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Assessing the poverty impact of the COVID-19-induced tourism crisis in Tanzania: a social accounting matrix microsimulation analysis

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ABSTRACT

The COVID-19 pandemic has caused major disruptions to international tourism and has stimulated research interest. This study examines links between COVID-19-induced tourism disruption and poverty in Tanzania. Unlike previous studies linking COVID-19, tourism and poverty, this paper uses a social accounting matrix (SAM) microsimulation analysis that allows decomposition of poverty indices by population subgroup and assessment of the drivers of aggregate poverty. The results of the SAM multiplier analysis indicate that all households will experience reduced incomes, and that this effect will be more pronounced in urban than rural households. The microsimulation results suggest that the COVID-19-induced tourism crisis will exacerbate the poverty headcount, poverty gap and poverty severity, with urban and rural non-farm households being most affected. The results of the poverty decomposition show that the growth effect has a stronger impact than the inequality effect on increased poverty. Poverty increases and inequality decreases simultaneously. The paper suggests several demand- and supply-side policies that may help to build tourism resilience and recovery and alleviate poverty in Tanzania in the post-COVID world.

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Tourism in Tanzania; tourism and poverty; COVID-19 pandemic; microsimulation; FGT poverty indices; poverty decomposition

Introduction

The first United Nations sustainable development goal (SDG) is to eradicate the incidence of extreme poverty, measured using an extreme poverty line corresponding with the budget required to satisfy minimum food requirements. Remarkable progress has been made over recent decades to eradicate poverty in developing economies. However, the COVID-19 pandemic is likely to hinder this progress. A year after its outbreak, the World Bank estimates that the pandemic has pushed more than 100 million people worldwide into extreme poverty (World Bank, 2020). Lakner et al. (2020) suggest that the number of extremely poor Africans may have increased by 14 million in 2020. Prior to the pandemic, poverty as a percentage of Africa's total population was expected to decline from 36% to 33%, but poverty levels are now expected to stabilize at around 35% at best, and slip to 37% at worst (Lakner et al., 2020). Tanzania has reportedly been amongst the most successful countries in reducing poverty in recent years, with

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a reduction of 3.2% between 2000 and 2015 (Lakner et al., 2020). Of the current 14 million poor people in Tanzania, an estimated 600,000 more are expected to fall into extreme poverty due to the pandemic unless the government implements targeted support packages to mitigate its impact on vulnerable groups (Akeel et al., 2021). This is partly because the tourism industry, a key pillar of the Tanzanian economy, has been hardest hit by the pandemic (Boston Consulting Group, 2020).

The tourism sector is an important component of Tanzania's economic development strategy, having grown at a healthy rate over recent decades and contributed significantly to poverty reduction (Yusuf & Ali, 2018). The travel and tourism sector is also Tanzania's primary foreign exchange earner. According to the World Travel & Tourism Council (WTTC, 2020), tourism accounts for 10.7% of Tanzanian GDP and supports 1.5 million jobs, or 11% of total employment, with 5.8% growth in 2019 compared with 6.1% in 2018 (WTTC, 2020). In 2020, as a result of the COVID-19 pandemic, the global economy shrank by 5.2% (World Bank, 2020), while the tourism sector experienced a sharp decrease in arrivals and receipts worldwide (UNWTO, 2021). The UNWTO reported a 70% decrease in international tourist arrivals in Tanzania in October 2020 compared with 2019, arguing that it will take two and a half to four years to return to 2019 levels. According to the International Air Transport Association (IATA, 2020), airline demand, measured by revenue passenger-kilometers, fell globally by 66% in 2020, and is unlikely to recover to pre-COVID levels before 2024.

While the economic and distributional impacts of the COVID-19-induced tourism crisis have been well documented (e.g. Arndt et al., 2020a, 2020b; Diao et al., 2020; Gössling et al., 2021), its impact on poverty has received little research attention. This paper contributes to the literature by measuring the impact of the COVID-19-induced collapse in tourism on poverty using a social accounting matrix (SAM) microsimulation approach. With its ability to capture the detailed structure of an economy and the various interdependencies within a socio-economic system, SAM lends itself particularly well to analysis of the short-term, economy-wide impacts of sectoral shocks. Thus, it is an important accounting tool for articulating the generation and distribution of income between social and institutional groups (Round, 2003). This paper decomposes the tourism shock's impact on poverty into growth and redistribution components, which helps us to examine the contributions of changes in income and inequality to poverty in Tanzania. This study also measures the impact of the tourism crisis on poverty in subgroups of the population, defined in terms of geographical, expenditure decile and other factors. Decomposing changes in poverty indices over time into growth and inequality components allows us to determine whether the changes are driven mainly by changes in mean income or by changes in the distribution of income within the population (Haughton & Khandker, 2009).

In the remainder of the paper, following a review of the literature on tourism and poverty in Africa, the impacts of COVID-19 on international tourism receipts in Tanzania are analyzed, the SAM model and data are explained, and the results of the model simulation are presented. This is followed by presentation of the methodology and data for the microsimulation, explanation of the results, and discussion of the policy implications, before drawing some conclusions.

Tourism, income distribution and poverty

Most studies of the tourism sector's potential as a source of income have focused on the impact of tourism growth on income distribution and poverty reduction (e.g. Blake, 2008; Folarin & Adeniyi, 2020; Kweka, 2004; Mitchell & Ashley, 2006; Njoya & Nikitas, 2020; Njoya & Seetaram, 2018; Saayman et al., 2012). Ashley and Roe (2003) argue that the sector connects with the concept of pro-poor growth because it is labor-intensive, providing a range of jobs for skilled and unskilled workers, migrants and informal workers, and is based on the cultural and natural assets of the poor. The sector is also particularly important for women, who make up 55.5% of workers

in tourism globally and 70% at a regional level, many of whom work in small and medium-sized enterprises (Baum, 2013).

Kweka (2004) and Odhiambo (2011) show that tourism has contributed significantly to Tanzania's economic growth. Kweka (2004) argues that tourism is a powerful tool for income distribution. However, unless accompanied by a tourism tax and infrastructural improvements, it may accelerate income disparities between urban (higher-income) and rural (lower-income) households. Blake (2008) concludes that despite strong links between tourism-related sectors and the rest of the economy, the tourism industry provides substantially less income for poor households than other export industries. Similarly, Njoya and Seetaram (2018) find that tourism expansion in Kenya will modestly improve income distribution across urban and rural regions, but that poor urban households will experience higher income increases than their rural counterparts. Overall, households in the middle- and upper-income deciles will gain more than those in the lower deciles in both regions. Saayman et al. (2012) argue that although tourism receipts can be used as a tool to alleviate poverty, tourism expansion will benefit the poor very little in the short term unless supported by policies focusing on the labour market and human resource development.

Njoya and Nikitas (2020) indicate that although tourism in Senegal may create opportunities for farmers, capital income plays a more significant role than labour income in how changes in tourism-related sectors affect households. Mitchell and Ashley (2006) and Folarin and Adeniyi (2020) argue that the poor in sub-Saharan Africa may benefit from tourism, especially when accompanied by equitable income distribution. Saayman et al. (2012) study of the impact on poverty of tourism expansion in South Africa concludes that tourism benefits the poor, albeit to a lesser extent than the non-poor. Folarin and Adeniyi's (2019) evidence supports the positive impact of tourism expansion in reducing poverty levels in Africa.

Focusing on employment and income, Adiyia et al. (2017) show that the incomes of workers employed in the tourism sector are higher than those of the lowest 20 percentile. They conclude that tourism employment contributes to poverty alleviation by improving households' livelihoods. Other studies focus on tourism earnings by gender. Signé (2018) observes that compared with other industries, the tourism sector disproportionately employs women, who often find it challenging to enter the formal employment market. According to UNCTAD (2017), 47% of hotel and restaurant workers are women. In countries such as Ethiopia, Lesotho and Mali, women's participation in the tourism sector workforce is particularly high, with 80% of employees in the hospitality sector in 2014 being female, compared with only 17.4%, 27% and 24.1% in Algeria, Morocco and Egypt, respectively (UNCTAD, 2017). The impact of tourism crises on poverty has received little research attention. Most studies of the economic costs of tourism crises focus on sectoral and macroeconomic impacts using computable general equilibrium models (e.g. Blake et al., 2003; Blake & Sinclair, 2003; Dwyer et al., 2006).

