COVID-19's Effect on Income, Tanzania Perspective

Hellen Mtove
(National Bureau of Statistics, Tanzania)

Johnia Kakiziba
(National Bureau of Statistics, Tanzania)

Tumaini Kalindile
(National Bureau of Statistics, Tanzania)

Magreth Maganda
(National Bureau of Statistics, Tanzania)

Elide Mwanri
(National Bureau of Statistics, Tanzania)

John Mwanri
(National Bureau of Statistics, Tanzania)

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Abstract:
The paper is a contribution to a better understanding of how COVID-19 has affected people's income. Although Tanzania did not implement a total lockdown nor close its borders, there is an economic crisis that affected international trade and threatened people's livelihoods all over the world including Tanzania. During the pandemic, there was a downfall in the economy, in the private sector, some people lost jobs due to the closure of businesses, especially in tourism, transport, and hotel accommodation activities. The pandemic also affected household consumption expenditure with a decrease in purchases of goods and services used by the household(s) such as clothing, household durable, and household rent. The number of individual entrepreneurs also decreased. In this paper, we combine indirect indicators of value-added tax (VAT), exports, and imports, also the level of hotel accommodation/bed occupancy to track the dynamics of household income during the pandemic period using the series of monthly data from 2017 to 2021. The indicators are nationally representative and applicable to a basic requirement of people's livelihood. The indicators are based on the Tanzania Revenue Authority and the National Bureau of Statistics. The structural regression model is used to analyse data and research findings will provide policymakers with more transparency on the effect of the pandemic on income.

Keywords: *The pandemic and Wellbeing*

INTRODUCTION

COVID-19 has been a massive shock to the global economy and has affected export and import by big impact. The economic crisis was exacerbated by the lockdown in many countries worldwide including Tanzania.

Countries have closed national borders bringing international trade and commerce to an abrupt halt. All these are severely disrupting supply mechanisms and distribution chains in almost all sectors. At the same time, there has been a complete collapse of consumer demand as millions of people stay home and postpone their non-essential expenditures. (Mahendra Dev & Sengupta, 2020).

Tanzania continued to record positive economic growth, despite the challenges posed by the pandemic. Real GDP growth slowed down to 4.8 percent in 2020 from 7 percent in 2019. The slow growth reflected the impact of the pandemic on economic activities, particularly those directly exposed to external shocks such as i) accommodation and food services ii) Arts, entertainment, and recreation, iii) mining and quarrying, iv) transport and storage, administrative and support services, and construction.(BoT, 2021)

The National Bureau of Statistics conducts a monthly sample survey of hotel statistics to produce a hotel bed occupancy rate When compared with the same month last year (i.e. March 2019) the result shows that there was a decreased rate of 18.8 percent bed occupancy. The decline is attributed to the outbreak of the COVID-19 pandemic.(National Bureau of Statistics), 2020).

The Problem

The crisis has challenged many socio-economic achievements from the past decades, particularly in poverty reduction, and improvement in education and gender. Apart from exposing and heightening the pre-existing challenges in the economic and social sectors, the pandemic has also created other sets of challenges. (Raihan & Uddin, n.d.)

THE VARIABLES USED

Variables for assessment: four variables were selected to reflect the economic situation that occurred in the country during the period before and under the pandemic threat. the four variables selected include (i) Export, (ii) Import, (iii) Bed Occupancy, and (iv) Domestic VAT

DATA

We use monthly time series from administrative data before and during the period of COVID-19 to detect the effect on income by showing a graphical time-series analysis to describe the trend and seasonality in the time series of four key variables in the economy as indicators of income in the country.

