SHOCKS TO INBOUND TOURISM IN EGYPT: A RECURSIVE DYNAMIC ASSESSMENT UNTIL 2020

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ABSTRACT

Following the January 2011 Revolution, Egypt has experienced increasing political instability. It has also been the target of intense terrorist attacks as the ousting of the first democratically elected Muslim Brotherhood president Mohamed Morsi in June 30, 2013 due to popular discontent with his policies, arousing rage among his followers. While substantial efforts are exerted by the current regime to put an end to these terrorist attacks, it is not clear whether the country's reputation as a safe tourist destination will be restored in the medium run. Utilizing a Recursive Dynamic General Equilibrium Model, this paper assesses the extent of vulnerability of the Egyptian economy to a prolonged tourism shock. Simulation results reveal that a shock to tourism has a significant impact on the Egyptian economy as a rebound of inbound tourism increases both GDP and welfare substantially. Based on these results, it pays to put in place measures to moderate the effect of this shock.

ملخص

شهدت مصر في أعقاب ثورة يناير ٢٠١١ حالة متنامية من عدم الاستقرار السياسي، كما تعرضت لهجمات إرهابية مكثفة في أعقاب الإطاحة بالرئيس محمد مرسي، أول رئيس منتخب من جماعة الإخوان المسلمين، في ٣٠ يونيو ٢٠١٣ بسبب الرفض الشعبي لسياساته، وهو ما أثار غضب أتباعه. وبالرغم من الجهود الضخمة التي يبذلها النظام الحالي للقضاء على هذه الهجمات الإرهابية، إلا أنه لم يتضح بعد إذا كانت مصر سوف تستعيد الصورة المعروفة عنها كوجهة سياحية آمنة في الأجل المتوسط. في هذا السياق، تقوم هذه الدراسة بتقييم مدى ضعف الاقتصاد المصري في مواجهة صدمة سياحية تمتد إلى فترة زمنية طويلة، وذلك باستخدام نموذج التوازن العام الديناميكي المتكرر. وتظهر النتائج أن تعرض السياحة لصدمة من شأنه أن يؤثر بشكل كبير على الاقتصاد المصري، بينما انتعاش السياحة الوافدة يؤدي إلى زيادة الناتج المحلي الإجمالي، والرفاهية بشكل كبير. وتشير هذه النتائج إلى ضرورة تبني التدابير اللازمة لتخفيف تأثير هذه الصدمة على الاقتصاد المصري.

1. INTRODUCTION

Following the January 2011 Revolution, Egypt underwent profound political and economic changes. On the political front, three decades of authoritarian regime of Hosni Mubarak came to an end. Subsequently, and for the first time in its history, a democratically elected Muslim Brotherhood president came to power only to be overthrown in less than a year in the wake of 30th of June Revolution and with the backing of the army due to popular discontent with his policies. The election of the second president Abdel Fattah el-Sisi aroused rage among Muslim Brotherhood followers leading to a series of terrorist attacks targeting the army, the police and minorities as well as vital public entities. The political turmoil resulted in severe disruption to economic activity, particularly tourism, which cumulated in declining rates of growth and rising unemployment.

While Political and economic instability caused by terrorism has a long history in the case of Egypt as in many instances tourist themselves were the subject of these attacks, the recent events, unlike previous ones, do not seem to be transitory in nature and thus their impact on tourism demand might not be short-lived. In fact, between 2009/2010 and 2016/2017 the number of tourists fell by 52 percent, while the number of tourist nights fell by 63 percent (Figure 1). Although the government continues to exert considerable amount of effort to put an end to these terrorist attacks, it is not clear whether the country's reputation as a safe tourist destination will be restored in the short to medium run. Several important questions arise in this regard: 1) to what extent is the Egyptian economy vulnerable to shocks, arising from falling inbound tourism demand, be it temporary or permanent? The answer to this question will not depend only on the size of tourism sector but also on the inter-sectoral linkages to this sector; 2) who loses from a fall in inbound tourism demand, labor or capital, skilled or unskilled labor, female or male labor, the rich or the poor? 3) Is it worthwhile that the government put in place measures to moderate the effect of these negative shocks?

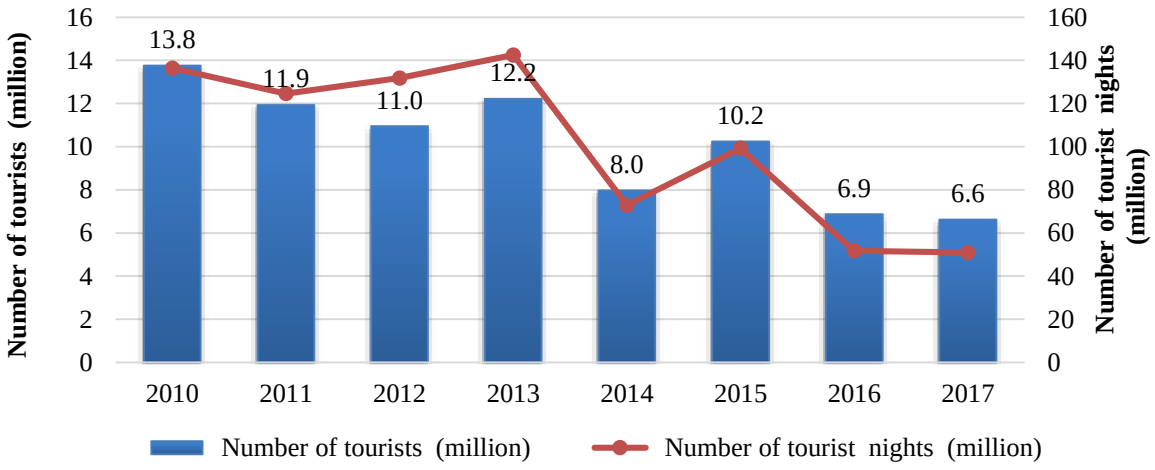
While there exists numerous studies assessing the economic impact of tourism, and where General Equilibrium models have proven especially useful, they pertain mostly to developed countries and are mainly static in nature. Static models by definition cannot be used to explore the growth implications of shocks to tourism let alone those of persistent nature.

Moreover, few of these studies examine the impact of negative shocks to tourism demand arising from terrorism and virtually none exists in the case of Egypt. In an attempt to address these knowledge gaps, this paper utilizes a recursive dynamic general equilibrium model to assess the impact of negative shocks to tourism demand arising from terrorism —and that are likely to persist for more than one period—on the Egyptian Economy.

