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Impact of lock-down measures on 2020 GDP growth in South Africa: A production-side approach

Kgotso Morema and Theo Janse van Rensburg

Abstract

This Economic Note quantifies the direct impact of the 35 days lock-down implemented by the South African government in response to curbing the spread of the Covid-19. The results suggest that the lock-down will directly lead to a loss in 2020 GDP of R123.4 billion in constant prices (which is roughly R203.6 billion in current prices). This implies a deviation from the baseline (no lock-down scenario) of about 3.9 percentage points (pp) on annual 2020 growth. To generalise our results, our analysis suggests that the economy will lose R4.7 billion in real terms per day (R7.7 billion in nominal terms) due to the lock-down (assuming the current lock-down rules do not change). If the government implements stricter rules (e.g. a complete shut-down), then the impact would be even more severe, with the economy losing about R10.2 billion on real GDP per day (R16.8 billion in nominal terms).

1. Introduction¹

The Coronavirus (COVID-19) pandemic has taken the world by storm, spreading rapidly with over 2 million cases confirmed globally and 200 thousand fatalities as of 26 April 2020². In response to the virus, governments across the globe (South Africa, Italy, France, China, India and other countries) have taken strict measures of social distancing in order to contain the spread of the virus and ultimately flatten the curve. These measures include travel restrictions (including border closures), individuals staying at home, and businesses stopping their operations (unless deemed essential). However, these measures are likely to have a significant negative impact on economic growth as large parts of the economy will not be functioning.

This note aims to quantify the impact (particularly the direct impact³) of the 35 days lock-down (implemented by the government) on SA's GDP growth. We assess each sector's output (from the production side), as this will allow us to account for sector-specific characteristics. The estimates from this method are then used to guide the QPM's forecast for GDP and potential GDP. Our results suggest that the 35-days lock-down will directly lead to a loss in GDP of R123.4 billion in constant prices (which is roughly R203.6 billion in current prices) in 2020. This implies a deviation from the baseline (no lock-down scenario) of about 3.9 percentage points (pp) on annual 2020 growth. Given the severe impact of the lock-down on GDP coupled with the impact of load-shedding (estimated to be 0.5 pp⁴ in 2020), a global recession, other indirect effects of the lock-down/Covid-19, and credit rating downgrade(s), SA is likely to enter a deep recession this year. In the April MPC baseline forecast, GDP growth is expected to register -

¹ Many thanks to Pamela Mjandana for her valuable comments and suggestions.

² <https://coronavirus.jhu.edu/map.html>

³ Direct impact means the impact of businesses not operating for 35 days (lost production that would have probably taken place there was no lock-down).

⁴ This was estimated pre-Covid-19, therefore it might be lower now given the fact that there hasn't been any load shedding thus far.

6.1% in 2020, outweighing the significant contraction experienced during the 2009 Global Financial Crises (GFC).

2. Method and assumptions

To estimate the direct impact of the lock-down on GDP, we employ a similar method by Morema, Rakgalakane, Mjandana and Alton (2019)⁵, with some modifications. Firstly, we calculate the gross value added (GVA) per day using equation (1) below;

$$GVA \text{ per day} = Total \text{ GVA} / No. of \text{ Working days} \quad (1)$$

We use 2019 GVA figures as total GVA and the number of working days varies for each sector. We assume operations in mining, trade, transport and electricity sector takes place every day (for 365 days). However, other sectors do not operate during weekends and holidays, so they operate for approximately 250 days in a year. With this information, we can now estimate the total GVA lost by each sector due to the lock-down as

$$GVA \text{ lost}_{Shutdown} = GVA \text{ per day} * No. of \text{ lockdown days} \quad (2)$$

The number of lock-down days varies across sectors depending on working days. Although there is a 35 days lock-down, sectors that do not work on weekends and holidays will only be affected for 22 days and not 35 (because there are 10 ‘weekend days’+ 3 holidays as Easter and freedom day falls within this lock-down). Therefore those working for 365 days will be affected by the full 35 days while those that do not usually operate during weekends and will only be affected for 22 days (as they wouldn’t be operating during weekends and holidays even if lock-down didn’t exist).

