

# COVID-19 and the economy: Lockdowns, recession and policy responses

## INTRODUCTION

The South African economy is affected by the COVID-19 pandemic through:

- The sharp fall in growth initially in China and then in Europe and the US as a result of measures to contain the virus; and
- The increasing pressure to exercise social distance and lock down households and businesses to slow the spread of COVID-19, including in South Africa (from 26 March 2020) as well as all its major trading partners.

These measures brought an extraordinarily sharp decline in global production and employment, especially in the US and Europe, over the past month. The result will likely be a global recession, with very uncertain prospects for recovery despite the adoption of extremely large stimulus packages in the US and much of Europe.

This briefing note first outlines the progress of the pandemic internationally and in South Africa. It then summarises key economic consequences, which have led to (widely varying) projections for global and South African growth. A final section reviews international and South African economic policy responses to the sharp slowdown.

The economic impacts of COVID-19 are changing rapidly. Information in this briefing note is valid as of 26 March 2020.

## THE COVID-19 PANDEMIC

Locking down communities or entire countries to contain the COVID-19 pandemic have extremely harsh economic outcomes. This section outlines why this approach has nonetheless become the international norm.

The World Health Organization (WHO) declared that COVID-19 was a pandemic on

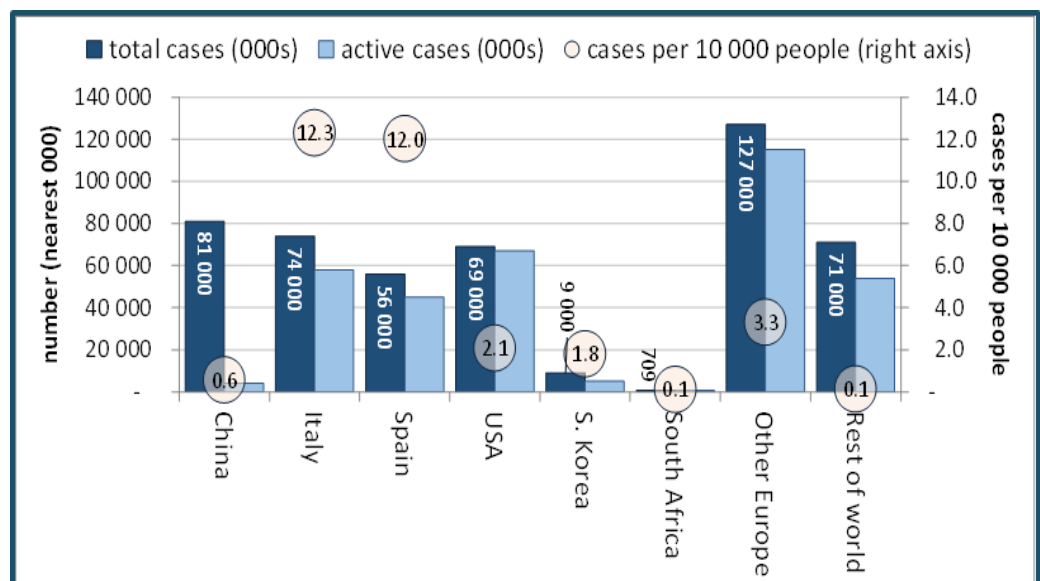
11 March 2020. In South Africa, the first case was detected on 5 March; by 26 March, the number had risen to 927. The data on the extent of the contagion are, however, strongly affected by the extent of testing, because around four out of five cases have no symptoms or only very mild ones. From 24 to 26 March, South Africa averaged around 2 500 tests a day, with around 7.5% returning positive results.

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**Graph 1. Number of confirmed cases by country, 25 March 2020**



Source: Calculated from Dadax. Worldometer. Electronic dataset. Series on coronavirus. Downloaded from <https://www.worldometers.info/coronavirus/> on 26 March 2020.

Strategies for dealing with COVID-19 are shaped by the fact that, as a newly emerging virus, there are no treatments or vaccines; only the survivors have acquired immunity; it is highly contagious: symptoms appear only after five days or so; around a fifth of symptomatic cases end up in hospital; and the death rate is typically 10 times as high as flu, at about 1% of cases (although it varies widely by country). Absent extreme measures to prevent contagion, the number of people showing symptoms can double in one to six days. The resulting acceleration in cases can swamp hospitals, leading to higher death rates.

