cooperative governance
& traditional affairs
Department:
Cooperative Governance and Traditional Affairs
REPUBLIC OF SOUTH AFRICA

COVID-19
IN SOUTH AFRICA

SOCIO-ECONOMIC IMPACT ASSESSMENT

UNITED NATIONS IN SOUTH AFRICA

Glossary

AIDS	Acquired Immunodeficiency Syndrome
CGE	Computable General Equilibrium
COVID-19	Coronavirus disease-2019
GDP	Gross Domestic Product
HIV	Human Immuno-deficiency Virus
MSME	Micro, Small & Medium Enterprises
NIDS	National Income Dynamics Study
SAM	Social Accounting Matrix
SDGs	Sustainable Development Goals
SMEs	Small to Medium Enterprises
TERS	Temporary Employer/Employee Relief Scheme
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	The United Nations Educational, Scientific and Cultural Organization
WHO	World Health Organization

UN agencies who participated in this study

ILO	International Labour Organization
FAO	Food and Agriculture Organization
OHCHR	Office of the United Nations High Commissioner for Human Rights
UNHCR	United Nations High Commissioner for Refugees

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Programme
(UNDP)

Part One:

BACKGROUND ON COVID-19 & REVIEW OF **LITERATURE ON COVID-19 IMPACT**

Foreword

Dr Nkosazana Dlamini-Zuma

Ms Nardos Bekele-Thomas

The COVID-19 Pandemic has changed the world as we knew it. In the words of the Secretary General of the United Nations

"We have been brought to our knees – by a microscopic virus... It has laid bare risks we have ignored for decades: inadequate health systems; gaps in social protection; structural inequalities; environmental degradation; the climate crisis."

Today globally there are over 15 million cases. The rapid spread of the virus, which knows no borders affects every country. It will challenge the global economy, al be it not to the same intensity.

South Africa ranks amongst the most infected countries in the world. The virus has set back the gains we had made in the 26 years since the dawn of democracy. It also came at a time when our economy was greatly challenged with pedestrian growth and limited wealth redistribution, thus making South Africa one of the most unequal nations in the world. The ripple effects of the virus impacted upon women more, with them having lost the most income and jobs, especially in the informal sector where they are in the majority.

The development consequences of the COVID-19 outbreak are likely to lead to a decline in real GDP growth by 3.6 percent in 2020 – under this report's "optimistic scenario" – resulting in an overall decline of GDP growth by 5.1 percentage points, as compared to the economy's projected performance before the onset of the COVID-19. Under this report's "pessimistic scenario," GDP is likely to fall by 6.4 percent, leading to a nearly 7.9 percentage point decline in 2020, compared to the economic performance projected before the onset of the COVID-19. As a result, at least five years must pass for South Africa's economy to return to pre-2019 levels – unless innovative actions are implemented.

The consequences born of the COVID-19 outbreak are likely to further exacerbate poverty and inequality in South Africa. The unemployment threatens to become further precarious – with the highest risks for informal workers and female-headed households. The impacts of COVID-19 on gender issues are very worrying and can curtail the gains made on advancing gender equality and women empowerment in the past few decades unless concerted efforts are taken to curtail these consequences. As businesses change contract types – from permanent to temporal

– as a financial coping mechanism, it is probable that nearly 44 percent of people will fall into poverty. In the same vein, the number of households falling from lower-middle class below the upper-level poverty line and the number of households falling below the chronic poverty line increases due to the impact of COVID-19. The most affected persons are semi- and unskilled-workers and female headed households with at least two children. This reality will further exacerbate the already wide income inequalities, as the COVID-19 is complicating income exclusion with the highest incidence on the black population, who are already disadvantaged.

Consequently, the South African government response seeks to maintain a delicate balance between saving lives and livelihoods. Thus, through messaging directed at adjusting social behaviour which includes the wearing of masks, washing of hands, sanitizing, and maintaining a safe social distance have been integral to the response. Which response also seeks to ensure the flattening of the curve healthcare system is adequately prepared and equipped to deal with the pandemic. Gradually, as progress was being recorded, the South African government was able to open up the economy through the Risk Adjusted Strategy. The strategy includes an alert system to determine the level of restrictions in place, an industry classification for readiness to return to work and enhances workplace public health, hygiene and social distancing. This strategy has been complemented by a socio economic support and rescue package which includes social relief for the vulnerable and support to key sectors in the economy including the arts, sports and tourism. However key sectors such as the informal and SMME sectors have not received adequate support. Going forward through the District Development Model, efforts will be coordsinated and integrated to lift these and other sectors. Efforts will be made to reach to all persons in order to leave no one behind. Ensuring that all are served – and properly so – is critical to attaining the Sustainable Development Goals (SDGs) as a country. Government and other stakeholders therefore will enhance support to all persons without regard to location, gender, nationality, creed, and race as enshrined in the Charter of the United Nations, of which South Africa is subscribed and the South African Constitution.

To fight COVID-19 effectively and ensure the economy's recovery, collective support to programmatic actions and policy options is required. This entails all stakeholders putting in all necessary effort and resources to provide the needed support. The UN System in South Africa is committed to continuing to fully support each Agency's mandate to stand in solidarity with the country and support the South African Government to overcome these three development challenges whose circumstances are likely to worsen due to COVID-19. This togetherness is evident in our collective and unyielding support to policy briefs and innovative studies, as well as support to refugees, children, the informal sector, youth, migrants, health systems, and all other thematic areas.

The call for action is now.

Signed

Dr Nkosazana Dlamini Zuma
Minister for Cooperative Governance and Traditional Affairs
South Africa

Signed

Ms Nardos Bekele-Thomas
UN Resident Coordinator
South Africa

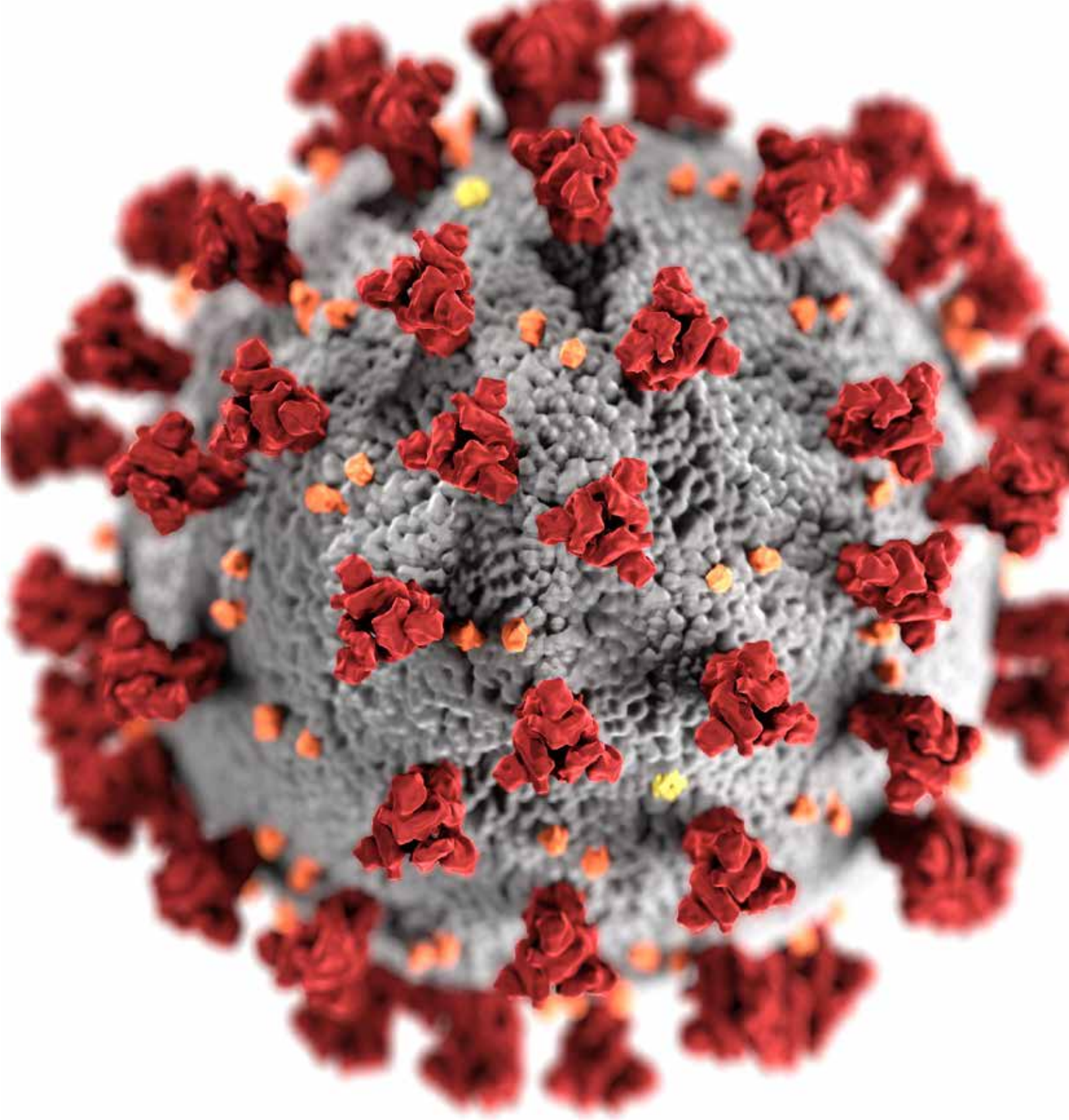
Acknowledgement

This study was prepared by the United Nations in South Africa under the auspices of the Resident Coordinator, Mrs Nardos Bekele-Thomas, and through the leadership of the United Nations Development Programme (UNDP). The UNDP Resident Representative, Dr Ayodele Odusola's, relentless guidance was instrumental in the quality of the study and relevance to policy contributions. The United Nations Technical Team with representatives from RCO, ILO, FAO, UNOHCR, UNDP, UNIDO, and UN Women brought an all-encompassing view and distinct dimensions of those most affected by the COVID-19 pandemic.

Appreciation is extended to the Sounding Board, consisting of eminent policymakers, researchers, members of think tanks and academia, civil society, and the private sector who provided insights on the realities of the country context, thus enhancing applicability of the study's findings. Members of the Sounding Board are: Mr Tshediso Matona, Executive Secretary, National Planning Commission (NPC) Presidency; Mr Risenga Maluleke. Statistician, General Statistics South Africa; Mr Robin Toli, Chief Director, International Development Cooperation, National Treasury; Prof Ivan Turok, Executive Director, Economic Performance and Development, Human Sciences Research Council; Dr Pali Lehohla, Researcher and Consultant, Oxford Poverty and Human Development Initiative; Dr David Everatt, Head, School of Governance, Wits University; Ms Namhla Mniki Mangaliso, Director, African Monitor; Dr Linda Vilakazi, Managing Director, Zanele Mbeki Development Trust; Ms Nozipho January Bardill, Chair: Interim Board of the UN Global Compact Local Network in South Africa and a board member of Shared Value Africa Initiative; Ms Keketso Naema, Chief Executive Officer, Gender Commission; Mr Sizwe Nxasana , Founder Sifiso Learning Group; and Ms Natalie Africa, Senior Advisor, Bill and Melinda Gates Foundation.

Due recognition is accorded to Prof Babatunde Abidoye, George Mason University and Prof Margaret Chitiga, University of Pretoria, lead authors of this study, for their expertise, objectivity, and also for their patience in ensuring all comments are duly considered. We would also like to thank Field & Insights Connections for conducting the surveys on the Psychological Effects of COVID-19 on Hospital Staff and household surveys on the socioeconomic impact of COVID-19 in South Africa.

This study is driven by an internal UNDP team under the stewardship of the Economic Advisor, Ms Fatou Leigh. The team consisted of Deputy Resident Representative Mr Gabriel Dava, Mr Shihao Han, Programme Analyst UNV China; Ms Sara Hamano, Programme Analyst, UNV Japan; Ms Nokuthula Nyamweda, Economist Intern; Ms Karabo Moloi, Economist Intern; Dr Nelly Mwaka, Gender Specialist; Mr Kordzo Sedegah, National Economist, Ghana; Ms Rhulani Lehloka, Communication Analyst; Mr Bobby Shabangu, Knowledge Management; and Mr James Neuhaus, Partnerships and Resource Mobilisation Specialist. The team developed concept notes and policy briefs, provided critical reviews, and created infographics.



The untiring administrative and logistics support of Ms Yoliswa Macoba, Executive Assistant; Ms Sibongile Kubeka, Programme Analyst; Ms Takalani Radzilani, Mr Augustus Maselela Mokoka, and Ms Siphelele Moloi for IT Support; and Ms Lerato Maimela and Ms Nozika Moasa, Procurement Unit, is truly valued. Kwambele (PTY) Ltd copy-edited, designed and printed this study. Artists and photographers whose work is used in this report: Nuno Acosta, Joseph Rwubusisi, Morris Moma of Morris Photos, Sonwabo Valashiya, Bandile Gumede.

Preface

Dr Ayodele Odusola

The COVID-19 pandemic represents the biggest shock, over the past century, to the global public health system with resounding impact on economies and societies – reversing progress on human development achieved over decades and impeding achievement of the Sustainable Development Goals (SDGs) by the year 2030. The pandemic created uncertainties that led countries to take bold actions (including complete lockdowns of economies and social activities) to safeguard public health. Such efforts, adopted to flatten the COVID-19 curve, unfortunately and coincidentally steepen the curve of economic recession in many countries.

The pandemic started when the South African economy experienced a technical recession, further complicated by the Moody's downgrade of the sovereign credit rating to junk status, making early and fast recovery very challenging. The Government's strong leadership and bold actions to contain the pandemic (including a total lockdown, implementation of a stimulus package, aggressive screening, and testing) were globally acknowledged; yet the COVID-19 remained untamed in the first five months – with devastating impacts on the economy and the population.

This study, conducted in the first three months of the COVID-19 in South Africa, uses a combination of primary and secondary information – constituting one of a series of impact studies conducted by the United Nations system under the leadership of the Resident Coordinator, with technical leadership from the United Nations Development Programme (UNDP) in partnership with associated Government departments. The report benefits from perspectives of prominent policymakers, civil society, researchers and academia, and the private sector through an apposite Sounding Board Group.

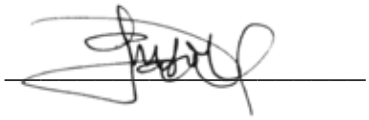
Key messages from the study offer substantial evidence to inform responses to the pandemic. For instance, populations living in poverty across upper and lower poverty lines increase due to COVID19, with higher incidences on female headed households, rural dwellers, populations with education below the secondary level, unskilled labour, and informal sector workers. Apart from the fact that about 54 percent of households pushed out of permanent employment to informal jobs are likely to fall into poverty, about 34 percent of those categorized as middle class are also likely to fall into vulnerability or poverty.

The devastating impact of COVID-19 is complicating income inequality, with the highest incidence affecting the black population. Overall, it may take at least 5 years for the economy to return to pre-2019 levels, unless innovative actions are implemented.

The report concludes that there is no silver bullet policy action – a combination of innovative policy actions is needed. In addition to implementing macroeconomic measures like reduced lending rates, tax deferrals, and debt rescheduling, ensuring no one is left behind calls for targeting the most vulnerable populations, like the marginalized women and unskilled workers, especially those in the informal sectors, through differentiated interventions, including deepening social assistance and re-skilling programmes for unskilled workers. With strong leadership and an understanding followership, this crisis could be turned to an accelerated, inclusive-growth economic strategy through local production of PPEs, medical devices, and diagnostic equipment through strategic support to small scale enterprises and creating enabling environments that allow SMEs to thrive.

It is our wish that this report contributes to the efforts of government partners, development agencies, civil society, and the private sector, providing insight into the impact of the pandemic, the road to early recovery from COVID-19, and pathways to build back better and innovatively.

Signed



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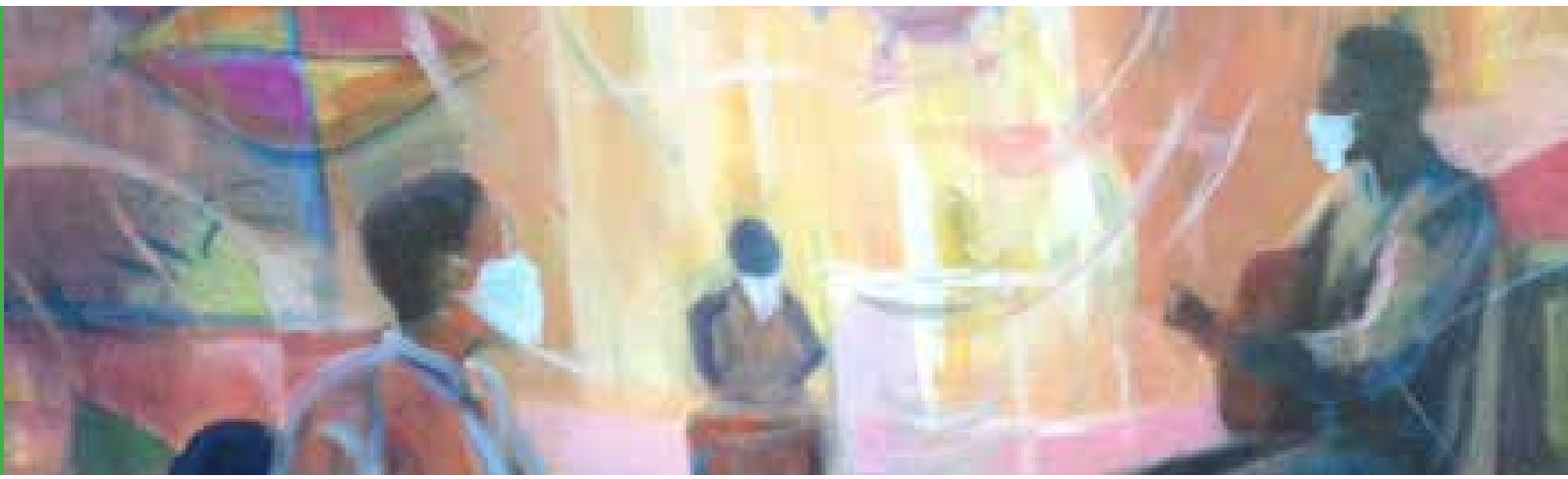
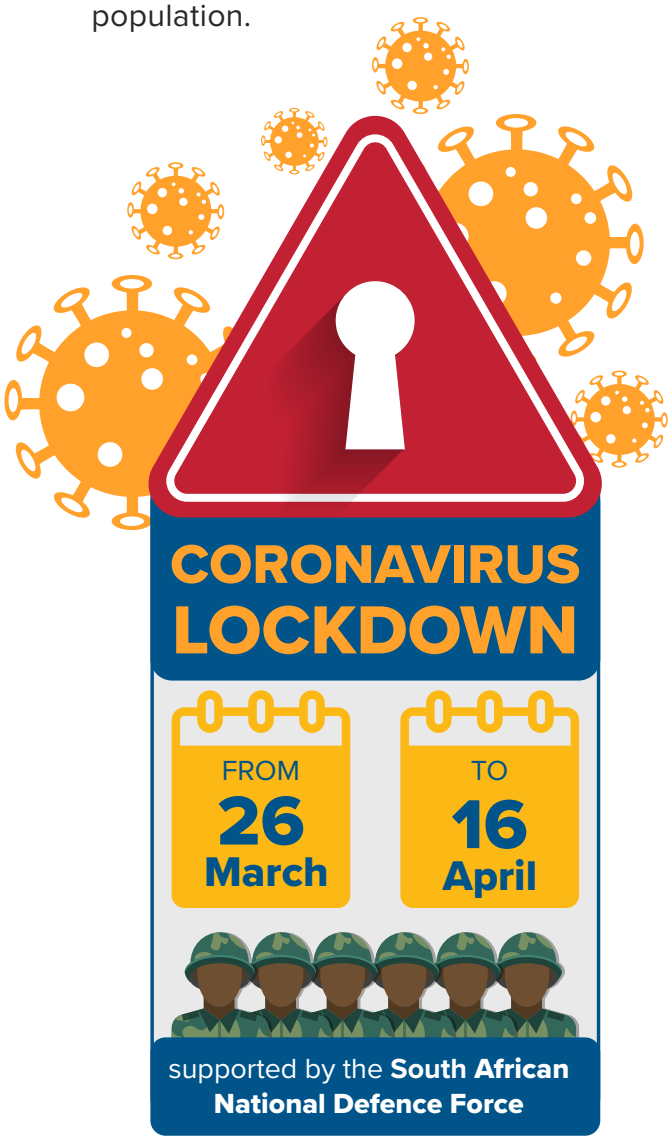


Executive Summary

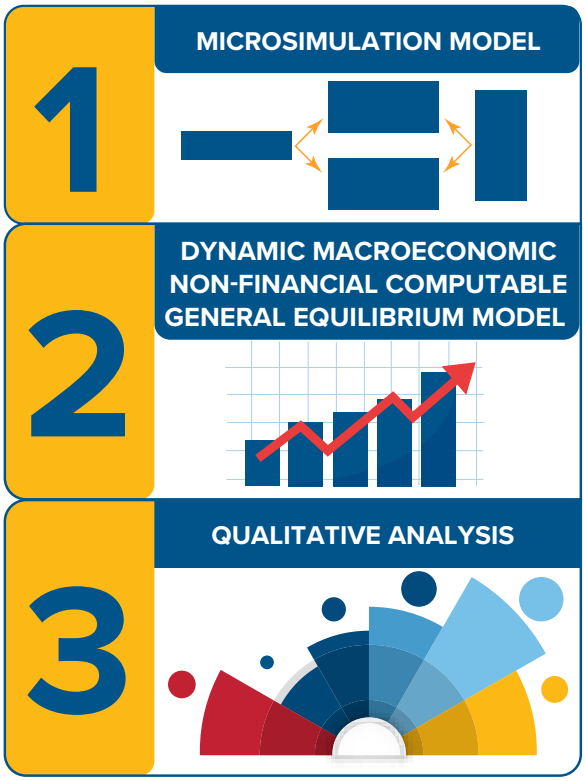
On 23 March 2020, President Cyril Ramaphosa announced a new measure to combat the spread of Coronavirus Disease 2019 (COVID-19) in South Africa – a three-week nationwide lockdown with severe restrictions on travel and movement, supported by the South African National Defence Force – from midnight on Thursday, 26 March, to midnight on Thursday, 16 April. The president said more is needed to avoid "an enormous catastrophe" among the population.



Such an extraordinary response is expected to significantly impact the people and the economy. The objective of this study is to contribute to the analysis and understanding of the impact of COVID-19 on the economy and importantly on the people in South Africa and from there promote the use of evidence-informed information for policy and recovery. This study uses three complementary methodologies to generate robust findings to reflect the realities on the ground: (i) a microsimulation model estimating the impact of COVID-19 on household poverty in South Africa using data from the South African National Income Dynamics Study (NIDS). Using a multivariate probit model, the study focuses on how COVID-19 will drive temporary and long-term changes in poverty levels in South Africa and predicts the probability of selected demographics falling into each of the defined poverty classes, (ii) a dynamic macroeconomic non-financial Computable General Equilibrium Model (CGE) calibrated to a 2015 Social Accounting Matrix (SAM) updated to 2017, analysing the impact of COVID-19 on economic growth, unemployment and inequalities within a framework of an optimistic and pessimistic scenarios in consideration of the situation before COVID-19, and (iii) a qualitative analysis capturing the perception and feelings of people on the impact of COVID-19 on their lives and work, through a survey on people working in hospitals and a second survey to understand the immediate impact on the general public.

Methodology

This study provides one of the first modelling assessments to understand that impact, looking at the household as a micro-unit and the macroeconomic effect that captures feedback and interactions within the economy. These models work sequentially in the sense that results from the macro model infer the impact of the pandemic on poverty and inequality. This analysis is important



given the uncertainties that surround not only the health aspects of COVID-19, itself, but also the impact on the economy and households as well as the possible response by governments. As we learn more about the pandemic, the model can be adjusted to reflect impacts and well as the responses of the government.

The microeconomic model evaluates poverty levels, dynamics, and the factors that drive households in and out of poverty. The model goes beyond the definition of poverty only as "poor" and "non-poor", disaggregating into five classifications that signify the potential of shocks to change a household's financial status. The methodology reclassifies households into "elite," "upper-middle-class" or "vulnerable class" (reclassifying the classic middle class) and the "chronic poor" and "transient poor" (reclassifying the classic poor).

The CGE model simulated three scenarios: 1) a "Business as Usual" (BaU) scenario, 2) an "optimistic" scenario, and 3) a "pessimistic" scenario. The COVID-19 scenarios are fashioned on the assumption that a period of the pandemic outside South Africa will precede South Africa's experience of the disease. The *BaU* scenario tracks the projected average growth of South Africa's economy using the 2019 growth rates from the International Monetary Fund's World Economic Outlook

data. This is followed by a period of suppressed economic activities, in which only essential sectors and commodities are traded internally. After this period, the economy is then allowed to get back to normal, albeit gradually. The *optimistic* scenario is less severe than the pessimistic scenario, including a lockdown period of one month. The pandemic period assumed for the optimistic scenario totals fifteen months. The *pessimistic* scenario, on the other hand, is assumed to have a lockdown period of one month followed by a prolonged re-opening of the economy and society at-large. The pandemic lasts for thirty months in this scenario.

Three main transmission channels through which the effects of the pandemic feed into the economy in the short term are identified. These are through international trade markets, domestic demand, and domestic supply channels. Regarding international trade markets, the pandemic slows down and, in some cases, halts world trade activities affecting imports and exports. Regarding the domestic demand side, the various measures put in place by government reduce demand. On the domestic supply side, the productivity of both capital and labour are reduced due to the pandemic.

