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***The economywide impact of the COVID-19
in Ethiopia: Policy and Recovery options***

Lulit Mitik Beyene, Tadele Ferede and Getachew Diriba

Policy Working Paper 03/2020

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² Researcher, Partnership for Economic Policy (lulit.mitik@gmail.com)

³ Associate Professor, Department of Economics, Addis Ababa University (tadele.ferede@aau.edu.et)

⁴ Chief Executive Officer Ethiopian Economics Association (gdiriba@yahoo.com).

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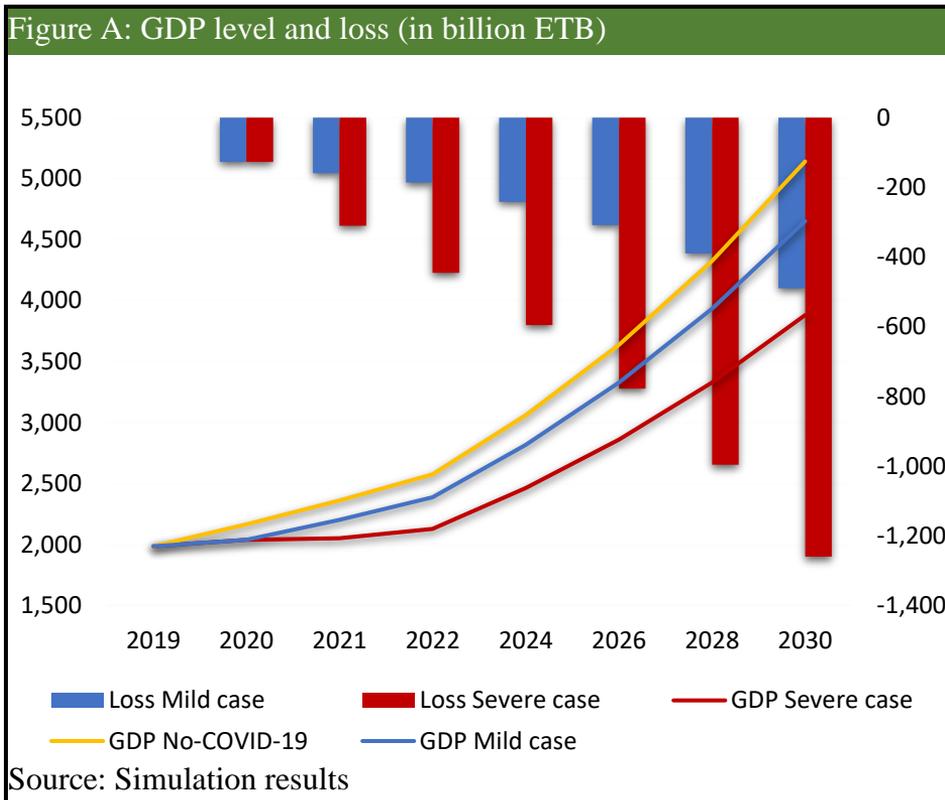
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Executive Summary

This study assesses the potential economywide impacts of the COVID-19 in Ethiopia. It uses a dynamic computable general equilibrium (CGE) model calibrated to a social accounting matrix for FY 2010/11 and covers the period from FY 2010/11 to FY 2029/30. The analysis accounts for the main channels through which the COVID-19 affects the economy. The domestic transmission channels include reduced labor market participation, lower productivity, and rising domestic trade costs. External channels include higher international trade costs, a drop in export demand, lower import supply, a reduction in foreign direct investment (FDI), reduction in remittances, and lower import price of oil. The impact of the COVID-19 crisis is analysed using three scenarios, namely business as usual (or the baseline), and the COVID-19 scenario considered under mild and severe assumptions. Economic impacts resulting from the COVID-19 crisis are expected to have differentiated impacts on a wide range of economic and social indicators. The results capture the impact on national accounts, the fiscal framework, the external accounts, the labor market, and household welfare. The distributional impact is captured through the effect on key economic sectors and on household groups distinguished by income quintiles and rural urban areas.

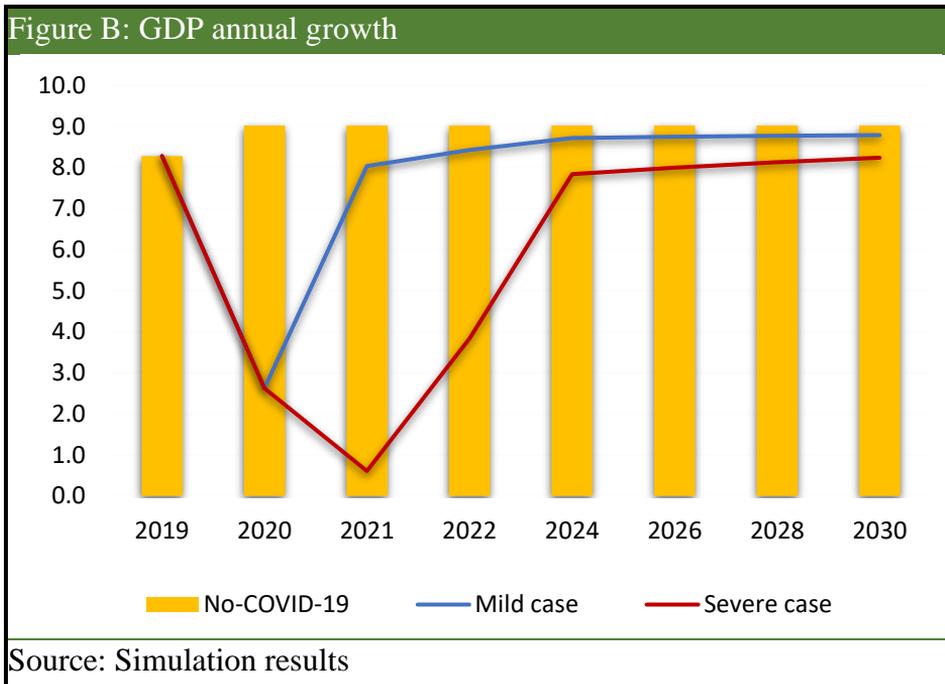
The COVID-19 pandemic has spread to the Ethiopian economy through multiple international and domestic channels. The infection rate is increasing, and the death toll is rising. All regions are affected with higher spread in the capital city, Addis Ababa. It is likely that the duration of the pandemic will be at a minimum six months. The scenarios designed are based on a six-month duration with mild and severe scenarios.

The COVID-19 pandemic is likely to have significant growth effects even under an optimistic scenario of mild shock and quick recovery. Our estimates suggest that GDP would be lower than in the no-COVID-19 scenario by 127 billion ETB in FY 2019/20 and between 159 and 310 billion ETB in FY 2020/21. On this basis, the economy would grow by 2.6 percent in FY 2019/20. Under an amplified (or severe) pandemic scenario, GDP growth would only reach 0.6 percent in FY 2020/21.



The COVID-19 pandemic is likely to have adverse effects on key sector of the Ethiopian economy. Not all sectors are equally affected by the crisis with higher contraction of manufacturing activities followed by agriculture. Export intensive industries such as textile and leather manufacturing, export-oriented agriculture, transportation services, accommodation and food services are likely to be hit the hardest. The effect on agriculture is much larger when we introduce a disruption in import supply of fertilizer and other chemicals and a reduction in export demand for Ethiopian coffee. The construction sector suffers from the investment reduction.

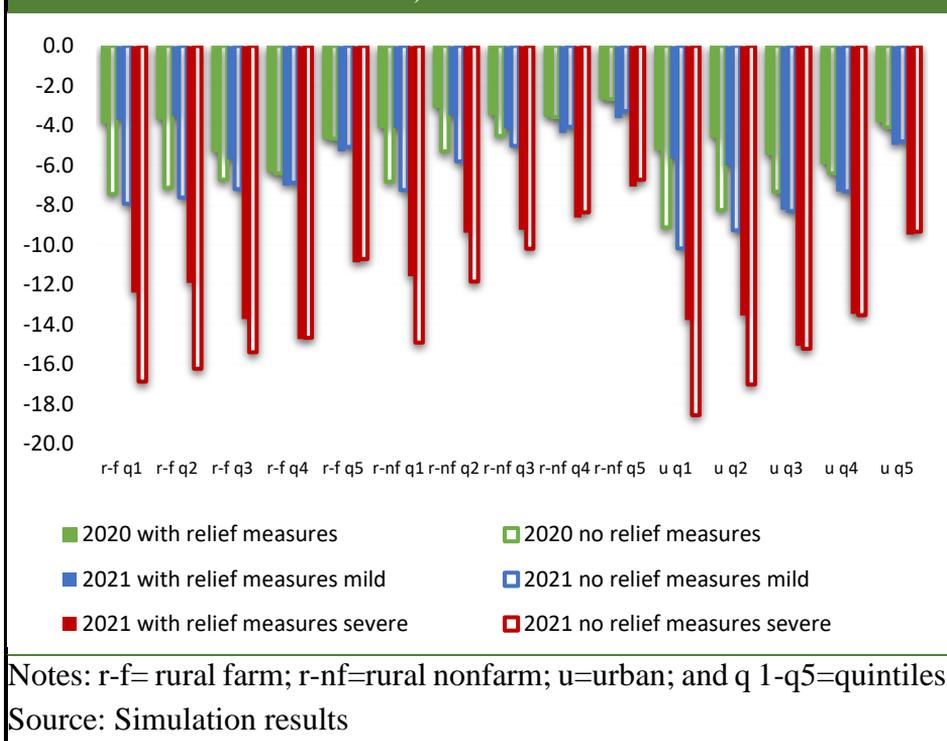
Employment is likely to be hit hard. The employment level is between 8.6 percent and 16.5 percent lower than the baseline. Job losses would be severe in all the export-oriented sectors. Rural employment is slightly more affected than the urban employment and the unskilled workers are negatively affected more than the skilled and semi-skilled.



The COVID-19 crisis is likely to have medium-to-long-term negative effects. All the indicators show the likelihood of medium to long term effects even in an optimistic scenario. While GDP growth rate is expected to converge to the no-COVID-19 baseline, the GDP losses are not likely to be recovered. The size of the Ethiopian economy would remain well below the no-COVID-19 baseline level. The recovery would have a V shape (i.e. quick recovery) in the mild case and a U shape in the severe case.

The negative impact of the crisis on household welfare would be severe. Real consumption expenditure could be between 4.6 and 12 percent lower than in the reference scenario in the short term. In the absence of appropriate measures, the most vulnerable populations are likely to be more severely impacted. The welfare loss of the bottom 20 percent is between 1.6 and 2.5 times higher than the top 20 percent without any in-kind and/or cash transfers.

Figure C: Household consumption (percent deviation relative to no-COVID-19 scenario)



Welfare losses would persist over time. By the end of the time horizon of the model, household welfare at the national level would be 1.9 percent and 10.7 percent lower than the no-COVID-19 scenario in the mild and severe cases, respectively. Even if the transmission channels of the COVID-19 to the Ethiopian economy partly regain their pre-crisis level, households in the lowest income categories are likely to have higher welfare reduction than households in the highest quintile.

The COVID-19 pandemic is likely to have a substantial effect on public finance. Fiscal deficit is likely to widen in absolute terms and in percentage of GDP. Government revenue would decline. At the same time, expenditure would increase to deliver emergency health care services and food assistance, and increase containment efforts, all of which will widen fiscal deficit.

Government response plan is of paramount importance for the medium- and long-term perspectives, especially if the impact of the pandemic is to be more severe. The adverse impact of the pandemic on investment would be even larger without government intervention. Household welfare would fall more sharply without relief and recovery measures. Furthermore, without the assistance of development partners, deficit financing would result in the deterioration of the fiscal framework with a risk of jeopardizing macroeconomic stability and debt sustainability.

The anticipated 3.4 billion USD government response plan meant for emergency responses, to support businesses and protect jobs would certainly contribute to protecting the livelihoods of workers and businesses. However, it is not enough to put the economy on a higher growth path that would reduce that gap with pre-COVID-19 situations.

There is uncertainty on the duration of the pandemic in Ethiopia and worldwide. This implies that recovery may not come as quickly as would be anticipated putting the Ethiopian economy closer to the severe scenario rather than the mild case. Government support is much needed not only by increasing its spending under the COVID-19 response plan, but by creating an enabling environment that would allow businesses to thrive and social safety nets to share the burden.

Shielding the most vulnerable groups from the pandemic is crucial to limit the populations that would fall (or back) into poverty. In-kind and cash transfers to the most vulnerable are likely to narrow the gap between households in the lowest quintiles and those in the highest quintiles. Hence it is necessary to expand the existing social assistance programs such as rural and urban safety nets to protect the most vulnerable segments of the population.

Given the multifaced nature of COVID-19 induced challenges facing the country, a recovery and response plan is urgently needed to achieve dual objectives of mitigating further economic contraction and of stimulating the economy. The recovery and response plan shall target and safeguard sectors essential for food security, job creation and sustainable and inclusive growth. The plan needs to take into account the differentiated impacts of the pandemic on different activities and households.

Both fiscal and monetary policy instruments that have been introduced by the government to fight the pandemic shall be continued, enforced and implemented, in a coordinated way, to support the effectiveness of interventions until the economy recovers. However, support measures need to be monitored and evaluated to facilitate the transition towards economic recovery and boost economic dynamism.

The recovery and response plan requires rapid and predictable financing which shall come from two sources. It is important that the international community provides quick and coordinated support. Given the global nature of the pandemic and uncertainty of external finance in terms of timing and amount, it is necessary to design a strategy for mobilizing and diversifying domestic sources of finance to manage and support the crisis and recovery in a more dependable manner. It is also necessary to evaluate tax related supports ongoing basis as across-the-board tax reductions, deferrals and relief may jeopardize medium-term revenue raising capacity of the government.

1. Introduction

The 21st century economies are interconnected due to advancement in information and communication technology and global value chains. In this chain, several actors can be identified: workers, firms, suppliers, consumers, banks and financial intermediaries. In this web of interconnectedness, if there are disruptions in any one of the links due to the disease or containment measures, the outcome could be a cascading chain of disruptions both across the world and within countries.

The COVID-19 adversely impacts economic activities which in turn, if unchecked, will lead to social crisis. Efforts to fight the virus affects economic activity and changes the economic trajectory. Keeping workers away from work and consumers away from consumption tend to reduce economic activity. The COVID-19 pandemic creates all manner of economic shocks and involves feedbacks among different economic actors. The virus triggers three types of economic shocks (Triggs and Kharas, 2020). First, as the pandemic spreads, it hits output by putting workers into their sickbeds creating temporary unemployment if the spread of the virus is contained. Second, public-health related containment measures (e.g. factory and office closures, travel bans, quarantines, and the like) will affect the economy through reduced supply, low demand and financial distress. Third, consumers and firms all around the world would be in a state of a wait-and-see mode (i.e. expectations).

The COVID-19 pandemic has spread to the Ethiopian economy through multiple international and domestic channels. The infection rate is increasing, and the death toll is rising. All regions are affected with higher spread in the capital city, Addis Ababa. It is likely that the duration of the pandemic will be at a minimum six months.

This study seeks to answer three policy questions:

- What is the economy-wide effects of COVID-19 in Ethiopia?
- How long will it take for the economy to recover to its pre-shock level?

