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Fiscal policy in the COVID-19 era

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Abstract

This paper analyses the COVID recession and the large fiscal policy response by modelling three scenarios using a macro-econometric model. Scenario comparisons show that the recession mainly arose from restrictions on certain consumer services to limit the spread of COVID-19. The large fiscal response to compensate for income losses in the restricted industries meant that unemployment was 2 to 3 percentage points lower for two years than otherwise would have been the case. However, there was over-compensation: for every $1 of income the private sector lost due to the restrictions, fiscal policy provided $2 of compensation. With the lifting of restrictions, the aftereffects of over-compensation are projected to generate excess demand driving inflation to a peak of 6 per cent. Also, three forms of over-compensation in the JobKeeper program that led the fiscal response had disincentive effects. The primary lesson for future pandemics is that fiscal policy should compensate, but not over-compensate, for income losses from health restrictions, both in aggregate and at the program level. The secondary lesson is that monetary policy needs to take more account of the stimulus already provided by the fiscal response, so that interest rates do not remain very low for too long.

Keywords: fiscal policy, COVID, econometric modelling, macroeconomic outlook, JobKeeper
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1 Introduction

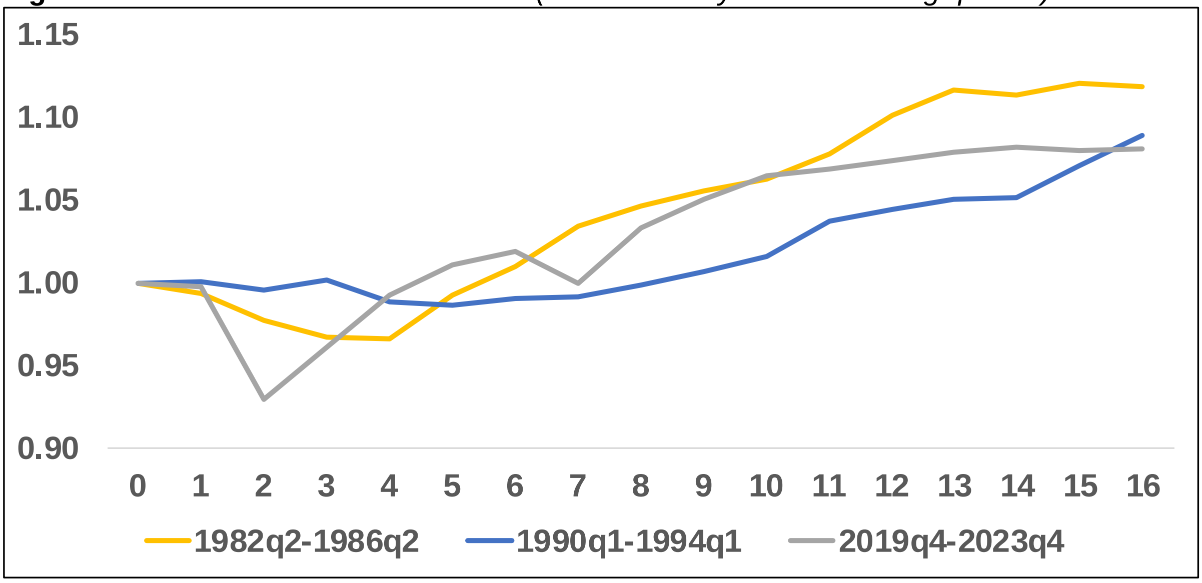
In March 2020, COVID-19 reached Australia, affecting health outcomes. The government introduced international and domestic restrictions to limit the spread of COVID to and within Australia. Besides these mandatory restrictions, individuals also voluntarily restricted their activities. This paper analyses how those COVID-related developments led to recession and the appropriateness of the highly expansionary fiscal policy response to that recession.

This paper analyses the COVID-related developments as a whole. It does not separately analyse the effects of ill-health, mandatory restrictions and voluntary restrictions. This means, for example, that no conclusions can be drawn from the modelling about the efficacy of the government restrictions. Rather, the aim is to understood how COVID developments as a whole affected the economy – the COVID economic shocks – because that is important for designing the appropriate fiscal policy response and for making modelling improvements.

The shape of the COVID recession is different from the previous recessions of the last 40 years (Figure 1). This recession began with the largest and quickest decline in real GDP, with GDP down by 7 per cent after just two quarters. This was followed by an unusually quick recovery, with the loss in GDP largely unwound only two quarters later.

Thus, the main COVID recession followed a deep V shape rather than the shallow U shape of the two preceding recessions. As we shall see, this V shape was generated when real GDP fell and rose with the imposition and relaxation of domestic restrictions on consumer spending on certain services. This was repeated on a smaller scale in the September quarter 2021 in response to the delta variant of COVID-19 (Figure 1). In contrast, the U shapes of the two previous longer and shallower recessions were generated when protracted periods of low housing and/or business investment were involved in affecting adjustments in capital stocks.

Figure 1. *Real GDP in three recessions (scaled to unity in each starting quarter)*

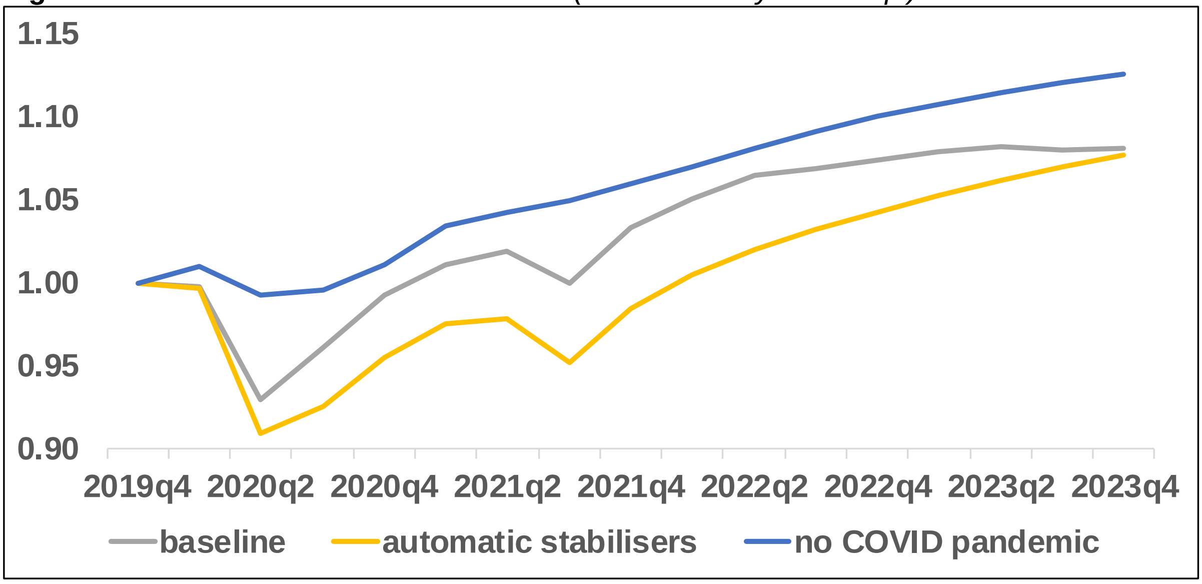


Note: The GDP path for the COVID recession (2019q4-2023q4) is based on historical data to 2021q4 and a *baseline* scenario for 2022q1-2023q4.

To more fully analyse the reasons for the unusual V-shaped recession(s) and the appropriateness of the fiscal policy response, this paper uses a macro-econometric model of Australia (Murphy, 2020) to construct three scenarios (Figure 2). The *baseline* scenario is based on actual developments and hence factors in the COVID shocks to the economy and the expansionary fiscal policy introduced in response. Its path for real GDP appears as both the *2019q4-2023q4* line in Figure 1 and the *baseline* line in Figure 2.

The *automatic stabilisers* scenario simulates a hypothetical situation in which there was no discretionary fiscal response to COVID-19. This results in a lower simulated path for real GDP over the first four years (Figure 2), although it is higher thereafter. This lower path means that the maximum decline in real GDP is 9 per cent instead of 7 per cent.

Figure 2. *Real GDP under three scenarios (scaled to unity in 2019q4)*



Thus, this paper finds that the fiscal expansion was successful in reducing the depth and length of the COVID recession brought about by COVID and the associated restrictions. On the other hand, it also finds that this fiscal expansion was excessive. For every $1 of real income that the private sector lost due to COVID, fiscal policy provided $2 of compensation. This fiscal over compensation is predicted to lead to high inflation in 2022 to 2024.

The *no COVID pandemic* scenario simulates another hypothetical situation. In this case there is no COVID-19 pandemic. This involves removing both the COVID economic shocks and the expansionary fiscal policy that was introduced in response. Empirical analysis shows that there were many abnormal shocks to the economy during 2020 and 2021, especially in the June quarter 2020, and these COVID economic shocks are all removed. Shocks to the economy apart from COVID are not removed so growth is not completely smooth.

Analysis of the *no COVID pandemic* scenario versus the *automatic stabilisers* scenario shows that the V-shaped COVID recession was mainly caused by just two of the many COVID economic shocks that are taken into account. Following the imposition of COVID restrictions, there was a large negative shock to household consumption of certain services, which flowed through to a similar shock to total household consumption. Economic activity fell and rose with the imposition and relaxation of those restrictions.

Compared to other Australian macro models, the model used in this paper has two advantages in analysing the COVID recession and the fiscal policy response. First, it contains more industry detail to better capture how COVID impacted unevenly across the economy. Second, following recent model development work, it also contains more fiscal detail to better differentiate the economic effects of the programs included in the fiscal policy response, such as JobKeeper and accelerated depreciation.

To better understand how over-compensation arose and some of its other consequences, this paper also provides a separate analysis of the JobKeeper program, which led the fiscal response to the COVID recession. The program involved three different forms of over-compensation. First, it originally over-compensated most part-time workers who had been stood down, creating a disincentive for them to find active employment elsewhere. Second, JobKeeper payments commonly extended for about three months after the turnover of a business had recovered to normal, providing business owners with a windfall. Third, it was often more profitable for smaller businesses not impacted by the COVID restrictions to nevertheless constrain their activity sufficiently to become eligible for JobKeeper than to operate as normal, creating a disincentive to fully maintain production and active employment.

The rest of this paper is organised as follows. Section 2 provides background including a brief literature survey on the topics of this paper and an overview of the model that is used, focussing on its general suitability for generating the three scenarios. Section 3 contains the separate analysis of the JobKeeper program. Section 4 explains how COVID and the fiscal response are captured in the model in generating the three scenarios. Section 5 presents and compares the outcomes of the *baseline*, *automatic stabilisers* and *no COVID pandemic* scenarios. Section 6 draws conclusions for the appropriate fiscal policy response to future pandemics.

2 Background

This background section includes a brief literature survey on the topics of this paper and an overview of the model that is used and its suitability for generating the three scenarios.

2.1 Literature Survey

Carlsson-Szlezak, Reeves and Swartz (2020), writing at the onset of the COVID recession in the USA, show that previous "epidemics such as SARS, the 1968 H3N2 ('Hong Kong') flu, 1958 H2N2 ('Asian') flu, and 1918 Spanish flu" all led to V-shaped rather than U-shaped or L-shaped recessions. They suggest that this is because the shocks to the economy were largely transient, there being no serious disruption to the economy's supply side, including capital formation and the labour supply. As was seen in Figure 1, the Australian COVID recession broadly followed the V-shape predicted by Carlsson-Szlesak et al. (2020).

McKibbin and Fernando (2020) use the G-cubed global model to simulate five main alternative COVID-19 scenarios. They introduce several types of shocks to model the economic impacts of COVID-19. In each country in the model, these shocks reduce the labour supply (through disease), total factor productivity, household consumption and business investment, and also change the pattern of consumption. In the first four scenarios the shocks are all temporary and tied to the course of the COVID-19 pandemic, leading to recessions in each country that could be broadly characterised as V-shaped. It is only in the fifth scenario that the negative shock to business investment is permanent, leading to an ongoing loss of output.

The McKibbin and Fernando (2020) paper provides a useful checklist of potential economic shocks from COVID-19. This paper will show that, in Australia's case, it turned out that the most important of these shocks were to the level and pattern of consumption. Besides the shocks considered by McKibbin and Fernando, the modelling here also shows that Australia experienced a significant permanent loss of labour supply from an interruption to immigration.

Treasury (2020) notes that the JobKeeper program had three main objectives, which were to: (i) keep workers in an unbroken relationship with the businesses who employ them; (ii) help those businesses remain viable; and (iii) provide workers and business owners with some compensation for their income losses from the COVID9 restrictions. Treasury (2020) provides evidence that JobKeeper had some success in each of these areas.

At the same time, Murphy (2021) showed in June 2021 that, under the design of the JobKeeper program, some businesses had a profit incentive to restrain their output and active employment to qualify for JobKeeper. In October 2021, Treasury (2021) showed that this potential negative side effect of JobKeeper occurred in practice.

> The share of businesses with turnover declines of slightly more than the 30 per cent (50,000 businesses with sales declines between 30 and 35 per cent) was much larger than the share with declines slightly smaller than 30 per cent (20,000 businesses with declined (*sic*) between 25 and 30 per cent). This provides evidence that a number of businesses may have adjusted their operations to qualify for the second phase of JobKeeper. Treasury (2021, p.34)

The profit incentive for this negative behaviour under JobKeeper is analysed in section 3.

2.2 General description of model

The Australian macro-econometric model used to generate the three scenarios is described in Murphy (2020). While the model was developed from scratch, it can be considered as the latest model in a series of models that includes the AMPS model (Murphy et al., 1986), MM (Murphy, 1988) and MM2 (Powell and Murphy, 1997).

These models are New Keynesian, with a Keynesian short run, neoclassical long run and forward-looking behaviour in financial markets. The more recent models, which use quarterly data, fully integrate multiple industries and can be characterised as dynamic CGE models. The Keynesian short run arises from sticky prices for labour and goods sold domestically.

As macro-econometric models, these models aim to balance principles from macroeconomic theory with econometric analysis of historical data. DSGE models generally place more weight on the theory while VAR models usually place more weight on the data. In the author's view, all three types of models have their place.

This study involves both forecasting (*baseline* scenario) and policy analysis (*automatic stabilisers* and *no COVID pandemic* scenarios). The balance that macro-econometric models offer between the data consistency that is important for forecasting and the theory consistency that is important for policy analysis is useful in this situation.

Two other broadly comparable Australian macro-econometric models that have been developed recently are EMMA at the Treasury (Bullen et al., 2021) and MARTIN at the Reserve Bank of Australia (Ballantyne et al., 2020). The recent development of these three models suggests that macro-econometric models continue to play a useful role.

Compared to the other two models, the macro model used here has finer industry and fiscal detail. As we shall see, the finer industry detail helps capture the uneven impacts across the economy of the COVID restrictions, while the fiscal detail helps differentiates the economic effects of the various programs included in the fiscal policy response, as discussed below.

The macro model identifies six broad industries (Table 1). For clarity, the Australian Bureau of Statistics (ABS) names for the constituent industry divisions for each broad industry are shown in the final column of the table.

Table 1. *Macro Model Industries*

Model industry	Model Code	ABS industry divisions
Agriculture	*A*	agriculture, forestry and fishing
Mining	*B*	mining
Manufacturing	*C*	manufacturing
Government services	*G*	public administration and safety; education and training; health care and social assistance
Other private services	*S*	all industries not included elsewhere
Housing services	*T*	residential property operators

In the first five industries, output is produced using a combination of intermediate inputs, labour, structures capital, machinery and equipment capital and a fixed factor. The fixed factor accounts for a relatively high share of value added in agriculture, where it represents agricultural land, and mining, where it mainly represents mineral resources.

In the remaining industry, housing services, output is produced using a combination of intermediate inputs, housing capital, housing land and capitalised ownership transfer costs, which include stamp duty on conveyances. This last input recognises that households invest in moving house so that their housing characteristics, such as size and location, better match their changing circumstances, thus adding to the value of housing services.

Of the six broad industries, other private services is the largest, accounting for 54 per cent of gross value added in 2019, prior to the COVID-19 pandemic. It is also the industry that was most affected by the COVID restrictions. By separately identifying this industry, the model better captures the uneven effects of the restrictions across the economy. In the other two models, other private services are combined with other industries that were less affected by the restrictions.

The main features of the 2019 version of the macro model have already been described in more detail in Murphy (2020) and so are not discussed further here. However, in new model development work in 2020 and 2021, the model's fiscal detail was further developed for this paper. This new, finer level of fiscal detail is discussed separately below.

In the latest 2021 version of the macro model, there are 56 estimated equations. The estimation method used is OLS. The estimation period generally starts in the September quarter 1985, but more recent start dates are used in cases where structural change is considered to be an issue.

The estimation period usually ends in the most recent quarter for which there is a full set of data, currently the December quarter 2021. However, because of the disturbance to some economic relationships from COVID-19, the estimation period is currently truncated to end in the December quarter 2019.

