

## Recommendations on Cyclical Lockdowns

### Problem statement

MAC requested to advise whether a cyclic lockdown strategy with specific reference to a preprint paper by Karin et al. might be appropriate for South Africa<sup>1</sup>.

In essence the questions which need to be addressed are:

- a) What is the likely reduction in  $R_E$  that could be achieved should a cyclic lockdown policy be adopted at a national or sub-national level in South Africa? **(modelling question)**
- b) To what extent would the cyclical lockdowns reduce the burden on the health care system, specifically on non-ICU bed capacity? **(modelling question)**
- c) Could a cyclical lockdown strategy be implemented in South Africa given the structure of the South African economy and society?
- d) What would be the economic and societal costs of a cyclical lockdown strategy? Could the effects on vulnerable populations be adequately mitigated?
- e) Lastly, would the concomitant reduction in the burden on the health care system be likely to be of significant magnitude to offset the societal and economic costs?

### MAC Considerations

The approach taken was to i) conduct a brief literature review of time triggered cyclic lockdowns, ii) model the potential impact of a cyclic lockdown strategy on total hospital bed demand Gauteng and the Western Cape, and iii) consider the feasibility and consequences of implementing a cyclic lockdown strategy in South Africa.

Three papers were identified that examine time-triggered cyclical lockdown strategies. These papers are reviewed in the accompanying briefing document (Appendix 1). The primary findings that the MAC was asked to consider were from a preprint by Karin et al. Briefly, the authors propose a 14-day cyclical lockdown strategy of 2-4 working days followed by 10-12 days of continuous lockdown to contain viral transmission whilst allowing predictable but limited economic activity<sup>1</sup>. The proposed strategy is designed to leverage the latent period of the virus, estimated at 3-4 days, with those infected during working days reaching peak infectiousness during subsequent lockdown days thus limiting transmission outside of the household. In order to be effective, strict hygiene, use of masks and other NPI measures need to be maintained throughout both work and lockdown periods. Cyclical lockdowns would need to be maintained until (a) the number of active infections in the population is small and (b) sufficient immunity has built up in the population such that releasing the lockdown would allow  $R_E$  to remain below 1. It is important to note that the cyclical lockdown strategy is a theoretical model which has not been implemented in any country or region to date.

### Feasibility of implementing cyclic or additional non-cyclic lockdowns in South Africa

The effect of increasing the levels of lockdown or implementing cyclical lockdowns on COVID-19 needs to be carefully balanced against the societal and economic costs. These are briefly addressed below.

#### *i. Epidemiology*

Cyclical or stricter lockdowns, whether implemented at a national, provincial or local level, will result in a smaller reduction in transmission compared to the initial Level 5 and 4

lockdowns as the dynamics of the epidemic are now fundamentally different. Furthermore, adherence to cyclical lockdowns is likely to wane with each successive cycle.

Despite cases being largely concentrated in middle-class suburbs, the nationally estimated  $R_T$  increased during the last two weeks of Level 5<sup>4</sup>. Widespread community transmission in informal settlements is now fully established in most areas of South Africa. The structural and economic barriers to effectively implementing restrictions which confine people to houses or shacks in informal settlements are enormous. Reports suggest that people are reluctant to make use of quarantine and isolation facilities. High rates of transmission *within* communities is likely to occur despite increased lockdown restrictions.

Model outputs indicate that cyclical lockdowns will have a moderate effect on hospitalisations in Gauteng and will be insufficient to prevent hospital bed capacity from being overwhelmed. **Breaching hospital bed and oxygen capacity will dramatically increase COVID-19 mortality rates.** Steps to increase hospital bed capacity are urgently required whether or not additional lockdown restrictions are implemented. Additional details on the modelling methods and results are provided in Appendix 1.

*ii. Societal perspective:*

South Africa's high level of inequality poses specific challenges to implementing additional or cyclical lockdowns. Our fragile social contract has come under enormous strain during the lockdown. Additional lockdowns, particularly if targeted at low-income areas, run the risk of triggering widespread insurrection if public support for increased restrictions is not first obtained.

