

Life Under Lockdown:
Illustrating Tradeoffs in South Africa’s Response to COVID-19
Online Appendix

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A1. DATA DESCRIPTION

Table A1. Data Description

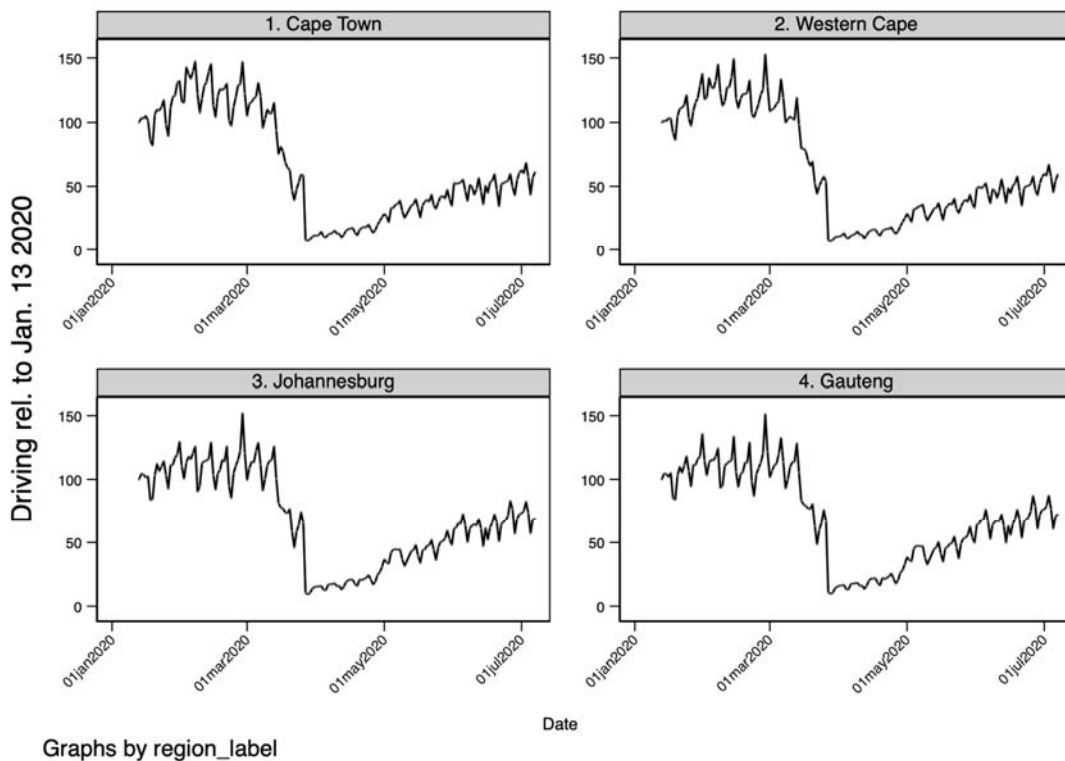
Variable	Description	Source
Stringency Index	Captures variation in containment and closure policies, including school closings, workplace closings, cancellation of public events, restrictions on gathering size, closures of public transport, stay at home requirements, and restrictions on internal movement.	Hale et al. (2020)
Google COVID-19 Community Mobility Reports	Reports use aggregated, anonymized data to chart movement trends over time by geography. The data shows how visitors to (or time spent in) categorized places change compared to our baseline days. A baseline day represents a normal value for that day of the week. The baseline day is the median value from the 5-week period Jan 3 – Feb 6, 2020.	https://www.google.com/covid19/mobility/
Population	Mid-year population estimates for South Africa, 2019	Statistics South Africa (2019)
Population Density	Calculated by dividing 2019 provincial population by area of province in square km.	Province area from: https://www.southafricanmi.com/sa-by-numbers.html
Contribution to GDP	Contribution various provinces make to South Africa's total GDP (as at end 2017)	https://www.southafricanmi.com/provincial-gdp-11mar2019.html
% in Poverty	Multidimensional Poverty Headcount (%)	Statistics South Africa (2016)
% Agricultural Households	The proportion of households engaged in agricultural activities.	Statistics South Africa (2011)
Confirmed Cases	We calculate total confirmed cases based on reports in press releases issued by the Department of Health. For days when no case count is given, we simply use the previous reported day's caseload. This mostly affects figures in early-mid March before reporting was standardized.	https://sacoronavirus.co.za/category/press-releases-and-notice/

A2. ANALYSIS OF APPLE MOBILITY TRENDS REPORTS

We supplement our analysis of the Google COVID-19 Community Mobility Reports with Mobility Trends Reports published by Apple Maps (<https://www.apple.com/covid19/mobility>). These reports present data on the relative volume of directions requests per country/region, sub-region or city compared to a baseline volume on January 13th, 2020. Higher proportions indicate smaller mobility reductions.