Globally, the main response has been to try to slow down the rate of contagion in order to relieve the hospital system and reduce the death rate. The number of cases would not necessarily fall, but they would take place over a longer period. The principal instruments have been increased handwashing, quarantines, and social distancing for everyone. The results take time to show up, however, because people do not immediately show symptoms; the disease itself often lasts for a week or two; and complications typically emerge only after two to three weeks. As a result, even if the rate of contagion has declined, the number of ill people will continue to climb for a few weeks, but at a decreasing rate.

The rapid rate of infection means that inadequate measures can lead to a surge in cases, as discussed in the box on case studies below. In response, governments have increasingly enforced lockdowns

requiring citizens to stay in their houses instead of going to work. The result has been a termination of economic activity with a scale and abruptness seen in recent history only during major wars.

South Africa has acted relatively early and decisively in tracking early cases and ultimately imposing the lockdown. Like virtually every other country, however, it struggles to ensure adequate testing and develop reserves of protective clothing and respirators, especially given growing international competition for these resources.

The development of effective treatments for COVID-19 would reduce the need for social distancing and surveillance. As of now, however, the earliest pharmaceutical tests are likely to show results in at least a month, while a vaccine will take over a year. For many viruses, such as HIV and Ebola, it took much longer to find effective treatments.

## ECONOMIC IMPACTS

The South African economy has been affected by:

- The slowdown in major trading partners, especially China, Germany and the US, appearing primarily in lower export demand,
- The effects of social distancing on virtually all forms of entertainment, with a lockdown from 26 March expected to keep at least three quarters of workers from their jobs; and
- Capital flight and sharp depreciation as investors pull money out of emerging markets.

## CASE STUDIES: RESPONSES TO COVID-19

Four countries' experiences with COVID-19 have largely shaped perceptions of "best practice".

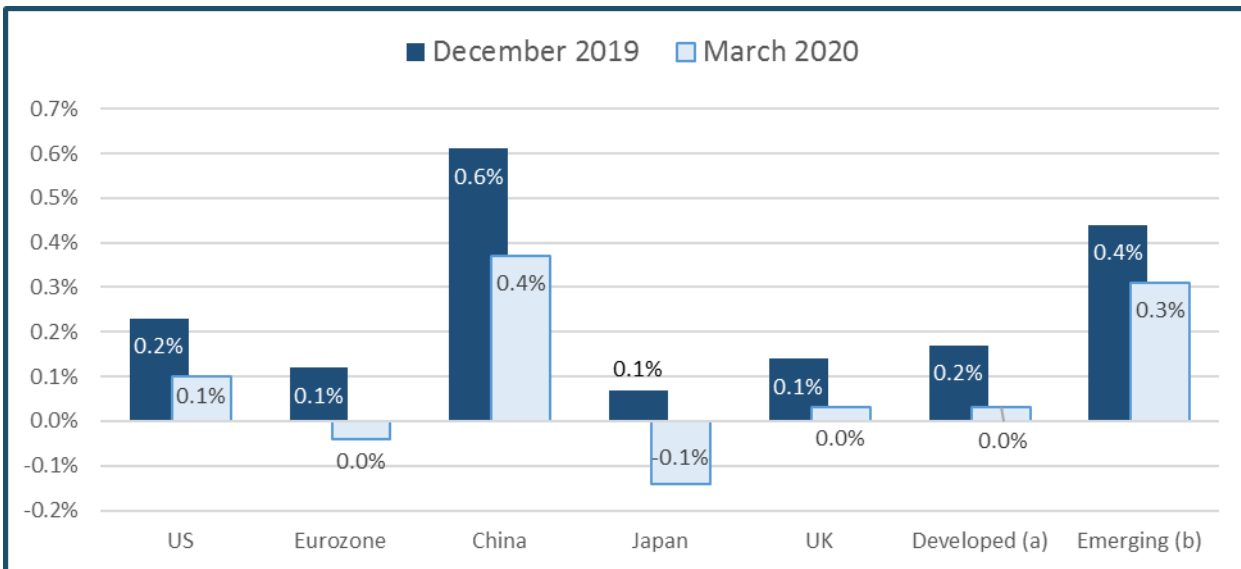
The disease originated in Wuhan province in China, and spread widely there in early January. The government responded with a rigorous lockdown of Wuhan, which has a population of 58 million – only 4% of the Chinese population. It prevented virtually all inward and outward travel as well as activities outside of people's homes. It set up quarantine sites for infected people, separating them from their families. China also closed down smaller hotspots elsewhere in the country. A total of 80 000 people were diagnosed by 26 March, and 3 000 died. But by mid-March China had contained the virus locally, with all new cases brought by foreign visitors.