- Is the current level of rescue and stimulus sufficient for the economy to reach its pre-shock level and beyond?

The paper is organized in five sections. Section 2 presents the methodology while Section 3 discusses the simulation results and main findings. Finally, Section 4 presents conclusions and recommendations.

2. Methodology

2.1. Model descriptions

Economic impacts resulting from the COVID-19 crisis are expected to have differentiated impacts on a wide range of economic and social indicators. It is therefore important to apply a methodology that allows to capture the impact of the shock through its multiple dimensions including on the national accounts (GDP, consumption, investment), the fiscal framework (government revenue, expenditure, and deficit and debt), the external accounts (trade, FDI, and the current account), the labor market (sectoral employment and wages), and household welfare.

The study uses a dynamic Computable General Equilibrium (CGE) model to assess the potential short-term and medium-to-long-term impacts of the pandemic in Ethiopia. The CGE methodology is well-suited as CGE models take into account the economic interdependencies between the different sectors and economic actors in the country and internationally allowing to capture direct, indirect and feedback effects of policies and shocks. The behavioural functions are based on sound microeconomic theory. In this model, agents adopt a profit/utility maximization behaviour and market prices adjust to reconcile endogenous supply and demand decisions, thus determining levels of production, employment, and consumption. This type of method offers a comprehensive assessment and analysis on a wide range of indicators including production, consumption, factor markets and prices.

It is also a tool that enables to simulate relief and recovery measures. The distributional effect is captured through the impact on households distinguished by income quintiles across rural-farm, rural non-farm and urban settings. This allows to identify vulnerable groups that would be most severely affected by the shock, recognize the contribution of relief measures towards alleviating the adverse effects, and inform the design of stimulus or recovery measures in the short to medium terms.

The single-country recursive dynamic CGE model used for the study is an adapted version of the Mitigation, Adaptation and New Technologies Applied General Equilibrium (MANAGE) model (Van der Mensbrugghe, 2017). In addition to the standard specifications of the MANAGE model, additional features have been introduced. Public and private investments are distinguished. A simple debt module was introduced to distinguish sources of government expenditure finance. This module allows to capture changes in cost of financing linked to interest payments on domestic and foreign debt.

The model is calibrated to a social accounting matrix (SAM) for the year 2010/11 for Ethiopia (Ahmed et al. 2017) and covers the period up to 2029/30. The SAM has 68 production activities, 71 commodities, and 3 types of factors of production: labor, land, and capital. There are 8 labor categories distinguished by education level and rural-urban divide: the uneducated, and those with primary, secondary or tertiary education allowing the distinction between the unskilled and semi-skilled/skilled labor. There are 15 household categories distinguished by income/consumption decile for the urban, rural farm and rural non-farm. Other institutions include enterprises, the government, and the rest of the world. There are several tax/subsidy accounts, including import tariffs, VAT, and other indirect taxes as well as direct income taxes. The investment account in the SAM was split to distinguish public and private investment.

Production is modelled using a nested Constant Elasticity of Substitution (CES) structure in each sector. The labor market is segmented into three groups: agricultural, non-agricultural, and public sector workers (public administration, education, and health). Labor supply is a function of real wages for each category of labor, and we assume partially flexible wages and labor supply. The model is run for 20 periods, from 2011 (FY 2010/11) to 2030 (FY 2029/30).

The macroeconomic closure imposes that the government budget balance is endogenous while government expenditure (recurrent and capital) is exogenous and calibrated in the baseline to reflect past performances. As such, any extra expenditure, or a reduction in revenue increases government deficit. This is the preferred closure considering the fiscal situation of the country and the need for prudent fiscal policy. Tax rates are also fixed at base year rates. Investment is savings driven with exogenous propensity to save for households and firms.

Regarding the external sector, we assume exogenous foreign savings in foreign currency calibrated to match historical data and projections. The nominal exchange rate is fixed. The real exchange rate adjusts to maintain the current account balance.

The baseline scenario was calibrated using Balance of Payments, fiscal, and other macro data for the fiscal year 2010/11 to present. Projections were used for the period 2019/20 to 2029/30. The sources of data include Central Statistical Authority (CSA), Ministry of Finance (MOF), National Bank of Ethiopia (NBE), World Bank and International Monetary Fund (IMF).

2.2. Transmission channels and scenarios

2.2.1. Transmission Channels

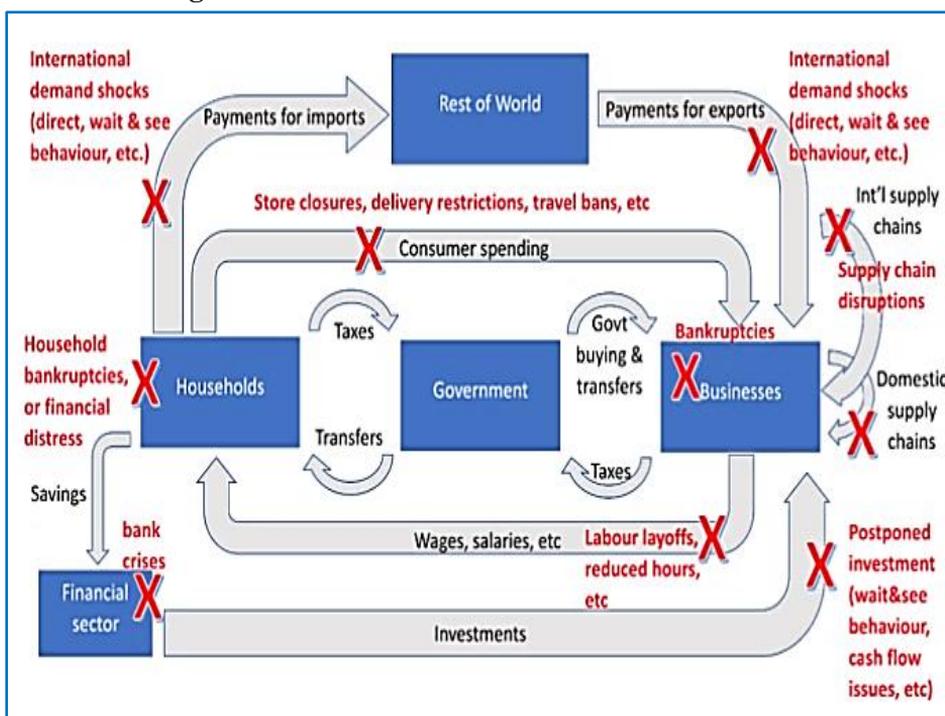
The pandemic generates shocks that affect the economy in multiple fronts (Figure 1). In particular, the pandemic creates economic shocks and involves feedbacks among different economic actors. In normal circumstances, as the circular flow diagram indicates, the economy continues running only when the money keeps flowing around the circuit (Baldwin and di Mauro, 2020). But COVID-19 disrupts the normal flow which causes a slowdown everywhere. International transmission mechanisms considered include remittances, export demand, import supply, foreign direct investment, and oil prices. Internal factors include labor supply and labor productivity, productivity of capital, and total factor productivity. Finally, the increase in transaction costs both on the domestic and international markets is incorporated. The impact of the shock is measured in terms of the national accounts, the fiscal framework, the external accounts, the labor market, and household welfare. The distributional effect is captured through the effect on key economic sectors and household groups distinguished by income quintiles.

The red crosses (see Figure 1) show where the shocks can potentially disrupt the flow of economic activities. For example, households who do not get paid may experience financial distress or even bankruptcy, as seen in many countries that have experienced pandemic outbreak. This reduces spending on goods and services, and this also affects the demand for imports.

Labor layoffs, sick leaves, quarantines, or stay-at-home is another strike area. When workers lose their jobs, they tend to cut back spending on less necessary items, which leads to a decline in domestic demand.

Note that a decline in demand and/or direct supply shocks can lead to a disruption in international and domestic supply chains. Both lead to further contraction in output, more so in the manufacturing sectors. Firms and households will be forced to postpone investment (due to wait-and-see behaviour of people and firms-expectations). In addition, many businesses may experience reductions in cashflow, if not supported, may lead to business bankruptcies (Benassy-Quéré, 2020). This sort of business closures creates further disruptions in the economy. For example, the financial sector will not get paid, putting the financial sector under stress.

Figure 1: COVID-19's multiple strikes in the circular flow of income diagram



Source: Baldwin (2020)

2.2.2. *Identifying shocks*

The shock has been divided into two major channels: domestic and external. The domestic transmission channels include reduced labor market participation, lower productivity, and rising domestic trade costs. External channels include higher international trade costs, a drop in export demand, lower import supply, a drop in FDI and remittances, and lower import price of oil. The remainder of this section provides some details on the individual transmission channels and the underlying assumptions.

Labor market participation: There is a general reduction in labor supply associated with the virus as workers are unable to work due to movement restrictions, stay-at-home directives, fear, business closures, and reduced capacity operation. It is also likely that there is a permanent reduction in the workforce due to coronavirus-triggered deaths. The scope of the shock was based on ILO (2020) and IMF (2020) estimations ranging from 5 to 8 percent reduction of working days. Working hours are estimated to decline by 4.9 percent in Africa in the second quarter of 2020 according to ILO (2020) estimates. The IMF African Economic Outlook of April 2020 estimates that between 5 and 8 percent of working days could be lost.

Productivity: Because of idle capacity in the economy and due to supply chain disruptions, both in the domestic market and globally, there will be a reduction in sectoral and economy-wide productivity. Given that some sectors will be hit hard by the pandemic, sector-specific shocks need to be introduced to better capture the sensitivity of the economy to disruptions to key exports, including horticulture (flower farms), tourism, transportation, labor-intensive manufacturing industries, and other services sectors such as hotels. A recent study has estimated factor productivities for the Ethiopian economy (Kidanemariam et al., 2020). The results are reported for labor and capital productivity between 2000 and 2014. The Ethiopian economy registered the lowest productivities in 2002 and 2003, due to drought which slowed down in economic activities. The pandemic is expected to lead to even a larger reduction in productivity than the drought because it affects all sectors directly or indirectly.

Foreign direct investment: Not only foreign direct investment but also domestic investment is likely to decline during the pandemic. FDI monthly data from the

National Bank of Ethiopia indicates a downward trend with FDI inflow declining from US\$ 2271.3 million (ETB 63.8 billion) in first eight months of FY 2018/19 to US\$ 1721.2 million (ETB 51.6 billion) for similar months of 2019/20. Although this reduction in FDI occurred before the spread of the pandemic, it is a good indicator of the extent of the shock. A large reduction in FDI is expected ranging from 24 to 70 percent.⁵

Remittances: Due to the global nature of the pandemic and the slowdown of economic activity in the Ethiopian migrants' host countries, remittance flows are expected to decline. Monthly data from NBE show that remittances has shown a declining trend between January and March 2020, reduced by 22.7 percent. This decline occurred during the early period of the outbreak of the pandemic indicating that the scope of the reduction could be much higher. Hence two scenarios are considered: a lower remittance inflow with a 25 percent reduction and large reduction of 70 percent.

World price of oil: Because of shrinking global demand, world price of oil has been significantly affected. For net oil importing countries like Ethiopia, this would be a positive shock. As prices are regulated, lower prices are not necessarily reflected on the consumer price but rather generate income to the government. Crude oil prices have drastically declined since the outbreak of the pandemic in 2020, decreasing by more than 60 percent. The decline in oil price led to a fall in natural gas prices, by one-third compared to the levels a year ago.⁶

Transaction costs: Higher trade transaction costs can be expected due to border closures, delays due to slowdown in logistics, quarantines, movement restrictions, and supply chain disruptions. This is modelled using the 'iceberg' approach. The size of the shock is calibrated such that the anticipated cost increase (between 25 and 50 percent) is applied to the trade and transport margins on domestic, imported and exported goods. The resulting reduction in exports, imports and domestic supply are then used as reference to calibrate the corresponding transaction cost.

⁵ UNCTAD also estimates a large reduction in FDI across the world.

⁶ <https://www.power-technology.com/comment/covid-19-outbreak-impact-fossil-fuel/>

Trade: The pandemic is affecting the Ethiopian economy through weak external demand and the disruption of import supply chains. Export demand is reducing because of the slowdown among the key trading partners of Ethiopia. The flower sector, the textile and apparel manufacturing, and tourism have been severely affected by the reduction in international demand.⁷ The supply of imported goods is expected to decline due to the disruption of global value chains. This affects the supply of intermediate inputs possibly creating shortages. The scope of the implemented shock is 25 percent reduction.

Depending on the anticipated severity, the magnitude of the shock will be different for each transmission mechanism. Table 1 presents the scenarios and the amplitude of the shocks for each channel. The scenarios are all implemented according to the anticipated duration of the crisis, that is six months. All the shocks are implemented simultaneously.

2.2.3. Scenarios

Three scenarios are considered to capture the economy-wide effects of COVID-19.

Scenario 1: Business as usual scenario which serves as a base run scenario to which other scenarios are compared⁸.

Scenario 2: Rapid containment of the virus with limited community spread, targeted restriction of movements or partial lockdown resulting in limited disruption to major economic activities. This scenario assumes that the adverse effects of the virus will be mitigated through rapid response mechanisms with fewer cases, including fiscal, financial, and other mechanisms. For instance, enterprises or firms may proactively take measures to contain the spread of the virus in the workplace through provision of personal protective devices, awareness creation, rescheduling work hours, etc. This will lead to a quick resumption of economic activities across most sectors as workers will return to their work place. In this scenario, the economy will experience mild productivity

⁷ Recently, the flower export has shown an increasing trend (in May).

⁸ We refer to this scenario as baseline, reference, pre-Covid-19 or as no-Covid-19 scenario.

loss, limited unemployment, etc. Hence, the economic and social repercussions are kept in check. The international transmission channels are mildly affected with FDI, export demand, import supply and remittances declining by about one-fourth.

Scenario 3: Relatively widespread community transmission and more geographic spread of the infections. The third scenario, severe COVID-19 situation, assumes an outbreak of the virus across the country. Accordingly, the economic and social impacts are expected to be more severe. In this scenario, rapid spread of the virus will hamper movement of people and goods due to travel bans, business closures, stay-at-home, etc. The economy is assumed to experience multiple and interlinked supply, demand and financial shocks, causing slowdown of economic activity, unemployment, supply shortage, low productivity, idle capacity, etc. International transmission channels are severely affected.

These scenarios are implemented under two assumptions linked to the severity of the impact:

- i. Mild impact:
 - a. Duration of the shock is six months from the last quarter of EFY 2019/20 lasting throughout the first quarter of EFY 2020/21; and
 - b. There is no recovery of the shock variables to their pre-COVID-19 level but variables resume their pre-COVID-19 growth rates starting from 2021/22.
- ii. Severe impact: replicates the same shocks as the mild scenario in the last quarter of FY 2019/20 and more severe effects in the first quarter of EFY 2020/21.

The distinction between the mild and severe scenarios is linked to the anticipated duration of the crisis and the magnitude of the effect on the transmission channels of the crisis. The two scenarios are analysed according to several variants:

- i. Analysis of results with and without considering any government relief measures or recovery with various financing sources;
- ii. Short-term and medium-to-long term effects; and
- iii. Rapid recovery versus deeper and more prolonged pandemic.

