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IMPACT OF INBOUND TOURISM IN KENYAN ECONOMY: AN ANALYSIS USING A COMPUTABLE GENERAL EQUILIBRIUM MODEL

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ABSTRACT

In both developing and developed countries tourism is often regarded as an economic activity of immense significance creating thousands of jobs. However, calculations dealing with the economic nature of tourism are often derived from input-output models, which largely overstate its effects on employment by assuming linear responses and highly elastic supplies of goods, services and labor. The purpose of this study is to develop and apply a computable general equilibrium approach to estimate the effects of growth in tourism spending on the Kenyan economy as a whole and on particular sectors within it. The results indicate that the economic benefits from tourism expansion in Kenya are small. The paper concludes with a discussion of the policy implications and research limitations.

Keywords: Tourism sector, Computable general equilibrium model

INTRODUCTION

In the past two decades an increasing number of researchers have sought to determine the impact of supply and demand shocks in one sector on the economy as a whole. Domestic or international shocks such as the outbreak of SARS or the terrorist attacks of September 11, 2001 adversely affect industries such as air transport, tourism and the economy as a whole. This indicates a need to understand the nature of the impact of shocks and policy changes in order to gain greater insight into the workings of such changes and determine ways of minimizing their adverse effects. However, much of the research with reference to developing country up to now has been descriptive in nature or has relied on input-output (I-O) analysis. The major objective of this study is to develop and applied Computable general equilibrium (CGE) models to investigate the effects of a range of alternative policies or exogenous tourist expenditure shocks. Despite the existence of varied tourist attractions, comprising warm weather, tropical beaches, abundant wildlife in natural

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habitats, scenic beauty and a geographically diverse landscape, this potential has in many cases not been fully exploited. However, in recent years, investment in tourism infrastructure and public health standards in most developing countries (DCs) has improved. On the other hand, a range of factors such as higher discretionary incomes, smaller family sizes, changing demographics in many Northern countries are having a huge impact on tourism demand. Many attempts to explain the linkages between tourism and economic growth have been made. Development theorists contend that increased services export (such as tourism) may contribute to economic diversification and to economic growth.

The net social benefit of tourism growth, that is the reduction of poverty and its effects on income distribution, is an important and relatively unexplored aspect of tourism in Kenya. Economic models of research in tourism are dominated by the impact of tourism measured in terms of its contribution to gross national product, employment and income generation. As a private sector led, outward oriented industry, the question is whether tourism can contribute to Kenya's urgent need for pro-poor growth - an important area into which this paper will delve. The goal of this paper is to make use of general equilibrium adjustment mechanisms in answering the following question: will the expansion of the tourism sector in Kenya advance or retard the broader development goal of poverty alleviation?

TOURISM AND THE KENYAN ECONOMY

The Kenyan economy has undergone a structural transformation since the country's independence in 1963. The macroeconomic performance of the Kenyan economy over the years is best understood in the context of external shocks and internal challenges that the economy has had to adjust to. There has been a gradual decline of the share of agriculture in overall GDP from 36.6% in the first decade after independence to about 22.2% in 2011. The share of manufacturing has only grown slowly and actually accounts for about 16.4% of GDP. The service sector accounts for 64.6% of GDP, with the key sub-sectors being transport and communication, wholesale and retail trade, and hotels and restaurants. Since 2000, Kenya's GDP growth has improved and remained strong. In 2011, real GDP grew by an estimated 5.7% due to improved performance across all the key sectors. Inflation has been more volatile, with 2011 inflation measured at 7.2%, up from 3.9% in 2010. The total population of Kenya was last reported over 40 million in 2010 (according to a World Bank report released in 2011) from 8.1 million in 1960. The vast majority of people (79% of total population) lives in rural areas and relies on agriculture for most of its income. The poverty rate is measured at about 48%.Kenya offers varied tourist attractions, comprising tropical beaches, abundant wildlife in natural habitats, scenic beauty and a geographically diverse landscape. The most popular tourist attractions in Kenya are the wildlife and the beaches. According to the World Travel and Tourism Council (WTTC) (2012), the direct contribution of Travel and Tourism to GDP was KES167.6 billion (5.7% of GDP) in 2011 and 13.7% at full impact level and is forecast

to rise by 4.3% in 2012. Travel and Tourism directly supported 313,500 jobs (4.8% of total employment) and 11.9% at full impact level. A focus on the sub-Saharan country shows that the travel and tourism sector contributed directly to about 2.6% of total GDP (USD33.5bn) and 2.4% of total employment (5,265,000 jobs) in 2011. International tourist arrivals generally doubled since 1990 and are still expected to grow steadily at least for the next decade. Most overseas visitors to Kenya come from Europe and America, with Europe accounting for over 70% of the country's visitors (Ministry of Tourism, 2012).

Tourism is a key part of the country's economic strategy. Tourism has been recognized as one of the sectors that will drive economic growth towards achievement of Vision 2030[3]. Key drivers in the tourism sector through which the government aims to achieve Vision 2030 comprise the following: repositioning of the Coast circuit; opening underutilized parks and providing niche products. The strategy aims at making Kenya one of the top 10 long haul tourist destinations, offering diverse and high end experiences by 2012 to a target of five million tourists. The first National Tourism Policy of Kenya was formulated under *Sessional paper No. 8 of 1969*, entitled *Tourism Development in Kenya*. That policy set growth targets and spelt out strategies on how the government and private sectors would develop tourism so that it becomes one of the Kenyan's leading economic activities. In 2002, the Ministry of Tourism and Wildlife initiated the process of developing a comprehensive tourism policy and legislation.