To gather the perceptions of people, data was collected through telephone interviews (CATI), Email, and SMS surveying techniques from 14-26 April 2020 and from 25 May-3 June 2020 to obtain supplementary data from hospital workers. The sample was nationally represented by race, age, gender and location and with a natural fallout of Living Standard Measures (LSM) across provinces. The survey was administered in English, Zulu, Xhosa, Setswana, Sepedi and Sesotho

Key Findings

- The main findings at the household level show that female-headed households are more likely to fall into poverty than male-headed households. Under the optimistic scenario, the percentage increase in the number of females who fell below the Lower Bound Poverty Line (LBPL) is 0.39% (equivalent to about 117 000) compared to 0.24% (equivalent to about 69 072) for males. For the Upper Bound Poverty Line (UBPL) percentage increase of females is 0.33% compared to 0.24% for males. Similarly, under the pessimistic scenario, the percentage increase in females that fall below the LBPL is 0.56% compared to 0.48% for males; and for the UBPL, 0.48% for females and 0.36% for males.

female-headed households are more likely to fall into poverty than male-headed households.

- The higher the level of education achieved by the head of household, the lower the probability of this household falling into poverty, with the average marginal impact higher for when secondary school was not completed than those with tertiary level of education.
- Employment is vital for poverty transition, since households who experience more secure employment (permanent, union, and self-employed

household in the formal sector) have a lower probability of falling into poverty.

- The study also shows that Black Africans and households with many dependents have a higher likelihood of being poor.
- The number of people living under the upper and lower poverty lines (poverty and extreme poverty) increase due to the pandemic.1
- Poorer households are more negatively affected by the pandemic mainly through the unskilled labour and wage reduction compared to the richer households. Hence inequality as measured by the Gini coefficient index increased by 0.16 in the optimistic scenario and 0.23 in the pessimistic scenario.
- The analysis also suggests that the current stimulus package may not be sufficient given that households are still going to lose at least 40 percent of their income even if they qualify for the special Temporary Employee/ Employer Relief Scheme (TERS). Based on data from households that experienced at least a 10 percent reduction in income alone before the pandemic, the results show that their odds of falling into poverty is 1.5.

The main findings at the macro level are:

- Gross Domestic Product (GDP) falls and does not recover even by 2024 as a result of the pandemic.
  - GDP declines by 3.6 percent in 2020 under the optimistic scenario, equating to a fall in GDP growth of 5.1 percentage points from the BaU growth.
  - GDP declines by 6.4 percent under the pessimistic scenario, equating to a fall in GDP growth of 7.9 percentage points in 2020 relative to the BaU growth.

GROSS DOMESTIC PRODUCT (GDP) FALLS AND DOES NOT RECOVER EVEN BY 2024

There are relative “winners” and “losers” among the sectors as a result of the pandemic:

  - The winning sectors are those designated as essential, including the health sector, the food and agriculture sector, financial and insurance service sectors and telecommunication services sector.
  - The losing sectors include textiles, glass products, footwear, education services, catering and accommodation (which contains tourism as per the United Nations System of National Accounts classification), beverages and tobacco sectors.

- Unemployment increases with about 47 082 people losing their jobs in the optimistic scenario and as many as 80 712 people losing their jobs in the pessimistic scenario in 2020. With the easing of lockdown restrictions and government measures to revive the economy, unemployment also recovers but similar to economic growth, the unemployment will take at least five years to recover to pre-

1 The FPL was R531 with an upper bound poverty line of R1 138 and a lower bound poverty line of R501 (per capita, per month) in 2017 PPPs.

COVID levels.

Aggregate household income falls. Upon disaggregation, it emerges that:

- The hardest hit are workers with only primary school education (grades 1-7) and those with only middle school education (grades 8-11), who are generally characterised as unskilled and semi-skilled, respectively, since they receive the majority of their wage income from sectors that are designated to be non-essential and were closed during the lockdown period.
- Workers who completed secondary school education (grade 12) and those with tertiary education (certificates, diplomas or degrees) receive the majority of their income from sectors that are designated as essential, which generally continued to operate during the lockdown period.
- Most of the job losses reflect people who worked in the informal sector.

- Income inequality increases due to the pandemic, exacerbating the already high-income disparities in South Africa, and compromising South Africa's progress towards attaining targets under the Sustainable Development Goals particularly regarding poverty, health, education, employment and inequalities. Women, particularly in the poorest female-headed households, disproportionately bear the brunt of the impact of COVID-19.
- Consumer prices are falling due to suppressed aggregate demand in the economy.
- Government revenue falls by 3.5% in the optimistic scenario and by 5.1% in the pessimistic scenario in 2020. This is attributable to the depressed economy as well as government expenditures growing at the same rate as before the COVID-19 pandemic (i.e., in the absence of a stimulus package). As a result government deficits increase

Key findings with respect to the surveys

- 66.3% of the respondents believe that the South African government has the ability to handle the current COVID-19 pandemic. The confidence in the government's ability to handle COVID-19 can be attributed to positive support of the lockdown and the fact that the majority of the respondents believe that closing the borders is effective in controlling the COVID-19 outbreak.
- About 60 percent of respondents feel they have enough knowledge about infectivity and virulence, whereas 69.2 percent feel they have adequate knowledge about protection and prevention from infection of COVID – 19.

66.3% of the respondents believe that the South African government has the ability to handle the current COVID-19 pandemic.

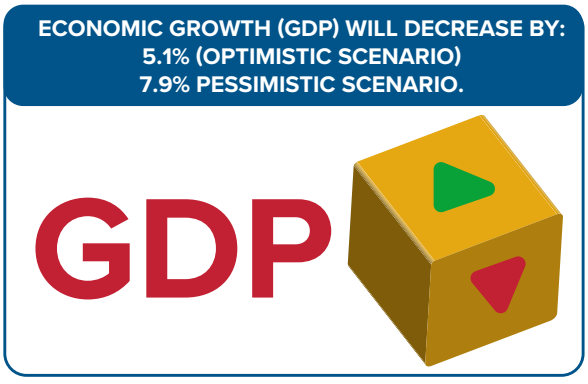
- There was no greater perceived food shortage. Most everyday/regular food items were easily available. Some grocery outlets limited quantities on bulk purchasing. In order to stretch food items and to curb increased food spending, respondents would eat less food, skip meals and ration plate portions.
- Over half of the people that work at

COVID-19 hospitals (workers age 18-24) rarely felt anxious about being infected with COVID-19 or being infected while commuting to work.

- Workers that are 65 years and older also felt always protected by the hospital.
- Doctors feel physical and mental exhaustion sometimes more than nurses and other workers. Nurses have less motivation to work than doctors and other workers.
- Workers that indicate that they feel protected are also more likely to be motivated, indicating that hospitals that protect their workers leads to workers who are more motivated, which is important for recovery during COVID-19.
- Exhausted workers are also more likely to be anxious and a high workload increases anxiety. Protection and anxiety are not correlated.
- Female workers are less motivated, less anxious, more likely to feel a high workload, and feel less protected.

Twelve Key Emerging Messages

1. Economic growth (GDP) will decrease by 5.1% in the optimistic scenario and by as much as 7.9% in the pessimistic scenario. It may take at least five years for the economy to return to the pre-2019 levels unless innovative actions are implemented.



2. A government rescue response, stimulus package, or social protection programme typically targets businesses and the chronically poor in society. The number of households below the upper-level poverty line increases as households fall from the lower middle class; the number of households falling into chronic poverty also increases due to COVID-19.
3. While support to these households in the chronic poverty group continues to be essential, this study makes a case for other categories of households that should be protected to at least preserve poverty levels before COVID-19. The transient poor and vulnerable poor[2] are essential groups that need special attention in line with the country's poverty reduction strategies. A government policy to maintain the current poverty rate, for instance, would include maintaining income and expenditure of households in the vulnerable class.
4. Poverty levels will increase by 0.45% (about 264 510 households) in the optimistic scenario and by 0.66% (about 387 948 households) in the pessimistic scenario in 2020 and more households will be vulnerable to shocks. Targeting will be critical for government support to be effective. This targeting can be by geography, education, household size, household poverty level, gender dimensions, skill levels, and form of employment.
5. COVID-19 is complicating income exclusion with the highest incidence on the black population.
6. Thirty-four percent of households are likely to exit the middle class into vulnerability.

2 - For more disaggregated analysis, the Poor are classified into Chronic poor and Transient poor, and the Non-Poor into Vulnerable, Middle class, and Elite based on vulnerability criterion. This broader definition of both the poor and the middle class identifies a household at risk of falling in and out of poverty. (Schotte et al., (2018)

7. The households whose employment type changes from permanent to contract employment have a 44 percent chance of falling into poverty. Switching contract types from permanent to temporary is a coping mechanism for many businesses affected by COVID-19.
8. A household that is pushed from permanent employment to informal work after the six-month stimulus package is over will have a 54 percent chance of falling into poverty.
9. 54 percent of households pushed out of permanent to informal jobs after the stimulus package will likely to fall into poverty. Semi and unskilled workers are the hardest hit. The negative impact of COVID-19 is higher on those without social assistance than on those who receive social protection.
10. Technology and digitisation has proven to be a "human right" as it redefined access to work, income and schooling during the lockdown periods necessitated by Covid-19.
11. Doctors and nurses feel less protected than other workers. Public hospital workers are less motivated and feel less protected relative to private hospital workers.
12. There is no silver bullet policy action – combined innovative policy actions are needed.

Policy Recommendations

Policy interventions need to pay specific attention to those persons hurt the most by COVID-19. Broadly, a strategic thrust in interventions is usually targeted towards persons most disadvantaged in terms of poverty, inequality, and sectoral/ production impact. A new dimension added by this study is that intervention responses mitigating the impact of COVID-19 need to be differentiated by

POLICY INTERVENTIONS NEED TO PAY SPECIFIC ATTENTION TO THOSE PERSONS HURT THE MOST BY COVID-19.

predicted losses.

- For households, this should be according to household poverty level and its gender dimension (including extending social assistance and creating new instruments), as well as marital status and number of children. Differentiated interventions should be made considering gender and the sex of the household head because of income source and level of education (women derive a larger share of their income from lower-skilled work). The differentiated impact also includes differences in location (urban versus rural areas) and type of employment (permanent versus casual employment).
- For workers, interventions can be differentiated according to skill category (those who occupy unskilled and semi-skilled occupations, including those requiring re-skilling programmes and the expansion of public works programmes). For the low skilled and less educated, re-skilling programmes for those in the informal sector will reduce the impact of some consequences of COVID-19. These households achieved primary school education (grades 1-7), and middle school education (grades

8-11); re-skilling programmes will be necessary if the head of household is out of work. Also, the workers from economic sectors most affected such as textiles, glass products, footwear, and catering and accommodation will require retraining to be able to work in the winning sectors such as telecommunications and service.

- For sectors, a particular focus should be on those designated as non-essential, specifically in textiles, glass products, footwear, education services, catering and accommodation, beverages and tobacco sectors. For the SMMEs in these sectors to recover and play a role in economic recovery, support in terms of increasing liquidity through either direct fiscal support or tax breaks will help. One of the significant risks to SMMEs is the liquidity crunch that the lockdown created. The role of the private sector and SMMEs in recovery cannot be underestimated and should include supporting the transition to digital technologies and improving digital skills. Policy measures such as boosting liquidity measures, tax deferrals, and job support, among others, may also be considered for SMMEs in the informal sector.
- A big part of the current social protection programme announced by the government provides additional funding to existing social grants in South Africa. These grants may need to be extended to cover vulnerable households that are not currently considered poor but at the edge of poverty. Deepening social grants beyond the current amount and a time extension will be useful.
- It is essential for the restructuring package to be directed towards the economic sectors where growth will take place. The growth rate that is still in line with the shift to a low-carbon economy and climate-resilient society, despite the impact of COVID-19, will be an essential part of the gradual restructuring package.
- It is critical that measures are taken for medical workers in public hospitals and for doctors and nurses to feel more protected. This can be promoted through ensuring a safer environment and increase in equipment and staff.

As the COVID-19 disease evolves and more information is available, the government is closely reopening the economy through a five-phase approach, whereby Level 5 was the most restrictive. South Africa moved to Level 3 in June 2020. Reopening the economy will include easing and adopting alternative lockdown measures to spur economic activity. Continuously cautious approaches to social distancing and alert measures can help the recovery, the opening of the economy, and minimise the recurring spread of COVID-19.

Part Two:

BACKGROUND ON COVID-19 & REVIEW OF **LITERATURE ON COVID-19 IMPACT**


SURGICEL SNoW

Introduction

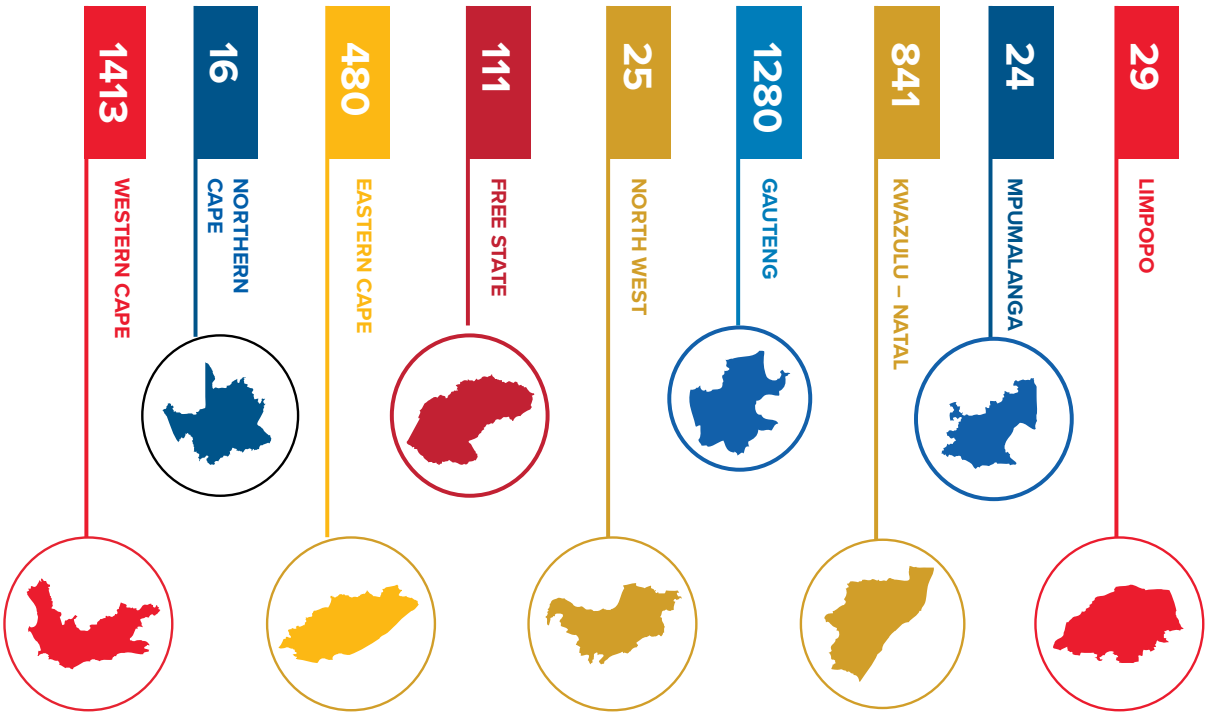
This report is part of the study on the socioeconomic impact of COVID-19 on households in South Africa by the United Nations Development Programme (UNDP). It focuses on how the COVID-19 pandemic affects households and the economy through multiple channels. These channels can include the loss of employment, death of family members, and psychological effects on health workers. Furthermore, due to the regulation implemented by the government to curb the spread of the virus, the channels into the economy include domestic demand and supply shocks, as well as international trade shocks. This report is divided into three sections:

Background on **COVID-19 & Review of Literature on COVID-19 Impact**

OVERVIEW

As of 24 April 2020, South Africa conducted 152 390 tests with 3 953 positive cases (Table 1) and 1 473 recoveries, with 79 deaths. As of April 6, the total number of confirmed COVID-19 cases was 1 686, showing an increase of 2 267 within 18 days.

Table 1: Confirmed cases in South Africa by Province



Source: Update on COVID-19 (24th April 2020) Press Releases and Notices. https://sacoronavirus.co.za/2020/04/24/update-on-covid-19-24th-april-2020/

1st Phase | PHASE ONE RECOVERY: ECONOMIC RESPONSE:

On 15 March 2020, in a statement made by the South African President, His Excellency President Cyril Ramaphosa, the government outlined measures to combat the COVID-19 epidemic in South Africa. The first phase included a broad range of measures to mitigate the worst effects of the pandemic on businesses, on communities, and on individuals. The measures included tax relief, the release of disaster relief funds, emergency procurement, wage support through the Unemployment Insurance Fund (UIF), and funding to small businesses.[3]

The specific rules announced included:

1. A declaration of a national state of disaster in regards to the Disaster Management Act to enable an integrated and coordinated disaster management mechanism that focuses on preventing and reducing the outbreak of the virus.
2. Limited contact between persons who may be infected and those not yet infected, including imposing a travel ban on foreign nationals from high-risk countries such as Italy, Iran, South Korea, Spain, Germany, the United States, the United Kingdom, and China with effect from 18 March 2020.
    - Travellers from medium-risk countries – such as Portugal, Hong Kong, and Singapore – were required to undergo high-intensity screening.
3. Closure of borders and ports from Monday 16 March: South Africa has 72 ports of entry across land, sea, and airports.
    - 35 of the 53 land ports were closed.
    - Two of the eight seaports were closed for passengers and crew changes.
4. Minimising the risk of the spread by limiting contact amongst groups of people.
    - Gatherings of more than 100 people were prohibited.
    - Mass celebrations of national days such as Human Rights Day and other large government events were subsequently cancelled.
    - Where small gatherings are unavoidable, organisers are required to put in place stringent measures of prevention and control.
    - Schools were closed from Wednesday, 18 March, and instructed to remain closed until after the Easter Weekend. This condition was subsequently updated to closure until further notice.

At the time of the first statement, there was no requirement to close businesses and public places. The president only called on companies including mining, retail, banking, farms, management of malls, entertainment centres, and other places frequented by large numbers of people to bolster their hygiene control.

3 https://www.cnbcafrica.com/coronavirus/2020/04/21/COVID-19-sa-announces-r500bn-stimulus-package-about-10-of-gdp/

The message also included suggested changes in behavioural patterns amongst all South Africans, including:

- washing hands frequently with soap and water, or using hand sanitizers, for at least 20 seconds;
- covering nose and mouth with a tissue or flexed elbow when coughing and sneezing;
- avoiding close contact with anyone with cold or flu-like symptoms and minimising physical contact with other people.

The statement also showed the potential impact of COVID-19 on the economy. The president noted the dramatic decline in economic activity in South Africa's major trading partners, with a sudden drop in international tourism and severe instability across all global markets. It was expected that an increase in infections – and the measures required to contain the spread of the disease – would worsen the predicted effects of the decline in exports and tourist arrivals. This will have a potentially severe impact on production, the viability of businesses, job retention, and job creation.

2nd Phase | RECOVERY: (STIMULUS PACKAGE)

As part of the second phase of recovery in South Africa, the government announced a massive social relief and economic support package of R500 billion, which amounts to around 10 percent of GDP. This fiscal support package is at the centre of the government's second phase economic response.

According to the statement released by the government, this response involves:

1. An extraordinary health budget to respond to coronavirus,
2. The relief of hunger and social distress,
3. Support for companies and workers,
4. The phased re-opening of the economy.

The relief of hunger and social distress includes increasing funds for child support grant beneficiaries by an extra R300 in May and from June to October they will receive an additional R500 each month. All other grant beneficiaries will also receive an extra R250 per month for six months (May to October). Further, a special COVID-10 Social Relief of Distress grant of R350 a month for the next six months will be paid to cover those who are currently unemployed and not beneficiaries of any other social grant or UIF payment (requirement and process still pending as at the time of this report).

The R500 billion will be paid for by repurposing R130 billion within the current budget, R44 billion worth of temporary tax referrals (which National Treasury has described as liquidity support), while the remaining R330 billion (roughly 6.5 percent of GDP), will be raised both from local sources, such as the UIF, and from global partners and international financial institutions. The exact source of the balance is still in progress.

The objective of the report is to gain a deeper understanding of the impact of COVID-19 on growth and employment

1. OBJECTIVE & OUTLINE OF THE REPORT

at the macro level and poverty and inequalities at the household level and the implications on the attainment of the Sustainable Development Goals (SDGs). The report analysed the impact on the economy and examined how people of different demographics and from various areas are affected by COVID-19. To understand and measure the socio-economic impact and awareness of COVID-19 on South African households under the stewardship of the Resident Coordinator, the United Nations (UN) in South Africa, through the leadership of the UNDP in South Africa, in collaboration with other UN agencies, commissioned this report.

This report presents the findings of two studies: (1) microeconomic analysis of the impact of COVID-19 on households in South Africa based on poverty dynamics; and (2) a macro-micro simulation using a Computable General Equilibrium (CGE) model based on the Social Accounting Matrix and nationally representative household survey data of the South African economy.

Two other reports are in the pipeline to support the Government of South Africa in its response to COVID-19. These are respectively, (1) the results of the psychological impact of COVID-19 on healthcare workers to estimate the capacity of the health centres in a time of crisis and (2) analysis of a socioeconomic survey carried out in April 2020 that is representative of South Africa, including rural-urban and township.

2. PUBLIC HEALTH PANDEMIC: LITERATURE REVIEW AND PATHWAYS

Over the past century, five other outbreaks have raised the same level of concern and global mobilisation as COVID-19 in terms of speed, spread, and severity of the disease. The five outbreaks are respectively, the Spanish flu, Severe Acute Respiratory Syndrome (SARS), Swine flu, the Ebola outbreak, and the Human Immunodeficiency Virus infection and Acquired Immune Deficiency Syndrome (HIV/AIDS)

pandemic. The Spanish flu, also known as the 1918 influenza pandemic, infected 500 million people (one-quarter of the world's population), between January 1918 and December 1920. The disease caused by the H1N1 influenza virus is so far the deadliest amongst influenzas in human history, causing about 1.1 million deaths globally in 1957, alone.[4] Young adults aged between 15 and 44 years were disproportionally overrepresented among the fatalities, in contrast to most influenza outbreaks that kill the very young and elderly. Between 2002 and 2004, the SARS outbreak infected 8 096 persons and killed 774 around the world. The epidemic started in November 2002 in China and spread across 29 countries and territories worldwide. The SARS outbreak was caused by the SARS-CoV strain, close to the SARS-CoV2 virus strain that caused the 2019 Coronavirus Disease (COVID-19). With a 9.5 percent global mortality rate, the SARS outbreak caused severe socioeconomic disruptions, including the cancellation and postponement of several sporting and cultural events in affected countries. A second pandemic involving the H1N1 influenza virus (albeit a new strain) hit the world between January 2009 and August 2010, infecting 700 million to 1.4 billion people around the world. The death toll was estimated between 18 000 and 284 000, a similar level of fatalities annually observed from the seasonal flu, according to the World Health Organisation (WHO).

Between December 2013 and June 2016, the Ebola virus infected 28 646 people and killed 11 323, mainly in Guinea, Liberia, and Sierra Leone. The virus's fatality rate of 39.5 percent created severe disruptions in West Africa as hundreds of thousands of people had to be quarantined. Large numbers of displaced persons were reported after the disease spread rapidly during the second half of 2014 (ACAPS, 2014). Apart from Guinea, Liberia, and Sierra Leone, seven other countries in West Africa, Europe, and North America reported at least one case of Ebola. In 2018, about 37.9 million were living with HIV/AIDS, with a death toll of 770,000 (UNAIDS, 2019). According to \ UNAIDS, the HIV pandemic killed 32 million people worldwide between 1980 and 2018.

The empirical evidence on the long-term economic impacts of disease outbreaks is inconclusive, but sizeable economic impacts are more likely to happen in the short term.

The long-term impact of epidemics can be negative or positive, depending on the flexibility and resilience of economies to the health shocks. Brainerd and Siegler (2002) find a robust positive impact of the 1918–1919 influenza epidemic on per capita income growth over the 1920s across the United States. However, Bloom and Mahal (1997a) find no significant impact of the epidemic on output and income in England, France, and India. Bloom and Mahal (1997b) use cross-country data and see little impact of AIDS on economic growth. In contrast, Haacker (2002) finds significant adverse effects of AIDS on growth and per capita income. Bloom and Canning (2006) argue that the sizeable economic impacts of epidemics are more likely to happen in the short term. Several studies estimated a short-term output decline for Taiwan under the 2002 SARS outbreak (Wu et al., 2003; Wu et al., 2003; Chou et al., 2003; Hsu et al., 2004). Fofana et al. (2015) and the World Bank

4 *https://www.cdc.gov/flu/pandemic-resources/pandemic-timeline-1930-and-beyond.htm.*

(2014) projected the negative short-term economic impact of the Ebola outbreak in Guinea. The latter also estimated a cut in GDP growth for Liberia and Sierra Leone in 2014 due to the Ebola outbreak.[5]

Non-private medical cost increases and labour productivity declines are the main direct costs related to the COVID-19 outbreak.

Traditionally, the economic cost of health outbreaks is studied based on an accounting approach. This approach consists of aggregating the **medical costs** borne by both private and non-private entities during, and in some cases, after the disease. Non-private budget reallocation to medical expenses would negatively affect discretionary expenses in the short run, such as investments, with long-run economy-wide consequences. Other studies (e.g. Sachs and Malaney, 2002) have included the **incomes forgone** due to the disease-related morbidity and mortality in the estimation of the costs of disease. Forgone income is estimated by the value of lost workdays and the capitalised value of future lifetime earnings in the case of mortality related to the disease. These costs are the direct costs of the health outbreak.

