AHURI

PEER REVIEWED

FINAL REPORT NO. 346

Supporting Australia's housing system: modelling pandemic policy responses

Authored by

Chris Leishman, University of Adelaide

Rachel Ong, Curtin University

Laurence Lester, University of Adelaide

Weidong Liang, University of Adelaide

Publication Date November 2020

DOI 10.18408/ahuri3125701

Title

Supporting Australia's housing system: modelling pandemic policy responses

Authors

Chris Leishman, University of Adelaide
Rachel Ong, Curtin University
Laurence Lester, University of Adelaide
Weidong Liang, University of Adelaide

ISBN

978-1-922498-12-0

Key words

Housing and the economy; tax and housing policy; COVID-19; Coronavirus; JobKeeper; JobSeeker; Commonwealth Rent Assistance; Rent Relief; Income Support; Housing Affordability Stress; Rental Investors.

Series

AHURI Final Report

Number

346

ISSN

1834-7223

Publisher

Australian Housing and Urban Research Institute Limited
Melbourne, Australia

DOI

10.18408/ahuri3125701

Format

PDF, online only

URL

https://www.ahuri.edu.au/research/final-reports/346

Recommended citation

Leishman, C., Ong, R., Lester, L. and Liang, W. (2020) *Supporting Australia's housing system: modelling pandemic policy responses,* AHURI Final Report No. 346, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/346, doi: 10.18408/ahuri3125701.

AHURI

AHURI is a national independent research network with an expert not-for-profit research management company, AHURI Limited, at its centre.

AHURI's mission is to deliver high quality research that influences policy development and practice change to improve the housing and urban environments of all Australians.

Using high quality, independent evidence and through active, managed engagement, AHURI works to inform the policies and practices of governments and the housing and urban development industries, and stimulate debate in the broader Australian community.

AHURI undertakes evidence-based policy development on a range of priority policy topics that are of interest to our audience groups, including housing and labour markets, urban growth and renewal, planning and infrastructure development, housing supply and affordability, homelessness, economic productivity, and social cohesion and wellbeing.

Acknowledgements

This material was produced with funding from the Australian Government and state and territory governments. AHURI Limited gratefully acknowledges the financial and other support it has received from these governments, without which this work would not have been possible.

AHURI Limited also gratefully acknowledges the contributions, both financial and in-kind, of its university research partners who have helped make the completion of this material possible.

Disclaimer

The opinions in this report reflect the views of the authors and do not necessarily reflect those of AHURI Limited, its Board, its funding organisations or Inquiry Panel members. No responsibility is accepted by AHURI Limited, its Board or funders for the accuracy or omission of any statement, opinion, advice or information in this publication.

This report uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this report are those of the authors and should not be attributed to either DSS or the Melbourne Institute.

AHURI journal

AHURI Final Report journal series is a refereed series presenting the results of original research to a diverse readership of policy-makers, researchers and practitioners.

Peer review statement

An objective assessment of reports published in the AHURI journal series by carefully selected experts in the field ensures that material published is of the highest quality. The AHURI journal series employs a double-blind peer review of the full report, where anonymity is strictly observed between authors and referees.

Copyright

Contents

List of tables

List of figures

Acronyms and abbreviations used in this report

ABS	Australian Bureau of Statistics
AHURI	Australian Housing and Urban Research Institute Limited
ATO	Australian Taxation Office
CEDA	Council for Economic Development of Australia
CGE	Computable General Equilibrium
COVID-19	Corona Virus Disease
CRA	Commonwealth Rent Assistance
FEM	Fixed Effects Model
FTB	Family Tax Benefit
GDP	Gross Domestic Product
HAS	Housing Affordability Stress
HILDA	Household Income and Labour Dynamics in Australia (survey)
IMF	International Monetary Fund
OECD	Organisation for Economic Cooperation and Development
RBA	Reserve Bank of Australia
REM	Random Effects Model
SARS	Severe Acute Respiratory Syndrome
SHAS	Severe Housing Affordability Stress
TRYM	Treasury Macro-Econometric Model

Glossary

A list of definitions for terms commonly used by AHURI is available on the AHURI website www.ahuri.edu.au/research/glossary.

Executive summary

Key points

- Predictions about the impact to Australian Gross Domestic Product (GDP) in 2020 suggest a range approximately 5 per cent to 25 per cent lower than in late 2019. There is a broad consensus that GDP growth in 2021 will deliver a total level of output approximately 4 per cent to 5 per cent lower than in late 2019.
- There are 956,000 households living in Housing Affordability Stress (HAS) in Australia. Commonwealth Rent Assistance (CRA) reduces this number to 758,000. There is a heavy concentration in the private rental sector (69%) but this is reduced to 61 per cent after CRA is taken into account.
- Nearly 50,000 households that face high housing cost burdens themselves also own a private investment property – this is cause for concern given that private renters have been disproportionately affected by the downturn.
- It is estimated that the number of households living with HAS would have risen to 1,336,000 (from the 758,000 baseline) without the JobKeeper and JobSeeker interventions.
- The JobKeeper and JobSeeker interventions reduced the incidence of housing affordability stress by a considerable amount: 861,500 household compared to 1,336,000 without the intervention.
- As JobKeeper moves through its later phases, HAS gradually rises by a further 124,000 compared to phase one, and 73 per cent of these households are private renters.

- A combination of CRA and a 25 per cent rent relief scenario have the most powerful impacts on simulated numbers in HAS of all the interventions modelled.
- The 2021 scenario modelling shows that CRA is not sufficient to fully mitigate the impacts of an economic downturn in any of the scenarios examined.
- Finally, households living with HAS and owning an investment property themselves are predicted to more than double. All interventions modelled have a mild effect on these additional numbers.

Key findings

In this project we reviewed and synthesised the small, niche literature on the economic consequences of pandemics. We found that predicted impacts on GDP ranged from 1 per cent to 7 per cent. However, these predictions were based on milder pandemic scenarios, such as Severe Acute Respiratory Syndrome (SARS) or influenza. Predictions about the impact of COVID-19 on Australia's GDP range from a 5 per cent drop to a 25 per cent drop. However, most other studies suggest a strong recovery after the initial lockdown phase(s), including possible second or third waves, resulting in a 2021 position that may be somewhere between 4 per cent and 5 per cent lower than 2019 GDP in real terms.

Early predictions included employment loss of up to 25 per cent. Fortunately, it is clear that the impact of COVID-19 has been somewhat mitigated, aided by Australian Government interventions. However, the job losses and potential future job losses that COVID-19 has caused are concentrated in public-facing industries including arts, leisure, accommodation and food services. This has the potential to dispropoprtionately impact specific groups of individuals and households.

In the course of this research, we established a baseline set of estimates of unemployment and numbers of households affected by living in Housing Affordability Stress (HAS). We then applied economic scenarios, modelled propensities to become unemployed, and simulated the impacts of policy interventions. The latter was centred on the Australian Government's JobKeeper and JobSeeker measures, and the Coronavirus supplement.

We found that large-scale job losses—which were mirrored by the total number of people (3.5 million) on income support measures (such as JobSeeker, JobKeeper and Coronavirus supplement)—would have resulted in 1,336,000 households living in HAS without the Australian Government interventions. This estimate reflects eligibility for Commonwealth Rent Assistance (CRA), but it is important to note that there remains a heavy concentration of households living in HAS in the private rental sector (58%).

We also found that nearly 124,000 households who face high housing cost burdens themselves also own a private investment (compared to the baseline estimate of 49,000 pre-pandemic).

The JobKeeper and JobSeeker interventions reduced the incidence of housing affordability stress by a considerable amount: 861,500 households compared to 1,336,000 without the intervention.

As JobKeeper moves through its later phases, HAS gradually rises by a further 62,000-124,000 and more than 70 per cent of these households are private renters. The 2021 scenario modelling shows that CRA is not sufficient to fully mitigate the impacts of an economic downturn in any of the scenarios examined. Households in HAS rise from the baseline 757,000 to at least 797,000 to 893,000.

Policy development options

The economic shocks imposed by the SARS-CoV2 (COVID-19) pandemic are unprecedented, and the full impacts and knock-on consequences are difficult to predict. This report focuses on the potential impacts to households and their ability to meet their housing costs in the face of economic uncertainty, reduced incomes and potential widespread job losses.

As the JobKeeper and JobSeeker interventions are gradually wound back, there are some important, but currently unanswered, questions. Yet these can be informed by the findings set out in this report. For example:

- To what extent is the phasing of income supports well-timed in terms of Australia's economic recovery?
- What is the right balance between withdrawing supports as the economy recovers, and withdrawing supports to pressure individuals back into the labour market?
- Is the design of the current interventions appropriate in terms of targeting the right individuals and households, i.e. those facing the most precarious of labour market and housing system circumstances?
- Should the current interventions be phased out completely after March 2021, or is there a case for continued support after this?

The study

This study was commissioned as one of AHURI's COVID-19 research program, and responds to the urgent housing research and policy questions that arose as a consequence of the pandemic. The overall aim of the project was to undertake a rapid redevelopment of economic and housing system modelling approaches previously funded by AHURI in order to provide deep policy insights to a range of COVID-19 interventions. Through three inter-linked research questions we examined the impacts of the pandemic on:

1. labour market participation, employment and earnings
2. the distributional impacts of the fallout on owners, renters, investors and at risk households
3. specific policy interventions.

The project provides a range of policy relevant outputs, including:

- scenario-based estimates of economic impacts on a range of sectors of the economy
- estimates of impacts on probabilities of labour force participation and (un)employment
- distributional analysis demonstrating impacts on owners, renters and 'Mum and Dad' investors
- specific analysis of three high risk groups of households (stressed households; households 'on the edge'; and households with double precarity)
- demonstration of the policy impacts of Commonwealth Rent Assistance (CRA); JobSeeker and Jobkeeper; and a crisis-related temporary rent relief scenario for two states.

1. Study context and methods

1.1 Policy context

At the outset of this project the full extent of the economic impacts of COVID-19 were unknown, but the subject of considerable speculation, both internationally and in Australia. In addition to domestic responses and events, outcomes depend on many rapidly changing factors, including impacts of the global economy and public health responses internationally. The purpose of this chapter is to set out a range of possible economic scenarios for Australia, focusing on 2020 and 2021. It will set the scene for understanding the possible impacts on (un) employment, household incomes, and the number of households potentially unable to afford to meet their housing costs. This chapter does not undertake any formal economic forecasts, but summarises findings from a survey of the literature, and a review of recently published economic scenarios for the Australian economy.

Australia recorded its 100th case of COVID-19 on 10 March 2020. The following day, the World Health Organisation declared the SARS-CoV2 virus, and the associated COVID-19 disease, a global pandemic. Yet, the impacts to Australia's economy were being felt well before these critical dates.