Impacts of COVID-19 on tourism in Tanzania

The COVID-19 pandemic, a global crisis that began in Asia in late 2019, has forced the Tanzanian government to make difficult choices about how to mitigate the risks and manage the economic downturn. Mitigation measures include school and university closures, travel bans, hotel closures in Zanzibar, screening practices at ports of entry and a stimulus package directed toward the private sector (Deloitte, 2020). Unlike many countries around the world, the Tanzanian government, like most African governments, did not implement lockdown measures. At a state level, some African countries initially started to restrict entry and/or mandate quarantine for travelers from 'high-risk' countries around March 2020. By the end of March, this had swiftly progressed to closure of international borders and restrictions on domestic travel. However, the end of April and

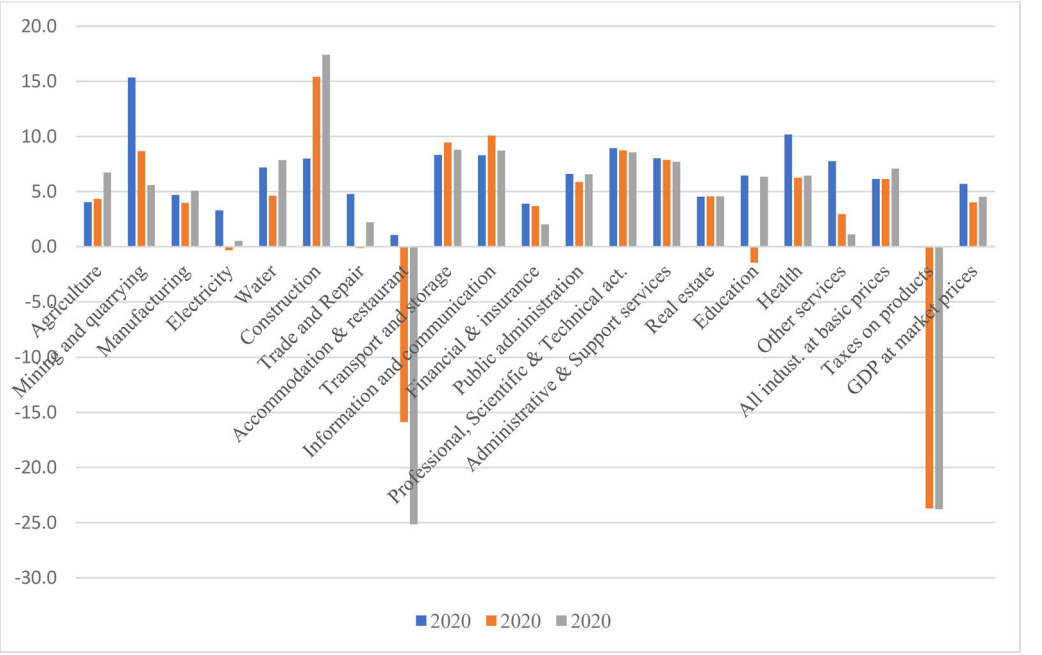


Figure 1. Economic activity growth rates, January to September 2020. Source: TNBS (2020).

beginning of May 2020 saw the disbandment of domestic travel restrictions within Ghana, the Seychelles, Namibia and Tanzania.

Overall, early measures to mitigate the adverse health and economic effects of the pandemic in Tanzania were moderate and shorter-lived than those in other countries in the region. Their effectiveness has not been assessed owing to lack of official information on COVID-19 infection and mortality rates. Compared with its regional peers, Tanzania has fared relatively well with regard to the economic impact of the pandemic, but poverty is expected to have increased as a result of slow economic growth. The economy grew by an estimated 2% in 2020, down from 6% in 2019, and although a 3% to 5% rebound is projected in 2021, Tanzania's economic output is expected to remain well below pre-pandemic levels over the medium term (Deloitte, 2020). In 2020, per capita growth became negative for the first time in over 25 years (World Bank,2021). The decline in GDP is attributable to two main factors: reduced tourism growth and the decline in international trade. The global economic slowdown has adversely affected export-oriented sectors, and especially tourism.

Figure 1 compares changes in the outputs of selected sectors by quarter. In the second and third quarters of fiscal year 2019/2020, accommodation and food services and tax revenues suffered huge declines (−25.1% in accommodation and restaurant activities in the third quarter), while other sectors, such as agriculture and construction, experienced moderate declines or slight increases (TNBS, 2020).

Figure 2 illustrates the impacts of COVID-19 on international tourism receipts in Tanzania. This shows that global travel restrictions due to the COVID-19 pandemic adversely affected international tourism receipts, which declined by 0.9% in the first quarter of 2020 and by more than 75% between April and October 2020.

Recent data show that in 2018 and 2019, international tourism receipts rose by 8.8% and 6.3%, respectively, compared with previous years (Figure 3). This confirms the continuous growth in international tourism receipts witnessed in East Africa over recent decades. In 2019, tourism spending reached USD 2605 million, up from USD 2449 million in 2018. However, following the COVID-19 outbreak, it decreased by 62.1% in Tanzania, 57.5% in Uganda and 59.8% in Rwanda

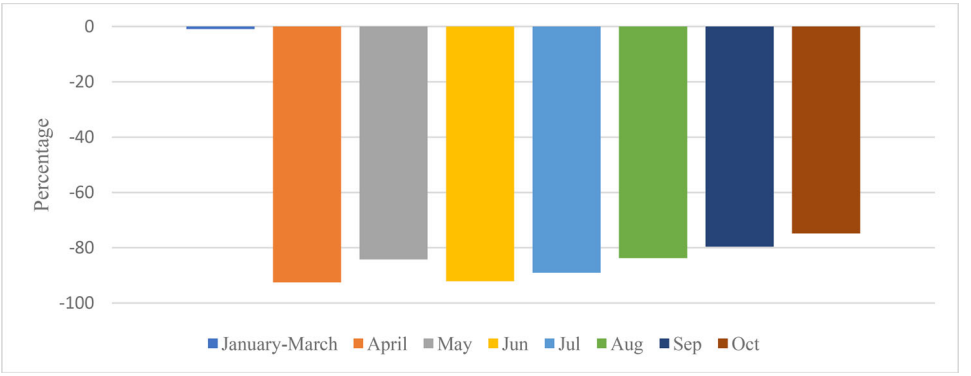
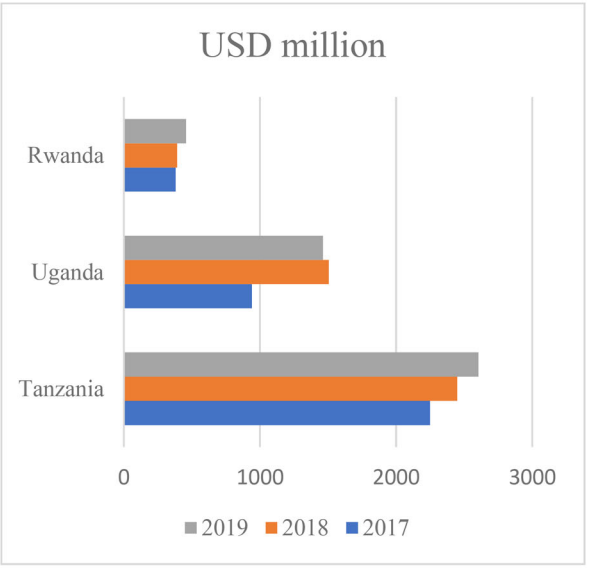


Figure 2. International tourism receipts in Tanzania in 2020 (USD million). Source: UNWTO (2021).



