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Tourism Contribution to Poverty Alleviation in Kenya: A Dynamic Computable General Equilibrium Analysis

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Abstract

The aim of this article is to investigate the claim that tourism development can be the engine for poverty reduction in Kenya using a dynamic, microsimulation computable general equilibrium model. The article improves on the common practice in the literature by using the more comprehensive Foster-Greer-Thorbecke (FGT) index to measure poverty instead of headcount ratios only. Simulations results from previous studies confirm that expansion of the tourism industry will benefit different sectors unevenly and will only marginally improve poverty headcount. This is mainly due to the contraction of the agricultural sector caused the appreciation of the real exchange rates. This article demonstrates that the effect on poverty gap and poverty severity is, nevertheless, significant for both rural and urban areas with higher impact in the urban areas. Tourism expansion enables poorer households to move closer to the poverty line. It is concluded that the tourism industry is pro-poor.

Keywords

Kenya, tourism development, poverty, dynamic computable general equilibrium, CGE, microsimulation, Foster-Greer-Thorbecke Index

Introduction

Nobel Prize laureate Amartya Sen's definition of poverty moves the concept from merely "lowness of income" to "the deprivation of basic capabilities" (Sen 2001, 87). He proposes that inadequate income is a "strong predisposing condition for an impoverished life," and lack of capabilities often resulting from lack of income is the underlying cause of poverty. By redefining poverty, Sen puts people at the heart of development. He links capability with freedom of choice and access to opportunities that empowers individuals, giving them the ability to choose the type of life that they have "reason to value." Hence, according to Sen, any policy aiming at achieving poverty reduction needs to address the issue of capability deprivation rather than merely targeting the level of household income.

On the other hand, Croes and Rivera (2015), who take a taking a purely economic perspective, postulate that poverty is a form of underutilization of productive resources. It represents the underdevelopment of the pool of skills and reduces the productive capacity of a nation. They argue that the poor should be helped in order to expand the wealth-creating capacity of nations and raise the standard of living and quality of life for the whole country. In other words, "the poor should be helped out of self-interest" (Croes and Rivera 2015, p. xvii). The authors propose that economic growth needs to be, a priori, inclusive and the benefits need to accrue to the poor for this to be achievable.

The Millennium Development Goals (MDGs) advocate economic development to reduce extreme poverty by tackling the problem of capability deprivation through better access to education, health, and better opportunities for all (UNWTO 2005). It has been acknowledged that tourism will play an important role in the achievement of MDGs. However, whether resources allocated to the tourism industry in fact lead to pro-poor development is an empirical question. Mitchell and Ashley (2010) provide some evidence supporting this claim. They state that in most destinations 10% to 30% of in-country tourist spending accrues to poor people. This is facilitated by the economic, political, and

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cultural context as well as the other factors pertaining to the implementation of tourism development strategies. On the other hand, Hall (2007), Scheyvens (2007), and Schilcher (2007) argue that tourism is not necessarily pro-poor. Croes and Rivera (2015) state that while the poor may benefit from tourism-led economic growth by accessing employment opportunities, in times of economic slowdown they tend to suffer the most and in periods of economic growth they benefit the least.

The literature on pro-poor tourism continues to grow as more research focus on individual pro-poor tourism projects at destinations and examine their outcomes. However, limited evidence is available on the relationship between tourism development and poverty reduction at a macro level. The advantage of studying the poverty reduction capacity of tourism development at the macro level is that it enables the researcher to trace the mechanism through which tourism expenditure affects the different industries at the destinations and, hence, account for those that are the most affected, positively or negatively. This provides policy makers with detailed information on the transmission mechanism of tourism expenditure and, can be an important tool in formulating and targeting policies that aim at increasing the economic benefits and reducing the economic cost of tourism expansion.

The few studies that have investigated the problem at the macro level have applied static techniques to investigate the relationship. Static modeling techniques analyze the contribution of the tourism industry but ignore the effect of policy changes on these contributions in the postimplementation years. This article argues that the effect on the poor may occur with a time lag, making dynamic modeling a more appropriate approach. This approach assesses the effect on an annual basis and allows for more effective monitoring and analysis of the effect of policy changes. Blake (2009) points out that a detailed household modeling using a microsimulation approach provides a more comprehensive assessment of the impact of tourism on economic development. Hence, this approach is better suited for the assessment of the effect of tourism expenditure on the standard of living of households at the destination. The microsimulation approach, however, is yet to be to be implemented in the tourism context.

This article aims to investigate the connection between tourism policies and poverty reduction by developing a dynamic general equilibrium model of the Kenyan economy by integrating the microsimulation approach of Cockburn and Decaluwé (2006) to analyse the extent to which the Kenyan tourism industry is benefiting poor households. It is one of the first studies in the tourism literature that uses a dynamic approach and contributes to the literature by not only providing the evidence as to whether tourism development is pro-poor in Kenya but also analysing the magnitude of the effect over time. Furthermore, the existing literature on tourism and poverty reduction has measured poverty by using headcount indices, such as the proportion of households below an identified poverty line, as in Blake et al. (2008) and Vanegas, Gartner, and Senauer (2015). While the headcount measures offer valuable information, they are deemed to be too crude.

The most widely used index in the development economics literature is the Foster-Greer-Thorbecke (FGT) index (1984), which is a multidimensional index combining three classes of measurements: headcount index (P_0), income gap index (P_1), and poverty severity index (P_2). The index has a simple additive structure where aggregate poverty is a population-weighted mean of subpopulation groups. This allows for the decomposition of the index and analysis of each subgroup individually. Such information is more relevant to policy holders as it allows the identification of the subgroup that contributes most to poverty, and therefore, more targeted measures of poverty reduction can be designed. The simple structure of the index makes it easy to apply and interpret and, hence, it is surprising that the FGT has not yet been used in the tourism context. This article fills in the gap.