South Korea had a substantial outbreak when a large church held long meetings with thousands of members in defiance of government guidance. The government responded by conducting an extraordinary number of tests – almost 350 000 by late March – to track the disease and quarantine those affected. It encouraged social isolation, but did not lock down areas by geography. As of late March, it had almost 10 000 cases. It had few new cases of local origin, however.

In Italy, COVID-19 was detected in the second week of February. By then, it had already spread widely from unknown sources. From late February, as known cases reached 200, the government encouraged social distancing and isolated some towns. But it did not emphasise social distancing consistently or strongly enforce the lockdown. By 9 March, when more rigorous measures were introduced, there were already over 9 000 identified cases, and hospitals in the north of the country were overwhelmed. As of 24 March, Italy had almost 75 000 cases, of which around 9 000 had recovered and 7 500 had died. The number of new cases had fallen from a peak of 6 500 on 21 March to around 5 000 a day from 23 to 24 March.

Finally, as in Italy, COVID-19 was not detected in the US until it had already spread into the community. The US also adopted a deficient testing system, which meant it could not effectively track the spread of the infection and isolate potential contacts. Measures to promote social distancing and lockdowns were carried out by subnational governments, although travel within the country is entirely unimpeded. In early March, the US had 70 cases; by late March the number had reached 70 000 (with half in New York) and 990 deaths. Hospitals in New York had begun to run out of beds and equipment. On 25 March alone, the number of cases climbed by 10 000.

**Graph 2. 2020 GDP forecasts, December 2019 forecast vs March 2020 forecast**



Source: Fitch Ratings, 2020. Global economic outlook – March 2020. Note: a) US, Japan, France, Germany, Italy, Spain, UK, Canada, Australia and Switzerland; b) Brazil, Russia, India, China, South Africa, Korea, Mexico, Indonesia, Poland and Turkey.

These effects will persist until the pandemic slows, which is highly unpredictable both for South Africa and for the US and Europe as well as much of Asia outside of China and South Korea.