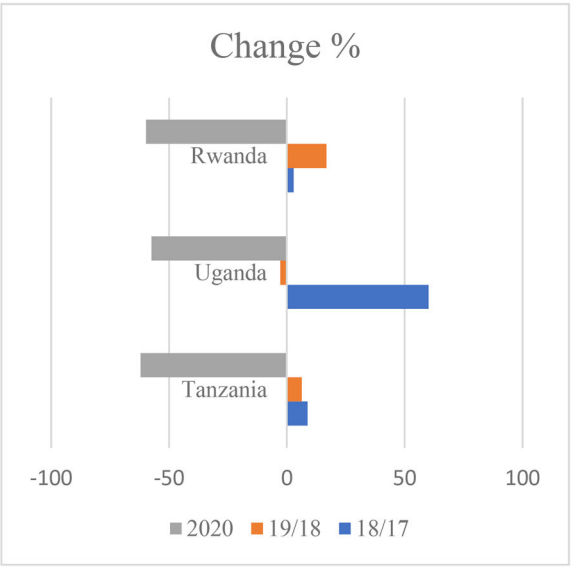


Figure 3. Recent trends in international tourism receipts. Source: UNWTO (2021).

(UNWTO, 2021). Hotel occupancy rates reduced from between 49% and 60% in 2019 to just 9% in mid-2020, and during the same period small enterprises, which account for 80% of Tanzanian tourist firms, experienced sales decreases of as much as 85% (Deloitte, 2020; TNBS, 2020).

Methods

The short-term distributional and poverty impacts of this tourism crisis can be assessed using a SAM microsimulation approach. In this study, two techniques were employed to measure the impact on poverty of the COVID-19-induced tourism crisis. First, a SAM multiplier model was used to estimate the socio-economic impact of a negative external shock to the tourism sector. SAM multiplier analysis is an accounting framework for predicting changes in overall economic activity resulting from some change in a given sector (Breisinger et al., 2009; Round, 2003). Its ultimate goal is to document and explore interdependencies throughout the economy, and specifically intersectoral and inter-institutional linkages. Second, deviations from the baseline for household income were linked with micro household data derived from the 2017/2018 Tanzanian Household Survey in order to examine the redistributive effects of tourism shocks on poverty.

SAM multiplier model

SAM is an extension of input-output (IO) tables that adds other institutional accounts to the framework. The IO/SAM framework is a useful tool for evaluating flows of goods between production nodes, in terms of industries transforming various products into sector-specific outputs, and market nodes distributing those outputs to other industries and final consumers (Miller & Blair, 2009). SAM and IO tables contain four main blocks: (1) value added (v), comprising capital and labor inputs into different industries; (2) intermediate consumption (z), from industries purchasing from other industries; (3) final demand (f) delivered by the industry to domestic and foreign agents; and (4) total output (x) from all sectors (Figure 4). The z matrix (see Figure 4) is an array of flows from markets for specific commodities back to industries. From the IO table/SAM, metrics of technical coefficients can be defined, which are inter-industry flows (z) normalized by the respective sectoral outputs. In matrix notation this can be written as $Z\hat{X}^{-1}$ (Eq. (1)), where $\hat{X}^{-1}$ indicates the inverse of each diagonal element and $Z\hat{X}^{-1}$ the A-matrix, with each column of A containing the product requirements per unit of output for each sector (Miller & Blair, 2009). Thus:

$$\boldsymbol{A} = \boldsymbol{Z} \cdot \hat{\boldsymbol{X}}^{-1} \tag{1}$$

In matrix form, these flows can be formulated as follows

$$\boldsymbol{x} = \boldsymbol{Z} \cdot \boldsymbol{i} + \boldsymbol{f} \tag{2}$$

We use *i* (Eq. (2)) to represent the summation vector, which is a column vector of 1 s of appropriate dimension, in this case n.

$$\text{Let} \boldsymbol{x} = \begin{bmatrix} \boldsymbol{x}_1 \\ \vdots \\ \boldsymbol{x}_n \end{bmatrix}, \boldsymbol{Z} = \begin{bmatrix} \boldsymbol{z}_{11} & \cdots & \boldsymbol{z}_{1n} \\ \vdots & \ddots & \vdots \\ \boldsymbol{z}_{n1} & \cdots & \boldsymbol{z}_{nn} \end{bmatrix} \text{and } \boldsymbol{f} = \begin{bmatrix} \boldsymbol{f}_1 \\ \vdots \\ \boldsymbol{f}_n \end{bmatrix} \tag{3}$$

Replacing *Z* in Eq. (3) by the definition of the A-matrix yields:

$$\boldsymbol{x} = (\boldsymbol{A} \cdot \hat{\boldsymbol{X}}) \cdot \boldsymbol{i} + \boldsymbol{f} \tag{4}$$

where *i* is a summation vector that contains only 1 s.

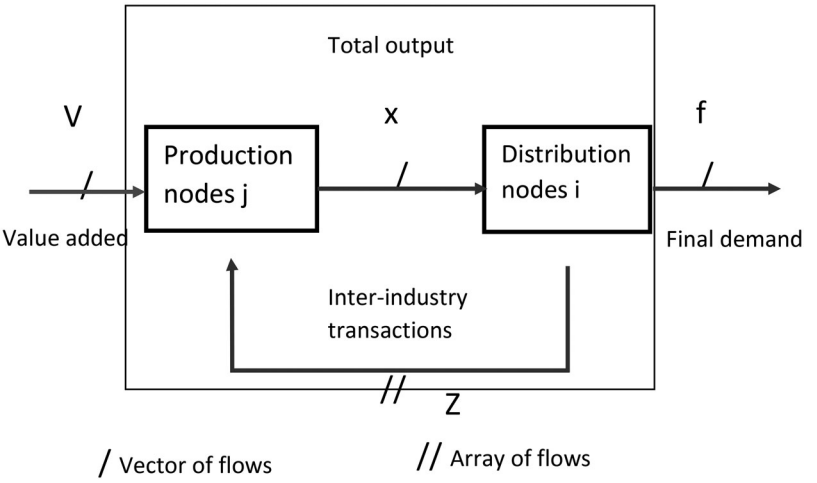


Figure 4. Schematic illustration of flows of goods between production and market nodes.

This matrix (Eq. (4)) shows the relative input per unit of output for each industrial sector. Having defined this A matrix, the IO model can be derived from the market equilibrium identity (Miller & Blair, 2009). In matrix notation, the above equation can be written as:

$$\boldsymbol{x} = \boldsymbol{A} \cdot (\hat{\boldsymbol{X}} \cdot \boldsymbol{i}) + \boldsymbol{f} \tag{5}$$

Replacing $(\hat{X} \cdot i)$ by (x) and rearranging the brackets in Eq. (5), we can specify the IO transaction as follows

$$\begin{gathered} x = A \cdot (\hat{X} \cdot i) + f \\ x = A \cdot (x) + f \\ (I - A)x = f \\ x = (I - A)^{-1} \cdot f \\ \boldsymbol{x} = \boldsymbol{L} \cdot \boldsymbol{f} \end{gathered} \tag{6}$$

The L in Eq. (6) is the Leontief inverse.

To compute SAM multipliers, the first step is to separate the SAM into endogenous and exogenous accounts. This is necessary for both economic and mathematical reasons. Endogenous accounts are sets of variables determined within the SAM framework, whereas endogenous accounts include variables taken as given within the model. Typically, endogenous accounts include production and income, while exogenous accounts comprise the rest of the world, government and capital accounts (Round, 2003). In a SAM matrix framework, exogenous and endogenous factors are linked by two mechanisms, injections and leakages. The multiplier approach builds on the assumption that changes resulting from an exogenous expenditure injection into an endogenous income account increase the income of the corresponding account and reflect average propensities to spend. For the SAM, we estimate a matrix of average expenditure propensities in a manner similar to the IO table by dividing SAM cells by the column sum total.

Following Miller and Blair (2009), we define the matrix of SAM coefficients as $S = Z \cdot \hat{X}^{-1}$ where, similar to the matrix of interindustry transactions in an IO model, partitions of S corresponding with partitions of $\overline{Z}$ are defined by Eq. (7)[1]:

$$\boldsymbol{S} = \begin{bmatrix} \boldsymbol{A} & 0 & \boldsymbol{C} \\ \boldsymbol{V} & 0 & 0 \\ 0 & \boldsymbol{Y} & \boldsymbol{H} \end{bmatrix} \tag{7}$$

where A is the matrix of interindustry technical coefficients, C is the matrix of endogenous final expenditure coefficients, V is the matrix of endogenous value-added input shares, Y is the matrix of endogenous coefficients distributing income to value-added categories and H is the matrix of endogenous coefficients for distributing institution and household income.