METHODS

The methodology used i) Time series to study the effect of COVID-19 over time and ii) a Difference-In-Difference Approach (DID) to detect the magnitude of impact during the pandemic.
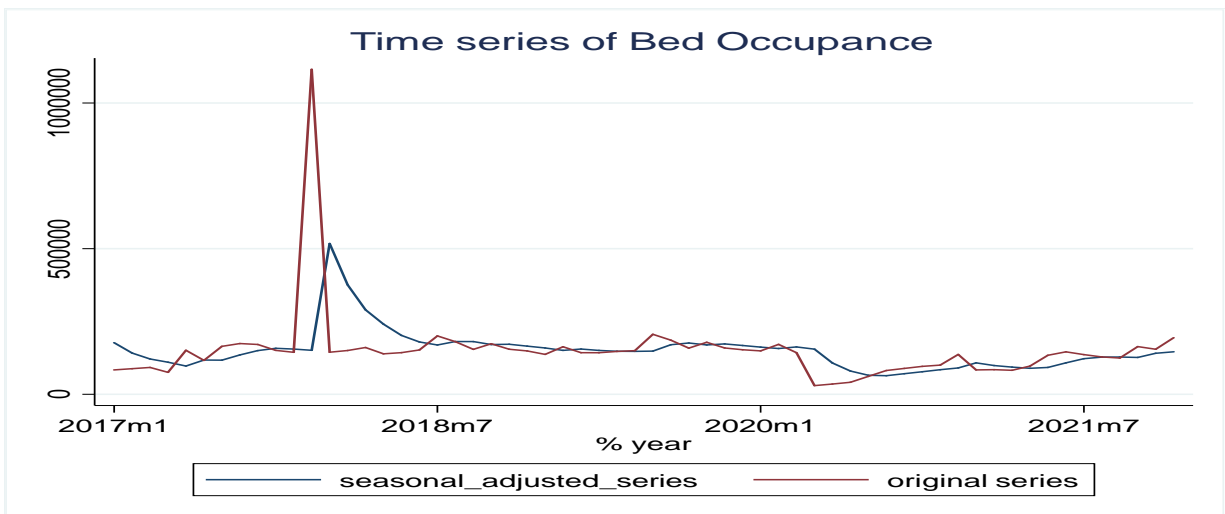
Time series graph:

    i)   VAT on goods and services
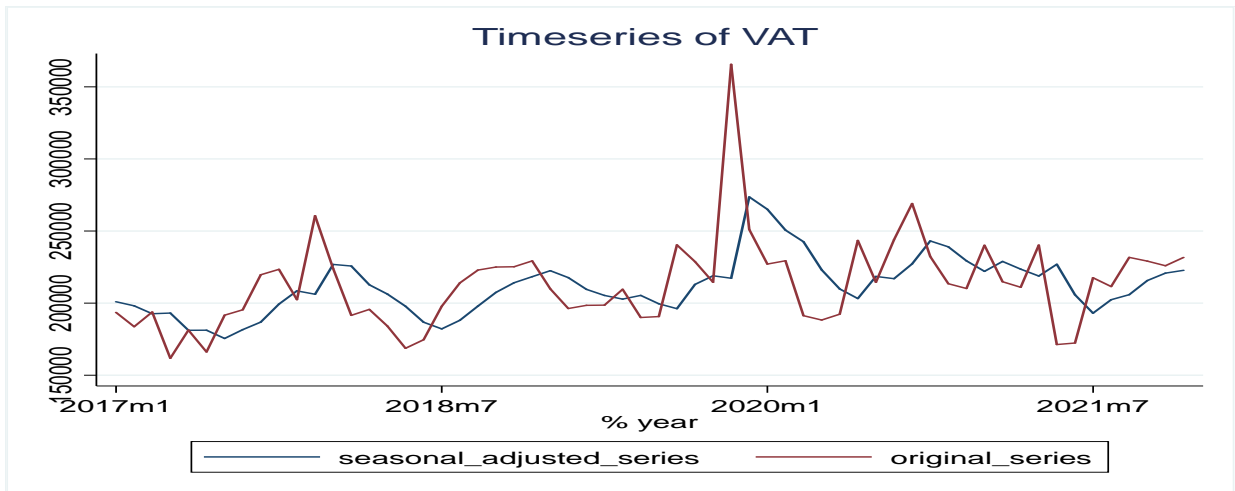
The graph shows a slightly increasing trend of VAT on goods and services, coupled with seasonal patterns and slightly additive seasonal changes over time in months and years up to 2019. However slightly sudden deductive seasonal changes appear after 2019, where VAT drops gradually from January 2020 and then goes back to a constant trend. A situation on January 2019 to January 2020 puts a mark on the effect of COVID-19 on VAT on goods and services.