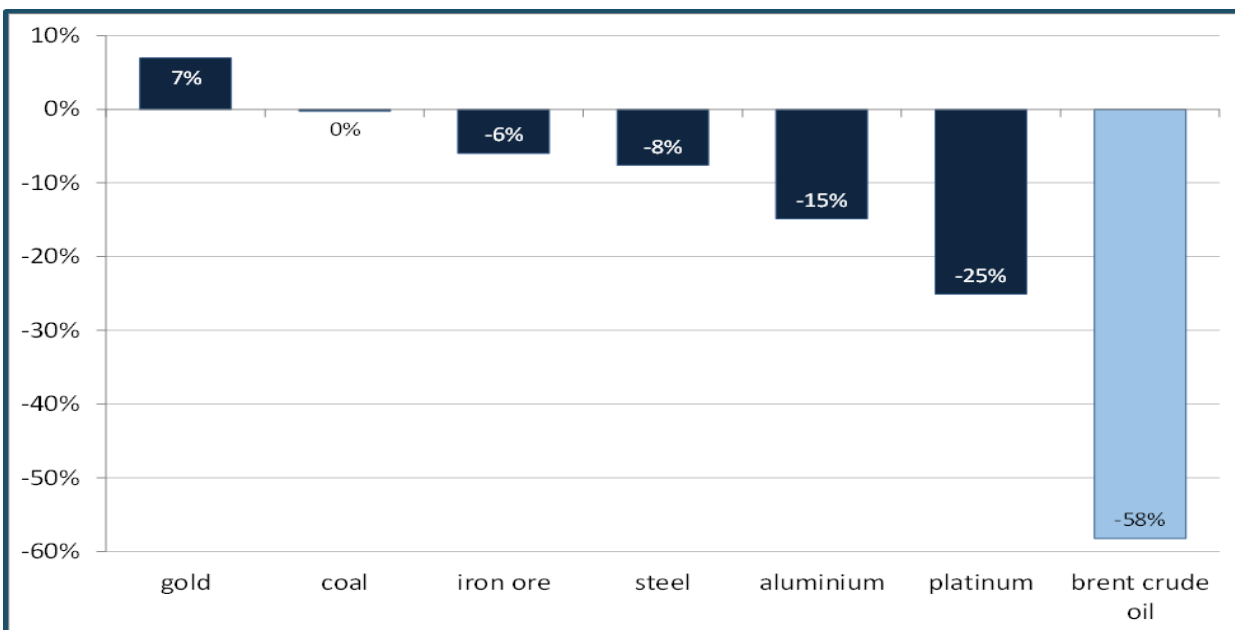
### 1. Global effects

Predictions for the effects of the pandemic on global growth vary widely and have worsened rapidly in the past month. Graph 2 compares GDP growth forecasts by Fitch Ratings from December 2019 to March 2020. These predictions mostly reflect the impacts on China, which is likely to see a shrinking economy for at least the first quarter of 2020 – the first in over 30 years. More recently, most economists agree that measures to promote social isolation in response to the surging epidemic mean the US and Europe are already in a recession. Claims for unemployment

insurance in the US surged by three million in the week of 23 March.

Impacts have differed by industry. Major airlines faced closure as they cancelled millions of flights. Restaurants, clubs, sporting facilities and tourism attractions in the most affected economies shuttered their premises and sent their workers home. Most auto plants in North America and Western Europe closed down from mid-March at least through early April, and car production in the UK was expected to fall by 18% in 2020. In contrast, producers of medical supplies, digital services of all kinds and news media saw an upswing in demand. That was not, however, enough to offset the downturn in production and household demand as lockdowns spread across the world’s leading economies.

**Graph 3. Percentage change in commodity prices, 2 January to 26 February, 2020**



Source: Calculated from Trading Economics. Commodity prices. Available at [www.tradingeconomics.com](http://www.tradingeconomics.com) on 26 March 2020.

*When it was introduced, the lockdown was expected to affect around 80% of South African employees, although some higher-level employees can work from home*

The slowing global economy, and especially the slowdown in China, has seen a fall in most commodity prices. Petroleum prices fell by over half from 2 January to 26 March, from almost US\$65 to under US\$25. As Graph 3 shows, of South Africa's major mining-based exports, platinum and iron ore were hit relatively hard. In contrast, gold prices climbed, reflecting the metal's safe-haven status, and coal prices were flat.

Concerns about the impact of the pandemic saw capital flight from emerging markets, including South Africa. Societe Generale estimated that in February and March, investors pulled US\$80 billion out of their stocks and bonds. The result was a 15% to 20% decline in the Mexican and Russian currencies, and a 11% fall in the Brazilian real as well as the rand. As Graph 4 shows, the rand depreciated from around R14 to a US dollar through December 2019 to R18 to the US dollar in late March 2020. The decline accelerated as growing uncertainty rocked international stock exchanges.

## 2. The economic implications of the lockdown in South Africa

The global slowdown would certainly lead to slower growth in South Africa, but in the immediate term those outcomes will be swamped by the lockdown. The regulations are designed to prevent workers from

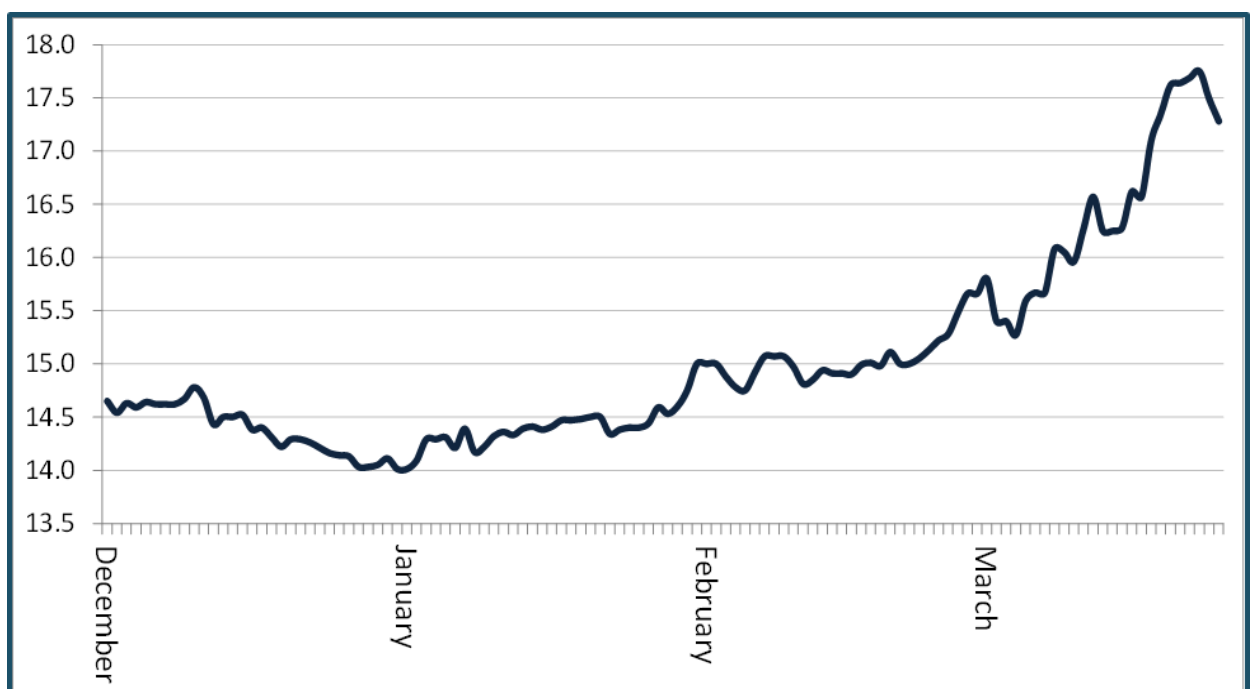
going to workplaces outside of the food and healthcare value chains plus essential services through at least mid-April. When it was introduced, the lockdown was expected to affect around 80% of South African employees, although some higher-level employees can work from home. Travel to work was permitted only for the food value chain, from farming to retail; the healthcare sector, including pharmaceuticals and the production of medical equipment and protective clothing; public and private security services; and other essential services, primarily electricity (including its coal supply), water supply, refuse removal and limited public transport.