In addition to being available at the country and province level, these reports are available for the cities of Johannesburg and Cape Town, allowing us to compare trends in these cities to the greater provinces. Note that these reports are available for both driving and walking for the two cities and South Africa as a whole; and for driving only at the greater province level. Figure A1 depicts city/province comparisons for driving trends over the same period considered in the manuscript (February 14-May 15, 2020; see Figure 4).

Figure A1. Mobility Trends (Driving) by City and Province



We see that the city-level trends appear to mirror the province-level trends. In order to confirm this and relate to the analysis presented in the paper, we also calculate average mobility reductions for the most stringent lockdown period (27 March-30 April 2020). These are depicted in Table A2 below.

Table A2. Average Mobility Reductions, Driving and Walking: March 27-April 30, 2020

Geographic Unit	Driving Requests (as % of baseline)	Walking requests (as % of baseline)
Cape Town	14.4%	14.5%
Johannesburg	17.8%	23.0%
South Africa	18.4%	21.1%
Eastern Cape	20.8%	
Free State	22.3%	
Gauteng	18.5%	
KwaZulu-Natal	23.5%	
Limpopo	32.8%	
Mpumalanga	27.2%	
North West	21.8%	
Northern Cape	24.9%	
Western Cape	13.5%	

As with our analysis of the Google Mobility Reports, Western Cape and Gauteng exhibit the largest mobility reduction (fewer directions requests compared to baseline, suggesting people are moving around less), and Limpopo and Mpumalanga province the smallest (a higher proportion of directions requests in comparison to the baseline, indicating less of a change in mobility).

We also see that the city-level mobility changes mirror the province level for Cape Town/Western Cape and Johannesburg/Gauteng, confirming the results suggested by the figures above. It is notable that in Cape Town, driving requests and walking requests are on par with each other whereas in Johannesburg the lockdown appeared to have a greater impact on people's driving habits compared to walking. This may be due to the fact that Cape Town and Western Cape are mostly tourist areas and thus when the lockdown instructions and impact of the disease set in, both driving and walking habits were similarly affected. On the other hand, the driving and walking populations of Johannesburg and Gauteng tend to be distinct. Most of the drivers are wealthier, while the walkers tend to be poorer. When the lockdown instructions set in, it was easier to enforce compliance with driving (using the existing traffic enforcement framework), while it was more difficult to enforce walking restrictions (due to the lack of a coherent enforcement framework and insufficient resources).

A3. ADDITIONAL PROVINCIAL MOBILITY TRENDS

All figures in this section depict mobility trends from February 14-May 16, 2020, using data from Google Mobility Reports

Figure A2. Mobility Trends by Province (Transit Stations)