The estimation results are then used to calculate the equation residuals over the eight COVID-affected quarters extending from the March quarter 2020 to the December quarter 2021. These COVID-period residuals are analysed for outliers to judge which behavioural equations have been disturbed by COVID. The results of this residual analysis play an important role in developing the three scenarios, as explained in section 4.

2.3 Fiscal Detail of Model

In the macro model, the government budget refers to the budgets of all three levels of government (federal, state and local) consolidated together. Following the development work in 2020 and 2021, there are model levers for changing fiscal policy in all of the areas shown in Table A1. This is greater fiscal detail than in Ballantyne et al. (2020) and Bullen et al. (2021).

The modelling of the COVID fiscal expansion involves adjustments to most of these fiscal levers, as discussed in section 4 and detailed in Table A3. While the model is mainly intended for macro analysis, generally a change to a fiscal lever has the main behavioural effect that would be expected from a public economics perspective.

To model the COVID fiscal expansion in a realistic way, it was also necessary to re-classify two of the key programs – JobKeeper and Boosting Cash Flow. As explained in section 4.2, the ABS classified these two programs as production subsidies whereas behaviourally they operated largely as business transfers.

3 JobKeeper

The JobKeeper program was the largest program in the fiscal response to COVID and, as part of its unusual design, it included three forms of over-compensation for the income losses from the government restrictions. For those reasons, besides being part of the macro modelling later, in this section the JobKeeper program is analysed separately. The three forms of over-compensation are identified together with their expected economic effects.

3.1 Design of the JobKeeper program

The general nature of the JobKeeper program was that it paid businesses with a sufficient loss of turnover under the COVID restrictions a flat amount per employee similar to the national minimum wage for full-time adult workers. Payments were made for both stood down (inactive) employees and active employees. The payments for stood down (inactive) employees were passed on to them as a superior alternative to the JobSeeker payment available to the unemployed. The payments for active employees compensated business owners for their loss of profits from lower turnover under the COVID restrictions.

The three objectives of the JobKeeper program were set out in section 2.1. Here we outline the design of the program and how it aligns with each of those objectives, giving most attention to the third objective of compensation.

The JobKeeper program was in place for one year, from the June quarter 2020 to the March quarter 2021. As the program progressed, payment rates and other arrangements changed such that three versions of the program can be distinguished, referred to here as JK1.0, JK2.0 and JK3.0 (Table 2).

The first version of JobKeeper, JK1.0, provided payments to businesses who projected a decline in turnover for the June quarter 2020[1] of a specified minimum percentage. The payment was at a flat rate of $1,500 per fortnight per eligible employee, similar to the national minimum wage for full-time workers[2]. Under JK1.0, JobKeeper payments were made in the June and September quarters 2020.

The minimum turnover decline that was required to be eligible was 50 per cent for larger businesses and a less demanding 30 per cent for smaller businesses. A business was considered larger if its annual turnover exceeded $1 billion.

The first aim of the program was to keep workers in an unbroken relationship with the businesses who employed them, hence the name JobKeeper. To achieve this, stood down full-time employees were paid at a higher rate if they remained with their existing employer to receive JobKeeper than if they left to become unemployed and receive JobSeeker. A substantial gap between the two payment rates was maintained through all three versions of the program (Table 2).

[1] There was also an option to use a monthly turnover test instead of a quarterly turnover test.
[2] The JK1.0 payment rate of $1,500 per fortnight is equivalent to $750 per week. This is similar to the national minimum wage for full-time adult workers, which was $740.80 per week when JobKeeper was introduced, rising to $753.80 per week on 1 July 2020 (Fair Work Commission, 2020).

Table 2. *JobKeeper Payment Rates ($ per fortnight per employee)*

JobKeeper version	JK1.0	JK2.0	JK3.0
duration	April-Sep 2020	Oct-Dec 2020	Jan-March 2021
full-time employee	$1,500	$1,200	$1,000
part-time employee	$1,500	$750	$650
JobSeeker rate	$1,116	$816	$716

Note: The JobSeeker rates reported in the table include the Coronavirus Supplement.

The idea of keeping inactive employees on the payroll was to increase the likelihood that they could return to their previous job rather than be unemployed once the COVID restrictions were lifted.

JobKeeper was less tailored to its second aim of helping businesses remain viable. Because businesses were only permitted to retain the JobKeeper payments that they received with respect to *active* employees, JobKeeper provided no support for the finances of the most hard-pressed businesses whose employees were all *inactive*. Operations at these hibernating businesses were suspended. Nevertheless, the combination of JobKeeper *with* other government programs was successful in helping businesses remain viable.

> The combination of economic support measures, including JobKeeper and the Boosting Cash Flow for Employers measure, as well as temporary insolvency relief prevented an increase in business failures. Administrations were at very low levels during 2020. Treasury (2021, p. 33)

The remainder of this section is concerned with the third and final aim of JobKeeper, which was to provide some compensation for the income losses from the COVID-19 restrictions. We shall see wide variations in rates of compensation as measured by compensation as a percentage of lost income. This is for two broad reasons. First, compensation was based on the minimum full-time wage, whereas actual wages vary widely. Second, the compensation received by business owners depended on the percentage of their employees who were *active*, whereas the profit losses they experienced depended on the percentage of employees who were *inactive*.

Table 3 outlines how workers and business owners were compensated by JobKeeper depending on the status of a business.

Active workers were typically paid their usual wage[3] and hence did not suffer an income loss. Appropriately, they were not compensated by JobKeeper.

[3] An exception to this occurred if the JobKeeper payment exceeded the usual wage. In that case, the active worker received the JobKeeper payment rather than the usual wage. This over-compensation of the worker reduced the compensation of the business owner by the same amount. This form of over-compensation was addressed in the move from JK1.0 to JK2.0, as discussed in section 3.2.

Table 3. *Compensation for COVID-19 Income Losses*

status of business / type of economic agent	suspended business	operating without JobKeeper	operating with JobKeeper
active worker	n.a.	no income loss	no income loss
inactive worker	JobKeeper	JobSeeker	JobKeeper for inactive workers
business owner	nil compensation	nil compensation	JobKeeper for active workers

Inactive workers received JobKeeper (via their employer) if they were attached to a business receiving JobKeeper payments. Otherwise, they could receive JobSeeker from Centrelink. JobKeeper payments received by inactive workers are best viewed as an income transfer to workers, just like the JobSeeker payments they replaced. Treasury (2021) draws the same conclusion.

If eligible for JobKeeper, business owners retained JobKeeper payments made with respect to their active employees. As discussed later, it is arguable whether this business compensation should be interpreted as a wage subsidy or as a business transfer payment. Businesses who suspended operations to go into hibernation had no active employees and hence received no compensation.

We now consider in turn the extent to which JobKeeper compensated inactive workers for lost wages and business owners for lost profits.

3.2 Compensation of Inactive Workers

JobKeeper payments to inactive workers are a worker transfer that replaces JobSeeker, as noted above. Treasury (2021, p. 29, Figure 15) estimates that, under JK1.0, an average of about 20 per cent of total JobKeeper payments were these worker transfers. Here we consider the extent to which these worker transfers compensated for lost wages. This varied considerably between full-time and part-time workers.

As noted above, JobKeeper payments were initially set at a similar rate to the national *minimum* wage for full-time adult workers. This ensured that no full-time workers were significantly over-compensated by JobKeeper. Compensation rates for different types of workers can be assessed using the Australian Bureau of Statistics (ABS) Employee Earnings and Hours survey of employing organisations (ABS, 2022)[4]. For a full-time worker usually on median earnings of $1,592 per week, JobKeeper of $750 per week (or $1,500 per fortnight) compensated for 47 per cent of his or her lost earnings.

Under JK1.0, part-time workers received the same JobKeeper payment as full-time workers of $750 per week, despite their lower usual earnings. This JobKeeper rate was close to the 60th

[4] We use the May 2021 survey because it is closest to the timing of the JobKeeper program, the previous survey being in May 2018.

percentile of the distribution of weekly earnings for part-time workers (ABS, 2022). Hence, about 60 per cent of part-time workers on JobKeeper were over-compensated for their loss of earnings under JK1.0. These over-compensated part-time workers were better off remaining inactive in their existing job and receiving JobKeeper than in finding an active job with an alternative employer and receiving their usual pay. Thus, JK1.0 acted as a disincentive for most inactive part-time workers on JobKeeper to become economically active.

The second and third versions of JobKeeper, JK2.0 and JK3.0, aimed to address this over-compensation by introducing a lower payment rate for part-time employees compared to full-time employees (Table 2). For example, under JK2.0, part-time workers received $375 in JobKeeper on a weekly basis, down from $750. This reduced the proportion of part-time workers who were over-compensated from 60 per cent to 25 per cent (ABS, 2022). Under JK3.0 this fell further to about 20 per cent of part-time workers on JobKeeper (ABS, 2022).

JK2.0 and JK.30 also phased down JobKeeper payment rates for full-time workers (Table 2). However, the Coronavirus supplement included with JobSeeker was phased down at the same time, so that JobKeeper remained more generous than JobSeeker for full-time workers. This supported the main aim of the JobKeeper program of keeping inactive workers in an unbroken relationship with their employers.

3.3 Compensation of Business Owners

Business owners were able to retain the JobKeeper payments made with respect to their active employees (Table 3). In addition, some businesses continued to receive JobKeeper payments even after their operations had returned to normal. We consider these extra duration payments first and then analyse the payments received for active employees.

Extra Duration Payments

Under the program arrangements, JobKeeper payments commonly extended for some months after the turnover of a business had recovered to normal.

This extra duration of JobKeeper payments arose partly from a move from forward-looking to back-looking eligibility tests. Under the forward-looking eligibility test used in JK1.0, in March 2020, businesses *projected* their turnover for the June quarter of 2020 and that governed their eligibility to receive JobKeeper payments in the June *and* September quarters of 2020. For JK2.0 and JK3.0, the eligibility test was instead backward-looking. Under JK2.0, businesses *actual* turnover in the September quarter 2020 governed their eligibility to receive payments in the December quarter 2020. Similarly, under JK3.0, businesses *actual* turnover in the December quarter 2020 governed their eligibility to receive payments in the March quarter 2021.

The potential for extra duration payments can be appreciated by applying the above test rules to a hypothetical business. This business was sufficiently affected by the onset of COVID-19 restrictions that it experienced a decline in turnover from the beginning of the June quarter 2020 of more than the minimum amount required to be eligible for JobKeeper. Hence, its JobKeeper payments commenced in the June quarter. If it resumed normal operations at the end of the June quarter, under JK1.0 it continued to receive payments in the September quarter because eligibility continued to be based on projected turnover for the June quarter. If instead it resumed normal operations at the end of the September quarter, under JK2.0 it continued to receive JobKeeper in the December quarter because of the switch to a backward-looking eligibility test. Similarly, if instead it resumed normal operations at the end of the December quarter 2020, under JK3.0 it continued to receive JobKeeper in the March quarter 2021. So, in all three cases, the hypothetical business would have received JobKeeper payments that began at the time of its decline in turnover, but extended for an extra three months after its resumption of normal operations.

In a final timing twist, JK1.0 allowed businesses to keep their JobKeeper payments even if their projection that their turnover in the June quarter 2020 would decline sufficiently to meet eligibility requirements was not met. Indeed, such businesses could receive payments in the September quarter as well.

In all of the above cases, the JobKeeper program provided payments for three months (or more) beyond the period of the required minimum decline in business turnover. This led to substantial extra duration payments. Under JK1.0, $27 billion out of $70 billion in JobKeeper payments, or 39 per cent, were received by businesses who would not have qualified for their payments if the program had been based on actual turnover Treasury (2021, p. 2 and 49).

For modelling purposes, it is necessary to classify these extra duration payments. Once a business had returned to normal operations and hence had no inactive employees, it was able to retain further JobKeeper payments in full, so there was no worker transfer component. Further, unlike under a wage subsidy, the business could not increase the amount of these payments by hiring additional employees, because JobKeeper was only payable with respect to existing employees. Rather, the extra duration payments were a windfall to the business that is best classified as a business transfer payment.

We now put the extra duration payments to one side for the purpose of analysing the JobKeeper payments made when businesses were experiencing the specified minimum loss of turnover.

Compensation for lost profits

Businesses who were eligible for JobKeeper because they had a sufficient loss of turnover were compensated for the associated loss of profits by being able to retain the JobKeeper payments made with respect to their active employees (Table 3). Here, we analyse whether these payments under or over compensated business owners for lost profits. One problem with overcompensation in this case is that it provides businesses with a profit motive to constrain their output and active employment to become eligible for JobKeeper, even if they are unaffected by the COVID restrictions.

This compensation of business owners is investigated by examining the revenue and expenses of ‘average’ businesses. This type of analysis of JobKeeper was first presented by Murphy (2021) in June 2021 and then by Treasury (2021) in October 2021. The analysis here is more illuminating because besides considering the economy as a whole, it also considers the individual industries in which JobKeeper was most prevalent. We begin by taking the economy-wide perspective.

Business revenues and costs are taken from the ABS (2021a) 2018-19 input-output tables[5]. These revenues and costs are then re-expressed on a "per business" basis by dividing by the number of economically active businesses at 30 June 2019 sourced from ABS (2020a). This gives the revenue and expenses shown in the final column of Table 4. Using ABS (2021c) employment data, average employment "per business" is calculated to be 5.4 persons.

Table 4. *Revenue and expenses of an "average" business ($'000 per year)*

operating level	0%	50%	70%	100%
revenue	0	721	1,010	1,443
JK1.0 payment for active labour	0	106	149	0
labour costs	0	-212	-297	-424
other variable costs	0	-381	-533	-761
profit	0	235	329	258
JK1.0 income transfer to inactive labour	212	106	64	0

The profit of the business is calculated as revenue plus any JobKeeper payment for active employees less labour costs less other variable costs. It corresponds to gross operating surplus in the national accounts[6], which in turn broadly matches the accounting concept of EBITDA. As such, it represents profits before the deduction of net interest expense, corporate tax and depreciation. For the average business, annual profit is $258,000, as seen in the final column of the table.

This measure of profit does not deduct an allowance for fixed costs. However, this makes no difference to our investigation of the extent of compensation for loss of profits. This is because we compare the loss of profits from lower turnover with the compensation from the JobKeeper payments for active employees, neither of which are affected by the level of fixed costs.

If this business is eligible for JobKeeper, under JK1.0 it received $212,000 on an annual basis. This is based on employment of 5.4 persons and the JK1.0 payment rate of $1,500 per fortnight per employee. As discussed above, this JobKeeper payment can be divided into a payment to the business with respect to active employees, and an income transfer to inactive employees, as shown in the two JK1.0 rows of Table 4.

In the table, a business that suspends operations while the restrictions are in place is represented in the column for an operating level of 0%. All of the employees are inactive, so they receive all of the JobKeeper payments. The business owners receive no compensation for losing their entire profit of $258,000 on an annual basis. Because a business may have expenses that are

[5] The housing services sector is excluded because, as a non-employing sector, it was not eligible for JobKeeper. In measuring labour costs, compensation of employees in each industry is upscaled to take into account the labour contribution of the self-employed, a necessary adjustment because the self-employed were eligible for JobKeeper.
[6] after the adjustments described in the preceding footnote

usually funded out of EBITDA, such as interest payments on debt, this business may face a risk of bankruptcy, potentially stranding its capital.

As noted earlier, larger businesses were eligible for JobKeeper provided their turnover fell within a ceiling set at 50 per cent of normal (i.e., pre-COVID-19) turnover. The profit situation for a business operating at that ceiling is shown in Table 4 in the column for an operating level of 50%. It shows that business revenue, labour costs and other variable costs are at 50 per cent of normal levels. It also shows that the business receives 50 per cent of the JobKeeper payment, or $106,000 on an annual basis, while the remaining 50 per cent must be paid to the inactive employees as compensation for lost wages. The business pays the usual wage to employees who are active, but pays the JobKeeper rate to employees who are inactive.

As shown in Table 4, this business makes a profit of $235,000, while operating at 50 per cent of normal levels compared to its profit in normal circumstances of $258,000. The reason that profit falls by only $23,000 is that the potential loss in profit of 50 per cent, or $129,000, is largely covered by compensation from JobKeeper of $106,000. Hence, the business is compensated for 82 per cent of potential lost profits, but overcompensation is avoided.

We now turn to the case of a smaller business operating at 70 per cent of normal turnover, which is its eligibility ceiling for JobKeeper. Its profit situation is shown in the table in the column for an operating level of 70%. Using the same approach as before, we find that the business makes a profit of $329,000, well above its profit in normal circumstances of $258,000. Profit rises by $71,000 because the potential loss in profit of 30 per cent, or $77,000, is exceeded by the JobKeeper paid for active employees of $149,000. Hence, the business is over-compensated, receiving 193 per cent of potential lost profits. This over-compensation means that many smaller businesses that were not affected by the COVID restrictions nevertheless had a profit motive to limit operations to 70 per cent of normal to enjoy unusually high profits under JobKeeper.