The government COVID-19 response plan is around 3.4 billion USD. While 1.6 billion is planned for emergency response, 1.8 billion USD is for macroeconomic interventions. The following interventions have been incorporated into the scenario:

- i. Health interventions of 439 million USD (15 billion ETB): this emergency relief measure is implemented as a recurrent expenditure in the EFY 2019/20.
- ii. Support to businesses and micro, small and medium enterprises (MSMEs) of 1000 million USD (33.4 billion ETB): the planned support to businesses encompasses several types of measures aimed at enabling large firms and MSMEs to survive this crisis. The financial support includes postponement of debt reimbursement, corporate income tax exemption, and expedited VAT reimbursement for larger firms. MSMEs are likely to benefit from financial support to reduce their operational costs, increase their liquidity, and maintain employees. These measures are implemented in the form of production subsidies to all the economic activities except public administration, education and health sectors. The time frame implemented in the scenario is such that 5 billion ETB is spent in EFY 2019/20 and the remaining in EFY 2020/21.
- iii. Protecting jobs through a wage support or subsidy of 328.8 million USD (10.8 billion ETB). This intervention is planned to benefit manufacturing and services sectors. The allocation of the fund is based on government calculations whereby three months of salary would be covered. Accordingly, we inject 7.2 billion ETB in construction, 1.5 in services, 2.1 in manufacturing sectors. As no information is provided on the timeframe, we allocate the equivalent of one month in EFY 2019/20 and two third in EFY 2020/21.
- iv. Food and other related emergency costs of up to 1,170 million USD. This expenditure is aimed at protecting the welfare of populations, in particular the most vulnerable ones. The government plans to use existing urban and rural safety net programs to provide income to the most affected. It also includes emergency food assistance. We implement this by introducing cash-transfers to both rural and urban households in quintiles 1, 2 and 3. This way, the 40 percent poorest or most vulnerable are targeted. In order to decide on the amount allocated to each group, we use the CGE model simulation results by running the mild scenarios without any government intervention in the mild case. This allowed us to

quantify the losses in EFY 2019/20 and 2020/21. For households in quintiles 1 and 2, a cash-transfer from the government is implemented representing half of their consumption budget losses in real terms. Households in quintile 3 are compensated up to 25 percent of their consumption losses.

When we consider government interventions, the sources of financing of these responses or measures are important. The loss of government revenue will already increase the fiscal deficit without any additional spending. Deficit financing is likely to have significant crowding-out effect on private investment. The alternative is a mix of deficit financing amounting 5 billion ETB and external assistance in the form of grant for other expenditures.

The medium- and long-term potential effects are captured by comparing the baseline scenario (no-COVID-19) with the COVID-19 scenario under four assumptions:

- i. No government intervention: there are no additional expenditures;
- ii. Relief measures through deficit financing: expenditure increases according to the above-mentioned relief measures;
- iii. Relief measures through development partners' assistance and some deficit financing; and
- iv. Relief measures with the above mix of financing and progressive recovery of the economy towards its pre COVID-19 level within a period of three years starting from EFY 2021/22. This is inspired by the convergence of growth rates of Ebola-affected countries between 2014 and 2018.

After the 2008 global financial crisis, economic growth in Ethiopia slowed down to 8.6 percent in FY 2008/09 from 10.7 percent in FY 2007/08. GDP growth recovered to 12.4 percent in FY 2009/10 and 11.4 the following year. In variant (ii) and (iii), the recovery of GDP growth towards the pre-COVID-19 growth rate in our medium-to-long-term scenarios is informed by this. In the mild case, we assume a rapid recovery. GDP growth rate converges to the no-COVID-19 baseline. The shock variables resume their pre-COVID-19 growth rates starting from FY 2021/22. In the severe scenario, we assume that the shock variables do not immediately recover their pre-COVID-19 growth rate but increase to the point that GDP growth is about half of the 9 percent no-COVID-19 baseline rate.

The fourth variant of the medium-to-long-term scenario allows the shock variables to fully or partially recover their no-COVID-19 level up to the point where GDP growth remains within the range of past performances, that is, not exceeding 12.4 percent. This implies that although economic growth could surpass the baseline rates, it will not reach the level that would allow the GDP loss to be recovered. In the mild case, we assume that recovery takes place from FY 2021/22 to 2023/24. In the severe case, it is calibrated to begin in FY 2021/22 where the shock variables reach their no-COVID-19 growth rates. From FY 2022/23 to 2024/25, the shock variables fully or partially recover their no-COVID-19 level up to a GDP growth rate not exceeding 11.3 percent. In both cases, after the recovery period, the baseline growth rates are applied.

Table 1: Operationalizing Scenarios

	Mild scenario	Severe scenario	Remarks
Business as usual	This is the No-COVID-19 scenario	This is the No-COVID-19 scenario	
Labor market participation	Loss of 5% of working days	5% reduction of working days	ILO 2020 and IMF 2020
Productivity growth			
- Labor	-2.79 %	-6.41%	Kidanemariam <i>et al.</i> (2020)
- Capital	-2.15%	-2.61%	
FDI	-24.1%	-70%	
Remittances	-25%	-60%	
Export demand	25% reduction in export demand for Ethiopian goods and services No reduction for coffee	50% reduction in export demand for Ethiopian goods and services and 25% reduction for coffee	Informed by review of recent trade statistics.
Import supply	There is no reduction in import supply	25% reduction of import supply	
Transaction costs	Higher transaction costs on domestic, exported, and imported goods (25%)	Higher transaction costs on domestic, exported, and imported goods (50%)	Motivated by early anecdotal reports (e.g. Tamiru, Engida and Minten, 2020).
International oil prices	Lower import price of oil by 33%	Lower import price of oil by 33%	
	Variant 1- deficit financing	Variant 1- external financing	
Government interventions	Health interventions: 439 million USD (15 billion ETB) in EFY 2019/20 Food and other related emergency costs: 1,170 million USD Support to businesses and MSMEs: 1,000 million USD (33.4 billion ETB) with 5 billion ETB in EFY 2019/20 and 28.4 billion ETB in EFY 2020/21 Protecting jobs: 328.8 million USD (10.8 billion ETB) with 1/3 in EFY 2019/20 and 2/3 in EFY 2020/21 BoP Financing: 500 million USD		MOF 2020

3. Simulation results: Main findings

The impact of the pandemic is analysed in two steps. In the first part, we analyse the short-term effects, that is, in FY 2019/20 and 2020/21. In the second part, we analyse medium to long term effects. To distinguish the role of government interventions in mitigating the adverse effects of the COVID-19, the reader can refer to the tables in the Annex to compare the results with and without government interventions. We focus our analysis on the results with government relief and recovery measures as described in Table 1.

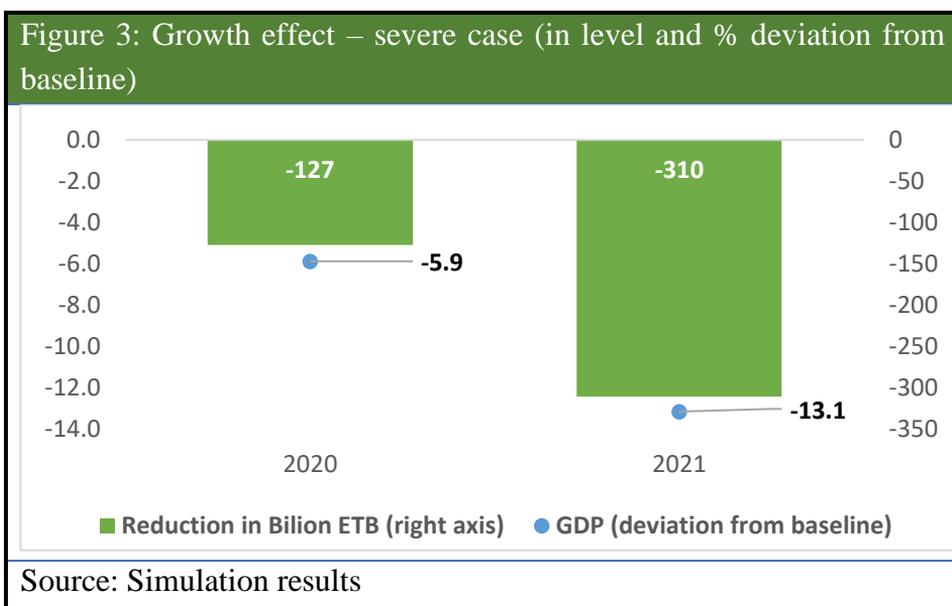
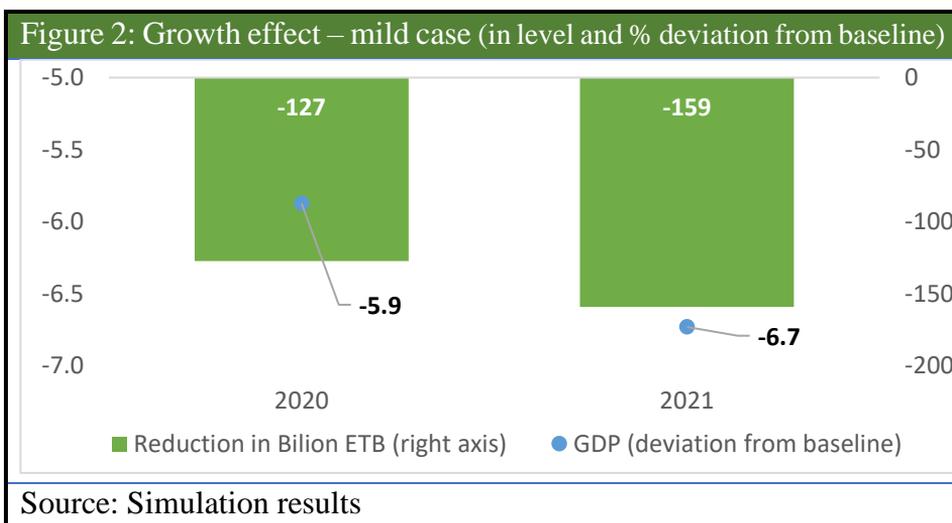
3.1. The short-term effects with government interventions

3.1.1. Growth effect

The drivers of growth in this model are key to understanding the growth effects of the COVID-19. The level of GDP in our analytical framework is determined by three factors: (i) the supply of workers, (ii) investment, and (iii) productivity. Investment is driven by savings from domestic and foreign sources. Labor supply is one of the transmission channels of the COVID-19 and is affected by the containment measures. It is also affected by lower labor demand as economic activity slows down. This will have a direct impact of GDP. Productivity, another transmission channel, is exogenous in the model and assumed to be lower, hence having a direct effect on GDP.

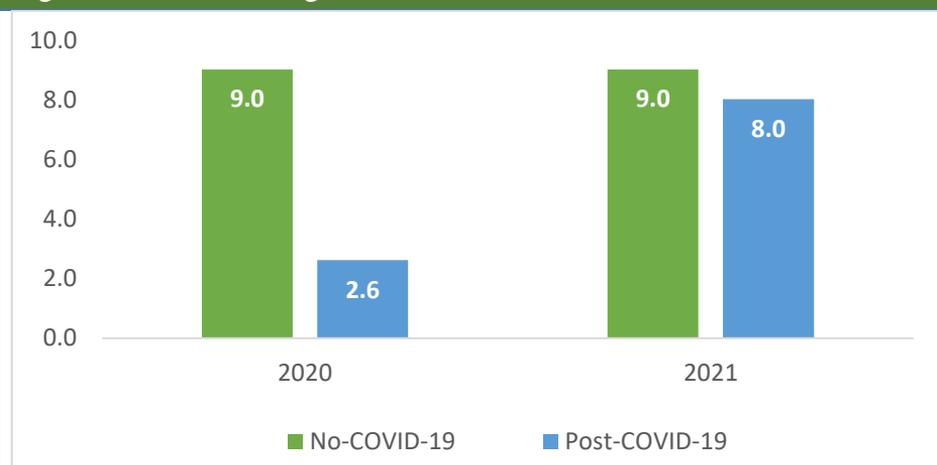
Our estimates suggest that the economic cost of the COVID-19 pandemic could be significant in the short term. GDP contracts in the short term with higher effects as the length of the duration of the pandemic increases from three to six months⁹. GDP is 5.9 percent lower in FY 2019/20 and contracts by 6.7 percent in FY 2020/21 compared to the baseline scenario (Figure 2). This represents 127 and 159 billion ETB loss of GDP in FY 2019/20 and 2020/21, respectively. The size of the Ethiopian economy shrinks significantly more in the severe scenario. With 13.1 percent deviation from the baseline, GDP is smaller by 310 billion ETB (Figure 3).

⁹ The first three months represent the last quarter of FY 2019/20. A six months duration extends the time frame to the first quarter of FY 2020/21.



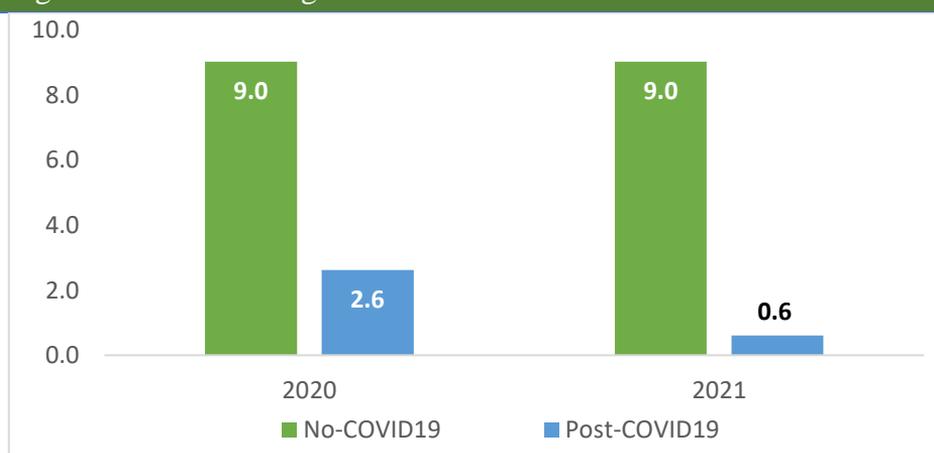
127 billion ETB translates into a 2.6 percent economic growth in FY 2019/20. The following year would see the economy growing by 8 percent in the mild scenario (Figure 4). With a higher degree of contraction in economic activity in FY 2020/21, GDP would grow by 0.6 percent in the severe case while the economy was estimated to grow by 9 percent in the No-COVID-19 scenario (Figure 5). This poor GDP performance is reflected in the drop in exports, investment and final consumption.