A particularly early study was published by McKibbin and Fernano (2020). The February publication date reflects the early stages of the outbreak when it was by no means certain that the virus would spread globally. Indeed, the principal scenarios considered by McKibbin and Fernano relate to the Chinese economy and impacts on global demand, rather than outbreaks in other countries. Nevertheless, the seven scenarios considered envisaged a drop in Australian GDP of between 0.3 per cent and 7.9 per cent. The most severe scenario assumed a 30 per cent attack rate and 3 per cent mortality rate. However, the modelling did not explicitly consider the impacts of long periods of lockdown or shutdown.

By March, Thorpe et al (2020) had published their economic scenarios in which they outlined three key concerns:

1. whether the virus would spread more widely than to Italy, Iran, Japan and South Korea
2. the longevity of the virus
3. the pace at which industries could return to normal after virus containment.

Thorpe et al (2020) assumed a 50 per cent attack rate, followed by a permanent reduction of 1 per cent of the workforce. As events have played out, these assumptions have been overly pessimistic in terms of the attack and mortality rates, but have not reflected the lockdown and shutdown effect strongly enough. Nevertheless, these PWC scenarios suggested a reduction in Australian GDP of $34.2 billion and a fall in 2020-21 tax revenue of $25.8 billion. They assumed a 1 per cent rise in government expenditure, with the combined measures amount to a $30.1 billion swing to a $24.8 billion budget deficit.

More recently, the International Monetary Fund (IMF) (2020) has reported that 2020 global growth is projected to be -4.9 per cent, with growth of 5.4 per cent in 2021 such that global GDP will 'just exceed its 2019 level'. The corresponding figures for 'other advanced economics' (which includes Australia) are -4.8 per cent and 4.2 per cent. Economic forecasts by the Organisation for Economic Cooperation and Development (OECD) (2020) are for a 7.6 per cent drop in global economic output in 2020, followed by a 2.8 per cent recovery in 2021. These most recent forecasts reflect the assumption of a second hit to economic growth in the fourth quarter of 2020.

The most significant immediate impacts of the pandemic have clearly been on unemployment. Unlike 'typical' economic recessions, the job losses experienced early in the economic shut-down (February / March 2020) were not in the banking, financial and business service sectors, but in labour intensive customer facing sectors such as retail, hospitality, food services, arts and recreation, and education (Wilkins, 2020; Hérault et al, 2020). However, falling incomes for many households, and growing labour market uncertainty will have knock-on consequences for consumption. Falling business confidence impacts upon investment, and thence consumption.

D'Souza (2020) and the Wilkins (2020) noted that the initial impacts of the COVID-19 shutdown impacted disproportionately on younger people, and on females. The highest initial job losses were experienced in accommodation and food services; arts and recreation services; rental, hiring and real estate services; and professional, scientific and technical services.

As the coronavirus began to spread rapidly, from its origins in Wuhan, China, it quickly became clear that its highly infectious nature and high proportion of cases potentially requiring hospitalisation and/or admission to intensive care units meant that the health services of even the most advanced countries would quickly become swamped and unable to cope with demand. The concept of lockdown had been deployed effectively in Chinese cities, and was implemented in Italy – one of the worst affected countries early in the evolution of the pandemic – on 9 March 2020. There has been some international variation in nations' approaches to suppress, contain or attempt to eradicate the coronavirus, but most have implemented lockdowns of one severity or another. The enormous international scale and near coincident timing has encouraged some commentators to dub the second quarter of 2020 as 'the great shutdown'. Australia can be seen as one of the more proactive nations in the world, having urgently implemented a number of government funded policy interventions early in the crisis. In particular, the JobKeeper payment was developed and introduced in mid-to-late March 2020. The Treasury (2020) reports that it had three principal functions:

- supporting business and job survival
- preserving employment relationships
- providing income support.

The Treasury (2020) also reported that approximately 3.5 million individuals received the payment during April through May, and that over 920,000 organisations were involved.

The overarching objective of this study was to estimate the number of households likely to fall into difficulties meeting housing costs as a result of the COVID-19 crisis, and to then assess the separate and combined impacts of these policy interventions. In addition, the project examined Commonwealth Rent Assistance (CRA), and the potential impact of a simple rent relief scheme.

1.2 Research methods

1.2.1 Introduction

The short COVID-19 program research project was inspired by the fact that early debate about policy interventions focussed heavily on economic stimulus measures including Jobkeeper and JobSeeker. Such was the urgency to support incomes and protect jobs in the early phase of the pandemic that the possible housing system interventions required, and those most likely to be effective and for which groups, had not been thought through or analytically tested.

This project therefore explicitly linked possible economic outcomes on employment and unemployment by sector, on earnings and incomes, and then on the housing outcomes of specific groups of interest. These groups included home owners, private renters, and small investor landlords. It included a specific focus on three types of household: those suffering financial stress, those living on the edge (being close to losing their homes), and those living in double precarity (facing job insecurity and unaffordable housing).

1.2.2 Research approach

At the outset of the project, economic and housing policy options and development of new options were heavily frustrated by the extreme uncertainty associated with any assessment of the economic outlook for 2020 or 2021. As demonstrated earlier in this chapter, the range of scenarios or forecasts for the Australian and the global economies published during the pandemic is very wide. Indeed, the volatility of these forecasts has also been in flux as countries, and regions of countries, have appeared to embark on economic recovery, some in earnest and others only to experience a second or third wave of COVID-19 outbreak. It is therefore important to acknowledge that there is no realistic or credible methodology by which to forecast Australian or global economic output or recovery to any useful degree of accuracy. Instead, our methodology develops and examines a range of possible economic scenarios that may apply in late 2020 and through 2021. We then examine the consequences on households and their ability to meet housing costs under these different scenarios. We assess the effects of a range of policy interventions and their effectiveness in mitigating the possible rise in households experiencing HAS under the various scenarios.

The project methodology essentially has three distinct, but integrated and overlapping strands. Each was desk-based, and involved repurposing and fine-tuning tried and tested datasets and analytical approaches. This approach had the advantage of reducing risks considerably, and of leveraging substantially from previously funded AHURI research activities. It also made it possible to arrive at a well-informed view on the range of economic and policy scenarios possible through 2020 and 2021 within a very tight project timetable.

Strand one: Impacts of COVID-19 on labour market participation, employment and earnings

At the outset of the project, the likely economic impacts of COVID-19 remained largely unknown, and extremely difficult to predict. Economic outcomes depend on many rapidly changing factors, including impacts on the global economy, and public health responses internationally. Yet, it was already clear that the most significant immediate impacts were to be felt in the labour markets. Unlike 'typical' economic recessions, job losses in the early stages of the pandemic were not in the banking, financial and business service sectors, but in labour intensive customer facing sectors such as retail, hospitality, food services, arts and recreation, and education. Recent work by the Grattan Institute (Coates et al. 2020) suggested that the unemployment rate could rise to between 10 per cent and 15 per cent, with heavy concentrations in the sectors listed above. They also warned of a second round of economic impacts driven by falling levels of household and company consumption. However, since then, it has become clear that some countries have entered a partial recovery, and others are experiencing slower rates of recovery and/or subsequent waves of COVID-19 outbreak.

Aggregate econometric models are generally reliable at predicting outcome variables when past relationships are assumed to hold. However, great caution must be had when using such approaches to predict outcomes in response to an unprecedented shock, such as the COVID-19 pandemic. For this reason, we combined results from several sources including re-estimation of labour market equations reported by Rowley, Leishman et al. (2017) **AHURI housing need model** using the Household, Income and Labour Dynamics in Australia (HILDA) Survey. This had the additional benefit of bringing earlier work up to date (to wave 18 or 2018, while previously estimated to wave 15 or 2015). These equations were used to predict individuals' labour market participation and employment decisions. In this strand, we extended the time period covered by the model and refined the equations such that they provide deeper insights for each employment sector. This allowed the generation of more highly tailored predictions of unemployment probabilities and impacts on earnings for each economic sector.

The second approach used a combination of Australian Bureau of Statistics (ABS) input-output tables and statistics on job losses, and a survey of published economic forecasts, to map out a range of possible consequences of contraction in the worse affected sectors (such as food, retail, tourism, hospitality, education) on all other economic sectors.

By combining the economic scenarios with the re-estimated econometric output, it was possible to recalculate the probability of each individual (aged 16-65) in HILDA becoming unemployed under a range of assumed economic and labour market conditions. The approach effectively used individuals observed in 2018 (the most recent wave of HILDA) as a snapshot, representing conditions before the pandemic. After running each scenario, individuals' incomes and their household's total income were recalculated under the new assumptions. This permitted the re-estimation of the number of households in housing affordability stress, as explained under strand 2 below.

Strand two: Impacts of COVID-19 on housing outcomes (distributional analysis)

Strand two attempts to drill down into a **household-level analysis to assess the distributional impacts** that the pandemic could have on housing outcomes, comparing the three key actor groups in housing markets – renters, home owners and landlords. We draw directly on the unemployment and earnings findings from strand one to predict the labour market and income positions of these key groups under the COVID-19 crisis. In line with strand one, we use the 2018 HILDA Survey for the distributional analysis.

Early housing policy interventions during the pandemic were, rightly, focussed on renters, who are more likely to be on lower incomes and employed in industries directly affected by the COVID-19 shutdown. For instance, bans on evictions and rent relief schemes were among the major planks of housing policy that the Australian Government announced in March and April. However, previous AHURI research by Ong et al. (2019) has shown that home owners are increasingly carrying large mortgage burdens into later stages of life. As such, a significant group of precarious owners exist, and the analysis therefore aims to uncover the extent to which their foothold on owner-occupation could become more precarious as a result of the pandemic.

The analysis also attempts to provide some indication about the extent to which indebted 'Mum and Dad' landlords could be impacted. Australian Tax Office (ATO) data shows that more than 1 million (around 60%) of rental investors are negatively geared. Given these investors are making rental losses, they are likely to be more financially exposed to any changes in personal economic circumstance as they are making up shortfalls in rental revenue from other income sources such as their wage. They are also less well-placed to offer rent reductions to tenants with potential negative impacts on tenants' outcomes.

The analyses are conducted along the following lines:

- **between-group** analysis of the extent to which the repercussions of the pandemic differs *between* renters, versus home owners and landlords
- **within-group** analysis that sheds light on the particular characteristics of households *within* each of the three actor groups that are particularly exposed to the repercussions from the pandemic.