Low-income households bear a disproportionate burden of lockdowns as their fragile income status renders them less able to weather loss of income. Distribution of food parcels was inadequate during the initial Level 5 lockdown despite considerable social mobilisation. Additional lockdown restrictions will have an even greater impact on food security going forward as households have expended savings and social mobilisation will be muted. If cyclical or additional lockdowns were to be implemented it is imperative that food parcels or cash transfers are distributed at scale. The logistical and economic impediments to achieving this may be insurmountable.

*iii. Health perspective:*

Excess non-COVID mortality has been documented across many countries during lockdowns as a result of decreased access to essential health services. Cyclical lockdowns or increased restrictions are likely to exacerbate the declines in childhood vaccinations, TB, and HIV services.

*iv. Economic perspective*

The SARB and NT Modelling and Forecasting prepared a briefing document on the economic impacts of COVID-19 lockdowns (Appendix 2). The analysis clearly demonstrates that even under the current Level 3 scenario that the impact on GDP and employment is very significant, and unsustainable if it persists. Furthermore, even level 2 restrictions will have significant adverse economic effects. Increasing restrictions to Level 4 or 5 will result in significantly worse economic outlook than that outlined in the briefing document. Opening up the economy after a shut-down is not instantaneous. Since many companies will have gone insolvent, we will start from a significantly lower level of productive activity. The briefing document notes that "*Sudden and frequent stops to operations impose a cost on*

*businesses as has been seen in the case of load-shedding. Constant disruptions to production processes will likely result in significant costs and/or production constraints. These impacts will be far reaching and cut across industries as a result of the increasingly integrated nature of value chains and business linkages in the economy. In addition, the impact of stop-start production will likely disproportionately affect businesses which are cash flow sensitive, particularly SMMEs.”*

## Recommendations

1. The moderate benefit of cyclical lockdowns does not appear to justify the enormous societal and economic costs that would be incurred.
2. Rapidly mobilise all health workers in the public and private sectors and military to address staffing constraints in areas where capacity has been or is likely to be breached in the near future. Health workers currently employed in non-essential roles need to be re-assigned to essential services.
3. Preserve health care worker capacity by ensuring continuous supply of high-quality personal protective equipment.
4. Focus on increasing general bed capacity and ensuring oxygen supplies as these will have the greatest impact on mortality.
5. Strengthen preventive measures, particularly social distancing, through community-based interventions.

## Briefing document on cyclical Lockdowns (Appendix 1)

### Brief

MAC requested to advise whether a cyclic lockdown strategy with specific reference to a preprint paper by Karin et al. might be appropriate for South Africa<sup>1</sup>. The approach taken was to i) conduct a brief literature review of time triggered cyclic lockdowns, ii) model the potential impact of a cyclic lockdown strategy on total hospital bed demand Gauteng and the Western Cape, and iii) consider the feasibility and consequences of implementing a cyclic lockdown strategy in South Africa.

In essence the questions which need to be addressed are:

- f) What is the likely reduction in  $R_E$  that could be achieved should a cyclic lockdown policy be adopted at a national or sub-national level in South Africa? **(modelling question)**
- g) To what extent would the cyclical lockdowns reduce the burden on the health care system, specifically on non-ICU bed capacity? **(modelling question)**
- h) Could a cyclical lockdown strategy be implemented in South Africa given the structure of the South African economy and society?
- i) What would be the economic and societal costs of a cyclical lockdown strategy? Could the effects on vulnerable populations be adequately mitigated?
- j) Lastly, would the concomitant reduction in the burden on the health care system be likely to be of significant magnitude to offset the societal and economic costs?

### Synopsis of Literature

Karin et al. propose a 14-day cyclical lockdown strategy of 2-4 working days followed by 10-12 days of continuous lockdown to contain viral transmission whilst allowing predictable but limited economic activity<sup>1</sup>. The proposed strategy is designed to leverage the latent period of the virus, estimated at 3-4 days, with those infected during working days reaching peak infectiousness during subsequent lockdown days thus limiting transmission outside of the household. In order to be effective, strict hygiene, use of masks and other NPI measures need to be maintained throughout both work and lockdown periods.

Splitting the workforce into two groups, working alternate weeks, could allow more sustained economic activity. The two group strategy has the theoretical advantage of decongesting workspaces and allowing businesses to operate for 8 days in a 14-day cycle, though at the cost of significant complexity and more difficult enforcement. Given the complexity of implementing and enforcing the staggered strategy we have confined the rest of the review and discussion to the simpler single group strategy.