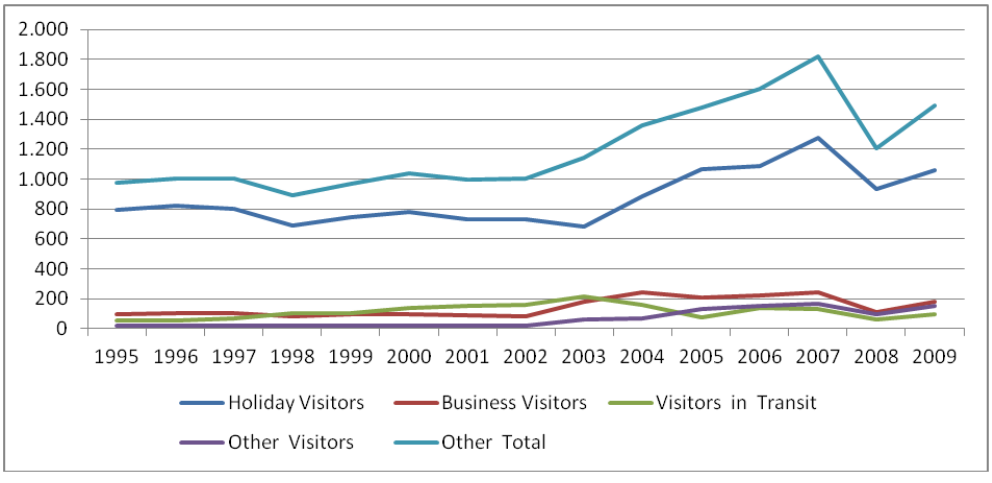

Figure 1: Tourists Arrivals (thousands)

Source: Kenya Tourism Board (http://www.tourism.go.ke/)

It should be noted that package holiday market now dominates demand. The number of tourist arrivals has increased in recent years as can be seen in Figure-1. Tourism arrivals peaked in 2007,

[3]Kenya Vision 2030 is the country's new development blueprint covering the period 2008 to 2030. It envisages that Kenya will become a globally competitive and prosperous middle-income country within the next two decades.

but dropped in 2008 to almost 33 % of the 2007 value as a result of post-election violence in December 2007. Through the 2000s, tourism arrivals grew by an average of 10% per annum.

THE ECONOMIC IMPACT OF TOURISM

Until recently, measurement of the economic impact of tourism has relied on input-output modeling. Input-output models can be used to assess the value added and inter-industries relationship attributable to tourism at the country level (Kweka *et al.* 2003; Archer, 1995; Archer and Fletcher, 1996; Heng and Low, 1990; Seow, 1981 and Khan *et al.*, 1990) and to examine the impact of tourism in a province and city setting (West, 1993; DBEDT, 2002; Frechtling and Horvath, 1999; Finn and Erdem, 1995). Table-1 reports the multiplier effects of selected applied I-O studies for developing countries.

Table 1: Selected applied I-O models for developing countries

Economy	Authors	Main Findings
Egypt	Tonamy and Swinscoe (2000)	Direct tourism jobs constitute 5.7% of national employment – and 12.6% if indirect and induced jobs are included. Tourism contributes over 10% to national GDP
Singapore	Heng and Low (1990)	The income impact of one Singapore dollar of tourist expenditure is estimated at S$0.77. Employment multipliers are relatively high (i.e. in 1986, 22 full time equivalent employees per million dollars of tourist expenditure).
Seychelles	Archer and Fletcher (1996)	Tourism expenditure Impacts vary by visitor country of origin so that higher spending tourists have a greater economic impact. Tourism contributes approximately 24% to GDP.

However, despite their general equilibrium structure, I-O models do not pay explicit attention to the effects of tourism on factor incomes or income distribution. Input-output models assume that wages and prices do not change regardless of the level of production. Thus, I-O analyses do not take account of resource constraints and crowding out effects. Due to their assumptions, I-O models may give misleading results. To address this shortcoming, computable general equilibrium (CGE) models have been widely used in recent years to estimate the economic effects of increases or decreases in tourism demand (Adams and Parmenter, 1995; Zhou *et al.*, 1997; Dwyer *et al.* 2000, 2003; Blake *et al.* 2003a, 2003b, 2006a, 2006b, 2008; Sugiyarto *et al.* 2003; Narayan, 2004; Madden and Thapa, 2000; Gooroochurn and Milner, 2005; Gooroochurn and Sinclair, 2005; Kweka, 2004; Polo and Valle, 2007, 2008; Wattanakuljarus and Coxhead, 2008). These models have proven to be an adequate tool for understanding the strengths, direction and channels of tourism's impact on a specific sector or the economy as a whole. Table-2 shows the key findings of selected empirical CGE analyses.

Table 2: Selected applied Tourism-CGE models for developing countries

Economy	Authors	Main Findings
Tanzania	Kweka (2004)	Tourism has a substantial positive impact on GDP, total welfare, exports and tax revenue. A 20% increase in tourism demand results in an increase in real GDP (at factor cost) of 0.1%. Urban areas will benefit more from tourism expansion than rural areas unless governments invest in improving infrastructure – under this scenario the distributional impact of tourism expansion disproportionally benefits the rural areas.
Indonesia	Sugiyarto *et al.* (2002)	Tourism growth amplifies the positive impacts of globalization on production and welfare. Globalization, i.e. a 20% reduction in the tariffs on imported commodities combined with a 20% reduction in indirect taxation levied on domestic commodities lead to an increase in demand by foreign tourists by 10%.
Mauritius	Gooroochurn and Milner (2005)	The tourism sectors are undertaxed. Taxing tourism-related sectors would generate an additional unit of tax revenue and increase social welfare in the process. The authors examine the effects of piecemeal, marginal reforms of the indirect taxes (production and sales tax) and, concluding that the additional welfare cost of raising extra revenues from an already existing tax while holding other taxes constant, is lower for sales tax simulations than for the production tax simulations, for all sectors.
Thailand	Wattanakuljarus and Coxhead (2008)	Tourism expansion generates foreign exchange and raises household incomes, but worsens their distribution. Tourism promotion is not a "pro-poor" strategy because tourism sectors are not especially labor-intensive, and their expansion brings about a real appreciation that undermines profitability and reduces employment in tradable sectors, notably agriculture, from which the poor derive a substantial fraction of their income.