We find the Egyptian economy to be particularly vulnerable to negative shocks affecting inbound tourism demand as GDP grows on average annually by over 1.6 percent between 2013-2020 if tourism rebounds to 2010 levels—a year considered to be normal when it comes to tourism activity. All labor—irrespective of skill category or gender—and both rich and poor regardless of area of residence (urban/rural) benefit substantially from a rebound in inbound tourism. Based on these results, it is important for the government put in place measures to moderate the effect of these shocks.

The rest of this paper is organized as follows: Section 2 presents a literature review. Section 3 lays out the structure of the model, and Section 4 discusses the simulation results. Section 5 concludes.

Figure 1. Number of Tourists and Tourist Nights per Year in Egypt (million, 2010-2017)



Source: Ministry of Tourism (2014,2017)

2. LITERATURE REVIEW

While Input-output (IO) and Social Accounting Matrix (SAM) models can be used to study the impact of an increase in tourism expenditure on local economies, they have limitations. These models cannot trace the impact of the shock over time. Dynamic General Equilibrium models

(DCGE) do not only overcome such limitation, but they are based on the SAM and retain the sectoral disaggregation of the IO and SAM approaches. General Equilibrium Models, in general, recognize that labor and capital are scarce, which makes possible the modeling of a more fully developed supply side of the economy (Allan 2017)

Allan (2017) investigates the impact of anticipated versus unanticipated temporary increase in tourist expenditure resulting from the Glasgow 2014 Commonwealth Games. Using a forward looking dynamic CGE model, the author found that the effect of this shock would lead to a cumulative increase in GDP by 19.4 million sterling pounds and generate 587 person years of employment.

Njoya and Seetaram (2018) use a Dynamic General Equilibrium model to study the impact of an increase in tourist spending on GDP and poverty in Kenya over the period 2003-2022. The author finds that a 5 percent increase in tourist spending generates an annual percentage increase in GDP equal to 0.24 percent on average. This growth, however, comes at the expense of reduction in exports caused by the appreciation of the currency on the back of the Dutch Disease. Growth caused by expansion in tourism trickles down to both the urban and rural poor.

Based on the belief that tourism is a low skilled labor-intensive activity, governments usually justify the use of tax revenue to promote this sector in order to improve income distribution. An applied general equilibrium model was used by Wattanakuljarus and Coxhead (2008) to examine the validity of this contention in the case of Thailand. Simulation results reveal that an increase in inbound tourism demand increases household income yet worsens income distribution, as the tourism sector in Thailand is not labor-intensive. Income distribution also worsens because expansion of foreign tourism reduces the profitability in tradable sector such as agriculture, where the bulk of income received by the poor is generated.

Li, Blake, and Thomas 2013 apply a static CGE model with imperfect competition to assess the impact of the 2008 Beijing Olympic Games on the Chinese Economy. While the event was found to bring benefits to local people as tourist expenditure increased, the size of these benefits were modest given the size of the Chinese economy. However, the welfare effect of the event was higher under imperfect competition compared to perfect competition. This is mainly due to the fact that most tourism-related industries are highly concentrated in China. As tourist demand for the products of these industries expands, more firms enter leading to a precompetitive effect.

Meng (2014) distinguishes between tourism shopping demand and tourism service demand and assesses the impact of an increase in each type of demand in both the short run and long run on Singaporean economy using a CGE model. An increase in tourism service demand was found to generate a higher increase in both nominal and real GDP compared to an increase in tourism shopping demand with even bigger differences when it comes to employment. Such results arise due to the fact that tourism services are more labor intensive compared to tourism shopping. Same results hold in the long run. The authors conclude that the Singaporean government should put more emphasis on promoting tourism service demand. Concerning sectoral effects, expansion in tourism sector has a mild crowding-out effect on competing sectors due mainly to the appreciation of the Singaporean dollar.

Meng et al. (2010) employs a computable general equilibrium model to investigate the effect of the global financial crisis 2008 on tourism and in turn on Singapore's economy. As tourism declines following the crisis, GDP declines. Exports are affected through two channels. First, purchases by tourists—which are part of exports—fall. Second, deflation caused by falling tourist demand leads to a depreciation of the real exchange rate, causing exports to increase. The net effect was an increase in exports. Tourism related sectors contract sharply, while tourism competing sectors expand. Tariff revenue falls due to declining demand by tourists for goods on which high tariffs are imposed such as liquor and tobacco. In the labor market, demand for low skilled workers drastically declines. As a policy response, a decline in the Goods and Service Tax or a decline in the Tourism Tax are simulated, where the former was found to be more effective in stimulating tourism.

In another study and as a response to the impact of the World Financial crisis on the Singaporean economy, Meng, Chin, and Grant (2015) examine the effectiveness of a one percent reduction in the Goods and Service Tax compared to a one percent subsidy rates to all industries or a 4 percent subsidy to the tourism industry to moderate the impact of the crisis by using a CGE model. The latter policy was found to lead to the highest increase in welfare mainly due the fact that the tourism industry is intensive in unskilled labor who typically earn low incomes. The subsidy boosts the income of this group permitting them to consume more.

With the aid of a CGE model, Blake and Sinclair (2003) examine the impact of the 9/11 terrorist attacks on the USA economy. Model results show that decline in tourist demand following this shock lead to a $30 billion reduction in GDP and a total of 559,000 jobs lost in addition to worsening the government budget by $7 billion. The authors also evaluate the effect

of a number of crisis management measures that were suggested by the government and tourism industry. These include compensation to airlines and individuals, spending on airline safety and public funding of advertisement campaigns to stimulate demand for tourism. Simulation results reveal that these measures were effective in reducing the impact of the crisis on the US economy. Other policies evaluated encompass a production subsidy to sectors most affected by the downturn in tourism demand, to consumer expenditure on tourism, to labor employment to capital profits. Cuts in direct taxation was also considered. The subsidy can be interpreted as a tax reduction. Simulation results show that directing the subsidy to the sectors most affected by the crisis is the most effective in terms of restoring GDP and minimizing adjustment costs and job losses.

Utilizing a CGE model Pambudi, McCaughey, and Smyth (2008) simulates the short-run economic impact of the Bali bombing, which took place in 2002, on Balian and Indonesian economy as a whole. Simulation results show that the Balian economy was severely affected by the decline in tourism that took place following the bombing as both output and employment contracted sharply.