We also define the vector:

$$\overline{\boldsymbol{X}} = \begin{bmatrix} \boldsymbol{X} \\ \boldsymbol{V} \\ \boldsymbol{Y} \end{bmatrix} \tag{8}$$

where X is the vector of total interindustry sector outputs, V is the vector of total value-added inputs, and Y is the vector of total household income. We can now specify the basic SAM model as follows:

$$\overline{\boldsymbol{X}} = \boldsymbol{S}\overline{\boldsymbol{X}} + \overline{\boldsymbol{f}} \tag{9}$$

where

$$\overline{\boldsymbol{f}} = \begin{bmatrix} \boldsymbol{f} \\ \boldsymbol{w} \\ \boldsymbol{h} \end{bmatrix} \tag{10}$$

and f is the vector of exogenously specified commodity demand, w is the vector of value-added inputs that are exogenously specified and h is the vector of household income categories, the levels of which we specify exogenously.

Equation (10) can be specified as:

$$(\boldsymbol{I} - \boldsymbol{S})\overline{\boldsymbol{X}} = \overline{\boldsymbol{f}} \tag{11}$$

or

$$\overline{\boldsymbol{X}} = (\boldsymbol{I} - \boldsymbol{S})^{-1}\overline{\boldsymbol{f}} \tag{12}$$

The SAM includes all economic transactions, and from Eq. (12) we define:

$$\boldsymbol{M} = (\boldsymbol{I} - \boldsymbol{S})^{-1} \tag{13}$$

as the matrix of SAM multipliers. The model is solved in SIMSIP, a tool for estimating IO and SAM models (Parra & Wodon, 2009).

The SAM multiplier has recently been used to assess the short-term economic impacts of the COVID-19 pandemic. Breisinger et al. (2020) argue that the SAM approach lends itself particularly well to determining short-term economic impacts of demand and supply shocks. They assess the direct and indirect effects of the COVID-19-induced crisis on tourism spending and remittance revenues in Egypt using a SAM multiplier model. They find that the economic loss due to COVID-19 will be significant but will vary depending on the duration of the crisis, and that although all household groups will be adversely affected by lower tourist expenditure, poor households will be most affected. Other recent studies using SAM multiplier models to analyze the economic impacts of the pandemic include Diao et al. (2020), Arndt et al. (2020a, 2020b), Amewu et al. (2020) and Aragie et al. (2021). Similar to Breisinger et al. (2020) findings, Diao et al. (2020) show that Myanmar will suffer substantial economic losses. Arndt et al. (2020a, 2020b) examine the impacts of COVID-19 on food insecurity in South Africa, concluding that the pandemic's adverse impacts on household income (both labor and transfer income) will be sufficiently large to drive thousands of households into food insecurity. Applying a SAM multiplier approach to Ghana, Amewu et al. (2020) find that the country's GDP had fallen by 27.9% three months after the lockdown measures were put in place, and an additional 3.8 million Ghanaians had slipped into poverty. Aragie et al. (2021) combine a poverty module and the IFPRI-SAM multiplier model to estimate the pandemic's impact on poverty. The results of their simulations

Table 1. Allocation of gross commodity sales by tourism types (billion TZS; 1TZS = 0.00043 $US).

		Tourism demand			Total demand	
Economic activity	Total output	Domestic	Foreign	Total	Non-tourism demand	Tourism share (%)
Agriculture and fishing	**33,685.00**	**0.00**	**0.00**	**0.00**	**33,685.00**	**0.00**
Industry and construction	**45,883.00**	**0.00**	**0.00**	**0.00**	**45,883.00**	**0.00**
Services	**70,171**	**1,301.84**	**2,766.43**	**4,068.27**	**66,103**	**100.00**
Wholesale and retail trade; repairs	17,150.22	53.68	114.08	167.76	16,982.45	4.00
Transport and storage	10,460.78	174.47	370.76	545.23	9,915.54	13.00
Accommodation and food services	6,586.99	818.69	1,739.71	2,558.40	4,028.59	61.00
Information and communication	3,506.17	0.00	0.00	0.00	3,506.17	0.00
Financial and insurance activities	3,803.06	0.00	0.00	0.00	3,803.06	0.00
Real estate and business services	2,776.76	0.00	0.00	0.00	2,776.76	0.00
Public administration and defense	8,952.05	0.00	0.00	0.00	8,952.05	0.00
Education	3,330.93	0.00	0.00	0.00	3,330.93	0.00
Human health and social work activities	2,135.55	0.00	0.00		2,135.55	
Business services	9,782.73	161.05	342.24	503.29	9,279.44	12.00
Other services	1,685.84	93.95	199.64	293.59	1,392.25	7.00
Sales taxes	**6,147.24**	**40.26**	**85.56**	**125.82**	**6,021.42**	**3.00**
All economic activities	**155,886.32**	**1,342.10**	**2,851.99**	**4,194.09**	**151,692.21**	**2.76**

Source: Author's estimates based on TNBS (2017) and WTTC (2016).

indicate that, assuming a COVID-19 shock duration of three months, the national poverty rate increases by 1.8 percentage points, equating to 1.6 additional Ethiopians falling below the poverty line.

2015 Tanzania Social Accounting Matrix

The model was calibrated to the most recent SAM for Tanzania, the 2015 Social Accounting Matrix for Tanzania developed by the International Food Policy Research Institute (IFPRI). The standard SAM, a square matrix relating to an economy over one year, comprises five main accounts: factors of production, institutions, production, capital and a rest-of-the-world account. The 2015 Tanzania SAM contains 70 activity and commodity accounts. The 13 factors of production accounts comprise four education-based categories of labor further disaggregated across rural and urban areas, four types of capital (crops, livestock, mining and other) and land. Households are disaggregated into 15 sub-categories by location (rural and urban) and expenditure deciles. Rural households are further disaggregated into farm and non-farm households. The SAM groups households into 15 groups, whereas we aggregate these categories into six groups based on data provided in the 2017/2018 Tanzanian Household Survey. Other accounts include trade margins, enterprise, government, various indirect taxes, saving and investments and the rest of the world.

Tourism-based SAM

In the absence of a tourism satellite account (TSA), we construct a tourism-based SAM using information from various sources, including the World Bank, the Tanzania National Bureau of Statistics (2017) and the WTTC (2016). The procedure for building a tourism-based SAM is well-documented (Pham et al., 2013). The allocation of commodity sales by tourism type (Table 1) is based on data collected from the Tanzania Tourism Sector Survey (TNBS, 2017) and WTTC Economic Impact Reports. According to the Tanzania Tourism Sector Survey (TNBS, 2017), of the total tourism expenditure in mainland Tanzania in 2015, 46% was spent on accommodation, 15% on food and drink, 13% on transport services, 12% on business services, 7% on other services, 4% on trade and 3% on taxes. The WTTC estimates that the direct contribution of travel and tourism to Tanzanian GDP in 2014 was 2975.6 billion Tanzanian shillings (TZS), or 5.1% of GDP.

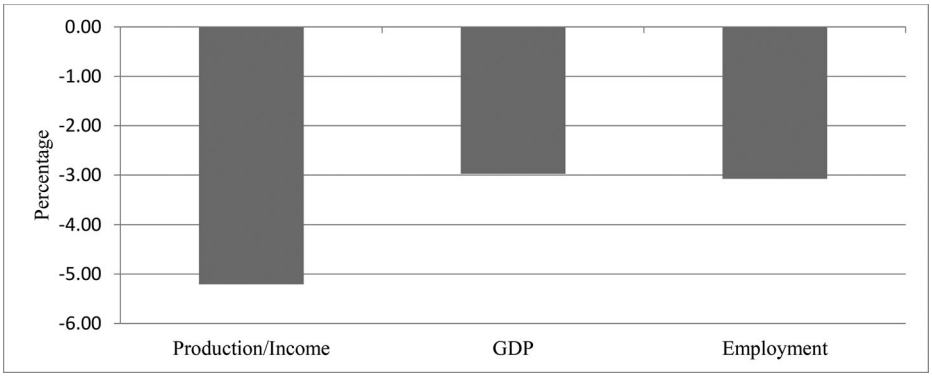


Figure 5. Macroeconomic impacts of a 70% reduction in tourism spending.