We estimated the impact that job losses will have on households' capacity to meet housing costs, focusing on the size of these three key 'at risk' groups:

- **'Stressed' households:** We estimated the possible increase in the number and share of households that are plunged into housing stress as incomes falls. We used typical 30 per cent housing cost burden benchmarks (the '30/40 rule') to identify groups in housing stress.
- **Households 'on the edge':** The likely increase in the number and share of renters and mortgagors who would be at the edge of being evicted from their home if rent relief and eviction moratoriums were not in place. These are identified as households in severe housing stress e.g. paying more than half their income in housing costs and leaving insufficient amounts to meet non-housing needs (the '50/40 rule'). We also estimated the number and share of landlords who are at risk of withdrawing from the rental property market due to an inability to sustain negatively geared properties, with potentially negative ramifications for tenants.
- **Households facing 'double precarity:** This assessment highlighted the double precarity of job insecurity and unaffordable housing that some households face. Groups that face this form of double precarity are arguably more vulnerable to the COVID-19 crisis than those who are facing job insecurity but live in affordable housing, as well as those who face housing stress but have secure jobs. We shed light on the extent to which labour market repercussions are likely to have disproportionate impacts on those already facing double precarity.

Strand three: Impacts of policy interventions in response to COVID-19 (policy simulations)

There are **three key sets of policy interventions** that are likely to assist tenants with responding to the repercussions of COVID-19. Using technology from models previously funded by AHURI (AHURI housing need model and AHURI-3M), we simulated the impacts of these three key sets of programs on the housing cost burdens of individuals affected by the crisis as identified in strand two. The impacts are simulated both separately, and as composite / cumulative effects.

- **Existing housing assistance programs – CRA and public housing:** This presents a base case scenario of existing settings. We took the sample of individuals affected by the crisis as identified in stage two and simulated the extent to which these housing assistance programs provided a buffer against housing stress for these individuals through their income loss. The simulation essentially addressed the following question: If no policy interventions were offered to provide temporary assistance to vulnerable renters to sustain tenancies through the COVID-19 crisis, to what extent would current programs in the form of CRA and public housing shield tenants from housing stress? It also offered insights into the potential ramifications of removing temporary measures, such as rent relief and evictions moratoriums, before tenants are able to regain the economic footing they had prior to the crisis.
- **Labour market programs – JobKeeper and JobSeeker:** We simulated the impact of these two labour market programs on the incomes of renters and mortgagors, and thus assessed the extent to which these payments protect capacity to meet housing costs by sustaining incomes.
- **Crisis-related temporary rent relief (varies by state):** We simulated the rent relief programs announced by states and territories and assessed the extent to which they shielded tenants from falling into housing stress. In practice, we carried out a very simple simulation loosely based on the measures examined in Victoria and the Australian Capital Territory (ACT), by assuming a reduction of 25 per cent in rent payable by households containing one or more individuals eligible for JobKeeper or JobSeeker.

Table 1: Research questions, data sources and methodology

Research question	Data sources	Methodology (including data sources)
RQ1. How are the initial COVID-19 shutdown economic shocks likely to translate to unemployment and earnings outcomes in each economic sector?	ABS, RBA, OECD, HILDA	Econometric modelling of participation and unemployment propensities; Input-output analysis of cross sectoral impacts using multipliers
RQ2. What are the distributional impacts of economic shocks likely to be? How will owners, renters and landlords be affected?	HILDA, ABS	Descriptive and distributional analysis of housing costs and incomes broken down by owner, renter, investor and a typology of 'at risk' households in HILDA
RQ3. How will the policy interventions affect baseline outcomes for stressed households, households on the edge, and households with double precarity?	Simulation modelling using AHURI housing need model and 3M technology (HILDA)	Impacts of specific interventions to be tested on actor types and at risk household types using a new simplified simulation model assembled from the AHURI housing need model and elements of 3M

Source: Authors.

2. Consequences of the pandemic on incomes

- Previous hypothetical studies of the macro-economic impacts of a possible pandemic estimated a drop in GDP of between 1 per cent and 7 per cent, based on SARS or Flu scenarios.
- Predictions about the impact to Australian GDP in 2020 range from around -5 per cent to -25 per cent.
- There are numerous predictions about the COVID-19 impacts on Australian GDP beyond 2020, but there is a broad consensus that GDP growth in 2021 will result in output that is approximately 4 per cent to 5 per cent lower than in late 2019.
- Some predictions of loss of employment by commentators are as high as 25 per cent. Early studies, that occurred in the first stages of the pandemic, suggest these job losses will be concentrated in public facing industry sectors, such as arts and accommodation and food services.
- Earlier research and commentary during the pandemic has highlighted that younger workers, females, and private renters are likely to be disproportionately affected.
- We developed a range of scenarios that mirror the 3.5 million people reported to be on JobKeeper payments at the outset of the project, and three scenarios concerning job losses in 2021, beyond the current income support interventions.

2.1 Previous research on pandemic impacts

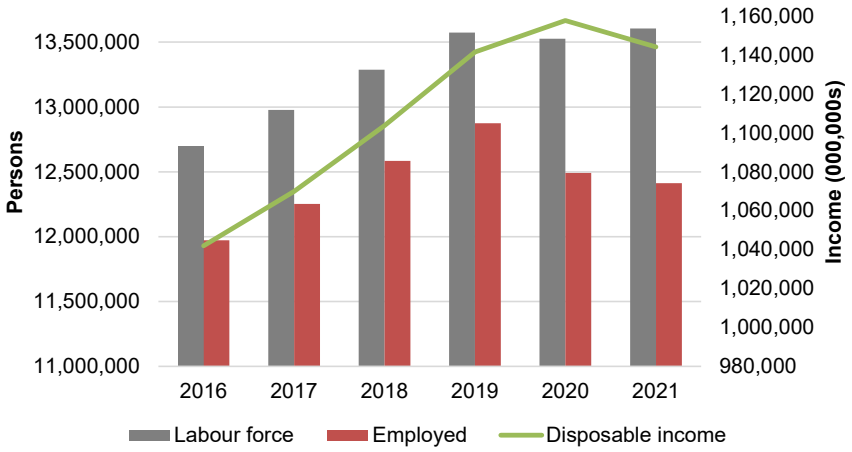
Prior to the onset of COVID-19 a niche literature existed, focussed on the potential economic consequences of a pandemic. For example, Kennedy et al. (2006) employed the Australian Treasury Macro-Econometric Model (TRYM) to examine the possible impacts of an outbreak of influenza on the economy. This study simulated a drop in exports from Australia of approximately 9 per cent per annum, a drop of more than 6 per cent in household consumption in the first year, and a decline of 7.4 per cent in business investment. Keogh-Brown et al. (2010) simulated a range of scenarios for the United Kingdom's (UK) economy and concluded that the worst affected sectors would cause a decrease in GDP in the range of 0.22 per cent to 4.45 per cent. Smith et al. (2009) used a Computable General Equilibrium (CGE) model and demonstrated a range of 0.5 per cent to 4.3 per cent reduction in UK GDP as a result of an influenza pandemic. Keogh-Brown et al. (2009) examined the potential impact of a SARS pandemic on four European Union (EU) countries (UK, France, Belgium and the Netherlands) and concluded a likely downturn range of 0.5 per cent to 2 per cent.

Previous studies have taken influenza or SARS as the presumed pandemic event, and the range of GDP impacts is around 1 per cent through 7 percent. There is no doubt that the COVID-19 pandemic has already produced much more severe economic impacts globally. There have been a number of recent commentaries and forecasts, but the range of predicted impacts is very wide. For example, Thorpe et al. (2020) forecast that GDP in Australia will reduce by $34.2 billion while Romano (2020) predicts $220 billion. McKibbin and Fernando (2020) predict a GDP contraction of up to 7.9 per cent in Australia. In the case of the United States (US), del Rio-Chanona et al. (2020) argue that GDP will be cut by 22 per cent. Global GDP is tipped to decrease by 1.25 per cent to 1.5 per cent in the OECD's forecast (Boone et al. 2020) or by 2 per cent to 4 per cent in the World Bank's forecast (Maliszewska, Mattoo et al. 2020). The IMF projects that the global GDP will shrink by 4.9 per cent in 2020 (IMF, 2020). In the case of Australia, GDP is projected to contract by 6.7 per cent this year.

Many of the immediate economic impacts affect global trade and employment. Global trade activities are predicted to fall by 2.3 per cent to 3.75 per cent (Boone et al. 2020). Additionally, Maliszewska, Mattoo et al. (2020) indicate that exports will reduce by 2.5 per cent to 4 per cent. For consumption, McKibbin and Fernando (2020) estimate that the consumption in their selected countries will decrease by 0.24 per cent to 0.5 per cent. Del Rio-Chanona et al. (2020) forecast that 24 per cent of jobs are at risk and wages will fall by 17 per cent in the US. McKibbin and Fernando (2020) estimate that labour supply will reduce by 0.1 per cent to 4.6 per cent, and in Australia, 14 per cent to 26 per cent of workers (or 1.9-3.4 million people) will be unemployed (Coates et al. 2020). Coates et al. (2020) and Grodach and Martin (2020) show that job losses in Australia are larger in the service industries (i.e. food, education, entertainment and tourism) than the manufacturing and mining industries.

As noted in chapter one, several recent studies have estimated the impacts of COVID-19 shutdowns on employment and GDP. The Grattan Institute (Coates et al. 2020) focussed on jobs, as noted above. Thorpe et al (2020) presented a range of scenarios that suggest a decline in GDP of around 2.5 per cent in 2020, but did not consider 2021. IMF (2020) project a decline of 4.9 per cent in 2020 and growth of 5.4 per cent in 2021 (implying 0.24% growth compared to 2019). OECD (2020) envisage a drop of 7.6 per cent, followed by growth of 2.8 per cent, or a quarter four 2021 outcome of -4.2 per cent compared to 2019. Thus, the overall economic outlook for 2021 appears to range from a worst (published so far) case scenario of -4.2 per cent through to a best case of 0.24 per cent, as compared with 2019. The OECD (2020) economic outlook predicts a reduction of employment of approximately 3 per cent in 2020 and 3.6 per cent in 2021 (compared to 2019), as shown in figure one.

Figure 1: OECD outlook impacts on employment and disposable income

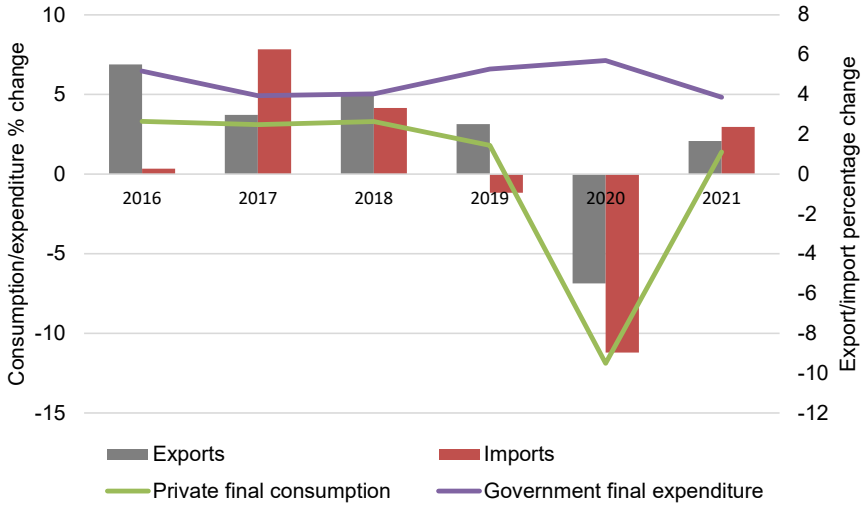


Note: 2020 and 2021 are OECD forecasts.

