The Impact of the COVID-19 Pandemic on the Australian Economy

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1 Introduction

To slow the spread of the COVID-19 disease and reduce its negative public health consequences, governments around the world have instituted a range of policies to reduce physical contact between people. State governments in Australia declared states of emergency in March 2020 and introduced restrictions including bans on gatherings of more than 500 people and 14 days of isolation for travellers arriving from abroad. The restrictions were progressively tightened and broadened to include the closure of schools, workplaces, and recreation venues as well as bans on people leaving their homes for any but a short list of prescribed purposes.

While the restrictions were considered necessary from a public health perspective, there are strong concerns about their potential economic effects. The restrictions have prevented some businesses from operating and forced some workers not to work or to work from home, which has had negative consequences for output and incomes. In addition, the COVID-19 illness may itself have affected the economy, by partially incapacitating the workforce and diverting resources. To counteract these effects, the Federal Government has instituted a set of stimulus measures to support businesses and maintain household finances. These measures are supplemented in Australia's states and territories with additional support from state and territory governments.

In this report we simulate the effects of COVID-19 and associated containment policies for three potential recovery arcs. The alternative scenarios are labelled V, W and L, with the shape of the letter describing the shape of the recovery path.

At the time of writing, indicative information is available about the June quarter 2020 (2020q2). From this incomplete information we build a plausible set of results for 2020q2, 2020q3 and 2020q4 which are the same for each scenario. The structural changes occurring between 2020q2 and 2020q4, such as changes to per capita household expenditure patterns, exports and productivity, are unwound over subsequent periods, using assumed paths. The model results fill in the rest of the picture.

The modelling work is conducted with the Victoria University Regional Model (VURM). The model and shocks are described in more detail in Section 2, followed by a discussion of results in Section 3.

2 Modelling

In this section we provide a brief description of VURM (Section 2.1). Shocks are discussed in Section 2.2. The economic environment assumed for the scenarios is explained in Section 2.3.

2.1 VURM

VURM is an 83-industry computable general equilibrium model of Australian states and territories (see Adams et al., 2015). To parameterise VURM, CoPS relies on data from a variety of sources, including the Australian Bureau of Statistics (ABS) Census data, Agricultural Census data, state accounts data, and international trade data. The core VURM model database underwent a significant update during the first half of 2020 to incorporate

the ABS 2016/17 Input-Output data release, together with updated Government Financial Statistics data from ABS cat. No. 5512.0.

Each region in VURM has a single representative household, and a single state/local government agent. The federal government operates in each region. The foreign sector is described by export demand curves for the products of each region, and by supply curves for international imports to each region. Supply and demand for each regionally-produced commodity is the outcome of optimising behaviour. Regional industries are assumed to use intermediate inputs, labour, capital and land in a cost-minimising way, while operating in competitive markets. Region-specific representative households purchase utility-maximising bundles of goods, subject to given prices and disposable income. Regions are linked via interregional trade, interregional migration and capital movements, and governments operate within a fiscal federal framework.

Investment in each regional industry is positively related to expected rates of return on capital in each regional industry. VURM recognises two investor classes: local investors (i.e. domestic households and government) and foreign investors. Capital creators assemble, in a cost-minimizing manner, units of industry-specific physical capital for each regional industry.

VURM normally provides results for economic variables on a year-on-year basis. The results for a particular year are used to update the database for the commencement of the next year. More specifically, the model contains a series of equations that connect capital stocks to past-year capital stocks and net investment. Similarly, debt is linked to past and present borrowing/saving, and the regional population is related to natural growth and international and interstate migration. The model is solved with the GEMPACK software package (Horrdige et.al., 2018).

In solving VURM, we typically undertake two parallel model runs: a baseline simulation and a policy (counterfactual) simulation. The baseline simulation is a business-as-usual forecast for the period of interest. The counterfactual simulation is identical to the baseline simulation in all respects, other than the addition of shocks describing the policy under investigation. We report results as cumulative deviations (either percentage or absolute) away from base case in the levels of variables in each period of the policy simulation.

2.1.1 Features added to VURM to enhance suitability for modelling COVID-19

The COVID-19 pandemic and containment measures initially produce a large, sudden drop in demand. Enhancements to the usual CGE framework were added to VURM to suitably capture the impact of the pandemic.

2.2 Model shocks

Each of the COVID scenarios are based on projections that are generated as deviations away from a hypothetical No-COVID base case. The No-COVID projection contains business-as-usual assumptions for productivity and other key economic drivers, and makes no allowance for COVID-19 and containment policies.

The COVID scenarios deviate from No-COVID in response to five sets of shocks:

- productivity shocks,
- social distancing (demand) shocks,
- shocks to the world economy,

- fiscal shocks, and
- shocks to population derived from reduced net overseas and interstate migration.

Each set of shocks has a magnitude and path to recovery that is based on a combination of evidence and legislation (mainly for the remaining quarters in 2020), and judgement based on assumed scenario descriptions. Model results derived from these shocks are our estimates the economic impacts of the pandemic, should these shocks play out as we have assumed.

The five sets of shocks are described below. Table 3 and associated notes in Section 2.3 provides more detail on the model variables that are shocked, and what variables are freed up (made endogenous) to allow the exogenously-imposed changes.

2.2.1 Part 1: Productivity shocks relating to social distancing, etc.

The social distancing strategy for containment of Covid-19 requires people to work from home where possible. This imposes a productivity loss, exacerbated by school closures and the unavailability of informal childcare arrangements. For workplaces that are still operating with staff on-site, productivity is also negatively impacted, due to additional cleaning and hygiene requirements and social distancing requirements such as limits on the number of passengers in lifts, and the need for 4 square metres of space per person.

Data for the impact on productivity of working from home is rare, as is data on the impact of additional hygiene requirements in the workplace. We assume initial productivity losses of between 1 per cent and 3 per cent, which are equivalent to losing 5-15 minutes of productive time per 8-hour workday.