3. MODEL AND DATA

Tourism is an important sector in Egypt. Different commodities and services demanded by this sector are produced by multiple sectors, and range from food and beverages, transport, health services and leasing and lodging, among others. Hence, whatever development the sector undergoes produces ripple effects throughout the economy in addition to its economy-wide effects on employment and capital. Accordingly, this study employs a multi-sector recursive-dynamic computable general equilibrium (CGE) model for Egypt. The model distinguishes the sectors involved in tourism activities and the products consumed by tourists internally (in Egypt) as well as products purchased by Egyptian tourists abroad. In addition, the model includes several agricultural and agro-processing sectors as well as industrial and services sectors. A detailed description of the model structure and equations can be found in Diao and Thurlow (2012). The model is calibrated to the most recent social accounting matrix (SAM) for Egypt (CAPMAS 2016).

We model the Egyptian economy as a competitive economy with flexible prices in which consumers maximize their utility subject to income constraints and producers maximize their profits. It is an open economy model in which all countries other than Egypt are aggregated in

one region, i. e. "the rest of the world," which is connected to Egypt via trade flows, remittances, and other transfers. Producers in Egypt are assumed to be price takers (small country assumption) in output and input markets and use constant returns to scale technologies. They demand primary factors of production based on constant elasticity of substitution (CES) value added functions and intermediate input by commodity group based on a Leontief fixed-coefficient technology. The decision of producers to choose between production for domestic and foreign markets is governed by constant elasticity of transformation (CET) functions that distinguish between exported and domestic goods in each traded commodity group in order to capture any quality-related differences between the two products. On the demand side, imported and domestic goods are assumed to be imperfect substitutes in both final and intermediate demand (Armington specification). Households use part of their incomes to consume commodities according to fixed budget shares.

The model includes three macroeconomic accounts: a government balance, a current account balance, and a savings-investment account. In the government account, the fiscal balance and therefore public savings are kept fixed exogenously, while the account is balanced by uniform direct tax rate point change for domestic non-governmental institutions. With this setup, the implications of our simulation will be kept independent from adjustments in the government savings. For the savings-investment identity, an investment-driven balanced closure rule is assumed that fixes the share of investment in total absorption, while uniform changes in the savings rates of households and enterprises adjust to generate the necessary funds. Finally, external balance assumes that voluntary external capital inflows are exogenously determined, while the exchange rate adjusts. The consumer price index is kept fixed as the numeraire of the model, while the producer price index is made flexible.

There are 12 labor categories in the model, differentiated by regional affiliation (rural and urban), gender (male and female), and skill category (unskilled, semi-skilled, skilled)[1], with all types assumed to be unemployed but mobile across sectors. The assumption unemployment is consistent with what has been witnessed in recent years in Egypt. Capital accumulation is modeled assuming a "putty-clay" formulation whereby new investment is allocated across sectors between periods in response to rate of return differentials, but once installed, capital remains immobile within periods until its depreciation (Diao and Thurlow 2012). In agriculture,

[1] Skill-based classification of the labor market in the SAM was based in the years of education. For more on the 29013 SAM for Egypt, refer to CAPMAS (2016).

cultivated land is assumed to be fully employed but activity specific given the short period considered for the simulations until 2020.

Egypt dynamic CGE model is based on a 2013 social accounting matrix (SAM) built by CAPMAS (2016). Despite the detailed sectoral representation of the original SAM, this study aggregates several sectors together to make the SAM focused on the topic of the paper and reduce complexity in order to facilitate interpretation of model results. Hence, the 92 activities of the SAM are aggregated into 19 sectors with the entire agricultural sector being represented by crops (including vegetables, oilseeds and fruits), forests (including forests and their products) and livestock (including live animals and their products). We kept all the sectors and commodities linked to tourism activities disaggregated. The SAM includes 14 commodities that are consumed by tourists and produced by 8 different activities.

The aggregated SAM therefore provides data on 19 aggregated production sectors producing 29 commodities, 14 factors of production, and 10 household types, distinguished by their regional affiliation and income level. In this respect, household groups are separated into rural and urban, each differentiated by income quintiles. This differentiation of household groups allows us to capture the distinctive patterns of income generation and consumption as well as the distributional impacts of tourism and terrorism shocks.

The model distinguishes between various institutions, including enterprises, the government, and different household groups. Households and enterprises receive income in return to producers' using factors of production supplied by them. Institutions pay direct taxes and save according to their respective marginal savings propensities. Enterprises pay their remaining incomes to households in the form of dividends. Households use their incomes to consume commodities according to fixed budget shares as derived from a Cobb-Douglas utility function. The government receives revenue from activity taxes, sales taxes, direct taxes, and import tariffs and then makes transfers to households, enterprises and the rest of the world. The government also purchases commodities in the form of government consumption expenditures while saves the remaining income. All savings from households, enterprises, government, and the rest of the world constitute the savings pool from which investment is financed.

The model includes three macroeconomic accounts: a government balance, a current account balance, and a savings-investment account. To balance the macro accounts, it is necessary to specify a set of macro-closure rules, which provide a mechanism through which balance is achieved. In the government account, the fiscal balance and therefore public savings

are endogenous, with government demand fixed to absorption and all tax rates held constant, so that government savings or dis-savings depend on the level of economic activity. For the savings-investment identity, an investment-driven balanced closure rule is assumed that fixes the share of investment in total absorption, while uniform changes in household savings rates adjust to generate the necessary funds. Finally, external balance assumes that voluntary external capital inflows are exogenously determined, while the exchange rate adjusts.