This highlights the two extremes in compensation of business owners for lost profits under JobKeeper. At one extreme, businesses forced to completely suspend operations experienced the largest loss of profits yet received no compensation. At the other extreme, smaller businesses able to operate at the turnover ceiling permitted under JobKeeper could receive over compensation of about $2 for each $1 of lost profits. These anomalies arose mainly because the compensation of business owners depended on the percentage of their employees who were active, whereas profit losses depended on the percentage of employees who were inactive.

Breakeven Ceiling and Individual Industries

A convenient way of checking for over-compensation of business owners under JobKeeper in different situations is to calculate a breakeven ceiling, *cp*. This is defined as the ceiling, expressed as a proportion of usual turnover, at which profit is the same irrespective of whether a business operates at that ceiling with JobKeeper or at full operations without JobKeeper.

The formula for the breakeven ceiling is derived by setting usual profit, π, equal to profit obtained operating at a given eligibility ceiling for JobKeeper. At that reduced level of operation, turnover and variable inputs, and hence profit, are scaled down by the ceiling proportion, *cp*, on the assumption that active employees are paid their usual wage. In addition, the business generally retains a proportion of JobKeeper, being the proportion, *cp*, of the total JobKeeper payment, *jk*, that is attached to active employees.

$$\pi = cp \cdot \pi + cp.jk$$

The above formula assumes that the usual wage rate exceeds the JobKeeper payment rate, but that was not always the case, as discussed in section 3.2. If instead the JobKeeper payment, *jk*, exceeds usual labour costs, *lab*, then a business operating under JobKeeper is required to make a top up payment to active employees to raise their wage rate to the JobKeeper rate. This reduces profit by the amount of the top up payment.

$$\pi = cp \cdot \pi + cp.jk - cp \cdot (jk - lab) = cp \cdot \pi + cp.lab$$

Taking both of these cases into account, the profit equality can be written as follows.

$$\pi = cp \cdot \pi + cp.minimum(jk, lab)$$

This can be solved for the following simple formula for the breakeven ceiling proportion.

$$cp = \pi \ / \ (\pi + minimum(jk, lab)\ )$$

Using the data for the average business (Table 4) in this formula gives a breakeven ceiling of 55 per cent of normal turnover, which is reported in the JL1.0 column of Table 5.

$$cp = 258 \ / \ (258 + 212\ ) = 0.55$$

Table 5. *Breakeven ceilings for versions of JobKeeper (% of turnover)*

	JK1.0	JK2.0	JK3.0
Accommodation and Food Services	20%	28%	31%
Arts and Recreation Services	32%	41%	46%
Average business	55%	63%	67%

This breakeven ceiling of 55 per cent can be compared with the actual eligibility ceilings for smaller and larger businesses. It falls above the eligibility ceiling for larger businesses of 50 per cent of normal turnover, making it is slightly more attractive for larger businesses to operate normally. However, it falls below the eligibility ceiling for smaller businesses of 70 per cent, making it much more profitable to constrain operations to stay within this high eligibility ceiling and retain JobKeeper than to operate at normal capacity. This is consistent with the profit outcomes reported in Table 4.

These calculations regarding compensation of business owners refer to economy-wide averages and so may not be typical of the industries that were more dependent on JobKeeper. The most dependent industries were Accommodation & Food Services and Arts & Recreation services, where JobKeeper payments were equivalent to 45 per cent and 49 per cent respectively of compensation of employees in the June quarter 2020 (ABS, 2021b), higher than for any other industry division.

Revenue and expenses were calculated for the average business in each of these two industries, using the approach followed in Table 4 for the economy as a whole. Using this information, breakeven ceilings were calculated using the formula and are reported in Table 5 in the column headed JK 1.0.

The breakeven ceilings for these two industries are very low, at only 20 per cent of normal turnover for Accommodation and Food services and 32 per cent of normal turnover for Arts and Recreation services (Table 5). This means that, in these two industries, even larger business operating at their eligibility ceiling of 50 per cent of normal turnover were over-compensated for loss of profits by JobKeeper. These larger businesses received compensation of over $2 for each $1 of lost profits, while smaller businesses operating at their higher eligibility ceiling received even greater over-compensation.

The reason for the low breakeven ceilings in these two industries can be seen from the formula. It implies that the higher is the JobKeeper payment relative to usual profits, the lower is the breakeven ceiling[7]. This means that breakeven ceilings will be lower in industries that are relatively labour intensive and/or pay below average wages because wage rates are low and/or a high proportion of employment is part-time. These two industries have those characteristics.

The design attribute of JobKeeper that leads to greater over-compensation for lost profits in these types of industries is that JobKeeper paid compensation at a flat rate based on the minimum full-time wage. This favoured business owners in low wage industries relative to business owners in high wage industries.

The phasing down in JobKeeper rates of payment under JK2.0 and JK3.0 (Table 2) reduced the extent of over-compensation for lost profits, so breakeven ceilings rose (Table 5). Nevertheless, even under JK3.0, the break-even ceilings for the two industries continued to be lower than the two eligibility ceilings. Hence, it was still more profitable for both smaller and larger businesses in these two industries to operate under Job Keeper at their eligibility ceilings than to operate normally without JobKeeper.

If business owners respond to this by reducing production to become eligible for JobKeeper, it has two harmful economic effects. First, it reduces national income. Second, it is inequitable because the workers who become inactive are generally only partially compensated by JobKeeper for their lost wages, as seen in section 3.2, whereas the business owners who restrict production are over-compensated for lost profits.

[7] If JobKeeper payments exceeds usual labour costs, this is re-expressed as *the higher is usual labour costs relative to usual profits, the lower is the breakeven ceiling*.

Improving JobKeeper

Hence, if there is a JobKeeper program in a future pandemic, the design should be changed in two ways to reduce the risk of production being artificially restricted by business owners to qualify for the program.

First, as much as possible, the program should only be available to businesses that are not able to operate normally because of restrictions. It would be limited to the particular industries or regions where restrictions apply and would be removed as soon as the restrictions are lifted.

Second, the payments should be redesigned to reduce the unevenness in compensation for lost profits. The original program favours low wage businesses over high wage businesses, and businesses operating near the eligibility ceilings over businesses only able to operate at low levels or forced to suspend operations entirely.

In addition, to further avoid overcompensation of business owners, program payments should only last for as long as the turnover of a business is limited by restrictions. As noted earlier, eliminating extra duration payments would save around 39 per cent of program expenditure.

Besides the cost savings, these changes to the JobKeeper program would achieve a better balance between its first aim of maintaining an unbroken relationship between employers and employees and its third aim of compensating workers and business owners for lost income from the COVID restrictions.

Business compensation: subsidy or transfer?

Returning to the historical JobKeeper program, it is necessary to classify it for the modelling purposes of section 4. One possibility is to classify it as a wage or production subsidy. Under a standard wage subsidy, additional employment is rewarded with additional payments. This stimulates employment and economic activity and reduces output prices[8].

The JobKeeper payments received by businesses differed from this standard wage subsidy because of the eligibility ceiling. Below the eligibility ceiling, additional active employment was rewarded with additional payments to the business, like a wage subsidy. However, above the eligibility ceiling, all JobKeeper payments were withdrawn. As shown above, this meant that JobKeeper could act as a disincentive to operate above the ceiling, in what Treasury (2021, p.13) describe as an "anti-production subsidy".

This combination of a production subsidy with an anti-production subsidy makes it questionable to classify JobKeeper for active employees as either one or the other. In practice, if these large payments for active employees are modelled as a subsidy, it leads to a large simulated reduction in prices that did not occur in practice. Hence, in this paper JobKeeper payments businesses received for their active employees are modelled as a business transfer.

[8] This is before considering possible offsetting effects on economic activity from how a wage subsidy is financed.

Whatever effect JobKeeper had on active employment, it reduced unemployment as measured in the ABS Labour Force Survey. This is because that survey treated inactive employees on JobKeeper as employed rather than unemployed. This is despite the fact that, for inactive employees, JobKeeper was a replacement for JobSeeker. This and related aspects of the ABS treatment of JobKeeper are questionable, as discussed further in section 4.2.

4 Modelling COVID-19 and the Fiscal Policy Response

This section explains in general terms how the COVID-19 restrictions and the fiscal response are captured in the model for the purpose of generating the *baseline*, *automatic stabilisers* and *no COVID pandemic* scenarios. Section 5 presents and compares the outcomes of those three scenarios.

The COVID-19 restrictions began affecting the economy in the March quarter 2020, the fiscal policy response commenced shortly afterwards, in the June quarter 2020, and by 2022 most of the restrictions had been lifted. Comprehensive historical macroeconomic data are available until the December quarter 2021 (at the time of writing in March 2022). In this paper, the two year period from 2020 to 2021 is referred to as the COVID-era.

The *baseline* scenario is based on actual events, including the COVID-19 restrictions and the discretionary fiscal policy response. Thus, the *baseline* scenario uses actual historical data through to the December quarter 2021 and then simulates a projection from the March quarter 2022 onwards.

The other two scenarios are designed for estimating how economic developments have, and will be, shaped by the COVID-19 restrictions on the one hand and the fiscal policy response on the other hand.

The *automatic stabilisers* scenario removes the discretionary fiscal response that began in the June quarter 2020 and re-simulates the model from that quarter onwards. The resulting simulation outputs can then be compared with those from the *baseline* scenario to estimate the economic effects of the fiscal policy response. This is done in section 5.

The *no COVID pandemic* scenario goes further by removing the COVID restrictions, that began in the March quarter 2020, and the associated fiscal response, before re-simulating the model from that quarter onwards. The resulting simulation outputs can then be compared with those from the *automatic stabilisers* scenario to estimate the potential economic effects of the COVID restrictions. This is also done in section 5.

All three scenarios use the same inputs in all other areas, such as for underlying productivity growth and world commodity prices. Because these other inputs are the same in all scenarios, they have little influence on our estimates of the economic effects at the margin of the COVID-19 restrictions and the fiscal policy response. Hence these other inputs are not detailed here to conserve space.

This remainder of this section is in two sub-sections. The first sub-section explains how the COVID-19 restrictions have been captured in inputs to the model. The second sub-section outlines the government's fiscal response and how that has been captured in inputs to the model. For accessibility and to conserve space, the model inputs are discussed here in general terms. However, for modellers, more specific information can be found in the Appendix.

4.1 COVID-19 inputs

This sub-section explains in general terms how the economic impacts of COVID and the associated health restrictions have been represented in inputs to the model. More specific information can be found in Table A2.

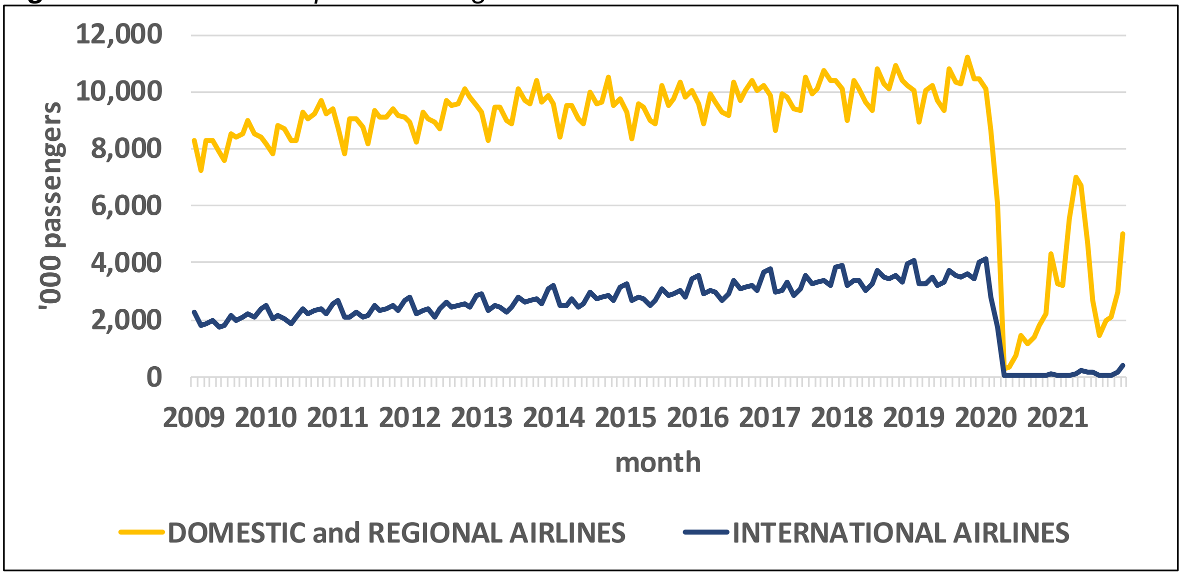
Besides the restrictions imposed by government, some individuals have also voluntarily restricted their activities to reduce their risk of infection. Here we aim to model the economic impacts of all restrictions, irrespective of whether they were imposed or adopted voluntarily. Brodeur et al. (2021) point out that the extent of social distancing can be quantified using measures of mobility. Below we use international and domestic passenger movements at Australian airports as measures of mobility.

The COVID restrictions affected the Australian economy in three broad ways. First, the government severely limited the international movement of people to limit the spread of COVID-19 to Australia, thus restricting net overseas migration, inbound and outbound tourism and enrolments of foreign students. Second, there were government-imposed and voluntary social distancing restrictions to limit the spread of COVID-19 within Australia, which constrained activity in certain service industries. Third, COVID-19 changed the international economic environment that Australia faced. We now provide some further brief information on the nature of these three types of economic shocks to the Australian economy before explaining how they have been captured in the model inputs.

The first type of shock, the government virtual ban on international movements of people, was introduced in March 2020 and resulted in international passenger movements almost ceasing at Australian airports (Figure 3). International passenger movements slumped to 75 thousand in April 2020, down from 3,503 thousand in the previous April. This ban on international travel was phased out gradually, beginning in November 2021. The modelling assumes that the restrictions on international movements of migrants, tourists and international students are fully removed in 2022 and that COVID-related reticence for people to travel internationally has fully dissipated by 2024.

The second type of shock, the domestic restrictions, were first introduced at the same time as the international restrictions, in March 2020. The industries most affected were the accommodation and food services industry division, the recreation and culture industry division and various subdivisions of other service industries. Unlike the international restrictions, the severity and regional extent of the domestic restrictions waxed and waned with COVID-19 outbreaks and recoveries.

Figure 3. Australian Airport Passengers



Source: Bureau of Infrastructure and Transport Research Economics (2022).

One indicator of the severity of the domestic restrictions is weakness in passenger movements for domestic and regional airlines (Figure 3). In December 2021 (the final month in Figure 3), domestic passenger movements were recovering following the lifting of government domestic restrictions in NSW and Victoria. The modelling assumes that the remaining domestic restrictions are phased out in the first half of 2022 as part of the policy shift from restrictions to vaccination to combat COVID-19.

Turning to the third type of shock, besides affecting the Australian economy directly, COVID-19 could have affected the Australian economy indirectly through its linkages with a weakened international economy. However, in practice, the international environment has been mostly favourable for Australia for reasons apart from COVID-19. In particular, our terms-of-trade rose by over 20 per cent over the year to the September quarter 2021, driven mainly by a run up in iron ore prices. One notable way in which COVID-related developments in the world economy did influence the Australian economy was through low world inflation in 2020 followed by high world inflation in 2021, with lagged responses in some world interest rates.

Table A2 summarises how the different types of COVID-19 shocks have been captured in model settings, with a panel of rows for each of the three types of shock. The two COVID-19 pandemic columns show the model settings under the pandemic. The first of these columns shows the historical settings based on the actual data for 2020Q1 to 2021Q4. The second column shows the projected settings for 2022Q1 onwards, the general assumption being that the model inputs gradually revert to their "normal" values. These COVID-19 settings are used in both the *baseline* scenario and the *automatic stabilisers* scenario.

The no COVID-19 pandemic column of Table A2 shows the model settings in the hypothetical situation in which there was no COVID-19 pandemic. This involves projecting the COVID-related model inputs from their pre-COVID bases in 2019Q4, the general assumption being that the COVID-related model inputs converge to their "normal" levels. These settings are used in the *no COVID pandemic* scenario.