For each industry, the productivity loss is put in place for 2020q2 and unwound in 2021q2, by which time we assume a vaccine is available and strict hygiene measures are relaxed. The extent of the productivity loss and its recovery are the same across all three scenarios.

Implementing these shocks in VURM is straightforward. As indicated in row 9 of Table 3, productivity is a naturally exogenous variable.

2.2.2 Part 2: domestic containment measures

Domestic containment shocks relate to limits on social gatherings and non-essential travel. To represent domestic containment, negative shocks were applied to domestic final demand in selected industries.

Shocks to demand for the VURM commodities were devised by using the most detailed industry classification available (ANZSIC class) and judging whether social distancing would have a low, medium or high impact on household demand. Scores were assigned to each impact, and these were weighted to arrive at estimates for demand losses in each VURM industry. Quantification of the impact of social distancing for each industry was based on some subjective judgement, June quarter spending data from sources such as the ANZ spending tracker, and an assumed scenario about the lifting of different restrictions over time.

These shocks are applied in 2020Q2 and unwound in line with the characteristics of each scenario (see rows 1 and 2 of Table 3).

2.2.3 Part 3: international shocks

2.2.3.1 Trade in goods and services

The slowing of the economies of all of Australia's major trading partners and the heavy restrictions on international travel have an impact on demand for exports. From economic growth of 2.9 per cent in 2019, the IMF forecasts a decline of 3 per cent in 2020, a negative turnaround of almost 6 per cent.

Shocks to exports of non-service commodities (everything except tourism and education) are derived from an average of the IMF forecast impacts on growth by country, weighted according to Australia's export profile of agriculture, mining and manufactured goods to each country. The export demand shift for mining is somewhat less negative than the shifts for Agriculture or Manufacturing because China, with a relatively high weight on mining, has a lower-than-average decline in GDP growth forecast by the IMF. The average impact on the growth of our trading partners, weighted for each set of commodities, is given in Table 1 below (Row 1). We apply an adjustment to reflect our trading partners becoming more inward looking. The adjustment is larger for Agriculture and Manufacturing, as exports of Australian food products and pharmaceuticals are a relatively expensive item and will be impacted by falls in discretionary spending in China and other trading countries. This is given in Table 1 (Row 2). The impact on 2020 growth is distributed across the four quarters of 2020 as shown in Row 3, with the majority of the impact occurring in 2020q2 and 2020q3.

Over 2021 and 2022, export recovery is governed by the nature of the scenarios to be modelled.

Table 1: Export demand shocks applied in VURM in 2020 (percentage deviations relative to No-COVID levels)

	Agriculture	Mining	Manufacturing
(1) Average impact on growth of trading partners, 2020	-5.40	-4.89	-6.39
(2) Assumed impact on exports, 2020	-10.99	-7.74	-11.92
(3) Distribution of impact over 2020			
q1	-2.87	-1.99	-3.12
q2	-16.02	-11.38	-17.33
q3	-13.54	-9.58	-14.67
q4	-10.99	-7.74	-11.92

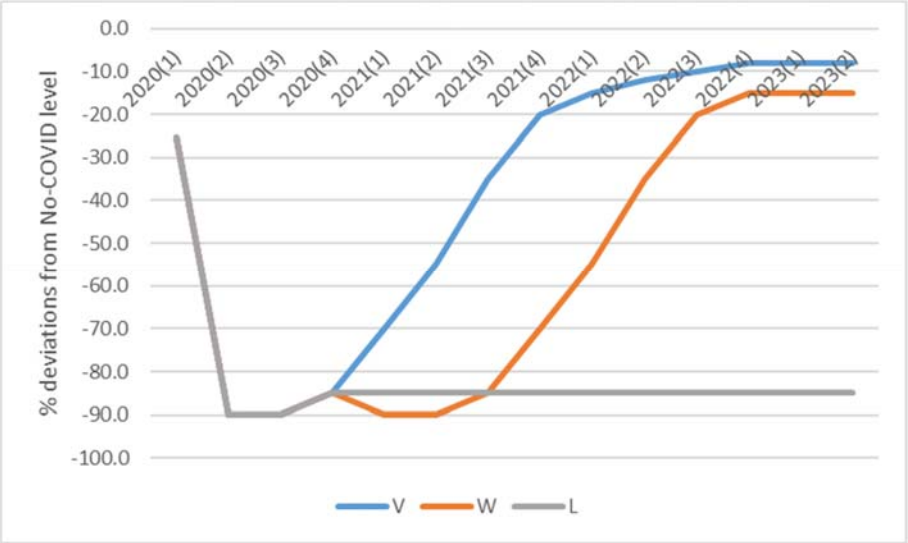
2.2.3.2 Travel-related exports

Shocks to travel-related exports are much more significant. These shocks have an impact on Accommodation, Restaurants, Air transport and other sectors. These shocks begin in 2020q1, ahead of significant numbers of Covid-19 cases in Australia and domestic social distancing measures.

Tourism shocks are shown in Figure 1 for each scenario. The shocks are expressed as percentage deviations relative to No-COVID levels.

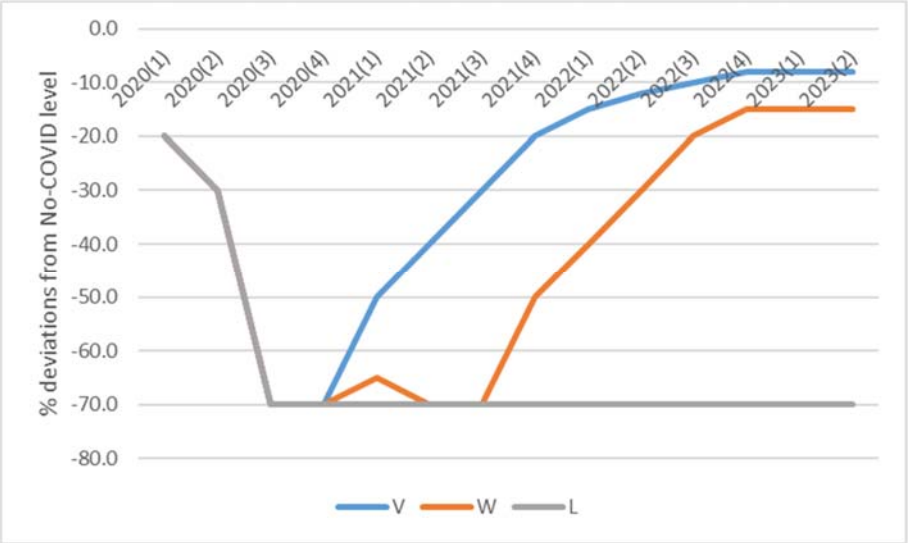
As shown in Figure 1, in each scenario tourism exports are assumed to fall to a level 90 per cent below No-COVID levels during 2020. In the V scenario, tourism exports gradually make a recovery by 2024q4. In the long-term, tourism is expected to remain 8 per cent below No-COVID levels. In the W scenario, the recovery stalls for four quarters, while in the L scenarios there is no recovery.