According to TNBS (2017),[2] tourism spending in Tanzania reached TZS 4194.1 (USD 1902.0 million) in 2015. The WTTC (2016) indicates that international spending accounted for 68% of total tourism spending versus 32% for domestic tourism in 2015. The share of domestic tourism increased from 31% in 2019 to 46% in 2020. In terms of spending by purpose of travel, leisure spending accounted for 84% of total spending in 2019 and 82% in 2020, versus 16% and 18% for business spending.

SAM multiplier simulation results

We simulate a 70% reduction in international tourism receipts. The results show that GDP falls by 2.97%, whereas employment and production decrease by 3.07% and 5.2%, respectively (Figure 5). The contraction of international tourist expenditure not only affects tourism-related sectors such as hotels and restaurants, tourist guides and transport, but also impacts indirectly on unrelated sectors such as food processing, agriculture and construction. Outputs from the agricultural sector decrease on average by 5.66%, and manufacturing and construction by 4.91%, while the services sector experiences a fall in outputs of 8.07%. The most affected activities are accommodation and food services (−43.65%), beverages (−25.79%), livestock (−14.28%), food processing (−12.83), real estate (−12.30%), electricity (−9.68%), water (−7.61%) and other services (−6.02%).

The decrease in outputs from production activities impacts on production factors. All factor incomes fall as a result of the decline in international tourism receipts. Rural uneducated (−3.43%) and urban primary workers (−3.16%) are the most affected labor types, while rural secondary (−1.95%) and urban tertiary labor (−1.98) are least affected (Figure 6).

Similarly to labor, capital and enterprise incomes decrease following the fall in international tourism receipts (Figure 7). However, on average, capital decreases faster than labor. The simulation results indicate that mining capital is the least affected type of capital, while non-agricultural capital (i.e. services and manufacturing) decreases slightly faster than agricultural capital. The negative impact on agricultural crops and livestock is likely to affect food availability and, in turn, food security. According to the World Bank's COVID-19 Business Pulse Survey (World Bank, 2021), 36% of surveyed small and medium-sized enterprises experienced sales decreases in June 2020. The survey also reveals that 140,000 formal jobs were lost, and 2.2 million Tanzanians employed in non-farm informal microenterprises experienced loss of income.

The falls in labour, capital and enterprise have varying income implications for different households based on their main sources of income. Table 2 decomposes household income by sources, expressed as the share of total income. The simulation results show that poor rural farm households experience a 3.31% decrease in income, whereas the income of poor rural non-farm

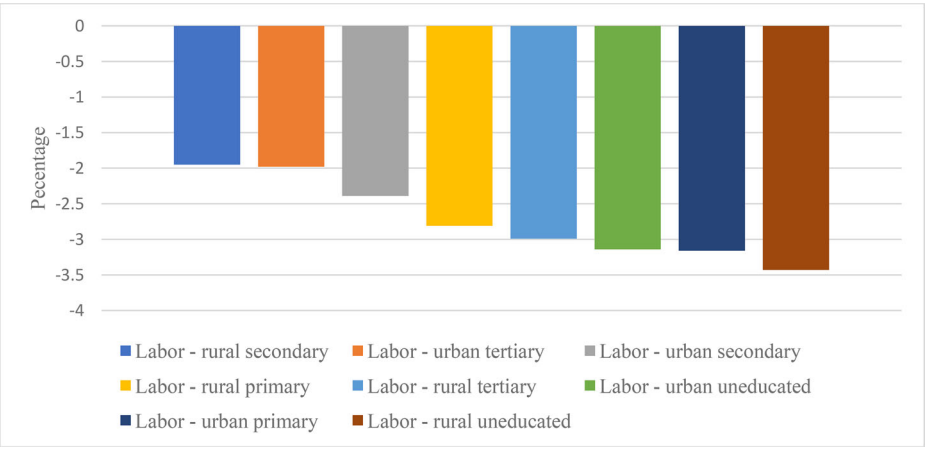


Figure 6. Employment effects of a 70% reduction in tourism spending.

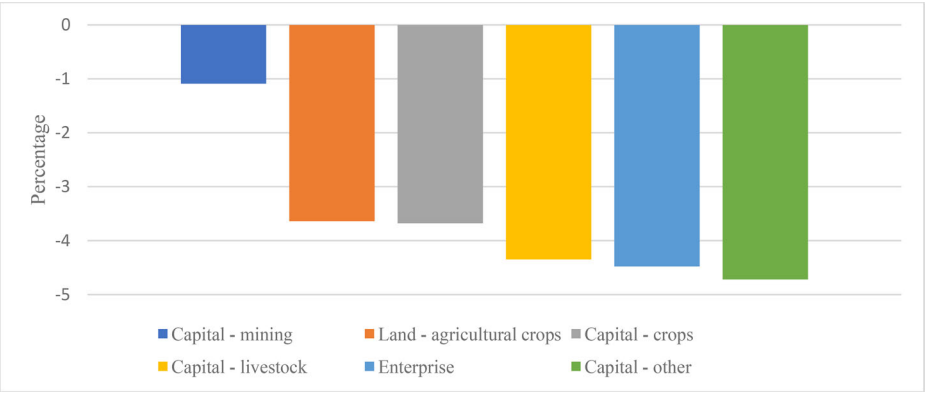


Figure 7. Impacts of a 70% reduction in tourism spending on capital demand.

Table 2. Households' sources of income (% of total income).

	Labor	Capital	Enterprise	Government	Rest of the world	Total (billion TZS)
Rural farm poor	53.29	39.14	6.88	0.41	0.28	14,820.84
Rural farm non-poor	52.88	33.90	12.26	0.36	0.60	15,080.69
Rural non-farm poor	89.09	0.00	10.10	0.44	0.37	614.86
Rural non-farm non-poor	84.38	0.00	14.54	0.22	0.87	2148.22
Urban poor	68.66	16.62	13.87	0.61	0.24	1474.94
Urban non-poor	66.49	3.61	28.34	0.40	1.15	36,631.19

Source: 2015 Tanzania SAM.

households decreases by 3.38%. The income of urban poor households is 3.35% lower. The large decreases for both rural and urban poor households can be ascribed to the sharp decrease in capital and enterprise income relative to labor income. Thus, households that rely on self-employment and informal micro-enterprises in rural and urban areas will witness substantial decreases in income. Rural non-farm households receive a large share of their income from labor, whereas poor rural farm and urban households have diversified sources of income. For instance, poor rural farm households receive incomes from two main sources accounting for 92.43% of their total income: capital, including land, and labor (Table 2).

The households most affected by the fall in international tourist spending are those with larger shares of factors that experience the biggest decreases in returns. For instance, it can be

assumed that non-poor urban households have larger proportions of income from secondary and tertiary labor. As illustrated in Figure 6, these types of labor are less affected by the shock than primary and uneducated labor. Poor rural households gain more of their income from uneducated labor types, which decrease significantly as a result of the tourism shock. The weakest effect is observed among rural non-farm non-poor, whose income is projected to decrease by 2.79%. They can be assumed to rely on a large proportion of rural secondary labor, which is less affected by the shock than urban secondary labor and other types of labor (Figure 6). The next sections examine the impact of decreases in income on poverty.

Foster-Greer-Thorbecke poverty indices

We apply the Foster-Greer-Thorbecke (FGT) poverty indices, the most common indices used to measure poverty, to Tanzanian data. The general formula for FGT is given as follows:

$$\mathbf{FGT}(\boldsymbol{\alpha}) = \frac{1}{\mathbf{N}}\sum_{\mathbf{i}=1}^{\mathbf{k}}\left(\frac{\mathbf{z}-\mathbf{y_i}}{\mathbf{z}}\right)^{\boldsymbol{\alpha}} \quad \boldsymbol{\alpha} = 0,\ 1,\ 2 \tag{14}$$

where population y_i is the income or consumption of individual i (adult equivalents); z is the poverty line; N is the total population; k is the number of poor people; and α is a parameter showing the degree of aversion to inequality among the poor (Haughton & Khandker, 2009).