Other direct costs of epidemics on the broader economy are impacts on **labour supply** and **labour productivity**. Brainerd and Siegler (2002) investigate the impact of changes in the population and labour force stock due to the influenza epidemic in 1918 and 1919. Haacker (2002) argues that AIDS affects the economy and per capita income in Southern African countries mainly through human capital, as measured by the supply of experienced workers. The human capital impact can affect girls and young women disproportionately, especially in cases where competition for jobs increases and high-risk employment is the only available work. Influenza differs from AIDS in the period of illness, which has severe implications for the way the disease affects the economy. In other words, flu claims victims within days of infection, while AIDS is associated with a long period of illness, reducing productivity, which in turn affects the economy differently (Brainerd and Siegler, 2002). While epidemics like influenza and AIDS primarily affect prime-age adults (Brainerd and Siegler, 2002); the COVID-19 pandemic seems so far to have a higher fatality rate for elderly people and those with underlying health conditions (WHO, 2020). Logically, given that most older adults are out of the labour market, the labour supply shock of COVID-19 would have been expected to be less critical compared to influenza and AIDS. However, given the rate of transmission of COVID-19 and the evolving threat to all ages, labour supply shocks can be low to medium.

Health outbreaks also affect labour productivity by restricting workers' ability to move to the places where they would be the most productive. Indeed, epidemics affect the mobility of labour within a country and across countries, and mobility limitations can be a vital transmission channel to the economy through labour productivity impact. Disease shocks may increase **real wages** because of a reduction in the size of the working population. This is confirmed by the short-term increase in wages due to

5 Fofana et al. (2015) estimated a 0.9 percent decline in output in annual average due to the Ebola outbreak in Guinea. The World Bank (2014) report projected a decline in GDP growth perspective by 2.1 percentage points for Guinea (from 4.5 to 2.4 percent), by 3.4 percentage points for Liberia (from 5.9 to 2.5 percent) and 3.3 percentage points for Sierra Leone (from 11.3 to 8.0 percent). Guinea's GDP growth stagnated at 3.9percent, 3.7 percent and 3.8 percent in 2013, 2014 and 2015 respectively. Liberia's GDP dropped from 8.8 percent, to 0.7percent and 0.0percent in 2013, 2014 and 2015 respectively. Sierra Leone's GDP drop from 20.7 percent to 4.6 percent to -20.5 percent in 2013, 2014 and 2015 respectively. Estimates from Fofana et al. (2015) and the World Bank (2014) did not include the national and international responses to contain the epidemic and mitigating its adverse economic effects.

the Black Death (Hirshleifer, 1987). The long-run evidence is more conflicting, as shown by Bloom and Mahal (1997a). They re-examine the effect of the Black Death epidemic in England and France and find a positive but statistically insignificant relationship between real wages of unskilled agricultural labourers and population growth.

The direct effects are far less critical than the indirect or behavioural effects stemming from people's and institutions' responses to the disease.

Several studies have focused more explicitly on the indirect effects of major health shocks. The cost of an epidemic also includes the estimated costs to the economy and society stemming from people's and institutions' responses to the disease. Lee and McKibbin (2003) find that the related medical expenses and demographic consequences of SARS are insignificant compared to the economic impact through other important channels of transmission, i.e., the direct effects are far less critical than the indirect or behavioural outcomes.[6] In the same vein, Bloom and Canning (2006) argue that the panic caused by SARS and Bovine Spongiform Encephalitis (BSE) outbreaks led to disproportionate economic costs. The fear of contagion during an epidemic leads people to avoid social interactions (Lee and McKibbin, 2003). The direct consequence of this change in people's behaviour is a decline in **consumer demand** for many services such as travel, tourism, and trade, among others. In the middle of the Ebola outbreak, the fear of contagion caused severe damage to the Guinean economy, according to Fofana et al. (2015). A report by Hsu et al. (2004) has shown that demand for services like accommodation, transportation, travel agencies, and consulting was the most hit by the 2002 SARS outbreak in Taiwan. However, industries such as the fabrication of products for medical use, cleaning products, precision instruments, and apparatus for medical and health services benefitted from the crisis.

Given the more significant linkages among regions of the affected countries, and between these countries and the rest of the world through the **trading of commodities** and commodity markets, Fofana et al. (2015) concluded that the trade-related effects of epidemics are an essential channel of transmission for the economies of the Ebola-affected countries. These countries pay a heavy price as the COVID-19 outbreak, like the Ebola and influenza outbreaks, can be transmitted with or without simple human contact. Domestic and international trade may not appear to be a significant channel if the disease is found to be transmitted only by "close" social contact, such as with HIV/AIDS.

The complete or partial shutdown of cities and countries around the world could seriously affect **labour productivity** in the short and medium run. The short-run impact is likely to be negative while employees are adapting to their new work environment. On the other hand, work-from-home may improve the productivity of employees in the long run. Government management of the epidemic and uncertainty around the disease's evolution and consequences on the economy are key elements that affect national and foreign investors'

6 The impact of the SARS epidemic in Taiwan's economy was primarily felt by the airline and tourism industries according to Chou et al. (2004). At the dawn of the epidemic, i.e. the second quarter of 2003, these industries were hit by the reduction in the number of passengers and flights cancelation, and a drastic fall in hotels' occupancy rate. Restaurant and recreative services were also seriously impacted by the outbreak and the entire service sector shrank. The manufacturing sector also contracted due to the contagion effect, particularly the non-heavy industry such as electric and electronic industries, processed foods, textiles and clothing, leather and fur products, wood and bamboo products, plastic products, and non-metallic mineral products.

confidence in the future. The long-run economic impact of epidemics is affected by changes in **savings and investments**, mortality and fertility (Sachs and Malaney, 2002), and **human and health capital destruction and accumulation** (Brainerd and Siegler, 2002; and Haacker, 2002).

Given data limitations and the current high uncertainty associated with the future epidemiological path of the disease, this report integrates only transmission channels associated with the short-term economic impact of COVID-19. This report investigates effects of the disease through four channels that are likely to be the most relevant in the short run: labour supply and behavioural impact, consumer demand, domestic and international trade, and domestic and foreign investments. The report does not consider the effects of non-private medical expenses, as the number of confirmed cases and the related spending are still low at this stage of the outbreak.

Social impact – the psychological impact of pandemic on health workers can be significant but can be reduced with better information and liaising with psychiatric services.

Ignoring the psychological and other social impacts that the pandemic can have on health workers can reduce human resources available to mitigate the impact of the pandemic.[7] Studies such as Matsuishi et al. (2012) that looked at the psychological impact of H1N1 in Japan concluded that hospitals must protect workers during a pandemic and emphasised the value of rapid information sharing. This will help maintain the productivity of health officials during the pandemic.

7 This link provides access to other Country studies and policy briefs on COVID-19
https://www.undp.org/content/undp/en/home/coronavirus/socio-economic-impact-of-COVID-19.html

Part Three:

3. MICRO-ECONOMIC ANALYSIS OF THE IMPACT OF COVID-19

3. MICROECONOMIC ANALYSIS OF THE IMPACT OF COVID-19

3.1 CONTEXT

Pandemics can have significant economic and social impacts in the short and long terms. The effects can manifest through many avenues, including labour market uncertainties, commodity supply chain disruptions, and significant drops in economic activities. For households, the financial consequences manifest through a loss of employment, reduction in remittances, and loss of life of household members. While there are other effects, including psychological and social costs, this microeconomic analysis primarily focuses on the impact of a loss of income and employment on the poverty classification of the households in South Africa. The implications for poverty dynamics will provide evidence to mobilise experts and partners in responding to the impacts.

The results of a rapid response survey of 707 companies in the formal sector conducted during the lockdown by Statistics South Africa (Stats SA) showed that 36.8 percent of the businesses expect a decline in their labour force.[8] A majority (65 percent) also responded that the impact on their business would be worse than the 2008/09 global financial crisis. With this expected level of decline in the labour force and income loss, the report will evaluate how this will change poverty levels in South Africa, where fiscal constraints also limit the relief support that the government can provide to a household. The current fiscal and monetary package of R500 billion[9] announced by the minister of finance on Friday, 24 April, emphasised the need to support the poor, the infirm, and the vulnerable in society by providing relief from hunger and social distress and support for companies. Recognising the different levels of the stimulus package by the government, this analysis focuses on the household unit at the edge of poverty that was not considered poor before the pandemic. There is a gap in the current stimulus package where households in the informal sector are not directly targeted. About 30 percent of households in South Africa are in the informal sector, according to the Stats SA Labour Force Survey of 2019.

Specifically, the interest is in estimating the percentage of households in South Africa that will fall into poverty as a result of the COVID-19 pandemic. Without access to stable income, an essential factor to achieve economic stability (Schotte et al., 2018), the question is what percentage of households will fall into poverty because of the COVID-19 pandemic? This analysis will emphasise the need to support these types of households that are at risk of falling into poverty.

8 Issued by Statistics South Africa on 21 April 2020. http://www.statssa.gov.za/?p=13244

9 This figure includes R130bn in expenditure reprioritisation, as well as R44bn worth of temporary tax referrals which National Treasury has described as liquidity support.

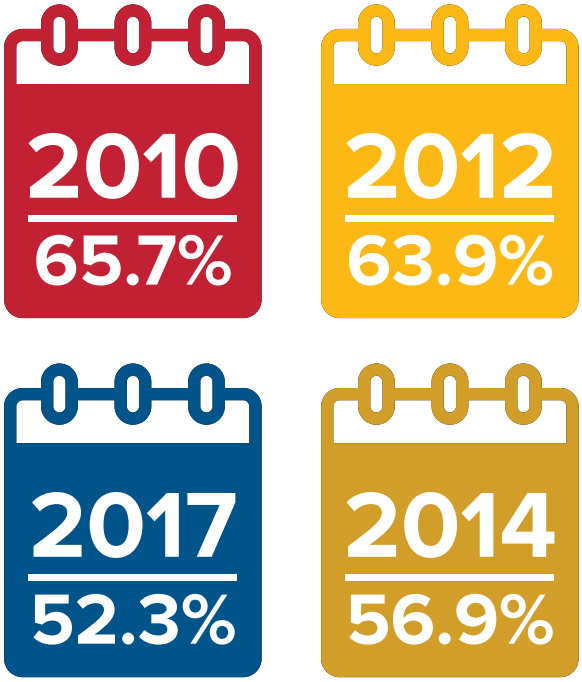
3.2 POVERTY DYNAMICS

The first step of the microeconomic analysis is to develop a model of the probability that a household is poor or non-poor. A dynamic model of poverty analysis is applied to estimate the impact of COVID-19 on households using data from the South African National Income Dynamics Study (NIDS) initially implemented by SALDRU at the University of Cape Town. The data is a nationally representative sample of 28 000 people followed since the 2008 panel survey. The five waves of data up to 2017 are used for this report.[10]

Pooling information from the five waves of data, monetary measures are deflated to March 2017 prices using the Stats SA headline consumer price index (Stats SA, 2015). In defining the poor, the Statistics South Africa definition is used. The Food Poverty Line (FPL) is the amount of money that an individual will need to afford the minimum required daily energy intake, commonly referred to as the "extreme" poverty line. The Upper Bound Poverty Line (UBPL) is the upper range of the food poverty line plus the average amount derived from non-food items of households. The Lower-Bound Poverty Line (LBPL) refers to the lower range of the food poverty line plus the average amount derived from non-food items of households whose total expenditure is equal to the food poverty line. The FPL was R531 with an upper bound poverty line of R1 138 and a lower bound poverty line of R758 (per capita, per month) in 2017 PPPs.

Using the UBPL of R1 138, Table 2 presents the poverty rate from the NIDS data. The 2014 poverty rate of 56.9 percent is similar to the World Bank Indicator statistics for South Africa for the same year. The NIDS data is consistent with poverty statistics in South Africa.

Table 2: Poverty rate in South Africa using the NIDS data.



Source: Author's calculation using NIDS data

The broad categorisation of poor versus non-poor ignores households on both sides of the poverty line threshold. These households exit and fall into poverty at different times with varying probabilities. These households are crucial to analyse during pandemics because they are more likely to drop out of their class without government support.

10 NIDS is a panel report that has been following the lives of the same 28 000 South Africans and those they live with since 2008. An initiative of the Department of Planning, Monitoring and Evaluation (DPME), the first five iterations of the report were implemented by the Southern Africa Labour and Development Research Unit based at the University of Cape Town's School of Economics between 2008 and 2017. Approximately every two years, highly trained fieldworkers re-interviewed the same people to find out what – if anything – has changed for them since they were last interviewed.

Table 3 presents the transition from poor to non-poor across the five waves. The data shows that about 85 percent of poor households are still poor by the next period (two years later). Also, about 15 percent of households are lifted out of poverty from one period to the next. The chance of being poor is, on average, 52 percentage points higher for the poor in the previous period than for the non-poor. However, about 33 percent of households that were non-poor two years earlier are poor two years later.

Table 3: Poverty dynamics in South Africa between 2008 & 2017. All sample unbalanced

Poverty Status, year t-1	Poverty Status, year t	
	Nonpoor	Poor
Non-poor	67.04	32.96
Poor	14.95	85.05
All	27.81	72.19

Source: Author's calculation using waves 1 to 5 pooled sample from NIDS.

The transition in and out of poverty is analysed to understand factors that contribute to the change. However, to do this, reclassifying poor and non-poor households is necessary. Traditionally, the middle class are households right above the poverty line (Zizzamia et al., 2016, have an extensive review of these approaches of classifying the middle class right above the poverty line). This report follows a methodology that differentiates the middle class. The middle class can be classified based on their vulnerability and shock resilience and how their welfare status can temporarily or permanently move them in or out of poverty. Studies such as Ncube et al. (2011), Lopez-Calva and Ortiz-Juarez (2014) and Schotte et al. (2018) which link the demarcation of social strata to poverty transitions are followed.

The households are classified as chronic poor, transient poor, vulnerable, middle class, and elite based on vulnerability criterion. This broader definition of both the poor and the middle class identifies a household at risk of falling in and out of poverty and differentiates the chronic and transient poor (See Schotte et al., (2018) for more details on this classification).

To arrive at the five categorisations (chronic poor, transient poor, vulnerable, middle class, and elite), we start with the broad category of poor and non-poor class. The poor are further classified into chronic poor and transient poor; and the non-poor are classified into vulnerable, middle class, and elite. The subcategories enable the dynamic model of poverty transitions to predict a propensity to remain in or fall into poverty, given past

poverty status. The latent scores from the multivariate probit model distinguish the chronic versus transient poor and the vulnerable from the more secure "actual" middle class with less risk of falling into poverty.[11] This categorisation is essential to understand the impact of a pandemic like COVID-19, given that the vulnerable households that are non-poor are at a high risk of falling into poverty given their characteristics.

RESULTS: EXIT FROM AND ENTRY INTO POVERTY.

The results of the poverty transitions multivariate probit model are presented in the Appendix to this report. The results do not depart substantially from Schotte et al. (2018) in terms of the direction of the factors that influence change in poverty status. Specifically, female-headed households are more likely to fall into poverty than male-headed households. The higher the level of education, the lower the probability of falling in poverty, with the average marginal impact being higher for tertiary level of education to secondary school not completed. Employment is vital for poverty transition – households employed with a low probability of losing their job (permanent, union, and self-employed household in the formal sector) have a lower probability of falling into poverty. Other results show that Black Africans and households with many dependents have a higher likelihood of being poor.

The report also presents the predicted average probability of falling (exiting) into poverty, given the household is poor (non-poor) in the first period (Table 4). The predicted probabilities are estimated based on the switching model or the multivariate probability. The average probability of exiting poverty for those who were non-poor in the 1st period is 25 percent. The percentage gives the households that transit from chronic poor to transient poor. These households have an average monthly per capita household expenditure of R657 with a confidence interval of R643 and R671. Next, it was also estimated, based on the observed poverty entry, that households that are initially non-poor have a 17.36 percent chance of falling into poverty. These households will be classified as middle class based on the traditional classification of having all households with income slightly above the poverty line as the middle class. However, these households are inherently different, given their probability of falling into poverty and are classified as a vulnerable group here. For this group, the average monthly per capita household expenditure is R3 436 with a confidence interval of R3 177 and R3 695.

It is important to note that the monetary values are not the cut-off but the probabilities of exiting or falling into poverty. Table 5 shows why using a monetary threshold is not appropriate.

11 The multivariate probit model is used to model first-order Markov process of poverty transitions between two consecutive panel waves, t-1 and t; poverty status at previous period to account for the potential endogeneity of initial conditions and; an equation for sample retention to consider potential non-random attrition.

Table 4: Average probability and associated monetary thresholds

	Probability threshold (%)				Associated monetary threshold			
	Mean	Std. Error	[95% Conf. Int.]		Mean	Std. Err.	[95% Conf. Int.]	
The average probability of exiting poverty for those who were non-poor in the 1st period	25.20	0.28	24.65	25.76	657	7	643	671
Average probability of entering poverty for those who were non-poor in the 1st period	17.36	0.14	17.09	17.64	3436	132	3177	3695

Source: Author's calculations using NIDS waves 1 to 5 pooled sample (post-stratified weights corrected for panel attrition).

The minimum and maximum per capita expenditure for both the vulnerable and the middle class are not vastly different. There is also no difference between transient and chronic poor in terms of per capita expenditure. However, there is a difference between mean and median for the classes.

Table 5: Monthly household expenditure per capita by social class, 2008 to 2017.

	Min	Max	Median	Mean	[95% Conf. Interval]	
Chronic Poor	74	1 138	525	561	547	574
Transient Poor	27	1 138	793	766	755	777
Vulnerable	1 139	12 827	1 896	2 382	2 307	2 457
Middle class	1 139	13 184	3 873	4 656	4 561	4 750
Elite	13 244	260 734	18 879	23 832	23 129	24 535

Source: Authors' calculations using NIDS waves 1 to 5 pooled sample (post-stratified weights corrected for panel attrition).

It is important to note that the monetary values are not the cut-off but the probabilities of exiting or falling into poverty.

3.2.1 CHARACTERISTICS OF HOUSEHOLDS BY SOCIAL CLASS.

This section presents the characteristics of households by class. It sheds light on how households in each class differ by expenditure, income, income source, the share of income by the sources and access to essential services (Table 6).

The chronic poor class has a mean household expenditure per capita (per month) of R5 112, which is R226 less than the expenditure of the transient poor. The chronic poor has a larger household size on average than the transient poor with about two children more than the vulnerable class.

The transient poor and the vulnerable households have a relatively equal share of income derived from labour sources, while 50 percent of the share of income for the chronic poor is from government grants. In absolute terms, however, income from government grants is relatively the same between chronic poor and the elite class at about R1500. The only difference is that the share is lower for the middle class and elite class.

Remittances play a significant role in the income of a vulnerable household but not a lot in the income of the middle class and elite. In absolute terms, the elite class in South Africa has a higher average income from remittances at R5 300, while the transient poor get about R1 458 on average. In contrast, the elite class has a larger share of income relative to the middle class in investments.

On access to basic services, only 15 percent of the chronic poor households have access to all basic goods and services (shelter, water, sanitation, and electricity) compared to about 80 percent of elite households. The basic services are an essential element of effectively implementing social distancing. Limited access to water means that the chronic poor household cannot wash their hands as many times as recommended by the WHO, nor can they work from home without electricity. Sanitation is also a problem. This issue is also not much better for vulnerable households, with only 33 percent having access to all the basic services.

Table 6: Average household characteristics by social class, 2008 to 2017.

	Chronic poor	Transient poor	Vulnerable	Middle class	Elite
Weighted share of respondents	44.7%	15.0%	16.8%	20.1%	3.3%
Mean household expenditure per capita	511.5	738.0	2 453.8	4 825.7	25 660.9
Median household expenditure per capita	464.0	758.9	1 871.5	3 989.4	20 295.8
log standard deviation of household expenditure	0.7	0.8	0.9	0.9	1.3
Number of members in HH	5.4	3.3	2.4	2.3	1.8
Number of workers in HH	0.7	1.1	0.9	1.1	1.0
Age composition					
No of children (<18 years)	2.6	1.0	0.7	0.5	0.2
No of members of working age (18-60 years)	2.4	2.1	1.6	1.5	1.3
No of elderly members (60+ years)	0.4	0.2	0.2	0.2	0.4
Income by source					
Share of income derived from source					
Labour	39.1%	71.9%	70.7%	86.7%	80.1%
Government grants	50.5%	20.0%	14.7%	4.3%	2.1%
Remittances	7.9%	6.5%	11.3%	2.6%	0.8%
Subsistence agriculture	0.4%	0.1%	0.2%	0.1%	0.1%
Investments	2.0%	1.3%	2.7%	6.1%	17.0%
Others	0.1%	0.1%	0.4%	0.2%	0.0%
Mean of income from source (if non-zero)					
Labour	3 451	4 917	5 769	13 964	39 019
Government grants	1 756	1 273	1 288	1 623	1 580
Remittances	1 458	1 217	1 840	2 378	5 302
Subsistence agriculture	373	254	680	1 178	3 483
Investments	2 139	2 422	3 547	17 088	15 451
Others	1 820	1 986	2 572	2 707	2 562
Access to services					
House, cluster, town house	58.2%	65.3%	58.1%	68.7%	82.1%
Tap water in house/on plot	56.0%	83.6%	78.6%	95.7%	98.4%
Flush toilet in/outside house	28.7%	70.8%	62.6%	92.8%	97.6%
Access to electricity	76.9%	86.1%	86.6%	95.5%	96.4%
HH has access to all basic goods and services	14.7%	48.8%	33.2%	62.7%	76.8%

Source: Authors' calculations using NIDS waves 1 to 5 pooled sample (corrected for panel attrition)

Lastly, a look at the characteristics of the head of the household is presented (Table 7). A middle-class head of the household is about 44 years old on average and more likely to be male with 12 years of education. In contrast, a vulnerable class has a higher percentage of female-headed households (48 percent) with nine years of schooling and more likely to be of the Black African race.

From the survey, 79 percent of the heads of the households in the middle class are employed, compared to about 55 percent of transient poor and vulnerable groups. A larger share of the chronic poor is in female-headed households. Elite (94 percent) and vulnerable (93 percent) class households have permanent contracts. There are also differences by race, as shown by the share of white-headed households in the elite class (65 percent) compared to Black African-headed households with a share of 23 percent in the elite class. The characteristics of the transient poor and the vulnerable class are similar except for the average age of 43 years for the transient poor that is higher than the vulnerable at 39 years on average.

Further it can be observed that only 14.7% of heads of households classified as chronic poor have access to all basic goods and services and only 28.7% of the same group have access to flush toilets. This makes social distancing difficult.

This categorisation will be useful for policymakers to plan an effective response to COVID-19. While typical government rescue goes to the chronic poor, the transient poor and vulnerable poor are essential groups that need special attention in line with the poverty reduction strategies of the country. A government policy to maintain the current poverty rate, for instance, will include maintaining income and expenditure of households in the vulnerable class.

Table 7: Characteristics of the head of the household by class

	Chronic poor	Transient poor	Vulnerable	Middle class	Elite
Age	48	43	39	44	49
Female	69.1%	47.4%	47.8%	31.5%	34.3%
Race					
Black African	94.9%	85.4%	91.7%	61.6%	23.0%
Coloured	5.1%	12.2%	8.0%	8.8%	5.6%
Asian/Indian	0.0%	1.0%	0.3%	5.6%	6.6%
White	0.0%	1.3%	0.0%	24.0%	64.9%
Education (average level if 25 years or older)	6	9	9	12	14
No schooling	22.1%	7.1%	7.0%	0.4%	0.4%
Less than primary completed (grades 1 to 6)	26.3%	15.1%	15.1%	2.2%	0.8%
Primary completed (grade 7)	12.0%	4.0%	7.6%	1.7%	1.6%
Secondary not completed (grades 8 to 11)	36.3%	45.2%	51.0%	30.6%	11.5%
Secondary completed (grade 12)	3.1%	17.2%	14.3%	23.6%	18.0%
Tertiary	0.2%	11.3%	4.9%	41.6%	67.6%
Employment status					
Inactive	56%	31%	29%	17%	23%
Unemployed (discouraged)	3%	1%	2%	1%	0%
Unemployed (strict)	12%	13%	12%	3%	1%
Employed	28%	55%	57%	79%	76%
Employment type (if employed)					
of which share in formal sector	55%	72%	71%	87%	77%
of which share with permanent contract	52%	74%	68%	93%	94%
of which share in trade union	29%	55%	41%	77%	82%
of which expected share in public sector	7%	27%	21%	47%	30%
Self-employed	16%	14%	13%	8%	19%
of which share in formal sector	0%	9%	5%	43%	74%
Casual worker/helping others	22%	10%	14%	2%	1%
Subsistence agriculture	4%	1%	1%	0%	0%

Source: Authors' calculations using NIDS waves 1 to 5 pooled sample (corrected for panel attrition)

3.3 OVERVIEW OF THE PROBABILITY OF FALLING INTO POVERTY DUE TO COVID-19

The effect of COVID-19 on households in South Africa can be evaluated based on the labour market and household characteristics. This section shows how the likelihood of falling into poverty changes as these characteristics change due to COVID-9. The baseline is a household in the middle class, with two working adults and one child, the head of the household is male, Black African, 44 years old and has completed secondary school education and is employed with a permanent work contract and union coverage. This household lives in the urban area of Gauteng province. The result from the econometric model of the risk of poverty for this household predicts that if the household is initially non-poor, it will have a predicted per capita household expenditure of R2 682 with a low probability of becoming poor of about 11.85 percent. The risk of this household falling into poverty because of COVID-19 is relatively small (Table 8). This household is non-poor. Various scenarios are presented in Table 8, but only a few are summarised here.