Previous applications of CGE modeling to the Kenyan economy were not concerned with tourism. During the 1980s several authors used CGE models to study the impact of economic reforms on the distribution of income. The pioneers in this area in Kenya were Dervis *et al.,* (1982) and Gunning (1983). McMahon (1990) examined the effects of unilateral tariff reduction in a dual economy (Kenya) using a dynamic CGE model on income distribution, concluding that the trickle-down effects does not take effect since the poorer classes do not consume imported goods or use them in production.NjugunaKaringi and Siriwardana (2001, 2003) applied CGE modeling to analyze the effects of macroeconomic stabilization and structural adjustment policies implemented by Kenya in response to two major terms of trade shocks in the 1970s, namely, the oil price shock and the coffee export boom. They suggest that fiscal austerity through raising indirect taxes and trade liberalization supported by foreign aid inflows achieve the best overall outcomes. More recently, Balistreri *et al.* (2009) employed a 55 sector small open economy CGE model of the Kenyan economy to assess the impact of services liberalization on both domestic and multinational service providers. They concluded that reduction of the barriers against potential providers would improve the productivity of labor and capital and could provide very substantial gains to the Kenyan economy.

MODEL OVERVIEW

The model structure follows closely Robinson *et al.,* (1999). The model builds on that of Dervis *et al.* (1982), which involve specification of a CGE model in terms of non-linear algebraic equations and addressing them directly with numerical solution techniques. The model is neoclassical in structure. Its main features involve profit maximization by producers, utility maximization by households, mobility of labor, and competitive markets. It can be described as a static and single-country CGE model extended to incorporate international tourism. The model is disaggregated into two households (urban and rural), two factors (labor and capital), and eight activities and associated commodities.Cobb-Douglas functions are used for both producer technology and the utility functions from which household consumption demands are derived (see Appendix B). Exported and domestically sold commodities are assumed to be differentiated by market, with the relationship between them represented by a constant elasticity of transformation (CET) function. Price ratio and elasticities of transformation determined the level of output exported and sold domestically. Households and producers do not directly consume or use imported commodities but instead use a so-called "Armington's composite commodity", which comprises imports and the corresponding domestic commodities. The substitution between imports and domestic commodities is described by a CES function.

Income to enterprises comes from the share of distributed factor incomes accruing to enterprises and real transfer from the government. Their incomes are used for direct taxes, savings, and transfers to other institutions. As opposed to households, enterprises do not consume. The government is disaggregated into a core government account and different tax accounts, one for each tax type. The government collects taxes and receives transfers from other institutions. The government uses this income to purchase commodities for its consumption and for transfers to other institutions as well as savings. The demand for commodities by government for consumption is defined in terms of fixed proportions. Transfer payments between the rest of the world and domestic institutions are all fixed in foreign currency.The final institution in the model is the representative tourist. Total tourism demand for commodities is derived from the assumption that all tourists are homogeneous, whereby Kenya faces a downward-sloping demand curve for its tourism exports. There is a representative tourist accounting for the consumption of a certain quantity of a composite good and service at an aggregated price level (PQ_c). Analogous to household demand, tourism demand is obtained by maximizing the utility function of the representative tourist function to its budget constraint. A Cobb-Douglas demand function is used to give tourism exports. The demand function can be formulated as follows:

$$Ctou_c \cdot PQ_c = \beta tou_c \cdot Ytou \qquad (1)$$

Where$Ctou_C$is the quantity of commodity C consumed by tourist, βtou_c the share of commodity C in tourism consumption and Ytou the total expenditure (revenue) of inbound tourist, which is defined as follows:

$$Ytou = \psi.Vtou \tag{2}$$

Where ψ represents the per capita consumption of tourist ($\psi = 1$ in the base year) and Vtou the total number of tourist arrival. The household welfare change is captured through the Hicksian Equivalent Variation (EV), which is one measure of welfare commonly used in the literature. Using changes in utility level evaluated in monetary terms (i.e. the minimum expenditure level), we compute the change needed to achieve new equilibrium utilities. The welfare change indicator (EV) is defined as the amount of money necessary to get the new level of utility. The expression of equivalent variation is given below:

$$EV_h = ep(P^0, U_h^1) - ep(P^0, U_h^0) \tag{3}$$

Where the expenditure function $ep(P,U)$ indicates the minimum expenditure level P*Q(H) that satisfies the given utility U under the price vector P.

$$EV_h = \frac{U_h^1 - U_h^0}{U_h^0} Y_h^0 \tag{4}$$

where U_h^0, U_h^1 and Y_h^0 are the benchmark utility, the new level utility and the benchmark income level of household group h, respectively. From the equivalent variation equation, it is clear that tourism expansion affects household welfare through the effects on prices and consumption.

DATA

The model follows the SAM (Social Accounting Matrix) disaggregation of factors, activities, commodities and institutions. The database of the model is the Kenyan SAM for 2003, jointly developed by the Kenya Institute for Public Policy Research and Analysis (KIPPRA) and the International Food Policy Research Institute (IFPRI). The structure of Kenyan Macro SAM is given in Table-1.A(see Appendix). The original micro SAM is disaggregated across 50 sectors (22 agriculture, 18 industry and 10 services). However, for this analysis the original SAM has been adjusted in several ways (i.e. 1 agriculture, 1 manufacture and 6 services). The presence of tourists in the economy necessitates an additional demand component in the SAM. No detailed consumption pattern of tourists in Kenya is available. The only survey available is from the World

Bank (2010). According to WTTC (2011) foreign visitor exports as a percentage of total exports accounted for about 17% of total exports. The expenditure categories are quite aggregated and they are illustrated in Table-3. Besides being much aggregated, the expenditure categories do not compare exactly with the I-O table of the sectors classification and consequently some amendment is needed. "Accommodation", "inland transport" and "excursions and park fees" are quite straightforward and are allocated to the hotel and restaurants, transport and communication and the other services sector respectively. "Food and beverage", "out-of-pocket expenditure" and "miscellaneous" are quite problematic. The latter is so because it is undefined. "Food and beverages" can actually remain in hotels and restaurants, other manufacturing or in wholesale and retail trade. Part of "out-of-pocket expenditure" will go to the wholesale and retail trade sector but the rest can go to any other sectors. "Food and beverage" is thus allocated to wholesale and retail trade and other manufacturing.