4. POLICY SIMULATIONS AND RESULTS

4.1 Policy Simulations

The shock to tourism that occurred over the past few years was simulated in our Egypt economy-wide model by adjusting the world price of the different tourism commodities on both the export and import sides. In each year, a rebound in tourism activity to the levels of 2010[2] —hereafter termed the tourism scenario—is thus used to measure the impact of the shock on the economy. This is reflected in the increase in the world prices of tourism commodities rendering these goods more expensive, which in turn stimulates exports of these commodities rather than decreases it—given the small country assumption underlying our model—while discourages imports. The small country assumption is justified based on data from the World Development Indicators, 2018 showing that the number of tourist arrivals to Egypt in 2010 constituted 1.5 percent of tourist arrivals worldwide. This number falls even more in the following years reaching 0.4 percent in 2016. While we adjust world prices on the import side for consistency, the presumption here is that as terrorist attacks subside, even Egyptians will find it safer to resume tourism activities in Egypt and this will in turn reduce outbound tourism

To insure that the shock is not uniform across commodities but commodity specific, we first calculated the change in the number of tourists and the number of tourist nights between 2010—the year subsequent to the shocks and where tourism activity was normal—and each year from 2013 -2017 (Figure 1). We then multiplied the average of these two numbers in each year over this interval by the shares of tourists purchases internally (abroad) in total exports (imports) for each commodity drawn from the SAM and displayed in second and third column of Table 1 below. This is the number used to adjust world prices of the different tourism

[2] The year 2010 is reasonable in the sense of being free from terrorism attacks on tourists but it may be a year of exceptionally good performance compared to the last two decades according to data published by the Central Bank of Egypt.

commodities on the export (import) side. The simulated changes in world prices of exports are presented in Table 1 while that for imports are presented in Appendix 1 and 2 for comparison.

As tourism exports in Egypt exceed tourism imports, the tourism scenario is expected to improve Egypt's terms of trade as well as returns to workers employed and capital invested in tourism sectors.

Table 1. Simulated Changes in Export Prices (2013-2017) and Export and Import Shares of Tourism

	% tourist purchases locally (exports)	% tourist purchases abroad (imports)	Simulated changes in export price				
			2013	2014	2015	2016	2017
Beverages	67.8	22.6	7.4	8.1	2.3	30.0	17.9
Tobacco products	37.7	5.7	4.1	4.5	1.3	16.7	9.9
Knitted or crocheted fabrics and wearing apparel	30.6	24.4	3.4	3.6	1.0	13.6	8.1
Leather, leather products and footwear	45.1	18.7	4.9	5.4	1.5	20.0	11.9
Products of wood, cork, straw and plaiting materials	97.2	13.6	10.7	11.6	3.3	43.1	25.7
Medical appliances, optical instruments, watches and clocks	51.5	2.9	5.6	6.1	1.7	22.8	13.6
Lodging, food and beverage serving services	100.0	86.9	11.0	11.9	3.4	44.3	26.4
Land transports	100.0	0.0	11.0	11.9	3.4	44.3	26.4
Water transports	3.0	NA	0.3	0.4	0.1	1.3	0.8
Air transport services	7.3	28.9	0.8	0.9	0.2	3.2	1.9
Supporting and auxiliary transport services	2.1	100.0	0.2	0.3	0.1	0.9	0.6
Leasing or rental services	289.2	NA	31.7	34.4	9.8	128.1	76.3
Health and social services	86.6	100.0	9.5	10.3	2.9	38.4	22.8
Recreational, cultural and sporting services	122.6	80.2	13.4	14.6	4.2	54.3	32.3

Source: Ministry of Tourism (2014,2017) and authors' calculations.

4.2 Results

The effect of the tourism shock on exports by commodity groups is depicted in Table 2, which shows average annual growth rate of domestic prices and export quantities over the period 2013-2020. The domestic price of exports is the world price converted into domestic currency using the prevailing exchange rate plus any tariff. As shown in Table 2, prices for all tourism commodities except knitted or crocheted fabrics and wearing apparel (cKnitwear) increased as a result of the tourism shock with that of leasing and renting increasing the most by 24 percent. On the other hand, while all tourism exports as well some of manufactured goods consumed also by tourists like beverages (cbeverage), leather products (cleather), wood products (cWoodprd) increased compared to the base run as tourism activity returns to normal, all other exports declined with the exception of livestock and fishery products (clivfish), electricity (celectricity) and medical appliances (medicapp).[3]

The decline in some exports occurs in response to the appreciation of EGY at a rate of about 4.5 percent annually over the period 2013-2020 and the movement of factors of production out of these sectors and into the tourism sectors. The rebound in tourism thus comes at a cost. Exports of the most strategic and largest manufacturing sectors of the Egyptian economy—in terms of output and employment—like food and textile and readymade garments and which policymakers focused their efforts on promoting for decades now decline.

Table 2. Impact on Exports of Goods and Services (average annual growth, 2013-2020)*

	Quantity of export in the base (EGP billion)	Domestic price of exports		Quantity of exports	
		Base	Tourism	Base	Tourism
cCrops	8.1	-3.0	-26.6	5.1	-26.8
cLivfish	0.3	-0.9	-8.5	26.6	3.4
cCoOlGas	30.3	0.0	-4.5	5.8	-5.4
cMtlStMnl	4.0	-0.1	-5.1	3.7	-0.5
cElectricity	0.4	0.0	-4.5	2.4	4.6
cOilMtFt	5.6	-1.2	-10.0	4.9	-10.7
cFood	7.0	-0.3	-6.0	7.1	-8.3
cBeverage	0.9	-0.1	2.9	5.1	12.3
cTobacprd	0.7	-3.3	-6.1	-4.5	-8.7
cTxPprYrn	9.1	-1.1	-9.2	0.8	-13.8
cKnitwear	6.6	-3.5	-9.2	-4.6	-13.0
cLeather	1.6	-0.2	0.3	4.4	7.6
cWoodprd	4.5	-0.3	6.2	1.7	31.6

[3] List of commodities and sectors showing their short and full description is provided in Appendix 4 and Appendix 5.

	Quantity of export in the base (EGP billion)	Domestic price of exports		Quantity of exports	
		Base	Tourism	Base	Tourism
cEnergy	22.5	0.0	-4.6	4.4	-2.6
cChmachn	76.8	-0.3	-6.0	2.8	-6.6
cMedcapp	0.7	-1.5	-0.3	2.7	2.4
cConstruct	3.6	0.0	-4.5	3.7	-5.5
cLdgfdbv	32.2	0.0	6.2	5.7	7.9
cLtrans	3.2	0.0	6.2	13.5	16.0
cWtrans	12.2	0.0	-4.2	4.2	5.3
cAtrans	7.0	0.0	-3.7	8.3	8.9
cOthtrans	37.2	0.0	-4.3	6.1	7.3
cLeasrent	0.8	0.0	23.5	0.2	59.2
cHealthsrv	3.7	0.0	4.9	0.6	11.0
cRecrculsrv	5.2	0.0	8.4	2.6	32.6
cOthersrv	15.9	0.0	-4.5	-0.7	-10.3

Source: Egypt's CGE model.