    1. Bed Occupancy

The graph shows a constant trend of Bed occupancy from 2017, coupled with very short seasonal patterns, few outliers between the middle of 2017 and 2018, and slightly addictive shallow seasonal changes over time in months and years up to 2020 where a sudden drop in Bed occupancy appears in January 2020 marking the period during COVID19.

2. Export

Timeseries of Export
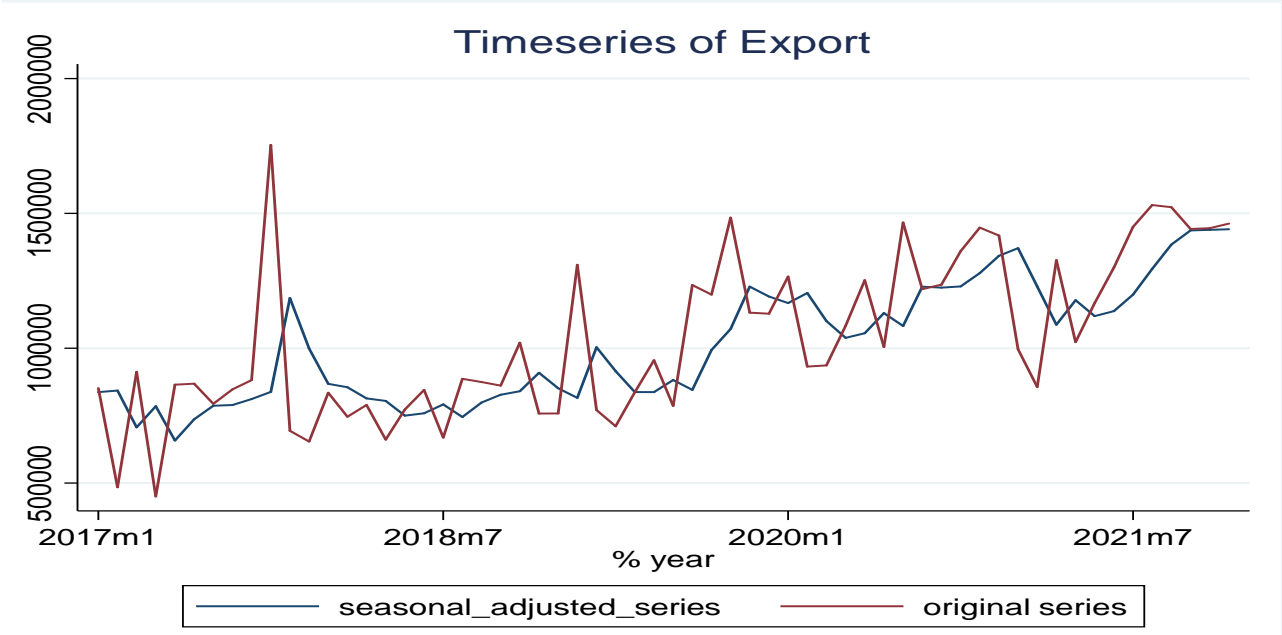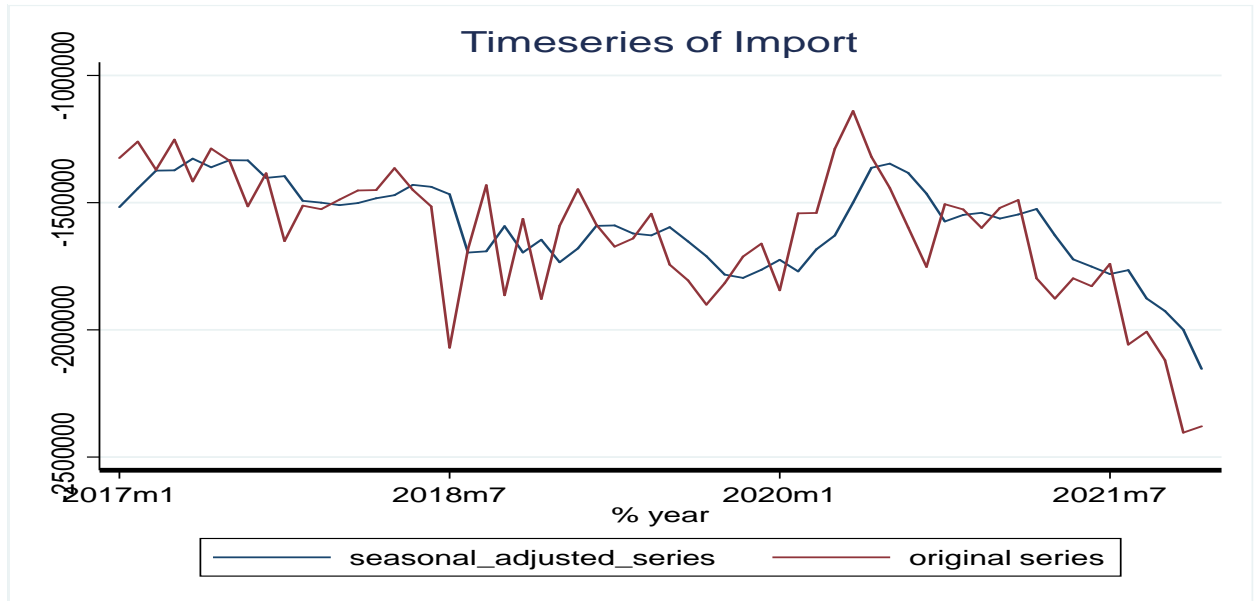