Figure 1: Assumed paths for Tourism Exports (percentage deviations from No-COVID levels)



Shocks to higher education exports in the V scenario in 2020 and 2021 are consistent with Hurley and Van Dyke's (2020) "optimistic" scenario, in which there is an intake of students in 2021. As shown in Figure 2, higher education exports in the V scenarios are assumed to return to 92 per cent of their No-COVID levels over 2 years. In the W scenario, the recovery stalls one year, while in the L case there is no recovery.

Figure 2: Assumed paths for International Education Exports (percentage deviations from No-COVID levels)



2.2.4 Part 4: Fiscal response

2.2.4.1 Overview of Commonwealth response

In response to the Covid-19 pandemic, the Federal government announced three support packages to the value of $150 billion, while the Reserve Bank of Australia announced a $90 billion funding facility to assisted banks with their lending practices to business. The first Federal support package of $17.6 billion was announce on the 12th of March 2020 and focused on four areas, namely supporting business investment and providing cash flow, targeted support for the most severely affected sectors, regions and communities and, direct payments to lower income households. The second rescue package worth $66.1 billion was announced on the 22nd of March and included further support to households and assistance to business to keep workers employed. The Reserve Bank of Australia (RBA) contributed $90 billion and the Federal government $15 billion to make it easier for business to access finance. The third support package, known as *JobKeeper*, provides a payment to approximately 3.5 million workers to the value of $70 billion.

To fund these packages the government will lift the debt ceiling form $600 billion to $ 850 billion.

2.2.4.2 JobKeeper in VURM

JobKeeper is the largest single government support package at any level of government, worth $70 billion. It is paid over the 2nd and 3rd quarters of 2020. *JobKeeper* is a payment of $1,500 per fortnight for eligible individuals who were employed by eligible employers before the pandemic. The payment is administered through employers and recipients are still nominally employed.

There are two mechanisms in VURM that are used to represent *JobKeeper*: wage subsidies and transfer payments. Wage subsidies reduce the employer cost of labour, while transfer payments (from government to households) are not linked to any other transaction and do not change incentives.

To some extent, *JobKeeper* is a wage subsidy, and to some extent it acts like a transfer payment from the government to workers (although administratively it passes through the employer). As a wage subsidy, *JobKeeper* is limited to eligible employees of eligible employers.

Consider Nick and Anne in the example provided on the Treasury's *JobKeeper* factsheet (**Error! Reference source not found.**). Under *JobKeeper*, the cost of employing Anne is reduced by $1500 per fortnight, a subsidy of 50%, while the cost of employing Nick is reduced by $1000, a subsidy of 100%. The extra $500 received by Nick is a direct transfer payment. Although the cost of employing Nick is subsidised by 100%, businesses are not supposed to ask employees to work extra hours for *JobKeeper*, so the subsidy is limited to Nick's existing labour input of $1000 per fortnight.

In this example (if Nick and Anne were a whole industry) the initial VURM database would show the cost of labour to be $4000 per fortnight. The *JobKeeper* shocks would be

(1) a subsidy to labour of $2500 (or 62.5%); and

(2) a direct transfer payments from government to households of $500.

Under normal circumstances, a wage subsidy leads to an increase in employment. Under *JobKeeper*, this mechanism is limited as the subsidy is only available to eligible employees, that is, those who were employed by the employer on March 1, 2020.

In VURM the normal response to a subsidy on labour is an increase in employment. In this case, the increase is provided by Nick and Anne "returning" to work, which is possible only if Nick and Anne would otherwise have lost their jobs.

If there are no eligible workers available (i.e. previously employed workers that would now be unemployed if not for *JobKeeper*), then *JobKeeper* does not act like a labour subsidy because it does not facilitate an increase in employment. Therefore, if Nick and Anne would not have otherwise lost their jobs, *JobKeeper* should not be treated as a labour subsidy in VURM. Instead, it should be treated as a transfer payment to Adam (the owner of the business).

Translating the example of Nick and Anne into industry shocks for VURM is complicated. First we evaluate the proportion of the payment that is a direct payment to business owners. This is the proportion of payments due to workers that would not have otherwise become unemployed.

The Australian government expects 3.5 million people to apply for *JobKeeper*. We assume that in 2020q2, 1.5 million of these applicants would have remained working during the pandemic even without *JobKeeper*. For these workers *JobKeeper* is treated as a transfer payment to business owners.

For the 2 million people who become "available" as subsidised employees under *JobKeeper*, we estimate the proportion of the *JobKeeper* payment that is treated as a labour subsidy, and the proportion that is a direct transfer to workers (like the $500 paid to Nick).

In 2020Q3, as containment measures start to ease, we halve the proportion that is treated as a labour subsidy. We estimate that 23 per cent of *JobKeeper* payments are a direct transfer to workers, while the remaining 77 per cent act as a wage subsidy in the true sense of a subsidy (that is, they reduce the marginal cost of labour).

The final representation of *JobKeeper* in VURM is given in **Error! Reference source not found.** below.