The Tourism and Poverty Nexus

Cross-country studies have verified that sustained economic growth reduces poverty (Kraay 2004). However, there is a widespread consensus that not all forms of growth have the same impact on poverty. Economic growth is pro-poor when it is balanced with equity but to be achievable, it requires the careful implementation of targeted macroeconomic policies on education and health, nutrition and infrastructure (Croes and Rivera 2015). Sectoral pattern of growth affect the extent of poverty reduction (Coxhead and Warr 1995; Fane and Warr 2002; Loayza and Raddatz 2006). If, for example, the tourism sector in a destination is low-skilled and labor-intensive, it is likely that its expansion will generate high income flows to the poor. There are many different ways by which tourism can engage the poor, boost local economic development, or affect the physical and social environment of local communities.

The link between tourism and the reduction of poverty is best understood by considering the link between trade liberalization and poverty reduction (McCulloch, Winters, and Cirera 2001). Figure 1 shows the channels through which tourism may affect the poor. These include income, tax, price, and risk channels (Blake et al. 2008). Poor households earn income through direct or indirect participation in tourism (International Trade Centre [ITC] 2009). Tourism also contributes to the tax base of local or national government, and the additional revenue can be used to provide or improve the social infrastructure. ITC (2009) argues that positive effects can include better social infrastructure, education, stronger local institutions, and gender equality.

The third channel is the price paid by the poor for the consumption bundle goods they purchase. Tourism expansion leads to an increase in the demand for local products,

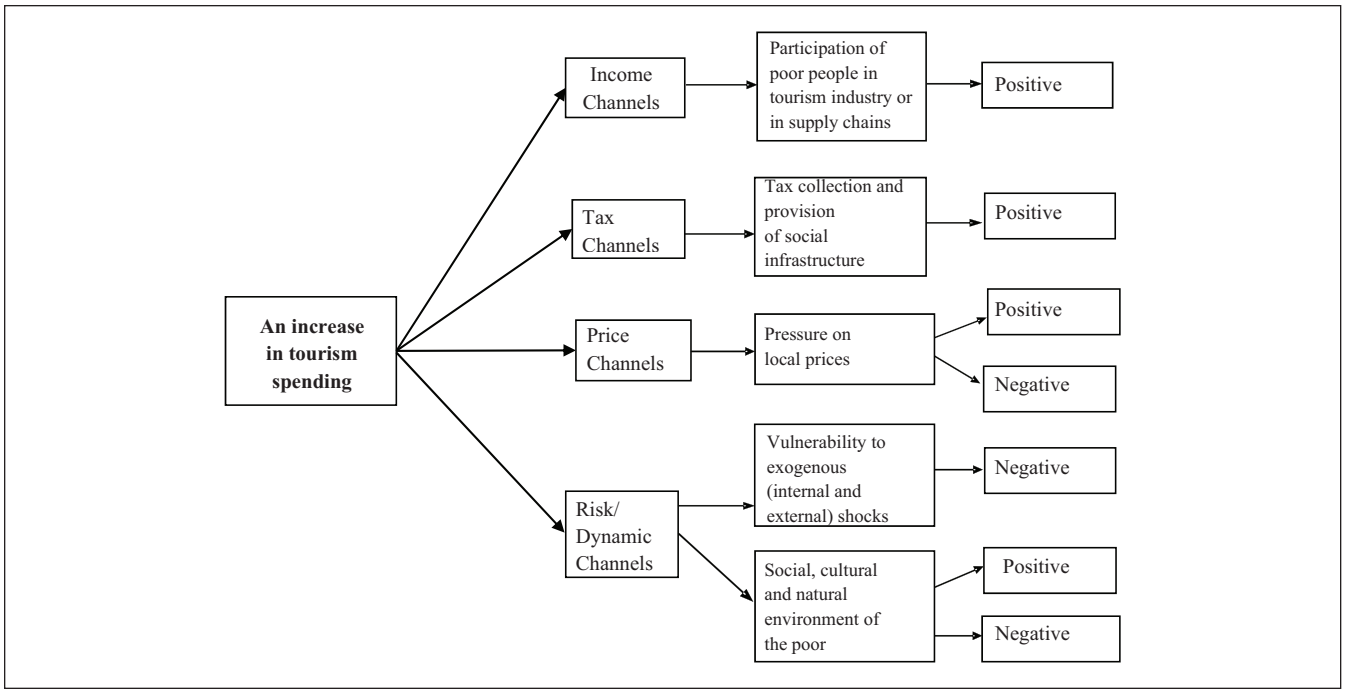

Figure 1. Channels by which tourism spending may affect the poor.
Source: Authors' own illustration.

such as food, land, and construction, which in turn can cause an increase in local prices (ITC 2009). As tourism increases, the demand for goods and services that the tourists use increases and, as a result, the prices of those goods will rise. The impact of the price channel on the poor will depend on the amount of tourism-related goods and services among the goods and services purchased by the poor (Blake et al. 2008). The fourth channel relates to risks and other long-term dynamic influences. The dynamic impact of tourism on local economic development can be positive (e.g., biodiversity conservation measures; allocation of funds for natural, cultural, and historical resources) and negative (e.g., destruction of environmental resources, pollution of air, water, noise).

A number of studies have developed theoretical models to show that expansion of the tourism sectors can be immiserizing (Chen and Devereux 1999; Copeland 1991; Hazari and Kaur 1995; Hazari and Nowak 2003; Sahli and Nowak, 2007). These models assume that a boom in the tourism industry will have a negative effect on poorer households when it leads to the appreciation of the local currency. A higher value of the local currency erodes the international competitiveness of non-tourism exports and, therefore, limits their growth and capacity for generating employment. This phenomenon, also known as the Dutch Disease effect, is often a result of the expansion of an export industry in the presence of market distortions such as monopoly power, repatriation of profits by foreign companies, increasing returns to scale in non-tourism export activities, crowding-out effects, and trade distortions. Poorer households who are employed in the affected non-tourism sectors, therefore, tend to find their real earnings fall following the expansion of the tourism industry.