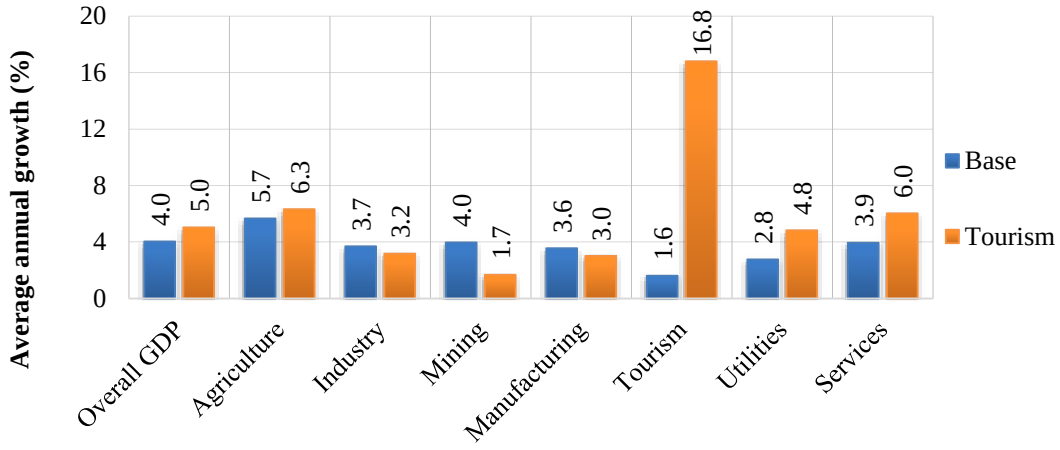
* Each commodity presented in the table is an aggregation of several other commodities (i.e., making the full name longer than can be listed in the table), therefore, a table with short and full names of these commodities is provided in Appendix 5.

Changes in the prices of exports and the subsequent changes in the quantities of exports are a reflection of changes occurring on the production side of the economy. These changes are depicted in Figure 2 under the tourism scenario where they are contrasted with those of the base run for the different aggregated sectors. The group of sectors that produces tourism commodities (aggregated under tourism in Figure 2) grow annually by an average of 16.8 percent under the tourism scenario compared to only 1.6 percent under the base scenario. At this aggregated level, the sector that bears the brunt of expansion in the tourism sector is the industrial sector, which accounts for 37.9 percent of GDP in the base data, and includes two subsectors, namely, mining and manufacturing. The annual growth of mining and manufacturing is expected to be slower than the base by 2.3 percent and 0.6 percent, respectively, which causes the entire industrial sector to grow annually by 0.5 percent less than the base growth rate.

Both tourism and utilities—which account for 2.9 percent and 1.7 percent of the GDP respectively in the base year—are part of the service sector (all shown in Figure 2), which accounts for 52.2 percent of the overall GDP in the base data. The overall service sector is thus the largest single sector in the Egyptian economy. The service sector will grow by 2.1 percent faster than the base as almost all the individual service sectors (see

Appendix *3*) experience an increase in output annually in response to a more vibrant tourism sector. The growth in services along with that of the agricultural sector—the latter sector constituting 9.9 percent of GDP in the base run—generate an overall growth rate of GDP that is 1.0 percent higher than in the absence of a rebound in tourism (Figure 2).

Figure 2. Average Annual Growth (%) in GDP at Factor Cost by Sector (aggregate)



Source: Egypt CGE model.

On the import side, Table 3 displays base imports in billion Egyptian pounds along with the average annual growth rates of import price and quantity under the base and tourism scenario. As the Egyptian pound appreciates annually by an average rate of 4.5 percent over the period 2013-2020 compared to the base as mentioned earlier, imports of various commodities become relatively cheaper in local currency, which becomes evident as the base and tourism runs are compared in columns 3 and 4 in local currency. With a few exceptions, namely, in the case of cAtrans, cOthtrans, cHealthsrv and cRecrculsrv[4] where base imports are negligible, imports of all goods and services increase above the base as tourism rebounds, thanks to the appreciation of the Egyptian pound and the additional income generated from a more vibrant tourism sector. It is worthwhile to emphasize that a rebound in inbound tourism discourages outbound tourism.

As imports of cChmachn, cEnergy, and cCrops—which constitute 45.2 percent, 12.3 percent and 10.2 percent, respectively of base imports—increase, the trade deficit increases. As a result, the trade deficit that increases by only 2.6 percent in 2013, increases annually at a rapid rate of 6.0 percent in 2014, 105.6 percent in 2018 and 194.0 percent in 2020 to reach

[4] See Appendix 5 for the full names of commodities.

EGP 703.3 billion by then compared to EGP 239.2 billion under the base scenario. A rebound in tourism comes at the expense of a deterioration in the country's external position.

Table 3. Impact on Imports of Goods and Services (average annual growth, 2012-2020)

	Quantity of imports in the base (EGP billion)	Price		Imports	
		Base	Tourism	Base	Tourism
cCrops	55.0	1.0	-1.2	3.9	8.9
cLivfish	1.0	0.6	-2.5	-8.7	1.9
cForsprod	1.0	0.8	-1.9	1.6	5.4
cCoOlGas	22.0	0.0	-4.5	1.5	11.0
cMtlStMnl	5.0	0.2	-4.0	4.1	4.0
cOilMtFt	35.0	0.7	-2.2	1.9	7.3
cFood	9.0	0.3	-3.4	0.9	13.1
cBeverage	1.0	0.2	-1.6	-1.3	3.7
cTobacprd	3.0	1.0	-0.8	1.2	4.4
cTxPprYrn	23.0	0.6	-2.3	1.6	4.4
cKnitwear	7.0	1.0	0.4	0.4	1.6
cLeather	2.0	0.2	-1.9	-1.4	1.0
cWoodprd	12.0	0.3	-2.1	2.5	5.9
cEnergy	66.0	0.1	-4.4	2.8	10.2
cChmachn	243.0	0.3	-3.4	4.7	10.2
cMedcapp	7.0	0.8	-1.7	3.3	6.1
cConstruct	2.0	0.0	-4.5	3.7	18.8
cLdgfdbv	8.0	0.0	4.9	0.1	0.3
cAtrans	7.0	0.0	-1.2	-3.0	-5.1
cOthtrans	1.0	0.0	6.2	-2.2	-17.9
cHealthsrv	1.0	0.0	6.2	2.6	-6.8
cRecrculsrv	1.0	0.0	4.2	2.0	-11.4
cOthersrv	26.0	0.0	-4.5	9.3	24.2

Source: Egypt CGE model.