This index is used to derive three poverty measures: poverty headcount, poverty gap and poverty severity. When parameter α equals 0, the FGT index is the poverty headcount index (P_0), which is the most popular poverty index. This measures the proportion of individuals in the population with income Y_i below poverty line Z. Algebraically, P_0 is specified as follows:

$\boldsymbol{P_0} = \frac{\boldsymbol{k}}{\boldsymbol{N}}$(15)When α equals 1, the FGT index is the poverty gap index (P_1). The poverty gap for individual i is defined as the difference between the poverty line and the individual's income. Thus, the poverty gap index captures the extent to which the incomes of the poor fall below the poverty line (Haughton & Khandker, 2009). The poverty gap corresponds with the minimum average transfer that would eliminate poverty. The general formula for P_1 is given as follows:

$$\boldsymbol{P}_1 = \frac{1}{\boldsymbol{N}}\sum_{\boldsymbol{i}=1}^{\boldsymbol{k}}\frac{\boldsymbol{z}-\boldsymbol{y_i}}{\boldsymbol{z}} \tag{16}$$

When α equals 2, we obtain the poverty severity index, which is a weighted average of normalized poverty gaps, where the weighting is the normalized poverty gap itself. In other words, the weighting is greater for poorer individuals (Haughton & Khandker, 2009). Algebraically, P_2 is specified as follows:

$$\boldsymbol{P}_2 = \frac{1}{\boldsymbol{N}}\sum_{\boldsymbol{i}=1}^{\boldsymbol{k}}\left(\frac{\boldsymbol{z}-\boldsymbol{y_i}}{\boldsymbol{z}}\right)^2 \tag{17}$$

Poverty decomposition

The FGT poverty index has the property of being decomposable across population subgroups. Between two periods $t-1$ and t we can decompose changes in total poverty into growth and redistribution effects. The growth effect captures changes in poverty due to changes in average incomes, and the redistribution effect identifies poverty changes due to redistributions of income within the population. Understanding the sources of changes in poverty may inform policymakers on the degree of inclusiveness in growth patterns as well as how changes in the distribution of income or sectoral growth affect poverty.

Decomposition across subgroups

The poverty decomposition employed in this paper is based on Kakwani's (2000) methodology, but differs in how it considers differential growth and inequality effects between groups. The approach outlined below follows that of Parra and Wodon (2009), who adapt Kakwani's approach to how SIMSIP (a tool for analyzing SAM) computes changes in poverty.

A general poverty measure is given by:

$\boldsymbol{P} = \boldsymbol{P}(\boldsymbol{z}, \boldsymbol{\mu}, \boldsymbol{L}(\boldsymbol{v}))$(18)where z is the poverty line, μ is the aggregate mean income and $L(v)$ is the Lorenz curve. Following Kakwani (2000), the change in poverty can be written as:

$$\Delta \boldsymbol{P} = \underbrace{(\Delta \boldsymbol{P})_{\boldsymbol{GR}}}_{\textbf{Growth effect}} + \underbrace{(\Delta \boldsymbol{P})_{\boldsymbol{IN}}}_{\textbf{Inequality effect}} \tag{19}$$

where $(\Delta P)_{GR}$ is the change in poverty if the mean income changes from μ_{t-1} in period $t-1$ to μ_t in period t but the Lorenz curve remains fixed, and $(\Delta P)_{IN}$ is the poverty change that would have been observed if μ_t were equal to μ_{t-1}, or in other words if only the income distribution rather than the level changed (Parra & Wodon, 2009).

We define the change in poverty between two periods t and $t-1$ as $\Delta P = P_{t-1} - P_t$. Since this is a class of additive decomposable measures, P_t can be written as a weighted average of poverty measures for the subgroups (Parra & Wodon, 2009). If we assume that we have k subgroups, and P_t^i is the poverty incidence in group i in period t, then the change in poverty can be rewritten as:

$$\frac{\Delta \boldsymbol{P}^{\boldsymbol{i}}}{\boldsymbol{P}^{\boldsymbol{i}}} = \frac{(\Delta \boldsymbol{P}^{\boldsymbol{i}})_{\boldsymbol{GR}}}{\boldsymbol{P}^{\boldsymbol{i}}} + \frac{(\Delta \boldsymbol{P}^{\boldsymbol{i}})_{\boldsymbol{IN}}}{\boldsymbol{P}^{\boldsymbol{i}}} \tag{20}$$

for $i = 1, 2, 3, \ldots, k$, with

$$(\Delta \boldsymbol{P}^{\boldsymbol{i}})_{\boldsymbol{GR}} = \frac{1}{2}\left[\boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t-1}}^{\boldsymbol{i}}(\boldsymbol{v})\right) - \boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t-1}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t-1}}^{\boldsymbol{i}}(\boldsymbol{v})\right) + \boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t}}^{\boldsymbol{i}}(\boldsymbol{v})\right) - \boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t-1}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t}}^{\boldsymbol{i}}(\boldsymbol{v})\right)\right] \tag{21}$$

and

$$(\Delta \boldsymbol{P}^{\boldsymbol{i}})_{\boldsymbol{IN}} = \frac{1}{2}\left[\boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t-1}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t}}^{\boldsymbol{i}}(\boldsymbol{v})\right) - \boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t-1}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t-1}}^{\boldsymbol{i}}(\boldsymbol{v})\right) + \boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t}}^{\boldsymbol{i}}(\boldsymbol{v})\right) - \boldsymbol{P}\left(\boldsymbol{z}, \boldsymbol{\mu}_{\boldsymbol{t}}^{\boldsymbol{i}}, \boldsymbol{L}_{\boldsymbol{t-1}}^{\boldsymbol{i}}(\boldsymbol{v})\right)\right] \tag{22}$$

In the above equations, $L_{t-1}^i(v)$ and $L_t^i(v)$ are the Lorenz curves in periods $t-1$ and t, respectively. Note that in deriving the growth effect, we can fix the Lorenz curve for either the initial period or the terminal period. Either period can be justified, and thus we take the average of the two periods (Parra & Wodon, 2009). Similarly, the inequality component can be derived as in Eq. (21). Equation (22) estimates the change in poverty if inequality measured by the Lorenz curve changes between periods $t-1$ and t but the mean income is fixed between the two periods.

Tanzania's poverty profile

We use the 2017/2018 Household Budget Survey (HBS) produced by the Tanzania National Bureau of Statistics (TNBS) to establish Tanzania's poverty profile. In the HBS, basic needs poverty is measured by the household expenditure or consumption per adult required to satisfy basic needs. The basic needs poverty line comprises household expenditure on non-food goods and services, including transportation, education, clothes and health. It does not include housing-related expenditure, rent, spending on exceptional events or larger consumer durable items. The HBS also defines the extreme food poverty line as the monetary value of the minimum food bundle per adult per month, including food produced by the households themselves. The HBS reveals that in 2017/2018, the food and basic needs poverty lines were TZS 33,748 and 49,320

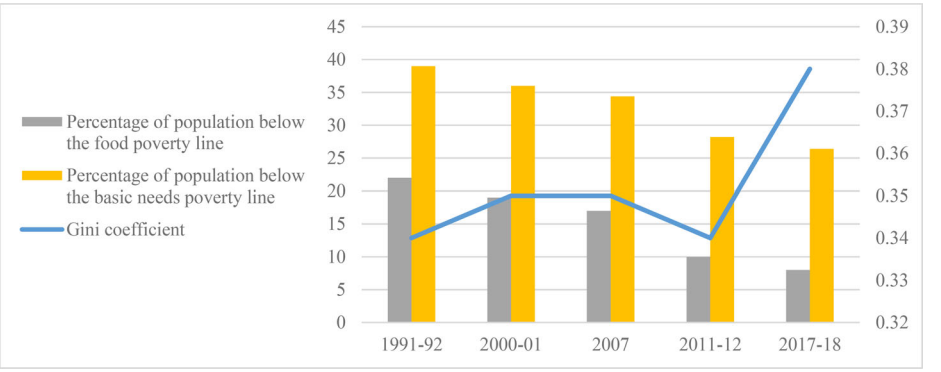


Figure 8. Trends in poverty and inequality in Tanzania. Source: TNBS.