Equation 2 estimates the GVA lost if the economy is completely shut-down for a certain number of days. However, during the 35-days lock-down, production does not entirely stop in some sectors as essential production/services is allowed to continue operating. The businesses affected are those that are not regarded as providing essential production/services. For example, most of agricultural sector’s operations will continue with its operations as it is key in the food chain, however a large part of the construction sector’s operations will halt entirely as it is not necessarily deemed an ‘essential’. Therefore, it is crucial to account for the fact that in each sector, some sub-sectors are deemed essential (some operations continue) and others are non-essential. To do so, we use equation 3 below;

$$GVA \text{ lost}_{Lockdown} = GVA \text{ lost}_{Shutdown} * \% \text{ of production that is not operating during lockdown} \quad (3)$$

The *% of production that is not operating during lockdown* is an informed assumption for each sector using a more disaggregated data set from Statistics SA to distinguish between essential and non-essential production. For more information regarding our assumptions, refer to table 1 and appendix 1a. Aggregating the GVA lost per sector will then result in the overall impact on GDP lost.

It is clear that production capacity might take time to recover back to normal⁶ after the lock-down. This is one of the indirect effects of the lock-down and it’s not captured in our methodology as the aim is to mainly estimate the direct impact of the 35 days lock-down. Once we include the “direct” effects in the QPM or Core model, the indirect effects can then be captured via the model’s multipliers and linkages as well as expert’s judgement. A CGE model can also be used to understand some of the indirect effects as it is able to capture the spill-over effects from one sector to the other (e.g. no production in mining or manufacturing will result in weak electricity demand from one of the biggest users).

⁵ Morema, Rakgalakane, Mjandana & Alton, ‘A novel supply-side approach to estimating the impact of load shedding on GDP growth in South Africa’, South African Reserve Bank Economic Note No. 2019/12, April 2019.

⁶ Normal means pre-lock-down

Table 1: Assumptions made for each sector

	Agriculture, forestry & fishing	Mining & quarrying	Manufacturing	Electricity, gas & water	Construction	Trade, catering & accommodation	Transport, storage & communication	Finance, real estate & business services	General government & personal services
2019 GVA (no lock-down)	69,049	226,154	383,831	64,619	104,150	431,720	272,179	655,040	658,806
No. of working days	250	365	250	365	250	365	365	250	250
Average GVA per day	276	620	1,535	177	417	1,183	746	2,620	2,635
% of production is not operating during lock-down	20%	70%	70%	20%	90%	60%	55%	40%	20%
GVA lost per day during lock-down	-55.2	-433.7	-1,074.7	-35.4	-374.9	-709.7	-410.1	-1,048.1	-527.0
Number of workdays lost during lock-down	22	35	22	35	22	35	35	22	22

Source: Author, Statistics SA

3. Results

Using our methodology as discussed above, we find that a total of approximately R123.4 billion in real GDP (R203.6 billion in nominal terms) will be lost in 2020 due to a pause in operations for 35 days (see Table 2)⁷. This would shave-off about 3.9 pp from the annual GDP growth number. All sectors are expected to be negatively affected by the lock-down, with the biggest losers being the most labour intensive sectors (such as construction, mining and manufacturing) and those that are not exempt from the lock-down. The least affected sector is agriculture, forestry and fishing (about 2.2% of GDP) as most of the operations in the sector are deemed essential for domestic food security. See Table 2 and Figure 1 below.

If Government implemented very strict rules such as a 35-days total shut-down, whereby all operations stop completely, then the impact would be even more severe. We estimate the impact would be approximately R260 billion in real GDP (R429 billion in nominal terms) in 2020 (see Table 2). This is more than double the impact of the current 35 days lock-down. This loss in GDP due to a shut-down implies that a 35 days total shut-down of the economy would shave-off about 12.3 pp from the annual 2020 GDP growth figure. In this scenario, all sectors will be negatively affected with the biggest negative contribution to GDP coming from the large producers/service providers. Therefore, as much as the current lock-down has a severe impact on economic growth, stricter rules (such as a total shut-down) than what was announced by the government would have an even more severe impact on GDP.

⁷ To get an estimate of GDP at market prices lost we have to add taxes and subtract subsidies for which we do not have an estimate.