Box 1: JobKeeper example

Employer with employees on different wages

Adam owns a real estate business with two employees. The business is still operating but Adam expects that turnover will decline by more than 30 per cent in coming months. The employees are:

- Anne, who is a permanent full-time employee on a salary of $3,000 per fortnight before tax and who continues working for the business; and
- Nick, who is a permanent part-time employee on a salary of $1,000 per fortnight before tax and who continues working for the business.

Adam is eligible to receive the JobKeeper Payment for each employee, which would have the following benefits for the business and its employees:

- The business continues to pay Anne her full-time salary of $3,000 per fortnight before tax, and the business will receive $1,500 per fortnight from the JobKeeper Payment to subsidise the cost of Anne's salary and will continue paying the superannuation guarantee on Anne's income;
- The business continues to pay Nick his part-time salary of $1,000 per fortnight before tax and an additional $500 per fortnight before tax, totalling $1,500 per fortnight before tax. The business receives $1,500 per fortnight from the JobKeeper Payment which will subsidise the full cost of Nick's salary. The business must continue to pay the superannuation guarantee on the $1,000 per fortnight that Nick is earning. The business has the option of choosing to pay the superannuation guarantee on the additional $500 (before tax) paid to Nick under the JobKeeper Payment.

Table 2: JobKeeper in VURM

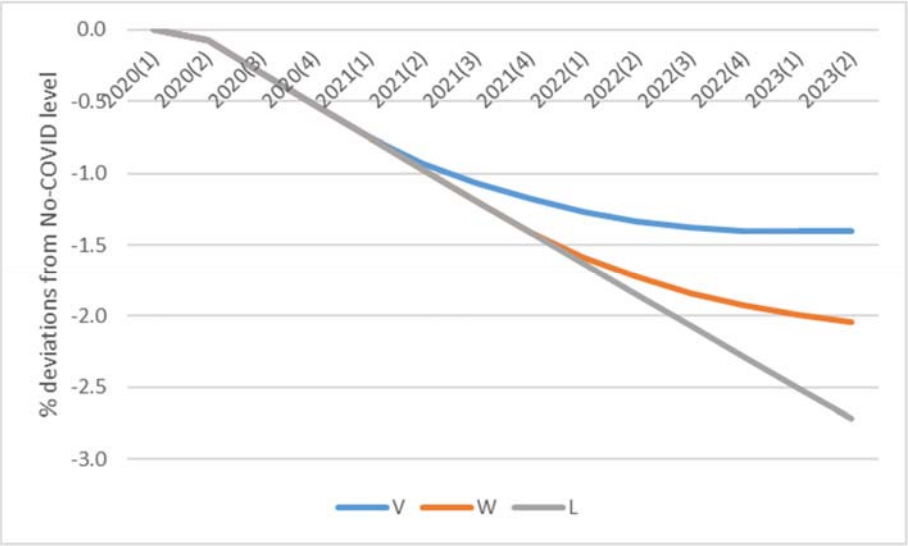
	2020Q2		2020Q3	
	% of *JobKeeper*	Budget ($ billion)	% of *JobKeeper*	Budget ($ billion)
Direct payments to households – payments to employers	43%	15.0	71%	25.0
Direct payments to households – payments to employees	13%	4.6	7%	2.3
Labour subsidy	44%	15.4	22%	7.7
Total		35.0		35.0

Note, that the estimates shown in Table 2 do not take account of the announcement on 21 July 2020 that the Government is extending the *JobKeeper* payment (at a reduced rate) for a further six months until 28 March 2021 and is targeting support to those businesses and not-for-profits who continue to be significantly impacted by COVID-19. At the time of writing exact details of the extension are unclear. In all three simulations we assume that *JobKeeper* continues in 2020q4 and 2021q1, with quarterly payments half that for 2020q2 and 2020q3.

2.2.5 Part 5: Net overseas migration

Net overseas migration is expected to fall in 2020 and take several quarters to recover even in the V scenario. Net overseas migration accounts for 56 per cent of population growth. Population growth rates are adjusted accordingly over the forecast period (see Figure 3).

Figure 3: Australian Population (percentage deviations from No-COVID levels)



2.3 Economic environment (closure)

At a macro level, the main features of the closure adopted for all three scenarios are summarised in

Table 3. The pandemic imposes many demand-side shocks on the economy, which are accommodated endogenously by changes to employment and capital utilisation.

Table 3: Summary of closure and shocks

		2020				2021		2022	2023
		Q1	Q2	Q3	Q4	Q1	Q2-4	Q1-4	Q1-4
1	Household consumption	N	X, neg	X, rec	X, rec	X, rec	X, rec	N	N
1a	Savings rate	X	N	N	N	N	N	X	X
2	Gov't consumption	N	X, neg	X, rec	X, rec	X, rec	X, rec	N	N
3	Exports	N	X,	X	X	X	X	X	X
4	Imports	N	N	N	N	N	N	N	N
5	Investment	N	N	N	N	N	N	N	N
6	Interstate trade	N	N	N	N	N	N	N	N
7	Employment	N	N	N	N	N	N	N	N
8	Capital utilisation	N	N	N	N	N	N	N	N
9	Productivity	X	X	X	X	X	X	X	X
10	Transfer payments	X	X	X	X	X	X	X	X
11	Wage subsidy	X	X	X	X	X	X	X	X
12	GDP and GSP	N	N	N	N	N	N	N	N
13	Population	X	X	X	X	X	X	X	X

X = exogenous, N=endogenous, neg=negative shock, rec=recovery shock, rem=removal of shock, N*=endogenous for part of period

Notes on

Table 3

1. ***Household expenditure*** is normally determined as a function of household income and an exogenous savings rate. Here we endogenise the savings rate (1a) to accommodate the negative shocks in 2020q2 and recovery thereafter. Taste changes are also endogenised to capture the change to the commodity composition of household expenditure under social distancing. In all three scenarios, from 2022q2 the savings rate is exogenous.
2. ***Government expenditure*** is normally determined as a function of population size. Like household expenditure, it is exogenised from 2020q2 to 2021q4 to incorporate productivity and social-distancing shocks. In all three scenarios, after 2022q1 government expenditure is determined as a function of population size.
3. ***Exports***

