

Our modelling tool, variables and assumptions

The current COVID-19 (C19) pandemic has triggered disruption to the world economies, prompting significant uncertainty in relation to when this pandemic will be over, and how different countries will be impacted in terms of both the immediate health crisis and subsequent economic dislocation. KPMG International recognises these circumstances and to help alleviate some of that uncertainty we have engaged the economics practice from KPMG Australia who have world leading capabilities in macroeconomic forecasting and analysis to prepare a set of forecasts that, along inputs from our Chief Economists, represent our best estimate as to how this pandemic may evolve over the short to medium term representing two potential paths forward. KPMG Economics in Australia has also utilised inputs from Eurasia Group, helping to guide their thinking on how the health crisis is being managed from a geopolitical perspective.

The central scenario incorporates an optimistic assumption that the worst of the health crisis that we have all been grappling with peaks for most countries in 2020Q2 and the world economy starts to recover from 2020Q3 onwards; whereas the downside scenario allows for a more pessimistic outlook where the C19 virus re-emerges in most economies in a 2nd wave (or extended 1st wave) and countries are required to adopt partial lockdown measures again into 2020Q3 and the recovery path is shallower than that assumed in the central case. The below will go into detail about our modelling tool, variables and assumptions to build the scenarios:

Background

We have seen government's around the world respond to the health and economic crisis in a swift, but largely uncoordinated, manner which is unsurprising given there is a no 'one size fits all' policy response to this situation. At one end of the policy response spectrum has been an approach that has sought to minimise the economic damage of C19 by allowing the virus to go through the population (relatively) unchecked, with the consequence of such an approach being a poorer health outcome with severe stress on the health system and a high mortality rate.

An alternative approach has been to adopt a government-engineered deliberate slowdown in the economy to manage the health risks. This approach has generally involved closing borders, introducing social distancing and quarantine measures and prohibiting specific activities. We are already starting to see how these different health strategies are flowing through to the real economy in various countries. What remains uncertain though is how sharp is the contraction in economic activity and employment will be in the short term, and conversely, when and how quickly will the rebound in economic activity and employment from the trough occur.

In attempting to answer these questions it is also important to consider whether the macro structure of an economy is likely to be impacted; what components of GDP get hit hardest; what do the recovery profiles look like; and how does government policy impact the structure?

Our teams considered these issues through combining our assessment as to how the health crisis is currently progressing on a country-by-country basis (using daily infection rate data sourced the University of Oxford – www.ourworldindata.org/coronavirus) and our analysis with respect to how government policy responses have impacted economic output using higher frequency data on industrial production and Purchasing Managers Index's (PMI).

Modelling tool

KPMG-Macro is based on the NiGEM quarterly model, which utilises real economic data for over 60 countries and regions, modelled using over 5,000 variables.

KPMG-Macro is structured around the national income identity, can accommodate forward looking consumer behaviour and has many of the characteristics of a Dynamic Stochastic General Equilibrium (DSGE) model.

It has the capability to test hypothetical economic scenarios by adopting different policy settings, rules or targets. This can be done through settings for fiscal policy, monetary policy, commodity prices, exchange rates, productivity / technical progress, and risk premiums.

Key macro variables

- Various output and income aggregates such as Gross Domestic (or Regional) Product, Gross National Income
- Employment, wages (measured various ways)
- Household consumption, household disposable income, economic welfare
- Government spending, revenue, budget balance and debt accumulation
- Aggregate investment and capital accumulation
- Aggregate price movements
- Exports, imports, trade balance
- Economy-wide productivity impacts
- Real exchange rate movements

Key sectoral variables

- Industry outputs
- Industry input demand
- Industry-level import and export activities
- Industry-specific price/wage movements
- Other variables

Modelling Assumptions

The central scenario analysis has been developed using the following steps:

- Started with the latest global macroeconomic forecasts prepared by the National Institute of Economic and Social Research (NIESR) which were released in late May 2020 and which incorporate expectations of how C19 will be impacting economic activity on a country-by-country basis.
- Then calculated the monthly change in per capita C19 infection rates and classified countries into categories from a disease progression perspective (i.e.: increasing, stable, decreasing, at-the-end) and from a size of population infected (i.e.: large, medium, small, at-the-end).
- Updated 2020Q1 for actual / preliminary GDP results where available.
- Reviewed other suppliers macroeconomic forecasts, including the IMF, World Bank, OECD, and Oxford Economics to understand what perspectives and considerations these other organisations are incorporating within their forecasts.
- Then completed a series of statistical analysis to estimate the correlation in 2020Q1 GDP and PMI data, and then based on this analysis prepared simple estimates of 2020Q2 GDP based on PMI data for April 2020.
- Then made a subjective assessment as to the likely quarter that individual countries will experience peak C19 infection rates, which generally accorded with country classifications (i.e.: 2020Q1 (China) or 2020Q2 (decreasing/end; small/end) or 2020Q3 (increasing/large))
- Adopted a recovery profile depending on C19 infection rates and historic dynamic growth paths for various countries.
- Estimated GDP by quarter based on peak decline and recovery profile
- Then, estimated the change in current NISER GDP forecast to our proposed GDP estimate by country, and then calculated the change in consumption / domestic demand required to achieve target GDP by quarter based on historic elasticity rates.
- Modelled the proposed central scenario using KPMG-Macro, a derivation of the NIESR macro econometric model, NiGEM.

Once the Central Scenario was finalised we then considered how to incorporate adjustments to reflect a downside scenario. The main considerations with respect to the downside scenario again started with health outcomes. The key assumptions in the downside scenario are:

- The C19 virus is not contained.
- A 2nd wave (or an expansion of the 1st wave) occurs in most country's.
- Governments respond by implementing some form of partial lockdown.
- The recovery path from the pandemic (relative to the Central Scenario) is stretched out due to continued restrictions, reduced confidence, and a longer time frame before any vaccine is found and deployed.

For more details, please get in touch [here](#).