SCENARIO 1: ONE MEMBER OF THE HOUSEHOLD IS UNEMPLOYED BECAUSE OF COVID-19 AND THE HEAD OF THE HOUSEHOLD IS FEMALE.

The model prediction shows that 34 percent of middle class households will fall into the category of a vulnerable class household (with a 34 percent predicted probability of falling into poverty). This translates to about 3.2 million people, classified as middle class, who may fall out of this group due to COVID-19. That is, about three in ten of such households will become vulnerable and fall out of the middle class. This household will have a predicted per capita expenditure of R1 439, which is slightly above the R1 138 UBPL. While these households are not poor, the risk of falling into poverty triples compared to the middle-class household.

SCENARIO 2: ONE WORKING HOUSEHOLD MEMBER LOST THEIR JOB DUE TO COVID-19; THE ONLY EMPLOYED MEMBER OF THE HOUSEHOLD IS FEMALE, BUT THE WORK IS NOT PERMANENT, AND SHE DOES NOT BELONG TO A UNION.

This scenario shows the impact on households in the middle class if employment type changes, where businesses restructure employment to non-permanent contracts to cope with COVID-19. This household, compared to the baseline, has a 44 percent chance of falling into poverty with a predicted average expenditure of R986. This same household in the traditional area will have a 54 percent chance of falling into poverty. These households have an average predicted per capita expenditure below the UBPL.[12]

A stimulus package that helps companies to keep the labour force and not restructure employment contracts will reduce the impact on poverty. The current stimulus package that expanded the UIF benefits known as the special Temporary Employee/Employer Relief Scheme (TERS) will help employers pay their employees for three months, although this excludes

12 Traditional is defined as communally-owned land under the jurisdiction of traditional leaders. Settlements within these areas are villages. Given that these are self reported, default response for households not in the urban area (townships) may be traditional.

workers in the informal sector who may not have been registered with the UIF before the crisis.

SCENARIO 3: THE HEAD OF THE HOUSEHOLD IS FEMALE, BUT THE ONLY WORK SHE CAN DO IS CASUAL (INFORMAL) BECAUSE OF COVID-19, AND THEY HAVE TWO KIDS.[13]

Model prediction for this household shows that it has a 54 percent chance of becoming transient poor within two years, with a predicted per capita expenditure of R791. If this household is in the traditional area in Gauteng instead of an urban area, the probability of entry into poverty elevates to 73 percent and the household will be chronic poor within two years.

Table 8: Persons with a different combination of characteristics that COVID-19 can affect.

	Predicted per capita household expenditure	Predicted probability of falling into poverty	Class
A typical middle-class household has TWO working adults and ONE child. The head of the household is male, Black African, 44 years old, has completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	2 682	11.85%	Middle class
The household has ONLY ONE working adult and ONE child. The head of the household is male, Black African, 44 years old, has completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	2 357	15.68%	Middle class
Household has ONLY ONE working adult and ONE child. The head of the household is male, Black African, 39 years old, has not completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	1 677	25.13%	At the edge of vulnerability
Household has ONLY ONE working adult and ONE child. The head of the household is female, Black African, 39 years old, has not completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	1 439	34.15%	Vulnerable

13 Casual work in the survey is defined as work that is irregular and short-term, or any work that you do in addition to any other primary work.

	Predicted per capita household expenditure	Predicted probability of falling into poverty	Class
A typical middle-class household has TWO working adults and ONE child. The head of the household is male, Black African, 44 years old, has completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	2 682	11.85%	Middle class
The household has ONLY ONE working adult and ONE child. The head of the household is male, Black African, 44 years old, has completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	2 357	15.68%	Middle class
Household has ONLY ONE working adult and ONE child. The head of the household is male, Black African, 39 years old, has not completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	1 677	25.13%	At the edge of vulnerability
Household has ONLY ONE working adult and ONE child. The head of the household is female, Black African, 39 years old, has not completed secondary education, is employed with a permanent work contract and union coverage, and resides in an urban area in Gauteng.	1 439	34.15%	Vulnerable
	Predicted per capita household expenditure	**Predicted probability of falling into poverty**	**Class**
The household has ONLY ONE working adult and ONE child. The head of the household is female, Black African, 39 years old, has not completed secondary education, is employed with a non-permanent work contract and no union coverage, and lives in a traditional area in Gauteng.	898	54.38%	At the edge of transient poverty
The household has ONE working adult and TWO children. The head of the household is female, Black African, 39 years old, has not completed secondary education, is employed with a non-permanent work contract and no union coverage, and lives in a traditional area in Gauteng.	773	60.10%	Transient poor
The household has ONE working adult and ONE child. The head of the household is male, Black African, 39 years old, has not completed secondary education, is employed with casual employment and no union coverage, and lives in a traditional area in Gauteng.	838	58.69%	At the edge of transient poverty
The household has ONE working adult and ONE child. The head of the household is female, Black African, 39 years old, has not completed secondary education, is employed with casual employment and no union coverage, and lives in a traditional area in Gauteng.	719	68.49%	At the edge of transient poverty

A household with ONE working adult and TWO children. The head of the household is male, Black African, 39 years old, has not completed secondary education, with casual employment and no union coverage, and lives in an urban area in Gauteng.	791	53.88%	Transient poor
A household with TWO adults but ONE working adult and TWO children. The head of the household is female, Black African, 39 years old, has not completed secondary education, is in casual employment and no union coverage, and lives in a traditional area in Gauteng.	618	73.49%	Chronic poor
A typical vulnerable household has TWO adults, but ONE is working and TWO children. The head of the household is male, Black African, 39 years old, has not completed secondary education, has casual employment and no union coverage, and lives in a traditional area in Gauteng.	721	64.27%	Chronic poor

Source: Authors' simulation from coefficient estimates from the poverty classification model

3.4 DETERMINANTS OF CHANGES IN POVERTY

In this section, different COVID-19 type labour shocks that households in our sample previously experienced are evaluated and used to predict the likelihood of falling into poverty. These events include a fall in the number of workers in the household, a fall in labour income due to fewer hours of work, the death of a resident family member who assisted financially, and the death of a household member.

From the NIDS data, we have 4 955 households classified as middle class (or elite) in the previous period. Of these, 16.23 percent exited out of the middle class (or elite) between the last period and current period, with 1 106 cases.

Correlation analysis to show the effect of the different events, with a fall into poverty from the middle class or elite to chronic or transient poverty is presented in Table 9. There were 1 056 cases that there was a fall in the number of workers in the household; 346 of such cases (26 percent) also shows that the household fell out of the middle class. Because there may be a fall in the number of workers in a household because an adult child moved out, cases where the number of workers in the household fell are evaluated – but the household size is constant. Twenty-five percent of the households that experienced this situation fell out of the middle class. Next, cases where labour income fell are evaluated. There are 759 cases with 167 of such households exiting from the middle class.

Other non-labour income events, such as the death of a non-resident family member who assisted financially and the death of a household member that resides in the household, were correlated with exiting from the middle class. There are 169 cases reporting a loss of a non-resident family member who assisted financially with a 12 percent correlation exiting middle class.

Table 9: COVID-19 type events that households experienced between 2008 and 2017 and associated exits out of the middle class (or elite).

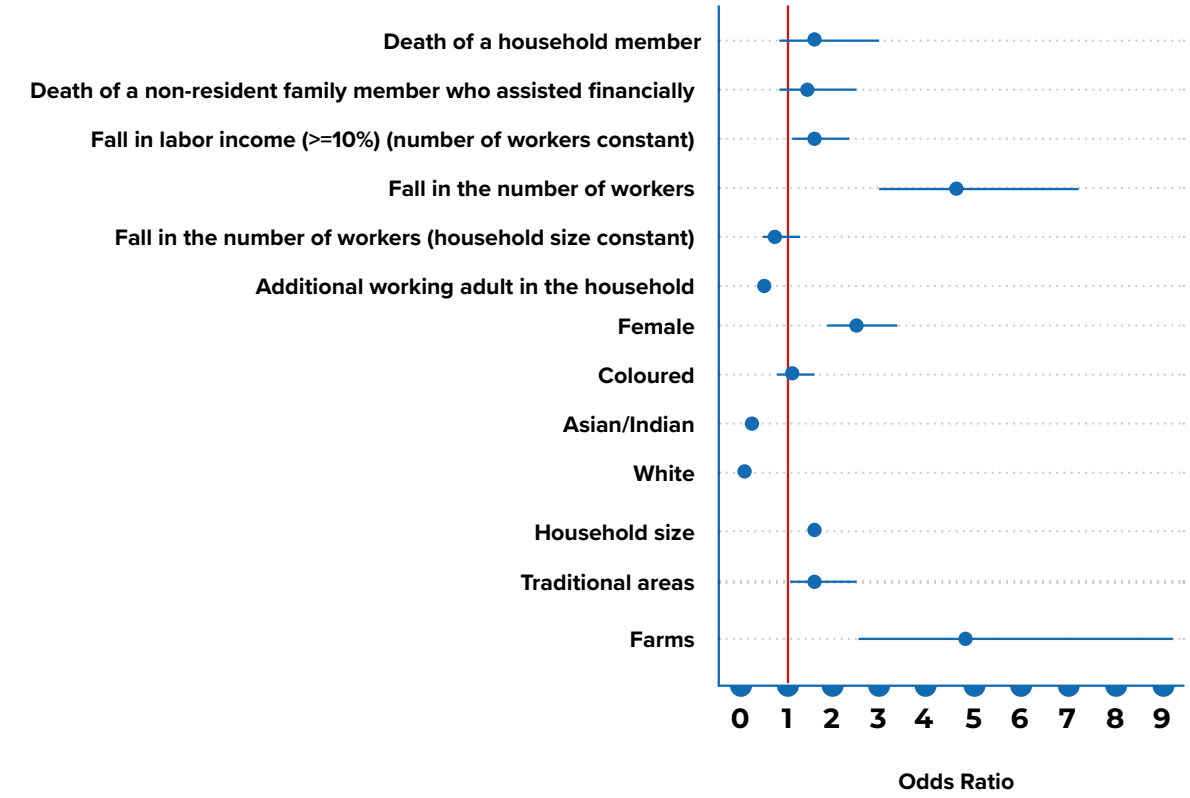
	Event prevalence		Middle-class exit conditional on the event	
Household event type	Number of cases	Weighted Share (%)	Number of cases	Weighted Share (%)
Labour market events				
Fall in the number of workers	1 056	16.23	346	24
Fall in the number of workers (household size constant)	504	16	143	25.13
Fall in labour income (>=10%) (number of workers constant)	759	16.23	167	17.73
Non-labour income events				
Death of a non-resident family member who assisted financially	169	16.64	57	12.2
Demographic events				
• Death of a household member	171	16.23	54	18.58
• Death of a household member (with life insurance)	62	16.67	17	11.01

Source: Author's calculations using NIDS waves 1 to 5 pooled samples (post-stratified weights corrected for panel attrition).

To explore the correlation further, a logistic regression to estimate the odds of falling out of the middle class is estimated. The odds ratio is shown instead of the parameter estimates for ease of interpretation (Figure 1). Appendix A presents the parameter estimates from the logit model. Households with a fall in the number of workers have the highest odds of exiting the middle class at about 4.5 times odds for each loss. The next category with a high odds ratio of falling into poverty are households that experienced a fall in income with 1.5 odds. Loss of a household member and a non-resident family member who assisted financially does significantly lead to a fall out of the middle class.

Support to households is an integral part of the stimulus package. However, none of the stimulus package proposed so far will pay up to the full income of the household. The UIF, for instance, is a percentage of an employee's salary, according to a legislated sliding scale from 38 percent (highest earners) to 60 percent (lowest earners). This implies that the lowest earners will lose at least 40 percent of their income and the highest earners will lose at least 62 percent of their income over a six-month period. This same household may be unemployed after six months if the company fails. That is, despite the stimulus package, the odds of a middle-class household falling into poverty are still 1.5, even if they do not lose their jobs due to COVID-19.

Figure 1: Odds ratio of the probability of falling out of the middle class.

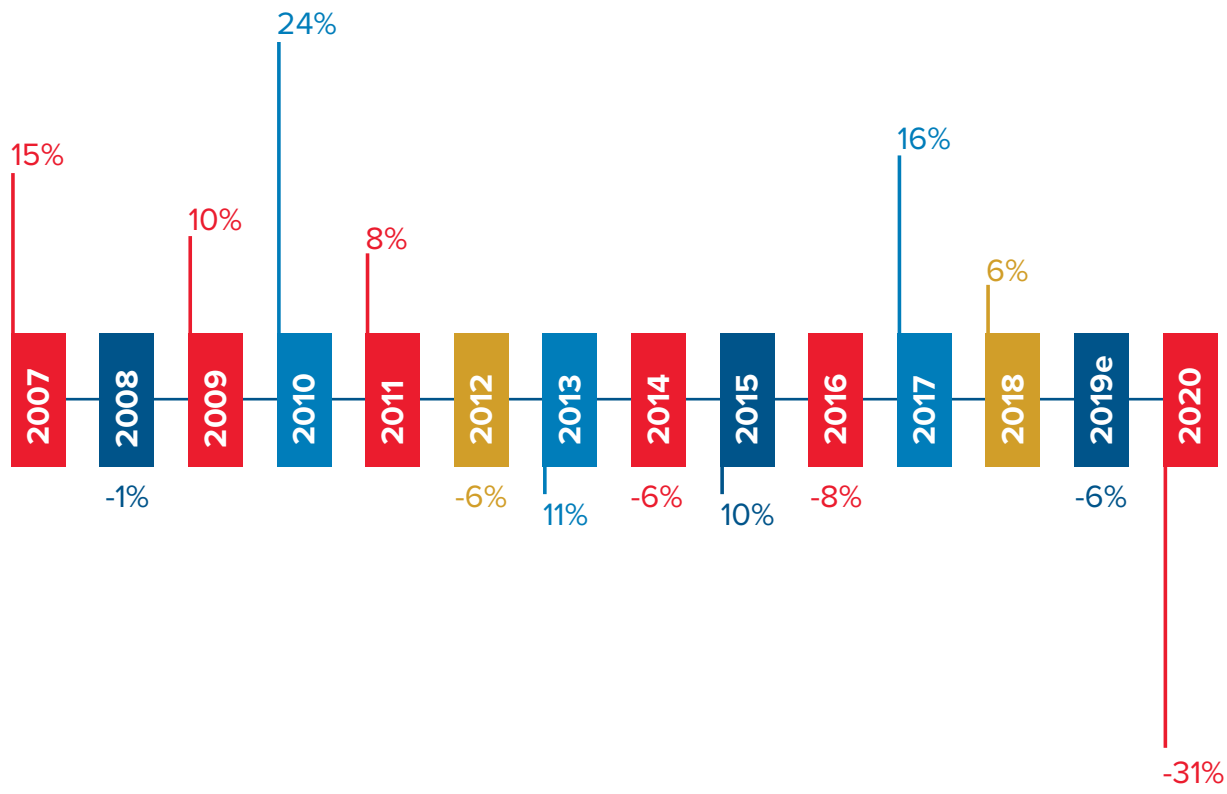


Source: *Author's computation using reported cases of events and poverty classification.*

OTHER POLICY QUESTIONS:

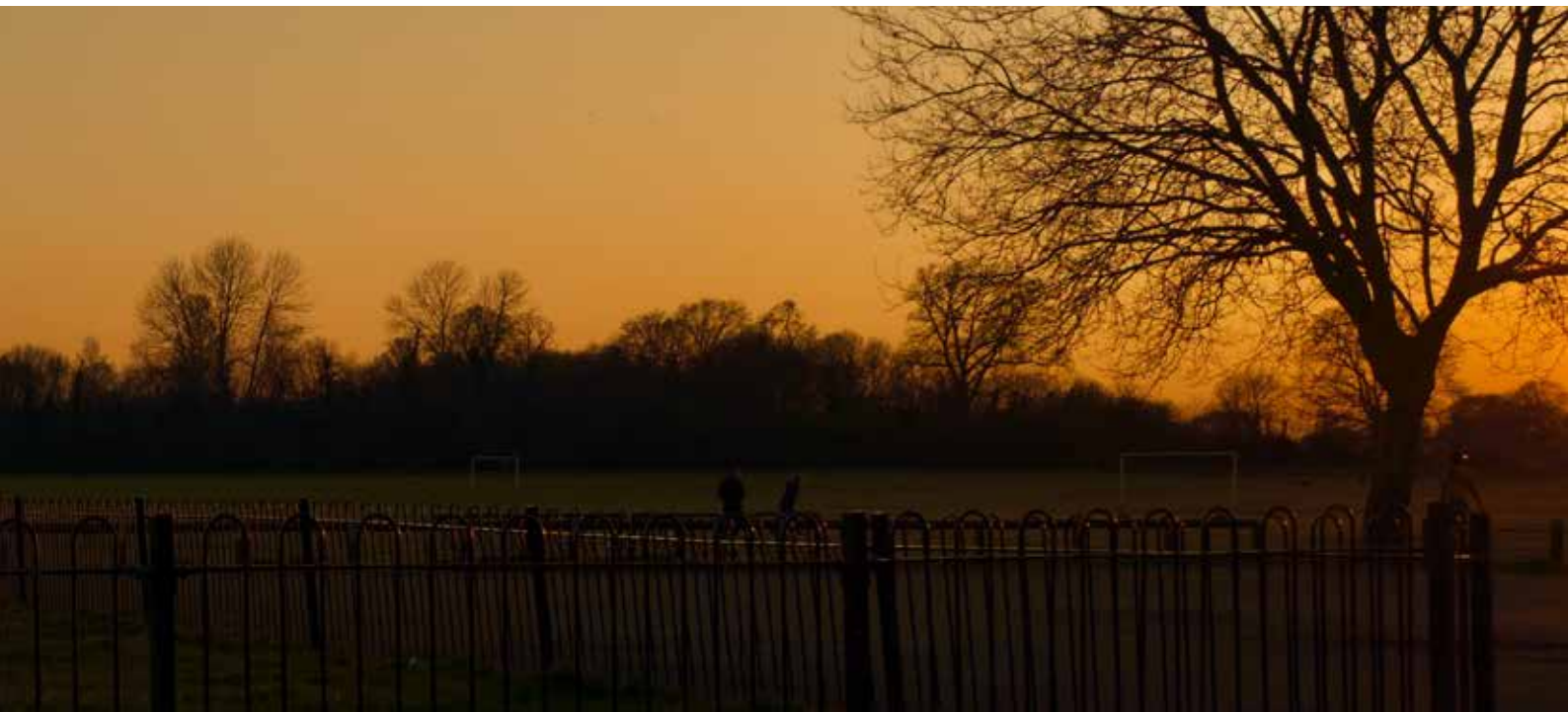
Remittances: Remittances are one of the primary sources of income for households, as indicated in the microeconomic section. However, while not explicitly modelled, the forecast by the World Bank for South Africa shows that remittances will drop by about 31% in 2020. This will be the highest drop in remittance inflow recorded in the past 15 years. The implication of this is further worsening of the outcome of households in the country.

Figure 2: Year-on-year growth rate of remittances in South Africa.



Authors' computation using data from the World Bank.

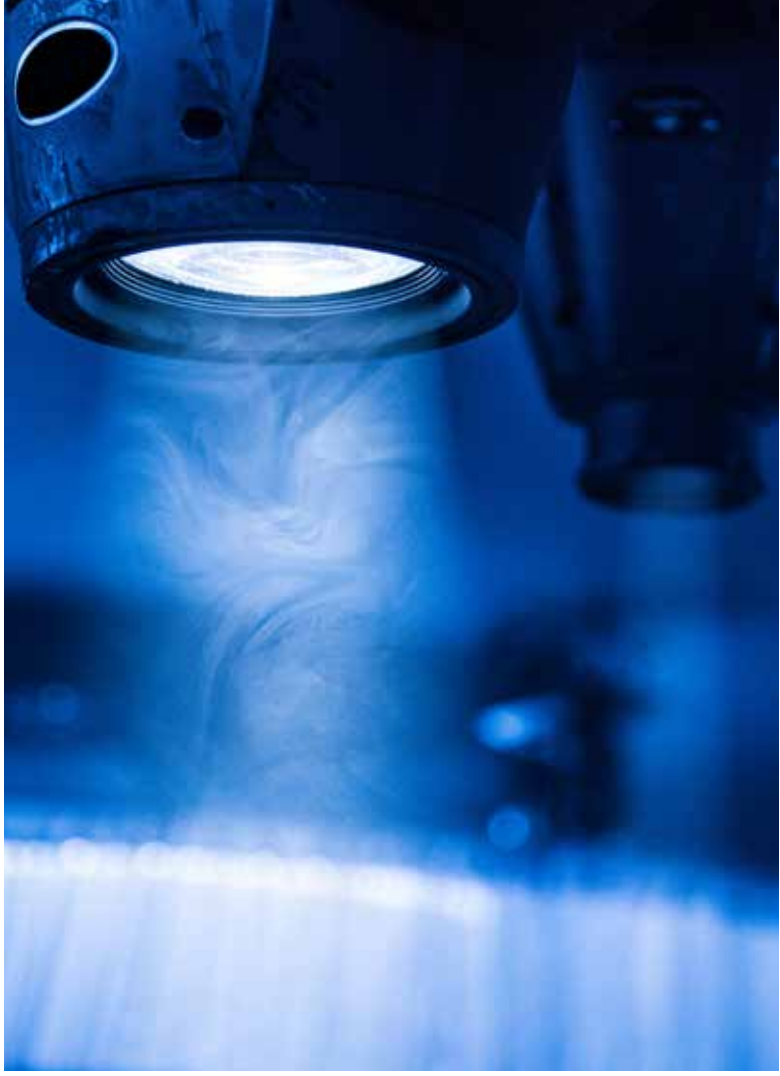
Informal Sector: According to the labour force statistics for South Africa (2019), 55 percent of those in informal employment are male and 45 percent female. However, a high percentage (48 percent) of youths aged 15-19 work in the informal sector. Education is also highly correlated with presence in the informal sector. Sixty-six percent of adults with no schooling are in the informal sector and a higher percentage of those with less than primary school completed are in the informal sector. Further analysis will be needed to understand the impact of COVID-19 on the informal sector and the youth.



Part Four:

4. MACRO AND MICRO-MACRO SIMULATION RESULTS

4.0 MACRO AND MICRO-MACRO SIMULATION RESULTS



4.1 CONTEXT

This part of the report analyses the macroeconomic and microeconomic impacts of COVID-19 in South Africa. To do this, a brief description of the macro-micro model used is presented, followed by a description of the impact pathways and scenarios through which the pandemic's effects get transmitted to the economy. Simulations are then described, followed by a discussion of the macroeconomic results and the household level results in terms of poverty, hunger, and inequality – disaggregated by gender.

4.2 MACRO-MICRO MODEL

A two-layer modelling framework is used to address the socio-economic impact of COVID-19 on the South African economy and its households. The framework consists of an economy-wide CGE model and a microsimulation model. The two models communicate through a set of interrelated variables linked sequentially; that is, the output from one model is used as an input to another model. CGE models are a class of economic models that use actual economic data to estimate how an economy might react to changes in policy, technology, or other external factors. It is important to note that these are not forecasting models. Primarily, the CGE model generates data on issues related to prices, economic growth, unemployment, investments, and external trade. This macro information is then fed into the microsimulation model to produce poverty and inequality effects measured at the household level using micro-level information, i.e. nationally representative survey data.

CGE models can be used for policy simulations in specific countries, regions, and even cities. They are often preferred for practical policy analysis worldwide because they allow for many inter-linkages in the economy, accounting for price-induced behaviour and resource constraints that allow them to be used in determining the economy-wide effects of a specific shock on an economy. General equilibrium modelling takes structural aspects of the economy into account and captures linkages between activities and agents, capturing the direct and indirect effects of socio-

economic shocks.[14] These features make CGE models particularly useful tools for scenario building. In these initial stages of the COVID-19 outbreak, the scarcity of economic data and future behaviour of the disease is a significant challenge for assessing the socioeconomic impact of the disease. Thus, scenario building exercises can generate valuable information for decision making.

The assessment of the socioeconomic impact of the COVID-19 pandemic in South Africa builds upon the studies on the 2013 Ebola outbreak (Fofana et al. 2015; Cuz et al., 2014; UNDP, 2014) that use a single-country CGE model to assess the short-run and medium-run impact of the disease. The model follows the report of Mabugu et al. (2015) to assess the likely economic impact of COVID-19. The South African economy is assumed to be a small country that takes world prices as given. The economy is interconnected to the global economy through the international trading of goods and services and the flows of capital. Thus, the country is likely to be impacted by the change in global supplies and demands due to the pandemic. This channel of transmission of the outbreak is captured by exogenous shocks on the world prices of commodities exchanged by South Africa with the rest of the world (exports and imports). A Constant Elasticity of Transformation (CET) relationship specifies the trade-off between the national and international markets for exported commodities. Imports are imperfect substitutes for local products – the Armington assumption. Exogenous fixed export F.O.B. prices and imports C.I.F. prices channel the impact of the pandemic on the global economy onto the South African economy.
The production technology takes the form of nested Constant Elasticity of Substitution (CES) functions with several levels. Here, the imperfect substitutions established through the CES functions are assumed to be inelastic. First, sectoral production combines value-added and total intermediate consumption according to a CES relationship. Second, a CES relationship combines composite labour and composite capital in sectoral value-added. Third, the various types of labour, i.e. distinguished by the level of education completed, are imperfect substitutes in the composite labour through a CES relationship. Capital is specific to each sector, and its remuneration is residual after deducting the cost of labour in the value-added.