The graph shows a slightly increasing trend of the Export series, coupled with seasonal patterns and with constant additive seasonal changes and magnitude over time in months and years up to 2019. However slightly sudden deductive seasonal changes appear after 2019, where Export drops gradually to January 2021 and then goes back to a constant trend. The situation on January 2020 to January 2021 puts a mark on the effect of COVID-19 on exports.

3.Import

The graph shows a slightly decreasing trend of the Import series, coupled with seasonal patterns and with multiplicative seasonal changes and magnitude over time in months and years up to 2019. However slightly sudden deductive seasonal changes appear after 2020, where Import drops drastically to January 2021. The situation on January 2020 to January 2021 puts a mark on the effect of COVID-19 on Import services.

ii)   Difference-In-Difference approach

We used the Difference-In-Difference approach to estimate the effect of COVID-19 on income and expose challenges in economic activities and social aspects. The difference-in-differences method remains one of the most frequently used impact evaluation methodologies,(Douglas C.Montgomery, Elizabeth A.Peck, n.d.)

In order to estimate the effect of COVID-19 on Bed Occupancy, VAT on goods and services, import and export the difference-in-difference model of time-series before and after 2019 was applied. The effect will be estimated as follows:

If t<T and T>t denotes the before-COVID-19 and under-COVID-19 periods respectively, where T=January 2019 the period when COVID-19 outbroke in Tanzania; then the Difference in Difference (DID) also known as the average effect is estimated as;

$$DiD = \{E[X_i(t > T)|covid19 = 1] - E[X_i(t < T)|covid19 = 1]\}$$

$$-\{E[X_i(t > T)|covid19 = 0] - E[X_i(t < T)|covid19 = 0]\}$$

The above procedure is manually tabulated as follows;

	Mean(t<T)	Mean(t>T)	Difference	
During COVID-19	A	B	B-A	
Before COVID-19	C	D	D-C	
			Difference -In-	[(B-A)-(D-
Difference	A-C	B-D	Difference	C)]

Where it can be modeled as $X_i = covid19 + \gamma t + e$, and t=year, $X_i = affected\ variables$ ie. Bed occupancy (X_1), VAT (X_2), Import (X_3), Exports (X_4) and γ=time effect and $covid$ 19=COVID-19 effect.

