP variable reported in this table is *qo(i,r)*. Each column reports results from a single simulation where a particular factor grows by 1 percent in Turkey. Source: Authors' simulation results.

TABLE 8: Effects (annual) of Romania's and Bulgaria's import barrier removals, on Greece, EU24, and the Rest of the World (ROW).

Welfare effects, € (million)

	total effect	***EU acces.***	***Bulg-Rom***	***ROW tariffs***
Greece	81,1	89,6	0	-8,5
Rest EU	26,3	206,3	0	-179,3
Romania	234,9	102,8	0	131,4
Bulgaria	56,4	34,8	2,3	19,3
ROW	-179,3	-303,7	0	124,4

Welfare effects, %

	total effect	***EU acces.***	***Bulg-Rom***	***ROW tariffs***
Greece	0,10	0,11	0,00	-0,01
Rest EU	0,00	0,00	0,00	0,00
Romania	1,01	0,44	0,00	0,57
Bulgaria	0,65	0,40	0,03	0,23
ROW	0,00	0,00	0,00	0,00

Total effect on bilateral trade, %

from/to	***Greece***	***Rest EU***	***Romania***	***Bulgaria***	***ROW***
Greece		-1,06	13,99	61,46	-0,86
Rest EU	0,14	-0,06	11,42	31,94	-0,06
Romania	13,74	5,90		-15,03	0,54
Bulgaria	18,59	19,99	2,67		5,43
ROW	0,31	0,03	17,61	-3,14	0,00

Total exports, %

	total effect	***EU acces.***	***Bulg-Rom***	***ROW tariffs***
Greece	0,25	0,26	0,00	-0,01
Rest EU	0,03	0,03	0,00	0,00
Romania	4,27	5,45	0,04	-1,21
Bulgaria	13,31	12,31	0,11	0,89
ROW	0,03	0,01	0,00	0,02

Total imports, %

	total effect	*EU acces.*	*Bulg-Rom*	*ROW tariffs*
Greece	0,54	0,58	0,00	-0,04
Rest EU	0,02	0,04	0,00	-0,02
Romania	13,31	9,75	0,08	3,49
Bulgaria	17,22	15,23	0,09	1,90
ROW	-0,01	-0,02	0,00	0,01

Income, %

	total effect	*EU acces.*	*Bulg-Rom*	*ROW tariffs*
Greece	0,30	0,33	0,00	-0,03
Rest EU	0,00	0,01	0,00	-0,01
Romania	1,80	0,33	-0,01	1,48
Bulgaria	0,86	0,19	0,05	0,61
ROW	-0,01	-0,01	0,00	0,00