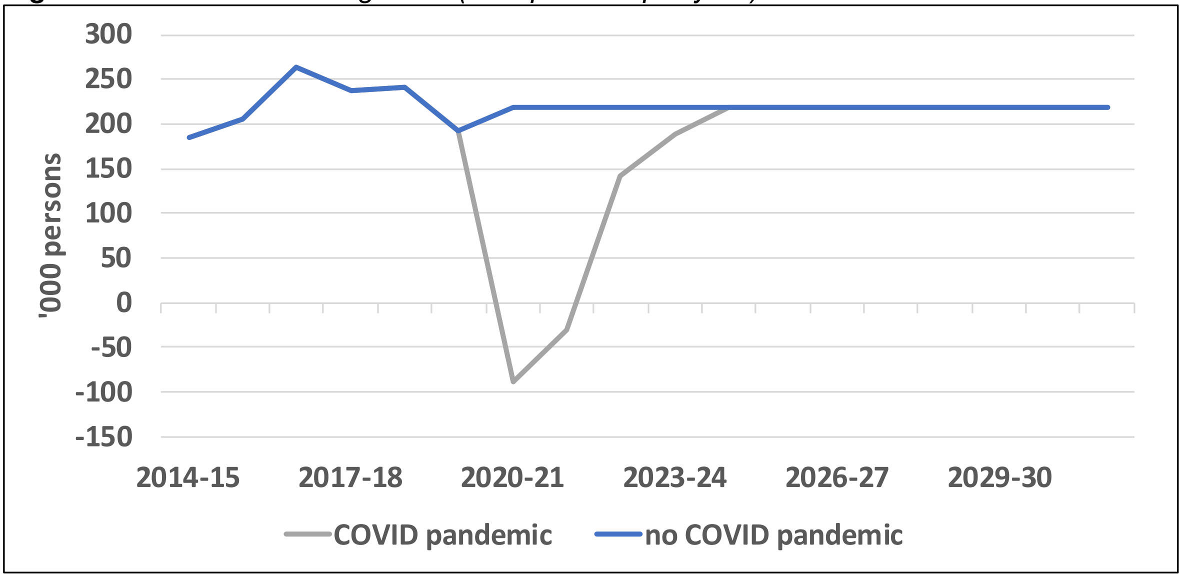
This general approach means that most model inputs eventually converge to the same "normal" values in both the COVID and no COVID cases. Hence, the effects of COVID are generally assumed to be temporary. As we shall see, the main exception is that there is a permanent loss of population in the COVID case, relative to the no COVID case, because of the temporary suspension of immigration under COVID.

The three panels of Table A2 are now discussed in general terms, beginning with the restrictions on international movements of people, then the domestic restrictions, and finally the COVID effects that operated via the world economy.

International movements of people

The international travel ban reflected in Figure 3 disrupted net overseas migration (NOM). NOM became negative (Figure 4) as potential new residents were barred from entering Australia while some Australian residents were allowed to return home. NOM is forecast to gradually recover to be at a normal level from 2024-25 onwards. This normal, annual level of 218 thousand persons is based on the average level over the decade prior to the pandemic.

Figure 4. *Net Overseas Migration ('000 persons per year)*

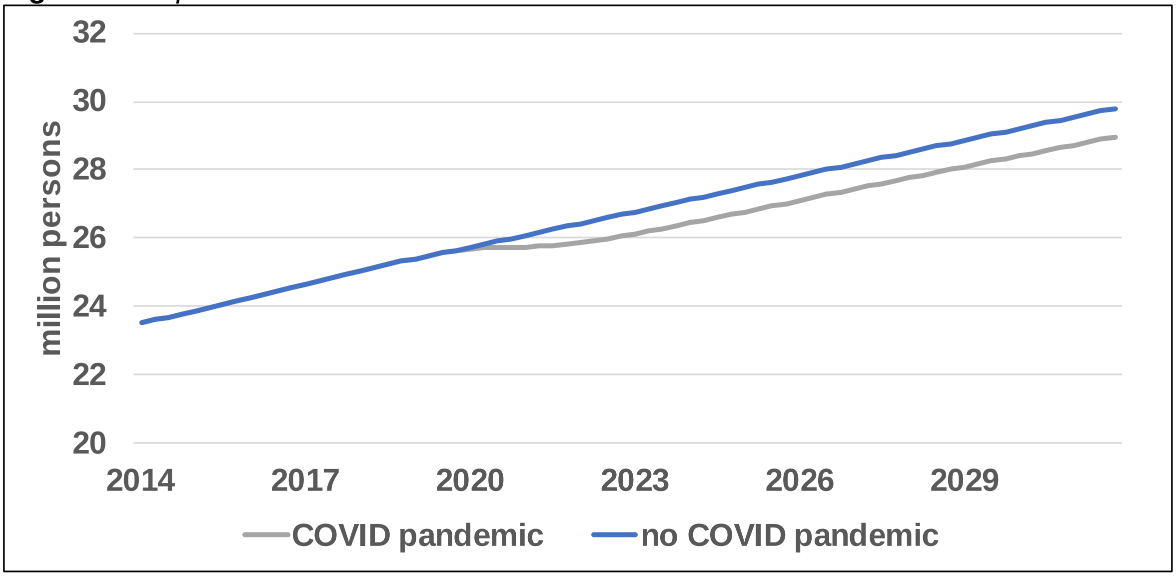


In contrast, in a hypothetical no COVID situation, it is assumed that NOM would have been maintained at the same normal level throughout (Figure 4). This would have avoided a total loss in NOM of 660 thousand persons. This loss in NOM implies a permanent loss in the level of the population relative to the *no COVID pandemic* scenario (Figure 5). This population projection is generated by a population model based on assumptions for NOM, fertility and mortality.

While COVID has resulted in a permanent loss in population, the economic significance of this should not be overstated. While a lower population means lower employment and GDP, we shall see in section 5 that there is relatively little effect on living standards as measured, for example, by GDP per capita.

Besides disrupting NOM, the international travel ban disrupted international travel and international study. This is reflected in travel-related international trade (Figure 6).

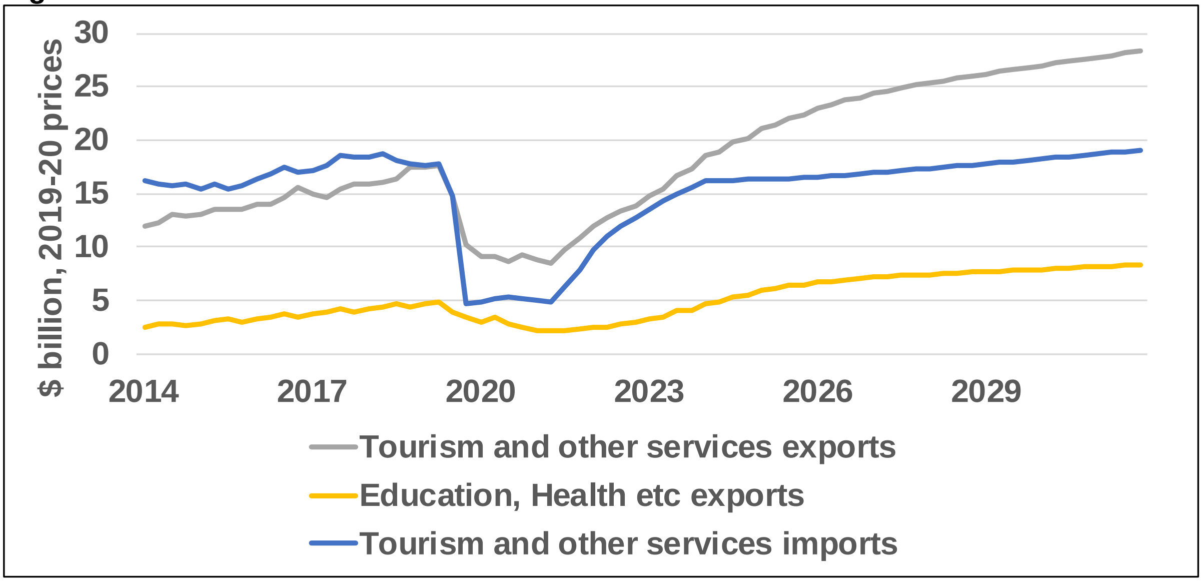
Figure 5. *Population*



Inbound tourism virtually disappeared under the international travel ban, leading to the sharp fall seen in exports of tourism and other services. The ban also eroded enrolments of international students in Australia, so that education and health exports eventually halved. However, the travel ban also virtually halted outbound tourism, leading to a sharp fall in imports of tourism and other services (Figure 6).

To represent the international travel ban in the model, the data on international passenger movements at airports (Figure 3) has been used as a simple inverse proxy for the severity of the ban. That proxy has been used to further develop the equations for travel-related international trade. That, combined with the population modelling, has enabled us to capture the main effects of the ban on international movements of people on the Australian economy.

Figure 6. *Travel-related trade*



Overall, the COVID restrictions on international travel led to weakness in both travel-related exports and imports, with approximately offsetting effects on demand for GDP. Hence, the COVID recession was mainly due to other factors, particularly the domestic restrictions that are discussed next.

Domestic restrictions

In March 2020, the government limited the local spread of COVID-19 by controlling "non-essential services". This closed or limited consumer service venues such as hotels, clubs, restaurants, gyms, indoor sporting venues, cinemas and beauty salons.

At the broadest industry level, these domestic restrictions led to the largest percentage falls in employment in the accommodation and food services industry division, and the arts and recreation industry division. At the finer subdivision level, employment was also sharply down in air and space transport, administrative services and personal and other services (ABS, 2021c). Ironically, the same employment data also indicates that two industry divisions prospered during the COVID recession, namely the financial and insurance services industry division and the public administration and safety industry division.

In any case, in terms of the modelling, all of the industry divisions and subdivisions most directly constrained by the COVID restrictions fall within the model's broad other private services industry. The model's other five broad industries (Table 1) have been directly affected by the restrictions to a lesser extent or not at all.

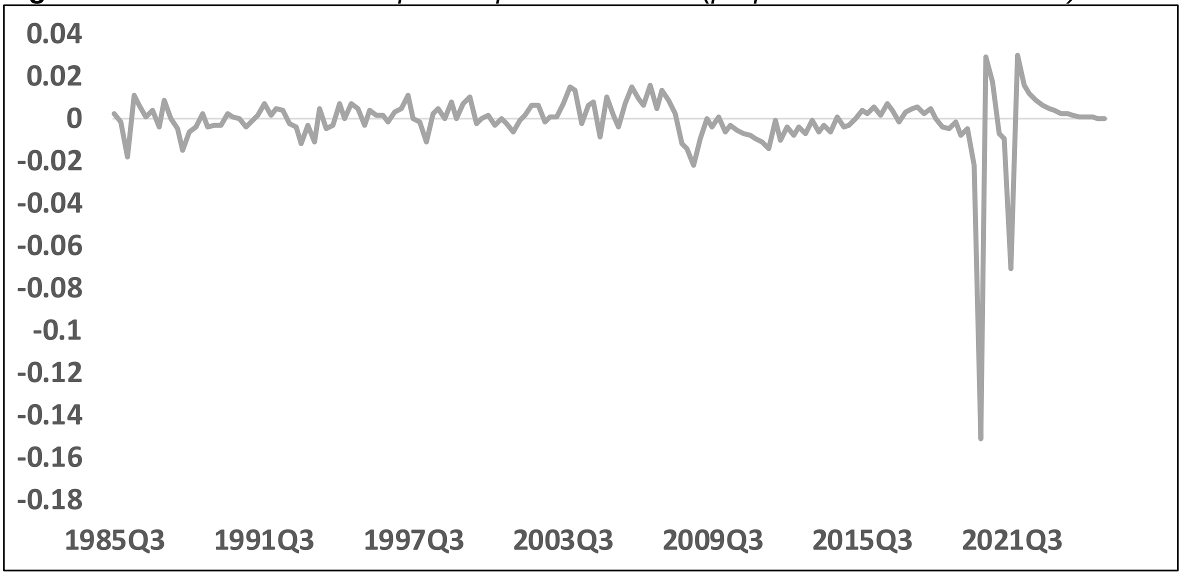
The more severe domestic restrictions and their associated economic impacts were mainly limited to short-lived episodes. This meant that real GDP was only clearly unusually low in the June and September quarters 2020 and again in the September quarter 2021 (Figure 2). Like most macro models, the model used in this paper has a Keynesian short run and hence these short-lived economic impacts appear as negative demand shocks.

In the main COVID shock, the restrictions led to a dive in household consumption in the June quarter 2020. This dive cannot be explained by the usual economic fundamentals appearing in consumption equations, such as income. It also seems at odds with the emphasis placed on habit persistence in most consumption equations.

The size of this shock to household consumption is extraordinary. The consumption equation residual of -15.1 per cent of labour income (Figure 7) is 22 times the equation's standard error of 0.7 per cent.

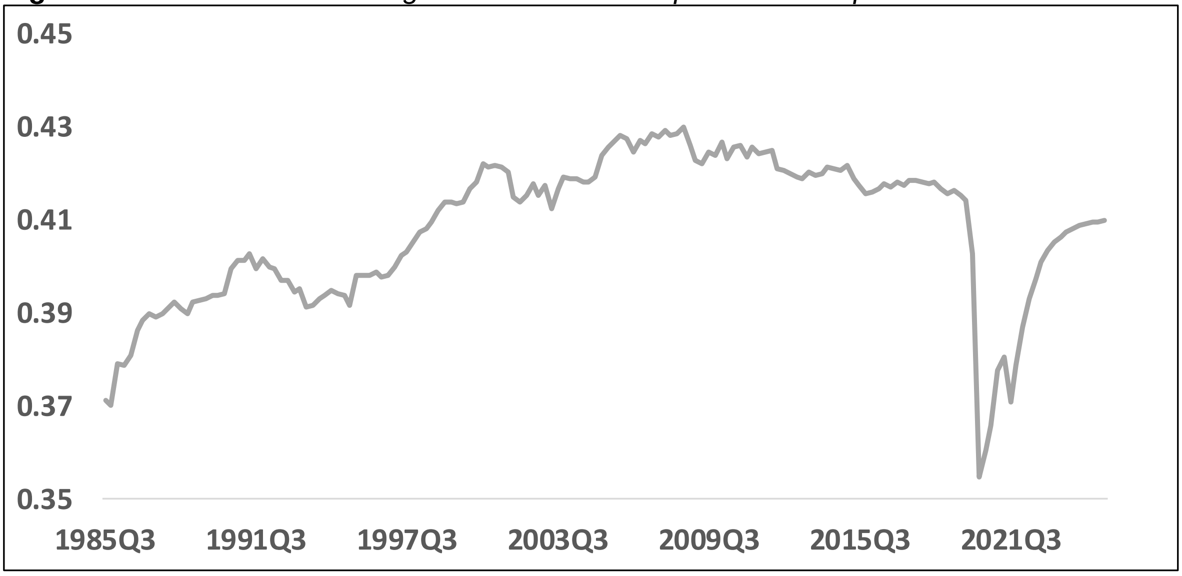
Examination of the components of household consumption show that this fall in aggregate consumption was concentrated in the category of consumption produced by the other private services industry. Thus, the share of (non-housing) household consumption accounted for by other private services dived from 41 per cent in the December quarter 2019 to 35 per cent in the June quarter 2020 (Figure 8). This is consistent with the fact noted above that the other private services industry bore the brunt of the domestic restrictions.

Figure 7. *Household Consumption equation residual (proportion of labour income)*



Considering Figures 7 and 8 together, the main effect of the domestic restrictions was to suppress household consumption of other private services, which in turn led to forced household saving. While the pattern of the shock looks different between the two figures, this difference is accounted for by the presence of the lagged dependent variable in the household consumption equation. Adjusting for that, the shocks are synchronised.

Figure 8. *Share in non-housing household consumption of other private services*



In terms of the current model, there was a pair of very large negative shocks to household consumption and household demand for other private services. Hence, in the hypothetical *no COVID pandemic* scenario, those negative shocks are removed (Table A2).

In due course, this may be represented in the model using a measure of domestic mobility such as domestic passenger movements at airports (Figure 3). These appear to provide a simple inverse proxy for the severity of those domestic restrictions, which might be used in modelling the effects on both household saving and household consumption of the restricted services.

While these consumption shocks were the main driver of the COVID recession, there was also some other COVID-related shocks that influenced the economy's recessionary path, especially in the June quarter 2020 when the domestic restrictions were imposed. This is documented in the second panel of Table A2 and is discussed briefly here.

The forced temporary closures of some businesses forced synchronised percentage falls in output and employment, whereas usually employment responds more gradually to changes in output. Thus, the domestic restrictions led to some negative shocks to industry employment demand, when those restrictions were introduced in the June quarter 2020 (Table A2).

The domestic restrictions immediately led to large job losses, which in turn led to a large jump in recipients of JobSeeker. However, because of a temporary relaxation of the work test, JobSeeker recipients did not need to look for work. Consequently, in the ABS labour force survey, many of new recipients of JobSeeker who would usually be recorded as unemployed, were instead recorded as having dropped out of the labour force because they were not looking for work. This manifests as a large negative shock to the labour force participation rate equation in the June quarter 2020 (Table A2).

The job losses in the June quarter 2020 were concentrated in part-time employment, which fell 10 per cent, rather than full-time employment, which fell 3 per cent. This compositional shift in favour of full-time employment meant that the model's measure of wages, average compensation of employees in the national accounts, rose by a very high 3.4 per cent, despite the weak labour market. This resulted in a large positive shock to the wage equation (Table A2).