Household consumption behaviour is captured by a Stone-Geary function, which is specified as a Linear Expenditure System (LES). The resulting demand for a given commodity describes two components, i.e. the non-discretionary minimal consumption component and a discretionary component. There are four categories of workers: two unskilled categories (labour with primary school education, i.e. grades 1-7; labour with middle school education, i.e. grades 8-11); one medium-skilled category (labour completed secondary school education, i.e. grade 12); and one skilled category (labour with tertiary education, i.e. certificates, diplomas or degrees). An imperfect labour market is assumed for unskilled, medium-skilled, and skilled labour.

To account for growth, the model uses a sequential dynamic setting in which consumers and producers are myopic optimisers. This means multi-period static models are linked through a between

14 Although CGE models can simulate future effects of policy changes, they are not a forecasting tool. Policies are evaluated by comparing the economy between two states of the world. The pre-policy baseline is generated from the base year data and the impact of a policy is estimated by measuring deviations from the baseline following the policy change.

period (or dynamic) specification of labour supply, labour endowment and capital stocks on the supply side and household minimum consumption, government final consumption, and the distribution of dividends on the demand side. Labour demand is endogenously determined by the model, while labour supply is exogenous. Private capital stock increases with private investment net of capital depreciation. In line with many models in this tradition, government final consumption expenditure per capita is kept constant in real terms. This implies that constant price total government final consumption expenditure gets updated between periods using population growth rates, a convenient feature since this rules out government current expenditures impacting welfare (or the free lunch problem). Households' minimum final consumption is similarly updated in-between periods using the population growth rates. Dividends are distributed to investors (i.e. households, government, and the rest of the world) according to their shares in the investments. While households and firms save fixed proportions of their income, it is assumed that government saving is residual after accounting for spending on goods and services for final consumption, and on transfers to other agents. In keeping with the small country assumption, foreign savings are exogenous and pegged as a ratio of GDP.

Investment is equal to the sum of domestic and foreign savings net of the exogenous changes in inventories. The total investment is driven by total savings. The economy-wide average basic prices established by supplies and demands in the various goods and services markets are arbitrarily set as the "numeraire" or the reference price. Other price changes are interpreted relative to the latter and evaluated in real terms.

Poverty, hunger and inequality implications of COVID-19 are derived from a microsimulation model using CGE model estimates. Our microsimulation approach uses the reweighting approach, pioneered by Meagher (1993) and later applied by Herault (2010) and Fofana et al. (2018) in South Africa. The poverty impact is assessed using the Foster, Greer, and Thorbecke (FGT) et al. (1984) measure of poverty or FGT, while inequality indicators are measured using the Gini index.

The core data used to implement the models (CGE and microsimulation) consists of macro data in the form of a Social Accounting Matrix (SAM) and nationally representative household survey data. The SAM used is for 2015 (Van Seventer et al. 2019). The SAM is updated to 2017, i.e. the year of the most recent official macro data. The SAM accounts for sixty-two categories of industry and 104 categories of products which have been aggregated into forty-two categories of industry and products for the report. It highlights fourteen representative categories of households. The microdata consists of household survey data obtained from NIDS data of 2017. The survey includes 28 000 households and information about households that is of interest for this report, i.e., on the household consumption expenditures, consumption decile categories, income, income decile categories, province, population group, head of the household, size, and weight. Foster, Greer and Thorbecke (FGT) indices (headcount) are computed for three poverty lines: the upper bound poverty line, the lower bound poverty line, and the food poverty line. Gini inequality measures are estimated using the average per capita consumption expenditures.

In wrapping up the model description, it is important to reiterate here that the CGE model used is a real side dynamic

recursive model which tracks the real side of the economy. Because the focus is on real side resource allocation, the model does not contain the monetary sector. This limitation may be addressed in future work. Similarly, recursive dynamics as opposed to intertemporal dynamics are used to assess the macroeconomic dynamics because recursive dynamics are more suitable for short-run analysis as opposed to longer-term horizons that would be more amenable to intertemporal analysis.

4.3 SIMULATION SCENARIOS

Three scenarios are run, business as usual (BaU), an optimistic COVID-19, and a pessimistic COVID-19 scenario.[15] The BaU scenario tracks the performance of the economy in the absence of the pandemic and serves as the reference scenario to be compared against alternative COVID-19 scenarios. Trend data is used to construct the BaU, starting from the base year (2015) for the SAM used. The historical data available between 2014 and 2019 are then used to make projections for the period between 2020 and 2024. Two scenarios representing the strike of the pandemic are built, one describing what is deemed an optimistic COVID-19 scenario, in the sense that it is considered mild, and the other a pessimistic COVID-19 scenario in the sense that it is harsher than the optimistic scenario.

Key macroeconomic results elaborated on below are that GDP falls and does not recover to BaU levels even by 2024 in both scenarios. Broadly, the pessimistic scenario's results are worse than the optimistic scenario results. However, the rate of percent variation in the period of recovery is faster in the pessimistic scenario because of the deeper fall from which the economy commences to recover, as well as the effect of forced savings accumulated during the time of the pandemic – which spurs the economy during recovery. Unemployment increases in both COVID-19 scenarios, mimicking the fall in GDP. Incomes of the workers with lower education levels fall, while those of the workers who completed secondary education and tertiary education increase. Government primary surplus as well as revenue collected worsens, particularly in 2020, and gradually begins to improve as the rest of the economy recovers after that.

The COVID-19 optimistic scenario depicts the response to the pandemic as pronounced by the government at the time of writing this report, including the lockdown regulations. Three steps are used to build the scenario. However, to investigate the effects of the disease through time, certain assumptions about the recovery period after the lockdown need to be made because such information on the ex-post recovery is not yet available. This scenario is optimistic in the sense that it assumes the lockdown period is for the indicated period and that it will take a total of 15 months from the first signs of the pandemic to the period when the pandemic is no longer a threat. First, the report assumes that for the first six months in 2020, South Africa and the world suffer disruptions to their economic systems due to the pandemic. Second, South Africa responds by instituting a lockdown period equivalent to one month during April 2020. Third, after the end of the pandemic, assumed to be six months, there is still about nine months

15 It is important to mention that this work was conceptualised two weeks into the South African government's imposed lockdown regulations. The scenarios were informed by information that was available then. It would be prudent to continually update the scenarios as more data and information become available. The results obtained give a very good indication of what to expect from the pandemic.

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The COVID-19 optimistic scenario depicts the response to the pandemic as pronounced by the government at the time of writing this report, including the lockdown regulations.

from July 2020 to March 2021 of gradual recovery and return to a state of normalcy in the economy. This scenario can thus be summarised as:

- six (6) months of COVID-19 induced health crisis, (January to June 2020)
- one (1) month of lockdown, (April 2020)
- followed by nine (9) months of gradual recovery (July 2020 to March 2021).[16]

The second COVID-19 scenario is assumed to be worse compared to the optimistic case, hence the reference to it as the pessimistic scenario. This scenario is pessimistic in the sense that it is assumed that it will take a total of 30 months (based on adding up the months outlined above), from the first signs of the pandemic to the period when the pandemic is no longer a threat. It is important to mention that these scenarios stand for assumptions about the trajectory of the disease. As in the optimistic case, there are also three periods and events to consider, with the main difference being the duration of the health crisis. Instead of six months of illness, we assume that it takes twelve months to get the disease under control – for instance, the time it may take for a vaccine or cure for COVID-19 to be available. Thus, the illness period runs until December 2020. Second, instead of assuming one month of lockdown, we expect the period is extended to two months. It is expected that the effect of the pandemic will be worse on the economy. As such, the required recovery period from January 2021 will be more extended than under the optimistic scenario. The report assumes that the economy begins to recover, albeit slowly, after the lockdown and that it takes another eighteen months from January 2021 to June 2022 to get back to full recovery. These three periods are summarised thus:

- **twelve (12) months of COVID-19 induced health crisis, (January 2020 to December 2020)**
- **two (2) months of drastically reduced activity in the economy (April and May 2020)**
- **followed by eighteen (18) months of gradual recovery, (January 2021 to June 2022)**

Given that the focus is on short-term dynamics of a pandemic as opposed to long-term dynamics, we utilise a pathway analysis to trace and track the channels

16 Note that since it is not known with certainty how much time it will take for full recovery, the report has relied on past anecdotal evidence from other types of pandemics such as the COVID 19, see for example https://www.cnn.com/2020/02/05/business/coronavirus-airline-cost/index.html.

through which the economy is affected by the pandemic. These pathways and assumptions underlying them are discussed in the following section and modelled in the macro model described earlier.

4.4 IMPACT PATHWAYS (SHORT TERM)

Three impact pathways to transfer the assumptions outlined above when building the COVID-19 scenarios into economic performance are built; that is, the report finds and quantifies the primary mechanisms through which COVID-19 conditions affect the economy. The report identifies three main transmission channels spearheading this shorter-term phenomenon, and associated responses, namely international trade markets, domestic demand, and domestic supply channels. The report makes use of both historical and projected trends of South Africa's economic performance to 2024. The world trade activities are slowed down, and in some instances, halted due to the pandemic and associated responses. This dynamic feeds into the CGE model through import and export prices. On the local economy, the advent of the pandemic – and subsequent interventions by the government – imply reduced demand. Furthermore, as mentioned earlier, there will be slow recovery after the economy opens again, with the duration differing between optimistic and pessimistic scenarios. Finally, the supply side introduces impacts on the economy. The report assumes that both capital and labour supply are substantially reduced during the lockdown period due to "aversion behaviour".[17] The pathways can be summarised as:

- Commodity Price
- Domestic Demand
- Domestic Supply
  - Capital utilisation
  - Labour supply

Next, the assumptions underlying the magnitudes of the change introduced to the South African economy for each of these three channels are discussed.

COMMODITY PRICES

Under the international trade channel, it is assumed that the pandemic impacts import and export prices because of the global economic slowdown. The slowdown, closures, and eventual gradual opening of international trade will form the building blocks of the simulation. The CGE model assumes that South Africa is a small open economy that takes as given world prices for internationally traded commodities. Using the World Bank data on traded commodity prices between 2014 and 2019, the expected price variation from 2020 to 2024 (World Bank 2020) is projected on the assumption that the trends using the best geometric fit would have persisted. Table 10 shows data used to compute the average percent annual real prices for selected commodities for the period 2014 to 2019. It is clear that, apart from coal, the average real prices for commodities have been negative.

The average annual price variations are used to project the changes to the period 2020 to 2024, as shown in Table 11 and Table 12. Based on the projections, five-year average real commodity prices under the optimistic and pessimistic scenarios are computed using trend analysis. The assumption in the computation is that the observed changes during the first quarter

17 This means that not only labour but also capital becomes partially unproductive because of the outbreak.

Table 10: Historical Trend 2014-2019 of Selected Commodity Real Prices, Percent Annual Variation

Period	Coal, South African	Energy	Non-energy	Fish meal	Beve-rages	Food	Grains	Agriculture Raw Materials	Fertilisers	Base Metals	Metals & Minerals
2014-2015	-13.3	-41.7	-6.4	2.3	2.1	-7.7	-7.5	0.2	7.3	-8.6	-12.7
2015-2016	17.4	-12.2	1.2	-0.2	1.1	5.4	-3.5	0.3	-17.8	-3.4	-2.1
2016-2017	28.7	19.2	2.0	-11.4	-12.0	-2.8	-3.5	-2.2	-7.7	20.2	20.0
2017-2018	9.5	23.6	-2.8	6.6	-9.1	-4.2	5.2	-4.2	6.1	1.8	0.8
2018-2019	-27.8	-11.9	-6.0	-6.9	-5.6	-5.7	-1.7	-6.0	-3.3	-11.6	-6.9

Source: Authors' computations based on the World Bank Commodity Price Data (April 2020).

are translated geometrically to the next quarters. That is, the projection of the price changes observed during quarter one (Q1) of 2020 is compared to 2015-2019 averages.

Table 11: Projection 2020-2024 of Selected Commodity Prices Under COVID Optimistic Scenario, percent Annual Variation Compared to BaU

Note from Table 12 that, in the pessimistic

Table 11: Projection 2020-2024 of Selected Commodity Prices Under COVID Optimistic Scenario, percent Annual Variation Compared to BaU

Period	Coal, South African	Energy	Non-energy	Fish meal	Beve-rages	Food	Grains	Agriculture Raw Materials	Fertilisers	Base Metals	Metals & Minerals
2019-2020	2.8	-17.5	-1.4	-8.5	-9.0	2.5	11.7	-4.7	-17.0	-1.2	-6.7
2020-2021	0.1	-0.7	-0.1	-0.3	-0.3	0.1	0.4	-0.2	-0.7	0.0	-0.2
2022-2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023-2024	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Authors' projections from the World Bank Commodity Price Data (April 2020).

scenario, the magnitude of the price changes will be larger than in the optimistic scenario. In this scenario, the recovery occurs much later, as discussed earlier.
Using these commodity prices tracked in Table 12 and Table 13, the corresponding

Table 12: Projection 2020-2024 of Selected Commodity Prices Under COVID Pessimistic Scenario, Percent Annual Variation

Period	Coal, South African	Energy	Non-energy	Fish meal	Beve-rages	Food	Grains	Agriculture Raw Materials	Fertilisers	Base Metals	Metals & Minerals
2019-2020	5.4	-30.1	-2.7	-15.4	-16.2	4.8	23.9	-8.7	-29.4	-12.3	-2.2
2020-2021	4.2	-24.4	-2.1	-12.3	-13.0	3.8	18.5	-6.9	-23.8	-9.8	-1.7
2022-2023	0.1	-0.7	-0.1	-0.3	-0.4	0.1	0.4	-0.2	-0.7	-0.3	0.0
2023-2024	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Authors' projections based on the World Bank Commodity Price Data (April 2020).Source: Authors' projections based on the World Bank Commodity Price Data (April 2020).

commodities associated with each price are mapped onto the SAM commodities. After that, using the SAM, this information is used to build an import and export commodity and price index, as shown in Table 13 and Table 14, respectively, for all of the three scenarios, (See also Appendix B2 and B3).
It is worth noting that imports are dominated by non-essential commodities (those

Table 13: Export and Import Prices, Average Annual Variation (Percent)

Period	Business as Usual		COVID Optimistic		COVID Pessimistic	
	Export	Import	Export	Import	Export	Import
2019	-1.2	-1.0	-1.2	-1.0	-1.2	-1.0
2020	-1.4	-1.0	-5.1	-5.6	-7.8	-9.0
2021	-1.4	-1.0	-1.8	-1.1	-6.8	-5.7
2022	-1.4	-1.0	-1.7	-0.9	-2.4	-0.8
2023	-1.3	-0.9	-1.7	-0.9	-2.0	-0.7
2024	-1.3	-0.9	-1.7	-0.8	-1.9	-0.7

Source: Authors' projections

not allowed to continue trading under lockdown) while exports are dominated by essential commodities (those allowed to continue trading under lockdown). Appendix B2 and B3 help explain why imports are increasing. The CIF price index of essential goods and services declines more than that of non-essential goods and services. The demand for essential goods and services increases in 2020, driving an increase in the aggregate volume of imports.

Table 14: Export and Import Volume, Average Annual Variation (Percent)

Period	Business as Usual		COVID Optimistic		COVID Pessimistic	
	Export	Import	Export	Import	Export	Import
2019	0.7	0.7	0.7	0.7	0.7	0.7
2020	1.0	0.9	-1.2	0.7	-3.5	1.9
2021	1.1	1.0	1.6	1.8	0.3	9.4
2022	1.1	1.1	1.9	2.0	3.4	3.8
2023	1.1	1.2	1.9	2.1	2.7	3.4
2024	1.1	1.2	1.9	2.1	2.7	3.4

Source: Authors' projections

DOMESTIC DEMAND

The second pathway through which the pandemic affects the economy is through the local demand channel. The lockdown response implies that there is minimal activity in the economy, restricted primarily to designated "essential" goods and services. This means that there is likely suppressed demand for some goods and no demand for others during the lockdown period. Thus, within the CGE model, consumption demand will be constrained via the LES function through non-discretionary consumption. As discussed earlier, production of most goods and services (see Appendix B1) had to close down for the duration of the lockdown.

To build a case for the optimistic scenario, the starting point is to observe that the typical data in the SAM is an annual flow and it is essential to reduce the shocks on demand proportionately to fit in with the less than one year of the lockdown. We assume that since January 2020, there was no reduced demand in South Africa due to the Chinese slowdown until April when there was a total shutdown. The report assumes that the most negative impact is felt in April, i.e., during the period of the lockdown. Finally, after the one month, the economy is expected to start to recover, but the recovery is gradual rather than immediate. For the pessimistic case, the effects are worse as explained above, with a more extended lockdown, world impact, as well as a prolonged economic recovery period.

The goods that are not affected by the lockdown, that is, those exempt from the restrictions, are listed in Appendix B1. These are matched to the SAM commodities to determine the commodity groupings that will be restricted, thus, subjected to reduced demand during each of the scenarios. Table 15 shows how the assumptions translate into actual changes in demand in the economy. Compared to the BaU, private consumption for all commodities is falling by 8.8 percent and 11.3 percent in 2020 under the optimistic and pessimistic COVID scenarios, respectively, compared to an increase of 1.5 percent in the BaU scenario. The fall in overall private consumption would have been worse if not for high consumption in agriculture. With the lockdown restrictions private consumption decreased in both the industries and services. Note that

the recovery magnitudes are higher from 2022 and 2023 for both the optimistic and pessimistic scenarios, respectively, because the recovery in demand is coming from a more profound reduction compared to the BaU scenario.

Table 15: Private Final Consumption, Average Annual Variation (Percent)

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	All	Agr	Ind	Ser	All	Agr	Ind	Ser	All	Agr	Ind	Ser
2019	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.4
2020	1.5	1.5	1.5	1.5	-8.8	22.9	-4.3	-15.9	-11.3	23.7	-5.9	-19.4
2021	1.5	1.5	1.5	1.5	2.6	4.1	2.5	2.4	2.3	3.9	2.9	1.3
2022	1.6	1.6	1.6	1.5	3.8	2.6	3.6	4.0	4.0	4.9	3.5	4.1
2023	1.5	1.5	1.6	1.5	3.3	2.5	3.3	3.5	4.9	3.4	4.6	5.5
2024	1.5	1.5	1.6	1.5	3.0	2.4	3.1	3.1	4.4	3.1	4.2	4.8

Source: Authors' projections.
Note: Agr = Agriculture; Ind = Industry ; Adm = Public Administration ; Ser = Private services.

DOMESTIC SUPPLY

The final channel through which the pandemic feeds into the economy in the short run is the supply side encompassing factor markets, as mentioned earlier. The report assumes that as most of the industries are closed during the lockdown, both labour and capital are not fully utilised. Specifically, capital and labour are largely unproductive during the lockdown period. Thus, there is reduced total factor productivity throughout the economy. Basically, the longer the lockdown persists, the lower the capital and labour utilisation. The industries to be affected by the lockdown are those in the SAM activities corresponding to the goods and services that are designated as non-essential, (See Table B1 in appendix). Table 16 shows the changes occurring to the factors of production on the supply side. During 2020, in which the lockdown occurs, the utilisation of capital and labour is lower under both the optimistic and pessimistic scenarios compared to the utilisation rate in the BaU scenario. Recovery in utilisation rates start in 2021 for both, and because of the more profound impact in 2020, we see larger magnitudes of recovery in both scenarios, compared to the BaU case. These utilisation rates have, in turn, supply impacts on the economy under different scenarios. It is important to remember that even though capital and labour are available for use after the lockdown, they are only going to be utilised gradually because it also takes time for the economy's demand to recover fully.

The report assumes that as most of the industries are closed during the lockdown, both labour and capital are not fully utilised. Specifically, capital and labour are largely unproductive during the lockdown period.

Table 16: Production Factor (Capital and Labour) Utilisation Compared to BaU

Period	COVID Optimistic				COVID Pessimistic			
	All	Agr	Ind	Ser	All	Agr	Ind	Ser
2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2020	-0.2	0.0	-2.2	-1.4	-1.4	1.4	-4.8	-3.4
2021	0.3	0.0	0.6	0.5	0.0	0.0	0.0	0.0
2022	0.3	0.0	0.7	0.5	1.2	0.0	2.7	2.1
2023	0.3	0.0	0.7	0.5	0.6	0.0	1.3	1.0
2024	0.3	0.0	0.7	0.5	0.6	0.0	1.3	1.0

Source: Authors' projections
Note: Agr = Agriculture; Ind = Industry; Ser = Private services.

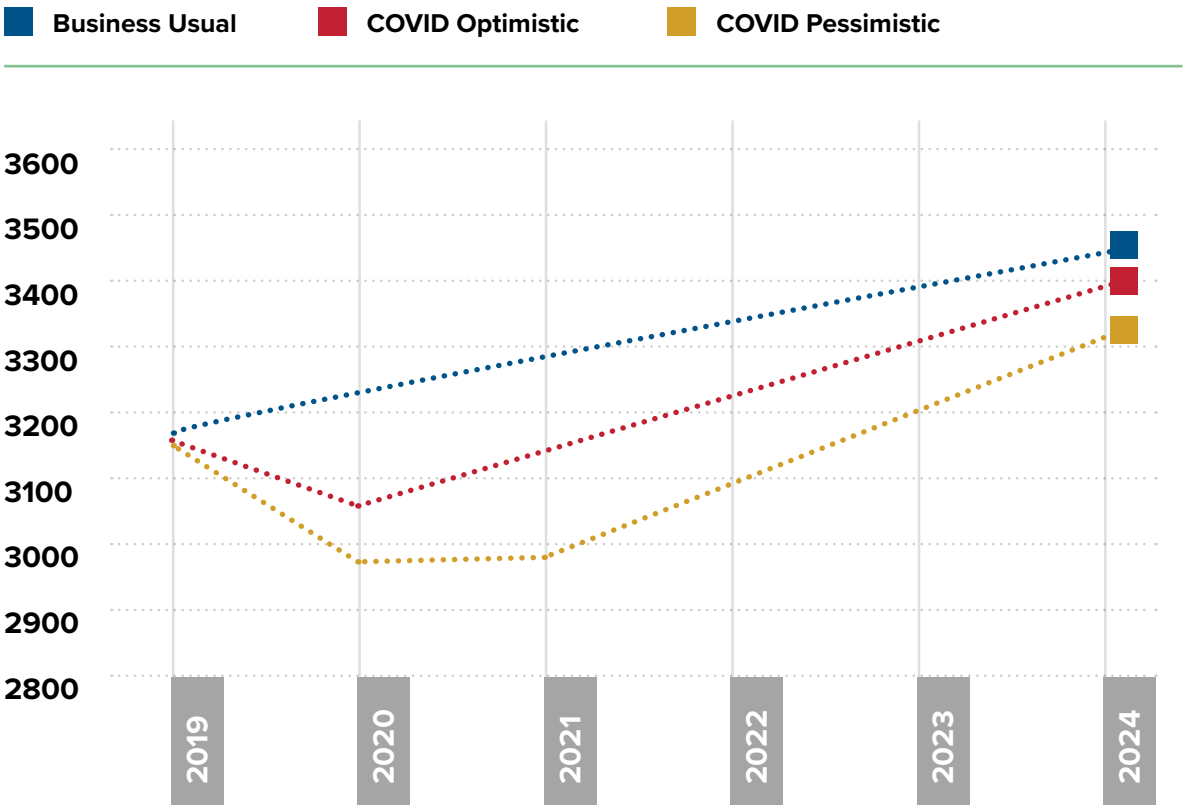
4.5 SIMULATION RESULTS

These three impact pathways are then implemented in the model as the pandemic effects under each of the COVID-19 scenarios. The results are reported below in terms of the impact on economic growth, employment, government, and households.

4.5.1 GDP GROWTH

Figure 3 plots the GDP results in constant 2019 billion Rand prices. For the five years (2020-2024), the overall economic loss is equivalent to fourteen percent of 2019 GDP (R453 billion) under the optimistic scenario and thirty-two percent of 2019 GDP (R1 011 billion) under the pessimistic scenario. What is striking is that even after five years, the GDP levels are still below the BaU levels under both COVID scenarios. This is an indication of the significant and persistent fall in South Africa's national income as a result of the COVID-19 pandemic. While the model is calibrated over a five-year horizon till 2024, based on the observation that the GDP growth trajectory exhibited in Figure 4 below stabilises somewhat in later years, it can be surmised using trend analysis that GDP would recover to its pre-crisis level by 2025.