For its duration, the lockdown will certainly bring about a sharp fall in production and employment, with a particularly sharp impact on small businesses in general and on restaurants and other recreational services in particular. Scope for work from home is limited, since only around one in seven households (even counting only those with employed members) had broadband internet access in 2018.

In the longer run, the economic outcomes from the lockdown depend on:

- Whether it is extended beyond the original three weeks; and
- How fast production and businesses rebound after it ends.

**Graph 4. Daily exchange rate of the rand to the US dollar, 1 December 2019 to 26 March 2020**



Source: Calculated from Exchange Rates.org.uk, interactive data set. Downloaded from <https://www.exchangerates.org.uk/USD-ZAR-exchange-rate-history.html> on 26 March 2020.

The likelihood of extension is unclear. China needed over two months to contain its (much wider spread) COVID-19 outbreak. But South Africa has initiated the lockdown earlier and more vigorously than other countries, which may make it possible to stick to the original timeline. In either case, an important factor will be the effectiveness of measures that aim to enable businesses to retain capacity and systems during the shutdown period, as discussed in the *International experiences* subsection.

## ECONOMIC POLICY RESPONSES

Government efforts to deal with the economic impacts of the pandemic take four main forms:

- Fiscal stimulus packages with spending focused on helping out businesses directly, usually with separate measures for small producers and especially hard-hit industries, notably the airlines;
- Monetary stimulus based on various forms of bond purchases to strengthen liquidity, as well as cuts in interest rates;
- Measures to assist those who cannot work during lockdowns, usually in the form of expanded unemployment insurance, tax incentives to employers to avoid retrenchments, payments to the self-employed and increased sick leave; and
- Increased budgets for public health systems, both as part of stimulus packages and through disaster relief spending.

In addition to the macroeconomic downturn, three significant concerns emerged both nationally and internationally.

First, if companies simply close down or retrench workers as a result of the downturn, economic reconstruction will prove far more difficult. The recovery from war has historically been relatively easy because people and institutions need merely to return to their previous work. That is a lot easier than say promoting inclusive industrialisation, which requires innovative changes to fundamental economic and social systems such as training, marketing and lending. If companies close down or have to bring in new, inexperienced employees, the bounce back to earlier activities will face more significant obstacles.

Second, the COVID-19 outbreak emerged just as company debt internationally hit new highs. Interest rates in most countries remained low from 2008/9 even as economies recovered. As a result, companies borrowed heavily, with total company debt reaching US\$2 trillion in 2019, while the share with near-junk ratings climbed rapidly. In response, many central banks committed to buying private as well as public bonds in order to avoid a default spiral.

Third, very small businesses (including most independent restaurants) and the self-employed fall outside of traditional systems designed to support business. They often do not belong to unemployment insurance schemes or qualify for formal loans. Many

do not have reserves that would enable them to last even two weeks without any customers. Establishing support programmes able to reach these producers on very short notice has required innovative programmes in virtually every affected country.