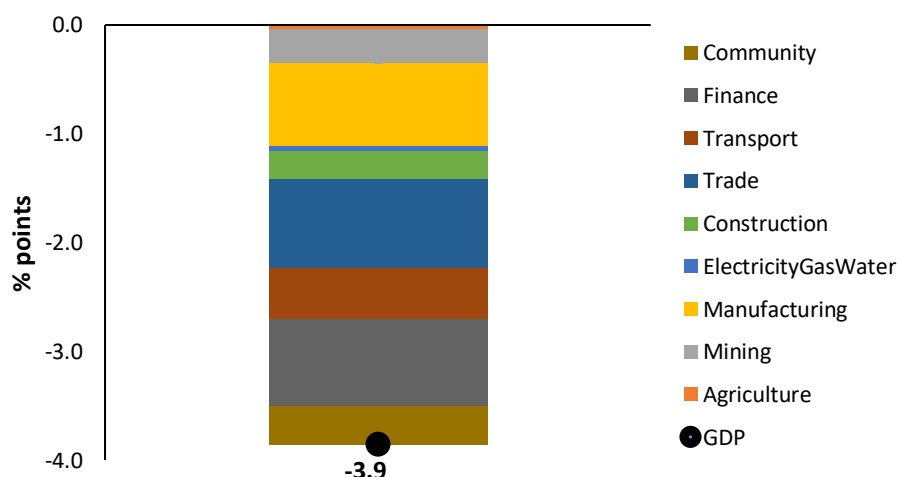
Table 2: Direct impact estimate on each sector and on aggregate GDP*

	35 days lock-down impact			35 days Shut-down impact		
Industry	Nominal GVA lost (R Billion ⁸)	Real GVA lost (R Billion)	2020 impact	Nominal GVA lost (R Billion)	Real GVA lost (R Billion)	2020 impact
Primary sector:	-27.1	-16.4	-3.5	-45.8	-27.8	-14.6
Agriculture	-2.0	-1.2	-1.6	-10.0	-6.1	-9.8
Mining and quarrying	-25.0	-15.2	-4.1	-35.8	-21.7	-16.0
Secondary sector:	-54.7	-33.1	-5.9	-81.1	-49.1	-14.7
Manufacturing	-39.0	-23.6	-6.1	-55.7	-33.8	-14.8
Electricity, gas and water	-2.0	-1.2	-1.9	-10.2	-6.2	-11.3
Construction	-13.6	-8.2	-7.7	-15.1	-9.2	-16.2
Tertiary sector:	-121.8	-73.8	-3.6	-302.1	-183.1	-13.8
Trade sector	-41.0	-24.8	-5.8	-68.3	-41.4	-16.2
Transport and storage	-23.7	-14.4	-5.3	-43.1	-26.1	-14.8
Financial sector	-38.0	-23.1	-3.6	-95.1	-57.6	-14.8
Community sector	-19.1	-11.6	-1.5	-95.7	-58.0	-10.7
Gross value added (basic prices)	-203.6	-123.4	-3.9	-429.0	-260.0	-12.2
Taxes on products	0.0	0.0	0.0	0.0	0.0	0.0
Subsidies on products	0.0	0.0	0.0	0.0	0.0	0.0
GDP at market prices	-203.6	-123.4	-3.9	-429.0	-260.0	-12.2

* The table shows annual impacts in percentage points unless stated otherwise.

Source: Author's calculations

Figure 1: Direct impact of the 35 days shutdown on 2020 growth



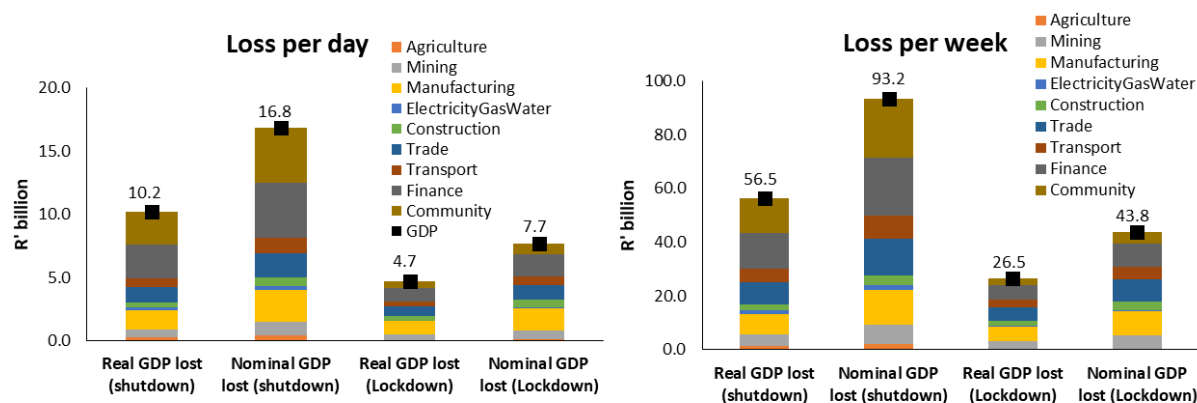
Source: Author's calculations

We generalise our results to show the impact of the lock-down or complete shut-down (given the current lock-down rules) on GDP growth per day/week. Our results suggest that the economy will lose approximately R4.7 billion in real terms per day (R7.7 billion in nominal terms) due to the lock-down (assuming current rules do not change). On a weekly basis, estimated GVA lost is approximately R26.5 billion in real terms (which is R43.8 billion in nominal terms). If we were to assume that the government

