Global and local effects of the COVID-19 pandemic on Africa: What role does tourism play?

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Abstract

The COVID19 pandemic has caused an unprecedented decline in global economic growth. COVID19 effects on an economy are numerous, including global and local effects. This study focusses on the pandemic's impacts on the African continent with the interest to understand how the continent's integration within the world economy and its dependency on income from tourism determines the severity of the pandemic's impacts. We are, i.e., interested to identify the global channels that are most vulnerable to distortion and their impact on local welfare. To this end, we report an adapted conceptual framework to identify the main impact channels of the COVID19 pandemic. Based on this framework we employ stylised shocks to single out the different impact channels, thus decomposing GDP effects. These stylised scenarios are informed by the literature on the magnitude of shocks induced by COVID19.

Keywords: Tourism, CGE, covid19, Africa

Introduction

The COVID19 pandemic has caused an unprecedented decline in global economic growth (IMF, 2020) and jeopardizes the livelihood of the poor, who disproportionately depend on labour as their predominant source of income (Arndt et al., 2020; Maliszewska et al., 2020). COVID19 effects on an economy are numerous, including global and local effects (Figure 1). Three main global channels can be identified, including increased cost of doing international trade, changes in international commodity prices and transfers, and decline in receipts from tourism. Local effects range from morbidity and mortality effects to effects from local containment policy effects and related indirect impacts such as increased time-use to care for children and sick family members.

Due to policy responses to contain the spread of the virus many economic activities have only experienced a temporary decline, while numerous other sectors, most notably tourism, have suffered both strong supply and demand shocks (Brinca et al., 2020; United Nations, 2020). Quite a number of studies have already analysed the impact of the COVID19 pandemic (McKibbin & Vines, 2020), yet particularly studies employing methods of economy-wide impact assessment have mostly focused on a specific country (e.g., Amewu et al., 2020; Arndt et al., 2020; Chitiga-Mabugu et al., 2020; Walmsley et al., 2020; Zhang et al., 2020; Zidouemba et al., 2020), rather than on a specific region or continent.

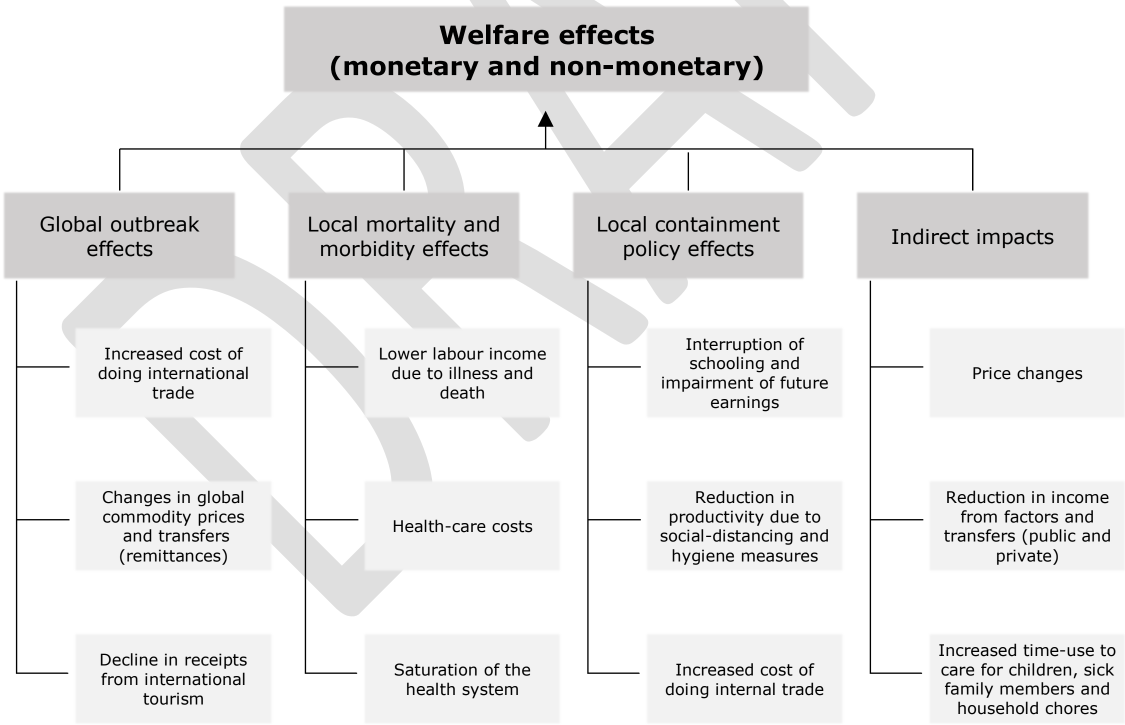

Figure 1 - The main impact channels affecting household welfare (Adapted from Feuerbacher, McDonald, & Thierfelder, 2020)

In this study, we focus on the pandemic's impacts on the African continent with the interest to understand how the continent's integration within the world economy and its dependency on income from tourism determines the severity of the pandemic's impacts. We are, i.e., interested to identify the global channels that are most vulnerable to distortion and their impact on local welfare.