Governments differed in the relative emphasis given to addressing the impacts of job losses and support for larger businesses. European countries provided far more income relief for workers and the self-employed than the US. In South Africa, the biggest stimulus was through an expansion in UIF payments and the mobilisation of very large private-sector funding to assist small business.

### 1. International experiences

Various countries have already initiated stimulus packages to mitigate the economic effects of the COVID-19 crisis. In many cases, additional measures are still expected. The following subsections summarise the measures as of 26 March.

#### The United States

The US has seen by far the largest response to the downturn in both monetary and fiscal terms.

On 15 March, the Federal Reserve cut its main benchmark interest rate by 0.5% to near 0%. The reduction in the rate was the largest since the 2008/9 global financial crisis. The Federal Reserve also reintroduced quantitative easing, purchasing US\$50 billion in treasury bonds and US\$200 billion in mortgage-backed securities, and later adding another US\$625 billion in purchases.

On 26 March, the US government passed a US\$2 trillion package that provides US\$500 billion for subsidies to business, including the hard-hit airlines industry; US\$350 billion in loans to small business; US\$250 billion for a direct payment of over US\$1 000 each to most adults; another US\$250 billion for unemployment insurance payments; and US\$180 billion to hospitals and local governments. The package is the largest stimulus package ever seen in the US.

When a federal disaster is declared in a US state, in theory the national government can provide relief to the self-employed and other workers who are not eligible for normal unemployment insurance. In practice, as of late March the national government had not authorised these payments even for states where it had proclaimed a federal disaster. The recent fiscal package may help address this gap in the safety net.

#### Europe

European governments have undertaken significant stimulus packages. That represents a marked divergence from their approach in 2008/9, when they relied primarily on monetary policy to counteract the downturn while insisting on fiscal restraint. The justification was, at least in part, that the pandemic and subsequent lockdowns were a due to natural causes rather than poor decisions by the affected businesses. Economists debate bitterly over how far



to go with counter-cyclical strategies, but most agree that government has to relax fiscal strictures to alleviate the economic impacts of natural disasters and wars.

Major stimulus packages have been introduced by the leading European Union countries. As examples, we describe Germany and the United Kingdom, where conservative governments have overturned their historic emphasis on austerity.

On 25 March, Germany adopted a €750 billion package, which was larger both per person and as a percentage of the GDP (at 10%) than the US plan. It comprises a €600 billion stabilisation fund for loans to business and an increase of €156 billion in government borrowing to expand direct spending. The associated increase in government borrowing required a special measure to suspend Constitutional debt limits.

The supplementary budget provides €50 billion for small businesses and the self-employed, with payments of up to €15 000 each. It also increases spending on healthcare and social protection, as well as providing a €55 billion contingency fund.

The stabilisation fund reflects concerns about company debt. It enables the state to guarantee up to €400 billion of corporate debt. It also provides €100 billion in credit to the state development bank, the KfW, to extend loans or buy shares in struggling companies. This measure was expected to leverage €356 billion in lending. The government also expanded access to support for companies going on short hours.

The UK announced a £330-billion package to provide loans and tax incentives for companies hit by the pandemic, and agreed to take over debt-ridden rail lines for six months. In this context, it committed to providing self-employed people with 80% of their earnings up to £50 000, which would reach virtually all of the self-employed. It expected to begin (backdated) payments only in June, however. In addition, it will pay up to 80% of wages for workers furloughed as a result of the pandemic.

The UK central bank cut interest rates to 0.1% and committed additional support to banks that extended low-interest term loans (up to four years) to small businesses. It reduced the reserve requirement so as to free up to £190 billion in new loans. That was 13 times as much as bank lending to business in 2019. The central bank also delayed a scheduled stress test and other regulatory requirements, encouraging the banks to take more risks at least temporarily.

The European Central Bank has established a €750 billion scheme to buy up both public and private bonds. Added to earlier schemes, the Bank's purchases are expected to reach €1 trillion, equal to 9% of the euro-area GDP. In the process, it expected to suspend limitations on how much debt it could buy from individual member countries, including those with low credit ratings. In contrast to 2008/9, then, the programme will provide relief to relatively highly indebted countries like Italy and Greece.