Figure 4: GDP annual growth rate – mild case



Source: Simulation results

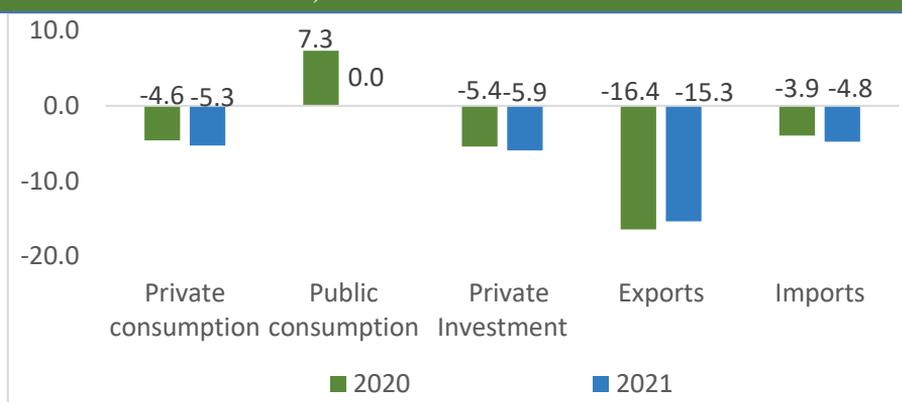
Figure 5: GDP annual growth rate – severe case



Source: Simulation results

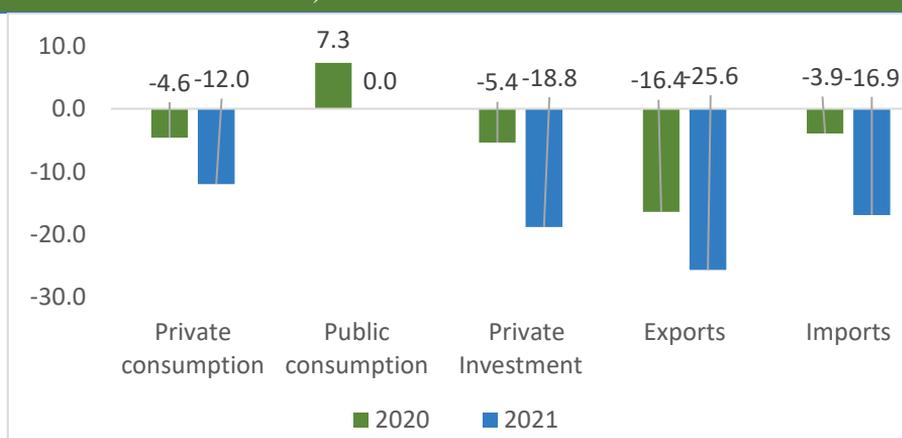
Private investment would be significantly affected via direct and indirect effects. Investment is affected through three channels. FDI is lower, fiscal deficit creates a crowding-out, and savings have declined reducing the total investment. Public investment is maintained exogenous in real terms and only varies with the investment price index. Investment is 5.4 percent lower in FY 2019/20 and 5.9 percent in FY 2020/21 in the mild case (Figure 6). Under the amplified pandemic scenario, investment is 18.3 percent lower FY 2020/21 (Figure 7).

Figure 6: expenditure on GDP at purchaser's price – mild case (% deviation from baseline)



Source: Simulation results

Figure 7: Expenditure on GDP at purchaser's price – severe case (% deviation from baseline)



Source: Simulation results

The impact on trade is likely to be significant. Under both scenarios, exports, and imports decline. Exports are affected by lower international demand, higher transaction and transport costs, and possible disruptions of supply due to containment measures. Exports are 16.4 percent lower in FY 2019/20 and decline by 15.3 and 25.6 percent in FY 2020/21 in the mild and severe cases, respectively (Figures 6 & 7). Imports are linked to three factors: higher transport and

transaction costs, disruption in international supply, and reduction in domestic economic activity. With exogenous current account in foreign currency, imports would decline by 3.9 percent in FY 2019/20 and by 4.8 and 16.9 percent in FY 2020/21 in the mild and severe cases, respectively (Figures 6 & 7).

Private consumption is likely to be negatively affected by the crisis. Consumption level is 4.6 percent lower in FY 2019/20 and reduced by 5.3 percent in FY 2020/21 in the mild scenario compared to a 12 percent loss in an amplified pandemic scenario (Figures 6 & 7). When we compare private consumption with and without government relief measures, we find that without relief measures, consumption levels would have been 1.2 percentage points lower in FY 2019/20 and 1.1 and 1.2 percentage points lower in the mild and severe cases, respectively in FY 2020/21.

Our estimates are in line with previous studies albeit higher effects. The IMF projections in the most recent African Economic Outlook (April 2020) suggests that real GDP would grow by 3.2 percent in FY 2019/20 and by 4.3 percent in FY 2020/21 from a pre-COVID-19 projection of 9 percent. The assessment of the socio-economic impact of the COVID-19 in Ethiopia by the United Nations Country Team suggests real GDP growth to range between 7 to 4.23 percent in an optimistic case to 5.4 to 2.23 percent in a pessimistic case in 2020.

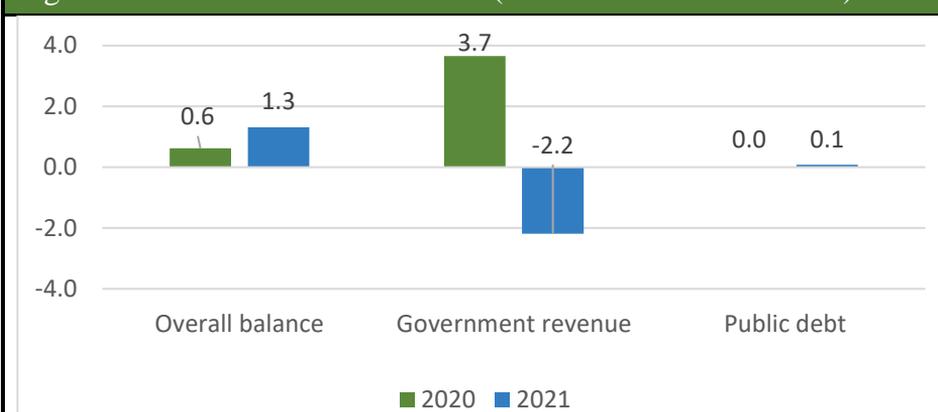
Government expenditure to strengthen the health sector, to protect the most vulnerable populations, to protect jobs, and to support businesses contributes to reducing the adverse effects of the COVID-19 pandemic on the Ethiopian economy. Although 3.4 billion USD, equivalent to 3.5 percent of the pre-COVID-19 GDP, is allocated, it is not enough to bring about notable improvements in economic growth.

3.1.2. Fiscal effect

The COVID-19 pandemic is likely to have a substantial effect on public finances. The pandemic is expected to increase the fiscal deficit with varying degrees depending on the level of development partners' assistance. The fiscal effect is driven by revenue loss and higher level of expenditure. Without external assistance and for the same level of expenditure as in the no-COVID-19 scenario, government revenue declines by of 2.5 percent in FY 2019/20 and by 3.3 percent in FY 2020/21 in the mild case and reaching 10.4 percent in the severe case. With

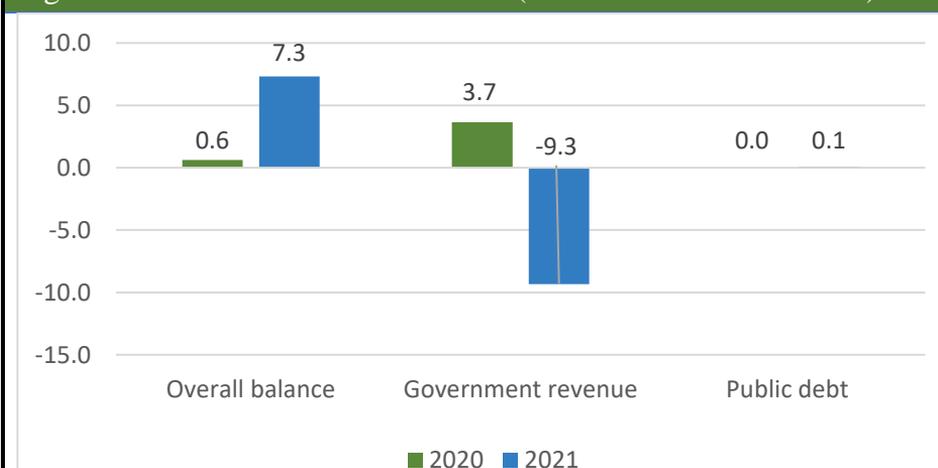
the 3.4 billion USD response plan mainly financed through external assistance, fiscal deficit would be 0.6 percent higher than the baseline in FY 2019/20 (Figures 8 & 9). When we consider financing the COVID-19 plan through borrowing, public deficit as a share of GDP would be 2.5 percentage points higher than in the baseline (Figure 26). In FY 2020/21, fiscal deficit would increase by 1.3 percent in the mild case and by 7.3 percent higher in the severe case compared to the deficit in the baseline (Figures 8 & 9). The impact on government debt is negligible in the short term.

Figure 8: Public finance – mild case (% deviation from baseline)



Source: Simulation results

Figure 9: Public finance – severe case (% deviation from baseline)



Source: Simulation results

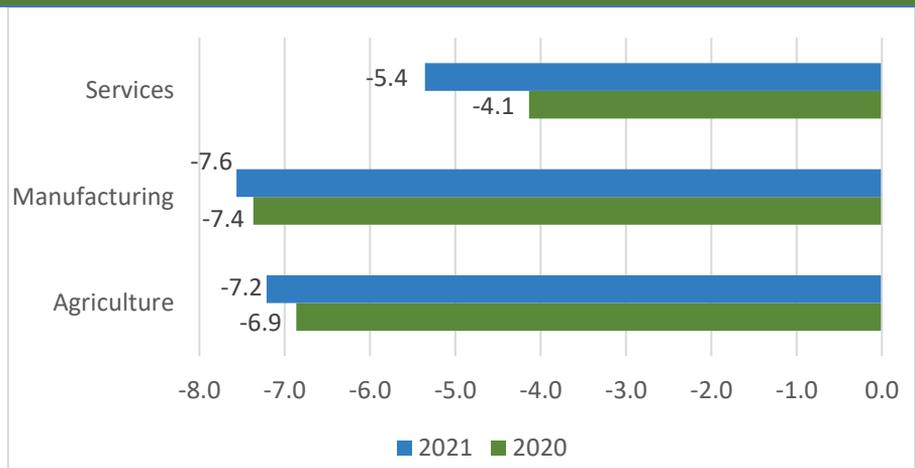
3.1.3. Sectoral effect

The COVID-19 pandemic is likely to have adverse effects on every key sector of the Ethiopian economy. Not all sectors are equally affected by the crisis with higher contraction of manufacturing activities followed by agriculture. The sectoral impact transmits through supply (of domestic and imported inputs and factors) and demand (from domestic and export markets) effects. Production and consumption linkages drive the direct and indirect effects at sectoral level. The production activities are linked to each other through forward and backward linkages. Backward linkages imply that a reduction in demand for intermediate inputs will affect the activities producing these goods and services¹⁰. Through forward linkages, a disruption in the of supply of intermediate inputs (and/or higher prices) will affect production of sectors that are using these inputs. Consumption linkages operate in such a way that lower factor income (labor, land and capital) leads to lower final consumption demand. Labor supply and labor productivity are two other important transmission channels. While the loss of 5 percent working days affects all the sectors similarly, activities with relatively higher labor-intensity are likely to be more affected. Finally, tradable sectors with a high degree of openness are hit hardest.

Manufacturing output declines by 7.4 percent in FY 2019/20 with relatively small increase the following year (Figure 10). Agricultural production declines by 7.4 percent and 7.6 percent in FY 2019/20 and 2020/21 in the mild case. With an amplified pandemic scenario, the reduction of agricultural output doubles reaching 13 percent (Figure 11). Services decline by 10.2 percent in FY 2020/21 in the severe case. The effect on agriculture is much larger in the severe scenario because we assume a disruption in import supply and a reduction in export demand for Ethiopian coffee. This is on top of an amplification of the other transmission channels (Table 1). Fertilizers and other chemicals used in agricultural production are mainly imported. A disruption of supply would have consequences on production.

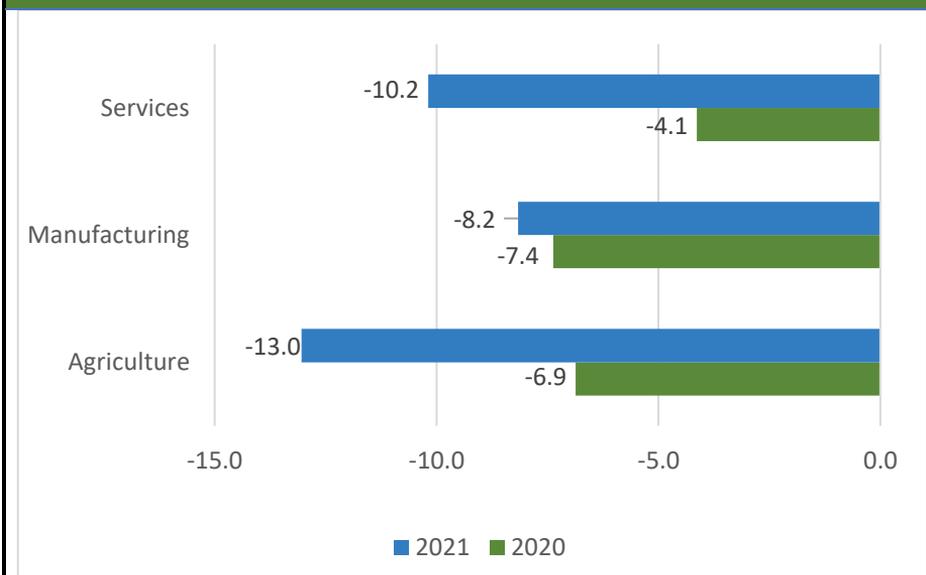
¹⁰ For instance, agricultural production uses agricultural products (such as seeds), manufacturing inputs (essentially consisting of fertilizers and chemicals) and services (mainly financial and transport services). A reduction in agricultural activities will affect services sectors more than the manufacturing because manufacturing inputs used in agricultural production are imported. Similarly, a reduction in services such as hotels and restaurants will affect demand for agricultural products.

