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**TOURISM CONTRIBUTION TO POVERTY ALLEVIATION IN KENYA: A DYNAMIC
COMPUTABLE GENERAL EQUILIBRIUM ANALYSIS**

ABSTRACT

The aim of this paper is to investigate the claim that tourism development can be the engine for poverty reduction in Kenya using a dynamic, micro-simulation computable general equilibrium model. The paper improves on the common practice in the literature by using the Foster-Greer-Thorbecke (FGT) index to measure poverty instead of headcount ratios only. Simulations results confirm those of previous studies and show that the 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 by the appreciation of the real exchange rates. However this paper demonstrates that the effect on poverty gap and poverty severity is nevertheless, significant for both rural and 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; poverty; dynamic computable general equilibrium, CGE; micro-simulation.

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1. INTRODUCTION

Nobel Prize laureate Amartya Sen expands the definition of poverty from merely 'lowness of income to 'the deprivation of basic capabilities' (Sen, 2001, pp. 87). He proposes that inadequate income is a 'strong predisposing condition for an impoverished life' but 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 which empowers individuals giving them the ability to choose the type of life that they have 'reason to value'. Hence, any policy aiming at achieving poverty reduction which is based on the Sen's model needs to address the issue of capability deprivation rather than merely targeting the level of household income.

On the other hand, by taking a purely economic perspective, Croes and Rivera (2015) postulate that poverty is a form of underutilisation of productive resources. It represents the underdevelopment of the pool of skills which 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 word, 'the poor should be helped out of self-interest' (Croes and Rivera, 2015, pp xvii). The authors purpose that economic growth needs to be, a priori, inclusive and benefits accrue to the poor for this to be achievable.

It has been acknowledged that tourism will play an important role in the achievement of the MDGs which 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). However, whether resources allocated to the tourism industry in fact lead to pro-poor development is an empirical debate. Mitchell and Ashley (2010) provide some evidence supporting this claim and state that in most destinations 10 to 30 percent of in-country tourist spending accrues to poor people. They state that factors which help to shape the impact on the poor are most likely factors in the economic, political and cultural context, as well as the specific factors of implementation. On the other hand, Hall (2007), Scheyvens (2007) and Schilcher (2007) argue that tourism is not necessarily pro-poor. Croes and Rivera (2015) states that whilst 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 they benefit the least in periods of economic growth.

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 macro level. The advantage of studying the poverty reduction capacity of the tourism development at macro level is that it enables the researcher trace the mechanism through which tourism expenditure affects the different industries at the destinations and hence, account for those which are the most affected, positively or negatively. This provides policy makers with detailed information on the transmission mechanism of tourism expenditure and hence can be an important tool in formulating and targeting policies which aim at increasing the economic benefits and reducing the economic cost of tourism expansion.

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

This paper aims to investigate the connection between tourism policies and poverty reduction by developing a dynamic general equilibrium model of the economy of Kenya which integrates the micro-simulation 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 papers in the tourism literature which 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 analysing the magnitude of the effect overtime. Furthermore, the existing literature on tourism and poverty reduction has measured poverty by either using headcount indices, such as the proportion of households below an identified poverty line as in Blake *et*

al. (2008) and Venegas *et al.* (2015). While the headcount measures offer valuable information, they are deemed to be too crude.