Table 3: Expenditures of inbound tourists in Kenya, 2007

Expenditure Categories	Wildlife Safari		Premium Wildlife Safari		Beach (All Inclusive)	
	$/day	% of Total	$/day	% of Total	$/day	% of Total
Accommodation	33,35	18,1	168,3	46,6	36,85	20,3
Food/beverage	36,65	19,9	83,44	23,1	18,81	10,4
Excursions and park fees	40,71	22,1	22,98	6,4	5	2,8
Inland transport	50,36	27,4	51,62	14,3	13,35	7,4
Out-of-pocket expenditure	16	8,7	35	9,7	41,43	22,9
Miscellaneous	6,84	3,70	0,00	0,00	65,83	36,30
Total expenditure/bed night	183,91	100	361,35	100	181,27	100
Average length of stay (nights)	3		7		7-9	

Source: World Bank (2010)

Five sectors are identified as related to tourism as follows: Hotel and restaurant (44%), transport and communication (2%), retail and wholesale trade (2%), manufacturing (0.2%), and other services (1%). Their ratio, measured as the proportion of inbound tourism demand out of the total, is given in brackets. These calculations are based on statistics provided by the Kenya National Bureau of Statistics[4], which estimates tourism revenues at 2% of GDP at market prices for the year 2003 (KSH25.8bn). According to World Bank (2010) studies, the total in-country expenditure of, for example beach package in Kenya represents 51.7% of total expenditure; 36.7% of which constitute public sector charges.

[44]http://www.tourism.go.ke/ministry.nsf/doc/Facts

SIMULATION RESULTS

We simulate a 10% increase in tourism demand by foreign tourist. The simulation quantifies changes in production in all industries, changes in employment, earnings, prices and all other variables in the model. Sectors of the economy that are closely related to tourism would increase output as the result of the increase in expenditure but there would be some contraction of other sectors. Table-4 shows the macroeconomic effects of a 10% increase in all tourism demand. A 10% increase in tourism demand is shown to increase GDP by KSH117,713 million. The GDP increase is equivalent to 0.12% of GDP. In addition to increasing GDP, the increase in tourism demand is shown to increase government revenues by 50 million KSH. There is a 0.027 % appreciation of the real exchange rate, and slight increases in labor demand. An economic rationale for promoting tourism by developing countries is the improvement of the trade balance by increasing export earnings. The simulated 10% increase in tourist expenditure results in an increase in total exports (0.008%) which outweighs the increase in total import (0.001%), resulting in an improvement in balance payment.

Table 4: Macroeconomic effects of simulations

		Effects of additional tourism growth	
	Base year value	**Value**	**Percentage change**
GDP at market prices (from spending side) (Millions KSH)	949418.343	1067131.343	0.124
Private Consumption (Millions KSH)	632831.000	748840.000	0.24
Investment (Millions KSH)	172670	172728.000	0.00
Government Consumption (Millions KSH)	234990.000	235030.000	0.00
Total Export (Millions KSH)	235449.000	237322.000	0.08
Total Import (Millions KSH)	-342006.000	-342273.000	0.01
Domestic Output (Millions KSH)	2002514.320	2002179.74	0.26
Labor Demand (Millions KSH)	456820.792	457265.691	0.47
Exchange Rate (Index)	1.000	0.973	-0.27

The expansion of tourism is projected to have implications on other industries. Table-5 contains output projections for 8 sectors aggregated from the 50 sectors distinguished in the 2003 Kenyan SAM database. The results demonstrate that, at the sectoral level, there will be losers as well as gainers from an expansion in inbound tourism. The industry level expansion patterns in Table-5 show the largest expansion in the sector that sells a larger proportion of their output to foreign tourists, that is hotel and restaurant services. The sector that contracts the most is the manufacturing

sector. Particularly poor growth prospects are projected for the construction sector and other services.

Table 5: Sectoral effects of simulations - Domestic output (Millions KSH)

		Effects of additional tourism growth	
	Base year value	**Value**	**Percentage change**
Agriculture	465670.000	466120.000	0.01
Manufacture	452320.000	450560.000	-0.04
Public Utilities	33335.083	33316.919	-0.01
Construction	161670.000	161720.000	0.00
Wholesale and Retail Trade	134860.000	134930.000	0.01
Hotel and Restaurant Service	29969.237	30812.820	0.28
Transport and Communication Services	208130.000	208290.000	0.01
Other Services	516560.000	516430.000	-0.00

Table-6 shows the effects that tourism demand shock has on labor demand. The results indicate that the effects of increasing inbound tourism on employment closely match with the effects on domestic output. That is, the industries with large domestic output effects will generate large labor demand effects. In the simulation results of this study, the largest effects are on the restaurant and hotel services sector. Effects on the restaurant and hotel services sector trigger an increase in domestic output of about 0.03% and an increase in the labor demand of about 0.05%.

Table 6: Sectoral effects of simulations - Labor demand

		Effects of additional tourism growth	
	Base year value	**Value**	**Percentage change**
Agriculture	172310.000	172910.000	0.03
Manufacture	44903.761	44463.299	-0.10
Public Utilities	7972.973	7960.104	-0.02
Construction	9167.519	9183.153	0.02
Wholesale and Retail Trade	17334.885	17364.311	0.02
Hotel and Restaurant Services	5275.675	5539.298	0.50
Transport and Communication Services	41925.979	41995.526	0.02
Other Services	157930.000	157850.000	-0.01

As expected, a 10% increase in tourist expenditure impacts on welfare and domestic consumption output. The simulated positive tourism shock results in a 0.3% increase in rural household consumption and in a 0.02% increase in welfare (Table-7). Urban household's consumption and welfare on the contrary drop by 0.05% and 0.06 respectively. Private consumption increases by 0.18%. Yet the rural household groups are the main beneficiaries of an international tourism increase. As can be seen from Table-6, a 10% increase in tourism results in an increase in the domestic consumption of agricultural commodities (0.285%), a decrease in the domestic consumption of manufacture and service products of 0.005% and 0.03% respectively. From the previous, it can be concluded that tourism growth in Kenya is pro-agriculture.

Table 7: Results in % change in welfare and household consumption

Economic indicator	Percentage change from benchmark
Welfare (EV)	
- Rural Household	0.02
- Urban Household	-0.06
- Net effect	-0.04
Consumption	
- Rural Household	0.3
o Agriculture	0.29
o Manufacture	0.001
o Public Utilities	0.002
o Wholesale and Retail Trade	0.002
o Hotel and Restaurant Service	-0.001
o Transport and Communication Services	0.001
o Other Services	0.002
- Urban Household	-0.05
o Agriculture	-0.005
o Manufacture	-0.006
o Public Utilities	-0.004
o Wholesale and Retail Trade	-0.006
o Hotel and Restaurant Service	-0.02
o Transport and Communication Services	-0.006
o Other Services	-0.005

Price effects are of particular interest in the CGE model. The 10% increase in foreign demand leads to increases in prices, on average, just under 0.2%, which reduces the growth in tourism consumption to around 0.04%. Increasing economic activity created by tourism expansion increases real wage rates by 0.8%.