Figure 10: Aggregate sectoral production – mild case (% deviation from baseline)



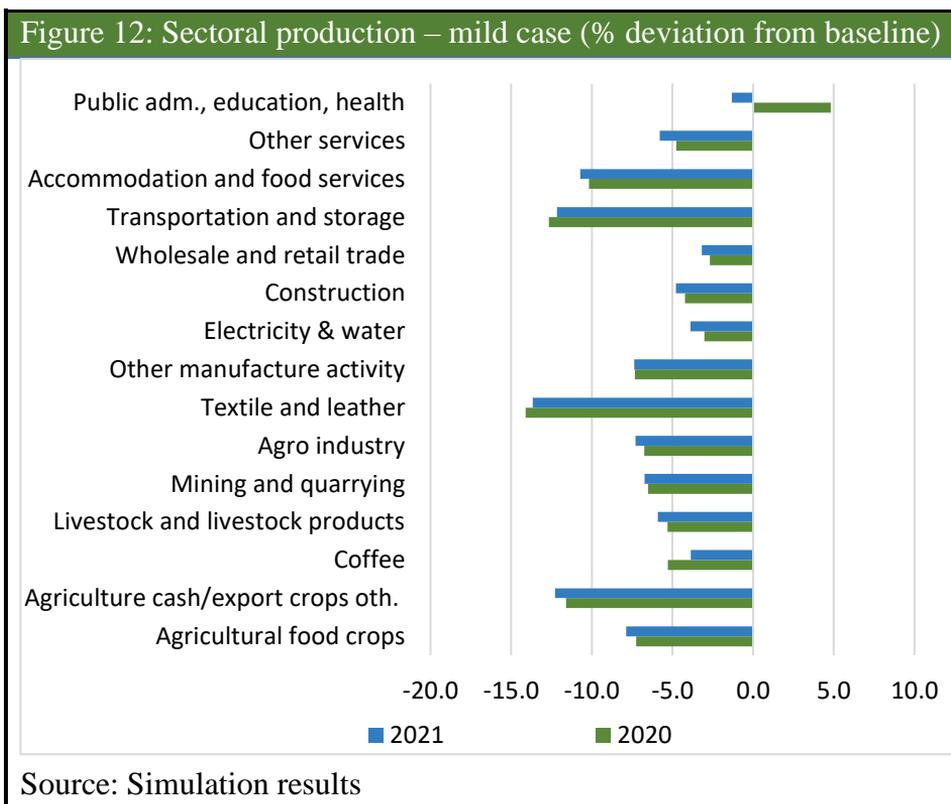
Source: Simulation results

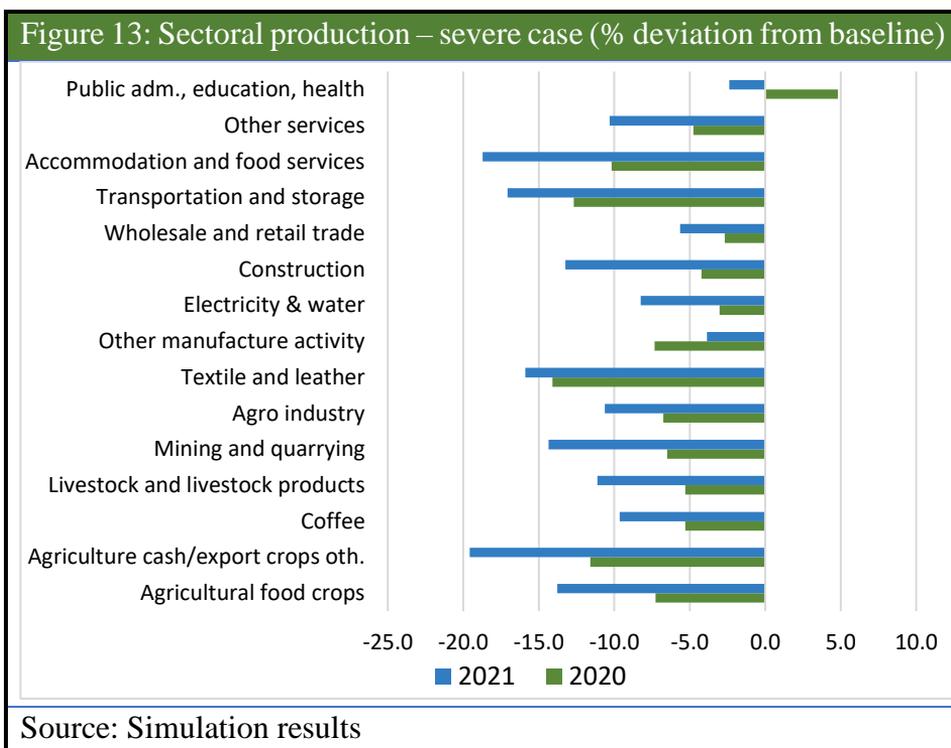
Figure 11: Aggregate sectoral production – severe case (% deviation from baseline)



Source: Simulation results

At a disaggregated level, key economic sectors are likely to contract at varying degrees. The exception would be the public administration, education and health sectors because of the expenditures linked to health interventions in FY 2019/20. Sector-specific effects are driven by the composition of output and exports. Export intensive industries such as the textile and leather, export-oriented agriculture, transportation and storage, and accommodation and food services are hit the hardest (Figures 12 & 13). The coffee sector was not heavily affected in FY 2019/20 because we assumed, in the scenarios, that export demand would not be affected in FY 2019/20. As soon as we introduce a reduction in export demand for Ethiopian coffee, the sector would be adversely affected. The higher the amplitude of the shock, the greater the output contraction across all sectors. The construction sector suffers from reduction in investment.



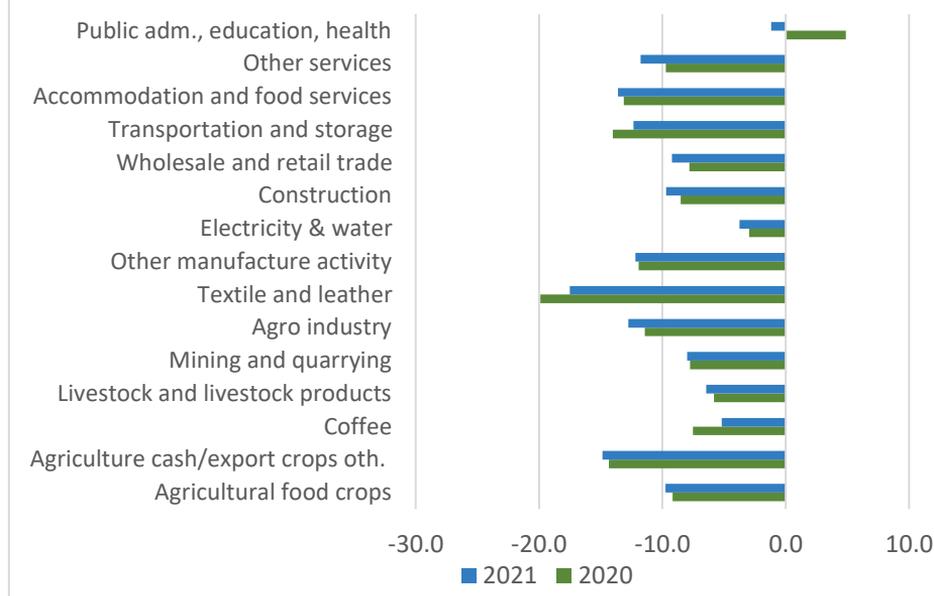


The impact on the agricultural food crops sectors is likely to have implications for food security. If we consider availability of food as an indicator of food security measured by nationwide food supply, lower output in food crops may indicate a possible food deficit. Food availability also indicates a reduction of 3.1 percent in FY 2019/20. Food imports are 3.4 percent lower in FY 2020/21 in the mild case and 17.3 percent lower in the severe case. Food availability also indicates a reduction of 3.1 percent in FY 2019/20 due to a combination of reduced food production and imports.

3.1.4. *Employment effect*

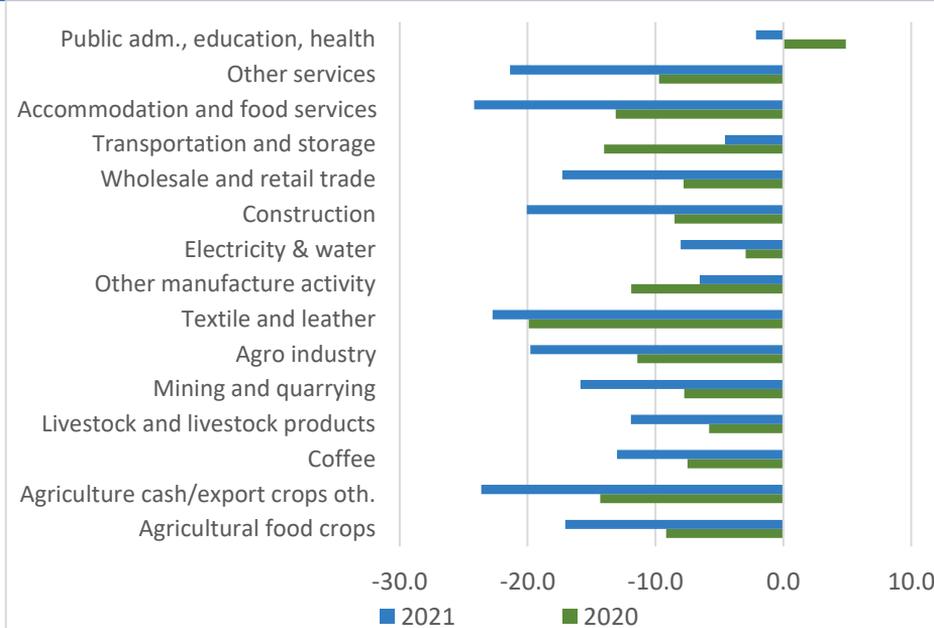
Employment is likely to take a big hit in line with the sectoral effects. The employment level is between 8.6 percent and up to 16.5 percent lower than the baseline. Employment losses are significant with higher reduction in manufacturing sectors (Figures 14 & 15). With a longer duration of the pandemic, the employment loss does not increase notably in the mild scenario. However, with higher amplitude of the shock, the employment effect would be severe in all the export-oriented sectors (Figure 15).

Figure 14: Employment by sector – mild case (% deviation from baseline)



Source: Simulation results

Figure 15: Employment by sector – severe case (% deviation from baseline)

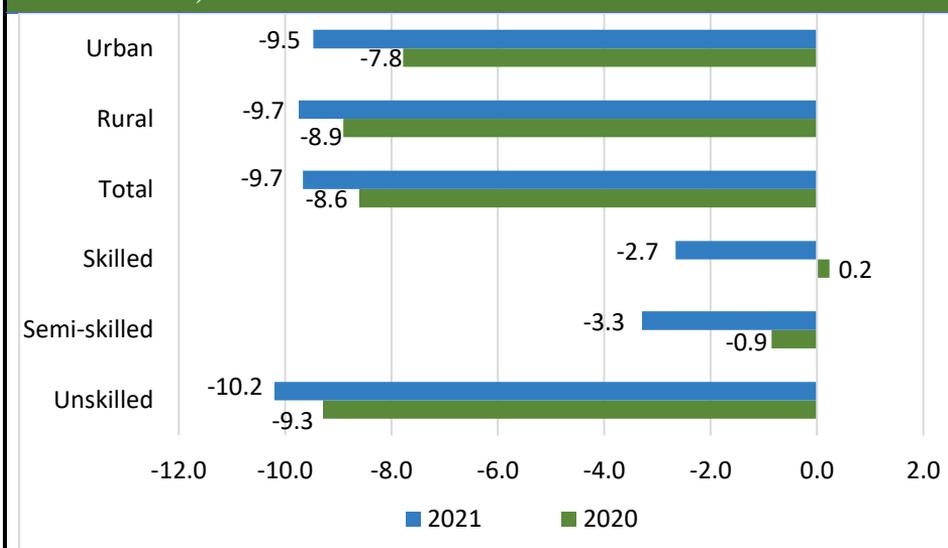


Source: Simulation results

Employment in rural sectors is slightly more affected than urban employment (Figures 16 & 17). The impact on rural employment goes along with the contraction in agricultural activities and the reduced activity in other rural non-agricultural sectors. Agriculture is the economy's largest employer. A significant proportion (72.6 percent) of the labor force works in agriculture and related activities. Furthermore, the government measures introduced in the form of wage support target sectors outside of agriculture. The loss of employment in the agricultural sectors would affect wage laborers and not family workers. Although it is not modelled, there are signs of urban to rural migration because of the slowdown in urban economic activity. There are already signs of urban to rural migration (see Degye et al., 2020). This is likely to increase the volume of the rural unemployed.

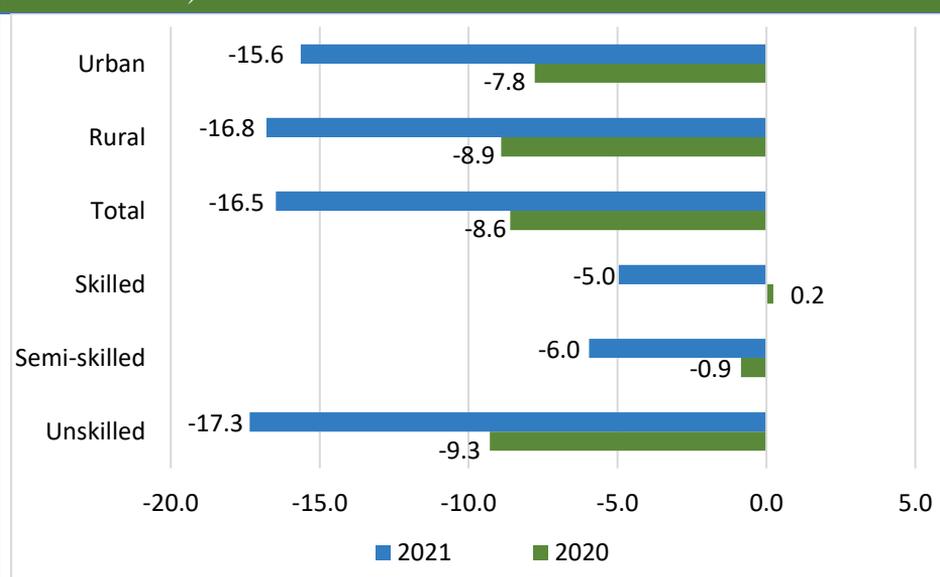
The unskilled, who constitute most of the work force, are more impacted than the skilled and semi-skilled. Employment of the unskilled is 9.3 percent lower in FY 2019/20 reaching 10.2 and 17.3 percent in the mild and severe scenarios, respectively, in FY 2020/21 (Figures 16 & 17). The skilled are the least affected by the crisis.

Figure 16: Employment by skill and location – mild case (% deviation from baseline)



Source: Simulation results

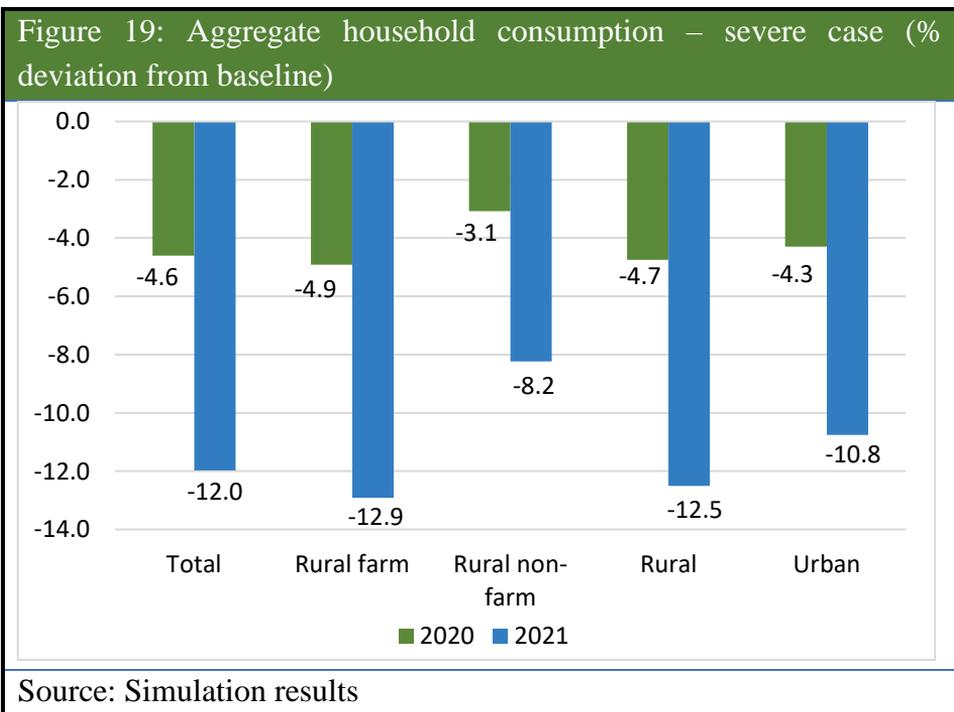
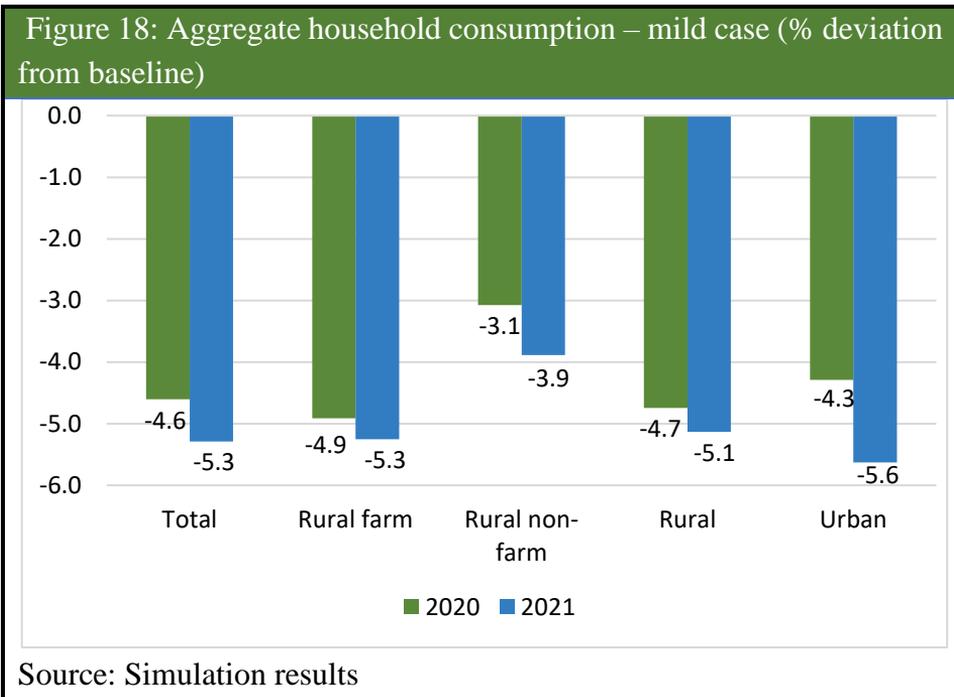
Figure 17: Employment by skill and location – severe case (% deviation from baseline)