In response to COVID, a temporary government program made child care fee free for a limited period. While this reduced the CPI in the June quarter 2020, it did not affect the closely related national accounts price deflator for household consumption expenditure, because of a measurement difference. This shocked the relationship between these two measures of consumer prices (Table A2). There is also some weaker evidence that the domestic restrictions had some effects on industry price setting behaviour (Table A2).

In the hypothetical *no COVID pandemic* scenario, all of the above shocks from the domestic restrictions are removed.

Notice that the *no COVID pandemic* scenario is generated without the need to remove any shocks to capital demand, because the COVID recession is mainly explained by the consumption shocks. This contrasts with previous recessions in which negative shocks to capital demand played the central role. These led to protracted periods of low housing and/or business investment to affect adjustments in capital stocks. These lengthy U-shaped recessions were met with similarly lengthy periods of expansionary macro policy. In contrast, under COVID, the imposition and relaxation of restrictions led to a synchronised V-shaped recession, calling for a macro policy response calibrated to that different shape, as we shall see in section 5.

COVID-19 effects on Australia via the international economy

Globally, the COVID recession in 2020 led to low inflation. However, in 2021 this reversed to high inflation. The reasons suggested for this inflation reversal include highly expansionary fiscal policy fuelling demand and a COVID-related loss of labour supply constricting supply. In any case, higher global inflation to some extent is being imported into Australia. In the modelling it is assumed, perhaps optimistically, that world prices for our imports gradually moderate to eventually follow the same price trend as in the *no COVID pandemic* scenario (Table A2).

This same pattern of low and then high inflation led central banks to reduce short-term interest rates in the first half of 2020 before beginning to increase them in 2022. In the *baseline* scenario, it is projected that the model's foreign short-term interest rate continues to gradually adjust upwards towards a neutral rate. In the *no COVID pandemic* scenario, this interest rate adjustment process begins sooner, from the higher pre-COVID base at the beginning of 2020 (Table A2).

4.2 Fiscal Response Inputs

This sub-section explains in general terms how fiscal policy in the COVID era has been represented in inputs to the model. More specific information can be found in Table A3.

COVID-era fiscal policy is defined as fiscal policy measures announced during 2020 and 2021. The pre-COVID starting point for fiscal policy was set out in the 2019-20 MYEFO issued in December 2019 (Australian Government, 2019). The fiscal policy announcements during 2020 and 2021 are conveniently set out in the 2020-21 Budget (Australian Government, 2020), the 2021-22 Budget (Australian Government, 2021a) and the 2021-22 MYEFO (Australian Government, 2021b), which was released in December 2021. These measures and their budget costs have been collated and then summarised in Table 6.

Table 6. *Budget Cost of COVID-era Fiscal Policy Measures*

Policy Measure	19-20	20-21	21-22	22-23	23-24	24-25	total
JobKeeper	35	55	0	0	0	0	90
COVID disaster payment & business support	0	0	21	0	0	0	21
accelerated depreciation until 2022-23	0	5	17	17	3	6	49
boosting cash flow for employers	15	20	0	0	0	0	35
JobSeeker supplements	6	15	2	2	2	2	29
bring forward of stage 2 income tax cuts	0	7	17	2	0	0	26
other policy measures	3	52	47	35	28	15	180
Total	58	155	104	55	33	24	429

Sources: Australian Government (2020, 2021a, 2021b).

The 2021-22 MYEFO (Australian Government, 2021b) provides its own summary of the budget cost of fiscal policy measures announced during 2020 and 2021. However, the MYEFO summary only includes economic and health support measures announced in response to the pandemic, which it calculates had a total budget cost of $337 billion. Our modelling differs by also including the non-pandemic policy measures of $92 billion announced in the same timeframe, bringing the total cost to $429 billion, as shown in Table 6. The table itemises the main economic support measures, while the health support measures and non-pandemic policy measures are both included under ‘other policy measures’.

The reason that we include all of the policy measures announced over this period in the modelling, not just those explicitly introduced in response to the pandemic, is because all of the measures can have a macroeconomic impact. The estimated $92 billion in non-COVID policy measures is large by historical standards, and the unfunded nature of these measures presumably reflects a willingness by policy makers to engage in additional fiscal expansion in the context of the pandemic, over and above the measures specifically linked to the pandemic.

Economic Classification of Economic Support Payments

The most important step in representing the COVID-era fiscal era measures in the model is to decide on an economic classification for each measure. The main issues arise in classifying the various economic support payments. Table 7 lists the five types of support payments, and how they are classified under three alternative classification schemes. The first classification scheme is that used by the Australian Bureau of Statistics (ABS) in preparing the national accounts. The second scheme is our preferred classification based on our economic analysis of each measure. The third scheme is the scheme adopted in the modelling. In cases where it is practical to adjust the ABS data in a consistent way to use the preferred scheme, we do that in the modelling. In cases where it is impractical to make the adjustments, we use the ABS scheme. Fortunately, in value terms, we are able to use the preferred scheme in the modelling for most of the economic support payments.

Table 7. *Economic Classification of Economic Support Payments*

Classification Program	ABS	Preferred	Modelled
JobKeeper	production subsidy	20% household transfer; 80% business transfer	20% production subsidy; 80% business transfer
Boosting Cash Flow	production subsidy	business transfer	business transfer
Business Support	production subsidy	business transfer	production subsidy
COVID-19 Disaster	household transfer	household transfer	household transfer
JobSeeker supplements	household transfer	household transfer	household transfer

JobKeeper is the policy measure with the largest Budget cost of $90 billion (Table 6). The ABS (2020b) ABS decided to classify all of JobKeeper as a production subsidy, as shown in the ABS column of Table 7. Using reasoning from the 2008 international system of national accounts (SNA2008), the ABS argued that because JobKeeper is a payment made to businesses and that the amounts of the payments are related to production values, it should be classified as a production subsidy.

In section 3 it was argued that, on closer examination, three separate components of JobKeeper can be distinguished and those components are best classified as follows. First, extra duration payments are a windfall to business owners and hence are a business transfer (39 per cent of total). Second, payments for inactive employees act as a replacement for JobSeeker and hence are a worker transfer (20 per cent of total). Third, payments for active employees are, on balance, classified as a business transfer (remaining 41 per cent of total).

Hence, under our preferred classification, 20 per cent of JobKeeper payments are classified as household transfers, representing the payments for inactive (or stood down) employees, while the remaining 80 per cent of JobKeeper payments are classified as business transfers (Table 7).

For the modelling, fortunately it was possible to adjust the ABS data to re-classify 80 per cent of JobKeeper payments as business transfers instead of production subsidies. This was done using ABS (2021b) information on JobKeeper payments by industry.

Unfortunately, it was not practical to re-classify the remaining 20 per cent of JobKeeper as a household transfer. This is because the ABS assumption that JobKeeper payments for inactive employees are a wage subsidy to employees, instead of a transfer payment to the unemployed, is ingrained in too much of the ABS data. This includes data on compensation of employees in the national accounts and employment in the labour force survey. To maintain comparability between model projections and published data, it was decided to consistently retain the assumption made in the ABS data that JobKeeper payments for inactive employees are a production subsidy (Table 7).

Businesses also received payments under the 'boosting cash flow for employers' program. It had a Budget cost of $35 billion (Table 6). Employing businesses with an annual turnover of up to $50 million received two payments totalling between $20,000 and $100,000. The exact amount of the payments depended primarily on the amount of tax that a business had withheld from wages and salaries in either the March month or the March quarter of 2020.

This retrospective nature means that businesses could not change the amount they received by changing their behaviour. Consequently, the cash flow boost operated as a lump sum transfer. As such, in our preferred classification it appears as a business transfer payment (Table 7). The aim of this transfer was to assist businesses to stay viable, although it was not targeted specifically at businesses who had been impacted by COVID restrictions.

The ABS (2020b) treated the Boosting Cash Flow program in the same way it treated the JobKeeper program, i.e., as a production subsidy. The ABS did not take into account that this program differed fundamentally from the usual production subsidy in that a business could not change the amount that it received by changing its production behaviour. Fortunately, for the modelling, it was possible to adjust the ABS data to re-classify Boosting Cash Flow payments as business transfers instead of production subsidies using ABS (2021b) information on Boosting Cash Flow payments by industry.

Without these re-classifications of JobKeeper and Boosting Cash Flow payments, the ABS data is deeply flawed for economic analysis. This has been confirmed by model simulations. Misinterpreting these extraordinarily large measures as production subsidies leads to the simulation of a large consumer price deflation when the measures were introduced, whereas in reality consumer prices were broadly static. This conflict with reality is avoided under the payment re-classifications used in the modelling in this paper.

When COVID re-emerged with the delta and omicron variants, the JobKeeper program, which expired in March 2021, was replaced with two separate programs that together performed a similar function and operated from June to December 2021. Compensation to inactive employees was paid under a COVID-19 disaster payment, compensation to business was paid under a Business Support program (Table 6), and extra duration payments were sensibly curtailed.

The ABS appropriately classified the COVID-19 disaster payment as a household transfer. Unfortunately, the ABS classified the Business Support program as a production subsidy, even though it included an anti-production subsidy element similar to the JobKeeper payments for active employees. Unfortunately, for the modelling it was not practical to re-classify the Business Support program as a business transfer because the ABS did not publish the data necessary to perform this re-classification at the industry level (Table 7).

The fifth and final category of COVID economic support program is JobSeeker supplements. A supplement of $550 per fortnight was paid to Jobseeker and related recipients in the June and September quarters 2020, phased down to $250 in the December quarter and $150 in the March quarter 2021. This was replaced with a permanent supplement of $50 per fortnight from the June quarter 2021, adding about 10 per cent to the original payment rate.

The Budget cost to 2024-25 of these JobSeeker measures was $29 billion (Table 6). Thereafter, the annual budget cost of the permanent 10 per cent increase in payment rate is $2 billion. The ABS appropriately classified these payments as household transfers (Table 7).

Model Inputs

Table A3 shows how the fiscal policy measures costed in Table 6 have been translated into model inputs. The fiscal expansion column shows the model settings under the fiscal expansion in the COVID-19 era. Those settings are used in the *baseline* scenario. The automatic stabilisers column shows the model settings in the hypothetical situation in which there was no fiscal expansion. Those settings are used in the *automatic stabilisers* scenario and the *no COVID pandemic* scenario. All three scenarios are presented in section 5.

The model classification of the various economic support payments was presented in Table 7. Those payments are translated into model inputs in the "spending" panel of Table A3.

The fiscal response also included introducing accelerated depreciation for business investment under a series of three programs at a total cost of $49 billion. The final and most generous of these, the temporary full expensing program, allows for full immediate expensing of certain investments undertaken up until 2022-23. It is subject to an eligibility cap of $5 billion in annual turnover. These immediate expensing provisions are modelled on an accrual basis when the assets are purchased (2019-20 to 2022-23), rather than on a cash basis when the reduction in tax liability is realised in the following financial year (2020-21 or 2023-24). This is to better capture the likely timing of the stimulus to investment.

The macro model now fully provides for immediate expensing provisions, including distinguishing between investment in machinery and equipment, which is eligible for immediate expensing, and investment in structures, which is not eligible. Immediate expensing is translated into model inputs in the "taxes" panel of Table A3.

The fiscal response also brought forward previously planned personal income tax cuts. The stage 2 personal income tax cuts were introduced in 2020-21 instead of 2022-23, while maintaining the original timetable for abolishing the Lower and Middle Income Tax Offset (LMITO) in 2022-23. The budget cost of the bringing forward of the stage 2 tax cuts was $26 billion (Table 6). The fiscal expansion did not involve any change to the stage 3 personal income tax cuts, which are legislated to be introduced in 2024-25 and are included in all scenarios ("taxes" panel of Table A3).

The remaining fiscal policy measures are shown in Table 6 as the single line item 'other policy measures'. These other measures have a combined budget cost of $180 billion. These measures include the health support payments, which are generally temporary, as well as measures not related to the pandemic, some of which have significant ongoing budget costs. For example, the response to the Aged Care Royal Commission entails a permanent, annual cost of about $5 billion. For modelling purposes, these remaining policy measures are assumed to add to government final demand ("spending" panel of Table A3).

Table 6 identifies the Federal Government, but not the state government, fiscal policy measures announced in 2020 and 2021. However, the way model inputs are set in Table A3 means that most state government measures are automatically included in the modelling of the fiscal expansion in the *baseline* scenario, because measures by all levels of government are generally captured in the underlying historical ABS data that are used in the modelling. Similarly, both Federal and state government measures announced in 2020 and 2021 are effectively removed in the *automatic stabilisers* scenario because it is based on 2019 fiscal policy settings.

5 The three scenarios

This section presents and compares the outcomes of the *baseline*, *automatic stabilisers* and *no COVID pandemic* scenarios. This allows us to separately identify the main macroeconomic effects of the COVID restrictions and the expansionary fiscal policy implemented at the same time.

To assess whether the strength of the discretionary fiscal response to COVID was appropriate, we compare macroeconomic outcomes between the *baseline* scenario and the *automatic stabilisers* scenario, which removes the discretionary fiscal response in the way discussed in section 4.2. To understand the macroeconomic effects of COVID, we compare outcomes between the *automatic stabilisers* scenario and the *no COVID pandemic* scenario, which removes the economic effects of the COVID restrictions in the way discussed in section 4.1.

Before generating the three scenarios, we ensure that the settings for the model's macro policy rules are suitable for this exercise.

5.1 Macro Policy Rules

The three scenarios have implications for how the fiscal and monetary policy rules are used in the modelling. The fiscal policy rule is used to ensure that fiscal policy is sustainable in each scenario; this is necessary so that the scenario outcomes can be validly compared. The monetary policy rule is used to target inflation; but it needs to take into account the zero lower bound (ZLB) on the cash rate.

The model ensures long run fiscal sustainability by using a fiscal policy rule. Under that rule, the effective average rate of personal income tax, *POLLAB*, is the swing fiscal policy instrument that adjusts automatically and gradually to achieve a long run target, *RPUBLIT*, for the ratio of net public debt to smoothed nominal GDP. For full details of the rule, see Murphy (2020).

In the short-term, this fiscal policy rule is over-written in the scenarios to take into account the announced personal income tax policies described in section 4.2. This includes the bringing forward to 2020-21 of the stage 2 personal income tax cuts in the *baseline* scenario, but not in the other two scenarios. It also includes the implementation in 2024-25 of the stage 3 personal income tax cuts in all three scenarios. The fiscal policy rule for *POLLAB* then comes into force from 2025-26 onwards.

By the time the fiscal policy rule is in force, the level of public debt is already very different between the three scenarios, making it unrealistic to impose a uniform public debt target. Instead, in each scenario, the target ratio of public debt to GDP, *RPUBLIT*, used from 2025-26 onwards, is set equal to the actual ratio at the end of 2024-25.

Turning to the monetary policy rule, in the model, inflation is targeted using a type of Taylor rule for the short-term interest rate, as described in Murphy (2020). A similar rule is used in the RBA's MARTIN model (Ballantyne et al., 2020), except that here the parameters of the rule are estimated rather than calibrated and the neutral interest rate is based on the 10-year government bond rate.

In response to the COVID recession, monetary policy was loosened. So much so that short-term interest rates were close to zero from May 2020 until the time of writing in March 2022. However, the short-term interest is simulated to begin increasing from the next quarter, the June quarter 2022, in the *baseline* scenario.

In the counter-factual *automatic stabilisers* scenario, the absence of discretionary fiscal expansion means that, initially, unemployment is higher and inflation is lower than under the *baseline* scenario. Under the Taylor rule, this combination of higher unemployment and lower inflation automatically lowers the short-term interest rate relative to its near-zero path in the *baseline* scenario, making the short-term interest negative to an implausible extent.

To avoid this implausibility, in the *automatic stabilisers* scenario a ZLB is imposed on the short-term interest rate. The ZLB is binding for 2.5 years, from mid-2020 until the end of 2022. Thereafter, the monetary policy rule pursues the inflation target in the usual way.

5.2 Comparing Scenario Outcomes

In considering the outcomes, we distinguish three time periods. The COVID era, in which the COVID restrictions suppressed economic activity and the discretionary fiscal expansion was implemented, extends from 2020 to 2021. The post-COVID era, in which there is macroeconomic instability following excessively expansionary macroeconomic policy, extends for 3.5 years, from 2022 to mid-2025. The macroeconomy then stabilises in the normalcy era, which begins from mid-2025. This stabilisation is aided by the fiscal policy rule, which comes into force at the beginning of this era.

These eras are a simplification, intended to make the model results more accessible. In practice the delineation between the eras is not so distinct, because macro variables do not evolve in a fully synchronised way because of the complex dynamic interactions between them.