SENSITITY ANALYSIS

The elasticity parameters for this study have been obtained from existing studies on Kenya, values assumed in CGE models for other developing countries and guesstimates. Considering the uncertainties associated with the elasticity parameter of Kenya, sensitivity analysis is used to demonstrate the robustness of simulation results by varying parameters that may significantly affect the results. By increasing or decreasing the value of the Armington constant elasticity of substitution (CES) and constant elasticity of transformation (CET), we examine the range over which output changes. We define a higher-elasticity case with 20% higher values and a lower-elasticity case with 20% lower value for those parameters. To evaluate the robustness of the simulation results, we set the following two criteria: (a) whether the signs of the sectoral output changes are unchanged in all cases and (b) whether the ordering of the output changes among sectors is maintained in all cases.The results of the sensitivity analysis shown in Table-7 indicate that the simulation results satisfy criterion (b) but not criterion (a). More precisely, while the output of manufacture would always be affected in the same direction in the different assumed elasticity values, the output of agriculture would increase in the base-line and higher-elasticity cases but would decrease in the lower-elasticity case.

Table 7: Impact of different elasticity values on sectoral output

Output of:	Elasticity of substitution/transformation		
	Baseline case	Higher-elasticity case	Lower-elasticity case
Agriculture	0.01	0.02	0.00
Manufacture	-0.04	-0.04	-0.03
Public Utilities	-0.01	0.00	0.00
Construction	0.00	0.00	0.00
Wholesale and Retail Trade	0.01	0.00	0.00
Hotel and Restaurant Services	0.28	0.32	0.33
Transport and Communication Services	0.01	0.01	0.00
Other Services	-0.00	-0.00	-0.00

Unit: changes from the base run in %

CONCLUING REMARKS AND RECOMMENDATIONS

In this study we have applied the CGE model to examine the implications on shocks in tourism expenditures on outputs, income distribution and national welfare. In doing so, this study analyses the supply side of the tourism sector in Kenya and reviews the literature on tourism using I-O and CGE with a special focus on developing countries. The analysis indicates that Kenya is endowed with tourism-attraction potentials. To date, most studies of the economic impact of tourism have relied on input-output analyses. These studies found that tourism expansion has the potential to contribute to increased economic growth of developing countries by generating additional

employment for the poor or increasing tax collection. However, CGE models are now increasingly being used in tourism economics analysis and those applied to developing countries found that tourism expansion may have an economic cost. The CGE models consist of a set of equations that characterize the production, consumption, trade and government activities of the economy. The CGE models enjoy an advantage over I-O models in that they take into account the interrelationships between tourism, other sectors in the economy and consumers, and have the ability of incorporating endogenous price determination mechanisms.

Using CGE simulations we analyzed the effects of an increase of 10% in foreign tourist arrivals. The results show that, overall, the effects of tourism expansion are beneficial but entail costs for other sectors and for the urban households group. The analysis has shown that a small proportion of the effects of an increase in tourism demand would be accompanied by an increase in prices. Rural households, which constitute 77.8 % of the total population (2010) of which 49% are considered poor, will benefit most from tourism growth. Inbound tourism increases the output of agricultural products, decreases its prices and increases employment. Agriculture is a major sector from which rural households derive a substantial fraction of their income (36%). Moreover, these groups spend a large proportion (53%) of their income on agricultural products. These results indicate a strong linkage between the agriculture industry and the tourism industry. This finding is in agreement with Summary's (1987) findings which, comparing the Kenyan tourism industry to other sectors of the economy, established that forward linkages were high in agriculture and that the import content of the tourism industry was low.

One of the more significant findings to emerge from this study is that the net benefit to Kenyan from additional tourism is ambiguous. These findings seem to be consistent with other researches. These authors found that in destinations where tourism is relatively less labor intensive than agriculture and whose tourism products are mainly intensive user of natural environment (e.g. Mauritius, South Africa and Zimbabwe), inbound tourism growth will lead to an ambiguous net benefit on national welfare. Of course, African tourism products (large scale resorts, national parks, safaris, golf tourism, adventure tourism, etc.) are mainly land-intensive. However, some findings of this study do not support some previous researches which highlighted that the tourism output expands at the expense of the agricultural output. It is difficult to explain this result, but it might be related to the highly aggregated nature of the agricultural sector in the model or the choice of functional forms and parameters.

In terms of policy implications, one the main issues that emerges from these findings is that when deciding on tourism development strategy, policy makers should give due consideration to the overall economic development. Moreover, they should paid attention to the whole range of distortions that affect the ongoing development of the tourism sector. With regard to the question whether inbound tourism growth will advance or retard the broader development goal of poverty

alleviation, the findings show that unless governments implement complementary strategies aiming at mitigating the costs of tourism expansion, economic development and poverty alleviation will not be attained.

This research is part of an ongoing research designed to develop quantitative information on the contribution of tourism in Kenya using CGE models. More research on this topic needs to be undertaken before the association between tourism growth and welfare is more clearly understood. One of the weaknesses of this study is the choice of the functional forms, which assume a Cobb-Douglas production and utility function. Alternative functional forms such as a CES production function or a Stone-Geary utility function (generally preferable since it allows for subsistence consumption expenditures) may be preferred. Another weakness of this study is the high level of aggregation of data concerning the agriculture and manufacture sectors, the factor markets and household categories as well as the tourism industry. Detailed data on tourism expenditures are needed to improve the understanding of the impact of tourism shocks on different sectors and institutions. Furthermore, the results would be more useful to tourism policy makers if these parameter values were empirically estimated. This is an important issue for future research.

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REFERENCES

Adams, P. D. and B. R. Parmenter (1995). An applied general equilibrium analysis of the economic effects of tourism in a quite small, quite open economy. *Applied Economics*, Vol. 27, pp. 985-994.