   Exports are exogenous in all three scenarios.
4. ***Imports*** are endogenous and treated as imperfect substitutes for domestic commodities.
5. ***Investment*** is endogenous and responds to changes in capital utilisation and rates of return.
6. ***Employment*** is endogenous and responds to changes in the marginal product of labour and the real wage. Real wages are sticky and adjust slowly to return the unemployment rate to its base case level.
7. ***Capital utilisation*** is endogenous and responds to changes in the marginal product of capital and the real rental rate. If capital rentals fall relative to the CPI, owners of capital are assumed to reduce capital utilisation. In the base case, capital utilisation averages around 95 per cent, so there is limited scope to increase capital utilisation but ample scope to reduce utilisation in an unanticipated downturn.
8. ***Productivity*** is exogenous in the policy simulation. It would normally take on the same growth rate as the base case. In the pandemic, an additional exogenous shock is applied to productivity from 2020q2 to 2020q4, after which it resumes its original path.
9. ***Transfer payments*** are exogenous and reflect *JobKeeper* and other packages.
10. ***Wage subsidies*** are exogenous and reflect *JobKeeper* and other packages.
11. ***GDP and GSP*** are endogenous and reflect the shocks applied to the major components of expenditure: household, government and exports.
12. ***Population*** is assumed to grow more slowly throughout the simulation in all three scenarios due to lower net overseas migration.

2.3.1 Labour market closure

The nature of the pandemic and the support packages necessitate the use of a slightly unusual labour market closure. Consider the ratios on the right-hand-side of this identity:

$$HOURS = \left(\frac{HOURS}{EMPLOYED}\right)\left(\frac{EMPLOYED}{LABOURFORCE}\right)\left(\frac{LABOURFORCE}{POP}\right)POP$$

That is, aggregate hours worked is the product of average hours per worker $\left(\frac{HOURS}{EMPLOYED}\right)$, one minus the unemployment rate $\left(\frac{EMPLOYED}{LABOURFORCE}\right)$, the participation rate $\left(\frac{LABOURFORCE}{POP}\right)$, and the population (POP).

Aggregate hours worked is derived from aggregate labour input,[1] an economic variable derived in the main CGE model. The standard CGE theory for the ratios on the right-hand-side is to treat the employment rate as endogenous, and the remaining ratios exogenous and unchanged.

For this project we make some changes to the standard approach. First, the suspension of mutual obligation under the *JobSeeker* scheme means that recipients of *JobSeeker* do not need to look for work, and so are likely to be counted as not in the labour force (NILF) rather than unemployed.

Second, the *JobKeeper* scheme encourages employees to remain connected to their employers, even if there is little or no work available. We assume that the fall in labour input during the pandemic is split equally between people who are eligible for *JobKeeper* and those who are not. We assume that these *JobKeeper* recipients remain attached to their employer and work no hours or very few hours, but are counted as persons employed. This is equivalent to assuming that an economy-wide fall in labour input of, say, 10 per cent comprises a 5 per cent fall in employment and a 5 per cent fall in average hours worked.[2]

2.3.2 Impact of transfers to households

The transfers to households are assumed to have a minimal impact on household consumption beyond partially compensating for lost factor income. Aggregate household expenditure is determined independently of household income, as it is tied to the limits placed by social distancing. This is consistent with evidence that a large proportion of income support payments is saved, or spent on necessities.

2.3.3 Budget balance

[1] "Labour input" is measured in "labour units", where a labour unit is a unit of labour worth $1 in the base case. At a granular level (industry by occupation), percentage changes in aggregate labour input and aggregate hours worked are equivalent. At an economy-wide level, labour units are aggregated according to wage bill weights, whereas hours worked are aggregated according to hours weights. Hence, compositional differences lead to differences in aggregate hours worked and aggregate labour input. For example, if hours worked increase in a high-wage industry, this adds more to economy-wide labour input than the same increase in hours in a low-wage industry. In the simulation reported here, these differences are very small.

[2] Let L = N.H where L = total labour input, N = persons employed and H = average hours per person. It follows that $\Delta L = \Delta N.H + \Delta H.N + \Delta N.\Delta H$. We assume that $\Delta N/N = 0.5*\Delta L/L$, that is, the proportional change in the number of persons worker is half of the proportional change in labour input. Ignoring $\Delta N.\Delta H/L$ as a second-order term, it follow that $\Delta H/H = 0.5*\Delta L/L$.

We do not explicitly model any attempt by the government to return the budget to balance via higher taxes, lower spending or other mechanisms.

2.4 Summary of shocks for the three scenarios

The shocks specific to each of the three scenarios are summarised in Appendix A.

3 Results

Results are presented as deviation from a No-COVID case. As the name suggests, the No-COVID simulation contains business-as-usual assumptions for productivity, population and the world economy, with no allowance for COVID-19 and associated containment policies.

3.1 Employment

Figure 4 shows changes away from No-COVID levels for Australian employment, expressed in terms of '000 jobs. As shown, at the peak of *current* containment measures, employment in Australia will be around 600 thousand persons below No-COVID levels. This is equivalent to an increase in the unemployment rate from 5.2 per cent in 2020q1 to 7.8 per cent in 2020q2.

After falling in 2020q2, employment recovers somewhat in 2020q3 in line with the easing of containment measures. In the V scenario, after 2020q4 employment recovers gradually as containment measures are eased. Employment does not make a full recovery, as the population gradually falls away from its No-COVID level due to reduced net overseas migration (see Figure 3). In the W scenario, employment recovery lags roughly one year, while in the L scenario employment never recovers. Indeed, in the L case, at the end of the period employment is still around 600 thousand below its No-COVID level.