Modelling Framework

To this end, we report an adapted conceptual framework to identify the main impact channels of the COVID19 pandemic, from which we derive two stylized scenarios, first, a global pandemic and, second, where it didn't reach Africa. These stylised scenarios are informed by the literature on the magnitude of shocks induced by COVID19 (e.g., del Rio-Chanona et al., 2020).

This paper employs a global computable general equilibrium (CGE) model, METRO (OECD, 2015), derived from the Social Accounting Matrix (SAM) based CGE model GLOBE (McDonald and Thierfelder, 2013). The model is based on a series of SAMs regional linked through trade relationships. The database derives from the GTAP v10 database (Aguiar et al., 2019) that is augmented with data on use categories distinguishing trade in intermediate and final demand goods compiled at the OECD.[1]

The database used in this study distinguishes transaction flows between 19 regions, and 25 sectors of production as detailed in Table 1. Production factors detail five labour categories, capital, land and natural resources. In addition, final demand agents are represented by a representative household, government and investment account per region.

Table 1 Regions, Sectors and production factors

Regions	**Sectors**	Communication
Egypt	Cereals	Recreational and other services
Nigeria	Vegetables Fruits	Public Administration, defense
Ethiopia	Crops	Education
Kenya	Animals	Health and social work activities
Zambia	Forestry	Other services
South Africa	Extraction industries	
North Africa	Oil	**Production Factors**
Rest of Western Africa	Meat and Dairy	Land
Central Africa	Food products nec.	Tech. and assistant professionals
Rest of Eastern Africa	Petroleum, coal products	Clerks
Southern Africa	Basic pharmaceutical products	Service and shop assistants
Oceania	Non-essential manufacturing	Office managers, professionals
China	Utilities	Agricultural, other low skilled
High Income Asia	Construction	Capital
Rest of Asia	Trade	Natural resources
North America	Accomm., Food and service act.	
South America	Transport nec	
Europe	Air transport	
Rest of the World	Warehousing, support activities	

The model represents an economy as mix of linear and non-linear relationships. Most importantly, households are assumed to maximize utility using a Stone-Geary utility function. Agents – households,

[1] Please refer to OECD (2015) for a detailed description of the model and its equations.

governments, investment – and production activities consume sets of composite commodities, that are formed by imported and domestically produced goods using a as three-level CES approach, following the so called Armington assumption of product differentiation. Mirroring the import side, the vector of commodities produced domestically is a function of a nested structure assuming imperfect transformability (CET) between domestic and export markets, the optimal distribution being determined by relative prices. Income elasticities and substitution elasticities are sourced from the GTAP database.

Domestic production is represented by a three-level nested production process. The lowest nest aggregates three unskilled labour categories and two skilled labour categories and capital using CES technology. Together with land and natural resources the resulting aggregates are forming aggregate value added using CES. Aggregate intermediate demand is formed by intermediates in fixed proportions using the Leontief technology. Intermediate demand and value added finally form output using CES technology. The substitution elasticities employed in this nesting are derived from GTAP.

The analysis is characterised by its short term character. Production factors, labour, capital and natural resources, are hence assumed immobile. Government expenditure is predefined and the income tax assumed flexible to balance the internal balance and internalise welfare effects, allowing for a comparison between scenarios. Similarly, in the foreign exchange account the exchange rate is flexible and current account fixed at its base level. Finally, the investment is predefined and savings adjust to maintain the balance.

Simulation setup

International trade margins are assumed to increase similar to shocks on trade costs implemented by other global analyses on COVID-19 (Laborde et al., 2020; Maliszewska et al., 2020). The COVID-19 crisis has led to a collapse in global tourism. Receipts from international tourism comprise a non-trivial share of GDP in many low-income countries (United Nations, 2020). Tourism services are contained in lodging (accommodation, food and service activities), air and land transportation as well as recreational and other services such as tourist guides. The decline in tourism exports is captured by reducing the total-factor-productivity of activities that provide international tourism services. The magnitude of this supply shock is quantified by the international tourism receipts reported for each country and distributed over the identified tourism sectors. Effects on global commodity prices and transfers result endogenously from simulations.

Local mortality and morbidity effects are implemented as reduced labour supply and increased government spending for health. Local containment policy effects enter the simulation in form of sector specific productivity shocks based on estimates from literature, for example as presented in Del Rio-Chanona et al. (2020).

Results

[tbc]

Conclusions

[tbc]

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