Archer, B. (1995). Importance of Tourism for the Economy of Bermuda', Annals of Tourism Research Vol. 22, pp. 918-930.

Archer, B. H. and J. Fletcher (1996). The Economic Impact of Tourism in the Seychelles. *Annals of Tourism Research*, Vol. 23, No. 1, pp. 32-47.

Balistreri, E., T. F. Rutherford and D. Tarr (2009). Modeling services liberalization: The case of Kenya. *Economic Modelling*, Vol. 26, No. 3, pp. 668–679.

Blake, A., Sinclair M. T. and Sugiyarto (2003a). Quantifying the impact of foot and mouth disease on tourism and the UK economy. *Tourism Economics*, Vol. 9, No. 4, pp. 449-465.

Blake, A. and M. T. Sinclair (2003b). Tourism Crisis Management: US Response to September 11. *Annals of Tourism Research*, Vol. 30, No. 4, pp. 813–832.

Blake, A., R. Durbarry, J., L. Eugenio-Martin., N. Gooroochurn, B., Hay, J. and J. Lennon, (2006a). Integrating forecasting and CGE models: The case of tourism in Scotland. *Tourism Management*, Vol. 27, pp. 292-305.

Blake, A., J. Gillham and M. T. Sinclair (2006b). CGE tourism analysis and policy modeling. In L. Dwyer and P. Forsyth (Eds) International Handbook on the Economics of Tourism, Cheltenham, Edward Elgar Publishing.

Blake, A., J. S. Arbache., M. T. Sinclair and V. Teles (2008). Tourism and Poverty Relief. *Annals of Tourism Research*, Vol. 35, No. 1, pp. 107-126.

Clemente, P. A and E. Valle (2007). An Assessment of the Weight of Tourism in the Balearic Islands', CRE Working Papers (Documents de treballdel CRE), Centre de Recerca Econòmica (UIB ·"Sa Nostra").

Dbedt(2002)'The Hawaii Input-Output Study: 1997 Benchmark Report', Honolulu: Research and Economic Analysis Division, State of Hawaii.

Dervis K., De Melo, J. and S. Robinson (1982). General equilibrium models for development policy. Cambridge, MA: Cambridge University Press.

Dwyer, L., P. Forsyth, J. Madden and R. Spurr (2000). Economic Impacts of Inbound Tourism under Different Assumptions Regarding the Macroeconomy. *Current Issues in Tourism*, Vol. 3, No. 4, pp. 325-363.

Dwyer, L., P. Forsyth, R. Spurr and T. Ho (2003). Contribution of tourism by origin market to a state economy: A multi-regional general equilibrium analysis. *Tourism Economics*, Vol. 9, No. 2, pp. 117–132.

Finn, A. and T. Erdem (1995). The economic impact in the case of West Edmonton Mall. *Tourism Management*, Vol. 16, No. 5, pp. 367-373.

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

Gooroochurn, N. and M. T. Sinclair (2005). Economics of Tourism Taxation: Evidence from Mauritius. *Annals of Tourism Research*, Vol. 32, No. 2, pp. 478-498.

Gooroochurn, N. and C. Milner (2005). Assessing Indirect Tax Reform in a Tourism-Dependent Developing Country. *World Development*, Vol. 33, No. 7, pp. 1183–1200.

Gunning, W. J. (1983). Income Distribution and Growth: A Simulation Model for Kenya. In D. G. Greene (principal author), Kenya: Growth and Structural Change, 2 vols. Washington, D. C: World Bank, pp. 487-621.

Heng, T. M. and L. Low (1990). Economic Impact of Tourism in Singapore. *Annals of Tourism Research*, Vol. 17, pp. 246-269.

Karingi, S. N. and M. Siriwardana (2001). Structural Adjustment Policies and the Kenyan Economy: A CGE Model Analysis. *African Development Review*, Vol. 13, pp. 24-45.

Karingi, S. N. and M. Siriwardana (2003). A CGE Model Analysis of Effects of Adjustment to Terms of Trade Shocks on Agriculture and Income Distribution In Kenya. *Journal of Developing Areas*, Vol. 37, pp. 87-108.

Khan, H., C. F. Sengand, and W. K. Cheong (1990). Tourism Multiplier Effects on Singapore. *Annals of Tourism Research*, Vol. 17, pp. 408-418.

Kweka, J., O. Morrissey and A. Blake (2003). The economic Potential of Tourism is Tanzania. *Journal of International Development*, Vol. 15, pp. 335–351

Kweka, J. (2004). Tourism and the Economy of Tanzania: A CGE Analysis. Retrieved March 31, 2012, *http://www.csae.ox.ac.uk/conferences/2004-GPRAHDIA/papers/1f-Kweka-CSAE2004.pdf*

McMahon, G. (1990). Tariff policy, income distribution, and long-run structural adjustment in a dual economy: A numerical analysis. *Journal of Public Economics*, Vol. 42, No. 1, pp. 105–123.

Madden, J., and P. Thapa (2000). The Contribution of Tourism to the New South Wales Economy. Centre for Regional Economic Analysis, University of Tasmania.

Ministry of Tourism (Kenya), (2012). Tourism performance overview. in websites.

Narayan, P. (2004). Economic Impact of Tourism on Fiji's Economy: Empirical Evidence from the Computable General Equilibrium Model. *Tourism Economics*, Vol. 10, No. 4, pp. 419-433.

Polo, C. and E. Valle (2007). A General Equilibrium Assessment of the Impact of a Fall in Tourism Under Alternative Closure Rules: the Case of the Balearic Islands. *International Regional Science Review*, Vol. 31, No. 1, pp. 3-34.

Robinson, S., A. Y. Naude, R. H. Ojeda, J. D. Lewis and S. Devarajan (1999). From stylized models: Building Multisector CGE Models for Policy Analysis. *North American Journal of Economics and Finance*, No. 10, pp. 5-38.

Sahli, M. and J. J. Nowak (2007). Does Inbound Tourism Benefit Developing Countries? A Trade Theoretic Approach. *Journal of Travel Research*, Vol. 45, pp. 426-434.

Seow, G. (1981). Economic Impact Significance of Tourism in Singapore. S*ingapore Economic Review*, Vol. 26, No. 2, pp. 64-79.