Source: Simulation results

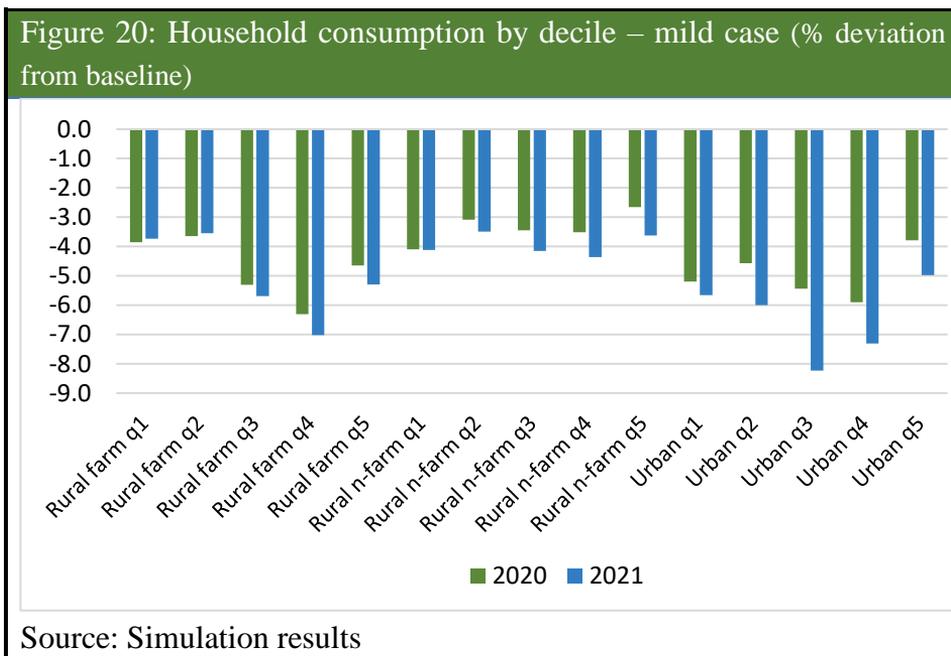
3.1.5. Welfare effect

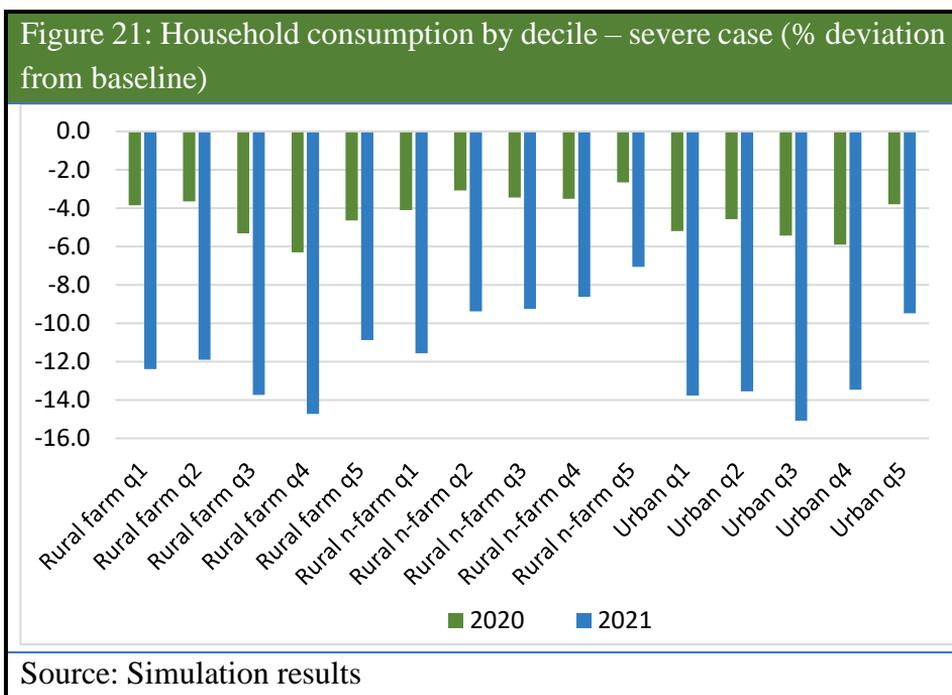
Income loss is likely to result in welfare reduction for all households. Household welfare at aggregate level, measured by real consumption, is 4.6 percent lower than in the reference scenario in FY 2019/20 (Figure 18). In FY 2020/21, the impact is 5.3 percent and 12 percent lower in the mild and severe cases, respectively (Figures 18 & 19). The rural households are likely to have higher consumption losses mainly due to the heavy toll on the rural farm households. Without government intervention simulated through cash transfers to the most vulnerable (and other measures), welfare in FY 2020/21 is lower than in the reference scenario by 6.4 percent and 13.2 percent in the mild and severe cases, respectively (Figures A1 & A2 in Annex). The rural farm households are the most affected group due to their source of livelihood, which heavily relies on agriculture.



Without targeted government support, the COVID-19 crisis is likely to be regressive, the poorest suffering the most across the rural farm and non-farm and the urban households. The simulation results that do not incorporate government expenditures targeting the 40 percent poorest demonstrate the harmful effect on the most vulnerable populations. The lower the income level, the higher the welfare loss, where the slightest welfare loss is likely to be detrimental. We find that the welfare loss of the bottom 20 percent is 1.6, 2.5, and 2.2 times higher than the top 20 percent for the rural-farm, the rural non-farm and the urban, respectively, in FY 2019/20 and in the mild scenario (Figures A3 & A4 in Annex). The trend is similar in the following fiscal year and in the severe case.

If the provision of in-kind and cash transfers target the 40 percent poorest, the disproportionate welfare loss of the poorest could be prevented. Our results suggest that by compensating up to half of their estimated reduction in consumption in FY 2019/20 and 2020/21, the disproportionate welfare loss would be minimised (Figures 20 & 21). Consumption would be 5.3 percent lower for the rural farm instead of 6.9 percent in FY 2020/21 in the mild case and decline by 12.3 percent instead of 14.7 percent in the severe case.





3.2. Prospects in the medium-to-long term

There is much uncertainty on the future of economic activity in the post-COVID-19 years. We assess the medium-to-long-term effects based on four assumptions:

- i. No government intervention;
- ii. Relief measures combined with lower import prices of oil financed via higher deficit;
- iii. The above relief measures are financed through assistance from development partners and deficit; and
- iv. Relief measure with the above mix of financing sources and progressive recovery of the economy within a period of three years from EFY 2021/22.

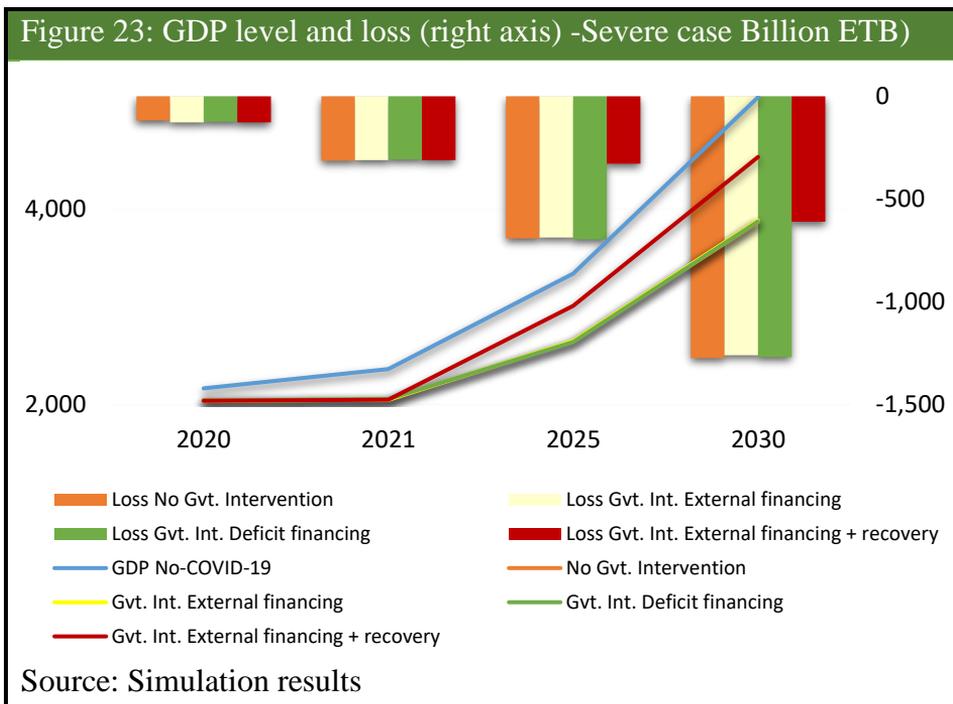
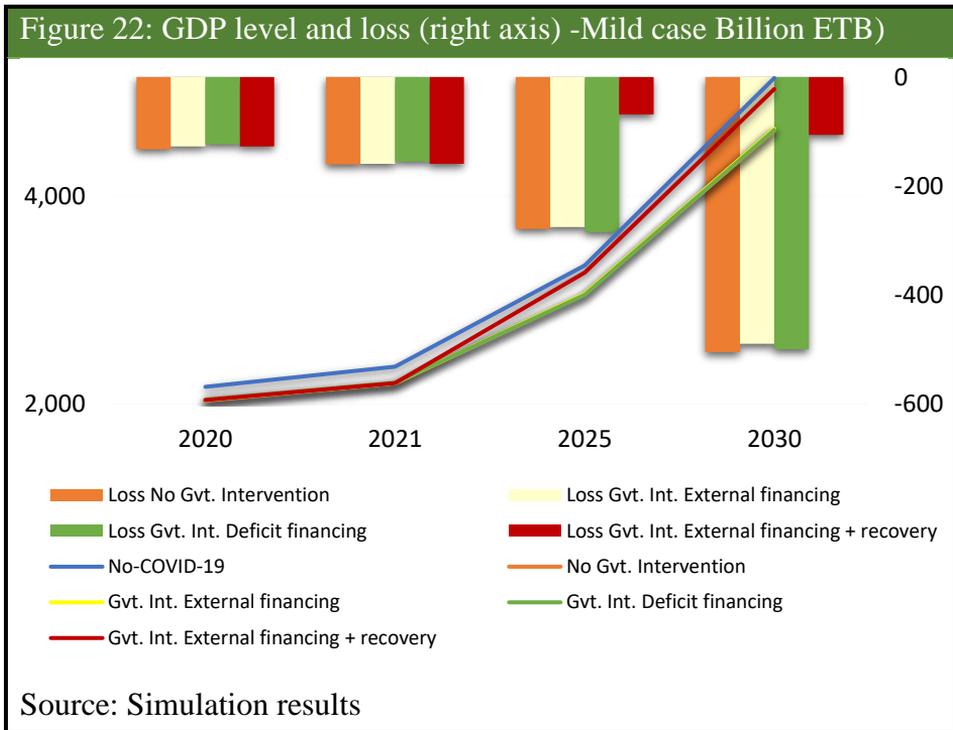
The key messages are summarized in the following points:

- The COVID-19 is likely to have medium-to-long-term effects.
- Although adverse effects do not amplify, the major macro indicators remain below their pre-COVID-19 level.

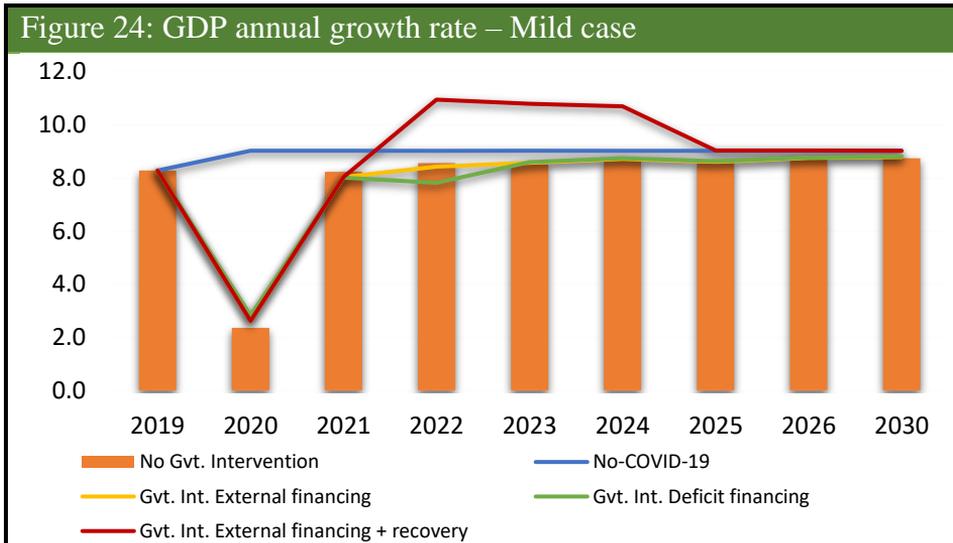
- The higher the scope of the impact, the greater the gap with the baseline (no-COVID-19) scenario.
- The current government intervention is not enough to put the economy on a higher growth path (no-COVID-19) if it does not go beyond FY 2020/21.