Because benefits accrued and costs incurred from expansion in tourism extend to the future where prices can be higher, it is necessary to calculate the present value of different indicators as well as use the exchange rate in 2013 to convert the values of these indicators into the US dollar (Table 4 and

Table *5*). Table 4 shows the different GDP indicators on the expenditure side, all discounted by 5 percent annually for 2013-2020. The sum of discounted values for each indictor over the period 2013-2020 are shown in the second column of the table, while the same values are converted into US dollar in the third column. In the fourth column, we present the absolute changes from the base for each indicator in billion US dollars, while in the last column we show the percentage change from the base. Simulation results indicate that GDP at market price will grow by 1.6 percent faster than the base with a cumulative amount of US$46.2 billion generated over the period 2013-2020 above the base.

This is mainly driven by considerable growth in private consumption, which grows under the tourism scenario by 8.4 percent faster than under the base scenario over the period 2013-2020. This is complemented by growth in investments and government consumption expenditure, which grow by 7.9 percent and 4.6 percent, respectively, relative to the base scenario. All in all, developments in the three indicators together make possible a 1.6 percent increase in GDP despite the rapidly growing imports (22.7 percent) and the lower growth in exports (-3.3 percent) relative to the base scenario.

Table 4. Discounted GDP Indicators by Expenditure (EGP, US$ and percentage change, 2013-2020)

	Accumulated values (2013-20)		**Deviation from base**	
	EGP (billion)	**US$ (billion)**	**Absolute US$ (billion)**	**%**
Total absorption	21,162.5	3,470.3	256.2	8.0
Private consumption	15,811.3	2,592.8	201.4	8.4
Total exports	3,212.8	526.8	-17.7	-3.3
Total imports	1,075.6	176.4	48.8	22.7
Fixed investment	3,356.3	550.4	40.0	7.9
Government consumption	2,057.0	337.3	14.8	4.6
GDP	18,032.9	2,957.1	46.2	1.6

Source: Egypt CGE model and Authors' calculations.

The discounted GDP indicators on the income side are presented in

Table 5. As net tax revenues decrease due to increasing outlays in the form of subsidies amounting to a cumulative US$48.8 billion, GDP at factor cost grows faster than GDP at market prices. Apart from this, the combined growth of the major aggregate three sectors (agriculture, industry and service) generates a cumulative increase of US$95.1 billion in GDP at factor cost under the tourism scenario above the base run. This is mainly driven by a considerable US$105.6 billion generated by the service GDP. Out of this US$105.6 billion, US$54.4 billion originates from the tourism sector, while the remainder originates in other service subsectors that are stimulated by a vibrantly growing tourism sector through forward and backward linkages.

Table 5. Discounted GDP Indicators by Income (EGP, US$ and percentage change, 2013-2020)

	Accumulated values (2013-20)		Deviation from Base	
	EGP (billion)	US$ (billion)	Absolute US$ (billion)	%
GDP at factor cost	19,108.6	3,133.5	95.1	3.1
Agricultural GDP	2,068.9	339.3	5.5	1.7
Industry GDP	6,761.8	1,108.8	-16.0	-1.4
Manufacturing GDP	3,021.4	495.5	-9.5	-1.9
Mining GDP	2,243.5	367.9	-20.7	-5.3
Service GDP	10,277.9	1,685.4	105.6	6.7
Tourism GDP	811.8	133.1	54.4	69.2
Utilities GDP	322.1	52.8	3.1	6.3
Net tax revenue	-1,075.6	-176.4	-48.8	38.3

Source: Egypt CGE model and Authors' calculations.

As factors of production move out of industry and into tourism and related sectors, and as the Egyptian pound appreciates, which reduces returns from exports, the industrial sector contracts. At a more disaggregated level, Appendix 3 shows that sectors like aChmachn, aMfCoke and aTxPprPrn[5] experience the largest loss in output relative to the base scenario.

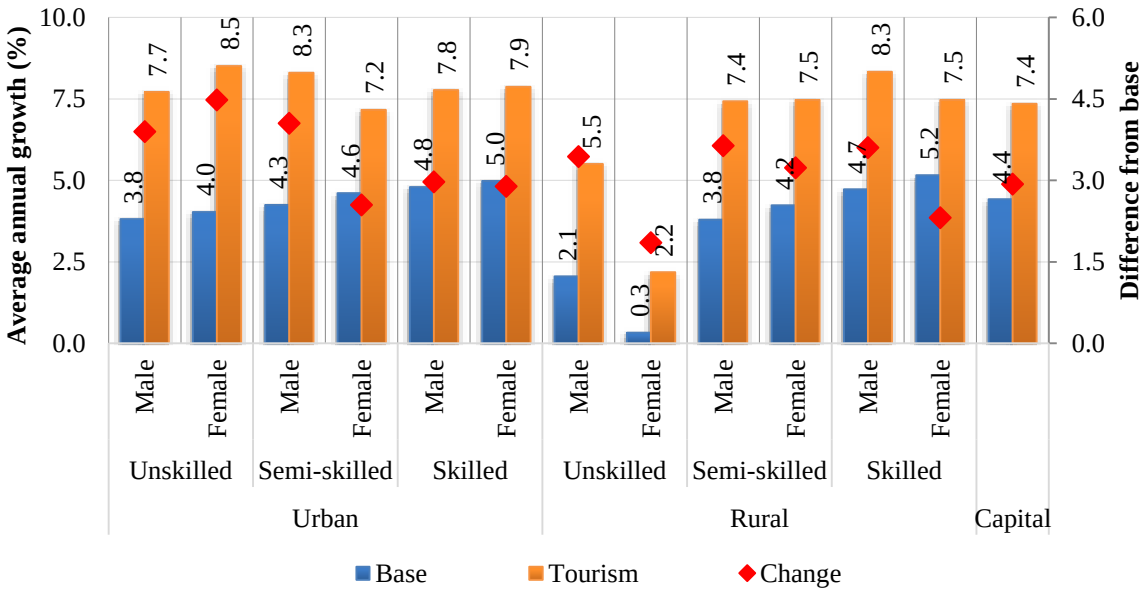
Income earned by the different factors of production is presented in Figure 3. The columns show average annual growth in factor income under the base and tourism scenarios, while the square points (depicted on the secondary vertical axis) show the difference between the average annual growth under the tourism and base scenarios. A higher square point for a factor implies a higher benefit from the tourism scenario relative to the base. In general, all labor categories in addition to capital benefit from the tourism scenario albeit with varying degrees, but labor —with the exception of rural unskilled females—benefits more than capital. Within labor, urban labor seems to benefit more as most hotels are located in urban areas.