Source: OECD (2020).

As figure two shows, the OECD predictions for change in household net disposable income are less dramatic than the impacts on employment. Of course, this reflects the very significant public expenditure on income support measures, particularly JobSeeker and JobKeeper. The impacts are summarised in figure two. This also sets out the OECD forecasts for growth in exports and imports (right-hand Y axis). A drop of 9.5 per cent in private final consumption in 2020 is partially offset by a 5.7 per cent increase in government final expenditure. The position stabilises in 2021, with a 1.1 per cent increase in private final consumption and a 3.9 per cent increase in government final expenditure.

Figure 2: Impacts on imports/exports and consumption/expenditure



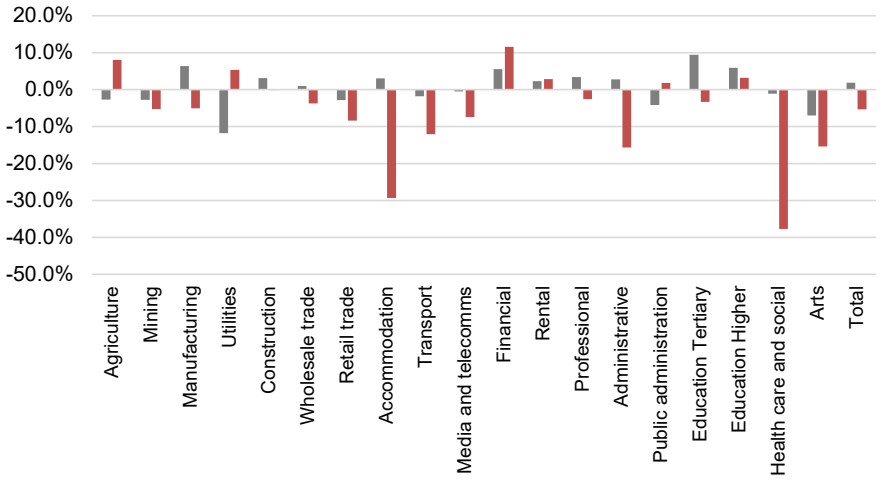
Source: OECD (2020).

2.2 Impacts on employment

In this section, we begin by summarising a set of employment scenarios for 2020 and 2021, and move on to explain how these are used to simulate impacts on the employment probabilities of individuals. It is important to note that there are two broad time periods that are of interest. First, and reflecting that there were approximately 3.5 million people on JobKeeper in July 2020, we calculated a probability for each employed individual in HILDA in 2018 to have switched from being employed, to being unemployed. Second, we investigated what is likely to happen to those individuals' probabilities of switching from employed to unemployed status in 2021, after the winding back and withdrawal of these income support measures.

To design the scenarios, we began by examining ABS (2020) data on job losses by broad industry sector. The February and May quarters of 2020 were compared with the corresponding quarters in 2019, as illustrated in figure three.

Figure 3: Year on year reductions in quarterly employment by industry sector

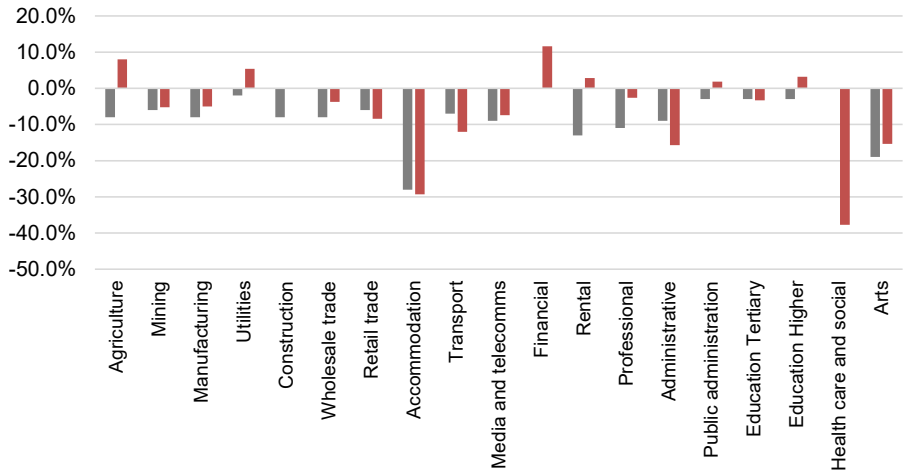


Source: ABS.

For ease of reading, the industry sector labels are shortened to one to two words in figure three. The analysis clearly shows the disproportionate impact of lockdown measures on several industry groups, including 'Arts' (arts and recreation services) at -15.4 per cent, 'Accommodation' (accommodation and food services) at -29.3 per cent, and 'Administration' (administration and support services) at -15.7 per cent. Some sectors show an increase in employment, including financial and insurance services, agriculture and electricity, gas, water and waste services. However, whether this reflects a one-off change in behaviour during or because of lockdown, or a 'real' effect, remains to be seen.

The pattern of job losses by industry group revealed by the ABS data differs in some areas to the analysis put forward by other sources early in the pandemic. For example, D'Souza (2020) reported that younger people and women were proportionately harder hit (see also Wilkins, 2020; Hérault et al, 2020). The D'Souza (2020) analysis of the hardest hit sectors early in the lockdown period is replicated as closely as possible in our first economic scenario, labelled 'pre-JobKeeper'. The differences between these assessments and the ABS results are summarised in figure four.

Figure 4: Comparison of ABS May quarter statistics with 'pre-JobKeeper' scenario



Source: ABS.

The 'early lockdown' scenario is more pessimistic than ABS statistics, particularly for the agriculture, utilities and financial industry groups. The scenario suggests a small reduction in jobs in each of these sectors, rather than the small to moderate increases shown by ABS. The 'early lockdown' figures capture the notion that small positive effects in these sectors may have been an aberration caused by behavioural factors such as panic buying, or purchase of home office equipment and furniture, that featured early in the lockdown. However, the 'early lockdown' scenario is much more optimistic in its treatment of 'Administration' and 'Health and Social Care'. These sectors were not reported to be badly affected in the early stages of the pandemic, but are revealed in more recent ABS data as being heavily impacted. Whether this reflects true loss of jobs, or a distortion caused or enhanced by the Jobkeeper and JobSeeker interventions is also impossible to determine at this stage. However, the difference in scenarios is large enough to justify the wisdom of including the 'early lockdown' scenario. As we explain later in the report, this pattern of job losses is used as one scenario to reflect possible outcomes in 2021 – after the end of the JobKeeper and related income support measures. Henceforth, we refer to it as the **'pre-JobKeeper pattern'** to emphasise that it is used to consider the early 2020 pattern of observed job losses, but applied to 2021.

We introduce two additional scenarios to represent possible outcomes in 2021. These are derived from ABS statistics, but we focus on the May 2020 quarter and assume that the observed job losses in 2021 will be either half or 1.5 times of those in the quarter two 2020 scale. We label these simple scenarios 'mild' and 'severe'. In summary, we arrive at three scenarios that are primarily of interest in predicting what may occur in 2021 (not in 2020):

- job losses by industry group mirror the early lockdown period
- job losses are half the ABS observed rate in quarter two of 2020
- they are 1.5 times the ABS observed rate in quarter two of 2020

Table 2: Assumed job losses by sector in 2021 for three scenarios

Industry grouping	Pre-JobKeeper pattern	Mild	Severe
Agriculture, forestry and fishing	-8.0%	-3.0%	-9.0%
Mining	-6.0%	-2.1%	-6.2%
Manufacturing	-8.0%	-2.2%	-6.6%
Electricity, gas, water and waste services	-2.0%	1.4%	2.1%
Construction	-8.0%	-2.0%	-5.9%
Wholesale trade	-8.0%	-2.1%	-6.2%
Retail trade	-6.0%	-1.7%	-5.0%
Accommodation and food services	-28.0%	-10.6%	-31.8%
Transport, postal and warehousing	-7.0%	-3.1%	-9.2%
Information media and telecommunications	-9.0%	-3.6%	-10.7%
Financial and insurance services	0.0%	0.9%	1.4%
Rental, hiring and real estate services	-13.0%	-3.9%	-11.6%
Professional, scientific and technical services	-11.0%	-2.0%	-5.9%
Administrative and support services	-9.0%	-3.5%	-10.4%
Public administration and safety	-3.0%	-0.5%	-1.4%
Education (tertiary)	-3.0%	-2.2%	-6.5%
Education (higher)	-3.0%	-2.2%	-6.5%
Health care and social assistance	0.0%	-2.6%	-7.8%
Arts and recreation services	-19.0%	-9.1%	-27.2%

Source: Authors' calculations.

2.3 Modelling individuals' employment

In this section we briefly set out our methodology for the development of an econometric model that accounts for the propensity of individuals to be employed. As discussed in chapter one, this model is then used to simulate the way in which the economic scenarios alter those individuals' probabilities. In effect, the model is used to predict which employed individuals become unemployed under different economic conditions. The process used, outlined below, replicates that set out in an earlier funded study (Rowley et al. 2017).

Since Heckman (1979), it has been commonplace in econometric analysis to correct for sample selection bias when estimating labour supply models through a two step procedure. Sample selection bias occurs naturally in labour supply modelling. This is because the probability of being employed (if in the labour force) and of being a labour force participant are interrelated. Potential bias arises from the exclusion of non-participating individuals from the sample when estimating the probability of being employed versus unemployed. Failure to take into account selection can result in econometric estimates of coefficients that are biased and inconsistent (i.e. the size and statistical significance of individual estimated coefficients may lead to false conclusions and poor policy prescription or advice). Hence, we modelled participation and employment status as a two step sample selection process. This modelling was based on the original work of Heckman (1979) and followed the sample selection correction approach of Verbeek and Nijman (1966) (see also Vella (1998); Vella and Verbeek (1999)).