The return to No-COVID employment levels in the V and W scenarios is facilitated by two factors. First, the recovery in conditions as work-from-home restrictions, school closures, and other social distancing measures are lifted will naturally reverse the productivity and demand-driven losses assumed in 2020q2. Second, wage growth will be dampened as employees and job seekers suffer a loss of bargaining power in an environment of high unemployment. The same factors operate in the L scenario, but are increasingly offset over time by the declining population (labour force).

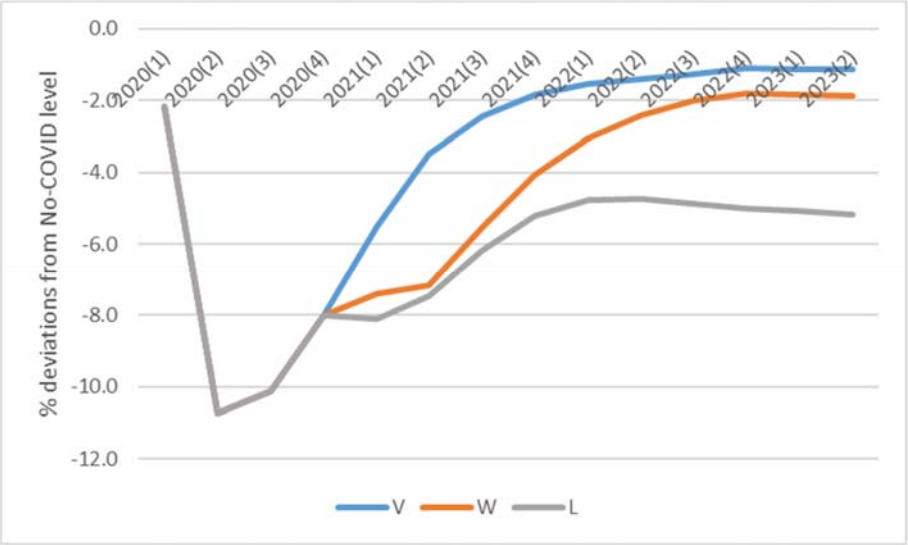
Figure 4: Australian employment – persons (changes ('000 persons) from No-COVID levels)

3.2 Macroeconomic impacts

Real GDP will fall significantly in 2020q2, to be 10.7 per cent below its No-COVID level. The fall reduces to 7.9 per cent in the fourth quarter. In the V scenario, recovery begins thereafter as conditions return to normal. The result for GDP is closely linked to the demand shocks due to social distancing and the slowing of international trade. In the W scenario recover is lagged around one year. In the L scenario, there is a mild short-term recovery, but in the longer term real GDP has started to trend down. In 2023(q2), real GDP is 5.1 per cent lower than its No-COVID level.

In per capita terms, real GDP returns to No-COVID levels after 2022q4 in the V and W scenarios, but is below No-COVID values in the L scenario.

Figure 5: Real GDP
(percentage deviations from No-COVID levels)



3.3 Domestic Final Demand

3.3.1 Real Household Consumption (Figure 6)

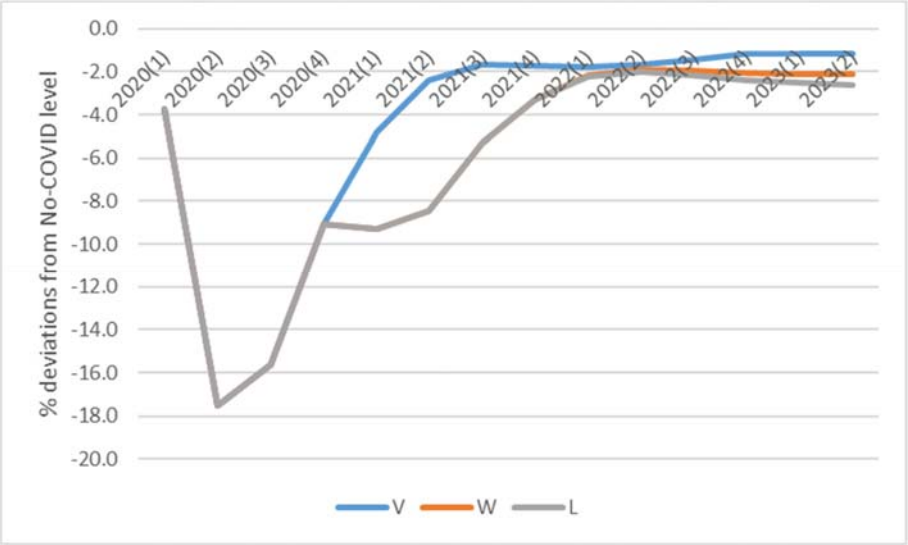
JobKeeper, *JobSeeker* and other stimulus packages have a significant impact on household income. Nationally, the combined impact of these packages will be a transfer of around $195 billion from government to households over four quarters, an increase of 16 per cent over normal levels of household income for this period.

At the same time, real household factor income – the income derived from employment and business profits – will fall below its No-COVID level by around 13 per cent in each of 2020q2 and 2020q3, commensurate with the deviation in GDP and devaluation in the exchange rate. On the other hand, *including* commonwealth and state government support, total household real disposable income will be around 2 per cent above No-COVID levels in these two quarters.

Due to social isolation, real household expenditure will fall to 14 per cent below No-COVID levels in 2020. Around 40 per cent of household expenditure is allocated to activities that are affected by social isolation. Expenditure on these activities is assumed to drop by an average of 30 per cent.

The large fall in expenditure coupled with the increase in household income means that savings are accumulated in 2020. From 2021q2 onwards, after the stimulus payments are completed, there is a period of dis-saving, as household consumption recovers. In all three scenarios, real consumption recovers over time. In V, the recovery is relatively quick. In the W and L scenarios recovery is lagged around one year.