The cyclical strategy aims to achieve an average 14-day cycle effective reproduction number ( $R_E$ ) of less than one.  $R_E$  here is a function of two components:  $R$  during lockdown days ( $R_L$ ) and  $R$  during working days ( $R_w$ ). In their model a  $R_w$  of 1.5 and  $R_L$  of 0.6 results in an  $R_E$  of 0.86 assuming good adherence and limited leakage between work and lockdown periods.

Cyclical lockdowns would need to be maintained until the end of the first wave – i.e., until (a) the number of active infections in the population is small and (b) sufficient immunity has built up in the population such that releasing the lockdown would allow  $R_E$  to remain below 1.

Karin et al. model cyclical lockdowns as a containment strategy, i.e. reducing  $R_E$  to  $<1$  for all 14-day cycles. Since sustained reductions in  $R_E$  translate into reductions in peak cases and hospitalisations, cyclical lockdowns could potentially be considered as a mitigation measure to decrease the burden on the health care system even if an  $RE<1$  is not attained in initial cycles.

Karin et al. contend that cyclical lockdowns could optimise both economic and health outcomes when compared to a sustained lockdown. The paper however provides little justification and no estimates of the postulated economic benefits of cyclical lockdown strategy. Instead, the economic section focuses almost entirely on the severe economic costs and implications of sustained lockdowns, the implication being that anything must be better for the economy than a sustained lockdown. The authors furthermore acknowledge that not all economic sectors will be able to effectively implement cyclical lockdowns due to structural constraints. While they assert that in countries with large informal sectors that cyclical lockdowns could make lockdown days more bearable and enhance adherence, they once again provide no evidence.

It is important to note that the cyclical lockdown strategy is a theoretical model which has not been implemented in any country or region to date.

Other papers which address time triggered lockdown approaches are briefly described below. Chowdhury et al. modelled the impact of consecutive cycles of relaxation periods ( $R=2.2$ ) with either mitigation ( $R=0.8$ ) or containment ( $R=0.5$ ) measures on ICU admissions across multiple countries, including South Africa<sup>2</sup>. While country specific age populations and estimated ICU capacity were incorporated, the choices of  $R$  were uniform across all countries having been selected for illustrative purposes. The model projections indicated that dynamic 50-day mitigation ( $R=0.8$ ) followed by 30-day relaxation cycles would not prevent breaching ICU capacity in any of the countries studied. By contrast, dynamic cycles of 50-day suppression ( $R=0.5$ ) followed by a 30-day relaxation kept ICU demand below capacity for most countries, including South Africa. The cycles however would have to be maintained for longer than 18 months. Menon et al. briefly describe a periodic 7-day lockdown followed by 5-day relaxation<sup>3</sup>. The authors caution that while the strategy may appear to be effective, it is economically impractical.

### Cyclic lockdown model

To evaluate the potential impact of a regular cyclical lockdown strategy in South Africa, we adapted the National COVID Epi Model, introducing cyclical lockdowns with four-day work periods followed by ten-day lockdown periods, from 20 July. Given time constraints and likely heterogeneity between provinces, we used Western Cape and Gauteng as case studies. We considered three scenarios. In the baseline scenario, Level 3 restrictions continue to be imposed with no cyclical lockdowns. In the optimistic scenario, the effect of the lockdown periods is equivalent to the previous effect of Level 4 lockdown, while work periods are equivalent to the effect of Level 3 lockdown. The third, pessimistic, scenario is the same as the optimistic scenario but assumes a decrease in compliance with each lockdown period (equivalent to a 5% increase in the value of the time-varying reproduction number  $R_T$ , until the  $R_T$  during lockdown periods is as high as during work periods). Parameter values used for Western Cape and Gauteng are shown in the table and are based on the NICD  $R_T$  analysis (Level 5 and Level 4) and fitting to recent case and admissions data (Level 3). The primary outcome considered was the effect on the number of hospital beds needed, as whether this need is met is the primary determinant of potential excess mortality, based on preliminary work by the South African COVID Modelling Consortium.