The two step model assumes that the propensity to participate in the labour force (versus not in the labour force: *Participation*) and the likelihood of being unemployed (versus employed: *Employment*) can be modelled by limited dependent variable binary response Random Effects Models (REM) with sample selection. Specifically, equations one and two (below) control for selection bias and include time-invariant individual effects to control for unobserved heterogeneity in panel data. They incorporate dynamics (lagged variables) to control for state dependence (Greene 2007), and control for endogeneity that could result from recall problems or respondent perceptions in reporting both current and previous behaviour. This is done by creating a polynomial of predicted values of the dependent variable (the participation equation) and including this in the labour force outcome equation (Semykina and Wooldridge 2011). In addition, the Mundlak specification of the REM, which allows for potential correlation between the individual specific effects and explanatory variables, was used (Chamberlain 1980; Mundlak 1978). The Mundlak correction, including in the right-hand side of the estimated equation(s) the individual or group (over time) means for time-varying explanatory variables that vary sufficiently within groups, ensures REM results are equivalently as robust as the Fixed Effects Model (FEM) (i.e. consistent, efficient and unbiased). Moreover, as is well known, the benefit of the REM is that time-invariant explanatory variables (e.g. county of birth) are not differenced out of the model as they are in the FEM model. There is also the added benefit that REM estimators are more able to accommodate measurement error (Hausman 2001) and can be viewed as long-run effects.

First, *Participation* is estimated as a limited dependent variable (probit) panel data model:

$$\begin{aligned} Participation_{it}^{*} &= \beta_p LFS_{i,t-1} + \sum \beta_{xp} \mathrm{X}_{\mathrm{it}} + \sum \beta_m \bar{x}_i + \mu_i + \upsilon_{it} \\ Participation_{it} &= (Participation_{it}^{*} > 0) \text{ if individual } i \text{ is a participant at time } t \end{aligned} \quad (1)$$

where *Participation** is the latent propensity for labour market participation of individual *i* at time *t*, *LFS* is labour force status (including not in the labour force), X are exogenous explanatory variables; the unobserved time-invariant individual heterogeneity is decomposed into two parts (Chamberlain 1980; Mundlak 1978) $\sum \beta_m \bar{x}_i + \mu_i$ where $\bar{x}$ are the means of the individual-specific time-variant explanatory variables included in the model (Mundlak means), μi are controls for individual time-invariant unobserved heterogeneity, βs are coefficients to be estimated and υ_{it} are zero-mean errors that are not correlated with the Xs.

Second, *Employment** is similarly estimated as a panel probit model and follows the process for the *Participation* equation above with the addition of correction for potential selection bias by inclusion of selection processes corrections derived from equation (1) for an individual-specific ($S_{1,i}$) and a random component ($S_{2,it}$) (Verbeek and Nijman 1996) and includes a polynomial (f_P) – of appropriate length (*k*) - to control for endogeneity (Semykina and Wooldridge 2011):

$$\begin{aligned} Employed_{it}^{*} &= \beta_e Employed_{i,t-1} + \sum \beta_{xe} \mathrm{X}_{\mathrm{it}} + \sum \beta_m \bar{x}_i + \mu_i + \upsilon_{it} + \ldots \\ &\quad \beta_{s1} S_{1i} + \beta_{s2} S_{2it} + f_p(Participation_{it}; \beta_p) \\ Employed_{it} &= (Employed_{it}^{*} > 0) \text{ if individual } i \text{ is employed at time } t \\ f_p(Participation_{it}; \beta_p) &= \beta_{p1} Participation_{it} + \ldots + \beta_{pk} Participation_{it}^{k} \end{aligned} \quad (2)$$

The inclusion of Mundlak means results in an REM (also referred to as Corrected Random Effects (CRE) model) that ensures the results are as robust as the fixed effects model (i.e. consistent, efficient and unbiased).

The data used for the two models are HILDA waves nine to 18 inclusive (post Global Financial Crisis). Models are estimated with Stata/SE 16.1 (2020). We included an extensive set of individual and demographic variables and the same set of explanatory variables (i.e. the X vector) are included in both models. This allowed the estimation process to indicate the most relevant explanatory variables for this dataset (i.e. we favour a general specification). This resulted in a subset of variables that are statistically significant and of the same sign in both models (e.g. education); variables that are significant in both, but with opposite sign (e.g. general health for females) and variables significant in one equation but not the other (e.g. children under four years of age). Interestingly, the only included explanatory variable (or category of a group variable) that is not significant in either male or female equations is the macro-economic level (log of the) average wage rate. Results of the two models, for males and females separately, are presented in appendices one and two.

Predicted unemployment numbers

The modelling approach leads us to predict a baseline total unemployment of some 758,000 in 2018, representing the 'pre-COVID-19' baseline position. The model is calibrated by adding a weight that reduces each individual's probability of being employed in line with the assumed job losses in table two. However, the first scenario we modelled is not shown in table two, but represents an approximation to the distribution of individuals on JobKeeper in June 2020, as reported by the Treasury (2020). This resulted in a predicted 4,115,00 total unemployed, representing the originally observed 783,000 plus an additional 3,332,000 (which is close to the 3.5 million reported by The Treasury (2020) to be eligible for JobKeeper). We examine the impacts of progressive withdrawal of JobKeer in chapter four. The next chapter examines the incidence of housing affordability stress, and its distribution, in the baseline predictions. This provided a useful set of comparisons when we examined the impacts of 2020 and 2021 economic scenarios in the subsequent chapter.

3. Consequences of unemployment on housing precarity

- There were 956,000 households living in Housing Affordability Stress (HAS) in Australia in 2018 (the baseline for the study).
- Eligibility for Commonwealth Rent Assistance (CRA) reduces this number to 758,000.
- There is a heavy concentration of households living in HAS in the private rental sector (69%), but this is reduced to 61 per cent after CRA is taken into account.
- Nearly 50,000 households who face high housing cost burdens themselves also own a private investment property. This is cause for concern given that private renters have been dispropoprtionately affected by the downturn.
- We estimate that households living with HAS would have risen to 1,336,000 (from the 758,000 baseline) without the JobKeeper and JobSeeker interventions.

3.1 Analytical approach

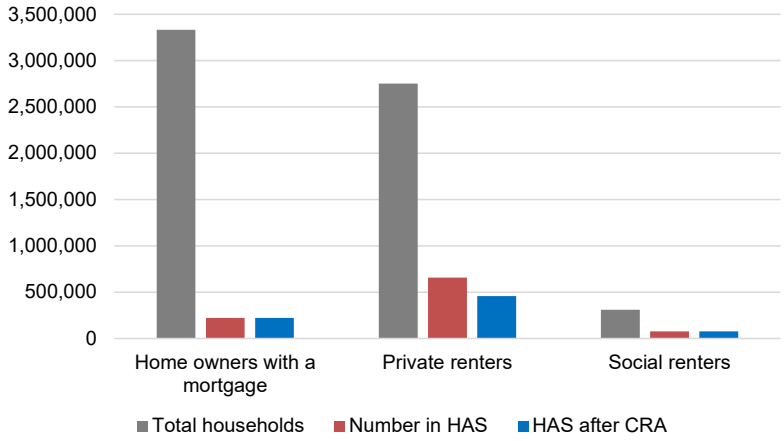
In this chapter, we provide a set of baseline results based on analysis of HILDA respondents for 2018. This is the latest available wave of the HILDA survey, and we use it to represent the pre-COVID-19 scenario or baseline. We focussed on identifying households living with levels of income and housing costs such that they were defined to be in Housing Affordability Stress (HAS) according to the well-known 30/40 rule, which has become a standard indicator in Australia over the course of many years. Households with a gross disposable income that sits within the lower 40% of the distribution, and whom pay 30% or more of their income by way of housing costs are defined as being in HAS under this measure. Households paying 50% or more are defined as being in Severe Housing Affordability Stress (SHAS).

In Australia, many renters in the private and not-for-profit (NFP) sectors are eligible to receive a Commonwealth Rent Assistance (CRA) payment. We calculated the eligibility of each household in HAS and SHAS and then recalculated the number of households in HAS and SHAS after this payment is received. We treated the CRA payment as a subsidy to housing costs rather than a supplement to income (i.e. we deducted CRA from housing costs rather than add it to income).

3.2 Baseline estimates of those in housing affordability stress

In this section we approximate the results to the nearest 500 households to reflect that the numbers are estimates, or are based on simulation results, and we wish to avoid the impression of false precision. The analysis is based on 2018 data, and provides a baseline that can be used as a comparator in the later analysis of economic scenarios. The analysis indicated that there were some 9,634,500 households in Australia, of which 956,000 were living in HAS before the application of CRA. CRA is only available to private and community housing tenants whose rents exceed minimum thresholds applicable to their household type. The effect of CRA is to reduce the number to 758,000. Nearly 69 per cent of households in HAS are private renters before CRA, compared to just under 61 per cent after CRA is received. These patterns are depicted in figure five.

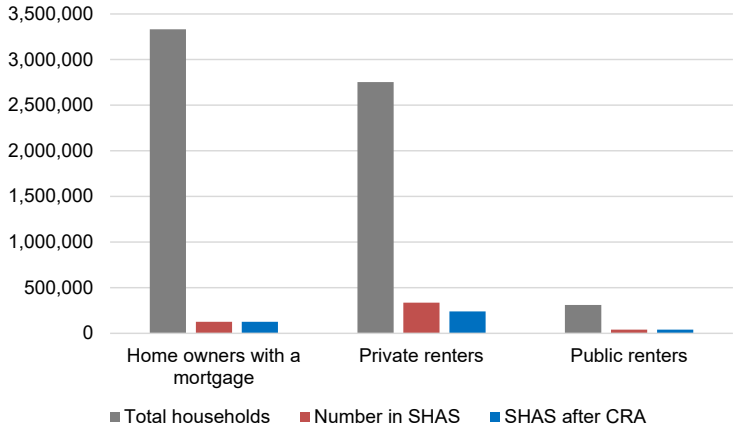
Figure 5: Households in housing affordability stress, and the impact of CRA



Source: Author's calculations.

The number of households living in SHAS is much lower before CRA at 346,000, compared to 270,500 after the receipt of CRA. The incidence of SHAS in the private rental sector is even higher than for HAS at 73 per cent, compared to 65 per cent after the application of CRA. CRA has a disproportionate positive impact on household renting privately, as designed. However, it is also clear that the provision of public housing has a considerable impact on alleviating housing affordability stress. Only 8 per cent of households in the tenure are in HAS (nearly all of them are in SHAS). However, CRA is not targeted at mortgaged home owners, and therefore has no impact on the HAS or SHAS numbers.