Sugiyarto, G., A. Blake, and, M.T. Sinclair (2002). Tourism and Globalization: Economic Impact in Indonesia. *Annals of Tourism Research*, Vol. 30, No. 3, pp. 683-701.

Summary, R. M. (1987). Tourism's contribution to the economy of Kenya. *Annals of Tourism Research*, Vol. 14, No. 4, pp. 531–540.

Tonamy, S. and A. Swinscoe (2000) 'The Economic Impact of Tourism in Egypt', Working Paper No.40.

West, G. R. (1993) 'Economic Significance of Tourism in Queensland', Annals of Tourism Research, Vol.20,pp.490-504.

Wattanakuljarus, A. and Coxhead, I. (2008). Is tourism-based development good for the poor?: A general equilibrium analysis for Thailand. *Journal of Policy Modeling*, Vol. 30, No. 6, pp. 929–955.

World Bank (2010). Kenya's Tourism: Polishing the Jewel. Retrieved March 31, 2012.

World Tourism Organisation (2001). The Least Developed Countries and International Tourism. in Tourism in the Least Developed Countries, edited by the World Tourism Organization. Madrid: World Tourism Organization.

World Travel and Travel Council (2011). Kenya Economic Impact Report. Retrieved March 28, 2012, *http://www.wttc.org/site_media/uploads/downloads/kenya2012_2.pdf*.

Zhou, D., J. F. Yanagida, U., Chakravorty and L. Ping Sun (1997). Estimating economic impacts from tourism. *Annals of Tourism Research*, Vol. 24, No. 1, pp. 76-89.

Appendix A: SAM Kenya

Table A. 1: 2003 Kenya Macro Social Accounting Matrix (Millions of Kenyan Shillings)

	Activities	Commo-dities	Labor	Capital	Enter-prises	House-holds	Taxes	Govern-ment	Invest-ment	Stocks	Rest of World	Total
Activities		1.793.765				92.484						1.886.249
Commo-dities	909.674	97.623				756.000		199.034	179.109	17.444	281.116	2.440.000
Labor	430.332											430.332
Capital	546.242											499.236
Enterpri-ses				494.960				43.575			4.938	543.473
House-holds			430.332	47.007	289.280			11.829			101.111	879.558
Taxes		131.721			35.809	33.613						201.143
Govern-ment				4.276	7.264		201.143				5.677	218.359
Savings					204.06	-2.539		-36.255			31.279	196.554
Stocks									17.444			17.444
Rest of World		416.892			7.052			176				424.120
Total	1.886.249	2.440.000	430.332	499.236	543.47	879.558	201.143	218.359	196.554	17.444	424.120	23.643.292

Appendix B: The equations of the models

Indices

$a \in A$	activities
$c \in C$	commodities
$c \in CE\ (\subset C)$	exported commodities
$c \in CNE\ (\subset C)$	commodities not in CE
$c \in CM\ (\subset C)$	imported commodities
$C \in CNM\ (\subset C)$	non imported commodities
$f \in F$	factors
$i \in I$	institutions (domestic, tourist and rest of the world)

Table B. 1: PARAMETERS

ad_a	production function efficiency parameter
aq_a	shift parameter for composite supply (Armington) function
at_c	shift parameter for output transformation (CET) function
cpi	consumer price index
$cwts_c$	weight of commodity *c* in the *CPI*
ica_{ca}	quantity of *c* as intermediate input per unit of activity *a*
$inta_a$	quantity of aggregate intermediate input per activity unit
iva_a	quantity of value-added per activity unit
mps_h	share of disposable household income to savings
pwe_c	export price (foreign currency)
pwm_c	import price (foreign currency)
$qdtst_c$	quantity of stock change
QG_C	base-year quantity of government demand
qbarinv(C)	exogenous (unscaled) investment demand
$\overline{qinv_c}$	base-year quantity of private investment demand
sE	enterprise saving rate
$shry_{if}$	share for domestic institution *i*in income of factor *f*
te_c	exporttax rate
tm_c	import tariff rate
tq_c	rate of sales tax
tr_{ii}	transfer from institution i'to institution *i*
ty_i	rate of nongovernmental institution income tax
Vtou	number of tourist
α_{fa}	value-added share for factor f in activity a
β_{ch}	share of commodity c in the consumption of household h
βtou_c	share of commodity c in tourism consumption
δ_c^q	share parameter for composite commodity supply (Armington) function
δ_c^t	share parameter for output transformation (CET) function
θ_{ac}	yield of commodity c per unit of activity a

ρ_c^q	Armington function exponent $\left(-1 \prec \rho_c^q \prec \infty\right)$
ρ_c^t	CET function exponent $\left(1 \prec \rho_c^q \prec \infty\right)$
ψ	per capita consumption of tourist
σ_c^q	elasticity of substitution for composite supply (Armington) function
σ_c^t	elasticity of transformation for output transformation (CET) function

Table B. 2: VARIABLES

Ctou_c	inbound tourist's consumption by sector
EG	government expenditures
EXR	exchange rate (*LCU* per unit of *FCU*)
FSAV	foreign savings
GSAV	government savings
IADJ	investment adjustment factor
PA_a	activity price
PD_c	domestic price of domestic output
PE_c	export price (domestic currency)
PM_c	import price (domestic currency)
PQ_c	composite commodity price
PVA_a	value-added price (factor income per unit of activity)
PX_c	aggregate producer price for commodity
QA_a	quantity (level) of activity
QD_c	quantity sold domestically of domestic output
QE_c	quantity of exports

QF_{fa}	quantity demanded of factor *f* from activity *a*
QFS_{f}	supply of factor f
QH_{ch}	quantity consumed of commodity c by household *h*
$QINT_{ca}$	quantity of commodity *c* as intermediate input to activity *a*
$QINV_{c}$	quantity of investment demand for commodity
QM_{c}	quantity of imports of commodity
QQ_{c}	quantity of goods supplied to domestic market (composite supply)
QX_{c}	aggregated marketed quantity of domestic output of commodity
Walras	dummy variable (zero at equilibrium)
WF_{f}	average price of factor *f*
$WFDIST_{f}$	wage distortion factor for factor f in activity *a*
YE	enterprise income
YF_{if}	transfer of income to institution I from factor *f*
YG	government revenue
YI_{i}	income of domestic nongovernment institution
Ytou	total expenditure of inbound tourist
UU	utility (fictitious)