Province	$R_0$	Level 5 $R_t$	Level 4 $R_t$	Level 3 $R_t$	4 days work	10 days lockdown*
W. Cape	2.5	1.5	1.6	1.76	1.76	1.6
Gauteng	2.5	1.1	1.5	1.75	1.75	1.5

\* In the pessimistic scenario, compliance decreases with each lockdown, resulting in a 5% increase in the  $R_t$  value, until the  $R_t$  during lockdown periods is as high as during work periods.

## Results

The model results indicate that cyclical lockdowns could have a small impact in Western Cape, where the epidemic surged early, and a moderate impact in Gauteng, which is currently in the early stage of its surge. The effect would be to lower the epidemic peak, and slightly delay the peak in Gauteng. **Even in the optimistic scenario, however, the effect of cyclical lockdowns is insufficient to prevent hospital bed capacity from being overwhelmed in either province.** In Gauteng, the potential attenuation of compliance with repeated lockdowns (pessimistic scenario) would further reduce the impact of this strategy.

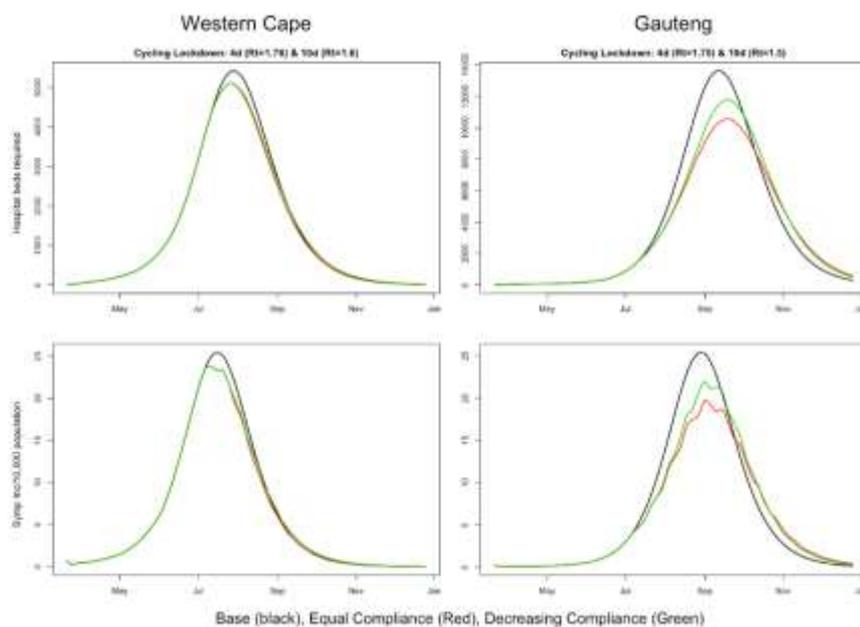


Figure 1. The modelled effect of cyclic lockdown strategies in Western Cape (left) and Gauteng (right). Each panel shows three scenarios: baseline (no cyclic lockdown – black), optimistic (cyclic lockdown with 4 day work periods followed by 10 day lockdown periods – red), and pessimistic (cyclic lockdown with decreasing compliance – green). The top row shows the number of hospital beds required through time under each scenario. The bottom row shows the incidence of symptomatic cases per 10,000 population through time for each scenario.

## Feasibility of implementing cyclic or additional non-cyclic lockdowns in South Africa

The effect of increasing the levels of lockdown or implementing cyclical lockdowns on COVID-19 needs to be carefully balanced against the societal and economic costs. These are briefly addressed below.

### v. *Epidemiology*

Cyclical or stricter lockdowns, whether implemented at a national, provincial or local level, will result in a smaller reduction in transmission compared to the initial Level 5 and 4 lockdowns as the dynamics of the epidemic are now fundamentally different. Furthermore, adherence to cyclical lockdowns is likely to wane with each successive cycle.

Despite cases being largely concentrated in middle-class suburbs, the nationally estimated  $R_T$  increased during the last two weeks of Level 5<sup>4</sup>. Widespread community transmission in informal settlements is now fully established in most areas of South Africa. The structural and economic barriers to effectively implementing restrictions which confine people to houses or shacks in informal settlements are enormous. Reports suggest that people are reluctant to make use of quarantine and isolation facilities. High rates of transmission *within* communities is likely to occur despite increased lockdown restrictions.