per adult equivalent per month, respectively. Three poverty indices are estimated in the HBS: basic needs poverty (poverty headcount), poverty gap and poverty severity. According to the HBS, 8% of the Tanzanian population fall below the food poverty line, with the incidence of extreme poverty (food poverty) being less pronounced in urban regions (4.4%) than in rural regions (9.7%). Similarly, the incidence of basic needs poverty in Tanzania is lower in urban regions (15.8%) than in rural areas (31.3%). Moreover, the average monthly consumption spending per household ranges from TZS 720,946 in urban areas to TZS 268,041 in rural areas, with the latter accounting for 65.5% of the total population in 2019 (World Bank Rural Population[3]). Like the poverty headcount, the basic needs and food poverty gap and poverty severity are higher in rural regions than in urban areas. All these poverty indices decreased steadily between 2007 and 2018 (Figure 8). According to the HBS, during this period, the national poverty rate declined from 34.4% to 26.4%, the poverty gap from 10% to 6%, and poverty severity from 5% to 2%, pointing to a reduction in inequality among the poor. A poverty gap of 0.1 in 2018 implies that the average income of poor households was about 90% of the poverty line ($1 - 0.1 = 0.9$). In 2018, about 14 million people lived below the national poverty line of TZS 49,320 per adult equivalent per month, and about 26 million (around 49% of the population) lived below the $1.90 per person per day international poverty line.

Poverty simulation results

Table 3 displays the simulated changes in poverty indices (headcount ratio, poverty gap and poverty severity) for the basic needs and food poverty lines. The headcount ratios indicate that basic needs poverty increases as a result of the tourism spending shortfall, particularly for rural farm households. The simulation results also suggest that while 3.12 percentage points (pp) more rural farm households and 2.72 pp more rural non-farm households slip into basic needs poverty as a result of tourism contraction, basic needs poverty headcount ratios increase by 0.68 pp among urban households. Aggregate headcount ratios worsen, increasing by 1.34 pp from 28.74 to 30.08 for basic needs poverty and by 0.91 pp from 11.21 to 12.12 for food poverty. The basic needs poverty gap and poverty severity ratios show a widening gap between the average income of the poor and the poverty line. The poverty gaps increase faster among poor urban and rural non-farm households than for poor farm households.

The percentage of the population below the food poverty line is also projected to increase, with urban and rural non-farm households being most affected. Among rural households, the highest impact is observed among poor rural non-farm households, with P_0 increasing by 2.52 pp from 61.78 to 64.30, suggesting that 4.08% of the poor rural farm population slip into extreme poverty as a result of the tourism contraction.

Table 3. Poverty analysis with baseline poverty levels (basic needs poverty line: TZS 49,320; food poverty line: TZS 33,748).

		RURAL FARM NON-POOR	RURAL FARM POOR	RURAL NON-FARM NON-POOR	RURAL NON-FARM POOR	URBAN NON-POOR	URBAN POOR	AGGREGATE
ORIGINAL	Basic needs poverty line							
distribution	P_0	0.00	100	0.00	100	0.00	100	**28.74**
	P_1	0.00	34.12	0.00	36.82	0.00	28.56	**11.08**
	P_2	0.00	15.71	0.00	17.65	0.00	11.32	**5.05**
	Food poverty line							
	P_0	0.00	61.78	0.00	68.23	0.00	52.55	**11.21**
	P_1	0.00	17.76	0.00	20.44	0.00	12.03	**5.71**
	P_2	0.00	7.33	0.00	8.49	0.00	4.11	**2.31**
INCOME CHANGE (%)		−3.31	−2.89	−2.79	−3.38	−3.2	−3.35	**−3.20**
AFTER	Basic needs poverty line							
INCOME	P_0	3.12	100	2.72	100	0.68	100	**30.08 (1.34)**
CHANGE	P_1	0.05	35.51 (1.39)	0.04	38.31 (1.49)	0.01	30.49 (1.93)	**11.59 (0.51)**
	P_2	0.00	16.51 (0.8)	0.00	18.57 (0.92)	0.00	12.29 (0.97)	**5.33 (0.28)**
	Food (extreme) poverty line							
	P_0	0.00	64.30 (2.52)	0.00	71.13 (2.90)	0.00	56.09 (3.54)	**12.12 (0.91)**
	P_1	0.00	18.71 (0.95)	0.00	21.61 (1.17)	0.00	13.17 (1.14)	**6.05 (0.34)**
	P_2	0.00	7.78 (0.45)	0.00	9.08 (0.59)	0.00	4.56 (0.45)	**2.47 (0.16)**

Note: numbers in brackets represent the change between the original distribution and the distribution after the change in income.

The poverty gap ratios (Table 3, row 17, column 6) indicate that the depth of food poverty is highest for rural non-farm households (1.17), followed by poor urban households (1.14) and rural farm households (0.95). The increases in the poverty gap and poverty severity indicate that poor households become more impoverished as a result of tourism contraction. Somewhat similar patterns are observed for poverty severity ratios (Table 3, row 18). Overall, the poverty estimates vary between the different poverty lines, with poverty increasing faster for the lower poverty line (i.e. basic needs poverty line) than for the higher poverty line (i.e. food poverty line).

Various World Bank studies show that a high proportion of Tanzania's population is clustered around the poverty line, with often limited savings making them highly vulnerable to adverse economic shocks. A recent study (Akeel et al., 2021) shows that 600,000 Tanzanian are likely to slip into poverty as a result of the COVID-19 pandemic, with the most vulnerable groups being self-employed urban households and households employed in informal microenterprises in urban areas.

Decomposition of growth and inequality change

Table 4 reports the contribution of inequality and income level to the aggregate poverty level. As in Parra and Wodon (2009), the change in households' poverty is measured assuming that income growth is uniform at the aggregate rate for all households, and that the growth rate may differ between households (Table 4, row 3).

The results for poverty decomposition show that the growth effect has a stronger impact than the inequality effect on poverty increases (Table 4). This holds for all household groups. For instance, of the total increase of 1.34 pp in the aggregate incidence of poverty, the total growth effect (or change in income level) explains 1.54%, while the change in inequality (income redistribution effect) contributes −0.2%. Note that there is a negative change in income distribution, resulting in a decrease in inequality. The Gini coefficient decreases by 0.07 pp. This finding is in line with Chitiga-Mabugu et al. (2021) results, which indicate that the pandemic will push more of the South African population below the poverty line, while at the same time inequality will decline.

Table 4. Poverty decomposition.

		BASIC NEEDS POVERTY					FOOD POVERTY				
		Growth effect			Inequality effect	Total change	Growth effect			Inequality effect	Total change
		Uniform rate	Different rates	Total			Uniform rate	Different rates	Total		
RURAL FARM NON-POOR	P_0	3.41	−0.29	3.12	0.00	3.12	0.00	0.00	0.00	0.00	0.00
	P_1	0.06	−0.01	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00
	P_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RURAL FARM POOR	P_0	0.00	0.00	0.00	0.00	0.00	3.77	−1.24	2.53	0.00	2.53
	P_1	2.11	−0.72	1.39	0.00	1.39	1.47	−0.51	0.95	0.00	0.95
	P_2	1.23	−0.43	0.80	0.00	0.80	0.70	−0.25	0.46	0.00	0.46
RURAL NON-FARM NON-POOR	P_0	2.83	−0.11	2.72	0.00	2.72	0.00	0.00	0.00	0.00	0.00
	P_1	0.04	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00
	P_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RURAL NON-FARM POOR	P_0	0.00	0.00	0.00	0.00	0.00	3.66	−0.75	2.90	0.00	2.90
	P_1	2.02	−0.54	1.48	0.00	1.48	1.60	−0.43	1.16	0.00	1.16
	P_2	1.27	−0.35	0.93	0.00	0.93	0.80	−0.22	0.58	0.00	0.58
URBAN NON-POOR	P_0	0.54	0.14	0.68	0.00	0.68	0.00	0.00	0.00	0.00	0.00
	P_1	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	P_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URBAN POOR	P_0	0.00	0.00	0.00	0.00	0.00	4.84	−1.30	3.54	0.00	3.54
	P_1	2.28	−0.35	1.94	0.00	1.94	1.36	−0.22	1.14	0.00	1.14
	P_2	1.16	−0.18	0.97	0.00	0.97	0.54	−0.09	0.45	0.00	0.45
AGGREGATE	**P_0**			**1.54**	**−0.20**	**1.34**			**1.30**	**−0.39**	**0.91**
	P_1			**0.72**	**−0.21**	**0.51**			**0.48**	**−0.14**	**0.34**
	P_2			**0.40**	**−0.12**	**0.28**			**0.23**	**−0.07**	**0.16**

