Modelling the impact of COVID-19 on the South African Economy

Sherwin Gabriel
Ex ante analysis of COVID-19 and lockdown

• SAM multiplier framework
  • Suddenness of pandemic makes it reasonable to assume no immediate changes in production method/technology
  • Drop in supply and demand are too severe and temporary for the market to find new and stable equilibrium price
  • Shocks work through quantity adjustments, not prices

• ‘First pass’ estimates of the economic costs of L5 lockdown
  • Scenario informed by gazetted regulations for the initial three-week lockdown
  • Investment and export demand also affected, so these matched to macro-level assumptions
**Ex ante analysis of COVID-19 and lockdown**

### Four main mechanisms

1. Closing non-essential industries
2. Movement restrictions/stay-at-home measures
3. Decline in investment projects and activity
4. Interruptions in global trade

#### Investment demand falls by 60-80 per cent

#### Non-agriculture export demand falls by 40-75 per cent

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<table>
<thead>
<tr>
<th>Mild decline (0 to -10%)</th>
<th>Moderate decline (-10% to -30%)</th>
<th>Large decline (-30% to -60%)</th>
<th>Severe decline (Larger than -60%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry, fishing</td>
<td>Mining and quarrying</td>
<td>Food and non-alcoholic beverages</td>
<td>Alcoholic beverages and tobacco</td>
</tr>
<tr>
<td>Textiles, clothing, leather and footwear</td>
<td>Oil</td>
<td>Paper, paper products</td>
<td>Wood, wood products</td>
</tr>
<tr>
<td>Pharmaceutical, hygiene and cleaning</td>
<td>Petroleum</td>
<td>Basic chemicals, fertilizer, paint, other</td>
<td>Wood, wood products</td>
</tr>
<tr>
<td>Plastic, glass</td>
<td>Steel</td>
<td>Non-metallic minerals and products (cement, concrete, etc.)</td>
<td>Iron, steel, metal products</td>
</tr>
<tr>
<td>Electricity, gas, water</td>
<td>Wholesale, retail trade, Construction</td>
<td>Rent, leasing, services of other support services</td>
<td>Machinery and equipment</td>
</tr>
<tr>
<td>Communication</td>
<td>Transport and storage</td>
<td>Real estate, legal and accounting, other support services</td>
<td></td>
</tr>
<tr>
<td>Finance and insurance, computing services</td>
<td>Education services</td>
<td>Real estate, legal and accounting, other support services</td>
<td></td>
</tr>
<tr>
<td>Health services</td>
<td>Recreation, other community services</td>
<td>Education services</td>
<td></td>
</tr>
</tbody>
</table>
Some key findings

Indirect effects are critical
Sectors not shut down inevitably suffered from low demand

Substantial loss of GDP
GDP estimated to fall by 34 per cent compared with a no-COVID, no-lockdown situation

Construction, trade, and informal sector hit hard
Not necessarily large contributors to GDP, but very important for employment

Cuts in sectoral value added are deep, but also varied
Production data suggested that many impacts came to pass

- Multiplier models are not forecasting tools in themselves, but can help inform forecasters
  - Multiplier models are used to analyse specific shocks and policy scenarios, stripping away other factors that could influence economic performance
  - Other events also influencing the economy (e.g. sovereign rating downgrade in March 2020), but pandemic and lockdown dominates

<table>
<thead>
<tr>
<th></th>
<th>April 2020 (y/y % change)</th>
<th>Arndt et al. (2020) (% deviation from base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining production</td>
<td>-50.9%</td>
<td>-41.4%</td>
</tr>
<tr>
<td>Manufacturing production</td>
<td>-48.7%</td>
<td>-46.8%</td>
</tr>
<tr>
<td>Volume of electricity distributed</td>
<td>-23.2%</td>
<td>-23.2%</td>
</tr>
<tr>
<td>Real retail trade sales</td>
<td>-49.9%</td>
<td>-48.6%</td>
</tr>
<tr>
<td>Real wholesale trade sales</td>
<td>-42.0%</td>
<td>-48.6%</td>
</tr>
</tbody>
</table>
Some key findings

Sharp, unexpected loss of income brings high risk of food insecurity…

Workers with lower levels of education harder hit. Most of these workers are in the bottom 50% of households.

Government grants help to blunt, but not offset, income shocks. Transfers from govt represent 40-70% of these households’ incomes.

Modelled scenarios did not include the change in transfers (TERS, SRD, existing grants) The grant system, although not designed to deal with pandemic, was able to offer some resilience.
Some key findings

- **30-50% of spending is on food**

- Poor households especially sensitive to pandemic and economic risks

- Poorest quintile least ready for lockdown, and most vulnerable to infection

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**Share of consumption on agriculture, food, and non-alcoholic beverages**

<table>
<thead>
<tr>
<th>Decile</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Source: Own calculations based on 2015 SAM for South Africa (van Seventer et al., 2019)

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**Lockdown readiness**

- Q1: Fully ready (10)
- Q2: 5
- Q3: 3
- Q4: 2
- Q5: 1

**Vulnerability index**

- Q1: Vulnerability index (1)
- Q2: 2
- Q3: 3
- Q4: 4
- Q5: 5

Source: Shifa, David, and Leibbrandt (2020)
• Analysed three speculative recovery scenarios
• Outlook for the pandemic and economic response, domestically and globally were extremely uncertain
• Forecasting projections had a very wide range
• Very little data for the start of 2020, but also on the pandemic’s impact thus far
• Based on the detail of the SAM, implicit assumptions of the model, and explicit assumptions about lockdown, how could the realm of possibilities look?

<table>
<thead>
<tr>
<th>Recovery scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>y/y % change in 2020</strong></td>
</tr>
<tr>
<td>Private consumption expenditure</td>
</tr>
<tr>
<td>Government expenditure</td>
</tr>
<tr>
<td>Fixed investment</td>
</tr>
<tr>
<td>Exports</td>
</tr>
<tr>
<td>Imports</td>
</tr>
<tr>
<td>GDP at market prices</td>
</tr>
</tbody>
</table>

**Quick**: Faster easing and recovery; lockdown effective in containing pandemic and people can quickly return to work with social distancing and partial lockdowns.

**Slow**: Lockdown extended, with gradual easing and recovery. Some firms shut down, impairing productive capacity.

**Long**: Lockdown difficult to extend due to of difficult social and economic consequences. Health crisis pressured by increased caseload. Gradual and slow recovery.
An uneven recovery

GDP fell more than employment, but recovered faster
A year later, a large gap still exists between what the economy can produce/employ now, and with it could in 2019

- Autonomous recovery as restrictions are loosened
- Income support at the lower end provides some stimulus, preventing a worse outcome than could have occurred
- But many workers, households and firms left behind because of remaining restrictions on contact-intensive activity, and low demand

Employment elasticity likely below 1
Proportionately smaller improvement in jobs than growth
An uneven recovery

Many sectors have recovered to close to 2019 levels
Although some industries still very weak

Consumption and exports have bounced back
But not investment which, alongside very weak employment numbers, can reduce SA's growth potential

Source: Statistics South Africa
Some concluding remarks

1. The usefulness of a model depends on what it can analyse

2. Indirect effects, and disaggregation, matter

3. Scenario analysis can be useful in assessing and planning for risk and informing policy responses

4. Impact of COVID-19 has been large, and recovery has been fast, but imbalanced and incomplete

5. Focus on addressing structural growth constraints for stronger, fairer growth and employment