Model outputs indicate that cyclical lockdowns will have a moderate effect on hospitalisations in Gauteng and will be insufficient to prevent hospital bed capacity from being overwhelmed. **Breaching hospital bed and oxygen capacity will dramatically increase COVID-19 mortality rates.** Steps to increase hospital bed capacity are urgently required whether or not additional lockdown restrictions are implemented.

Lockdowns, whether cyclical or sustained, cannot be maintained indefinitely. A viable plan for containing viral transmission post-lockdown would be required to justify the economic and societal costs of implementing additional lockdowns. While test, trace and isolate strategies have been variably successful in containing transmission in more developed countries, testing capacity constraints in South Africa are unlikely to be resolved in the next few months. The high numbers of cases, limited testing capacity, structural barriers to effective contact tracing (e.g., 70% of South Africans use taxis to commute), and asymptomatic transmission has likely rendered a test, trace and isolate strategy ineffective in all but the lowest transmission areas of South Africa.

In the absence of viable alternatives, the post-lockdown prevention strategies will therefore have to continue to be centred on current NPI interventions of physical distancing, hand hygiene and masks to decrease transmission. Strengthening the uptake and adherence to these measures is critical.

### vi. *Societal perspective:*

South Africa's high level of inequality poses specific challenges to implementing additional or cyclical lockdowns. Our fragile social contract has come under enormous strain during the lockdown. Additional lockdowns, particularly if targeted at low-income areas, run the risk of triggering widespread insurrection if public support for increased restrictions is not first obtained.

Low-income households bear a disproportionate burden of lockdowns as their fragile income status renders them less able to weather loss of income. Distribution of food parcels was inadequate during the initial Level 5 lockdown despite considerable social mobilisation.

Additional lockdown restrictions will have an even greater impact on food security going forward as households have expended savings and social mobilisation will be muted. If cyclical or additional lockdowns were to be implemented it is imperative that food parcels or cash transfers are distributed at scale. The logistical and economic impediments to achieving this may be insurmountable.

vii. *Health perspective:*

Excess non-COVID mortality has been documented across many countries during lockdowns as a result of decreased access to essential health services. Cyclical lockdowns or increased restrictions are likely to exacerbate the declines in childhood vaccinations, TB, and HIV services.

viii. *Economic perspective*

The SARB and NT Modelling and Forecasting prepared a briefing document on the economic impacts of COVID-19 lockdowns (Appendix 1). The analysis clearly demonstrates that even under the current Level 3 scenario that the impact on GDP and employment is very significant, and unsustainable if it persists. Furthermore, even level 2 restrictions will have significant adverse economic effects. Increasing restrictions to Level 4 or 5 will result in significantly worse economic outlook than that outlined in the briefing document. Opening up the economy after a shut-down is not instantaneous. Since many companies will have gone insolvent, we will start from a significantly lower level of productive activity. The briefing document notes that *“Sudden and frequent stops to operations impose a cost on businesses as has been seen in the case of load-shedding. Constant disruptions to production processes will likely result in significant costs and/or production constraints. These impacts will be far reaching and cut across industries as a result of the increasingly integrated nature of value chains and business linkages in the economy. In addition, the impact of stop-start production will likely disproportionately affect businesses which are cash flow sensitive, particularly SMMEs.”*

## Conclusions

Model outputs indicate that cyclical lockdowns will have a moderate effect on hospitalisations in Gauteng and will be insufficient to prevent hospital bed capacity from being overwhelmed. Despite the dramatically higher mortality associated with breaching general hospital bed capacity and oxygen supplies, the moderate benefit of cyclical lockdowns does not appear to justify the enormous societal and economic costs that would be incurred.

The policy space for government to influence the trajectory of the epidemic through increased lockdown restrictions has significantly narrowed. Going forward prevention interventions should focus on building public trust, and persuading and educating the public through evidence-based communication strategies to adopt NPI to the best of their ability.

Health care service capacity constraints need to be urgently addressed to avoid the high mortality associated with breaching hospital bed capacity.