Empirical results:

The results of the COVID-19's Effect on Income are presented in table 1.0 (export), table 1.1 (import), table 1.2 (domestic VAT) and table 1.3 (bed occupancy.
Difference In Differences Estimation results:
Number of observations in the diff-in-diff 60 months
Table:1.0 Export

Outcome Variable	Export	S.Err	|t|	P>|t|
Before				
Control	7.0e+05			
Treated	9.0e+05			
Diff (T-C)	2.0e+05	1.2e+05	.1.70	0.095*
After				
Control	7.2e+05			
Treated	9.5e+05			
Diff (T-C)	2.3e+05	1.1e+05	2.14	0.036**
Diff-in-Diff	2.3e+04	1.6e+04	1.41	0.164

R- square: 0.51   Stata output
* Means and Standard Errors are estimated by linear regression, **Inference; ***p<0.01, **p<0.05, *p<0.1

The results indicate difference-in-difference effect on Income due to COVID-19 was 230000 million at a p-value of 0.1, indicating a significant impact on export.

Table:1.2 Import

Outcome Variable	Import	S.Err	|t|	P>|t|
Before				
Control	-1.3e+06			
Treated	-1.5e+06			
Diff (T-C)	-1.8e+05	1.2e+05	-1.43	0.095*
After				
Control	-1.3e+06			
Treated	-1.5e+06			
Diff (T-C)	-1.8e+05	1.1e+05	1.65	0.036**
Diff-in-Diff	-3.2e+03	1.7e+04	0.19	0.164

R- square: 0.32   Stata output

* Means and Standard Errors are estimated by linear regression, **Inference; ***p<0.01, **p<0.05, *p<0.1 **Inference; ***p<0.01, **p<0.05, *p<0.1

The results confirmed a negative significant impact of COVID-19 on import of 32000 million at the p<0.1

Table:1.3 Domestic VAT

Outcome Variable	Domestic VAT	S.Err	|t|	P>|t|
Before				
Control	1.7e+05			
Treated	2.0e+05			
Diff (T-C)	2.3e+04	1.5e+05	1.53	0.131
After				
Control	1.8e+05			
Treated	2.0e+05			
Diff (T-C)	2.3e+04	1.4e+05	1.7	'0.096*
Diff-in-Diff	-592.144	2080.749	0.28	0.777

R- square: 0.32   Stata output

* Means and Standard Errors are estimated by linear regression, **Inference; ***p<0.01, **p<0.05, *p<0.1

The results indicate a negative significant effect of COVID-19 on VAT of 592.144 million at P>0.1

Table 1.4 Bed Occupancy

Outcome Variable	Bed Occupancy	S.Err	|t|	P>|t|
Before				
Control	3.4e+04			
Treated	1.1e+05			
Diff (T-C)	7.5e+04	6.9e+04	1.09	0.282
After				
Control	5.7e+04			
Treated	1.1e+05			
Diff (T-C)	5.4e+04	6.1e+04	0.9	0.374
Diff-in-Diff	-2.0e+04	9342.635	2.17	0.034**

R- square: 0.32   Stata output
* Means and Standard Errors are estimated by linear regression, **Inference; ***p<0.01, **p<0.05, *p<0.1

The results indicate a negative significant effect of COVID-19 on Bed Occupancy of 20000 million at P>0.1

The general concluding remarks

The estimation of COVID-19 effects on income in the absence of an impact evaluation analysis is critical for formulation of public policy. More so in the aftermath of the pandemic which is likely to have increased the poverty rates in most countries. Several reports have attempted to answer the question regarding the effect of the pandemic in the absence of the impact evaluation analysis.

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