⁸ We use a GDP deflator of 1.65 to covert real values to nominal (real GDP*GDP deflator).

implements stricter rules (like a complete shut-down), then the impact will be even more severe. Shaving off about R10.2 billion on GDP per day in real terms (R16.8 billion in nominal terms) and R56.5 billion on real GDP per week (R93.2 billion in nominal terms) and R56.5 billion on real GDP per week (R93.2 billion in nominal terms).

Figure 2: Generalising the results: GDP lost per day ⁹and per week



Source: Author's calculations

4. Conclusion

The necessary strict measures taken by the SA government to reduce the spread of Covid-19 are likely to cause severe disruptions to economic activity. In this note, we estimated the impact of the 35-days lockdown in SA on 2020 GDP growth from a production side approach. Our assessment suggests that the direct impact of the lock-down on GDP is about 3.9 pp on annual 2020 figure. In level terms, the loss in real GDP is estimated to be R123.4 billion (R203.6 billion in current prices). If the lock-down is extended/ indefinite (e.g. lockdown with eased rules post the 35 days) or the rules of the lock-down become stricter (such as a complete shut-down), then the impact could be even more negative. Fiscal and monetary stimulus measure introduced will likely soften the negative impact of the 35 days lockdown/Covid-19. One major limitation with our study is the fact that it doesn't take into account for some of the positive effect the lock-down will have on a particular sectors such as communication services.

⁹ The loss/per on a weekend or holiday differs due to the fact that some sectors might not be operating. During the weekend or holiday, real GDP lost per day is estimated to be R1.6 billion (R2.6 billion in nominal terms) under a lock-down (with similar rule introduced during the 35 days national lock-down). During a complete shut-down, real GDP lost per day is estimated to be R2.7 billion (R4.5 billion in nominal terms)

Appendix 1a: Assumption on percentage of production that is not operating during lock-down

Distinguishing between essential production/services and non-essentials will help us with the assumption of the percentage of restricted operations. We make use of a more disaggregated GDP dataset with individual sub-sectors based on 2017 data as a guide to our assumptions. We also cross check our assumption with the results from Stats-SA's Business impact survey of the COVID-19 pandemic in South Africa¹⁰ which shows trading status of businesses¹¹.

Primary sector

Agriculture, forestry and fishing sector is probably one of the least affected industry by the lock-down as all the subsectors are deemed essential. Agriculture and fishing is crucial for domestic food security. Forestry sector will also continue to operate as it plays a crucial role in the production of essential products (such as toilet paper and personal hygiene products). Despite most operations in the sector deemed essential, some activities might be limited (see figure 3b). Hence we assume 20% of production will not operate in the sector.

Unlike the agricultural sector, mining is likely to be one of the hardest hit sectors due to its labour-intensive nature. During the 35 days lock-down, selected mining activities are allowed to continue to operate but at a reduced scale. We assume about 30 percent of these operations will continue during the lock-down, while 70% will stop entirely. This assumption is somewhat in line with Stats-SA's trading status of businesses survey, we notice that a large number of mines have reported that operations have paused or are limited.

Secondary sector

Under manufacturing, food & non-alcoholic beverage and petroleum products & chemicals plants (combined, account for about 40% of the total) are classified as essentials hence operations are allowed to continue while all other plants close down. Despite 40% being deemed essential, in our assumption we allow for the fact that even those that are operating will not operate at full capacity hence we assume about 70% production will not be operating during the lock-down. This is also in line with Stats-SA's survey results shown in Figure 3b.

Most production/services in the electricity, gas and water sector is exempted from the lock-down. However, some operations in noncore activities might be limited, hence we assume 20% of the sector will not be operating during lock-down. As shown in Stats-SA's survey results, some businesses in the sector have indicated a permanent halt in their operations.

Construction projects will stall as most operations in the sector are deemed non-essentials. Some operations such as maintenance and repairs of essential services (such as power/water infrastructure) will likely continue operation. But probably makes up a small portion of the sector, hence we assume about 90% of production will halt during this period.