Figure 6: Households in severe housing affordability stress, and the impact of CRA

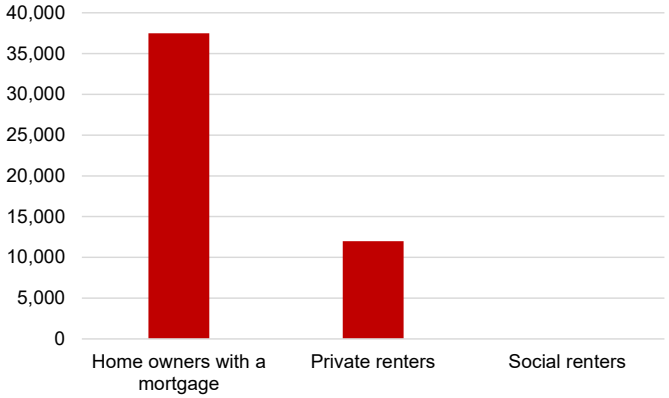


Source: Author's calculations.

The analysis also examined the cross-over between households living in HAS, and ownership of private rental investments. This is a potentially important group of households given that the immediate impact of the COVID-19 shutdown measures were felt disproportionately by private renters, and by households in the lower part of the income distribution. There is considerable potential for highly leveraged households owning an investment property, who are spending a higher proportion of their incomes on their own housing costs, to run into trouble meeting those costs and/or the servicing of their investment loan commitments. We examine this in more detail in the next chapter.

We estimate that there are around 37,500 mortgage home owners living in HAS who also own an investment property, and approximately 12,000 private renters in a similar position. This is summarised in figure seven.

Figure 7: Housing affordability stress and investment



Source: Author's calculations.

Analysis of the baseline estimates by State or Territory reveals that, after CRA has been accounted for, there are:

- 283,500 households in HAS in New South Wales
- 144,000 households in HAS in Victoria
- 167,000 households in HAS in Queensland
- 57,000 households in HAS in South Australia
- 77,000 households in HAS in Western Australia
- 19,000 households in HAS in Tasmania
- 18,500 households in HAS in the Northern Territory
- 7,400 households in in HAS the Australian Capital Territory

Descriptive statistics suggest that, for those in HAS, the distribution by age is fairly uniform except that the 50-64 age group is disproportionately represented (27% of cases). More than 46 per cent has a low educational attainment (year 12 or below). Single adults account for 42 per cent and a further 22 per cent is single parents, and 69 per cent is private renters. The distribution of HAS within Australia is relatively uniform apart from New South Wales (32% of households but 39% of HAS cases) and Victoria (26% of households but 19% of HAS cases).

The descriptive statistics for all households (whether in HAS or not) show that the 50-64 age group also represents 27 per cent of cases, but almost 30 per cent has a low educational attainment, 24 per cent is single adults, 14 per cent is single parents and 43 per cent is private renters.

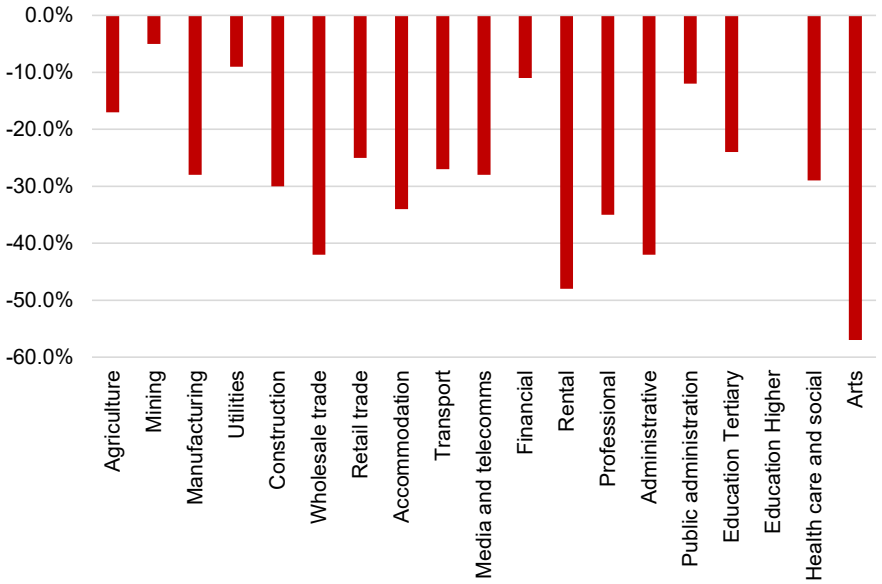
The highest incidence of households living in HAS, but owning an investment property themselves, is in Western Australia (9.1%) followed by New South Wales (6.2%), and then Queensland (5.0%).

3.3 Impact of the phase one JobKeeper and JobSeeker

The Treasury (2020) reported that in June 2020 there were approximately 3.5 million individuals eligible for the JobKeeper income support interventions. Their data suggests job losses by industry grouping on the scale summarised in figure nine. On the assumption that this many people, and the distribution shown in figure nine, simply lost their jobs then the impact on households' incomes would have been considerable. We recalculated households' incomes on this assumption, and recomputed the HAS measures accordingly.

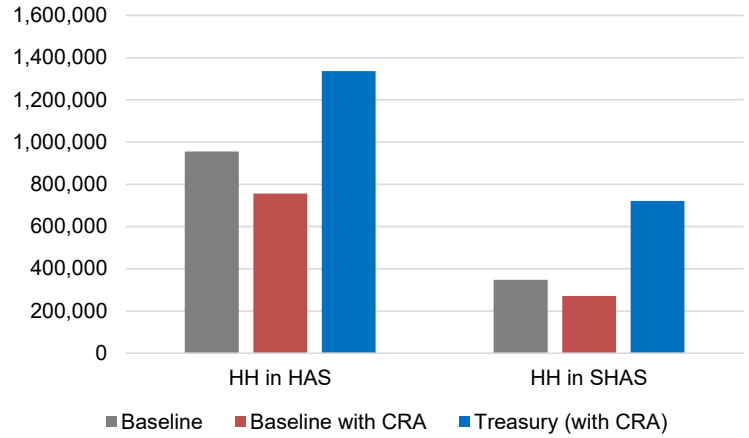
The analysis provides an insight into the number of households potentially unable to meet their housing costs without the JobKeeper and JobSeeker intervention (see figure 10). We estimate that households living with HAS would have risen to 1,336,000 (from the 757,000 baseline) and that those in SHAS would have risen to 721,000 (from the 270,000 baseline). These figures reflect eligibility for CRA (i.e. are after CRA is applied to housing costs).

Figure 8: Distribution of assumed industry sector job losses in the 'Treasury' scenario



Source: Authors' calculations based on The Treasury (2020).

Figure 9: Impact of the lockdown, before application of JobKeeper and JobSeeker



Source: Author's calculations.

3.4 Next steps

JobKeeper, JobSeeker and the coronavirus supplement were designed as short-term, emergency measures to support household incomes, businesses and the continuation of jobs during recovery from the economic shock caused by the pandemic. As we explain in the next chapter, the interventions are scheduled for gradual reduction and withdrawal starting in the third quarter of 2020 and concluding after March 2021. The over-arching issue to be addressed in this research project concerns the likely impacts on individuals, and their households, of lost employment and income, and the knock-on consequences for their ability to meet their own housing costs.

This chapter has set the scene for the economic scenario and policy modelling analyses in the next chapter. It is important to establish that Australia already had a significant number of households living with HAS and SHAS prior to the pandemic. Our results confirm earlier studies that have shown a concentration of HAS in the private rental sector (Rowley and Ong 2012; Wood and Ong 2017). The provision of social housing is very effective in reducing the burden of housing costs, but the sector is very small by international standards. Home owners with a mortgage are not immune either. We estimated that there are 221,000 households in the bottom 40 per cent of the income distribution who are paying more than 30 per cent of their income towards mortgage costs.

The analysis has also shown that without the JobKeeper, JobSeeker and coronavirus supplement interventions, the implications of large scale job losses on households' ability to meet housing costs would have been devasting. We estimate that households in housing affordability stress would have nearly doubled, from 757,000 at the baseline to more than 1.36 million, even after CRA had been taken into account. Having set these broad baselines for comparison, we now move on to summarise the more detailed modelling of economic scenarios and policy intervention simulations in chapter four.

4. Impacts of policy

- We carried out simulations for 2021 and predict possible total unemployment ranging from 783,500 to 1,752,000.
- The JobKeeper and JobSeeker interventions reduced the incidence of housing affordability stress by a considerable amount: 861,000 households compared to 1.34 million without the intervention.
- As JobKeeper moves through its later phases, the predicted number of households in HAS is expected to gradually rise by a further 124,000; 73 per cent of these households are private renters.
- A combination of CRA and a 25 per cent rent relief scenario have the most powerful impacts on simulated numbers in HAS of all the interventions modelled.
- The 2021 scenario modelling shows that CRA is not sufficient to fully mitigate the impacts of an economic downturn in any of the scenarios examined.
- Finally, households living with HAS and owning an investment property themselves are predicted to more than double, and all interventions modelled have a mild effect on these additional numbers.

4.1 COVID-19 policy intervention parameters

We modelled three key sets of policy interventions implemented to assist Australians in response to the repercussions of COVID-19. The first two sets constituted labour market programs that assisted Australians to meet their housing and non-housing needs by providing some income support throughout the economic crisis. The third constituted rent relief schemes that helped alleviate housing stress via direct rent reductions to tenants in need.

4.1.1 JobKeeper

The JobKeeper payment was a wage subsidy program introduced by the Australian Government to help businesses affected by COVID-19 meet the costs of their employees' wages. This, in turn, ensured that more employees could retain their job and continue to earn an income despite the sharp economic downturn (Australian Government 2020a).

JobKeeper eligibility relied on the characteristics of both the employee and the business for which the employee worked. Employees working in government agencies (including the education sector) and casual workers who had been employed by their current employer for less than 12 months were two key groups excluded from JobKeeper eligibility. Furthermore, to be eligible for the payment, an employee must work for a business that meets a turnover test based on the business' aggregated annual turnover ($1 billion or less) and an expected percentage decline in turnover of 30 per cent or more due to COVID-19 (Australian Government 2020a). These parameters are modelled, with the exception of the turnover test. This test cannot be modelled as actual turnover and expected changes in turnover cannot be observed in the HILDA Survey. Hence, the JobKeeper estimates in our modelling exercise reflect upper bound estimates.

We modelled all three JobKeeper phases announced by the Australian Government since its introduction in March 2020. The parameters of each phase are set out in table three. The initial phase ran from March 2020 until September 2020, and was the most generous phase, offering each eligible employee a flat payment rate of $1,500 per fortnight. During phase two, the maximum payment rate for employees falls to $1,200 per fortnight for employees working more than 20 hours per week, and $750 per fortnight for employees working less than 20 hours per week. The third phase sees the JobKeeper payment rates drop even further to $1,000 and $650 per fortnight respectively.