Figure 6: Real Household Consumption
(percentage deviations from No-COVID levels)



3.3.2 Investment expenditure (Figure 7)

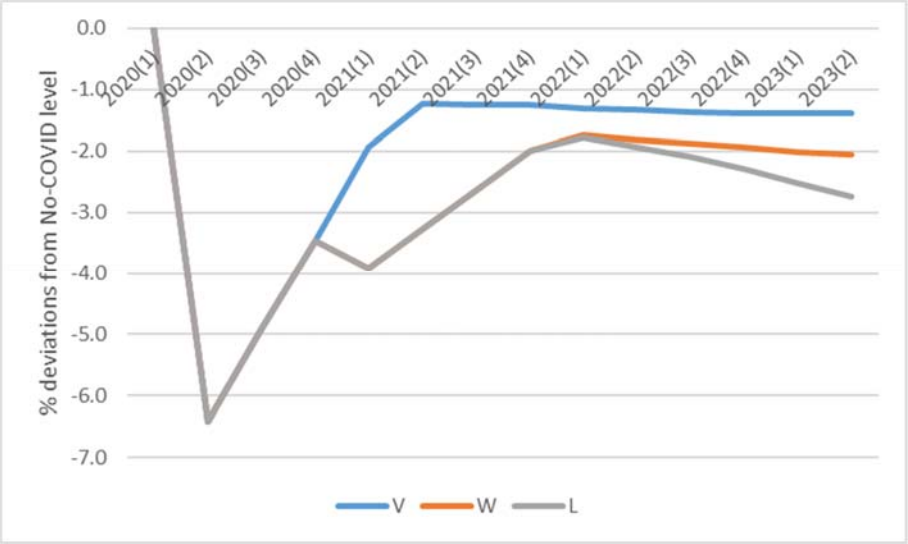
Real investment expenditure falls as a result of low capital utilisation. During the social isolation period, with significant amounts of capital unutilised, the incentives for investment in new capital are low. Investment recovers in line with the assumed recovery in household expenditure after social distancing. However, the incomplete recovery in export expenditure and lower population suppresses investment and it remains below No-COVID levels throughout the simulation period. The extent to which investment expenditure remains supressed across the three scenarios reflects, in the main, the respective recovery paths in exports (see Figure 9 below).

3.3.3 Government expenditure (Figure 8)

Real government consumption falls in line with the assumed impact of social distancing. While expenditure on public administration and defence is unchanged (comprising around 40 per cent of total government expenditure), expenditure in on other services will fall, including health care, tertiary education, school education and arts and recreation. Expenditure on these services will recover quickly after social distancing is no longer required. That recovery will be quickest in the V scenario, followed by the W scenario. In the L scenario, recovery is relatively weak.

Figure 7: Real Investment
(percentage deviations from No-COVID levels)

Figure 8: Real Public Consumption
(percentage deviations from No-COVID levels)



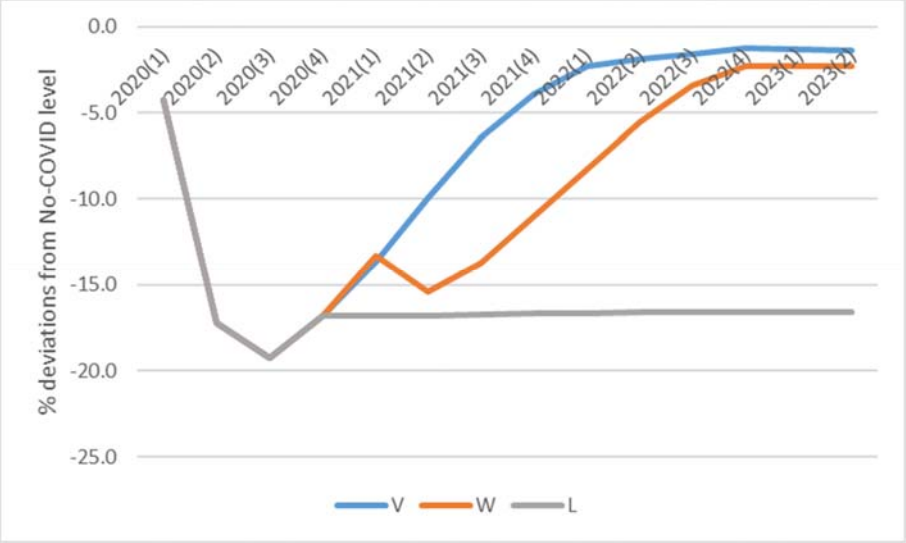
3.4 Trade

3.4.1 Exports (Figure 9)

Through to the end of 2020, foreign exports are assumed to fall in line with travel bans and a fall in world economic growth.

In the V scenario, the world economy recovers relatively quickly. World recovery in the W scenario is lagged one year, while there is no recovery in the L scenario. The export deviations shown in Figure 9 reflect these assumptions.

Figure 9: Real Exports
(percentage deviations from No-COVID levels)

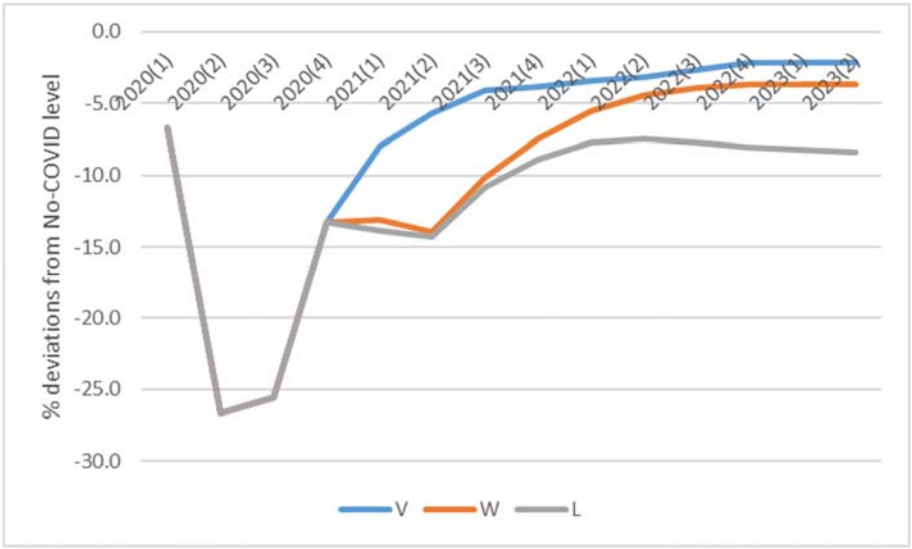


3.4.2 Imports (Figure 10)

Through to the end of 2020, foreign imports are assumed to fall in line with supressed demand. Another contributing factor is devaluation of the real exchange rate which occurs as the demand for exports contract.