This effect is empirically proven by Wattanakuljarus and Coxhead (2008), who simulate the effects of a boom in the inbound tourism demand on the Thai economy. The authors show that an increase in tourism arrivals of 10% would lead to an increase in household income accompanied by a worsening of the income distribution. Benefits from the tourism industry do not trickle down to the poorer household because tourism is not a notably labor-intensive sector in comparison to key tradable sectors such as agriculture and labor-intensive manufacturing, and its expansion triggers the Dutch Disease effect, which undermines profitability and reduces employment in tradable sectors, notably agriculture, from which the poor derive a substantial percentage of their income.

On the other hand, Blake et al. (2008), who apply a CGE model of the Brazilian economy to assess the distributional effects, find that poorer households will benefit from an increase of 10% in tourism spending. Increasing demand from tourism causes prices of goods and services to rise but have no effect on the price of the bundle of consumption of the poorer households. However, the poorer households are not the main beneficiaries of the earnings and price channel effects of tourism expansion. The authors note that transferring all additional government revenue to the poorest household group can double the benefits for poor people, giving them around one third of benefits in total.

This recommendation is challenged by Mahadevan, Amir, and Nugroho (2016). The authors use a CGE model of the Indonesian economy to show that expansion of the tourism sector reduces poverty but increases income inequality at national level. The authors undertook several types of simulations aimed at exploring complementary policies likely to improve the poverty impact of tourism growth and reduce income inequality gaps. They found that poverty reduction can be achieved faster by investment that raises the labor productivity of the poor as compared to monetary transfers. This result offers a solution to the problem identified by Croes (2014) who finds that in Costa Rica jobs created by the tourism industry are filled by higher educated local labor force and foreigners, thus excluding the poor. Croes concludes that economic growth in Costa Rica is followed by declining opportunities for the poor.

Similary, Kweka (2004) finds that in Tanzania, urban (higher income) households will benefit more from a 20% increase in tourism than their rural (lower income) counterparts, confirming the argument of Croes and Rivera (2015). On the other hand, Vanegas, Gartner, and Senauer (2015) apply an autoregressive lag model and find that in Costa Rica and Nicaragua, tourism development is negatively related to the prevalence of extreme poverty and that the poverty reduction effect of the tourism industry is higher than that of the agricultural sector in both countries. Croes (2014), using an error correction model to assess the effect of tourism growth on absolute poverty, concludes that in Nicaragua a 1% increase in tourism receipts reduces the poverty headcount index by 1.23 points. He explains that in Nicaragua, where the proportion of poor is higher, the tourism industry creates jobs in the informal sector providing opportunities for the poor to join the supply chain. His results confirm those of Croes and Vanegas (2008). In Croes and Rivera (2017), the authors use the social accounting matrix of Ecuador to show that tourism development benefits the poor disproportionately by improving their income. The authors conclude that tourism development is a viable tool for reducing poverty in developing countries. However, the use of SAM may overestimate the poverty reduction effect of tourism development as this method is based on restrictive assumptions that do not take into account the price effect on the consumption of households. Croes and Rivera (2017) use poverty headcount as their measure of poverty in Ecuador.

From the empirical studies above, it is seen that the effect of tourism expansion on poorer households is mixed. These studies, while offering invaluable insight on the ways in which poorer households are affected by tourism, use static analysis and, therefore, cannot provide more information on the yearly longer-term effect. The current study seeks to address this gap. Furthermore, the studies discussed above have focused on one measurement of poverty, which does not necessarily provide a comprehensive assessment of the effect of an expansion of the tourism industry on poverty reduction. They use headcount indices, which according to Haughton and Khandker (2009), are basic measures and need to be complemented with other indices to accurately quantify the effect of growth on poverty reduction.

Schilcher (2007) stipulates that economic growth can reduce poverty and help poor households cross the poverty line while making the extreme poor worse off. The effect on the latter, however, has not been analyzed empirically in the tourism literature. Studies that focus on headcount measurement of poverty only have mostly concluded that tourism growth provides limited benefits to the poor. The effect on the extreme poor and their income distribution are ignored. A policy that helps the extreme poor move closer to the poverty line though not having a significant contribution in reducing poverty count is a valid mean for poverty alleviation, but failure to account for the benefits accrued in the form of improved income distribution for the poorest leads to the erroneous conclusion that the policy is ineffective. According to Schilcher (2007), there is a need to distinguish between the poor and the extreme poor.

In this study, it is proposed to use the FGT index, which is multidimensional and incorporates three indices of poverty, (P_0), (P_1), and (P_2). P_0 measures the proportion of the population of a country that is below the poverty line. It measures the mean gap between the income of the poor households and the poverty line. That is, the gap between the poverty line and the income of each poor household is summed and divided by the population of the country. While P_0 measures the incidence of poverty, P_1 measures the incidence and depth of poverty. P_2 is a measure of income distribution among the poor. It is the square of P_1, and it places higher weights on the poorest households. It is expected that using the FGT to assess the effect of tourism development on poverty reduction adds additional dimensions to the analysis that are more relevant for policy makers. Furthermore, the analysis is carried out in a dynamic setup, and, therefore, the time lag that may be needed for poverty reduction effect to be noticeable is taken into account, allowing for the study of poverty alleviation nexus path over time.

Modeling the Economic Impact of Tourism in Kenya

The World Bank (2010) estimates that Kenya has one of the world's highest rates of population growth below the age of 25 at 2.6% (on average per annum), with approximately three quarters of the population living in rural areas. The Kenyan social accounting matrix (SAM) shows that the highest total consumption expenditure shares of poor households in rural areas are found in agricultural products (32%), followed by transport (12.8%). The richest rural household spends more on services than on agricultural and manufactured goods. The urban households spend a large percentage of their budget on services such as transport (17.7%) and

restaurants (11.9%). The poorest urban deciles, on the other hand, spend 51% of their consumption expenditure on food.