Figure 3: Projection of GDP, constant prices, national currency (Billion)



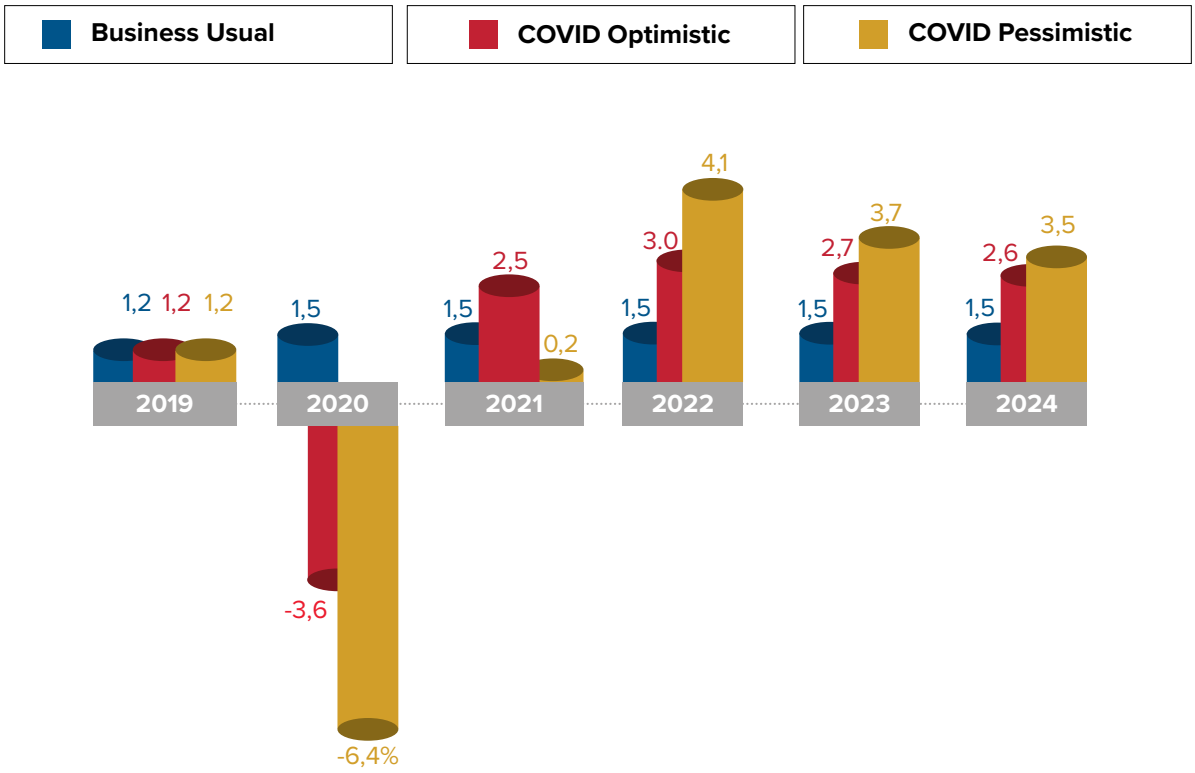
Source: Authors' based on model simulation results, 2020.

Figure 4 presents a time profile of the growth in GDP under the three scenarios. Notice that the BaU path captures the average GDP growth based on the 2019 growth figure (IMF WEO, April 2019) projected to 2024. These growth figures are projections on how the economy would have performed on average, according to the data that was available for April 2019.

The results are expressed as annual percentage change and display a V-shape trajectory on the GDP growth pathway. GDP growth declines by 3.6 percent in 2020 under the optimistic scenario. This is equivalent to a fall in GDP growth of 5.1 percentage points from the BaU growth. GDP growth then subsequently recovers, and by 2021 there will be a growth recovery under the optimistic scenario. However, as shown in Figure 3, GDP levels under the COVID scenarios are still below the BaU levels. The pessimistic scenario shows a steeper decline in GDP growth by 6.4 percent, which is equivalent to a reduction in growth of 7.9 percentage points in 2020 relative to the BaU. Although there is a 0.2 percent growth in 2021, this is still a decline of 1.3 percentage points from what it would have been without the pandemic. In both scenarios, there is growth acceleration in the medium term, i.e., from 2022 onwards. This is as a result of higher forced savings accumulated during the pandemic when household consumption was constrained. The rate of acceleration, during the recovery period, is higher in the outbreak scenarios than in the BaU because of the different initial starting points in 2020. The slope of the increase in growth of GDP is steeper in the pessimistic scenario due to the differences in starting levels, and because the forced savings period was longer than the optimistic scenarios. This fact is important to remember for the rest of the results presented below.

The accelerated increase in the two pandemic scenarios after 2021 is spurred by increased investment from forced savings; although, as Figure 3 shows, real GDP levels **do not** catch up to the BaU levels by 2024.

Figure 4: Annual GDP Growth Under Various Scenarios (Percent)



Source: Authors' based on model simulation results, 2020.
Note the BaU was constructed using April 2019 World Economic Outlook data (IMF, 2018, Table A4). The figure for 2019 (1.2 percent) is used together with the projected figures for 2020 (1.5) and 2021 (1.8) to construct an average BaU projection to 2024 (1.5 percent).

Table 17 shows that the GDP contraction witnessed is driven mainly through the domestic demand (i.e. private consumption) and external demands (i.e. net exports) transmission channels (true for both the optimistic and pessimistic scenarios). Meanwhile, private investments, spurred by forced savings, increase starting from 2020.

Table 17: GDP Growth Decomposition by Expenditure, Average Annual Variation (Percent)

Period	Gross Income			Consumer Price Index (CPI)			Gross Income deflated by CPI		
	Private Final Consumption	Invest-ment	Net Exports	Private Final Consumption	Invest-ment	Net Exports	Private Final Consumption	Invest-ment	Net Exports
2019	1.5	-0.9	-1.2	1.5	-0.9	-1.2	1.5	-0.9	-1.2
2020	1.5	-0.2	1.2	-9.0	8.8	-41.9	-11.4	7.3	-117.5
2021	1.6	-0.1	0.0	2.6	2.5	-5.5	2.4	5.8	-96.7
2022	1.6	0.1	-1.3	3.8	1.3	-4.0	3.9	6.2	-5.8
2023	1.6	0.0	-3.4	3.3	1.5	-4.6	5.0	2.6	-6.8
2024	1.6	0.0	-5.4	3.1	1.6	-5.3	4.5	2.7	-6.6

Source: Authors' based on model simulation results, 2020

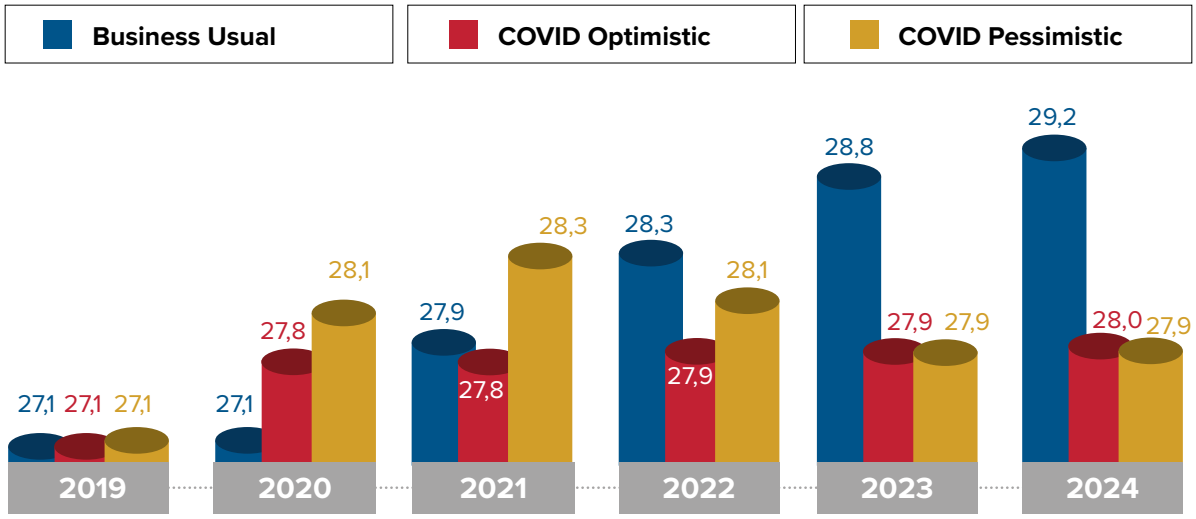
The results in Table 18 and Figures 5 and 6 show the growth decomposition by sector. The table shows that declines in industry and private services in 2020 have the most severe effects on GDP. As expected, the non-essential sectors see a decline compared to the essential sectors (Figure 5 and 6). Figure 5 shows that textiles, glass products, footwear, education services, catering and accommodation (which contains tourism as per the System of National Accounts classification of the UN), beverages and tobacco sectors suffer more than other sectors. On the other hand, other sectors, such as food and health services, being essential sectors, are expanding, although this is not strong enough to reverse the overall fall in GDP growth. After 2020, growth fully recovers for industry and private services under the optimistic scenario while recovery is only partly under the pessimistic scenario.

Table 18: GDP Growth Decomposition by Sector, Average Annual Variation (Percent)

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	Agri-culture	Industry	Public Services	Private Services	Agri-culture	Industry	Public Services	Private Services	Agri-culture	Industry	Public Services	Private Services
2019	0.9	0.8	2.6	1.0	0.9	0.8	2.6	1.0	0.9	0.8	2.6	1.0
2020	1.1	1.2	2.7	1.3	5.3	-0.5	4.6	-1.8	6.0	-2.7	4.8	-4.7
2021	1.0	1.2	2.7	1.3	3.2	2.4	2.8	2.2	5.2	1.2	2.9	0.9
2022	1.0	1.2	2.7	1.3	3.1	2.6	2.7	2.4	6.3	4.1	2.8	3.8
2023	1.0	1.2	2.7	1.3	3.0	2.6	2.7	2.2	5.2	3.4	2.7	3.1
2024	0.9	1.2	2.7	1.3	2.8	2.5	2.7	2.2	4.5	3.4	2.7	3.0

Source: Authors' based on model simulation results, 2020

Figure 5: Unemployment Rate under Various Scenarios (Percent)



Source: Authors' based on model simulation results, 2020. Note that the unemployment figure for 2019 is equivalent to the figure for January 2019 (December 2018) as in April 2019 World Economic Outlook data (IMF, 2018).

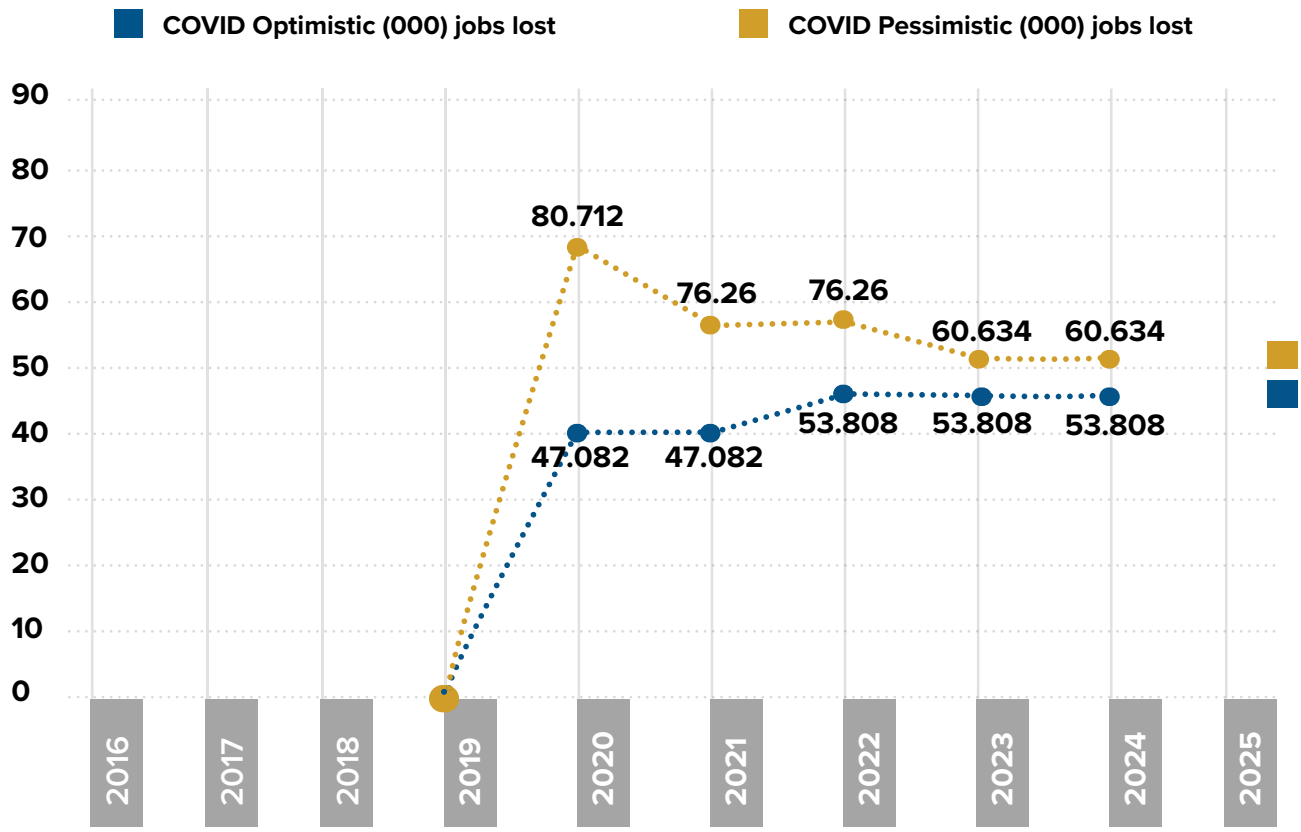
Overall, the results in Table 17 and Table 18 highlight the importance of the identified transmission channels for the economic outcome of the COVID-19 pandemic. The shocks which make up the pandemic cause a sharp drop in private consumption and exports, in particular. These, in turn, have the most detrimental effects on sectoral output and the overall economy.

4.5.2 UNEMPLOYMENT

The decline in the economy, together with the original shocks, causes an increase in unemployment in 2020 in both COVID scenarios. Note that this change in unemployment is because of COVID scenarios and further adds to the changes in the unemployment rate for the country projected initially. The unemployment increase continues in 2021 in the pessimistic COVID scenario (Figure 5). After that, unemployment begins to drop, in the rest of the medium run, with the drop driven by the growth acceleration taking place during this period as the economy emerges from the outbreak-induced decline as discussed earlier. The rate of increase and recovery in unemployment mirrors the GDP growth trend in Figure 4. Forced savings during the pandemic period, which is driving the increased economic growth, are primarily responsible for the improvement in the unemployment rate after 2021.

In the pessimistic scenario, more than 80 712 additional people will lose their job because of COVID. This will be in addition to the number of jobs that would have being lost without COVID. For instance, Stats SA indicates that unemployed persons increased by 587 000 in 2019. If we assume the same number for 2020, an additional 667 712 people will lose their jobs in 2020.

Figure 6: Number of Unemployed under Various Scenarios (Thousands)



Source: Authors' based on model simulation results, 2020. Note that the unemployment figure base for 2019 is equivalent to the figure for October to December 2019 by Stats South Africa. http://www.statssa.gov.za/publications/P0211/P02114thQuarter2019.pdf

As Table 19 shows, unemployment increases the most among unskilled labour categories, i.e., those labour categories with primary and secondary education up to Grade 11. These workers are likely to belong to poorer households, thus worsening their vulnerability. The change in unemployment is less severe amongst those with tertiary schooling. Figure 6 shows the employment structure between sectors producing essential goods and services and those that are not. The skilled workers, i.e., those with tertiary education, derive a higher proportion of their employment earnings from sectors classified as essential compared to the unskilled whose income is predominantly derived from the sectors that have been designated as non-essential, for example, construction, most manufacturing, and mining. This employment structure partly explains why skilled workers escape relatively unharmed in terms of earnings during the pandemic while the unskilled labour categories are hurt the most. Appendix C shows more disaggregated information on employment.

The decline in the economy, together with the original shocks, causes an increase in unemployment in 2020 in both COVID scenarios"

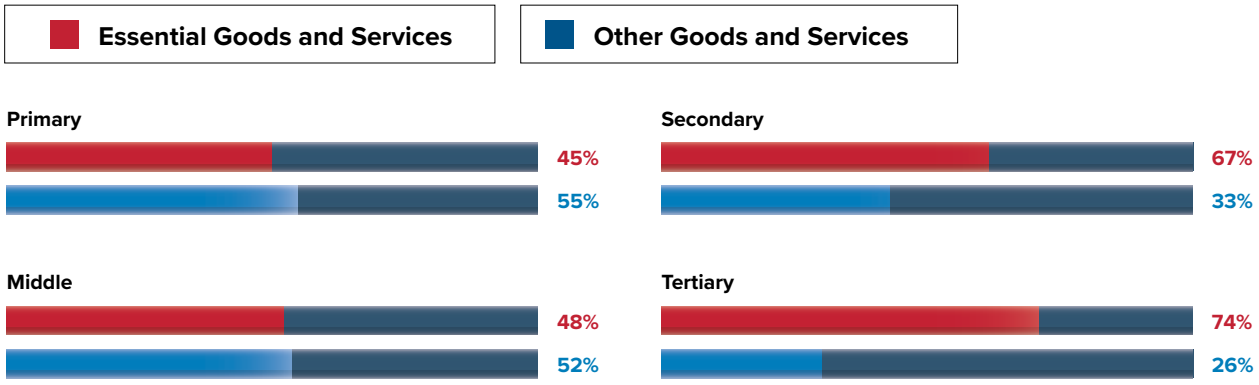
Table 19: Unemployment Rate by Labour Category, Percentage Point Variation

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	P	M	S	T	P	M	S	T	P	M	S	T
2019	0.5	0.5	0.3	0.4	0.5	0.5	0.3	0.4	0.5	0.5	0.3	0.4
2020	0.5	0.5	0.3	0.4	2.0	1.9	0.8	0.2	2.3	2.2	1.1	0.5
2021	0.5	0.5	0.3	0.5	0.5	0.4	0.1	-0.2	0.4	0.4	0.2	0.0
2022	0.5	0.5	0.3	0.5	0.4	0.3	0.1	-0.1	0.1	0.1	-0.1	-0.4
2023	0.5	0.5	0.3	0.5	0.4	0.3	0.1	0.0	0.2	0.1	-0.1	-0.3
2024	0.5	0.5	0.4	0.5	0.4	0.3	0.1	0.0	0.2	0.1	0.0	-0.3

Source: Authors' based on model simulation results, 2020.

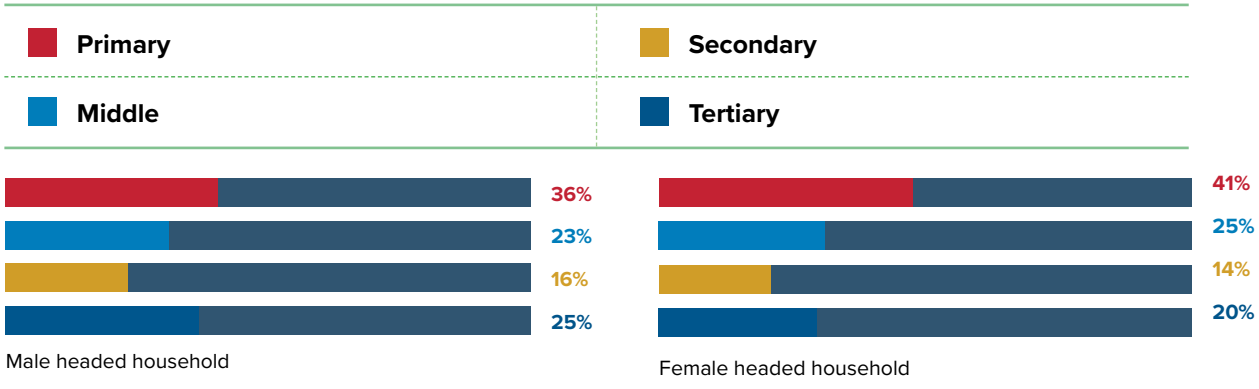
Note: P or Primary: Labour with primary school education (grades 1-7); M or Middle: Labour with middle school education (grades 8-11); S or Secondary: Labour completed secondary school education (grade 12); T or Tertiary: Labour with tertiary education (certificates, diplomas or degrees.

Figure 7: Structure of Employment Earnings by Categorisation of Labour and Goods and Services



Source: Authors' calculations, based on SAM data 2015

Figure 8: Structure of Income from Labour Market by Gender



Source: Authors' calculations, based on NIDS data 2017

Furthermore, looking at the sources of income to households by gender, the NIDS data of 2017 shows that female-headed households derive 66 percent of their income from workers with primary and middle level education. Male headed households, on the other hand, are less reliant on that group of workers, deriving 59 percent of their income from workers with primary and middle level education (see Figure 7). This would imply that female-headed households are more likely to be negatively impacted by the pandemic compared to male-headed households. This result is indeed confirmed later in the microsimulation results.

4.5.3 FISCAL IMPACT

Next, we discuss the fiscal outcomes.[18] Table 20 shows the impact on the government deficit and gross revenues. There is a deterioration in the primary surplus under both the optimistic and pessimistic scenarios, with the negative impact persisting but declining over five years. Government gross revenue falls in 2020 in response to the declining economy and generally increases as economic growth begins to pick up after the pandemic. It is important to remember that the annual growth rates indicated in Table 18 show that the rate of the recovery is sharper under the pessimistic scenario due to the level from which it is starting. Thus, in the pessimistic scenario, the revenue begins to recover from 2021, as the economy gradually opens. The deficit also starts to decline from 2021.

18 It is important to note that by assumption, government expenditure continues to grow at the population growth trend along the BaU projections and does not deviate from those previously announced, with only reallocations being made within the existing envelope. This report does not simulate any changes in government expenditure as a result.

Table 20: Government Revenue and Balance, Percentage Point Variation

Period	Government Primary Budget Surplus			Government Gross Revenue		
	Business as Usual	COVID Optimistic	COVID Pessimistic	Business as Usual	COVID Optimistic	COVID Pessimistic
2019	-2.6	-2.6	-2.6	0.6	0.6	0.6
2020	-2.8	-3.8	-4.2	0.8	-1.7	-2.6
2021	-2.9	-3.9	-3.9	0.8	1.4	1.8
2022	-3.1	-3.8	-3.5	0.9	1.5	2.5
2023	-3.2	-3.8	-3.3	0.9	1.4	1.9
2024	-3.3	-3.7	-3.1	0.9	1.4	1.9

Source: Authors' based on model simulation results, 2020

Table 21 shows the percentage variation in capital and taxes to the change in government revenue. As would be expected, capital revenues are mostly unharmed during the five years, while taxes decline in 2021, although they remain positive for the rest of the years. Industries producing essential goods and services generate the primary government capital revenue.

Table 21: Government Revenue and Balance, Percentage Variation

Period	Business as Usual		COVID Optimistic		COVID Pessimistic	
	Capital	Taxes	Capital	Taxes	Capital	Taxes
2019	0.7	0.8	0.7	0.8	0.7	0.8
2020	0.9	1.0	2.2	-3.5	2.3	-5.1
2021	1.0	1.1	1.7	1.8	4.3	1.7
2022	1.0	1.1	1.3	2.0	3.2	3.3
2023	1.0	1.1	1.4	1.9	1.8	2.6
2024	1.1	1.1	1.4	1.9	1.8	2.5

Source: Authors' based on model simulation results, 2020

Table 22 shows the impacts on the individual tax handles of the pandemic. Income taxes remain positive throughout the period, thanks to the contribution to income taxes of skilled workers whose earnings are largely unharmed during the pandemic. However, activity taxes and indirect taxes show a decline, particularly in 2020.[19] Table 22 is important in that it illustrates the impact of the pandemic on the main sources of government income.

The most significant decrease is in import taxes (-22.1 percent in the pessimistic case), followed by activity taxes (-19.7 percent in the pessimistic case). These dynamics in taxes apply to both the optimistic and pessimistic scenarios; the pessimistic scenario showing worse outcomes as expected, and again reflecting the vital role played by the transmission channels of imports and domestic demand and production.

Table 22: Tax Revenues, Percentage Variation

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	Income	Activity	Import	Sales	Income	Activity	Import	Sales	Income	Activity	Import	Sales
2019	0.9	1.3	1.1	0.7	0.9	1.3	1.1	0.7	0.9	1.3	1.1	0.7
2020	1.1	1.5	1.5	1.0	1.7	-16.9	-18.3	-7.3	1.5	-19.7	-22.1	-10.3
2021	1.1	1.5	1.6	1.0	2.0	2.0	1.1	1.8	3.4	0.2	-1.5	-0.2
2022	1.1	1.5	1.7	1.1	1.7	3.1	3.3	2.4	3.1	3.6	2.3	3.7
2023	1.1	1.5	1.7	1.0	1.7	2.8	3.1	2.3	2.2	3.9	4.0	3.3
2024	1.1	1.5	1.6	1.0	1.7	2.7	3.0	2.2	2.2	3.6	3.9	3.2

19 Activity taxes are production-based taxes other than transaction taxes (VAT, import taxes etc.). They refer to a tax imposed directly on businesses measured by receipts, income or profits (not transaction taxes) and include corporate income taxes, franchise taxes, single business taxes, capital stock taxes, net worth taxes, gross receipts taxes, and business and occupation taxes. Activity taxes in the SAM and model are disaggregated across activities according to the activity shares in the supply and use tables.

4.5.4 HOUSEHOLD INCOMES

The simulation of the domestic supply and demand and the international trade channels jointly indicates a decline in the consumer price index and an increase in household real gross income (Table 23). The decline in consumer prices means households' economic well-being improves because of the decrease in the cost of living. Table 24 confirms that the general direction of the results, disaggregated by income category, is the same when the focus is on change in household income in real terms. It is important to note that this improvement is only an aggregate outcome that masks substantial individual differences, as will be seen later. The remuneration of workers who completed secondary school education (Grade 12) and tertiary education (certificates, diplomas or degrees), who can be characterised as medium-skilled and skilled respectively, contributes 85 percent to the total remuneration.

On the other hand, those workers with primary school education (Grades 1-7) and with middle school education (Grades 8-11), typically characterised as unskilled labour, contribute only 15 percent to total remuneration. Thus, the positive aggregate income result is driven by skilled workers, while the negative impacts hurt unskilled workers. Therefore, not everyone's income increases under the pandemic; in particular, the vulnerable groups suffer reduced incomes.