## Recommendations

6. The moderate benefit of cyclical lockdowns does not appear to justify the enormous societal and economic costs that would be incurred.
7. Rapidly mobilise all health workers in the public and private sectors and military to address staffing constraints in areas where capacity has been or is likely to be breached in the near future. Health workers currently employed in non-essential roles need to be re-assigned to essential services.
8. Preserve health care worker capacity by ensuring continuous supply of high-quality personal protective equipment.
9. Focus on increasing general bed capacity and ensuring oxygen supplies as these will have the greatest impact on mortality.
10. Strengthen preventive measures, particularly social distancing, through community-based interventions.

## References

1. Karin O, Bar-On YM, Milo T, et al. Adaptive cyclic exit strategies from lockdown to suppress COVID-19 and allow economic activity. *medRxiv* 2020: 2020.04.04.20053579.
2. Chowdhury R, Heng K, Shawon MSR, et al. Dynamic interventions to control COVID-19 pandemic: a multivariate prediction modelling study comparing 16 worldwide countries. *Eur J Epidemiol* 2020; **35**(5): 389-99.
3. Menon A, Rajendran NK, Chandrachud A, Setlur G. Modelling and simulation of COVID-19 propagation in a large population with specific reference to India. *medRxiv* 2020: 2020.04.30.20086306.
4. National Institute for Communicable Diseases. The initial and daily covid-19 effective reproductive number (R) in South Africa, 2020. [https://www.nicd.ac.za/wp-content/uploads/2020/06/Initial-and-Daily-COVID-19-Effective-Reproductive-Number-R-in-SA-11\\_6\\_2020.pdf](https://www.nicd.ac.za/wp-content/uploads/2020/06/Initial-and-Daily-COVID-19-Effective-Reproductive-Number-R-in-SA-11_6_2020.pdf)

## Covid-19 lockdowns: Updated view on economic impacts

### *Key findings*

- This note improves on earlier work assessing the economic impact of the Covid-19 pandemic by incorporating the Covid-19 support package and refining underlying assumptions.
- Findings show that the lockdown measures are likely to have a larger impact on annual GDP and employment in 2020 than previously estimated.
  - If lockdown level 3 remains in place in 2020Q3 and 2020Q4, annual GDP and employment is estimated to contract by 16.8% and 12.3%, respectively.
  - If the economy moves to lockdown level 2 in 2020Q3 and lockdown level 1 in 2020Q4, then annual GDP is estimated to decline by 10.9% and employment by 7.8% in 2020.
  - Annual GDP in 2020 is estimated to decline by 8.2% and employment by 6% if the economy moves to lockdown level 1 in 2020Q3 and remains at that level in 2020Q4.
  - We have not updated the analysis for a return to lockdown levels 4 or 5 in 2020Q3 or 2020Q4, however the results would likely be worse than the scenarios presented.
- The fiscal and monetary policy package can reduce the contraction in annual GDP by around 2.4% depending on how effectively these measures support aggregate demand and growth.
- The scenarios suggest a revenue shortfall of between R259 billion and R544 billion.
- Therefore, two policy implications are immediate:
  - First, policy efforts should be directed towards reducing risk aversion, increasing confidence and improving the pass-through of the current support measures to aggregate demand and economic growth.  
Second, government needs to take bold action to stabilise the debt trajectory to avoid an implosion of the public finances.

### *Introduction*

This note expands on earlier work estimating the impact of the Covid-19 lockdown on the economy, by (i) refining the underlying assumptions owing to recent data releases, and (ii) incorporating the government fiscal and monetary policy support measures. South Africa is currently under lockdown level 3, where some sectors of the economy such as, agriculture, mining and manufacturing are allowed to operate at full capacity while others (e.g. construction, tourism, and retail) are still subject to restrictions.

Similar to the previous analysis (Aarndt et al., 2020), we use the multiplier approach to estimate the impact of the national lockdown measures.<sup>1</sup> We distinguish four channels through which the lockdown is expected to impact economic activity, namely (i) the forced reduction in production as a result of a national lockdown and other restrictions on non-essential business operations, (ii) the impact of the lockdown on household demand for goods and services (e.g., tourism as a result of travel and movement restrictions), (iii) the effect of disrupted global production and supply chains on South African exports, and (iv) the effect of uncertainty on business investment.