Tourism is one of the fast growing sectors in Kenya's economy, and it is directly responsible for creating about half a million jobs. It has been earmarked as one of the strategic sectors for economic growth and development in Kenya. According to World Travel and Tourism Council (WTTC 2015), the travel and tourism sector contributed approximately 4.1% directly and 10.5% indirectly to GDP in 2014. Export earnings from international tourists generated 18.3% of total exports in the same year. Income from tourism grew by 126% between 1995 and 2014, attaining US$2.1 billion. This study investigates the impact of sustained tourism growth on poverty from 2003 to 2015, with 2003 as the base year and using poverty indicators in 2004–2005 as a baseline estimate.

The effect of tourism expansion on the Kenyan economy will be assessed using a recursive dynamic Computable General Equilibrium (CGE) that draws on CGE models by Decaluwé et al. (2010), Savard (2003), Cockburn (2001), Robinson et al. (1999), and Dervis, de Melo, and Robinson (1982), as well as the contributions to tourism-based dynamic CGE model by Blake (2009). It involves the specification of a multihousehold and multisectorial CGE model by means of nonlinear algebraic equations and addressing these equations directly with numerical solution techniques. The basic model illustrates consumption and production-related behavior, interinstitutional transactions, and trade relationships. Thus, the model has the following key structural elements:

a. *Production and factor demand*: Production technology is specified in a multilevel nesting structure.
b. *Product demand*: The final demand is composed of demand by households, investment, inventory, the government, the rest of the world, and tourists.
   - *Household demand*: Households are assumed to choose the consumption of different commodities according to an Engel expenditure function. The demand functions are derived from maximization of a Stone–Geary utility function (often called Linear Expenditure System) subject to the budget constraint. Most empirical literature on the link between household consumption patterns of different goods and level of income in developing countries applies Engel's law, which suggests that as households become more affluent, the share of household spending dedicated to necessities such as food declines (Banerjee and Duflo 2011). In an LES specification, consumers first set aside subsistence levels of goods, then allocate the remaining budget in proportion to preferences.
   - *Government demand*: The government collects taxes and receive transfers from other institutions.
   - *Investment demand*: The value of investment expenditure is equal to the sum of investment demand value plus the value of stock changes that are defined as being fixed, usually in volume terms at the levels in the base period.
c. *Exports*: Aggregate domestic output is allocated between domestic and export markets. This is done under the assumption that suppliers maximize the sales revenue for any given aggregate output level, subject to imperfect transformability between exports and domestic sales, expressed by a constant elasticity of transformation function.
d. *Imports*: It is assumed that the institutions in the economy consume a composite good, made up of domestic goods and imports. Imports and domestic goods in the same sector are imperfect substitutes, an approach called Armington assumption.
e. A group of equations describing net transfers, incomes, expenditures and savings, GDP, trade balance, consumer price index, real exchange rate and market clearing for composite commodities and primary factors.

Thus, the model developed has 115 block equations and the same number of variables that are solved simultaneously using GAMS, Generalized Algebraic Modeling System software. For reasons of space, the article only describes how tourism, dynamics, and poverty are modeled.

Modeling Tourism Demand

A Cobb-Douglas (C-D) utility function is used to determine how tourists substitute between commodities. C-D and Constant Elasticity of Substitution (CES) functions have been widely used in the tourism-based CGE models. The C-D utility function exhibits a constant and unitary elasticity of substitution. With the exception of the demand for tourism, which is modeled using a C-D function because of lack of data, consumption and production behavior are modeled using CES, LES, and constant elasticity of transformation functions.

From the modeling point of view, two categories of tourism demand (domestic tourism demand and international inbound tourism demand) are considered, assuming that there are differences in the structure of their spending. Hence, the assumption is that there are two categories of tourism demand accounting for the consumption of a certain quantity of a composite good and service at an aggregated tourism price level $\left(PTOU_{(t)}\right)$. Analogous to household demand, domestic $\left(CDD_{(t)}\right)$ as well as international inbound $\left(CDF_{(t)}\right)$ tourism demand is obtained by maximizing the utility function of each individual tourist function to its budget constraint. Following Blake et al. (2008), the demand for tourism is defined by the following equations:

$$CDD_{(t)} = \chi \cdot \overline{CDD_{(t)}} \cdot \left(\frac{PTOU_{(t)}}{PIXCON_{(t)}} \right)^{\varsigma_d} \quad (1)$$

$$CDF_{(t)} = \chi \cdot \overline{CDF_{(t)}} \cdot \left(\frac{PTOU_{(t)}}{e_{(t)}} \right)^{\varsigma_F} \quad (2)$$

$$CTOU_{(i,t)} = \omega_{(i)} \prod_c tcom_{(c,i,t)}^{\varepsilon_{(c,i)}} \quad (3)$$

$$tcom_{(c,i,t)} PC_{(c,t)} = \varepsilon_{(c)} CTOU_{(i,t)} \cdot PTOU_{(t)} \quad (4)$$

$$TOUP_{(i,t)} = \prod_c PC_{(c,t)}^{\varepsilon_{(c,i)}} \quad (5)$$

where $\overline{CDD}_{(t)}$ and $\overline{CDF_{(t)}}$ are parameters equal to the base level of domestic and international inbound tourism consumption, respectively, except where tourism demand shocks are introduced into the modeling system by changing these parameters. The price elasticity of demand for domestic tourism is captured by the parameter ς_d with $\varsigma_d \succ 1$, while χ is a shift parameter $(\chi = 1)$ in the base year. Domestic tourists are concerned with how the composite price changes relative to the consumer price index $\left(PIXCON_{(t)}\right)$. $\omega_{(i)}$ is a shift parameter, calibrated to ensure that the model replicates the benchmark; $\varepsilon_{(c,i)}$ is the share of each commodity in each tourism consumption; and $CTOU_{(i,t)}$ the aggregate tourism consumption by each *i* category of tourism (the index *i* refers to the type of tourism, i.e., domestic or inbound).