The scenarios actually extend to the end of 2060. However, for the purposes of this paper, results are reported only to the June quarter 2032, because by then each scenario has largely converged to its long run equilibrium path. Thus, results for the normalcy era are reported from 2025-26 to 2031-32.

The *no COVID pandemic* scenario serves as a reference point for the other scenarios. Because it removes both the economic shocks from COVID and the expansionary fiscal policy that was introduced in response, the economy expands relatively smoothly compared to the two scenarios in which COVID is present, as will be seen in Figures 9-19.

At the same time, because the *no COVID pandemic* scenario does not remove non-COVID shocks to the economy, growth shows some variation. One example of a non-COVID shock that influences the *no COVID pandemic* scenario is the run up in world commodity prices from the September quarter 2020 to the September quarter 2021, which resulted in a rise of over 20 per cent in Australia’s terms-of-trade. Since then, this rise in the terms of trade has been gradually subsiding.

We now compare the outcomes across the three scenarios for 11 key variables in Figures 9-19. The figures cover public finances, household finances, economic activity, inflation and monetary policy. In discussing each figure, we begin with the *no COVID pandemic* scenario, because it serves as the reference point for the COVID scenarios. We then use the *automatic stabilisers* scenario to examine the economic effects of COVID, and the *baseline* scenario to assess the effects of the discretionary fiscal expansion introduced in response to those economic effects.

Public finances

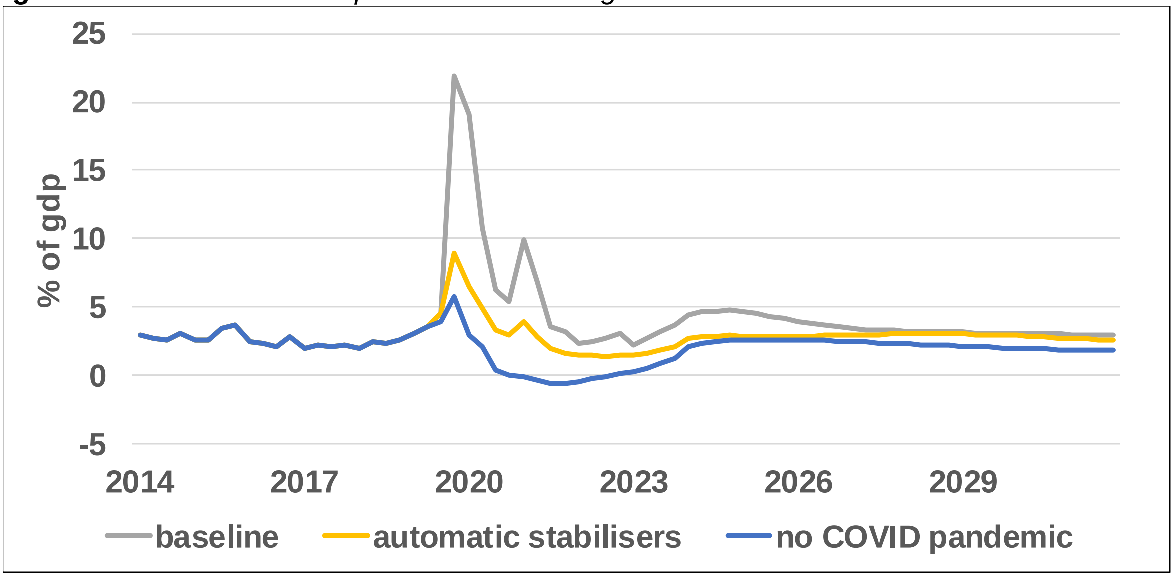
In the model, public finances cover the entire non-financial public sector. This is broader in scope than the Federal Government Budget, because state and local governments are included as are public trading enterprises. This broader scope means that the deficit and debt estimates reported here are generally higher than the more commonly reported estimates that only cover the Federal Government Budget.

Public net borrowing as a ratio to GDP is relatively constant in the *no COVID pandemic* scenario (Figure 9). While there is a movement into negative borrowing or surplus in 2021-22 and 2022-23, this is temporary, mainly reflecting the boost to tax revenue from the temporary strength in the terms of trade referred to above.

COVID is introduced in the *automatic stabilisers* scenario, leading to a recession. This weaker economic activity during the COVID era elevates the ratio of public net borrowing to GDP over the path in the *no COVID pandemic* scenario (Figure 9) due to three main factors. First, the ratio of government final demand to GDP rises, even in the absence of a discretionary fiscal expansion, because the recession makes GDP lower. Second, the recession raises government transfer payments because unemployment is higher. Third, the recession reduces profits, leading to lower company tax revenue[9].

The massive discretionary fiscal expansion that was detailed in Table 6 is introduced in the *baseline* scenario. This makes the public borrowing ratio extraordinarily high, much higher than the already elevated level seen in the *automatic stabilisers* scenario (Figure 9).

Figure 9. *Public finances – public net borrowing*

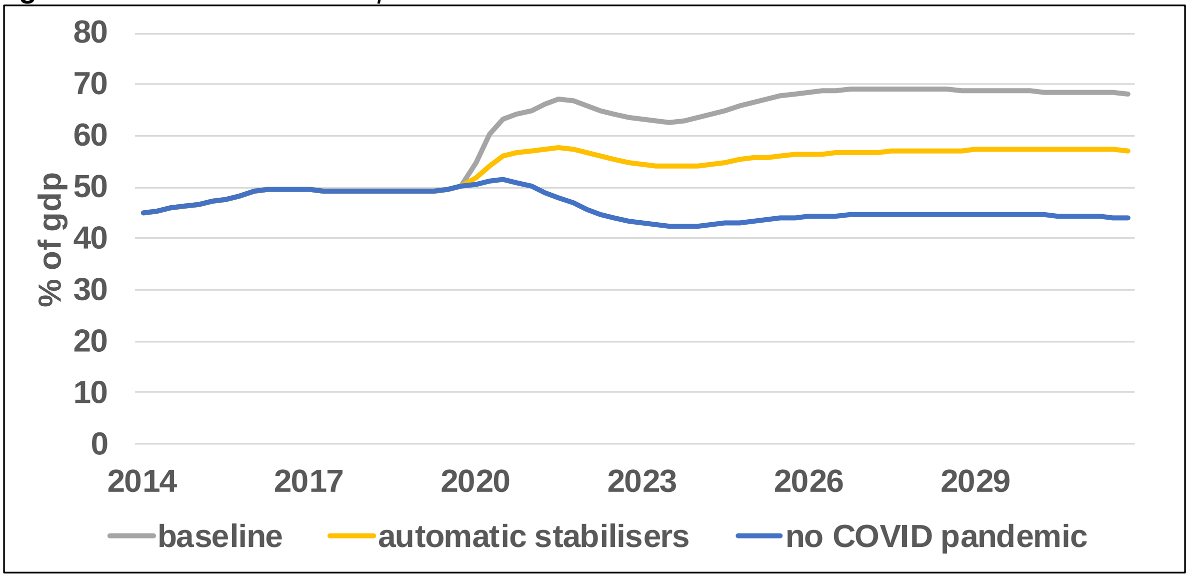


Turning to public debt, the ratio of public debt to annual GDP was stable in the three years to 2019 (Figure 10), suggesting that fiscal policy was sustainable before COVID. Once COVID strikes, the public debt ratio is driven by the developments in the public net borrowing ratio discussed above and by changes in inflation. From 2025-26 the fiscal policy rule is switched on, ensuring that the public debt ratio then stabilises in all three scenarios.

[9] In the *automatic stabilisers* scenario, the percentage contributions of the three factors to the elevation in the public borrowing ratio during the COVID era are 55 per cent from government final demand, 25 per cent from government transfer payments and 21 per cent from company tax revenue.

In the *No COVID pandemic* scenario, the temporary budget surplus referred to above pushes down the public debt ratio from 2021 to 2023, before it again stabilises (Figure 10).

Figure 10. *Public finances – public net debt*



In the *automatic stabilisers* scenario, the COVID economic shock has two effects on the ratio of public debt to GDP, until the ratio stabilises in the normalcy era under the fiscal policy rule. First, the additional public borrowing resulting from a weak economy directly adds 8 percentage points to the public debt to GDP ratio through the public debt numerator, compared to the *No COVID pandemic* scenario (Figure 10). Second, the weak economy reduces inflation, increasing the ratio by a further 4 percentage points by reducing the nominal GDP denominator, in a negative inflation tax on holders of public debt. Hence, in total, the COVID economic shock adds 12 percentage points to the public debt to GDP ratio, which is the difference between the ratio in the *automatic stabilisers* scenario and the *no COVID pandemic* scenario, as measured at the beginning of the normalcy era (Figure 10).

In the *baseline* scenario, the massive discretionary fiscal expansion in response to COVID-19 has effects on the ratio of public debt to GDP through the same two channels. First, the additional public borrowing directly adds 16 percentage points to the ratio through the public debt numerator. Second, the fiscal expansion adds to inflation, reducing the ratio by 5 percentage points by adding to the nominal GDP denominator, in an inflation tax on holders of public debt. Hence, in net terms, the discretionary fiscal expansion adds 11 percentage points to the public debt to GDP ratio, which is the difference between the ratio in the *baseline* scenario and the *automatic stabilisers* scenario, as measured at the beginning of the normalcy era (Figure 10).

Combining these results, in the *baseline* scenario, COVID adds a total of 23 percentage points to the ratio of net public debt to GDP, relative to the *No COVID pandemic* scenario. Of this, 16 points is from the additional borrowing under the discretionary fiscal expansion and 8 points is from the additional borrowing under the automatic stabilisers, a total of 24 points. There is a net offset of 1 percentage points from an inflation tax on bond holders. In short, the discretionary fiscal expansion trebled the fiscal expansion that would have otherwise occurred had sole reliance been placed on the automatic stabilisers, by lifting it from 8 points to 24 points of annual GDP, before taking into account inflation tax effects.

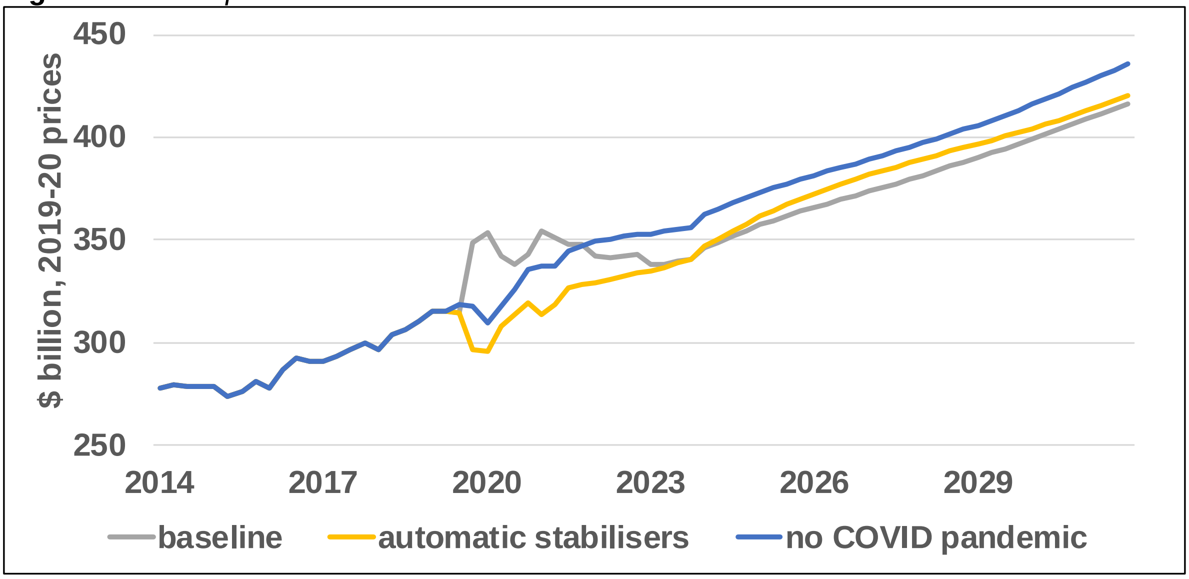
Household finances

COVID-related policies had three dramatic effects on household finances during the COVID era. First, the restrictions on consumption of services produced by certain industries forced down household consumption in aggregate, i.e., there was forced private saving, as seen in section 4.1. Second, the same restrictions also reduced employment and profits in the restricted industries, reducing private incomes. Third, the discretionary fiscal expansion, as set out in section 4.2, added greatly to private incomes, in fact more than offsetting the negative effect from the restrictions. The modelling scenarios quantify all three of these shocks to household finances.

None of these three COVID shocks are present in the *no COVID pandemic* scenario. Thus, real private income (Figure 11) and real household consumption (Figure 12) both grow relatively smoothly.

In the *automatic stabilisers* scenario, the first two COVID economic shocks are present. Thus, the COVID restrictions lower private incomes (Figure 11) and household consumption (Figures 12), compared to the *no COVID pandemic* scenario. Further, the income losses experienced by the factors of production in the restricted industries lead the affected households to reduce their consumption, causing the weakness in economic activity to spread to the unrestricted industries. Overall, in the COVID era (2020 and 2021), real private income is $119 billion lower in the *automatic stabilisers* scenario compared to the *No COVID pandemic* scenario (Figure 11).

Figure 11. *Real private income*



Without the operation of automatic stabilisers on the government budget, this income loss would have been larger. For example, the operation of automatic stabilisers means that real personal income tax payments are $12 billion lower and real government transfers to the private sector are $10 billion higher compared to the *No COVID pandemic* scenario, during the COVID era.

The *baseline* scenario adds in the third and final COVID economic shock, the massive discretionary fiscal expansion. This expansion more than compensates the private sector for the COVID income loss of $119 billion identified above. In fact, during the COVID era, the fiscal expansion means that real private income is $265 billion higher in the *baseline* scenario than in the *automatic stabilisers* scenario (Figure 11).

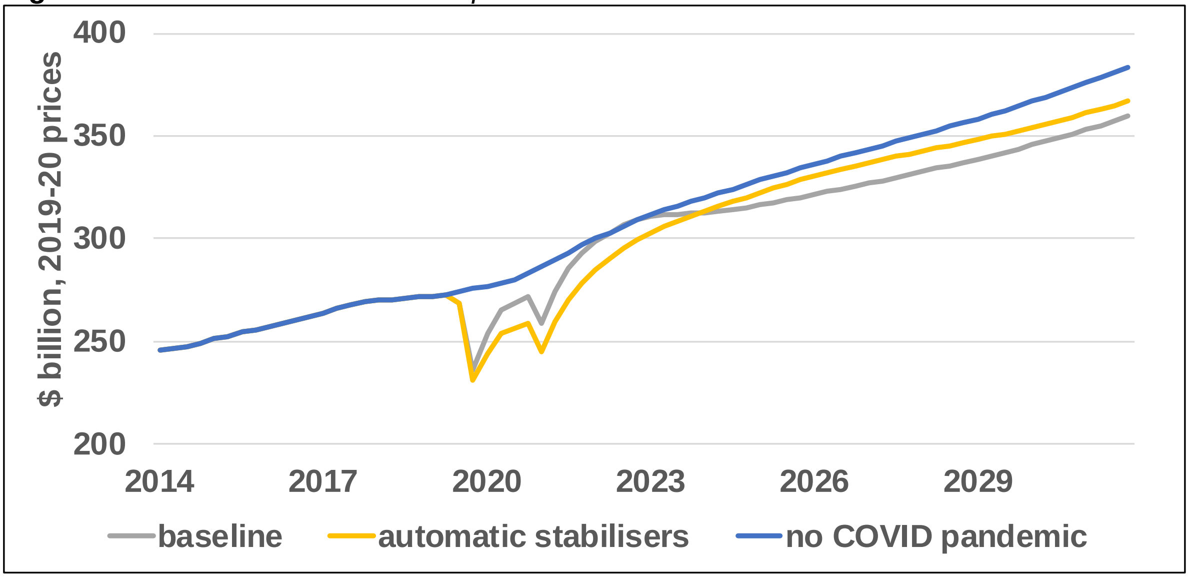
Thus, during the COVID era, the fiscal expansion conferred the private sector with over $2 in compensation for every $1 of real income loss from the COVID recession. Hence, when compared to the reference path of the *No COVID pandemic* scenario, real private income is lower in the *automatic stabilisers* scenario but higher in the *baseline* scenario (Figure 11). Such over-compensation goes beyond what is justified in equity grounds, can create disincentive effects, as shown in section 3.3, and can lead to inflationary pressures, as analysed later in this section.

The COVID-era gain in real private income of $265 billion from the fiscal expansion reflects both its direct and indirect effects. The direct effects arise from the economic support payments shown in Table 7 and the bringing forward of the stage 2 personal income tax cuts, and account for the majority of the gain. The remainder of the real income gain is due to indirect effects on private incomes from the fiscal expansion via higher employment and profits in the *baseline* scenario compared to the *automatic stabilisers* scenario.