In general, unskilled labor seems to benefit more than skilled labor under the tourism scenario in the urban sector while the opposite is true in the rural sector. As unskilled labor is abundant in the rural sector while skilled labor is abundant in the urban sector in the case of Egypt, low labor mobility will render the former scarce in the urban sector while the latter scarce in the rural sector. The factor of production, which benefits the most is urban unskilled female, whose income grows on average by 4.5 percent higher under the tourism scenario than

[5] aChmachn: Chemicals, rubber, plastic, glass, metal, furniture, wastes, machinery, and equipment activities. aMfCoke: Manufacture of coke and refined petroleum products. aTxPprPrn: Manufacture of textiles paper and printing. For the full list of sectors, see Appendix *4*.

in the base. In contrast, rural unskilled female workers benefit the least under the tourism scenario. This can be attributed to the fact that the tourism industry is intensive in unskilled female labor in the urban sector. This is not the case in the rural sector given the conservative nature of the rural community in general, which renders unskilled females—who typically have low levels of education—unlikely to work in the first place, let alone in the tourism sector.

Figure 3. Income to *P*roduction *F*actors (average annual growth 2013-2020)



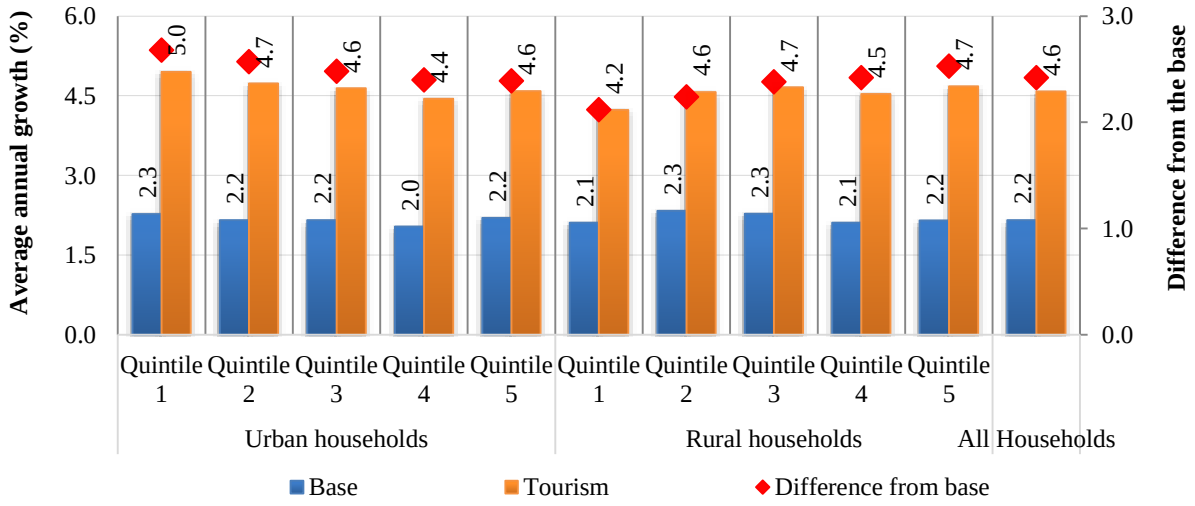
Source: Egypt CGE model.

In Figure 4, which follows a similar structure as Figure 2, welfare results measured as equivalent variation for households disaggregated into urban and rural and further disaggregated by income quintile are presented. As evident, all households, whether urban or rural, rich or poor, seem to benefit from a rebound in tourism activity. Average annual change in equivalent variation between 2013-2020 roughly doubles for all households.

However, the poorest urban households (quintiles 1 and 2) were found to benefit more from the tourism scenario compared to the richest urban household (quintiles 4 and 5). In contrast, it is the richest rural households that benefit more from the tourism scenario compared to the poorest rural. A rebound in tourism thus improves income distribution in the urban sector and worsens it in the rural sector. This stems from the fact that it is unskilled (mainly female) labor in the urban sector that benefits from expansion in tourism, while it is skilled labor that

benefits in rural sector. Unskilled labor is typically supplied by the poor, while skilled labor is supplied by the rich.

Figure 4. Household Welfare Measured by Average Annual Change (%) in Equivalent Variation 2013-2020



Source: Egypt CGE model.

5. CONCLUSIONS AND POLICY IMPLICATIONS

Terrorism, which has a long history in the case of Egypt, and the political instability it creates have consistently been a cause of serious disruption to economic activity, particularly tourism. This has been specially true over the past few years due to the frequent recurrence of terrorist attacks, which produced a damaging and long-lasting effect on the country's reputation as a safe tourist destination. In this paper, we have shown that the Egyptian economy is particularly vulnerable to shocks arising from a fall in inbound tourism. The growth prospects of the economy depend heavily on a rebound in tourism activity to 2010 levels as GDP was found to grow annually on average by 1.6 percent higher over the period 2013-2020. Welfare improves by almost 50 percent for all income quintiles across both the urban and rural sectors. However, the slight variation in welfare improvement across income quintiles indicates that the tourism sector can play a rather limited role in income redistribution.

Nonetheless, labor, which is Egypt's abundant factor of production, gains, albeit not at the expense of its scarce factor, namely, capital. All labor skill categories, whether located in the urban or rural sectors, benefit from a rebound in tourism, but unskilled urban females stand to benefit the most. Thus, expansion in tourism has significant implications for gender equality.

In a nutshell, and while questionable in the case of other countries (Hampton, Jeyacheya, and Hong Long 2018), the benefits of tourism-led growth in the case of Egypt are quite diffused, implying that this sector can play a potentially important role in fostering inclusive growth. This contention can be further asserted given that the agricultural sector, where typically most of the poor are employed, expands in response to expansion in the tourism sector. All this can serve to reduce the extent of urban and industrial bias inherent in market-led development policies (Hampton, Jeyacheya, and Hong Long 2018), adopted by the government since 1990s, which in turn can help engender wider support for them.