It is assumed that international inbound tourists are concerned with how their composite price changes relative to a real exchange rate. Thus, international inbound tourism demand is modeled in a similar way to export demand and is assumed to be inversely proportioned to the price of foreign exchange in the domestic market (equation (2)). The utility of the two categories of tourists is modeled using a Cobb–Douglas function, determining how they substitute between commodities. Following Blake et al. (2008), tourism consumption by sector $\left(tcom_{(c,i,t)}\right)$ can be specified as indicated in equation (3).

Thus, the total value of total tourist expenditure of each tourism category $\left(CTOU_{(i,t)} \cdot PTOU_{(t)}\right)$ must equal the total expenditure of each tourism category of different commodities $\left(tcom_{(c,i,t)} \cdot PC_{(c,t)}\right)$. Additionally, the price paid by tourists in each category can be related to the prices of the individual commodities as indicated in equation (5). $PC_{(c,t)}$ is the purchasing price of composite commodity *i* (including all taxes and margins). The impact of changes in the tourism sector on the rest of the economy is captured through their effect on the aggregate prices (see equation (5)).

Dynamic Setup

The dynamic setting follows Decaluwé et al. (2010) and takes into account accumulation and growth effects. It is established by means of lagged variables and by updating exogenous variables and parameters that are either fixed or absent in the base-year solution. In this study, the dynamic-recursive adjustment is solved recursively from the base year 2003 to the year 2022.

Moreover, there is a population index $pop_{(t)}$, which is updated exogenously and growing in each period at a rate $\eta_{(t)}$. This index is used in the model to update the values of variables, parameters, and constants that are assumed to grow at the same rate $\eta_{(t)}$ as the population index pop_t. Following World Bank's current and projected annual growth rate of approximately 2.6%, the Kenyan population is assumed to grow at a rate of 0.026 per year in the model. Total labor supply becomes an endogenous variable and is assumed to grow at the exogenous rate $\eta_{(t)}$, which is the labor force growth rate.

Unlike the static model, capital stock is endogenous in the dynamic model. In every period, capital stock is the result of the stock of the preceding period, minus depreciation, plus the volume of new capital investment in the preceding period (equation (6)).

$$KD_{(k,a,t+1)} = (1 - \delta_{(k,a)}) KD_{(k,a,t)} + IND_{(k,a,t)} \quad (6)$$

$$IT_{(t)}^{j} = PK_{(t)}^{j} \sum_{k,j} IND_{(k,j,t)} \quad (7)$$

$$PK_{(t)}^{j} = \frac{1}{A^{K_{(j)}}} \prod_c \left[\frac{PC_{(c,t)}}{\gamma_{(c)}^{j}} \right]^{\gamma_{(c)}^{j}} \quad (8)$$

$$IND_{(k,j,t)} = \varphi_{(k,j)} \left[\frac{IR_{(k,j,t)}}{U_{(k,j,t)}} \right]^{\sigma_{(k,j)}^{INV}} KD_{(k,j,t)} \quad (9)$$

$$U_{(k,j,t)} = PK_{(t)}^{j} \left(\delta_{(k,j)} + IR_{(t)} \right) \quad (10)$$

where $KD_{(k,a,t+1)}$ is the demand for type *k* capital by activity *a* and $IND_{(k,a,t)}$ the volume of new type *k* capital investment to activity *a*. The amount of each investment expenditures category $\left(IT_{(t)}^{j}\right)$ (the index *j* refers to the type of capital, i.e., public or private) is determined by equation (7) as the price of each investment category $\left(PK_{(t)}^{j}\right)$ times the aggregate volume of the new type *k* of each category of capital investment $\left(IND_{(k,j,t)}\right)$.

The prices of new private and public capital are given by equation (8). These prices are obtained from the investment demand functions, whose forms imply that the production function of new capital follows a Cobb-Douglas form. $A^{K_{(j)}}$ are scale parameters for each category of investment and $\gamma_{(c)}^{j}$ are positive parameters calibrated on the basis of the investment elasticity and the investment equilibrium equation. $\sigma_{(k,j)}^{INV}$ is the elasticity of investment demand. The volume of new capital allocated to a sector is proportional to the existing stock of capital. The proportion varies according to

the ratio of the rental rate to the user cost of that capital. The investment demand follows a modified version of Bourgignon, Branson, and Melo (1989). Equation (10) defines the capital user cost $\left(U_{(k,a,t)}\right)$ as a function of the price of new capital (the replacement cost of capital), the rate of depreciation $\left(\delta_{(k,a)}\right)$, and the interest rate $\left(IR_{(t)}\right)$ (Decaluwé et al. 2010).

Model Closure

Simulations are carried out under the following assumptions. The current account is fixed, reflecting the scarcity of foreign credit in developing countries. Government expenditures are assumed to be fixed in real terms in the first period. However, this increases as the same rate of population growth. Tax policy instruments are free. It is assumed that investment expenditures are endogenous and adjust to changes in savings. Past investments influence economic growth owing to the inclusion of dynamics into the model. It is assumed that there is perfect mobility of labor and capital between rural and urban areas. This implies that the model has three specific prices for payment for factors, namely, wages, return on agricultural capital (land), and return on other capital.[1] The nominal exchange rate (i.e., the rest of the world's imports price index) is chosen to be the numéraire.