Table 3: JobKeeper phases

Phase	Period	JobKeeper parameters
1	Late March 2020 to 27 September 2020	• $1,500 per fortnight per eligible employee
2	28 September 2021 to 3 January 2021	• $1,200 per fortnight per eligible employee who, in the four weekly pay periods before the reference period, was working 20+ hours per week on average • $750 per fortnight per eligible employee who, in the four weekly pay periods before the reference period, was working less than 20 hours per week on average
3	4 January 2021 to 28 March 2021	• $1,000 per fortnight per eligible employee who, in the four weekly pay periods before the reference period, was working 20+ hours per week on average • $650 per fortnight per eligible employee who, in the four weekly pay periods before the reference period, was working less than 20 hours per week on average

Source: Australian Government (2020a).

4.1.2 JobSeeker and Coronavirus supplement

Workers who fall into unemployment become eligible for the JobSeeker payment. The JobSeeker income support scheme was expanded via the Coronavirus Supplement, which significantly increased the maximum amount of income support payment that an unemployed person can receive (Australian Government 2020b).

We modelled both JobSeeker phases announced by the Australian Government since its introduction in March 2020. The parameters of each phase are set out in table four. In each phase, there is an income free area beyond which the JobSeeker payment is reduced at a taper rate. The key difference between phase one and phase one is that the latter is designed to increase incentives to return to work. In phase two, the income free area almost triples from $106 per fortnight to $300 per fortnight, thereby increasing the amount of income that can be earned before the JobSeeker payment is reduced. However, the taper rate is higher in phase two, and the Coronavirus Supplement is reduced from $550 to $250 per fortnight. Because most income support recipients' entitlements are determined by their income levels, we do not model the assets test.

It is important to note that there are interactions between the JobKeeper and JobSeeker programs. The JobKeeper payments received by an individual offset their assessable income when determining JobSeeker entitlements. Hence, while it is possible for some individuals to receive both payments, JobSeeker entitlements are reduced when a person is already eligible for the JobKeeper payment (Services Australia 2020).

Table 4: JobSeeker phases

Phase	Period	JobSeeker parameters	Coronavirus Supplement parameters
1	Late March 2020 to 24 September 2020	• Income free area $106 per fortnight. • Taper rate 50 cents for each dollar between $106 and $256 per fortnight, and 60 cents for every dollar over $256 per fortnight. • For single principal carers, taper rate is 40 cents for each dollar above $106 per fortnight. • The partner income test taper rate is 25 cents per dollar of the partner's income over $996 per fortnight.	$550 per fortnight
2	25 September 2020 to 31 December 2020	• Income free area increased to $300 per fortnight. • Taper rate 60 cents for every dollar over $300 per fortnight. • For single principal carers, taper rate is 40 cents for every dollar over $300 per fortnight. • The partner income test taper rate increases to 27 cents.	$250 per fortnight

Source: Australian Government (2020b); Service Australia (2020).

4.1.3 Rent relief

While the JobKeeper and JobSeeker schemes are federally funded, state and territory governments have each introduced their own crisis-related temporary rent relief schemes. For instance, the Victorian Government established a rental assistance fund to provide a one-off rent relief grant of up to $3,000 to Victorians suffering rental stress due to the pandemic (Department of Health and Human Services 2020). In the ACT, landlords who reduced rent for their tenants by at least 25% due to the pandemic may be eligible to receive a land tax credit (ACT Revenue Office 2020).

As it is impossible to directly observe which tenants are likely to receive rent relief from their landlords from the HILDA Survey, we modelled a hypothetical scenario whereby all private rental tenants received a 25 per cent rent reduction. While hypothetical, this scenario allowed us to gauge the impact that rent relief schemes are likely to have on housing stress levels during periods of economic crises.

4.1.4 Commonwealth Rent Assistance

The COVID-19 policy interventions described above can interact with existing housing assistance programs. Low-income private rental tenants whose rents exceed a minimum rent threshold applicable to their household type currently receive Commonwealth Rent Assistance (CRA). CRA is paid as: a supplement to a pension; an allowance to eligible households with no children; or a supplement to the Family Tax Benefit Part A (FTB(A)) to eligible households with children who receive more than the base rate of FTB(A) (Centrelink 2018). Private renters who lose employment and become eligible for the JobSeeker payment as a result of COVID-19 will gain eligibility for CRA. On the other hand, tenants who benefit from rent relief (as outlined in the previous sub-section) may find their CRA entitlements reduced as their rents fall.

The HILDA Survey contains a comprehensive set of information on respondents' labour market characteristics. HILDA also includes data on income support payments (including pension, allowance and FTB(A) payments), which act as passports to CRA for those respondents' whose rents exceed the minimum rent threshold applicable to their household type. However, the HILDA Survey does not report CRA entitlements separately. Using the relevant data available in the HILDA Survey, we were able to estimate the amount of CRA each eligible private renter household was entitled to receive. Given we are drawing on the 2018 HILDA Survey, we modelled the September 2018 parameters of the CRA program.

4.2 COVID-19 policy simulation modelling under alternative economic scenarios

Micro-simulation modelling is employed to estimate the JobKeeper, JobSeeker, rent relief and CRA entitlements of Australians under each of the four COVID-19 economic scenarios described previously. It is important to note that the scenarios cover different time periods. For example, the 'Treasury' scenario is intended to cover March 2020 to September 2020, and reflect the eligibility phases coming into play in September 2020 to December 2020, then January 2021 to March 2021, and then beyond March 2021. The other three scenarios are designed to cover the 2021 calendar year (rather than March 2020 through March 2021).

- Phase one combines the initial JobKeeper and JobSeeker phases that ran from March to September 2020. It represents the phase in which financial support from the Australian Government was most generous; JobKeeper fortnightly payments were $1,500 and the Coronavirus Supplement attached to the JobSeeker scheme was $550 per fortnight.
- Phase two combines the second phases of both the JobKeeper and JobSeeker programs that run over the final quarter of 2020. It is less generous than phase one, with the JobKeeper rates declining and the JobSeeker taper rates rising.
- Phase three runs from through the first quarter of 2021. As per table five, the JobKeeper parameters for this phase have been announced, with fortnightly payments of $1,000 for those working more than 20 hours per week, and $650 for those working less than 20 hours per week. However, no further changes have been announced to the JobSeeker program beyond phase two, due to conclude at the end of 2020. Hence, we assume that phase two of the JobSeeker program will continue into 2021.
- Phase four is purely hypothetical, as the Australian Government has not announced their plans for the JobKeeper and JobSeeker programs beyond the first quarter of 2021. Hence, we assume that in phase four, the JobKeeper program will be fully phased out, reducing fortnightly rates to zero. Those previously eligible for the JobKeeper program would thus begin claiming JobSeeker payments. Here again, we assume that phase two of the JobSeeker program will continue through 2021.

Table 5: Policy intervention phases under the 'Treasury' economic scenario

Phase number	Phase period	JobKeeper*	JobSeeker*	
			JobSeeker payment	Coronavirus Supplement
1	March 2020 to September 2020	Phase 1	Phase 1	Phase 1
2	September 2020 to December 2020	Phase 2	Phase 2	Phase 2
3	January 2021 to March 2021	Phase 3	Phase 2 (assume this is extended to 2021)	Phase 2 (assume this is extended to 2021)
4	Beyond March 2021	Assume no JobKeeper	Phase 2 (assume this is extended to 2021)	Phase 2 (assume this is extended to 2021)

*Notes: *See tables three and four for details of each JobKeeper and JobSeeker phase respectively.*

Source: Australian Government (2020a); Australian Government (2020b); Services Australia (2020).

4.2.1 The 'pre-JobKeeper pattern', 'mild' and 'severe' scenarios for 2021

As explained previously, we constructed three economic scenarios for 2021. One is based on observations made by Council for Economic Development of Australia (CEDA) early in the 2020 lockdown – we refer to this as the 'pre-JobKeeper pattern'. This is an important scenario because it reflects the initial pattern of job losses observed early in the pandemic, before the introduction of income support measures. There is an argument that some recipients of JobKeeper would not have lost their jobs in the absence of JobKeeper. Although it is impossible to evidence or quantify unintended consequences of intervention such as JobKeeper, it is nevertheless important to address the question to the extent possible. We therefore posit that the 2021 scale and distribution of job losses could reflect observations early in the pandemic in 2020. To this scenario we added our own hypothetical projections under the assumption of a mild (versus severe) crisis in 2021. Hence, we modelled the potential impacts of policy interventions in 2021 under these three economic scenarios. As these scenarios pertain to 2021, we only modelled phases three and four.

Table 6: Policy intervention phases under the 'pre-JobKeeper', mild and severe scenarios (2021)

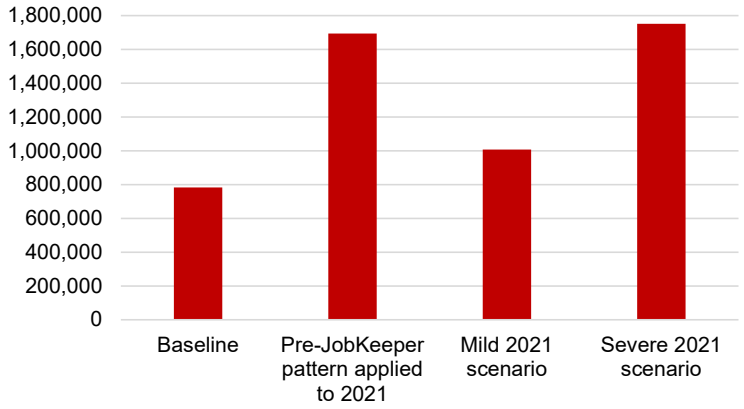
Phase number	Phase period	JobKeeper*	JobSeeker*	
			JobSeeker payment	Coronavirus Supplement
3	January 2021 to March 2021	Phase 3	Phase 2 (assume this is extended to 2021)	Phase 2 (assume this is extended to 2021)
4	Beyond March 2021	Assume no JobKeeper	Phase 2 (assume this is extended to 2021)	Phase 2 (assume this is extended to 2021)

*Notes: *See table 2 and 3 for details of each JobKeeper and JobSeeker phase respectively.*

Source: Australian Government (2020a); Australian Government (2020b); Services Australia (2020).

The simulations suggest total unemployment in 2021 ranging from 1,008,000 (mild scenario) to 1,752,000 (severe scenario). The 'pre-JobKeeper pattern' scenario assumes that the pattern of unemployment by industry grouping would be similar to the patterns witnessed in the early stages of the pandemic, before the JobKeeper and JobSeeker support measures were announced. This scenario suggests total unemployment of 1,694,500. This is similar to the severe scenario, but as noted in chapter two, the distribution of job losses by industry grouping is different. The simulated unemployment totals are shown in figure 10.

Figure 10: Simulated unemployment in 2021



Source: Author's calculations.