Policy implications

The findings of this study suggest that in the short term, social assistance from the government will be needed to help poor households and those pushed below the poverty line to maintain their pre-COVID-19 purchasing power. The analysis shows that the size of the basic needs poverty gap, which is the minimum per capita cost of maintaining the pre-COVID-19 poverty level as a share of the poverty line, is TZS 81.7 billion, and TZS 40.2 billion for the extreme poverty gap. Thus, government support will be a key determinant for mitigating the disruptive effects of the crisis and ensuring a swift recovery trajectory for firms and businesses negatively affected by the COVID-19 pandemic. This might include cash transfers to households, tax deferrals for firms or the creation of a tourism relief fund. In South Africa, the Tourism Relief Fund for Small, Medium-sized and Micro Enterprises (SMMEs) was created as part of the government's overall relief efforts, providing a grant to small entities in accommodation, hospitality and travel services sectors capped at US$2700 per entity (South African Government[4]). SMMEs are the backbone of the Tanzanian economy, accounting for 95% of all businesses and 35% of the country's GDP,[5] and are highly vulnerable to economic shocks. Moreover, SMMEs in Africa often have limited access to financial support, especially from banks, which hinders their expansion (Nemasetoni & Rogerson, 2005; Rogerson, 2004). Camilleri (2018) observes that travel and tourism SME owners rely on their savings or on informal financing such as from friends and family to sustain their businesses.

On the external policy side, tourism recovery hinges on vaccination rollout globally. While the rollout of vaccinations in Tanzania's key markets has progressed significantly (as of August 2021), it is likely to be a year or more before Tanzanians themselves will have access to vaccines. The Tanzanian tourism industry depends heavily on aviation, particularly long-haul travel. According to IATA, the latter may recover more slowly than most of the global economy, as revenue passenger kilometers (RPKs) may not recover to 2019 levels until 2023. Europe is Tanzania's main source market, while Australia, China, India and South Africa are major emerging markets. The

country's high dependence on inbound leisure tourism makes it exceptionally vulnerable to external shocks, such as COVID-19, which has implications for the speed of recovery of the Tanzanian tourism sector and poverty.

On the domestic policy side, recent measures announced by the Tanzanian government to control the spread of the virus will also impact on the speed of recovery. These include proof of a negative coronavirus test taken in the 72 hours prior to arrival for all travelers entering Tanzania, with mandatory 14-day quarantine at their own expense applying to travelers who have visited a country with 'new Covid-19 variants' in the previous two weeks. Safety and hygiene will play an important role in the short to medium term. Therefore, safety networks at all levels, including hoteliers, airlines, tour operators and airports, will help to restore confidence and facilitate recovery. Small group travel is an increasingly popular option, so small, customized tours enabling people to travel with close family members or friends will be needed to help tourism recovery and reduce poverty. Further innovations designed to suit customers' needs in this new environment, such as the provision of flexible packages with free cancellation and changeable tickets, will be vital to Tanzania's tourism recovery.

Some jobs might be saved by promoting domestic tourism to build recovery resilience. The UNWTO (2020) notes that governments in various parts of the world have taken steps to promote domestic tourism. For example, the Malaysian government has provided travel vouchers and tax relief for tourism-related expenditure, while the Italian government has launched marketing and promotion strategies to attract more domestic visitors and has given cash payments to spend in hotel accommodation. The Tanzanian government has encouraged businesses to lower entry fees to tourist attractions in order to increase domestic tourism. Melubo (2020) finds that the high prices of tourism products, especially accommodation facilities, coupled with a lack of financial resources or a culture of travelling for leisure, are among the main causes of the local population's low participation in Tanzania's tourism industries. He suggests that diversification of product offerings, awareness campaigns and tackling the affordability issue would help to overcome the challenges facing the growth of domestic tourism in Tanzania.

Although domestic tourism may help to build tourism resilience and recovery, it is important to note that the type of tourism matters for poverty alleviation. Using a sustainable livelihoods framework, Ashley (2000) argues that the overall impact of tourism on the livelihoods of rural dwellers in Namibia depends on the type of tourism and the extent to which the impact varies within and between communities. Muhanna (2007) observes that local communities in South Africa that participated actively in designing sustainable tourism developments were likely to experience a higher impact of tourism in alleviating poverty. Spenceley and Goodwin (2007) suggest that nature tourism helps to reduce poverty, mainly through its employment generation effect, as well as through investment in community development. Saayman et al. (2012) argue that although the poor benefit from tourism expansion, its impact is lower than on the non-poor, and that the impact on the poor will be higher if tourism development is complemented with policies that aim to both enhance human capital development and address labor market imperfections.

Conclusions

One of the greatest concerns of the impact of COVID-19 is the expected rise in poverty, which had declined over the previous two decades. Travel bans and the collapse of international tourist travel during the COVID-19 pandemic have had profound impacts on poverty in tourism-dependent developing countries, but have received little research attention. While some recent studies have examined the distributional impacts of the COVID-19-induced tourism crisis using both SAM analysis and computable general equilibrium models, very few have adopted a

microsimulation approach to explore the link between the international tourism crisis and poverty during the pandemic.

This study uses a SAM microsimulation approach to assess the economic and poverty impacts of the COVID-19-induced tourism crisis in Tanzania. Small negative shocks may have significant impacts on the very poor because of their low income and capabilities. Moreover, policymakers are always interested in understanding not just the overall effect on the economy but also how different groups in the population are affected. Poverty and inequality are rising around the world as a result of the COVID-19 pandemic, so understanding how different groups are affected may help to design policies that have a beneficial effect on income distribution. Examining impacts on poverty within subgroups is useful from a policymaking perspective, as it allows efficient targeting of policies for poverty reduction.

Our findings indicate that the contraction of international tourism brought about by the COVID-19 pandemic will lead to decreased income and increased poverty. Its impact on household incomes will be significant. All households will experience a decrease in income, with more pronounced effects on urban households (−3.27% on average) than on their rural counterparts (−3.09% on average). The simulation results also suggest that the tourism crisis will widen the poverty gap and worsen the severity of poverty because more households will be brought into basic needs poverty, with deepening poverty among poor households. Increases in the FGT indicators are observed in both urban and rural areas. Another major finding of this investigation is that differences in poverty across households are due to differences in mean levels of income. Thus, the main source of increasing poverty at the aggregate level is the change in mean income.

Although the SAM multiplier model is very useful for assessing economic links, income elasticity of demand and socially relevant questions, it has some limitations. It assumes the availability of inputs without constraints, fixed commodity structure and prices, constant return to scale and homogeneous sector outputs. Tourism impacts often operate primarily through the price channel, while employment and wages are affected by factor supply elasticity. Further insights might be gained by adopting a model capable of modelling price and quantity changes simultaneously, such as CGE microsimulation modelling. Dynamic CGE modelling would also help to capture the long-term implications of COVID-19 on poverty. The health and economic impacts of the pandemic, coupled with the government's efforts to mitigate the effect of the crisis, will have significant consequences for Tanzania's socio-economic trajectory.

Notes

1. The matrix $\overline{Z}$ in a SAM, like a Leontief model, is a square matrix for which the row and column sums are identical, which we designate as x.
2. https://www.tanzaniainvest.com/tourism
3. https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS
4. https://www.gov.za/covid-19/companies-and-employees/support-business
5. Tanzaniainvest.com

Disclosure statement

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