Poverty Analysis

In order to assess the mechanism through which tourism growth may affect poverty in the country, the identified "macro effects" from the CGE growth scenario are fed back into a microsimulation model, based on household survey data. The construction of the micro household module relies on data sets from the Kenya Integrated Household Budget Survey (KIHBS). The KIHBS is based on a representative sample of 13,430 households. The impact of tourism growth on poverty is captured by changes in the FGT poverty indices (Foster, Greer, and Thorbecke 1984). FGT is one of the most important poverty measures, which is widely applied in empirical work because of its simplicity. It is based on normalized poverty gaps, that is, the term in the parentheses in equation (11). Poverty gaps are then raised to the α power to capture how deep poverty is. The definition is as follows:

$$P_\alpha\left(y;z\right)=\frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^\alpha \tag{11}$$

where y is a vector of household incomes in increasing order, z is the poverty line (in income units), N is the total number of households, q is the number of poor households and α is a parameter.

$$\text{For } \alpha=0, P_0=\frac{q}{N},$$

where P_0 is the simple headcount index, as it measures the incidence of poverty as the proportion of total population below the poverty line. In other words, the headcount ratio gives the percentage of the population that is below the poverty line.

$$\text{For } \alpha=1, P_1=\frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right),$$

where P_1 is the poverty gap index. It reflects how far the poor are from the poverty line. For any individual, the poverty gap is the distance between the poverty line and his/her income. Aggregating individual poverty gaps for all individuals gives the aggregate poverty gap.

$$\text{And for } \alpha=2, P_2=\frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^2,$$

where P_2 is the poverty severity index. It gives an indication of the degree of inequality among the poor. Moreover, poverty severity captures how difficult it is to get out of poverty. Building on poverty gap measures, the poverty severity index gives more weight to the extreme poor by squaring the distance to the poverty line. In other words, it measures inequality between subpopulations of the poor. The micro model is solved using DAD 4.6, a Software for Poverty and Distributive Analysis.

Simulation Design

Tourism expansion is generally modeled as an increase in total tourism spending or a reduction or elimination of trade restrictions on the tourism industry or related industries. This requires information on both the economic structure and the size of tourism as well as the likely path for the future growth of the economy and the sectors within it. International tourist arrivals and spending in Kenya grew on an average of 4.6% per annum between 2003 and 2013, totalling approximately 1.5 million arrivals in 2013 (WTTC 2015). With respect to future growth, it is forecasted that domestic and foreign travel spending will rise by 4.7% on average p.a. from 2013 to 2023 (WTTC 2015). In this context, the effects of a 5% annual growth of tourism spending on the Kenyan economy are simulated. With 2003 as the baseline, this corresponds to a yearly increase in tourism spending of Kenyan shilling (KES) 2,723 million (or 0.2% of GDP) (KES 100 = US$1.08). It should be noted that the tourism sector accounted for 4.15% of total GDP in 2003, namely, KES 1,311 billion.

Simulation Results

The simulation results are reported in terms of macroeconomic and sectoral impacts and in terms of income, consumption, and poverty impacts.

Macroeconomic Impacts

A 5% increase in tourist spending generates an annual percentage change in GDP of 0.24% on average, aggregating to an overall percentage change in GDP of 4.87% from the first (2003) to the last (2022) period. On the expenditure side, total real investments increase by 0.52% per year, accumulating to an overall percentage change in aggregate investments of 10.44% for the whole period. Regarding the contribution of each investment aggregate to total investment, it is found that private investments make the largest contribution to total investment (0.66% per year on average) compared with public investments (0.09% per year on average). Both domestic and international inbound tourism have a positive impact on the Kenyan economy and there seem to be no marked differences between domestic and international inbound tourism with respect to the overall economic impact.

For non-tourism exporters and some manufactured goods, the simulated percentage changes are negative. The changes to total export are lower in the first period (0.09% on average) and positive in the last period (0.11% on average). Total imports, on the other hand, increase on average by 0.24% annually, leading to a trade deficit. Over the whole period, total imports accumulate up to 49.06%, outweighing the increase in total exports (19.94%). Government income increases per annum by 0.21% in the first period and 0.22% in the last period, accumulating to 4.36% over the whole time period. There is an increase in savings of all household groups, which increase on average by 0.18% annually. Enterprise savings also increase (0.24%), while government savings decline on average by 0.92% per year.

Sectorial Impacts

An increase in tourism demand is associated with the shifting of scarce resources from non-tourism sectors, such as agriculture, towards tourism-related sectors, construction, transport, mechanical repair work, crafts, entertainment and shopping. Clearly tourism, especially rural tourism impacts on agriculture in many ways. Both industries compete for resources, including land, labor and capital. For instance, the designation of parks and recreation areas for the visitors reduces the economic opportunity of the farmers. Fishermen have to compete for shore space with tourism development. Outputs of the agricultural activities fall by 0.01% on average annually, manufacturing increases by 1.65% and the services sectors increase by 12.11% over the whole period. In terms of annual percentage change in gross value added, the largest positive impact is in transport (0.4% on average), followed by construction (0.38%) and trade (0.11%).

The results confirm those of Wattanakuljarus and Coxhead (2008). The expansion of the tourism industry introduces the Dutch Disease phenomenon into the Kenyan economy through an annual appreciation of the exchange rate (0.34%), which when combined with increasing domestic prices (0.1%), rental returns (0.11%), and wage rates (0.18%) per annum sees traditional export sectors, such as agriculture, experiencing a decrease in international competitiveness. Consequently, export earnings decline. Agricultural exports show an annual percentage decrease of –0.11%, while export demand for manufacture and services shows annual percentage increase of 0.09% and 0.21%, respectively. At the same time, the higher value of the Kenyan dollar makes imports cheaper, increasing the demand for imports of agricultural, manufactured, and services products by 0.26%, 0.17%, and 0.31% respectively.

The growth of the manufacturing and services sectors is followed by a 0.03% average annual increase in the demand for labor. The results are consistent with other studies that have investigated the relationship between tourism and agriculture in developing economies (e.g., Bowen, Cox, and Fox 1991; Sahli and Nowak 2007; Wattanakuljarus and Coxhead 2008). Sahli and Nowak (2007) argue that in developing economies where the tourism sector is relatively more labor intensive than the agricultural sector, the net benefit from inbound tourism growth on national welfare will be positive as is the case for Kenya.