The impact analysis has adapted as new information became available. Initially, assumptions were based solely on the announced regulations, in absence of hard data on actual activity. The analysis now incorporates (i) data that has come out since the lockdown began, allowing for refinement of the assumptions underpinning the analysis, (ii) evaluates the extent to which the government fiscal (and monetary) policy packages announced in April 2020 will cushion the impact of the Covid-19

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<sup>1</sup> <https://sa-tied.wider.unu.edu/sites/default/files/pdf/SA-TIED-WP-111.pdf>

pandemic on the South African economy, and (iii) assess the likely impact on tax revenue and the fiscal deficit.

*Impacts excluding Covid-19 support package*

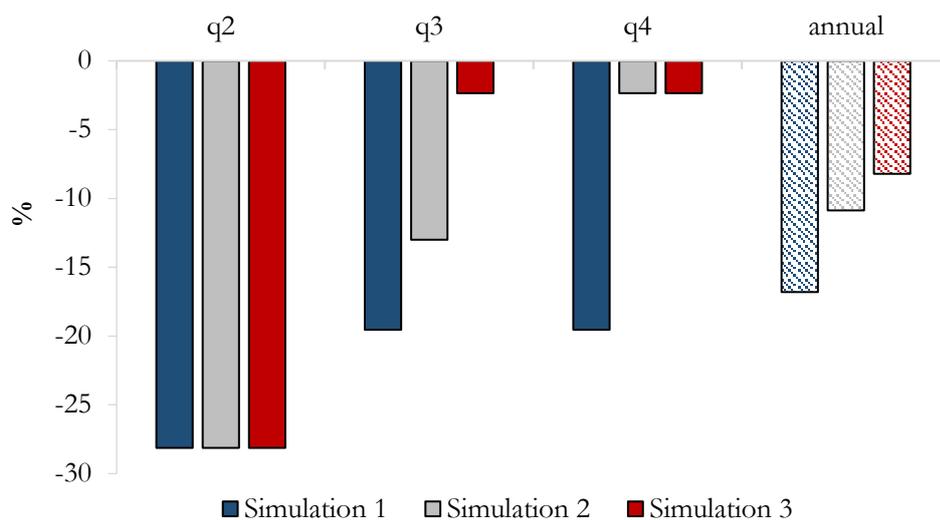
The impact analysis suggests that lockdown measures could lead to a GDP contraction of 28% (seasonally adjusted and annualised) in 2020Q2 relative to 2020Q1. The worst affected sectors, considering both the direct and indirect effects from other sectors, include: construction; personal services; trade, catering and accommodation; transport, storage and communications; manufacturing; and mining.

Further, the outcomes for annual GDP and employment under three simulations were estimated by assuming different lockdown levels in 2020Q3 and 2020Q4:

- **Simulation 1:** lockdown level 3 remains in place in 2020Q3 and 2020Q4;
- **Simulation 2:** lockdown level 2 in 2020Q3 and lockdown level 1 in 2020Q4;
- **Simulation 3:** the economy moves to level 1 in 2020Q3 and remains at that level in 2020Q4.

On an annual basis, GDP is expected to contract by between 16.8% and 8.2% in 2020 depending on the speed with which the economy moves to normalisation (see Figure 1).