In the V scenario, as the domestic economy recovers so imports return to No-COVID levels. In the other two cases, imports move back towards their No-COVID level, but persistent real devaluation (particularly in the L case) prevents full recovery. Indeed, in the L scenarios, even in the final quarters imports remain around 12 per cent below No-COVID levels.

Figure 10: Real Imports
(percentage deviations from No-COVID levels)



3.5 Industry output

3.5.1 Overview of 2020Q2 (Figure 11)

Industry results can be understood in terms of (1) the shocks implemented, and (2) the macroeconomic environment. Figure 11 shows that Divisions R (Arts and Recreation), H (Accommodation and Food services) and S (Other Services) are the most negatively impacted in 2020q2. These industries are affected by both domestic social distancing measures and international travel bans.

Division I (Transport) is also negatively affected by travel bans, which affect air transport and road and rail passenger transport. This division also includes postal, delivery and warehousing services, which are assumed not to be directly affected by travel bans or social distancing.

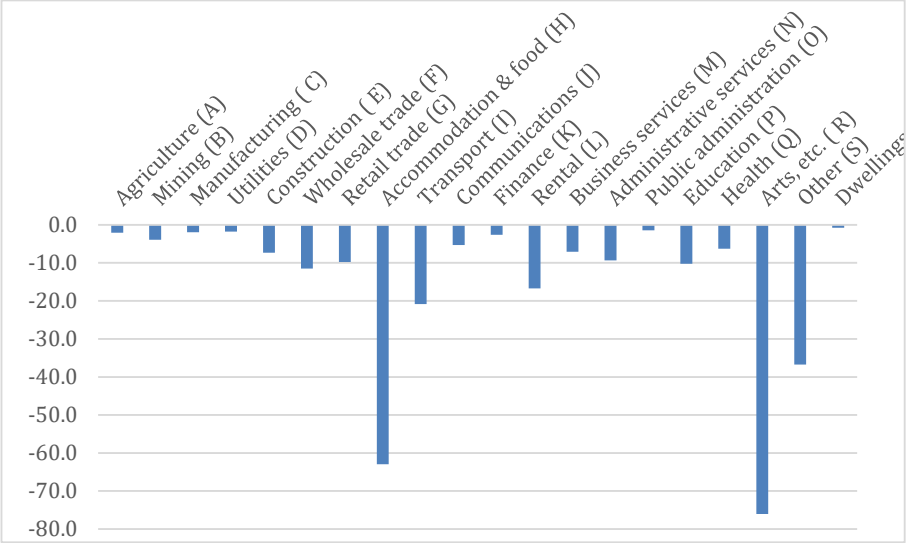
Division L (Rental) is negatively affected directly by social distancing, and indirectly through its links to the construction sector and dwelling investment. This division includes real estate services, which is negatively affected by social distancing, and passenger car hire, which is negatively affected by the travel bans. It also includes rental and leasing of heavy machinery and other equipment, for which the construction sector is an important customer.

Construction is not assumed to be directly impacted by social distancing or a downturn in exports, yet activity in the construction sector falls by 7.3 per cent. This is a consequence of the overall decline in investment (Figure 8).

The decline in Division C (manufacturing) output is relatively small. Manufacturing has some indirect links with the negative impacts of social distancing via supplying food and drinks to restaurants and bars, however this accounts for a small share of manufacturing output. An increase in retail sales of food and drink to households offsets the negative impact of links to restaurants. Moreover, there is scope for manufacturing activity to expand to offset the decline in imports as domestic manufactured goods become more competitive with imports under a weaker exchange rate.

The small decline in Division O is due to a fall in sales to the non-government sector, including sales to households and industries including Professional, Scientific and Technical Services, Construction, Transport and Communication.

Figure 11: Industry output, 2020q2 – Peak of Social Distancing (percentage deviations from No-COVID Levels for ANZSIC major categories)



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Appendix A: Summary of shock for the three COVID Scenarios

	V	W	L
2020q1-2020q4			
1. Labour productivity	Initial small declines as we learn	Same as V	Same as V
2. Social isolation	Strict isolation starts in q2, eases after.	Same as V	Same as V
3. Federal government policy	In q2 and q3, now extended to q1	Same as V	Same as V
4a. International demand - not travel	Start in q2, similar in q3, then slow recovery	Same as V	Same as V
4b. International demand - travel	Reduced in q1, further in q2 and q3, then recovery	Same as V	Same as V
5. Population	Zero foreign contribution to growth	Same as V	Same as V
2021q1-2021q4			
1. Labour productivity	Zero change from No-COVID level	Same as V	Same as V
2. Social isolation	Easing continues. No isolation from q3	Easing but less than in V.	Same as W
3. Federal government policy	In q1, nothing thereafter	Same as V	Same as V
4a. International demand - not travel	Recovery continues	Downturn - half that of initial V	Constant % deviation after 20q4
4b. International demand - travel	Slow recovery continues	Downturn – same as V in 2020	Constant % deviation after 20q4
5. Population	Zero foreign contribution to growth	No foreign contribution to growth	No foreign contribution to growth
2022q1-			
1. Labour productivity	Zero change from No-COVID level	Same as V	Same as V
2. Social isolation	No isolation	Easing. No isolation from q3	Easing, but less than W
3. Federal government policy	None	None	None
4a. International demand - not travel	Zero change from No-COVID level	Slow recovery.	Constant % deviation after 20q4
4b. International demand - travel	Sow recovery, but not back to No-COVID level	Slow recovery.	Constant % deviation after 20q4
5. Population	Foreign contribution to growth at No-COVID level	No foreign contribution up to q2.	No foreign contribution to growth.