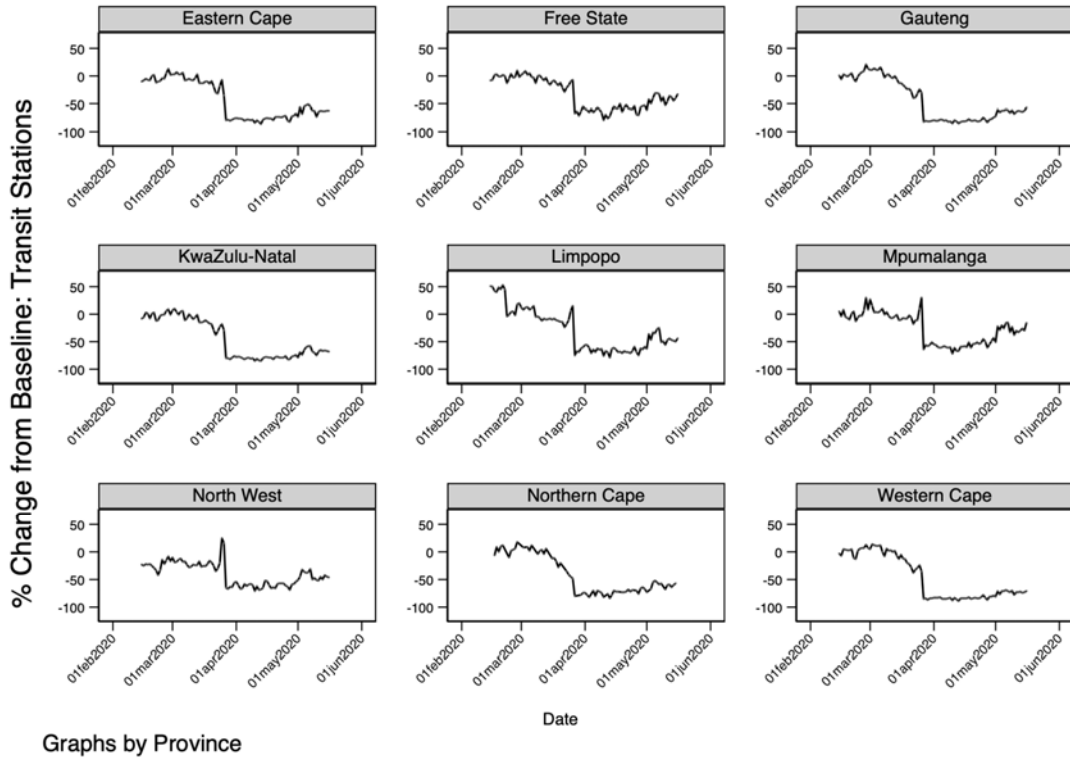


Figure A3. Mobility Trends by Province (Workplace)