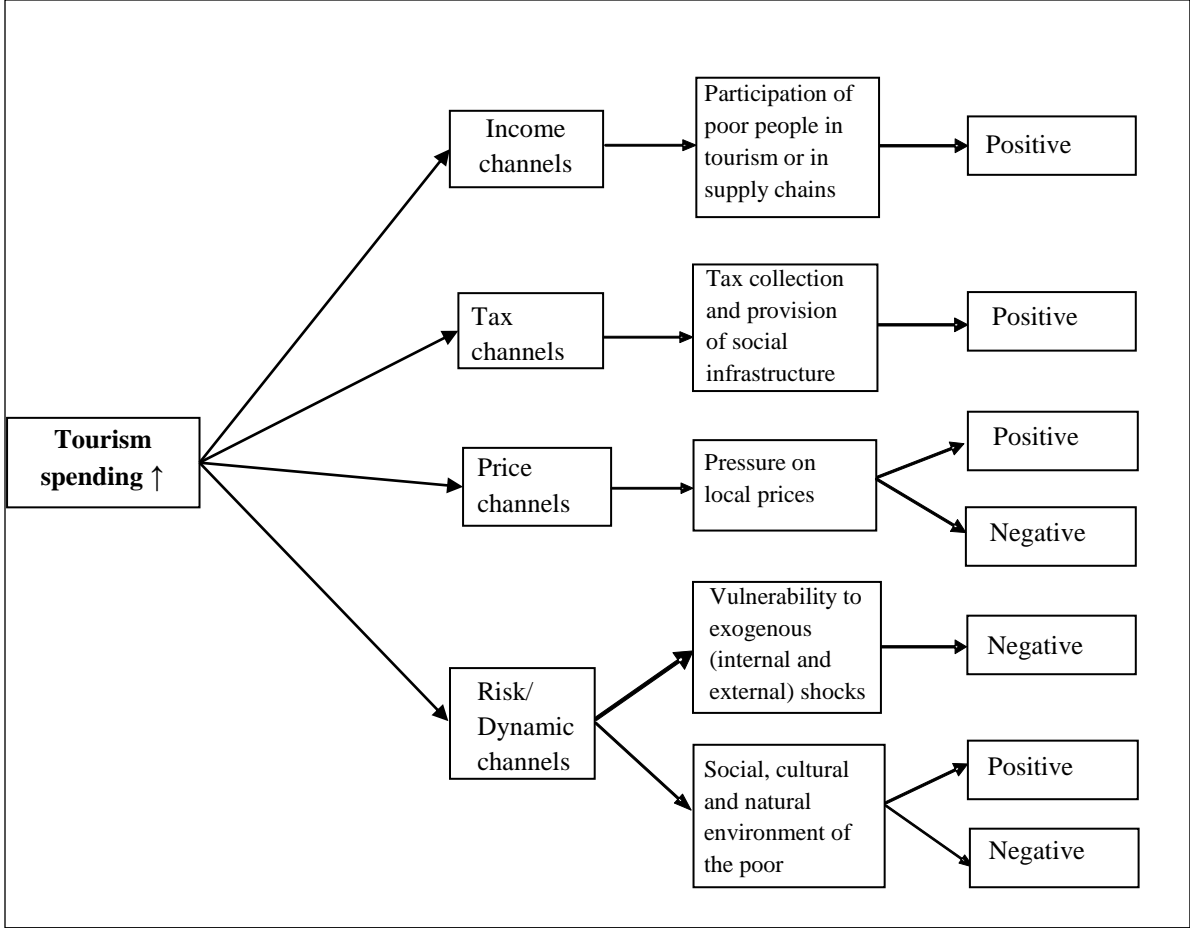
The most widely used index in the literature of development economics, is the Foster-Greer-Thorbecke (FGT) index (1984) which is a multidimensional index combining three classes of measurements: headcount index (P_0), income gap index (P_1) and poverty severity index (P_2). The index has a simple additive structure where aggregate poverty is a population weighted mean of sub population groups. This allows for the decomposition of the index and analysis of each sub group individually. Such information is more relevant to policy holders as it allows the identification of subgroup which contributes most to poverty and therefore more targeted measure 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 been used in the tourism context. This paper fills the gap and applies FGT to measure the level of poverty in Kenya.

2. 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 labour-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 *et al.*, 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 (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.