The patterns of demand for the different types of labor are identical to patterns of output growth. Demand for all types of labor increases in industries closely associated to the tourism industry as well as industries in the supply chain and decreases in non-tourism sectors. However, demand for unskilled labor increases faster than demand for skilled and semi-skilled labor, both in the first period and last period. Hotel has the largest impact (0.92%), followed by transport (0.7%), construction (0.59%), and retail trade (0.29%). This suggests that service exports are relatively (unskilled) labor intensive and that households endowed with these factors, that is, low-income households in service industries will be the main beneficiaries. Semi-skilled labor experiences the lowest growth in the service industries and the highest decline within non-service in all periods.

Impact on Income and Consumption

The simulation results indicate that the nominal income of all household categories rises. A comparison of households by deciles and region reveal that the changes are uneven. The poor households in urban areas receive a 0.25% rise in their nominal income in the first period as compared to only 0.19% for the poor households in rural areas. In the rural area, middle- and upper-income households gain more than low-income ones. In the urban area, middle- and upper-income households as well as households at the lowest decile gain the most. As a result, low-income agricultural households experience the least changes, while low-income non-agricultural households (i.e., those who derive their income from services industries) and high-income households gain the most. These results are in line with the results by Blake

Table 1. Poverty Results—Kenya: All Households.

	Poverty Count P_0 (%)	Poverty Gap P_1 (%)	Poverty Severity P_2 (%)
Base year	*45*	*15.2*	*7.7*
Year 1	−0.092	−0.17	−0.15
Year 5	−0.103	−0.19	−0.17
Year 9	−0.102	−0.2	−0.19
Year 13	−0.09	−0.18	−0.19
Year 17	−0.08	−0.24	−0.18
Year 20	−0.07	−0.26	−0.21
Poverty indices, Year 20	*43.16*	*12.22*	*4.93*
Change in poverty indices	−1.84	−2.98	−2.77

Source: Authors' simulations results.
Note: Italicized values represent the key results from the study.

et al. (2008), Kweka (2004) and Wattanakuljarus and Coxhead (2008), and show that, in general, tourism expansion benefits all household groups, but the poorest (rural) household group gains less than other household groups.

Impact on Poverty

The poverty effects are assessed against the base year (2005). Table 1 presents a summary of the poverty incidence using the standard Foster-Greer-Thorbecke FGT poverty indicators, that is, headcount (P_0), income gap (P_1), and severity (P_2). In 2005, 45% of the population of Kenya lived below the poverty line, and the poverty gap shows that the average shortfall of income of the population from the poverty line is 15.2%. Poverty severity is 7.7 in Kenya in 2005. The simulation effect indicates that tourism development reduces the poverty count by 1.83% to 43.16 in year 20. This means a steady 5% increase in arrivals in Kenya will enable 1.83% of the population to cross the poverty line. A priori, the results indicate the poverty reduction effect of the growth of the tourism industry is very small.

However, during the same period of time, the poverty gap is reduced by approximately 3%, meaning that not only 1.83% of the population will no longer be poor but that among the poor, the average income needed to close the poverty gap will have fallen as well. Furthermore, poverty severity will have fallen, implying that the poorest households of the country will experience an improvement in their welfare. The effect on poverty count is highest in years 3 to 11. These results validate the use of a dynamic model and show that application of statics models as is common in the literature will underestimate the poverty reduction effect of tourism expansion as the higher effect occurs with a lag. This is understandable, as growth of the manufacturing and services sector leads to an increase in demand and create job opportunities for the poor but the effect occurs mostly in the postsimulation years. The results indicate that the tourism industry will not only reduce poverty in Kenya but also reduce the poverty gap and improve the income distribution among the poor. In other words, a larger number of households will be able to move closer to the poverty line.

Increased income allows rural consumers to enjoy an annual increase in aggregate real consumption of 0.11%. Urban households, on the other hand, register an annual increase in aggregate real consumption of 0.14%, reflecting the higher increase in their annual income. The poverty effects are assessed against the base year (2005) using the poverty line of KES 1,562 per month per person for rural and KES 2,913 per month for urban areas (in adult-equivalent terms, which at the time was approximately US$0.75 and US$1.40 a day per person) and include minimum provisions for both food and nonfood expenditures (GOK 2007). The results are reported in Table 2.

In the base year, all three indices indicate that poverty is more prevalent and severe in the rural areas of Kenya. In 2005, 70% of the rural population of Kenya lived below the poverty line as opposed to 34.5% in the urban areas. The results clearly demonstrate that the urban population of Kenya will benefit more from the development of the tourism industry. The poor households in urban areas are more favored than the poor households in rural areas. Moreover, low-income agricultural households experience the least improvement, while low-income nonagricultural households and high-income households gain the most. It can be predicted that 1.56% of the rural population and 1.89% of the urban population will move out of poverty by year 20. The effect on poverty gap and severity is significantly higher. The poverty gap is reduced by 5.8% and 5.15% for rural and urban households, respectively. Poverty severity falls faster in the urban area by 4.43 as opposed to 3.72 in the rural areas. The urban poor benefit more than that poor household in the rural areas.

These effects indicate that the tourism industry is inclusive and benefit the poorest household of Kenya. It has the potential of significantly reducing poverty severity in the

Table 2. Poverty Results—Rural and Urban Households.