## China

Already large state ownership and extensive regulation of the Chinese economy, at provincial as well as national level, reduced the importance of separate stimulus packages. That said, in contrast to the EU, China seemed less interested in a large stimulus package than it was in 2008/9, when it led the world in adopting expansionary measures. As of late March, it had not announced anything on the scale seen in the global North, with considerable public debate about the need for a large stimulus. In part, caution in China reflected concerns about high levels of provincial and company debt accumulated since 2008. Even before the COVID-19 outbreak, according to World Bank data, China's real prime interest rate was around 1%, compared to 4% in other upper-middle-income economies and 5.5% in South Africa.

That said, China has adopted a variety of measures to cushion particular industries and to support business by cutting costs, for instance by reducing VAT and electricity payments. It has also begun to subsidise airlines. On the monetary side, the People's Bank extended US\$250 billion for reverse repo operations to maintain liquidity in early February and shaved 0.1% off the interest rate.

## 2. South African policy responses

South Africa entered the pandemic with a fairly high budget deficit, at 6.8%, but also relatively high interest rates. Government has focused more on mobilising off-budget funding, especially from social security surpluses and private business, than on expanding its own spending. Still, it is likely that the lockdown will force up the budget deficit as tax revenues dive and spending on healthcare and security climb.

The government has committed over R30 billion of the UIF's total R160 billion financial investments to expand support for workers and businesses facing layoffs. The Temporary Employment Relief Scheme, which provides funds for furloughed workers, is expected to see a significant expansion in claims. The UIF has established rapid response teams to ensure faster pay-outs, aiming to overcome its historically lackadaisical approach to providing relief. Workers who have to go into quarantine will also be able to claim UIF.

The Industrial Development Corporation (IDC) has put together a R3 billion package to address needs arising from the pandemic in the second quarter of 2020. In addition, it has set aside resources to provide targeted assistance to agriculture, tourism and auto components producers, as well as to support suppliers of medical inputs. It agreed to consider deferring debt-service payments for customers on a case-by-case basis.

The Rupert and Oppenheimer families have each donated R1 billion (around 1% of their total assets) to

assist small business. They plan to work with government to establish an independent agency to administer the funds, primarily in the form of low-interest loans. In addition, the national Department of Tourism will provide R200 million for small businesses in the heavily hit tourism industry.

As of late March, it was not clear how these measures would be tailored to meet the needs of self-employed people in the informal sector. Many of these businesses are survivalist, with limited ability to deal with internet applications and financial sector requirements. They could, however, be assisted by a likely increase in poverty relief measures, which had not yet been finalised when the lockdown commenced.

Besides the loan schemes, the government is providing a degree of tax relief for affected employers, aimed in part to incentivise them to avoid retrenchments. Tax-compliant enterprises with turnover of less than R50 million will be able to delay 20% of their pay-as-you-earn liabilities over the next four months. In addition, the employment tax incentive (ETI) that provides tax write-offs for young workers earning under R6 500 a month will be increased to allow an additional R500 a month per employee for the next four months. The South African Revenue Service will begin providing the reimbursements monthly rather than bi-annually. The ETI measures will reach more than a tenth of the 650 000 small businesses.

Finally, government exempted the banks from Competition Act requirements to enable them to provide relief to customers affected by the slowdown. For both individual and business customers, the banks have agreed to explore deferring payments; limiting repossessions; and extending credit lines. Government was also asking malls to limit evictions and provide relief on rentals for retailers that were closed by the lockdown, especially restaurants, clothing shops and personal-care services such as hairdressing.

On the monetary side, the Reserve Bank cut interests rates by 1% on 19 March. That should reverse the increase in the real prime rate, which climbed 2% from 2015. Still, the real rate in South Africa would remain around 0.5% higher than in other upper-middle-income economies, which were also likely to reduce their rates as a result of the global downturn.

## REFERENCES

Alpert, G. 2020. Investopedia. [Online] Available at: <https://www.investopedia.com/government-stimulus-efforts-to-fight-the-covid-19-crisis-4799723> [Accessed 24 March 2020].

Amaro, S. 2020. CNBC. [Online] Available at: <https://www.cnbc.com/2020/03/20/italy-conte-calls-for-eu-crisis-fund-as-coronavirus-death-toll-rises.html> [Accessed 23 March 2020].

Bhosale, J. 2020. The Economic Times. [Online] Available at: <https://economictimes.indiatimes.com/news/economy/agriculture/prices-of-agricultural-commodities-drop-20-post-covid-19-outbreak/articleshow/74705537.cms> [Accessed 23 March 2020].