Table 23: Household Gross Income, Percentage Variation

Period	Gross Income			Consumer Price Index (CPI)			Gross Income deflated by CPI		
	Business as Usual	COVID Optimistic	COVID Pessimistic	Business as Usual	COVID Optimistic	COVID Pessimistic	Business as Usual	COVID Optimistic	COVID Pessimistic
2019	1.0	1.0	1.0	-0.2	-0.2	-0.2	1.2	1.2	1.2
2020	1.1	1.5	1.1	-0.2	-1.9	-1.8	1.2	3.5	3.0
2021	1.1	2.1	2.9	-0.1	-1.0	-0.9	1.2	3.1	3.9
2022	1.2	2.0	3.1	-0.1	-0.6	-1.0	1.2	2.6	4.2
2023	1.2	1.9	2.4	-0.1	-0.4	-0.8	1.2	2.3	3.3
2024	1.2	1.8	2.4	-0.1	-0.3	-0.6	1.2	2.2	3.0

Source: Authors' based on model simulation results, 2020

As shown earlier, the disruptions in the supply of essential and non-essential products emanating from the outbreak-induced lockdown are the leading cause of falling consumer prices and, consequently, a decline in labour employment income of workers with primary and middle school education. Thus, the labour employment income decreases relative to the Business as Usual for the unskilled under both the COVID-19 optimistic and pessimistic scenarios (Table 24). Together with earlier results, this means the shocks are translated into reduced employment and earnings for the unskilled workers. On the other hand, employment income increases in real terms for workers with secondary school and tertiary education. As mentioned, the workers with relatively

higher education attainment largely continue working during lockdown as they dominate the essential goods and services sectors (as earlier illustrated in Figure 6). The pandemic thus has detrimental effects on the unskilled workers in South Africa, who see reduced employment income in real terms, under both scenarios.

Table 24: Change in Household Employment Income, Real Terms (Percent)

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	P	M	S	T	P	M	S	T	P	M	S	T
2019	1.5	1.6	2.0	1.4	1.5	1.6	2.0	1.4	1.5	1.6	2.0	1.4
2020	1.5	1.6	1.9	1.3	0.2	0.4	2.7	3.9	-0.7	-0.5	2.0	2.8
2021	1.5	1.6	1.9	1.3	2.4	2.6	3.2	4.0	2.4	2.5	2.8	3.3
2022	1.5	1.6	1.8	1.3	2.3	2.5	3.0	3.5	3.3	3.3	3.7	4.7
2023	1.4	1.5	1.8	1.3	2.1	2.2	2.7	3.0	2.9	3.0	3.5	4.4
2024	1.4	1.5	1.8	1.3	1.9	2.1	2.5	2.7	2.6	2.8	3.2	3.9

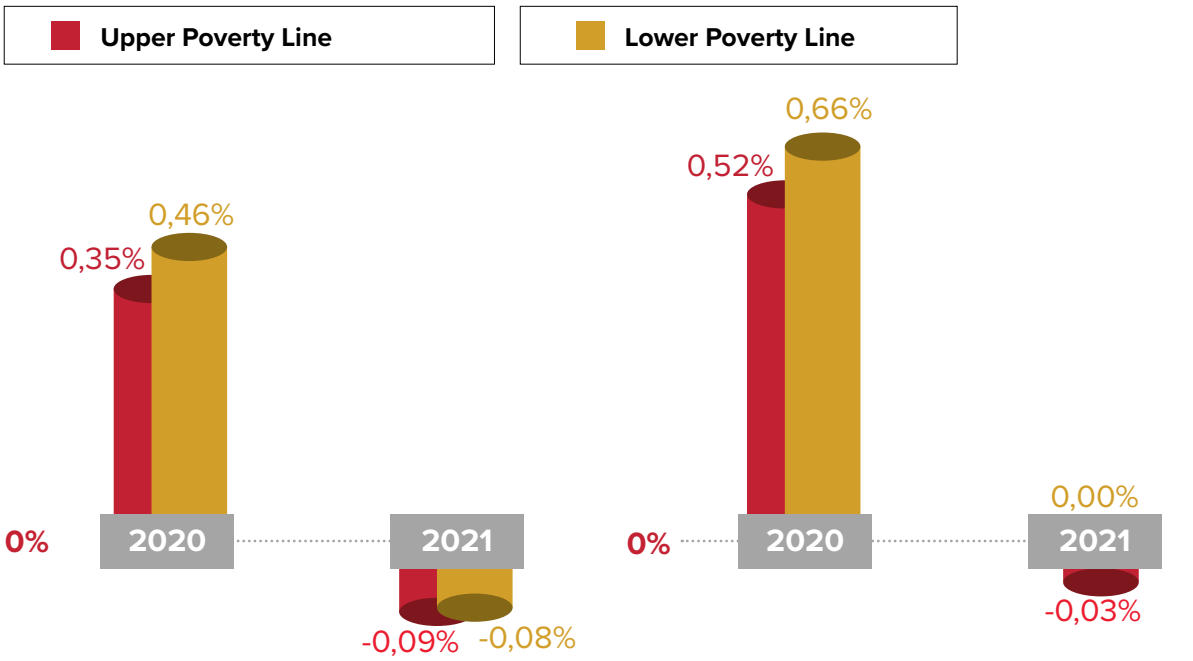
Source: Authors' based on model simulation results, 2020
Note: P or Primary: Labour with primary school education (grades 1-7); M or Middle: Labour with middle school education (grades 8-11); S or Secondary: Labour completed secondary school education (grade 12); T or Tertiary: Labour with tertiary education (certificates, diplomas or degrees).

> *"This sequential approval to microsimulation analysis ensures that the poverty outcomes are informed and consistent with the generated macroeconomic results."*

4.6 MICRO-SIMULATION RESULTS

One question that this section tries to answer is: *What will be the impact of COVID-19 effects just outlined at the macro and sectoral level on poverty and inequality numbers?* The report's estimates on poverty, hunger, and inequality are derived from the microsimulation model using the CGE model estimates of how supply and demand shocks, output contractions, and changes in trade and production factors just discussed feed through to poverty. This sequential approval to microsimulation analysis ensures that the poverty outcomes are informed and consistent with the generated macroeconomic results. Figure 8 shows the results for poverty. When compared to BaU, poverty headcount indices, people living below both the upper and lower poverty lines increase under the health crisis in 2020. Poverty declines slightly more compared to BaU due to the faster recovery of the economy in 2021, in line with the results previously discussed.

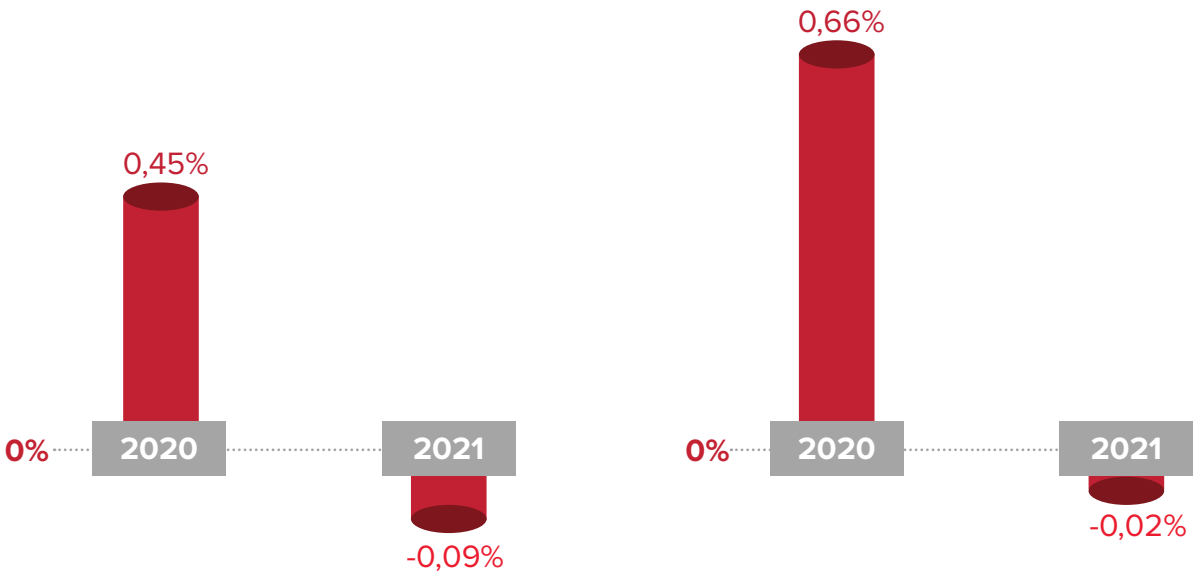
Figure 9: Change in poverty headcount indices, COVID-19 compared to BaU Scenario (Percentage point)



Source: Authors' based on model simulation results, 2020

The results of extreme poverty and hunger are shown next in Figure 9. According to the results, extreme poverty and hunger are expected to increase in 2020 with the COVID-19 pandemic compared to BaU and decline in 2021 with the economic recovery.

Figure 10: Change in poverty headcount indices and the food poverty line, COVID-19 compared to BaU Scenario (Percentage point)

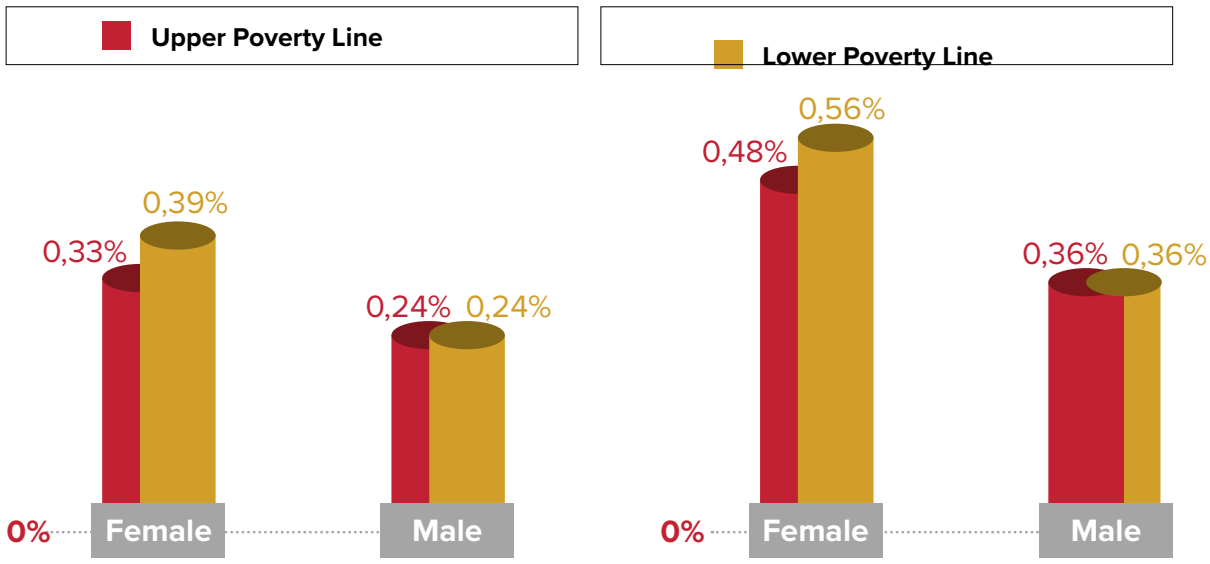


Source: Authors' based on model simulation results, 2020

When analysing poverty by gender, the results reveal that in both optimistic and pessimistic scenarios, females shoulder a higher burden of the increase in poverty compared to males and especially at the lower poverty line, suggesting that the poorest female-headed households bear a disproportionately heavier brunt of the poverty increase (Figure 10). This is consistent with the macroeconomic results that revealed that those workers with lower levels of education suffer more when compared to those with higher levels of education. Since more females occupy and rely more on incomes from lower-income levels, female poverty is higher than male poverty and particularly high amongst the poorest female-headed households (lower poverty line).

The result of this section should be interpreted in line with the scenario modelled. In both scenarios, activities go back to normal after a certain period. This is the best scenario as of the time of the modelling, which will need to be updated as the uncertainties are resolved. However, the magnitude of the changes in poverty is small, but the direction of the shift is towards increased poverty. The magnitude is a direct function of the macroeconomic and sectoral results as well as the current simulation that skilled workers are not affected by the pandemic as much as unskilled workers (where the non-poor are skilled workers).

Figure 11: Headcount Poverty Index by Gender, Upper and Lower Poverty Lines, COVID Scenarios Compared to BaU Scenario, Percentage Point



Source: Authors' based on model simulation results, 2020

Finally, Figure 11 and Figure 12 show income inequality changes, while Figure 13 complements the analysis by showing income shares by category of income quintile of expenditure group in 2017.

Figure 11 shows that income inequality, measured by the Gini index, increases in 2020 because of the economic contraction and its differential impacts on the various household and labour

categories and declines in 2021 with the economic recovery witnessed from the macroeconomic analysis. According to Figure 12, the income of the bottom 40 percent of the population declines with the contraction of the economy in 2020. However, their income share increases as the income of the other groups decreases more. In terms of share of expenditure, the share of expenditure of the bottom 40 percent of the population increases relatively as this population group relies more on government grants (31 percent to 40 percent of their total income) compared to other groups and this category of income is assumed not to change under the health crisis (Figure 13).

The result of this section should be interpreted in line with the scenario modelled. In both scenarios, activities go back to normal after a certain period. This is the best scenario as at the time of the modelling, which will need to be updated as the uncertainties get resolved. However, even though the magnitude of the changes in poverty would appear small, the direction of the shift is towards increased poverty and this is significant because it signals a reversal to the downward trend in poverty that South Africa had observed during 2015 to 2019, that is, the pre-COVID-19 era. The magnitude of the change is a direct function of the macroeconomic and sectoral results, the short period horizon of the model as well as the current simulation that skilled workers are not affected by the pandemic as much as unskilled workers (who constitute the majority of the poor). It is also because of these macroeconomic results and considerations that we see a deepening in inequality. In the case of inequality, poorer households are more negatively affected by the pandemic mainly through unskilled labour and wage reduction compared to the richer households. Because inequality is a relative measure of the gap between rich and poor household income in this case, that gap is widening because poor people's incomes are experiencing larger declines than the rich, explaining the increased Gini index.

Figure 12: Change in Gini Index, COVID-19 compared to BaU Scenario (Percentage point)

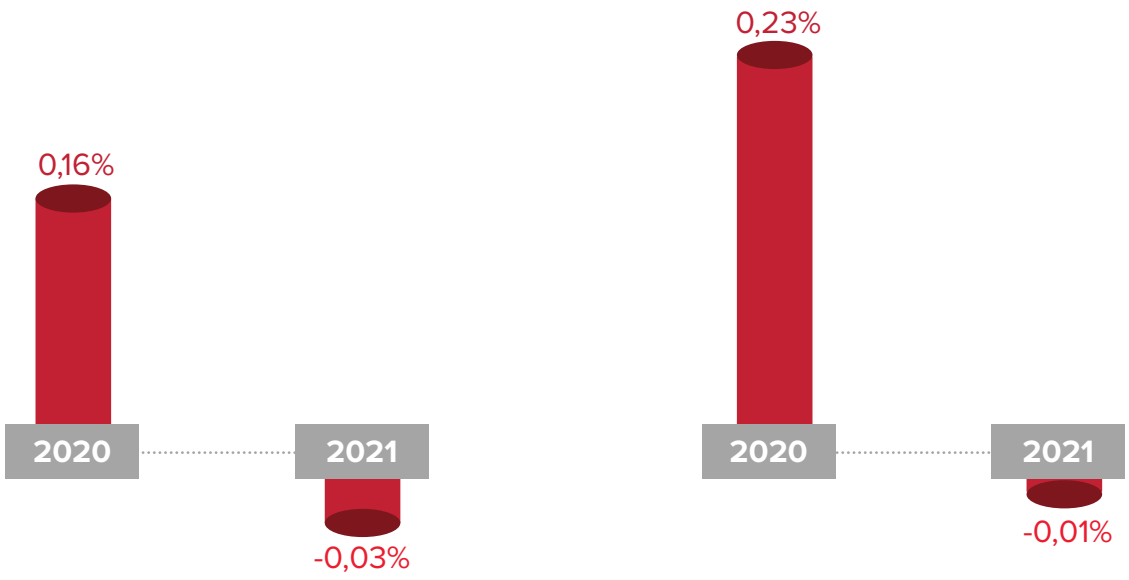
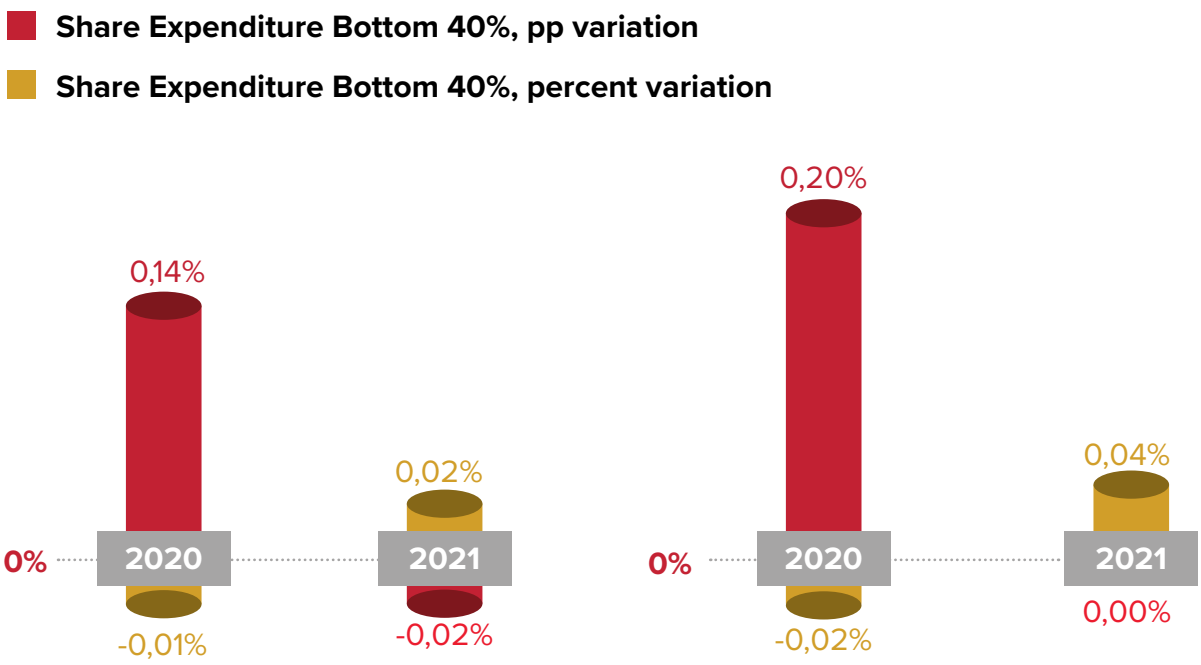
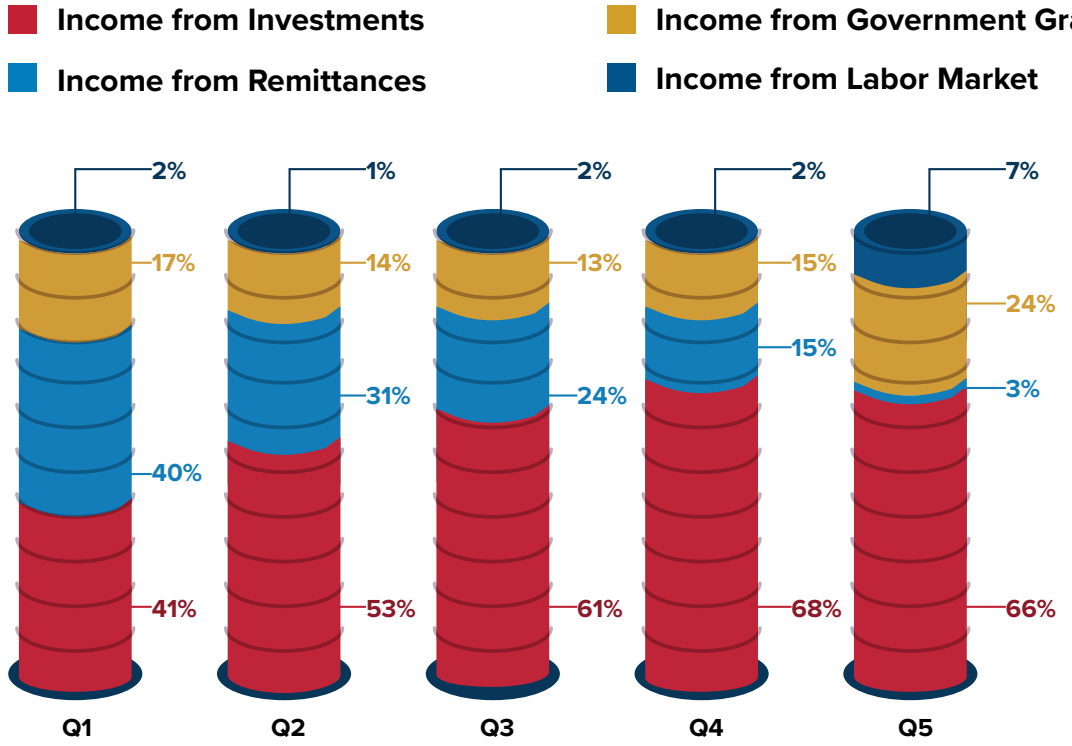


Figure 13: Change in income inequality, COVID-19 compared to BaU Scenario (Percentage point)



Source: Authors' based on model simulation results, 2020
Note: pp: percentage point.

Figure 14: Income share by category of income quintile of expenditure group in 2017



Source: Authors' based on model simulation results, 2020
Note: pp: percentage point.

Part Five:

5. CONCLUSIONS


COVID-19 Screening Tool

5. CONCLUSIONS

The microeconomic analysis presents a classification of households in South Africa that goes beyond the basic poor and non-poor to a ranking that factors in the likelihood of falling into or exiting poverty. This classification divides the poor into two categories, chronic poor and transient poor, and the middle class into two categories (vulnerable and middle class). The elite class is in the upper class of the distribution.

The microeconomic analysis shows that households are affected by changes in employment, in employment situation, and the implications for entry and exit from poverty. From the observed impact on households in the past based on COVID-19 type events, the results show that households with a decrease in the number of workers have the highest odds of exiting the middle class and falling into poverty, at about 4.5 times odds for each household member that becomes unemployed. Similarly, a temporary fall in income has one of the second highest odds ratios of falling into poverty with 1.5 odds. Female-headed households are highly vulnerable and more likely to fall into poverty

A stimulus package or social protection typically targets businesses and the chronically poor in society. While support to these households is essential, this analysis makes a case for other categories of households that should be protected to at least preserve the poverty levels before COVID-19. The analysis also suggests that the current stimulus package may not be sufficient given that households are still going to lose at least 40 percent of their income, even if they qualify for the special Temporary Employee/Employer Relief Scheme (TERS). Based on the model, looking at a loss of income of at least a 10 percent reduction in income alone, the odds of falling into poverty is 1.5.

The macroeconomic results show that in both COVID-19 scenarios, there is a reduction in real GDP in 2020 – and GDP levels do not catch up to 2019 levels even by 2024. The fall in GDP in the pessimistic scenarios is markedly sharp in 2020, but begins to recover towards 2021 as the economy starts opening. As per the assumption, the impact of the optimistic scenario is generally milder than in the pessimistic scenario. The rate at which GDP recovers is spurred by forced savings during the lockdown as well as the gradual opening of the economy. Furthermore, the plunge in 2020 in both scenarios was so deep that the rise in annual percentage change in the growth of GDP is faster than under BaU. Nevertheless, as mentioned, GDP levels still do not catch up to BaU even by 2024.

The results indicate that unemployment increases across all skill categories in 2020 and 2021, though the increase is steeper for the unskilled. After that, unemployment begins to decline for skilled categories. Thus, the effects of the COVID-19 pandemic lead to an increase in unemployment, primarily driven by GDP growth contraction. However, the unemployment effects are disproportionately felt as the burden lies on the workers with lower education levels, who primarily occupy unskilled jobs. These workers tend to be more

represented in the sectors designated as non-essential. Because of this, the real incomes of the workers with lower education levels fall, while those of the workers with completed secondary education and tertiary education increases.

The results of these macroeconomic effects are used to assess the implications on poverty and inequality by transferring them onto a microsimulation model. Poverty increases both at the upper and lower poverty lines. Furthermore, the results show that female-headed households, particularly the poorest female-headed households, are more negatively impacted by the pandemic than other households. This image also applies to extreme poverty (hunger), a sign of the worsening of conditions regarding SDG goals 1 and 2. If nothing is done by the authorities that specifically target these groups, the progress towards attaining SDG 1 and 2 by 2030 would, at the very least, be stalled considerably. The findings further suggest that policy interventions need to pay special attention to female-headed households, particularly those in the poorest categories.

Focusing on income inequality, the findings are that inequality increases. This is largely because the incomes of the non-poor are hardly impacted while those of the poor fall – since less educated populations work predominately in sectors designated as non-essential and thus, are closed during lockdown with slow recovery post-lockdown. On the other hand, higher educated workers generally continue to work and earn an income during the lockdown. This result gives further credence to interventions that are differentiated according to skill and poverty levels.

Across sectors, the results indicate that not all sectors are affected equally. Textiles, glass products, footwear, education services, catering, accommodation, beverages, and tobacco sectors suffer more than other sectors. Sectors that are hardest hit might need special consideration from government relief and stimulus for them to recover. Government interventions could pay particular attention to the sectors that are losing as well as the types of workers hardest hit in these sectors.

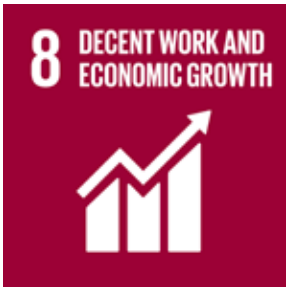
The results of this study should be used with some limitations. First, this study was carried out in the first weeks of the coronavirus arriving in South Africa. Not much was known then and as more information becomes available, there might be a need to update the model assumptions and simulations. Secondly, the study was carried out before the stimulus package was announced, and thus, did not model the impact of the stumulus package.