Table B. 3: EQUATIONS

Price Block			
Import price	$PM_c = pwm_c(1+tm_c)\cdot EXR$	$c \in CM$	(1)
Export price	$PE_c = pwe_c(1-te_c)\cdot EXR$	$c \in CM$	(2)
Absorption	$PQ_c \cdot QQ_c = PD_c \cdot QD_c + PM_c \cdot QM_c \cdot (1+tq_c)$	$c \in (CD \cup CM)$	(3)
Market output value	$PX_c \cdot QX_c = PD_c \cdot QD_c + PE_c \cdot QE_c$	$c \in CX$	(4)
Activity price	$PA_a = \sum_{c \in C} PX_c \cdot \theta_{ac}$	$a \in A$	(5)

Value-added price $$PVA_a = PA_a - \sum_{c \in C} PQ_c \cdot ica_{ca} \quad a \in A \qquad (6)$$

Production and Commodity Block

C-D technology: Activity production function $$QA_a = ad_a \cdot \prod_{f \in F} QF_{fa}^{\alpha_{fa}} \quad a \in A \qquad (7)$$

Factor demand $$WF_f \cdot WFDIST_{fa} = \frac{\alpha_{fa} \cdot PVA_a \cdot QA_a}{QF_{fa}} \quad a \in A \text{ and } f \in F \qquad (8)$$

Intermediate demand $$QINT_{ca} = ica_{ca} \cdot QA_a \quad a \in A \text{ and } c \in C \qquad (9)$$

Output Function $$QX_c = \sum_{a \in A} \theta_{ac} \cdot QA_a \quad c \in C \qquad (10)$$

Composite supply (Armington) function

$$QQ_c = \alpha_c^q \cdot \left(\delta_c^q \cdot QM_c^{-\rho_c^q} - \left(1-\delta_c^q\right) \cdot QD_c^{-\rho_c^q}\right)^{-\frac{1}{\rho_c^q}} \quad c \in (CM \cap CD) \qquad (11)$$

Import-domestic demand ratio $$\frac{QM_c}{QD_c} = \left(\frac{PD_c}{PM_c} \cdot \frac{\delta_c^q}{1-\delta_c^q}\right)^{\frac{1}{1+\rho_c^q}} \quad c \in (CM \cap CD) \qquad (12)$$

Composite supply for non-imported outputs imports $$QQ_c = QD_c \quad c \in CNM \qquad (13)$$

Output transformation (CET) function

$$QX_c = at_c \cdot \left(\delta_c^t \cdot QE_c^{\rho_c^t} + \left(1-\delta_c^t\right) \cdot QD_c^{\rho_c^t}\right)^{\frac{1}{\rho_c^t}} \quad c \in CE \qquad (14)$$

Export-domestic supply ratio

$$\frac{QE_c}{QD_c} = \left(\frac{PE_c}{PD_c} \cdot \frac{1-\delta_c^t}{\delta_c^t}\right)^{\frac{1}{\rho_c^t - 1}} \quad c \in CE \qquad (15)$$

Output Transformation for nonexported Commodities $$QX_c = QD_c \quad c \in CNE \qquad (16)$$

Institution Block

Factor income $$YF_{if} = shry_{if} \cdot \sum_{a \in A} WF_f \cdot WFDIST_{fa} \cdot QF_{fa} \quad i \in I \text{ and } f \in F \qquad (17)$$

Household consumption demand for marketed commodities

$$PQ_c \cdot QH_{ch} = \beta_{ch} \cdot \left(1 - mps_h\right) + \left(1 - t_y\right) \cdot YH_h \quad c \in C \text{ and } h \in H \qquad (18)$$

Investment demand $$QINV_c = \overline{IADJ} \cdot \overline{qinv}_c \quad c \in C \qquad (19)$$

Government consumption demand $$QG_c = \overline{GADJ} \cdot \overline{qg_c} \quad c \in C \qquad (20)$$

Government revenue

$$YG = \sum_{i \in I} ty_i \cdot YI_i + EXR \cdot tr_{gov,row} + \sum_{c \in C} tq_c \cdot PQ_c \cdot QQ_c + shry_{gov,f} + tr_{gov,ent} + \sum_{c \in CM} tm_c \cdot pwm_c \cdot QM_c \cdot EXR + \sum_{c \in CE} te_c \cdot pwe_c \cdot QE_c \cdot EXR \quad (21)$$

Government expenditures

$$EG = \sum_{c \in C} PQ_c \cdot QG_c + \sum_{i \in I} tr_{i,gov} \quad (22)$$

Tourism demand

$$Ctou_c \cdot PQ_c = \beta tou_c \cdot Ytou \quad (23)$$

Tourist Revenue (expenditure)

$$Ytou = \psi \cdot Vtou \quad (24)$$

Enterprise revenue

$$YE = \sum_{i \in I} tr_{ent,i} + shry_{ent,cap} \quad (25)$$

Objective function

$$UU = -sqr(walras) \quad (26)$$

System Constraint Block

Factor market

$$\sum_{a \in A} QF_{fa} = QFS_f \qquad f \in F \quad (27)$$

Composite commodity markets

$$QQ_c = \sum_{a \in A} QINT_{ca} + \sum_{h \in H} QH_{ch} + QG_c + QINV_c + qdst_c + CTOU_c \qquad c \in C \quad (28)$$

Current account balance for rest of the world (in foreign currency)

$$\sum_{c \in CM} pwm_c \cdot QM_c + \sum_{i \in I} tr_{row,i} = \sum_{c \in CE} pwe_c \cdot QE_c + \sum_{i \in I} tr_{i,row} + \sum_{c \in C} PQ_c / EXR \cdot Ctou_c + FSAV \quad (29)$$

Savings-Investment Balance

$$\sum_{i \in I} MPS_i \cdot (1 - ty_i) \cdot YI_i + (YG - EG) + EXR \cdot FSAV = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c + WALRAS \quad (30)$$

Price Normalization

$$\overline{CPI} = \sum_{c \in C} PQ_c \cdot cwts_c \quad (31)$$