Based on these results, it certainly pays that the government put in place measures to moderate the effect of negative shocks to inbound tourism. However, caution must be exercised as a rebound in tourism comes at a cost. As the Egyptian pound appreciates, several manufactured exports decline and the country's external position worsens. Additional measures to counter these negative effects must be considered by policymakers, especially in light of the importance of manufactured exports as a more stable source of foreign exchange compared to tourism. Identifying the right policy mix, namely one that helps moderate the impact of negative shocks to inbound tourism and at the same time help avoid any adverse effects on manufactured exports, should be a priority subject for future research.

6. APPENDICES

Appendix 1. Changes (%) in number of tourists and tourist nights relative to 2010, reduced to reflect the share of tourist purchases locally in exports (for export price simulation)

	2013	2014	2015	2016	2017
cBeverage	7.44	8.06	2.30	30.04	17.89
cTobacprd	4.13	4.48	1.28	16.69	9.94
cKnitwear	3.35	3.63	1.04	13.55	8.07
cLeather	4.94	5.36	1.53	19.97	11.90
cWoodprd	10.66	11.55	3.30	43.08	25.66
cMedcapp	5.65	6.12	1.75	22.81	13.59
cLodgfdbev	10.97	11.88	3.39	44.31	26.39
cLtrans	10.97	11.88	3.39	44.31	26.39
cWtrans	0.32	0.35	0.10	1.31	0.78
cAtrans	0.80	0.86	0.25	3.22	1.92
cStrans	0.23	0.25	0.07	0.93	0.56
cLeasrent	31.71	34.36	9.81	128.14	76.31
cHealthsrv	9.50	10.29	2.94	38.37	22.85
cRecrculsrv	13.44	14.56	4.16	54.31	32.34

Appendix 2. Changes (%) in number of tourists and tourist nights relative to 2010, reduced to reflect the share of tourist purchases abroad in imports (for import price simulation)

	2013	2014	2015	2016	2017
cBeverage	2.48	2.69	0.77	10.02	5.97
cTobacprd	0.62	0.68	0.19	2.52	1.50
cKnitwear	2.67	2.90	0.83	10.80	6.43
cLeather	2.05	2.22	0.63	8.29	4.94
cWoodprd	1.49	1.61	0.46	6.02	3.58
cMedcapp	0.31	0.34	0.10	1.27	0.76
cLodgfdbev	9.53	10.33	2.95	38.51	22.93
cLtrans	0.00	0.00	0.00	0.00	0.00
cWtrans	NA	NA	NA	NA	NA
cAtrans	3.17	3.43	0.98	12.79	7.62
cStrans	10.97	11.88	3.39	44.31	26.39
cLeasrent	NA	NA	NA	NA	NA
cHealthsrv	10.97	11.88	3.39	44.31	26.39
cRecrculsrv	8.80	9.53	2.72	35.54	21.16

Appendix 3. Production by sector in the base (EGP billion) and average annual growth rate (%)

	Base value in EGP billion	Average annual growth (%)	
		Base	Tourism
aCrops	286.0	5.9	6.6
aForsld	0.1	10.9	6.1
aLivfish	18.3	2.6	3.6
aExtMinqu	264.4	3.9	1.7
aMnffood	161.2	4.4	3.8
aMfBeverg	17.4	-0.6	0.8
aMfTobaco	6.3	1.2	0.8
aTxPprPrn	43.2	1.8	-1.3
aMfWearn	22.7	0.2	0.1
aMfLeathr	6.0	2.4	3.6
aMfWood	5.0	1.6	31.6
aMfCoke	271.8	3.7	3.4
aChmachn	358.0	3.9	2.1
aElcGsWtr	148.3	2.8	4.8
aConstct	213.0	3.7	5.8
aRecrculsrv	38.3	2.4	18.3
aRentlleas	3.3	3.1	42.4
aHuhealth	60.9	1.3	3.5
aOthersrv	1,107.2	4.1	5.2

Appendix 4. Short and full names of activities (sectors) used in the study

Short name	Full description
aCrops	Crops, animal production, hunting, and related service activities
aForsld	Forestry and logging
aLivfish	Fishing, aquaculture, and live animals
aExtMinqu	Extraction of petroleum gas, mining and quarrying of metals
aMnffood	Manufacture of food products, including wheat, flour, rice, sugar, pasta, tea beverages, and tobacco
aMfBeverg	Manufacture of beverages
aMfTobaco	Manufacture of tobacco products
aTxPprPrn	Manufacture of textiles, paper, and printing
aMfWearn	Manufacture of wearing apparel
aMfLeathr	Manufacture of leather and related products
aMfWood	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
aMfCoke	Manufacture of coke and refined petroleum products
aChmachn	Chemical, rubber, plastic, glass, metal, furniture, wastes, and machinery and equipment activities
aElcGsWtr	Electricity, gas, water supply, treatment of sewage and waste collection
aConstct	Recreational cultural and sporting service activities
aRecrculsrv	Rental and leasing activities
aRentlleas	Human health activities
aHuhealth	Other services

Appendix 5. Short and full names of commodities used in the study

Short name	Full description
cCrops	Crops, including cereals, vegetables, oil seeds and others
cLivfish	Live animals, fish and other animal products
cForsprod	Forest and forest products
cCoOlGas	Coal, oil, and gas
cMtlStMnl	Metal ores, stones, clay and other minerals
cElectricity	Generated electricity
cOilMtFt	Oil, meat fat and dairy products
cFood	Flour, rice, sugar, pasta, tea, and other food products
cBeverage	Beverages
cTobacprd	Tobacco products
cTxPprYrn	Textile, paper, and yarn
cKnitwear	Knitted or crocheted fabrics and wearing apparel
cLeather	Leather, leather products, and footwear
cWoodprd	Products of wood, cork, straw and plaiting materials
cEnergy	LPG, gasoline octane 80-90-92-95, kerosen, diesel fuel and mazot
cChmachn	Chemicals, rubber, plastic, glass, metal, furniture, wastes, machinery, and equipment
cMedcapp	Medical appliances, precision and optical instruments, watches and clocks
cConstruct	Construction services
cTrade	Wholesale and retail trade services
cLdgfdbv	Lodging and food and beverage serving services
cLtrans	Land transport services
cWtrans	Water transport services
cAtrans	Air transport services
cOthtrans	Supporting and auxiliary transport services; and postal and courier services
cElcGsWtr	Electricity, gas and water; transmission and distribution
cLeasrent	Leasing or rental services without operator
cHealthsrv	Health and social services
cRecrculsrv	Recreational, cultural and sporting services
cOthersrv	Other services

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