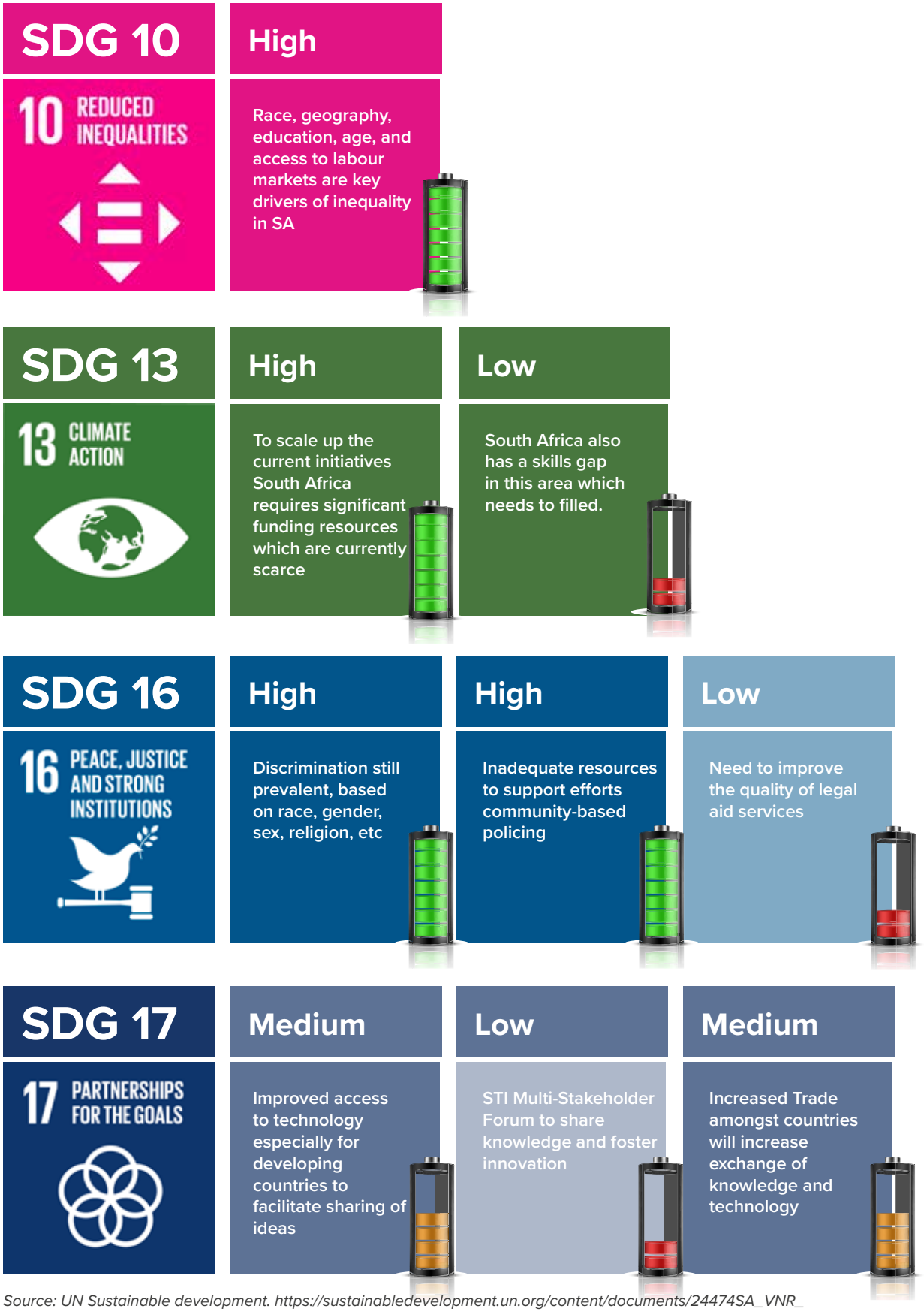
SDGS

Lastly, on Sustainable Development Goals, based on in South Africa's Voluntary National Review presented on 17 July 2019, Table 25 presents the potential impact of COVID-19 on the achievement of the SDGs. The country presented challenges for SDG 4, 8, 10, 13, 16, and 17 as of 2019, and the results from this report show that these challenges will be aggravated with COVID-19. COVID-19 has brought to the forefront, for instance, the challenge of achieving SDG 4 and 8 because of low internet access with school and workplace closures and not all households having access to essential services like the internet to be able to access educational information as well as working from home where nature of the work permits. The challenge of funding and addressing the need for significant funding resources, which was scarce in 2019, will be worse in 2020 and going forward with COVID and further aggravate the achievement of the SDGs.

The country presented challenges for SDG 4, 8, 10, 13, 16, and 17 as of 2019, and the results from this report show that these challenges will be aggravated with COVID-19. COVID-19 has brought to the forefront

Table 25: Challenges of achieving SDGs in South Africa and the threat of COVID-19

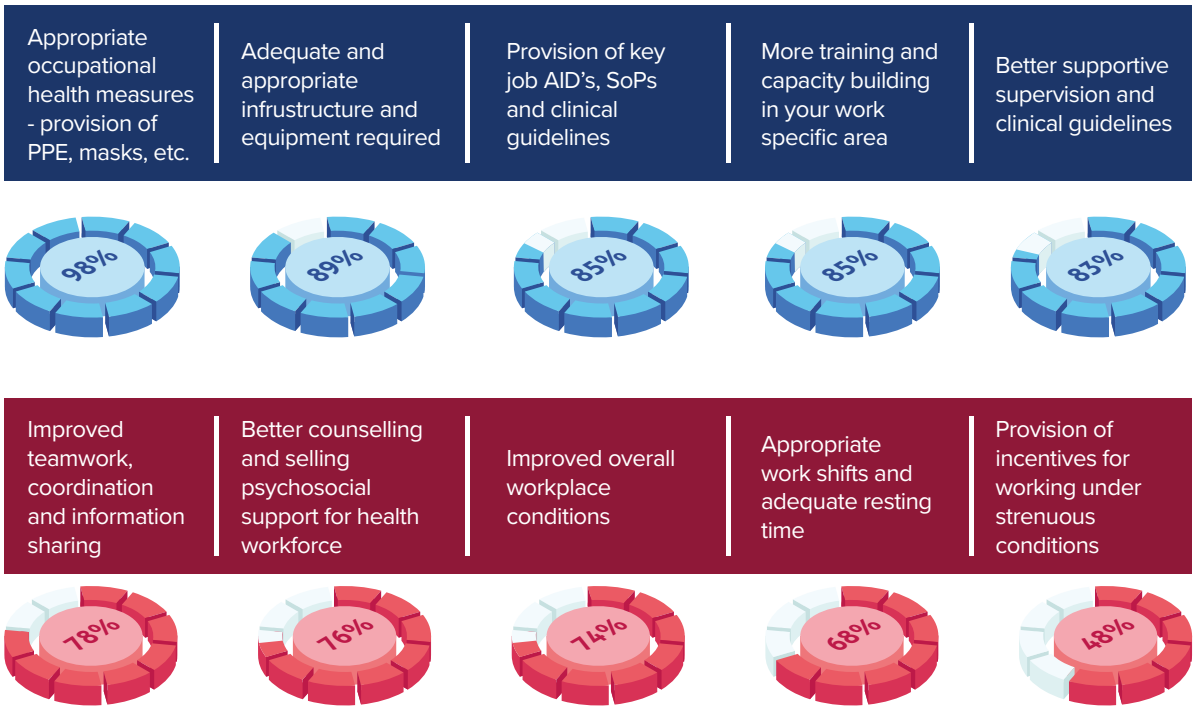
SDG 4 	**Low** Top Grades participation rates low	**Low** High Drop-out rate relating to children living with disabilities	**High** Low Internet access
SDG 8 	**High** Unemployment remains high	**High** SA economy is deindustrialising, with share of manufacturing in GDP declining from about 19,3% in 1994 to about 12% in 2017 & 2018	



Source: UN Sustainable development. https://sustainabledevelopment.un.org/content/documents/24474SA_VNR_Presentation__HLPF_17_July_2019._copy.pdf

Figure 15: Addressing Fear and Anxiety in Hospitals

Ways to better address/minimise fear/anxiety associated with COVID-19 across All Hospitals



Almost all of the respondents across all 12 hospitals believe that to ease their fears and anxieties associated with COVID-19, their safety is a priority. Training and supportive supervision are also regarded by the majority of the respondents as very important.

POLICY RECOMMENDATIONS

Policy interventions need to pay specific attention to those hurt the most. Broadly, a strategic thrust in interventions is usually targeted towards persons most disadvantaged in terms of poverty, inequality, and sectoral/production impact. This is commendable. A new dimension added by this study is that intervention responses mitigating the impact of COVID-19 need to be differentiated by predicted losses.

- For households, this should be according to household poverty level and its gender dimension (including extending social assistance and creating new instruments), as well as marital status and number of children. Differentiated interventions should be made considering gender and sex of the household head because of income source and level of education (women derive a larger share of their income from lower-skilled type work). The differentiated impact also includes differences in location (urban versus rural areas) and type of employment (permanent versus casual employment types).
- For workers, interventions can

be differentiated according to skill category (those who occupy unskilled and semi-skilled occupations, including re-skilling programmes and expansion of public works programmes). For the low skilled and less educated, re-skilling programmes for those in the informal sector will reduce the impact. These households hold primary school education (grades 1-7), and middle school education (grades 8-11) where re-skilling programmes will be necessary if they are out of work. Also, the workers from economic sectors most affected such as textiles, glass products, footwear, and catering and accommodation will require retraining to be able to work in the winning sectors such as telecommunications and service.

- For sectors, a particular focus should be on those designated as non-essential, specifically in textiles, glass products, footwear, education services, catering and accommodation, beverages and tobacco sectors. For the SMMEs in these sectors to recover and to be able to play a role in economic recovery, support in terms of increasing liquidity through either direct fiscal support or tax breaks will help. One of the significant risks of SMMEs is the liquidity crunch that the lockdown creates. The role of the private sector and SMMEs in recovery cannot be underestimated and should include supporting the transition to digital and improving digital skills. Policy measures such as boosting liquidity measures, tax deferrals, and job support, among others may also be considered for SMMEs in the informal sector.
- Deepening social assistance will be important to fill this gap. A big part of the current social protection announced by the government provides additional funding to existing social grants in South Africa. These grants may need to be extended to cover vulnerable households that are not currently considered poor but at the edge of poverty. Deepening social grants beyond the COVID-19 amount and time extension will be useful.
- It is essential for the restructuring package to be directed towards the economic sectors where growth will take place. The growth rate that is still in line with the shift to a low-carbon economy and climate-resilient society, despite the impact of COVID-19, will be an essential part of the gradual restructuring package.

- It is critical that measures are taken for medical workers in public hospitals and for doctors and nurses to feel more protected. This can be promoted through ensuring a safer environment, equipment and more staff.

As the COVID-19 disease evolves and more information is available, the government is closely reopening the economy through a five-phases approach, whereby Level 5 was the most restrictive. South Africa moved to Level 3 from June 2020. Reopening the economy will include easing and adopting alternative lockdown measures to spur economic activity. Continuously cautious approaches to social distancing and alert measures can help the recovery, the opening of the economy, and minimise the recurring spread of COVID-19.

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APPENDIX A – MICROECONOMIC ANALYSIS

Table A1: Multivariate probit model: Poverty transitions

Probability of being poor in t conditional on poverty status in t-1	Poverty Persistence			Poverty Entry		
	Average Marginal Effect	Coeff. Estimate	se	Average Marginal Effect	Coeff. Estimate	se
HoH age	0.001	0.010***	0.003	-0.004	-0.004	0.003
HoH age squared (x0.01)	-0.001	-0.014***	0.003	-0.001	-0.005	0.004
HoH is female	0.014	0.060***	0.02	0.059	0.197***	0.02
HoH race group (base: Black African)						
Coloured	-0.024	-0.004	0.044	-0.102	-0.254***	0.04
Asian/Indian	-0.631	-1.426***	0.147	-0.325	-1.651***	0.079
White	-0.651	-1.533***	0.263	-0.367	-1.426***	0.114
HoH education (base: no schooling)						
Less than primary completed	-0.013	-0.008	0.027	-0.028	-0.148***	0.034
Primary completed	0.003	0.044	0.038	-0.076	-0.196***	0.041
Secondary not completed	-0.051	-0.157***	0.029	-0.146	-0.551***	0.033
Secondary completed	-0.103	-0.387***	0.042	-0.229	-0.959***	0.042
Tertiary	-0.225	-0.836***	0.06	-0.306	-1.294***	0.047
HoH employment status (base: inactive)						
Unemployed (discouraged)	0.054	0.065	0.057	0.031	-0.141**	0.061
Unemployed (strict)	0.013	-0.039	0.033	0.020	0.099***	0.034
Employee	-0.011	-0.045	0.034	0.037	-0.104***	0.031
Self-employed	-0.001	-0.085**	0.043	0.018	-0.182***	0.037
Casual worker/ helping others	0.049	0.086*	0.048	0.076	0.239***	0.046
Subsistence farmer	0.034	-0.017	0.059	0.019	-0.037	0.061
Self-employed # Formal	-0.418	-0.578***	0.124	-0.151	-0.768***	0.121

Employee # Permanent contract	-0.031	-0.091**	0.041	-0.081	-0.286***	0.031
Employee # Union member	-0.035	-0.176***	0.05	-0.031	-0.332***	0.035
Employee # Share public sector	-0.019	-0.129*	0.072	-0.112	-0.401***	0.055
Characteristics of the household (HH) in t-1						
Composition of the HH						
No. of members in HH	0.013	0.037***	0.007	0.026	0.210***	0.009
No. of workers in HH (excl. HoH)	-0.028	-0.079***	0.013	-0.018	-0.215***	0.014
No. of children (<18 years)	0.021	0.087***	0.009	0.022	0.059***	0.011
No. of elderly members (60+ years)	-0.009	-0.014	0.018	0.023	-0.041**	0.02
HH has access to basic goods and services (shelter/water/ sanitation/electricity)	-0.056	-0.213***	0.027	-0.051	-0.415***	0.024
Geographic location (base: traditional)						
Urban	-0.015	-0.036	0.027	-0.036	-0.079***	0.028
Farms	0.037	0.112**	0.044	0.056	0.354***	0.048
Constant		0.762***	0.103		0.836***	0.102
Province fixed effects		YES			YES	
Time fixed effects		YES			YES	
Log-likelihood		-1.41E+08				
Model chi2 (d.f. = 178)		28905.375				
Number of observations		96838				

*Asymptotic standard errors are robust for the presence of repeated observations on the same individual. ***p < 0.01, **p < 0.05, *p < 0.1.*
Source: Author's calculations using NIDS waves 1 to 5 pooled sample (post-stratified weights).

- *Urban – A continuously built-up area that is established through cities, towns, 'townships', small towns, and hamlets.*
- *Traditional – Communally owned land under the jurisdiction of traditional leaders. Settlements within these areas are villages.*
- *Farms – Land allocated for and used for commercial farming including the structures and infrastructure on it.*
- *Those parts of the country falling under the jurisdiction of traditional authorities (or traditional chiefs) are considered as rural, mainly due to their lack of infrastructure as a result of historical events.*
- *For self-employed, formal businesses are registered for income tax &/or VAT.*
- *The average share of public sector employment by industry and survey year has been calculated from the 2008, 2010/11, 2012, 2014/2015 and 2017 Quarterly Labour Force Surveys.*
- *In line with the 2011 census, three settlement types are distinguished in NIDS:*

Table A2: Logit model: Probability of exit out of the middle class (or elite)

VARIABLES	Logit estimates
Death of a household member	0.416
	(0.336)
Death of a non-resident family member who assisted financially	0.331
	(0.288)
Fall in labour income (>=10%) (number of workers constant)	0.416**
	(0.207)
Fall in the number of workers	1.517***
	(0.229)
Fall in the number of workers (household size constant)	-0.326
	(0.262)
Additional working adult in the household	-0.703***
	(0.112)
Female	0.901***
	(0.148)
Coloured	0.076
	(0.196)
Asian/Indian	-1.941***
	(0.389)
White	-3.879***
	(0.644)
Household size	0.462***
	(0.041)
Traditional area	0.448**
	(0.225)
Farms	1.560***
	(0.333)
Constant	-3.074***
	(0.203)
Observations	4,628
Robust standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

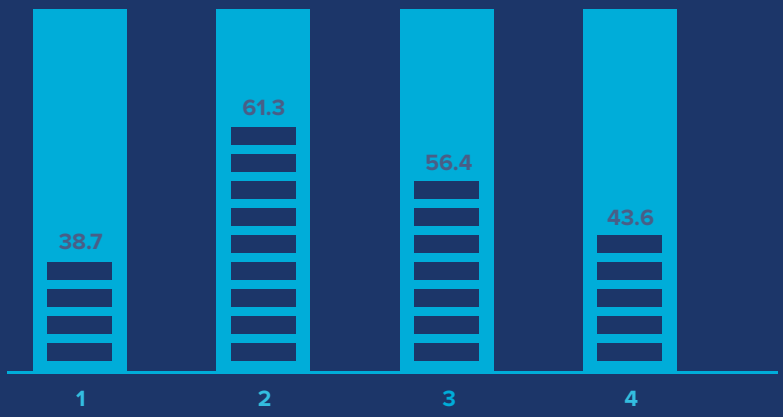
Source: Author's computation using reported cases of events and poverty classification.

Appendix B1: Categorisation of non-essential goods and services during the lockdown – Macro

Product or Industries	Machinery and equipment
Beverages & Tobacco	Electrical machinery
Textile	Radio, television
Leather	Transport equipment
Footwear	Other manufactured products
Wood products	Construction
Printing	Accommodation & catering services
Rubber products	Transport & storage
Plastic products	Real estate services
Glass products	Business services
Non-metallic products	Education services
Iron, steel products	Health, social services
Non-ferrous metals	Other services
Fabricated metal	

Appendix B2: Export and Import Price Indices by Category of Goods and Services, 2019-2020 Average Variation (Percent)

Scenario	**Imports**		**Exports**	
	Essential Goods and Services	**Non-essential Goods and Services**	**Essential Goods and Services**	**Non-essential Goods and Services**
BaU	-1.8	-0.6	-1.3	-1.5
Optimistic COVID	-7.9	-4.6	-4.3	-6.2
Pessimistic COVID	-12.1	-7.6	-7.5	-8.5



Appendix B3: Share of Essential and Non-Essential Goods and Services in Total Imports and Exports in 2017 (Percent)

Appendix C: Appendix C1: Employment Income in Agriculture, Percent Variation

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	P	M	S	T	P	M	S	T	P	M	S	T
2019	1.0	1.0	1.0	0.3	1.0	1.0	1.0	0.3	1.0	1.0	1.0	0.3
2020	1.0	1.0	1.0	0.3	10.0	10.3	10.1	10.5	13.1	13.7	13.2	13.2
2021	1.0	0.9	1.0	0.2	3.1	3.1	3.1	3.6	8.4	8.7	8.2	8.8
2022	0.9	0.9	0.9	0.2	2.6	2.6	2.6	2.9	5.0	5.1	4.9	5.9
2023	0.9	0.8	0.9	0.2	2.4	2.4	2.4	2.6	3.8	3.9	3.8	4.6
2024	0.8	0.8	0.8	0.2	2.3	2.3	2.3	2.3	3.4	3.4	3.4	4.0

Appendix C2: Employment Income in Industry, Percent Variation

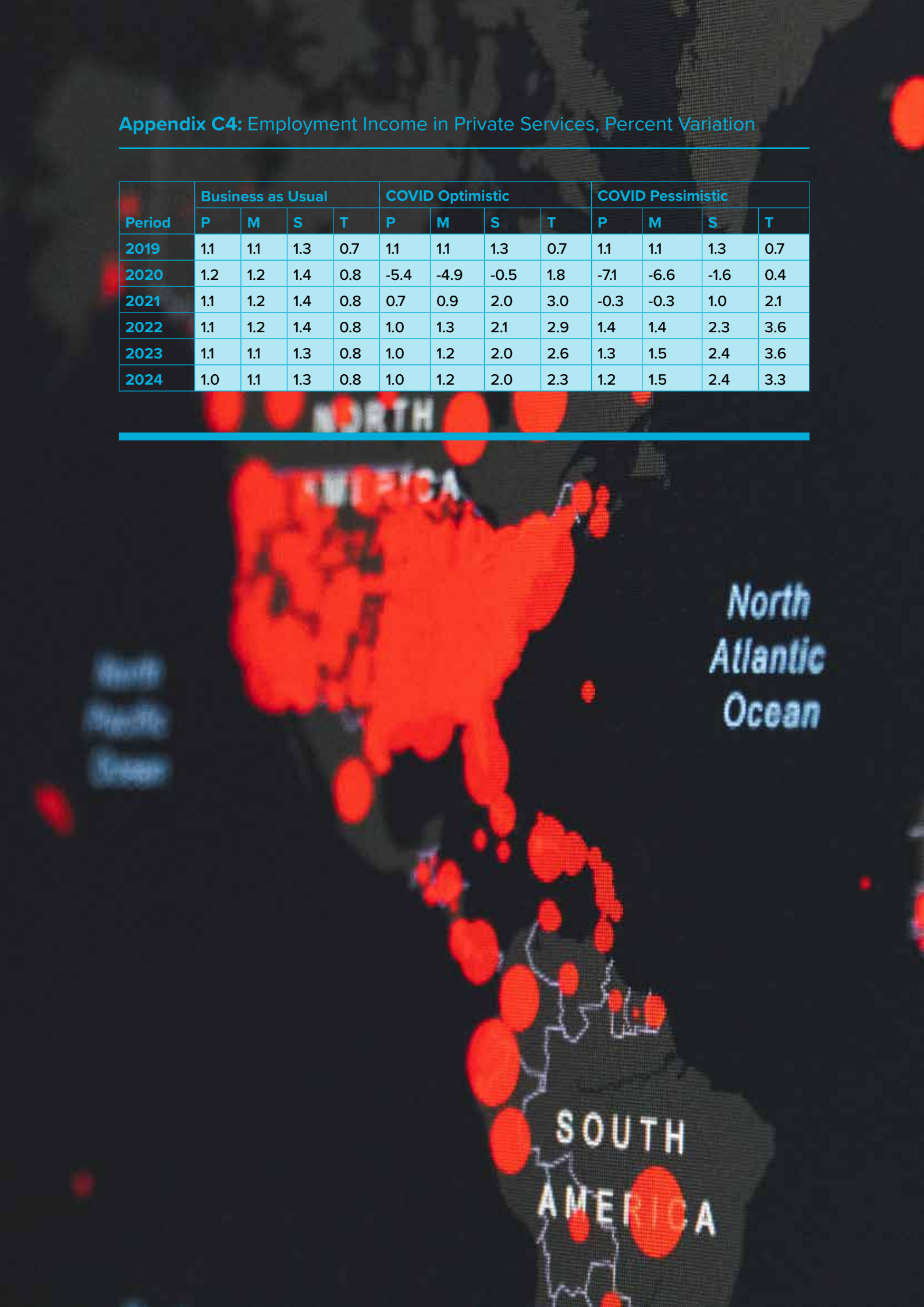
Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	P	M	S	T	P	M	S	T	P	M	S	T
2019	1.0	1.1	1.1	0.4	1.0	1.1	1.1	0.4	1.0	1.1	1.1	0.4
2020	1.2	1.3	1.3	0.5	0.6	0.4	-0.2	0.4	0.3	0.3	-0.9	-0.9
2021	1.2	1.3	1.3	0.5	1.8	1.8	1.8	2.3	2.1	2.6	1.6	1.5
2022	1.2	1.3	1.3	0.6	2.0	2.1	2.1	2.4	2.5	2.6	2.5	3.3
2023	1.2	1.3	1.2	0.6	2.0	2.1	2.1	2.2	2.4	2.6	2.6	3.3
2024	1.2	1.3	1.2	0.6	2.0	2.1	2.0	2.0	2.4	2.5	2.5	3.1

Appendix C3: Employment Income in Public Administration Services, Percent Variation

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	P	M	S	T	P	M	S	T	P	M	S	T
2019	3.1	3.1	3.1	2.4	3.1	3.1	3.1	2.4	3.1	3.1	3.1	2.4
2020	2.7	2.7	2.8	2.0	2.9	2.9	3.1	3.0	3.0	3.0	3.3	2.5
2021	2.7	2.7	2.7	2.0	2.9	2.9	3.0	3.3	3.1	3.1	3.1	3.1
2022	2.6	2.6	2.7	1.9	2.7	2.7	2.8	3.0	3.0	3.0	3.0	3.7
2023	2.6	2.6	2.7	2.0	2.7	2.7	2.7	2.8	2.7	2.8	2.8	3.5
2024	2.6	2.6	2.6	2.0	2.6	2.6	2.7	2.7	2.7	2.7	2.7	3.3

Appendix C4: Employment Income in Private Services, Percent Variation

Period	Business as Usual				COVID Optimistic				COVID Pessimistic			
	P	M	S	T	P	M	S	T	P	M	S	T
2019	1.1	1.1	1.3	0.7	1.1	1.1	1.3	0.7	1.1	1.1	1.3	0.7
2020	1.2	1.2	1.4	0.8	-5.4	-4.9	-0.5	1.8	-7.1	-6.6	-1.6	0.4
2021	1.1	1.2	1.4	0.8	0.7	0.9	2.0	3.0	-0.3	-0.3	1.0	2.1
2022	1.1	1.2	1.4	0.8	1.0	1.3	2.1	2.9	1.4	1.4	2.3	3.6
2023	1.1	1.1	1.3	0.8	1.0	1.2	2.0	2.6	1.3	1.5	2.4	3.6
2024	1.0	1.1	1.3	0.8	1.0	1.2	2.0	2.3	1.2	1.5	2.4	3.3



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