Figure 1: Channels by which tourism spending may affect the poor



Source: Authors’ own illustration

The third channel is the price faced by the poor for their consumption bundle goods they purchase. Tourism expansion leads to an increase in the demand for local products, 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 which 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, 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; 2005; Nowak and Sahli, 2007). These models assume that a boom in the tourism industry will have negative effect on poorer household when it leads to the appreciation of the local currency. A higher value of the local currency erodes the international competitiveness of the non-tourism export and therefore, limits their growth and capacity for generating employment. This phenomenon also known as the Dutch Disease effect, is often the 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 empirical 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 percent 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 labour-intensive sector in comparison to key tradable sectors such as agriculture and labour-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 percent 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 et al. (2016). The authors use a CGE model to show that expansion of foreign tourism in Indonesia reduces poverty but increases

income inequality at the 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 labour 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 job created by the tourism industry are filled by higher educated local labour force and foreigners, thus excluding the poor. He concludes that economic growth in Costa Rica is followed by declining opportunities for the poor.

Similarly, Kweka (2004) finds that in Tanzania, urban (higher income) households will benefit more from a 20 percent increase in tourism than their rural (lower income) counterparts confirming the argument of Croes and Rivera (2015). On the other hand, Venegas *et al.* (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 the error correction approach to assess the effect of tourism growth on absolute poverty concludes that in Nicaragua a 1 percent 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 Venegas (2008). In Croes and Rivera (2016) the authors use the social accounting matrix of Ecuador to show that tourism development benefit 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 which do not take into account price effect on the consumption of households. Croes and Venegas (2016) follow the trend in the literature and 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 household is mixed. These studies while offering invaluable insight on ways in which the poorer household 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 concentrated on one measurement of poverty

which does not necessarily provide comprehensive assessment of the effect of an expansion of the tourism industry on poverty reduction. They use headcount indices which according to Haughton and Khandher (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. Thus, to base policy on a single measure of poverty such as the headcount index, may reduce poverty for some while exacerbating the condition of the extreme poor but the effect on the latter has not been analysed empirically in the tourism literature. Studies that focus on headcount measurement of poverty only, have mostly concluded that tourism growth provide limited benefits to be poor. The effect on the extreme poor and their income distribution are ignored. A policy which helps the extreme poor move closer to the poverty line although not having a significant contribution in reducing poverty count is a valid measure for poverty reduction but failure to account for the benefit in the form of improved income distribution for the poor, lead to the erroneous conclusion that the policy is ineffective. According to Schilcher (2007), there is the need to distinguish between the poor and the extreme poor.

In this study is it proposed to use the FGT index instead 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 which 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 measure the incidence of poverty. P_1 measures the incidence and the 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 add additional dimensions to the analysis which is more relevant for policy makers. Additionally in this study, the analysis is carried out in a dynamic set up, contrary to previous studies and therefore, the time lag which may be needed for poverty reduction effect to be noticeable, are taken into account allowing for the study of poverty reduction nexus path overtime.

3. MODELLING THE ECONOMIC IMPACT OF TOURISM IN KENYA

The World Bank estimates that, Kenya has one of the world's highest rates of population growth below the age of 25 at 2.6 percent (on average per annum), with approximately three quarters of the population living in rural areas. 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 percent), followed by transport (12.8 percent). 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 percent) and restaurants (11.9 percent). The poorest urban deciles, on the other hand, spend 51 percent of their consumption expenditure on food.

Tourism is one of the faster 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 WTTC (2015), the travel and tourism sector contributed approximately 4.1 percent directly and 10.5 percent indirectly (i.e., including the indirect, induced and catalytic effects) to GDP in 2014. Export earnings from international tourists generated 18.3 percent of total exports in the same year. Income from tourism grew by 126 percent between 1995 and 2014, attaining US\$ 2.1 billion. Using poverty indicators in 2004/5 as a baseline estimate (GOK, 2007), this study investigates the impact of sustained tourism growth on poverty from 2003 to 2015, with 2003 as the base year.