	Rural			Urban		
	P_0 (%)	P_1 (%)	P_2 (%)	P_0 (%)	P_1 (%)	P_2 (%)
Base year	*69.9*	*17.6*	*8.9*	*34.5*	*11.6*	*5.4*
Year 1	−0.06	−0.41	−0.25	−0.15	−0.42	−0.25
Year 5	−0.07	−0.39	−0.3	−0.17	−0.38	−0.21
Year 9	−0.08	−0.34	−0.35	−0.16	−0.32	−0.24
Year 13	−0.08	−0.37	−0.28	−0.15	−0.29	−0.25
Year 17	−0.09	−0.38	−0.21	−0.14	−0.27	−0.2
Year 20	−0.09	−0.34	−0.21	−0.13	−0.25	−0.2
Poverty indices, year 20	*68.34*	*11.76*	*5.17*	*32.61*	*5.85*	*0.97*
Change in poverty indices	−1.56	−5.83	−3.72	−1.89	−5.15	−4.43

Source: Authors' simulations results.
Note: Italicized values represent the key results from the study.

urban area and drastically reduces the income gap of the poorer households in the rural and the urban areas. However, while the condition of the poorer households are improved, only a very small proportion of the households will cross the line, implying that tourism will not have a very significant role in improving the incidence of poverty. Furthermore, the gap between poverty in rural and urban households is not significantly narrowed. The gap in the headcount ratio and the poverty severity ratio between rural and urban households increases marginally and the poverty gap for rural improves slightly compared to that of the urban area. It indicates that tourism development will benefit the urban household disproportionately. This can result from the fact that investments in hotels and transport will grow the fastest and as these investments are more likely to take place in the larger towns and cities of Kenya, this is where opportunites for employment and consumption will be created. On the other hand as the agricultural sectors contracts in the rural areas, the positive effect of the expansion of the tourism industry may be dampened.

Recommendations and Conclusion

This article investigates the impact of increase in inbound tourism on Kenyan households using a dynamic GCE model. The aim is to find out the extent to which the tourism industry affects the poorer households of the country.

Results indicate that as a nation Kenya will benefit from the higher growth in its GDP and export earnings. However, the higher growth will come at a cost. As a result of Dutch Disease, other exportable sectors will find their competitiveness eroded and appreciation of the currency will make import cheaper, leading to a worsening of the balance of trade of the country. Resources move from traditional sectors to tourism industries and its supply chain. These industries expand creating employment opportunities and offering higher wages. The agricultural sector declines whereas non-tourism exporters will experience a weak to negative growth.

Tourism expansion and the resulting economic growth principally trickle down to both the urban and rural poor, through increases in income and in labor demand. This leads to a fall in poverty headcount and an even greater fall in poverty gap and severity. Tourism in Kenya has the potential to reduce poverty at the national and at urban and rural levels. However, poverty falls faster in the urban area, and the effect in the rural area is dampened by a fall in labor demand and earnings for the poor working in the agricultural sector.

The results of the present article have important implications for policies. First, it demonstrates that the use of only one poverty index as is common in the literature does not provide a complete picture. For example, based on poverty count index only, it can be concluded that the tourism industry is only marginally beneficial for the Kenyan poor. However, taking into account the poverty gap and poverty severity indices can change that conclusion. It is clear from the results that policies aiming at attracting more tourists or boosting the discretionary spending of tourists alone will have relatively minor impacts on rural poverty although it will enable a proportion of households to move closer to the poverty line and reduce poverty severity.

One of the main policy implications that emerge from these findings is that tourism development strategies need to give due consideration to agricultural production. Results indicate that there is a significant pull of labor from agriculture to sectors with higher linkages to the tourism industry. Fostering collaborations and reducing competition between the two sectors has the potential of benefiting both. Tourism can stimulate the development of new agriculture-based services, such as tours of agricultural production and processing facilities. Strengthening linkages between the agricultural and the tourism sector may dissipate the negative impact on the former. New synergies between these two competing sectors can take the form of favoring locally sourcing food needed from the increased demand in the tourism sectors over import, as suggested by Belisle (1983). This will create opportunities in the agricultural sector through the expansion

of its market while reducing the leakage rate from the tourism sector.

Although it can be expected that different types of tourism generate different distributional impacts on poor people, the combination of size and linkage strength is likely to amplify the beneficial effects of any type of tourism. Exploiting the linkages between tourism and the local economy toward poverty reduction requires a diversified growth strategy that expands tourism while improving the competitiveness of other sectors and ensuring a better distribution of income.

From a technical point of view, it is worth noting that the application of a dynamic model offered additional information on the impact on poverty alleviation, which becomes more apparent from the third year. It is clear that the poverty effect occurs with a lag, and it is recommended that when possible, dynamism be included in future models developed. The model developed in this study, however, is not without limitations. It is based on the assumption of rational economic agents and of perfect competition with no distortions. In reality, however, despite the existence of many small firms, much of tourism supply is dominated by a few large firms (e.g., airlines, cruise ships, and theme parks), market failure such as price controls, and formal and informal sectors. Knowledge of the impact of tourism shocks on the informal sector and other market failures is essential to guiding the direction of policy changes. Therefore, future studies might incorporate market failure to reflect such a situation. Furthermore, while the model captures the mechanisms by which tourism shocks ripple through the economy, it does not investigate the impact of uncertainty and instability characterizing demand for tourism on poverty.

Additional research is required to better understand how tourism policies can be combined with other macroeconomic, environmental, or complementary policies to ensure that tourism growth benefits the poor. Finally, this article has attempted to assess the impact of the growth of the tourism industry on poverty alleviation and concludes that tourism has the potential for reducing poverty in Kenya. However, there may be alternative macroeconomic policies which are as effective if not more so, at reducing poverty such as reallocating of resources to the manufacturing sector or adding value to agricultural sector. It is beyond the scope of this article to compare and evaluate the alternative paths to reducing poverty in Kenya.

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Note

1. Labor migration between rural and urban owing to the structure of data is not explicitly modeled. Thus, the data does not provide information about the spatial location of different types of labor. However, the assumption of perfect mobility within agriculture (industries mainly classed as urban) and nonagriculture (industries mainly classed as rural) sectors may be considered as a proxy for rural–urban labor mobility.

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