The effect of the COVID-19 crisis is likely to remain negative in the coming years if a progressive recovery of the shock variables (transmission channels) does not take place. In this highly pessimistic scenario, labor supply, productivity of labor and capital, remittances, FDI, export demand and imports supply, would resume their baseline (or no-COVID-19) growth rates from FY 2021/22 onwards. This situation is represented by the green and yellow colours (Figures 23 and 24). The three-year progressive recovery is represented by the red line. The orange columns represent the situation without government intervention. The blue colour represents the baseline or no-COVID-19 scenario.

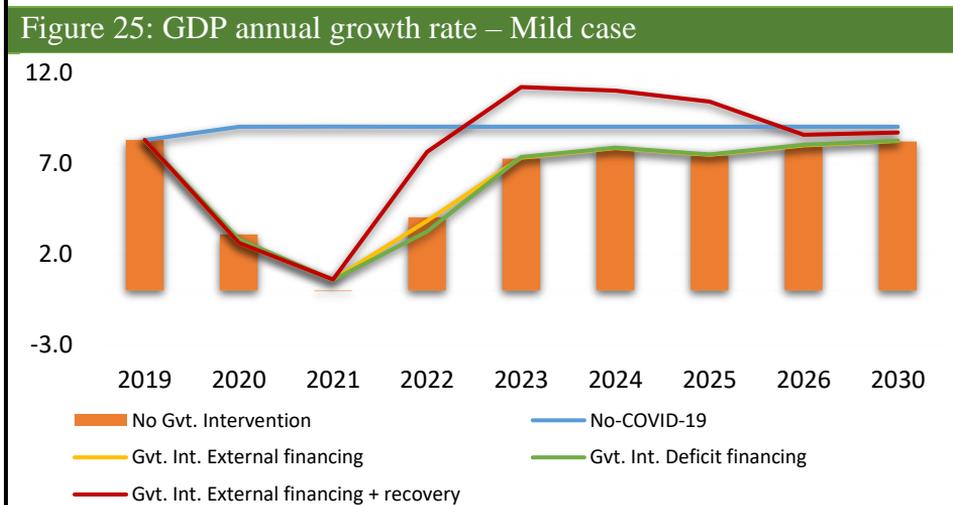
Even if GDP growth recovers its pre-crisis 9 percent growth rate, the size of the Ethiopian economy would remain well below the no-COVID-19 baseline level. Without any recovery of the transmission channels of the shock, the size of the Ethiopian economy would remain well below the baseline level (Figures 22 & 23). A progressive recovery is not likely to allow the economy to reach its pre-COVID-19 size. GDP would be lower by 106 billion ETB than the baseline in the mild case in FY 2029/30 and by 610 billion ETB lower in the severe case. By the end of the time horizon of our model, 2029/30, and without recovery, GDP would be lower than that of the baseline (no-COVID-19) by 489 billion ETB in the mild case and by 1,259 billion ETB in the severe case (Figures 22 & 23).



With a three-year recovery assumption, GDP growth rate would attain the pre-COVID-19 situation of 9 percent growth rate in the mid-term in the mild case. In a pessimistic scenario, GDP growth would remain below the baseline scenario in either the mild (8.7 percent) or severe (8 percent) cases in FY 2025/26 (Figures 24 & 25). In line with the severity of the shock, the recovery would have a V shape in the mild case and a U shape in the severe case.



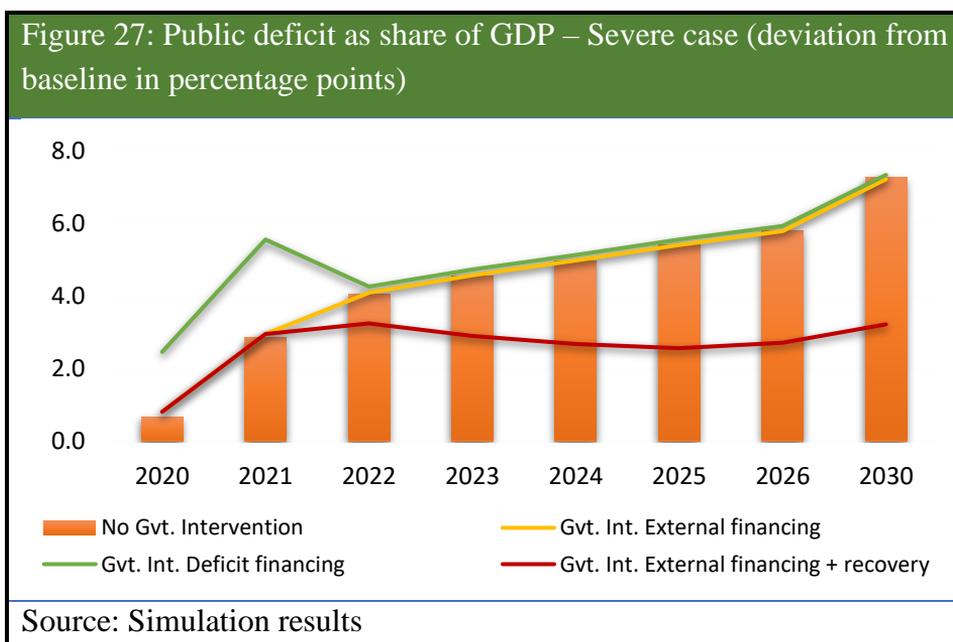
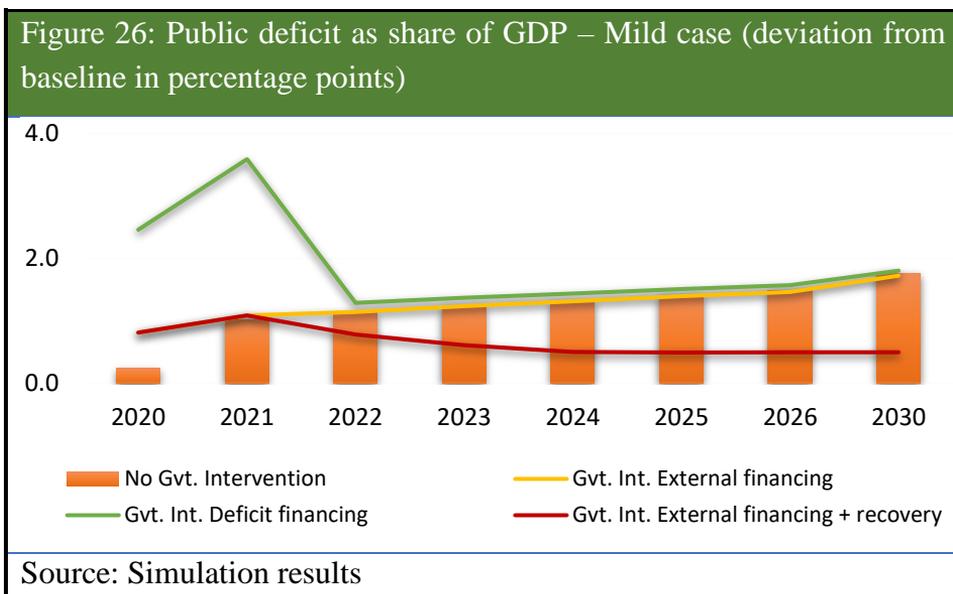
Source: Simulation results



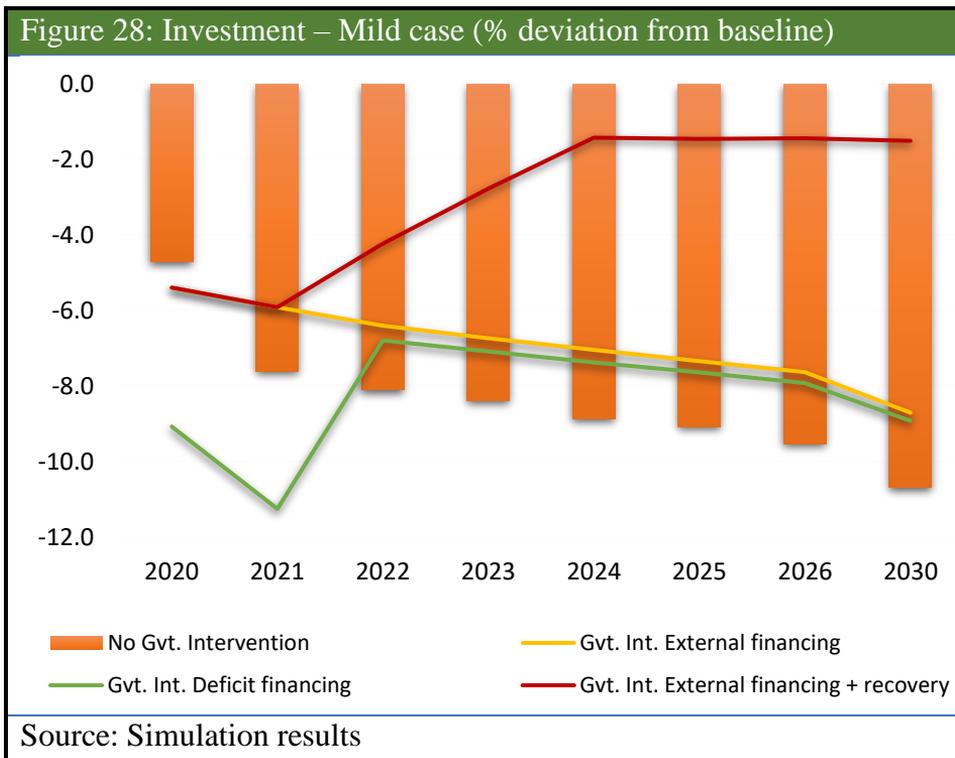
Notes: Gvt.int.=Government intervention.

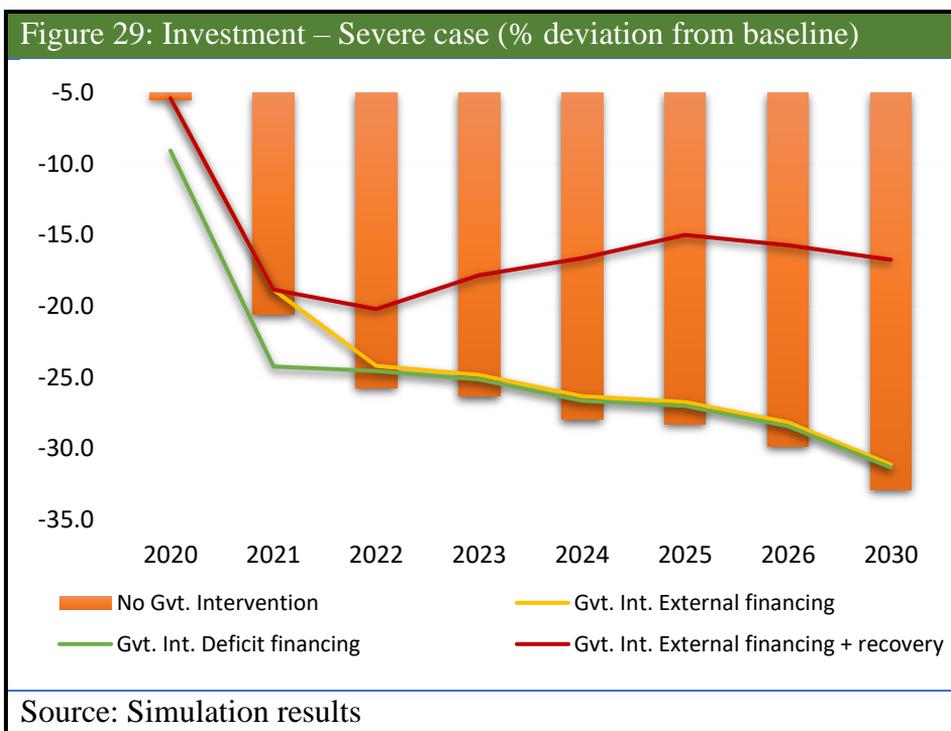
Source: Simulation results

Regardless of the scenario, fiscal deficit is likely to increase in absolute terms and in percentage of GDP. Deficit financing of the government-COVID-19 economic response plan would lead to a severe deterioration of the fiscal balance (Figures 26 & 27).

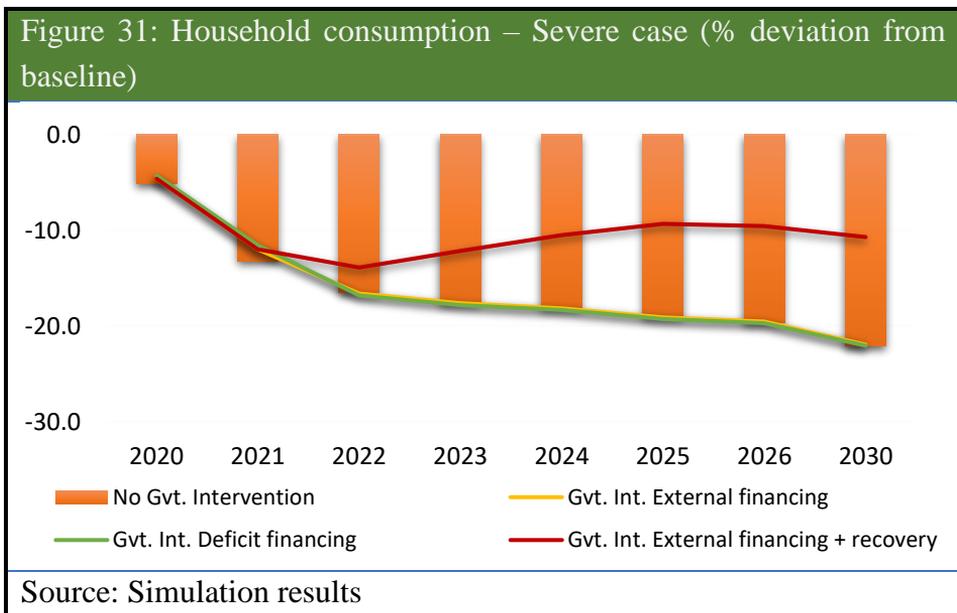
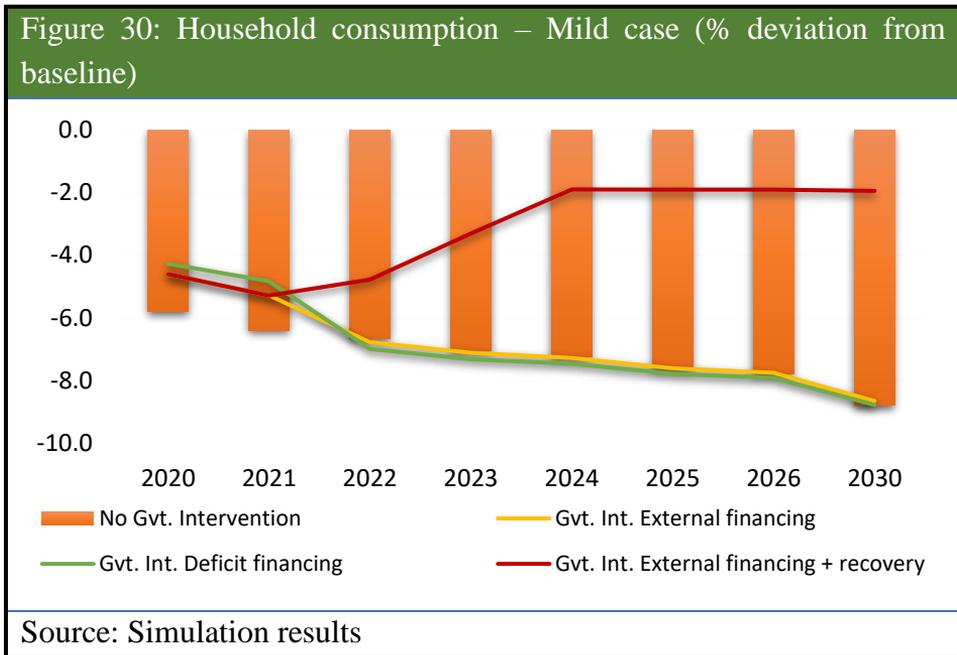


Government response plan is of paramount importance for the medium- and long-term investment. The impact of the pandemic on investment would be larger without government intervention in the short, medium and long terms. The role of the assistance from development partners is crucial at this time of crisis. Both mild and severe scenarios clearly illustrate the importance of government interventions supported by external assistance to avoid losing the gains from the prudent fiscal management of the past years. This would also avoid medium- and long-term investment reductions (Figures 28 & 29). Without government intervention, private investment would be 1.9 and 1.4 percentage points lower compared to the level with COVID-19 response plan in the mild and severe cases respectively in FY 2025/26.