In each scenario, the implications of these developments in real private income for real household consumption are influenced by the approach taken to modelling household consumption. In the model, household shareholders are assumed to 'pierce the corporate veil' (Poterba, 1987) so they take into account the benefit they receive in the form of higher share prices when profits are retained rather than distributed as dividends. This plays a role in the modelling to the extent that some of the transfer payments that businesses received from government under the fiscal expansion were retained. Except in the long run, the model does not assume Ricardian equivalence under which households also pierce the government veil to understand the government's intertemporal budget constraint. Consequently, in the model, consumers gradually spend the over-compensation they receive from government, rather than ignore it in the knowledge that they will have to pay later through higher taxes. See Murphy (2020, pp. 259-262) for further details on how consumption has been modelled.

The over-compensation of the private sector means that real private incomes were $146 billion above normal levels during the COVID era, as seen by comparing the *baseline* scenario to the *No COVID pandemic* scenario (Figure 11). Despite higher real incomes, real household consumption was $148 billion below normal levels in the same period (Figure 12). This unusual outcome reflects the forced private saving brought about by the COVID restrictions.

Figure 12. *Real household consumption*

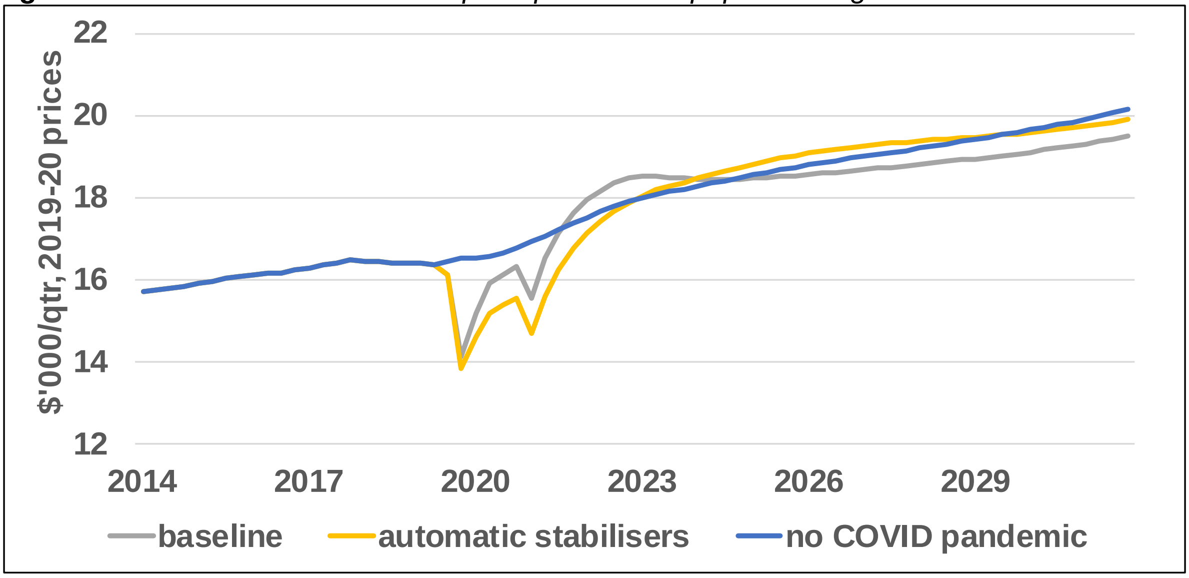


At the same time, the massive discretionary fiscal expansion was successful in reducing the weakness in household consumption caused by the COVID restrictions. While real household consumption was $148 billion below normal levels in the *baseline* scenario, without the discretionary fiscal expansion it is an additional $81 billion weaker in the *automatic stabilisers* scenario in the COVID era (Figure 12).

Moving on from the COVID era to the post-COVID era, the relaxation of COVID restrictions brings an end to forced household saving. This sees real household consumption recover. While consumption remains below the level in the *no COVID pandemic* scenario, this is only because the permanent population loss (Figure 5) from reduced migration during the COVID era results in the economy being smaller than under the *no COVID pandemic* scenario. When consumption is instead viewed in per capita terms, it is seen to fully recover in the *automatic stabilisers* scenario to be close to the path followed under the *no COVID pandemic* scenario (Figure 13).

In the *baseline* scenario, the massive discretionary fiscal stimulus causes the recovery in per capita consumption to overshoot the path followed in the *no COVID pandemic* scenario (Figure 13). When the COVID restrictions lift, consumption can return to normal, but it overshoots mainly because it takes consumers time to spend the large COVID support payments that they have received during the COVID era. This sets a pattern for the *baseline* scenario in which the combination of the lifting of restrictions and the aftereffects of the COVID support payments and other discretionary fiscal stimulus initially leads to unsustainably strong economic activity. This brings macroeconomic instability in the 3.5 years of the post-COVID era. This is finally followed by the resumption of macroeconomic stability in the normalcy era.

Figure 13. *Real household consumption per head of population aged 15-64*



Economic activity

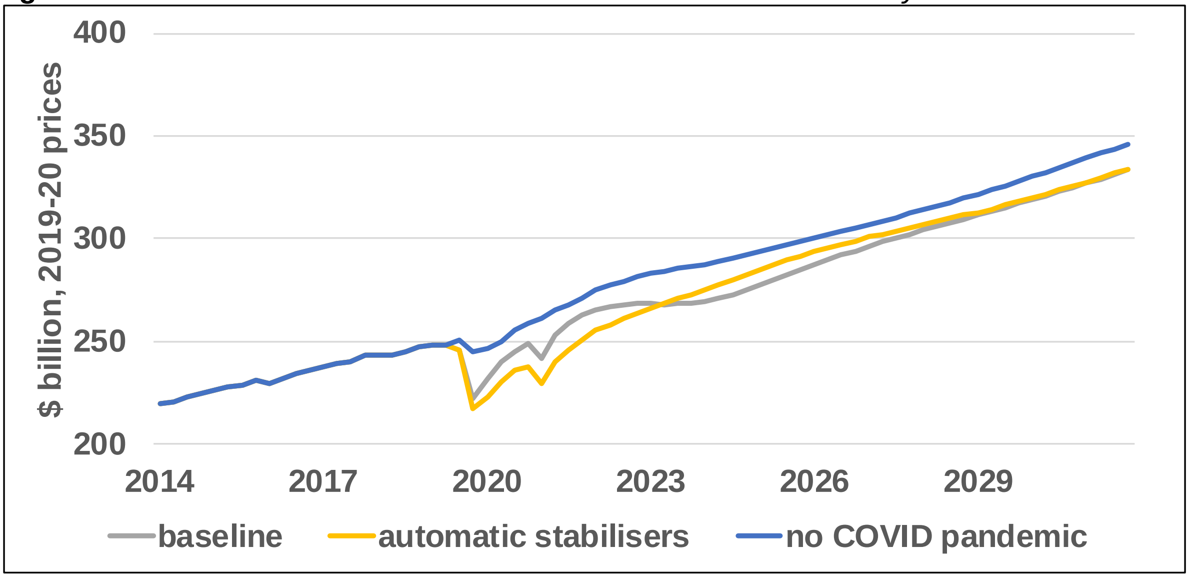
Returning to the COVID-era, the COVID economic cycle was largely driven by the imposition and relaxation of restrictions on consumption of certain consumer services. Hence, in the *baseline* scenario, we see that the fluctuations in household consumption (Figure 12) are the main driver of the fluctuations in real GDP (Figure 15). On the entry to the economic downturn, in the June quarter 2020, real household consumption fell by 12 per cent, while on the exit from the downturn, in the four quarters to the September quarter 2022, it is forecast to rise by 16 per cent[10]. This translates into qualitatively similar, but more muted, percentage changes in real GDP, reflecting the share of GDP accounted for by household consumption.

This central role of consumption of other services in driving the economic fluctuations can also be seen in the data for real GVA by industry. The cycle already seen in Figures 12 and 15 can be seen again in the real value added of the other private services industry (Figure 14). It is largely absent from the model's five other industries listed in Table 1. Figures 12 and 14 use the same scale to facilitate direct comparisons. This cyclical pattern is largely absent from the *no COVID pandemic* scenario, consistent with the idea that the *no COVID pandemic* scenario serves its purpose of removing the main COVID-related shocks.

As noted above, in the post-COVID era, real GDP grows very strongly in the four quarters to the September quarter 2022. This is in response to the removal of restrictions and the aftereffects of the massive fiscal expansion. This results in a tight goods market.

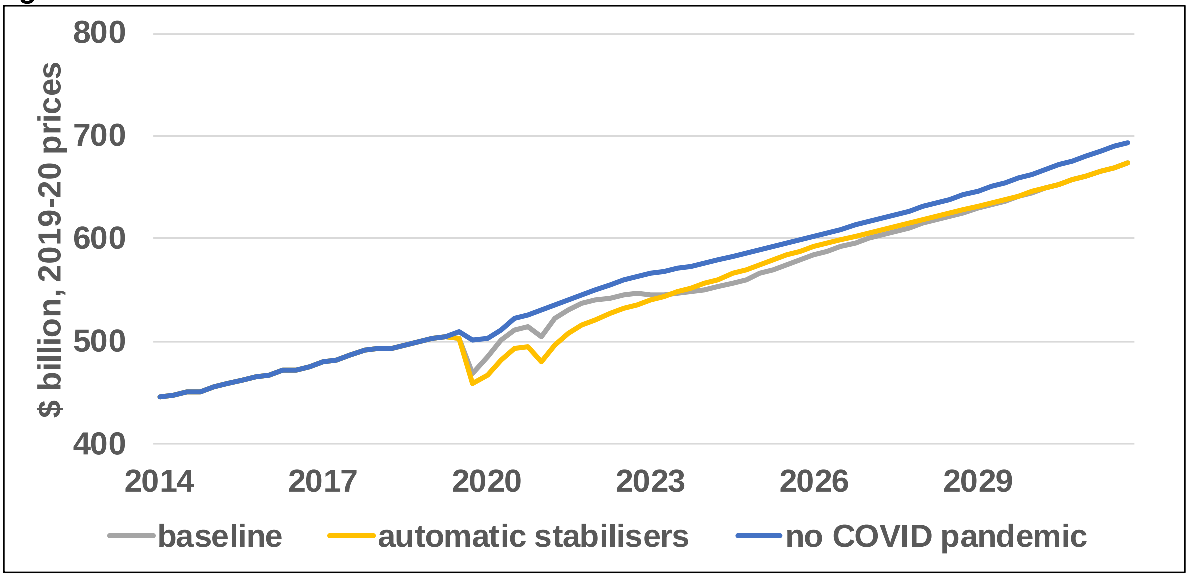
[10] 6 out of this 17 per cent forecast gain in real consumption over four quarters was recorded in the first quarter alone, the December quarter 2021.

Figure 14. *Real Gross Value Added of Other Private Services Industry*



Once the normalcy era is reached, real GDP grows at a similar steady rate in all three scenarios. However, while growth rates are similar, the level of real GDP is lower in the two COVID scenarios than in the *no COVID pandemic* scenario. This is because in the COVID scenarios there is an ongoing population loss from net overseas migration being very low during the COVID era, resulting in a smaller economy. In the long run (the year 2060), the population, employment, real GDP and total[11] real consumption are, respectively, 2.8, 3.0, 2.8 and 2.7 per cent lower in the *baseline* scenario than in the *no COVID pandemic* scenario. This implies that, while the population loss leads to a loss in real GDP and real consumption, these losses disappear when real GDP and consumption are re-calculated on a per capita basis to better gauge of living standards.

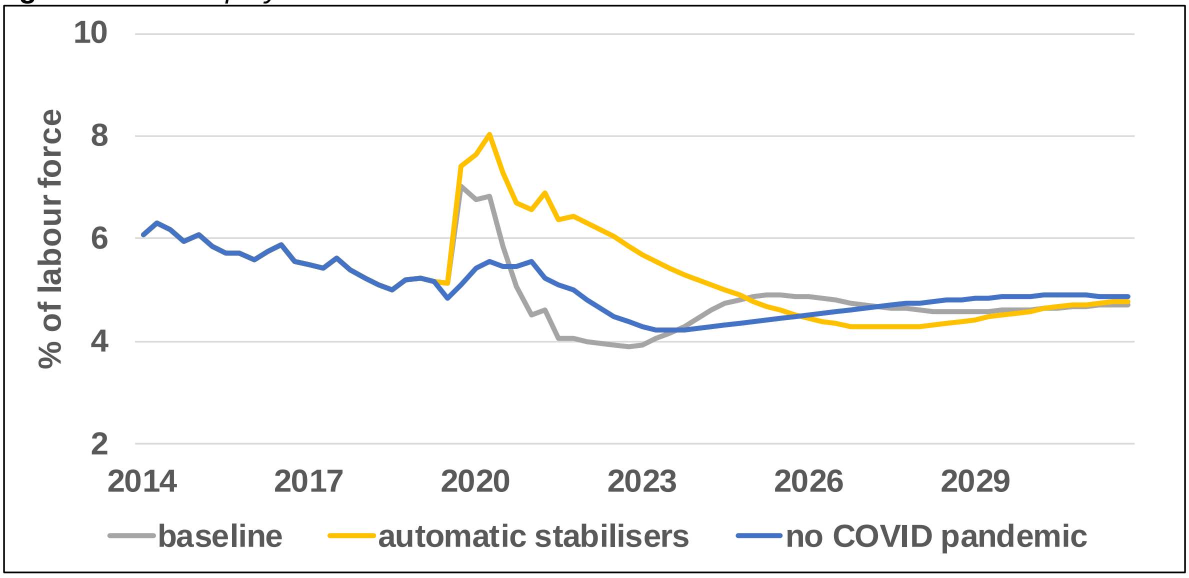
Figure 15. *Real GDP*



[11] Total consumption includes household and government consumption.

Turning to unemployment, in the *no COVID pandemic* scenario, it falls to stabilise eventually at its sustainable rate, or NAIRU, estimated at 4.6 per cent (Figure 16). In contrast, in the *automatic stabilisers* scenario, the COVID restrictions cause unemployment to initially climb to a peak of 8 per cent.

Figure 16. *Unemployment rate*



In the *baseline* scenario, the massive fiscal expansion means the rise in unemployment is more moderate and short-lived than in the *automatic stabilisers* scenario. As a result, in 2021-22 and 2022-23, the unemployment rate is between 2 and 3 percentage points lower than in the *baseline* scenario than in the *automatic stabilisers* scenario. Indeed, such is the strength of the fiscal expansion, that over the same period unemployment is actually 0.5 to 1 percentage points lower in the *baseline* scenario than in the *no COVID pandemic* scenario (Figure 16). So, while the fiscal expansion was successful in countering higher unemployment, it may have been applied too strongly and for too long.

Some caution is needed in interpreting the outcomes for unemployment during the JobKeeper program, which extended from the June quarter 2020 to the March quarter 2021. As noted previously, the ABS treated employees who were stood down but in receipt of JobKeeper as being employed, even though they were economically inactively, like recipients of JobSeeker. If stood down employees were instead regarded as unemployed, the unemployment peak in the *baseline* scenario[12] would be significantly higher than shown in Figure 16.

By the time the normalcy era is reached, the unemployment rate is close to converging to the estimated NAIRU of 4.6 per cent in all three scenarios. However, before then, in the *baseline* scenario the unemployment rate remains lower at near 4 per cent throughout 2022 and 2023 because of the lagged effects of the massive fiscal expansion. This results in a tight labour

[12] The unemployment peak in the *automatic stabilisers* scenario would also be higher, even though JobKeeper is not included in that scenario. This is because the *automatic stabilisers* scenario uses the *baseline* scenario as its starting point, and therefore inherits its measurement errors in unemployment.

market in the post-COVID era. In contrast, in the *automatic stabilisers* scenario, the labour market is weak in the post-COVID era in the absence of a discretionary fiscal expansion.

Inflation

Under the relative stability of the *no COVID pandemic* scenario, annual consumer price inflation converges to the Reserve Bank target of 2 to 3 per cent (Figure 18) relatively quickly. After allowing for annual productivity growth of about 1.5 per cent, annual wage inflation converges to its implicit target rate of about 4 per cent (Figure 17).