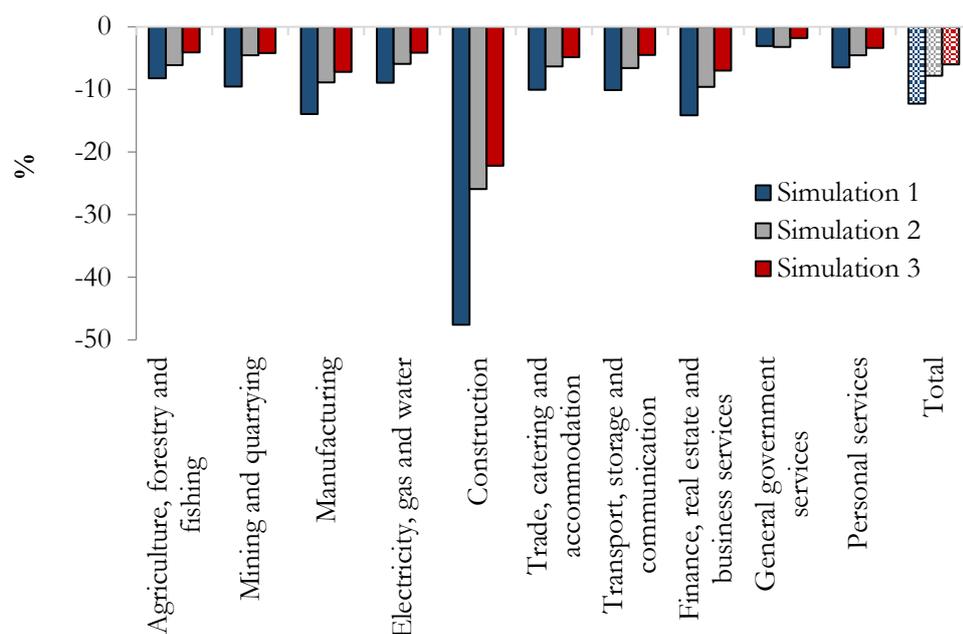
**Figure 1: Annual GDP impacts in 2020**



Source: Authors’ own calculations.

Employment is expected to contract by 12.3% in simulation 1, by 7.8% in simulation 2, and by 6% in simulation 3, respectively by the end of 2020 (see Figure 2). The construction sector is expected to record the largest declines. Under simulation 1 close to 50% of those employed in the sector are projected to lose their jobs. Although not presented in the figure, consideration is also made for employment impacts by income decile. The bottom deciles of the income distribution record smaller declines in their income as government grants are their major income source rather than income from employment.

**Figure 3: Annual employment impacts in 2020**



Source: Authors' own calculations.

*Impacts including Covid-19 support package*

Table 3 below summarises the Covid-19 support package. The total Covid-19 relief packages amounts to more than R930 billion. An assumed government budget support of R130 billion does not increase overall aggregate demand, because the funds are reprioritised from other programmes (or within existing baselines). Therefore an equivalent of R800 billion in net new relief support is incorporated, however it is assumed that only R240 billion of this amount translates into higher aggregate demand in 2020. The multiplier impacts of government spending are lower than may be assumed, as difficulties with disbursements and a higher propensity to save will constrain spending opportunities, particularly for higher income households.

**Table 3: Total Covid-19 Package**

R million	2020/21
Budgetary support (spending)	130,000
Credit guarantee scheme	200,000
Measures for income support (including further tax deferrals, SDL holiday and ETI extension)	70,000
Drawdown on government balance sheet for wage protection (e.g. UIF, Compensation Fund)	40,000
Contingent amount for additional employment and wage support	60,000
Repo rate reduction estimate	80,750
Regulatory relief measures	350,000
Total Covid-19 package	930,750
% of GDP	18.80%

Source: National Treasury and SARB.

The results from the impact assessment indicate that the Covid-19 fiscal and monetary support packages can reduce the contraction in annual GDP by approximately 2.4% depending on how effectively these measures support aggregate demand and growth. The annual contraction in GDP can be reduced further if these packages are implemented more effectively than what we assume. However, the current low take-up of the credit guarantee scheme, for example, supports our modest assumptions on the pass-through of these support measures to growth. Our results suggest

that the current challenge for policymakers is not the size of the current package but how effectively these measures actually transmit to economic growth. While the lockdown restrictions may be eased further, firms and consumers may continue to behave similarly as if the restrictions were still on a higher level due to fear of increasing infections.

Dealing with risk aversion by firms and consumers can increase this transmission to economic growth. A critical step here is addressing the deteriorating fiscal situation, which can reduce risk perceptions and improve confidence amongst firms and consumers. The results, however, indicate further deterioration in the fiscal framework. The scenarios suggest a revenue shortfall of between R259 billion and R544 billion.

In addition, while this analysis has not quantified its impacts, business continuity is critical for many firms in the economy. Sudden and frequent stops to operations impose a cost on businesses as has been seen in the case of load-shedding. Constant disruptions to production processes will likely result in significant costs and/or production constraints. These impacts will be far reaching and cut across industries as a result of the increasingly integrated nature of value chains and business linkages in the economy. In addition, the impact of stop-start production will likely disproportionately affect businesses which are cash flow sensitive, particularly SMMEs.