Tertiary Sector

Trade, catering and accommodation category has a number of subsectors that are deemed essentials, such as those that provide food and pharmaceuticals products. Under Retail sales, about 48.8% (of total retail sales) is deemed essential, and wholesales essentials makes up roughly 48.3% (of total wholesale). Vehicle sales operations are not deemed essential, and restaurants are also restricted from operating. Activity in some accommodations will likely continue for essential purposes such as providing a place for persons under quarantine. Nevertheless, we make assumptions on each subsector on the percentage of production

¹⁰ Statistics South Africa, Business impact survey of the COVID-19 pandemic in South Africa, April 2020 (<http://www.statssa.gov.za/publications/Report-00-80-01/Report-00-80-01April2020.pdf>).

¹¹ Note that the survey results are not only due to the lock-down but Covid-19 impacts as well, so the results should be interpreted with caution. The survey results consists of 707 businesses' responses.

that will operate or will halt. We then aggregate these using their shares on the total, which resulted in roughly 60% of production/service not operating.

Transport and communications are both essentials to a limited extent though. Transport sector is crucial for transporting essential workers, sick people for medical attention and goods such as food and pharmaceuticals. Communications sector is useful to ensure some operations that can be done remotely continues. However, given the fact that operations in the transport sector will be limited (as transporting passenger and non-essential goods is restricted), we assume 55% of production in the sector will not be operating.

Under the finance, real estate and business services industry, some operations by banks and insurance companies will likely continue but partially. Most of the operations are likely to be done remotely. However, for banks, activities in physical branches will be limited (some will be closed). Real estate and other business services' operations will also be limited as employees will be working from home without all the necessary resources provided at the work place. Hence we assume 40% of production will not be active during the lock-down.

A more disaggregated breakdown of various services' in the overall general government and personal services industry category is not available, therefore it is difficult to distinguish between essentials and non-essentials. Services deemed to be essentials in this category includes medical care, securities and others. However, there are also non-essential services such as hair salons, gyms, recreation activities and others, whereby operations will halt.

Figure 3: Assumption on Operating vs Non-operating and Trading status of businesses survey¹²

Figure 3a: Assumption on Operating vs Non-operating

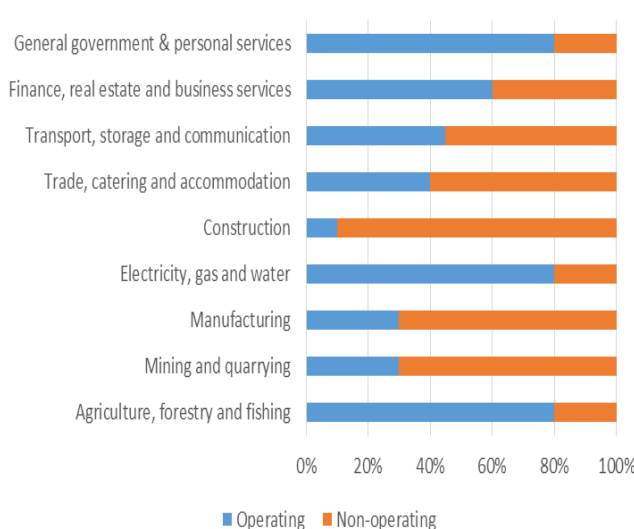
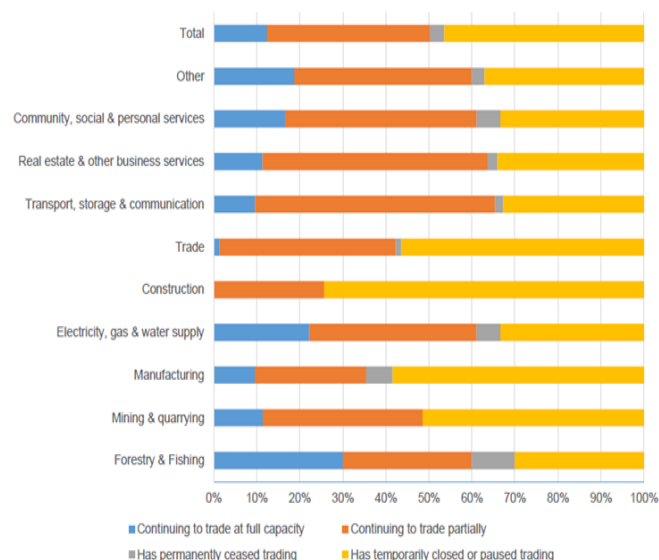


Figure 3b: Trading status of businesses survey



Source: Author, Statistics SA

¹² Statistics South Africa, Business impact survey of the COVID-19 pandemic in South Africa, April 2020