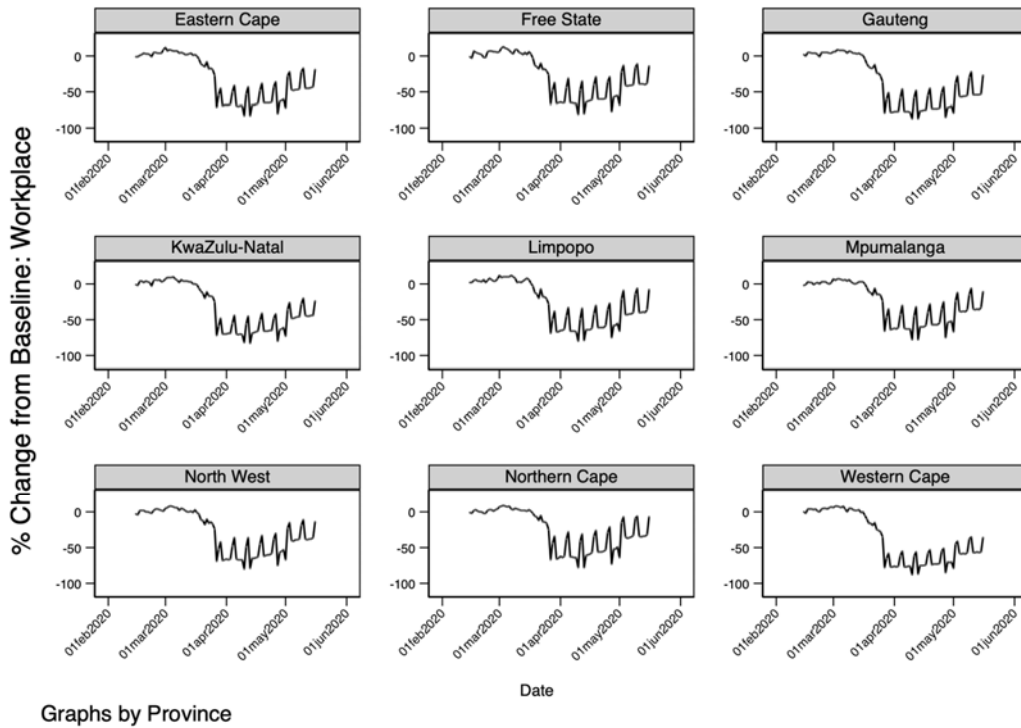
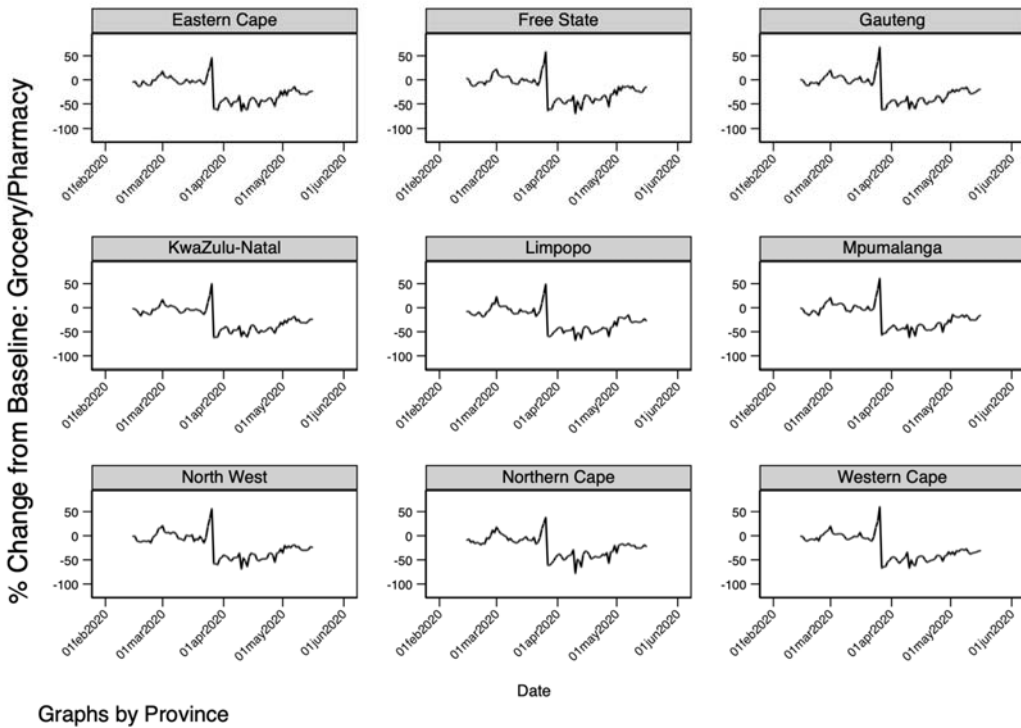


Figure A4. Mobility Trends by Province (Grocery/Pharmacy)



A4. DETAILS OF QUALITATIVE COMPARATIVE ANALYSIS

In order to conduct crisp qualitative comparative analysis (QCA) we begin by creating sets -- dichotomizing the variables of interest to designate membership within a given set. The sets are defined as follows:

- M = large average mobility decrease (defined alternatively as provinces in the top quintile of the distribution and provinces in the top two quintiles)
- I = 100 or more confirmed infections as at March 26, 2020 (start of lockdown)
- D = densely populated provinces, i.e. those with an average of 100 people or more per km sq.
- G = Provinces whose contribution to national GDP is greater than 10%
- P = Provinces with a multidimensional poverty rate greater than 10%
- A = Provinces with a proportion of agricultural households exceeding 25%

We have reproduced a crisp set version of the relevant data in Table A2 as a data matrix.

Table A3. Data Matrix for Qualitative Comparative Analysis

Province	M	M _{alt}	I	D	G	P	A
Eastern Cape	0	1	0	0	0	1	1
Free State	0	0	0	0	0	0	0
Gauteng	1	1	1	1	1	0	0
Kwazulu-Natal	0	1	1	1	1	0	1
Limpopo	0	0	0	0	0	1	1
Mpumalanga	0	0	0	0	0	0	0
North West	0	0	0	0	0	0	0
Northern Cape	0	0	0	0	0	0	0
Western Cape	1	1	1	0	1	0	0

We see that for either definition of M, the set also contains members of I and G -- that is, provinces with at least 100 confirmed cases pre-lockdown and those that contribute significantly to national GDP.