The effect of tourism expansion on the Kenyan economy will be assessed using a recursive dynamic Computable General Equilibrium (CGE) which draws on CGE models by, Decaluwe *et al.* (2010), Savard (2003), Cockburn (2001), Robinson *et al.* (1999) and Dervis *et al.* (1982), as well as the contributions to tourism-based dynamic CGE model by Blake (2009). It involves the specification of a multi-household and multi-sectorial CGE model by means of non-linear algebraic equations and addressing these equations directly with numerical solution techniques. The basic model illustrates consumption and production-related behaviour, inter-institutional transactions and trade relationships. Thus, the model has the following key structural elements:

- (a) *Production and factor demand*: Production technology is specified in a multi-level 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 maximisation 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 household become more affluent, the share of household spending dedicated to necessities such as food declines (Banerjee & Duflo, 2011). In a LES specification consumers first set aside subsistence levels of goods, then allocate remaining budget in proportion to preferences.
- *Government demand:* The government is supposed to collect 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:* Export is described by a constant elasticity of transformation technology.

(d) *Imports:* It is assumed that the institutions in the economy consume a composite good, which is a constant elasticity of substitution.

(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 Modelling System software. For reasons of space, we only explain how tourism, dynamics and poverty are modelled.

3.1 Modelling 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 modelled using a C-D function due to lack of data, consumption and production behaviour are

modelled using CES functions, LES functions and constant elasticity of transformation functions.

From the modelling point of view, two categories of tourism demand (domestic tourism demand and foreign 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, $(PTOU_{(t)})$. Analogous to household demand, domestic $(CDD_{(t)})$ as well as foreign $(CDF_{(t)})$ 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:

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

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

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

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

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

where $\overline{CDD_{(t)}}$ and $\overline{CDF_{(t)}}$ are parameters equal to the base level of domestic and foreign tourism consumption, respectively, except where tourism demand shocks are introduced into the modelling system by changing these parameters. The price elasticity of demand for domestic tourism is captured by the parameter (ζ_d) with $(\zeta_d > 1)$, 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 $(PIXCON_{(t)})$. $\omega_{(i)}$ 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 foreign).

It is assumed that foreign tourists are concerned with how their composite price changes relative to a real exchange rate. Thus, foreign tourism demand is modelled 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 a Cobb-Douglas function, determining how they substitute between commodities. Following Blake et al. (2008), tourism consumption by sector ($tcom_{(c,i,t)}$) can be specified as indicated in equation (3).

Thus, the total value of total tourist expenditure of each tourism category ($CTOU_{(i,t)} \cdot PTOU_{(t)}$) must equal the total expenditure of each tourism category of different commodities ($tcom_{(c,i,t)} \cdot PC_{(c,t)}$). 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 which changes in the rest of the economy have on the tourism sector can be captured by showing how these changes affect prices, using (Equation 5), and how they affect the aggregate price that each tourist category pays.

3.2 Dynamic set-up

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 percent, the Kenyan population was assumed to grow at a rate of 0.026 per year in the model. Total labour supply becomes an endogenous variable and is assumed to grow at the exogenous rate $\eta_{(t)}$, which is the labour 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).

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

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

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

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

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

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 ($IT_{(t)}^j$) (the index j refers to the type of capital, i.e. public or private) is determined in Equation (7) as the price of each investment category ($PK_{(t)}^j$) times the aggregate volume of the new type k of each category of capital investment ($IND_{(k,j,t)}$).

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 is Cobb-Douglas. $A^{K(j)}$ 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 Bourguignon et al. (1989). Equation (10) defines the capital user cost ($U_{(k,a,t)}$) as a function of the price of new capital (the replacement cost of capital), the rate of depreciation ($\delta_{(k,a)}$) and the interest rate ($IR_{(t)}$) (Decaluwé *et al.*, 2010).

3.3 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 labour 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 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.

3.4 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 micro-simulation model, based on household survey data. The construction of the micro household module relies on datasets 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 et al, 1984). FGT is one of the most important poverty measures, which is widely applied in empirical work due to its simplicity. It is based on normalised poverty gaps, i.e. the term in the round brackets in Equation (11). Poverty gaps are then raised to the α power to capture how deep poverty is. The definition is as follows:

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

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.

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

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

where P_0 is the simple head-count 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 population which 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 sub-populations of the poor. The micro model is solved using DAD 4.6, a Software for Poverty and Distributive Analysis.