Bloomberg. 2020. Bloomberg. [Online] Available at: <https://www.bloomberg.com/markets/commodities/futures/metals> [Accessed 23 March 2020].

Bosman, M. 2020. The liquor industry. Who Owns Whom.

Brzozowski, A. 2020. Euractiv.com. [Online] Available at: <https://www.euractiv.com/section/coronavirus/news/european-tourism-sector-urges-measures-to-mitigate-covid-19-impact/> [Accessed 23 March 2020].

Cairns, P. 2020. Moneyweb. [Online] Available at: <https://www.moneyweb.co.za/news/south-africa/how-much-could-covid-19-impact-the-sa-economy/> [Accessed 23 March 2020].

Cokayne, R. 2020. Moneyweb. [Online] Available at: <https://www.moneyweb.co.za/news/industry/bmw-shuts-down-its-rosslyn-car-plant-for-two-weeks/> [Accessed 23 March 2020].

Conerly, B. 2020. Forbes. [Online] Available at: <https://www.forbes.com/sites/billconerly/2020/03/20/economic-forecast-update-march-20-2020-for-covid-19-coronavirus-impacts/#4383e722f07c> [Accessed 23 March 2020].

Craven, J. 2020. Regulatory Focus. [Online] Available at: <https://www.raps.org/news-and-articles/news-articles/2020/3/covid-19-vaccine-tracker>.

Goyal, M. 2020. The Economic Times. [Online] Available at: <https://economictimes.indiatimes.com/news/economy/finance/covid-19-crisis-how-the-deadly-virus-hints-at-a-looming-financial-crisis/articleshow/74752200.cms> [Accessed 23 March 2020].

Karunakar, R. and Sarkar, S. 2020. Reuters. Available at: <https://www.reuters.com/article/us-health-coronavirus-global-economy/global-economy-already-in-recession-on-coronavirus-devastation-reuters-poll-idUSKBN21702Y> [Accessed 23 March 2020].

Kupferschmidt, K. and Cohen, J. 2020. American Association for the Advancement of Science. [Online] Available at: <https://www.sciencemag.org/news/2020/03/who-launches-global-megatrial-four-most-promising-coronavirus-treatments> [Accessed 23 March 2020].

Lynch, D. J. and Long, H. 2020. The Washington Post. [Online] Available at: <https://www.washingtonpost.com/business/2020/03/20/us-economy-deteriorating-faster-than-anticipated-80-million-americans-forced-stay-home/> [Accessed 23 March 2020].

National Institute for Communicable Diseases. 2020. National Institute for Communicable Diseases. [Online] Available at: <http://www.nicd.ac.za/> [Accessed 23 March 2020].

Nicholas, L. 2020. Small Caps. [Online] Available at: <https://smallcaps.com.au/covid-19-global-rampage-causes-turmoil-mining-commodities/> [Accessed 23 March 2020].

Ortiz-Ospina, E. 2020. Our World in Data. [Online] Available at: <https://ourworldindata.org/covid-testing> [Accessed 23 March 2020].

SABC News, 2020. SABC News. [Online] Available at: <https://www.sabcnews.com/sabcnews/sa-among-countries-committed-to-covid-19-vaccine-trials-who/> [Accessed 23 March 2020].

Safi, M., Giuffrida, A. and Farrer, M. 2020. The Guardian. [Online] Available at: <https://www.theguardian.com/world/2020/mar/22/italian-pm-warns-of-worst-crisis-since-ww2-as-coronavirus-deaths-leap-by-almost-800>.

Strohecker, K. 2020. ANALYSIS— Emerging market turmoil may bring FX controls back on radar. Reuters. 26 March. Downloaded from <https://www.nasdaq.com/articles/analysis-emerging-market-turmoil-may-bring-fx-controls-back-on-radar-2020-03-26>.

United Nations, 2020. Africa Renewal, United Nations. [Online] Available at: <https://www.un.org/africarenewal/news/coronavirus/eca-estimates-billions-worth-losses-africa-due-covid-19-impact> [Accessed 23 March 2020].

Wood, G. and Spiegel, D. A. 2020. The Atlantic. [Online] Available at: <https://www.theatlantic.com/ideas/archive/2020/03/two-extreme-long-shots-could-save-us-coronavirus/608539/> [Accessed 23 March 2020].

World Health Organization. 2020. World Health Organization. [Online] Available at: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020> [Accessed 22 March 2020].