A5. ADDITIONAL TABLES

Table A4. Correlation Matrix: Mobility Measures

	Retail/ Recreation	Grocery/ Pharmacy	Parks	Transit Stations	Workplaces	Residential
Retail/ Recreation	1.000					
Grocery/ Pharmacy	0.940***	1.000				
Parks	0.717***	0.624***	1.000			
Transit Stations	0.928***	0.833***	0.711***	1.000		
Workplaces	0.894***	0.796***	0.623***	0.898***	1.000	
Residential	-0.927***	-0.839***	-0.652***	-0.909***	-0.979***	1.000

Table A5. Covid-19 Caseload as Predictor of Average Mobility Reductions

	(1)	(2)	(3)	(4)	(5)	(6)
Total Cases	0.01**	-0.00				
	(0.01)	(0.00)				
Time trend		0.27***		0.26***		0.29***
		(0.02)		(0.02)		(0.03)
L7.Total Cases			0.02**	-0.00		
			(0.01)	(0.00)		
L14.Total Cases					0.03***	-0.01
					(0.01)	(0.01)
Observations	764	764	757	757	694	694
R ²	0.103	0.570	0.121	0.565	0.103	0.523

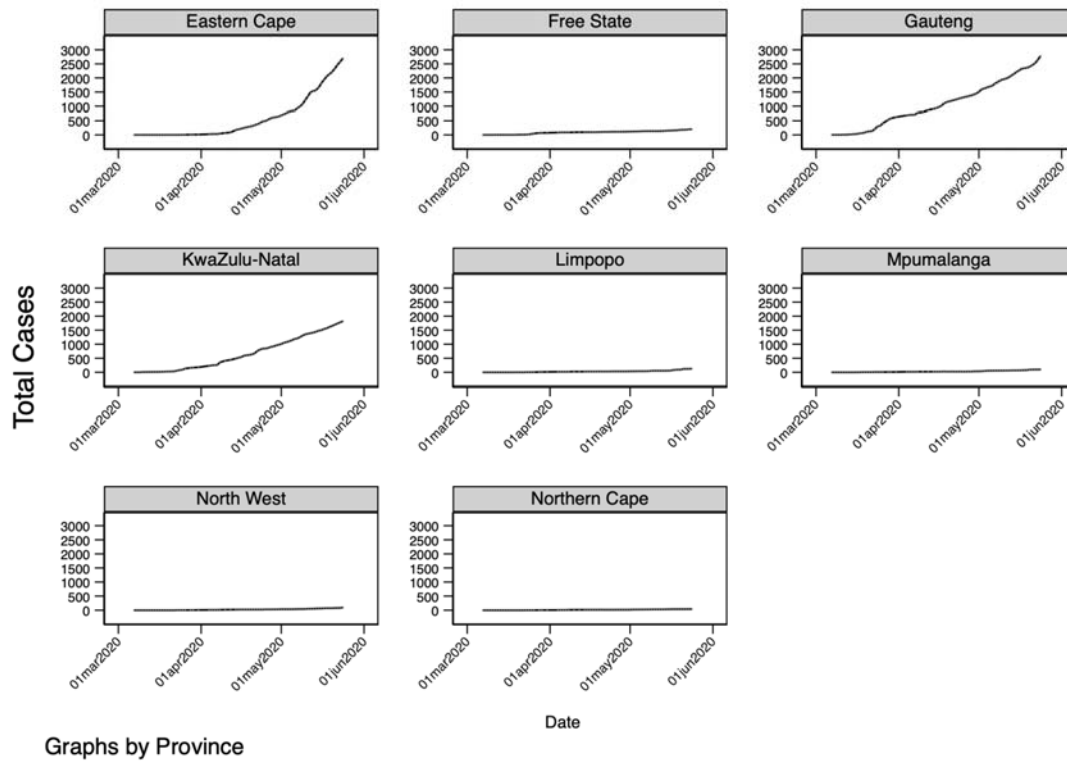
Standard errors in parentheses

The dependent variable is the average weekly reduction in mobility to workplaces, retail and recreation, and transit stations. All models include province fixed effects and robust standard errors clustered by province.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A6. ADDITIONAL FIGURES

**Figure A5. Confirmed Cases by Province, March 1-May 24, 2020
(excluding Western Cape)**



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