3.5 Simulation Design

Tourism expansion is generally modelled 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 percent 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 percent on average p.a. from 2013-2023 (WTTC, 2015). In this context, the effects of a 5 percent 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 KES 2,723 million (or 0.2 percent of GDP) (KES 100 Kenyan Shilling = US\$ 1.08). It should be noted that the tourism sector accounted for 4.15 percent of total GDP in 2003, namely KES 1,311 billion.

4 SIMULATION RESULTS

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

4.1 Macroeconomic Impacts

A 5 percent increase in tourist spending generates an annual percentage change in GDP of 0.24 percent on average, aggregating to an overall percentage change in GDP of 4.87 percent from the first (2003) to the last (2022) period. On the expenditure side, total real investments increase by 0.52 percent per year, accumulating to an overall percentage change in aggregate investments of 10.44 percent for the whole period. Regarding the contribution of each investment aggregate to total investment, it was found that private investments make the largest contribution to total investment (0.66 percent per year on average) as compared to public investments (0.09 percent per year on average). Both domestic and foreign tourism have a positive impact on the Kenyan economy and there seem to be no marked differences between domestic and foreign 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 percent on average) and positive in the last period (0.11 percent on average). Total imports, on the other hand, increase on average by 0.24 percent annually, leading to a trade deficit. Over the whole period, total imports accumulate up to 49.06 percent, outweighing the increase in total exports (19.94 percent). Government income increases per annum by 0.21 percent in the first period and 0.22 percent in the last period, accumulating to 4.36 percent over the whole time period. There is an increase in savings of all household groups which increase on average by 0.18 percent annually. Enterprise savings also increase (0.24 percent), while government savings decline on average by -0.92 percent per year.

4.2 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, labour 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

percent on average annually, manufacturing increases by 1.65 percent and the services sectors increase by 12.11 percent over the whole period. In terms of annual percentage change in gross value added, the largest positive impact is in transport (0.4 percent on average), followed by construction (0.38 percent) and trade (0.11 percent).

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 percent), which when combined with increasing domestic prices (0.1 percent), rental returns (0.11 percent) and wage rates (0.18 percent) per annum sees traditional export sectors, such as agriculture, experiencing a decrease in their international competitiveness. Consequently, export earnings decline. Agricultural exports show an annual percentage decrease of -0.11 percent, while export demand for manufacture and services shows annual percentage increase of 0.09 percent and 0.21 percent, respectively. At the same time higher value of the Kenyan dollar makes import cheaper, increasing the demand for demand for agricultural, manufacture and services by 0.26 percent, 0.17 percent and 0.31 percent in the import, respectively.

The growth of the manufacturing and services sectors is followed by a 0.03 percent on average annual increase in the demand for labour. The results are consistent with other studies which have investigated the relationship between tourism and agriculture in developing economies (for example, Wattanakuljarus and Coxhead 2008; Sahli & Nowak, 2009; Bowen et al. 1991). Sahli & Nowak (2007) argue that in developing economies where the tourism sector is relatively more labour 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 labour are identical to patterns of output growth. Demand for all types of labour 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 labour increases faster than demand for skilled and semi-skilled labour, both in the first period and last period. Hotel has the largest impact (0.92 percent), followed by transport (0.7 percent), construction (0.59 percent) and trade (0.29 percent). This suggests that service exports are relatively (unskilled) labour intensive and that households endowed with these factors, i.e. low-income households in service industries will be the main beneficiaries. Semi-skilled labour experiences the lowest growth in the service industries and the highest decline within non-service in all periods.

4.3 Impact on Income and Consumption

Figures 2 and 3 show the post-simulation changes in nominal income of rural households. The simulation results indicate 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 percent rise in their nominal income in the first period as compared to only 0.19 percent 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 Wattanakuljarus and Coxhead (2008), Blake *et al.* (2008) and Kweka (2004) and show that, in general, tourism expansion benefits all household groups, but the poorest (rural) household group gains less than other household groups.