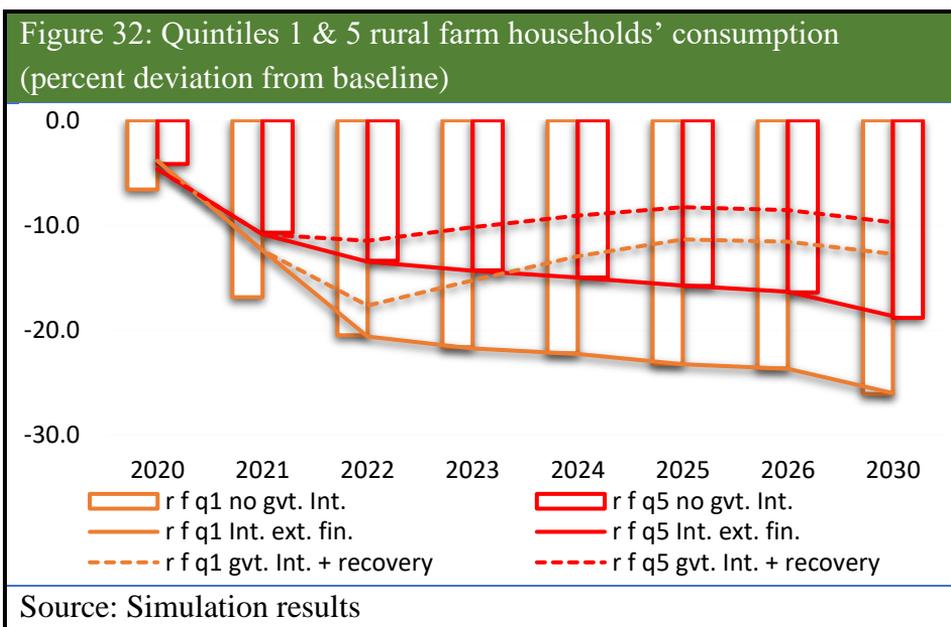
Household welfare would fall more sharply without relief and recovery measures. Relief measures are only effective in the short term. By the end of the time horizon of our model, FY 2029/30, household welfare at the national level, under the recovery scenario, would be 1.9 and 10.7 percent lower than the reference scenario in the mild and severe cases, respectively (Figures 30 & 31). This is likely to undermine the poverty reduction efforts with a risk of increasing poverty incidence, especially among those households with income just above the poverty line.

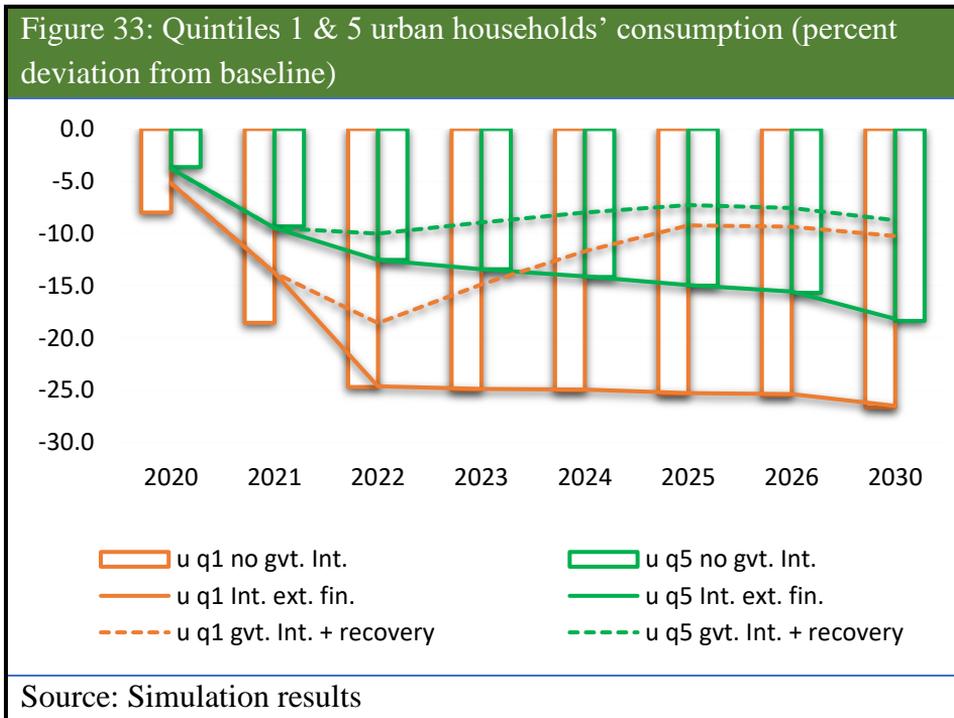


The poorest are likely to have higher welfare reduction in the medium to long term. In-kind and cash transfers to the most vulnerable are likely to narrow the gap

between households in the lowest quintiles and those in the highest quintiles, in the short term, in the severe case (Figures 32 and 33). However, this is not enough because the gap is clearly visible between the poorest and the others in the medium to long term. The rural urban divide is also likely to widen with the duration of the crisis between FY 2019/20 and 2020/21 with larger gap if no recovery.

Even if the transmission channels of the COVID-19 to the Ethiopian economy partly regain their pre-crisis level, households in the lowest income categories will have the higher welfare reduction than the highest quintile. The gap between the rural and urban would be slightly smaller than in a no recovery scenario. All households would have consumption level that is lower than the no-COVID-19 scenario.





4. Conclusions and recommendations

The COVID-19 pandemic is likely to have significant growth and welfare effects even under an optimistic scenario of mild shock and quick recovery. Fiscal deficit is likely to widen in absolute terms and as the percentage of GDP. The COVID-19 pandemic is likely to have adverse effects on every key sector of the Ethiopian economy. Employment is likely to be hardly hit. Although there is much uncertainty in the future, the COVID-19 crisis is likely to have medium-to-long-term negative effects.

GDP growth rate is expected to converge to the no-COVID-19 baseline relatively swiftly if the scope of the shock is mild. However, the GDP and welfare losses are not likely to be fully recovered. In an amplified scenario, the economic and welfare losses would be higher and the gap with the no-COVID-19 baseline would be much greater.

There is much uncertainty on the duration of the pandemic in Ethiopia and worldwide. This implies that recovery may not come as quickly as anticipated putting the Ethiopian economy closer to the severe scenario rather than the mild case. The role of the government is of paramount importance not only by increasing its spending under the COVID-19 response plan, but by creating an enabling environment that would support businesses to thrive and allow social safety nets to share the burden.

The anticipated 3.4 billion USD response plan is meant for emergency responses and to support businesses and protect jobs. Under the current allocation, this plan would certainly contribute protecting the livelihoods of workers and businesses. However, it is not enough to put the economy on a higher growth path that would reduce that gap with the pre-COVID-19 projections. Furthermore, without the assistance of development partners, deficit financing would result in the deterioration of the fiscal framework with a risk of jeopardizing macroeconomic stability and debt sustainability.

Shielding the most vulnerable groups is crucial to limit the populations that would fall (or back) into poverty. Hence it is necessary to expand the existing social

assistance programs such as rural and urban safety nets to protect the most vulnerable segments of the population.

Given the multifaced nature of COVID-19 induced challenges facing the country, a recovery and response plan is urgently needed to achieve dual objectives of mitigating further economic contraction and of stimulating the economy. The recovery and response plan shall target and safeguard sectors essential for food security, job creation and sustainable and inclusive growth. The plan needs to take into account the differentiated impacts of the pandemic on different activities and households.

Both fiscal and monetary policy instruments that have been introduced by the government to fight the pandemic shall be continued, enforced and implemented, in a coordinated way, to support the effectiveness of interventions until the economy recovers. However, support measures need to be monitored and evaluated to facilitate the transition towards economic recovery and boost economic dynamism.

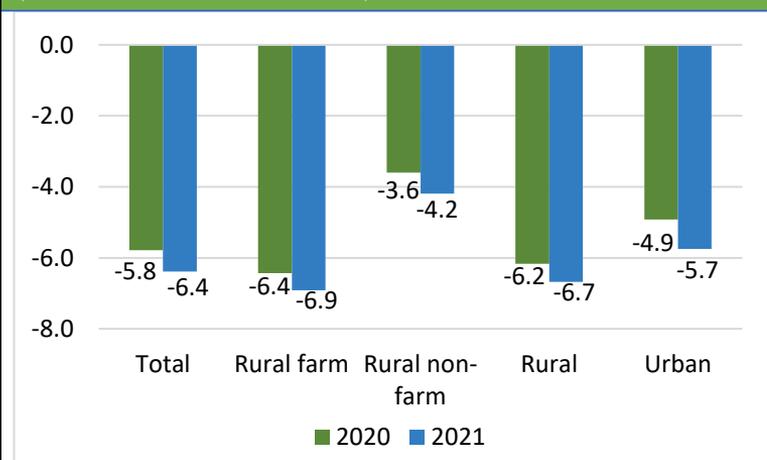
The recovery and response plan requires rapid and predictable financing which shall come from two sources. It is important that the international community provides quick and coordinated support. Given the global nature of the pandemic and uncertainty of external finance in terms of timing and amount, it is necessary to design a strategy for mobilizing and diversifying domestic sources of finance to manage and support the crisis and recovery in a more dependable manner. It is also necessary to evaluate tax related supports ongoing basis as across-the-board tax reductions, deferrals and relief may jeopardize medium-term revenue raising capacity of the government.

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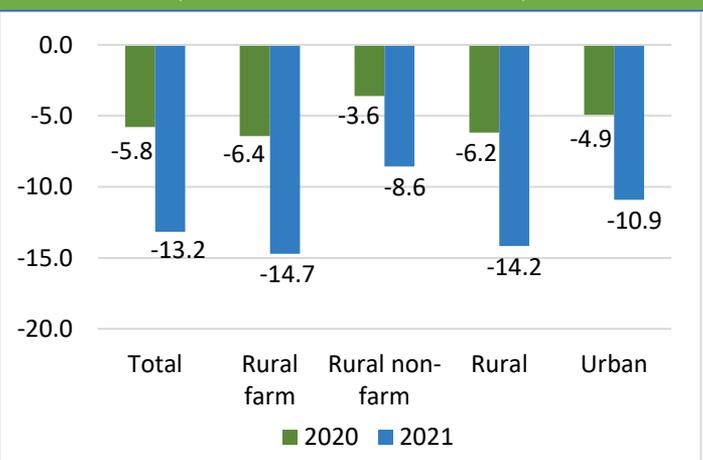
Annex 1 - The short-term effects without government interventions

Figure A1: Aggregate household consumption – mild case (% deviation from baseline)



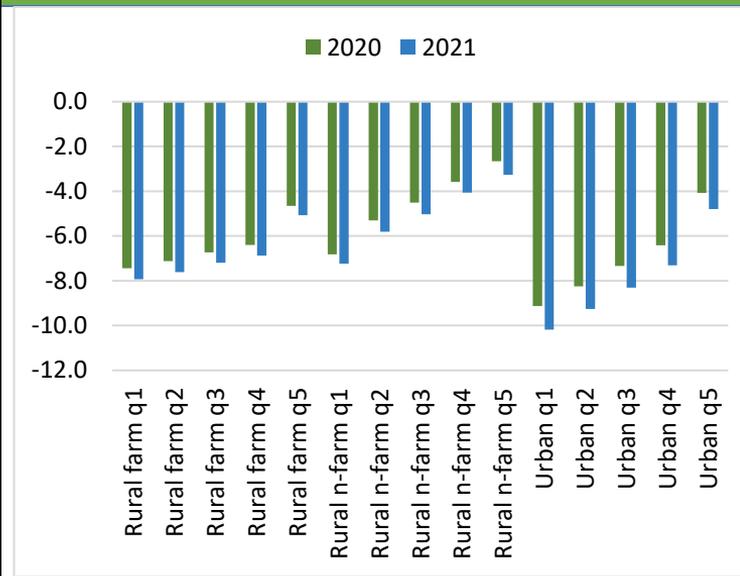
Source: Simulation results

Figure A2: Aggregate household consumption – severe case (% deviation from baseline)



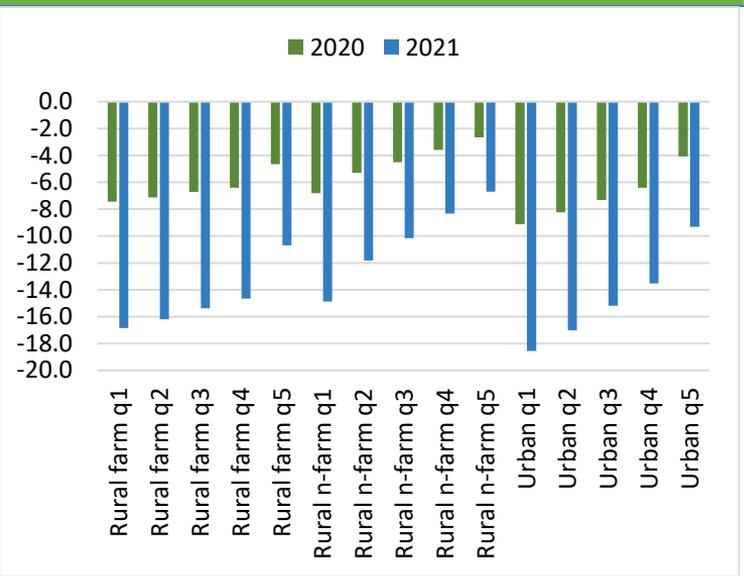
Source: Simulation results

Figure A3: Household consumption by decile – mild case (% deviation from baseline)



Source: Simulation results

Figure A4: Household consumption by decile – severe case (% deviation from baseline)



Source: Simulation results

Inquiries should be addressed to:

Ethiopian Economics Association (EEA)

Ethiopian Economic Policy Research Institute (EEPRI)

P. O. Box 34282

Tel: 011 645 32 00, 3329, 3041

Fax: 011 645 30 20

e-mail: eea@ethionet.et

Website: www.eaecon.org