Figure 17. *Wages inflation (national accounts basis)*

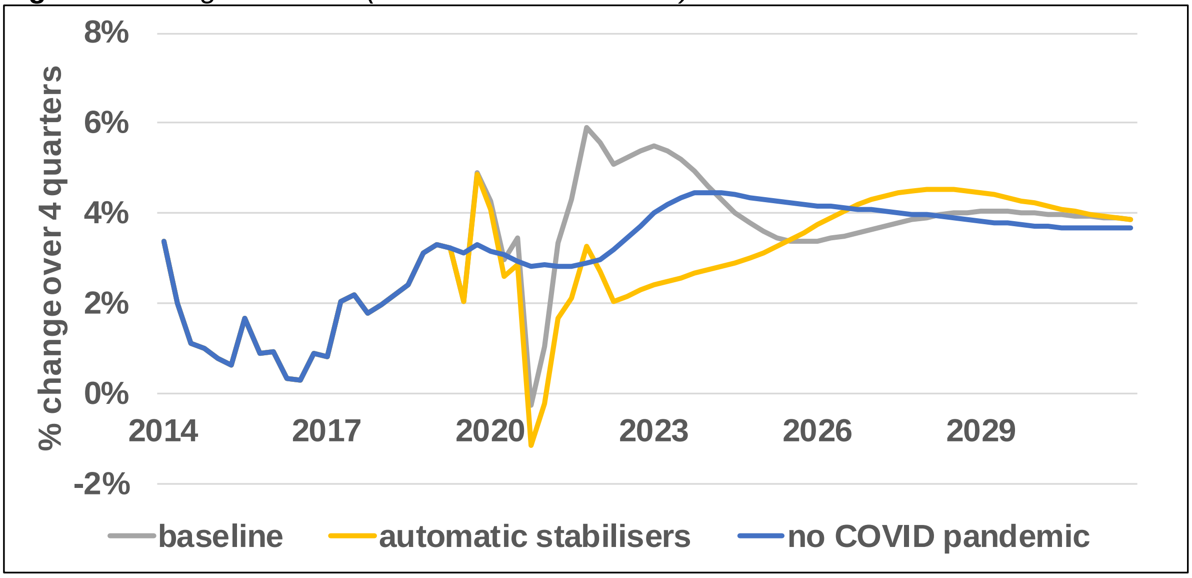
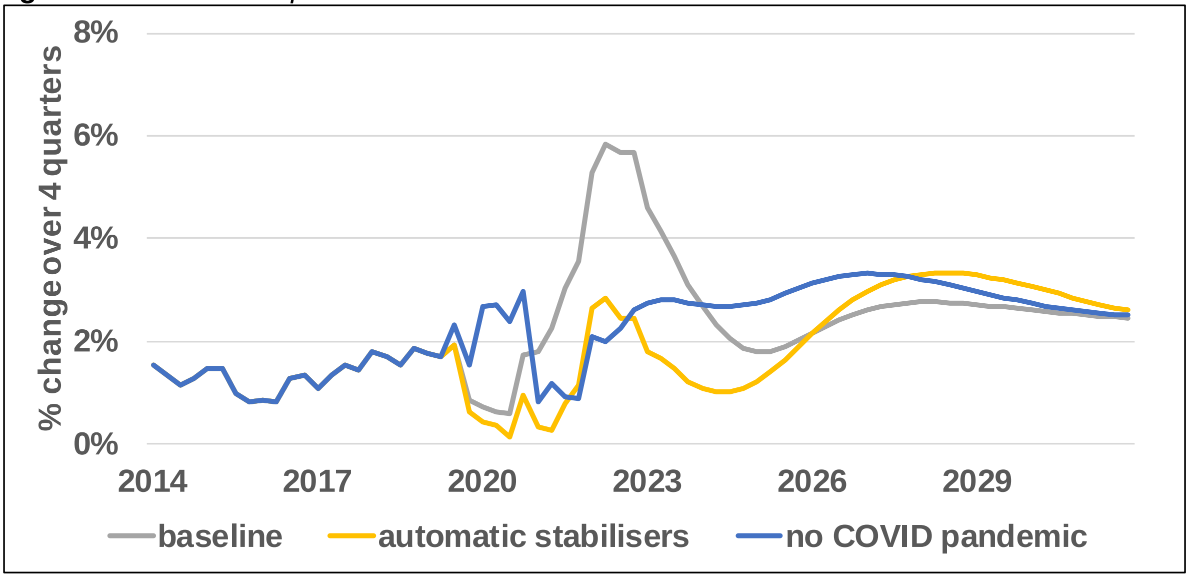


Figure 18. *Consumer price inflation*



In contrast, the COVID scenarios are marked by these inflation targets being missed in the post-COVID era. On the one hand, in the *automatic stabilisers* scenario, the weak labour market results in wage and price inflation generally being below target. On the other hand, in the *baseline* scenario, the combination of tight goods and labour markets results in wage and price inflation generally being above target. Annual wage and price inflation both reach peaks of about 6 per cent. The tight goods market plays an important role in these inflation outcomes; price inflation exceeds its target by more than wage inflation exceeds its implicit target.

These simulated outcomes for price and wage inflation, like the simulated outcomes for GDP and unemployment, are consistent with the interpretation that discretionary fiscal expansion was the appropriate policy, but that it was applied too strongly and for too long. That is, a fiscal policy that lay somewhere between the settings in the *automatic stabilisers* scenario and the *baseline* scenario would have been able to stabilise wage and price inflation near their targets and unemployment near the NAIRU early, rather than late, in the post-COVID era.

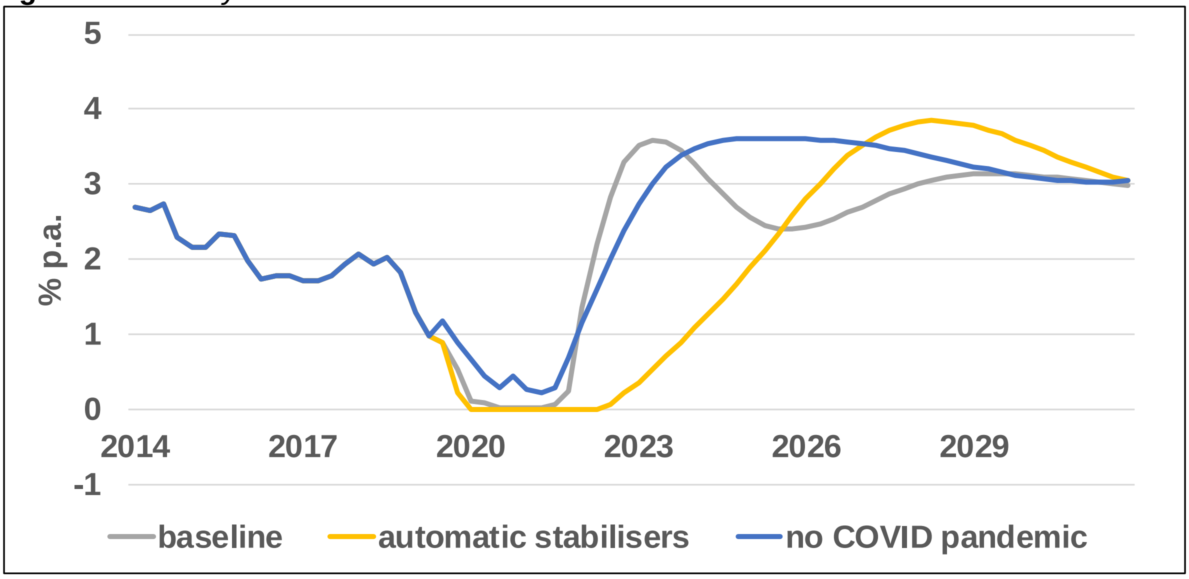
The *baseline* scenario projections for consumer price inflation are well above the latest government forecasts. For example, the through the year inflation rate to the June quarter 2023 is projected at 5.75 per cent (Figure 18). This compares to Treasury (Australian Government, 2021b) and RBA (RBA, 2022) forecasts at the time of writing of 2.5 per cent and 2.75 per cent respectively. The government forecasts more resemble those in the *automatic stabilisers* scenario, which may indicate that the government forecasts make insufficient allowance for the looming inflationary effects of the highly expansionary fiscal policy.

Monetary policy

Under the monetary policy of the hypothetical *no COVID pandemic* scenario, monetary policy is loose enough during the COVID-era years to expand the economy sufficiently to bring unemployment down to the NAIRU and inflation up to its target rate. While monetary policy is loose, it is not so loose that the short-term interest rate falls as low as the ZLB (Figure 19). Macroeconomic stability is achieved earlier than in the COVID scenarios.

In the *automatic stablisers* scenario, the higher unemployment and lower inflation resulting from the COVID restrictions lead to a looser monetary policy under the model's monetary policy rule. Indeed, as flagged earlier, the short-term interest rate reaches the ZLB in mid-2020 and remains there for 2.5 years, until the beginning of 2023 (Figure 19), before rising slowly.

Figure 19. *90-day bill interest rates*



Even though the *automatic stabilisers* scenario does not allow for the discretionary fiscal expansion that was introduced, its interest rate trajectory is similar to that planned by Reserve Bank early in the COVID era. In November 2020, the cash rate was cut to cut to 0.1 per cent, or very close to the ZLB, and Governor Lowe (2020) announced that “the Board is not expecting to increase the cash rate for at least three years”, i.e., at least until November 2023.

The interest rate trajectory is very different in the *baseline* scenario, which does allow for the fiscal policy response. That response leads to tight labour and goods markets, which in turn lead to excessive wage and price inflation in the post-COVID era. In this environment, the model’s Taylor rule predicts that the short-term interest rate would begin rising from the middle of 2021. However, in practice, the cash rate remained at the lower bound through to the time of writing in the March quarter 2022, in an apparent departure from the Reserve Bank’s historical behaviour captured in the rule.

The *baseline* scenario incorporates this historical data, but then simulates that the short-term interest rate immediately begins rising from the June quarter 2022. Because of the deferred nature of this rise, it is steep and the short-term interest rate reaches over three per cent by mid-2023 (Figure 19). This is in stark contrast to the *automatic stabilisers* scenario under which cash rate remains close to the ZLB up until that time.

Comparing the two COVID scenarios suggest that the Reserve Bank’s initial plan for monetary policy in the COVID era under which the short-term interest rate would have remained close to zero for at least three years was broadly appropriate under the *automatic stabilisers* scenario, but not under the *baseline* scenario that actually transpired with its highly expansionary fiscal policy. It is likely that the Reserve Bank’s plan for a prolonged period of highly expansionary monetary policy made less allowance than the modelling here for an inflationary effect from the highly expansionary fiscal policy that was already in place.

6 Conclusion

The COVID recession in 2020 and 2021 was mainly generated by government domestic restrictions designed to limit the spread of COVID-19 within Australia. Those restrictions suppressed household consumption of certain services, leading to lower activity in the restricted industries and forced household saving. (Unlike in previous recessions, investment did not play a major role.) The loss of employment and profits in the restricted industries had the potential to reduce incomes in those industries, leading to lower consumer spending that would have spread the economic weakness to unrestricted industries.

Those potential effects on unrestricted industries were averted by a massive discretionary fiscal expansion. This fiscal expansion was successful in reducing the depth and length of the COVID recession brought about by the restrictions. In 2021-22 and 2022-23, the unemployment rate was between 2 and 3 percentage points lower than in the *baseline* scenario than in a hypothetical *automatic stabilisers* scenario in which there was no fiscal response.

At the same time, this fiscal expansion was so large that it over-compensated for the potential income losses in the restricted industries. In aggregate, there was $2 of compensation for each $1 of private income loss due to COVID. The combination of the lifting of restrictions and the aftereffects of the over-compensation in fiscal policy is expected to lead to unsustainably strong economic activity as 2022 unfolds. This results in high inflation in 2022 to 2024, with price and wage inflation both peaking at about 6 per cent.

The JobKeeper program, in its original form, included three different forms of over-compensation. This led to disincentive effects and contributed to the excessive fiscal expansion. Hence, if there is a JobKeeper program in a future pandemic, its design should be changed. It should only be available to businesses that are not able to operate normally because of restrictions. Payments should not extend beyond the duration of those restrictions. The payments should be redesigned to reduce the great unevenness in compensation for lost profits.

To capture the COVID recession, macro models need to be adjusted to model the effects of (mandatory and voluntary) social distancing restrictions on economic activities. Social distancing can be quantified using mobility measures such as passenger movements at airports. Domestic passenger movements might be used to model the effects of domestic restrictions, which were the main driver of the recession, on household consumption of the restricted services and household saving. International passenger movements can be used to model the effects of international restrictions on travel-related exports and imports.

The main policy lesson for a future pandemic is that fiscal policy should compensate, but not overcompensate, for income losses from economic restrictions. Compensation helps to limit the weakness in economic activity and employment and to avoid inequities. However, overcompensation at the macro level is likely to lead to an outbreak of inflation after restrictions are lifted. Overcompensation at the program level can have harmful disincentive effects and create inequities. Finally, monetary policy should take more account of the stimulus already provided by fiscal policy, so that monetary policy does not remain very loose for too long, as now seems to be the case.

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Appendix

Table A1. *Fiscal Levers in the Macro Model*

Fiscal Area	Fiscal Detail/Base
General government final demand	consumption, investment
General government transfers	age-related, child-related, disability-related, unemployment-related, other transfers to households, transfers to business, transfers to overseas
Company income tax	tax rate, rate of immediate expensing for investment in (a) machinery and equipment and (b) structures
Goods and services tax	tax rate, coverage rate by industry
Stamp duty on conveyances	on ownership transfer costs
Other product taxes	on final demand, on intermediate inputs (allows for differences in effective tax rates between components)
Payroll tax	tax rate (allows for differences in effective tax rates at the industry level)
Land-related taxes (municipal rates, state land tax)	on land rents (allows for differences in effective tax rates at the industry level)
Other production taxes net of subsidies	on gross value added by industry
Mining royalties	on mining industry gross value added

Note: tax and transfer rates are generally effective rates rather than statutory rates.

Table A2. *Model Inputs in COVID and No COVID settings*

Variables		COVID-19 pandemic		No COVID-19 pandemic
Description	Code	2020q1-2021q4	projection	2020q1 onwards
international movements of people:				
net overseas migration (via demographic model)	*NOM*	actual (371k below normal)	289k below normal, normal from 2024/25	normal (218k per year)
international tourism scale factor	*DUMCV_TROTH*	actual (low of 0.02 in 2021q3)	recovers to normal by 2024q3	normal (1.00)
international student scale factor	*DUMCV_TREDU*	actual (declines to 0.47 by 2021q3)	recovers to normal by 2027q3	normal (1.00)
domestic economy - equation residuals:				
consumption residual	*HCONZ_A*	actual	consumption suppression decays by 25% per quarter	zero
consumer demand errors (i=A,B,C,G)	*HCONZi_A*	actual	partially adjust to no COVID-19 paths by 25% per quarter	projected with random walk
housing rent residual	*PHCONT_A*	actual	housing demand based on unsuppressed consumption	zero
wage and CPI residuals	*W_A, PCPI_A*	actual	zero	zero
labour demand residuals (i=C,G,S)	*Ni_A*	actual	projected with AR(1)	projected with AR(1)
labour supply residual	*LNSU_A*	actual	projected with AR(1)	projected with AR(1)
prices for domestic sales (i=C,G,SN)	*PDOMi_A*	actual	zero	zero
international economy:				
world prices for imports (i=A,B,C,G,SN)	*PIMFi*	actual	partially adjust to no COVID-19 paths by 25% per quarter	annual world inflation rate of 2.5%
prices for exports residuals (i=A,B,C,G,SN)	*PEXi_A*	actual	projected with AR(1)	projected with AR(1)
expectational errors in foreign exchange market	*Z_A*	actual	chosen to remove initial jumps; decay by 10% per quarter	zero
foreign short-term interest rate	*RSF*	actual	adjusts to equlibrium rate of 3.5% p.a. by 8% per quarter	adjusts to equlibrium rate of 3.5% p.a. by 8% per quarter

Table A3. *Model Inputs in Fiscal Expansion and Automatic Stabilisers settings*

Variables		Fiscal Expansion		Automatic Stabilisers
Description	Code	2020q2-2021q4	projection	2020q2 onwards
spending:				
business subsidies	*RTPNOi*	includes 20% of JobKeeper (a)	2019 effective rates	2019 effective rates
business transfers	*POLBUS*	80% of JobKeeper & boosting cash flow (a)	2019 effective rates	2019 effective rates
government final demand	*GCON, CFGG*	actual	6.5% down to 2.5% above stabilisers scenario	projected from 2019 base
gap between benefit and survey unemployment	*RLMR*	actual	gradually declining from 2.6% to 0.5% of labour force	normal (0.5% of labour force)
unemployment benefit rate (relative to wage)	*POLUNEMP*	actual	10% above 2019 effective rates	2019 effective rates
other household transfer rates (relative to wage)	*POL(CHILD, AGED, DISAB, OTHER)*	actual	2019 effective rates	2019 effective rates
taxes:				
effective average personal income tax rate	*POLLAB*	cut to 0.225 in 2020/21	cut to 0.230 in 2021/22	pre-COVID policy of 0.242 in 2020/21, 0.244 in 2021/22
immediate write-off of machinery and equipment	*POLIO*	0.28 in 2020q2-q3, then 0.67	0.67 to 2023q2, then zero	zero
average payroll tax rate	*POLPAY*	actual	2019 effective rates	2019 effective rates

(a) See Table 7.