4.4 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, i.e. headcount (P_0), income gap (P_1) and severity (P_2). In 2005, 45 percent 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 percent. Poverty severity is 7.7 in Kenya in 2005. The simulation effect indicates that tourism development reduces the poverty count by 1.834 percent to 43.16 in year 20. This is means a steady 5 percent increase in arrivals in Kenya will enable 1.83 percent 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.

Table 1: Poverty results, percentage change from the base scenario – Kenya

	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 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.

However, during the same period of time, the poverty gap is reduced by approximately 3 percent meaning that not only 1.83 percent 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 household of the country will experience an improvement in their welfare. The effect on the poverty count is highest in Years 3 to 11. These results validate the use of a dynamic model and show that application of static 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, lead to an increase in demand and create job opportunities for the poor but the effect occurs mostly in the post simulation years. The results indicate that not only the tourism industry will reduce poverty in Kenya but also reduce the poverty gap and improve the income distribution amongst the poor. In other words, a larger number of households are 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 percent. Urban households, on the other hand, register an annual increase in aggregate real consumption of 0.14 percent reflecting the higher increase in annual income of the latter. 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 non-food expenditures (GOK, 2007). The results are reported in Table 2.

Table 2: Poverty results, percentage change from the base scenario – Rural and Urban

	Rural			Urban		
	<i>P0</i>	<i>P1</i>	<i>P2</i>	<i>P0</i>	<i>P1</i>	<i>P2</i>
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 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.

In the base year, all three indices indicate that poverty is more prevalent and severe in the rural areas of Kenya. In 2005, 70 percent of the rural population of Kenya lived below the poverty line as opposed to 34.5 percent 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 favoured than poor households in rural areas. Moreover, low-income agricultural households experience the least improvement, while low-income non-agricultural households and high-income households gain the most.

1.56 percent of the rural population and 1.89 percent 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 percent and 5.15 percent 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 reducing poverty severity to a minimum in the 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 the tourism will not be very significant in improving the incidence of poverty of Kenya. Furthermore, the gap between poverty in rural and urban household is not significantly narrowed.

The gap in the headcount ratio and 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. However, the benefits are more evenly distributed in rural areas as compared to urban areas. Income inequality is more pronounced in urban areas than in their rural counterparts. Expansion of the hotel sectors and investment in transports, are the two sectors which will grow the fastest. These investments are more likely to take place in the

larger town and cities of Kenya. 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.

5. RECOMMENDATIONS AND CONCLUSION

This paper investigated the impact of increase in inbound tourism on the Kenyan households using a dynamic GCE model. The aim was to find out the extent to which the tourism industry impact on the poorer households of the country.

Results indicate that as a nation Kenya will benefit from 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. At sectorial level, there will be losers and gainers. Resources move from traditional sectors to tourism industries and tis 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 labour 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 both urban and rural level. However, poverty falls faster in the urban area than in the rural area and the effect in the rural area is dampened by a fall in labour demand and earnings for the poor working in the agricultural sector.

The results of the present paper 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 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 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 labour from agriculture to sectors with higher linkages to the tourism industry. Fostering collaborations and reducing competition between the two sectors has the potential of benefitting 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 sector and the tourism sector, may dissipate the negative impact on the agricultural sector. New synergies between these two competing sectors can take the form of favouring locally sourcing of food needed from an increasing 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.

Though there is no doubt that different types of tourism generate a different distributional impact 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 towards poverty reduction require a diversified growth strategy that expands tourism while at the same time 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 reduction which becomes more apparent as from the third year. It is clear that the poverty reduction effect occurs with a lag and it is recommended that when possible dynamism be included in future models developed. Finally, the model developed in this study is based on the assumption of rational economic agents and the assumption of perfect competition and no distortions. In reality, however, despite the existence of many small firms, much of tourism supply is dominated by a few large firms (for example airlines, cruise ships and theme parks), market failure such as price controls, 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. Additional research is required to better understand how tourism policies can be combined with other macroeconomic, environmental or complementary policies that ensure that tourism growth benefits poor people and the environment. 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.

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