4.2.2 Simulating housing cost burdens under the COVID-19 policy interventions

A key measure that reflects the affordability faced by households is their housing cost burden. Conceptually, this is a household's housing cost expressed as a percentage of household gross income. For a mortgagor, housing cost is represented by mortgage payments; for a tenant, housing cost is represented by rent payment less any CRA entitlement received. CRA is conceptualised as a housing assistance measure though it is paid as a cash supplement to income support payments. Hence, it is deducted from rents in the numerator of the housing cost burden measure while excluded from the income denominator of the housing cost burden.

The housing cost burden can be used to determine whether a household is in housing stress using the traditional 30/40 rule. Under this rule, a household is in housing stress when the household's housing cost burden is greater than 30 per cent and the household falls into the bottom 40 per cent of the household income distribution. To determine whether a household is in the bottom 40 per cent of the income distribution, following previous AHURI housing affordability research by Yates (2007), we apply the modified OECD equivalence scale to equivalise household disposable income. The households that fall into the bottom 40 per cent of the income distribution are defined as having a low income.

After simulating the policy interventions, we were able to estimate housing cost burdens and housing stress incidences under a range of economic scenarios. In particular, the housing cost burden is affected by COVID-19 and related policy interventions as follows:

- JobKeeper and JobSeeker payments and the Coronavirus Supplement boost income in the denominator of the housing cost burden measure.
- Rent relief reduces housing cost in the numerator of the housing cost burden measure.
- JobSeeker, the Coronavirus Supplement and Rent relief can all influence eligibility for CRA entitlements, which in turn affects housing cost in the numerator of the burden measure.

4.3 Results: JobKeeper, JobSeeker and the coronavirus

Table six summarises the full set of results for the 'Treasury' scenario (which is designed to approximate the 3.5 million people reported to be on JobKeeper in phase one). Without the JobKeeper and JobSeeker payments, it is predicted that 1,336,000 households would have experienced HAS once CRA was calculated and deducted from housing costs. This drops to 861,000 when the phase one criteria are applied (compared to the 757,000 households in the baseline, recalling that this is defined as the observed 2018 number of households in HAS). On this basis, it is clear that the JobKeeper, JobSeeker and Coronavirus supplement were very effective in reducing the burden of housing costs, when working in conjunction with CRA. The intervention was also effective in reducing the number of investor households who are in danger of being unable to meet their own housing costs. This simulated number drops from 124,000 to 92,000 but remains considerably higher than the 49,000 predicted at the baseline.

It is notable that the number of households with a mortgage and experiencing housing affordability stress drops by a smaller proportion than private renter equivalents (from 469,000 to 350,000 or 10% compared to 18% for private renters). The impact on social renters is milder still, reflecting the lower starting numbers in HAS.

As the simulations move from phase one to phases two and three, the predicted number of households living in HAS gradually rises by a further 66,000. Almost all of these households are private renters. Moving to phase four increases the number of households in HAS by approximately 124,000 compared to phase one, and almost all of these households are private renters.

As indicated earlier in the report, the 'Treasury' scenario is static in terms of its assumptions about the economy and labour market. As such, the presumption is that all 3.5 million of the current recipients of JobKeeper and JobSeeker remain out of work, but experience a reduction in the level of their benefits as the phases of the intervention play out. At this stage, the analysis does not reflect any assumptions about economic recovery during the period, or into 2021.

Finally, we can see that a combination of CRA, phase four and a crude 25 per cent rent relief scenario has the most powerful impact on simulated numbers in HAS of all the interventions modelled in this scenario. Total households in HAS would fall to 745,000 – a level slightly below the baseline. Naturally, the impacts on mortgaged home owners and investors are minimal. This is a function of the fact that rent relief is targeted at private renters. Investors are also much more likely to be mortgaged home owners than private renters.

Table 7: Simulated impacts of policy interventions in the 'Treasury' scenario

	Households living in HAS			
Scenario and policy intervention	Mortgage	Private rent	Social rent	Investors
Baseline without CRA	221,000	657,000	77,000	51,000
Baseline with CRA	221,000	459,000	77,000	49,000
Baseline with rent relief but without CRA	221,000	389,000	77,000	46,000
Treasury with CRA	469,000	778,000	89,000	124,000
Treasury with rent relief but without CRA	469,000	699,000	89,000	120,000
Treasury with CRA and JobKeeper phase 1	335,000	461,000	65,000	92,000
Treasury with CRA and JobKeeper phase 2	350,000	509,000	68,000	97,000
Treasury with CRA and JobKeeper phase 3	350,000	505,000	68,000	96,000
Treasury with CRA and JobKeeper phase 4	362,000	552,000	71,000	101,000
Treasury with CRA, JobKeeper phase 4 and rent relief	362,000	312,000	71,000	93,000

Source: Author's calculations.

4.4 Results: Simulations for 2021

We now turn to the simulation results for the 2021 economic scenarios, and the smaller set of policy interventions. To recap, we examine three scenarios: 'pre-JobKeeper pattern', 'mild' and 'severe', as explained earlier in the chapter. We examine the impact of CRA, phase four of JobKeeper and JobSeeker, and a crude 25 per cent rent relief policy.

For all three scenarios, we predict that a phase four of JobKeeper, when combined with CRA, would be more than sufficient to reduce the total number of households in HAS to a figure below the original baseline. In keeping with previous analyses, the benefits disproportionately accrue to private renters, but the figures for mortgage holders and social renters are also slightly lower.

CRA is not sufficient to fully mitigate the impacts of an economic downturn in any of the three scenarios. Households in HAS rise from the baseline 757,000 to at least 793,000 (mild) or as high as 893,000 (severe). We can easily see that a combination of CRA, phase four JobKeeper and 25 per cent rent relief has an enormous impact on the total numbers in HAS.

Finally, households living with HAS and owning an investment property themselves are predicted to be greater in number by between 2,000 and 13,000, depending on which economic scenario is used. A phase four JobKeeper intervention would reduce these numbers slightly, but not as far as the original baseline numbers.

Table 8: Simulated impacts of interventions in 2021 scenarios

	Households living in HAS			
Scenario and policy intervention	Mortgage	Private rent	Social rent	Investors
Baseline without CRA	221,000	657,000	77,000	51,000
Baseline with CRA	221,000	459,000	77,000	49,000
Pre-JobKeeper pattern with CRA	247,000	547,000	82,000	63,000
Pre-JobKeeper pattern with CRA and JobKeeper phase 4	217,000	419,000	66,000	54,000
Pre-JobKeeper pattern with CRA, JobKeeper phase 4 and rent relief	217,000	211,000	66,000	47,000
Mild with CRA	226,000	487,000	80,000	51,000
Mild with CRA and JobKeeper phase 4	213,000	398,000	66,000	51,000
Mild with CRA, JobKeeper phase 4 and rent relief	213,000	192,000	66,000	44,000
Severe with CRA	252,000	558,000	83,000	58,000
Severe with CRA and JobKeeper phase 4	220,000	428,000	67,000	55,000
Severe with CRA, JobKeeper phase 4 and rent relief	220,000	212,000	67,000	48,000

Source: Author's calculations.

4.5 Profile of people living in HAS

An analysis of descriptive statistics revealed some differences in the attributes of individuals living in HAS between some of the scenarios, and when compared to the baseline. For example:

- In the severe and 'Treasury' scenarios, 15 per cent and 26 per cent respectively of 15 to 34 year olds are living in HAS, compared to 12 per cent in the baseline.
- In the 'Treasury' scenario, 15 per cent are couples compared to 20 per cent in the baseline, and 26 per cent are lone parents compared to 17 per cent in the baseline.
- In the 'Treasury' scenario, 23 per cent of individuals affected are in New South Wales (14% baseline) and 18 per cent in Victoria (9% baseline).
- In the 'Treasury' scenario 56 per cent of individuals in HAS have an education Year 12 or less, compared to 41 per cent in the 'severe' scenario, and 34 per cent in the baseline.
- The effects of interventions assist a significantly higher proportion of private renters than mortgage holders such that more than 51 per cent more mortgagees are in HAS in the 'Treasury' phase one scenario compared to the baseline.
- The severe 2021 scenario shows a similar pattern, with 28 per cent of individuals living in HAS being mortgaged home owners compared to the 30 per cent baseline prediction. This demonstrates the stabilising effect of CRA entitlement.
- In all scenarios, females aged 55 or over are approximately 5 percentage points more likely to be in HAS (e.g. in the baseline 17% of males, but 22% of females).
- Those in casual employment are almost twice as likely to be in HAS in the 'Treasury' scenario (33%) compared to the baseline (17%).
- Those outside major cities are more likely to be in HAS in the 'Treasury' scenario (21%), compared to the baseline (12%).

5. Policy development options

In March 2020, the Australian Government made a swift and decisive decision to introduce a radical set of reforms designed to support households' incomes, protect jobs and promote early economic recovery. The economic shocks imposed by the SARS-CoV2 (COVID-19) pandemic are unprecedented, and the full impacts and knock-on consequences are difficult to predict. This final report focuses on the potential impacts to households and their ability to meet their housing costs in the face of economic uncertainty, reduced incomes and potential widespread job losses.

As the JobKeeper and JobSeeker interventions are gradually wound back, there are some important but currently unanswered questions. The answers to these questions can be informed by the findings set out in this report. The key questions are as follows:

- To what extent is the phasing of income supports well timed in terms of economic recovery?
- What is the right balance between withdrawing supports as the economy recovers, and withdrawing supports to pressure individuals back into the labour market?
- Is the design of the current interventions appropriate in terms of targeting the right individuals and households (i.e. those facing the most precarious of labour market and housing system circumstances)?
- Should the current interventions be phased out completely after March 2021, or is there a case for continued support after this?

5.1 New findings set out in this research

In this project, we reviewed and synthesised the small, niche literature on the economic consequences of pandemics. We found that the predicted impacts on GDP ranged from 1 per cent to 7 per cent. However, these predictions were based on milder SARS or influenza pandemic scenarios. Predictions about impacts of COVID-19 on Australia's GDP range from a 5 per cent drop to a 25 per cent drop. However, most other studies suggest a strong recovery after the initial lockdown phase(s), including possible second or third waves, resulting in a 2021 position that may be somewhere between 4 per cent and 5 per cent lower than 2019 GDP in real terms.

Early predictions included employment loss of up to 25 per cent. Fortunately, it is clear that the impact of COVID-19 has been somewhat mitigated, aided by Australian Government interventions. However, the job losses and potential future job losses that COVID-19 has caused are concentrated in public-facing industries including arts, leisure, accommodation and food services. This has the potential to dispropoprtionately impact specific groups of individuals and households.

We established a baseline set of estimates of unemployment and numbers of households affected by living in HAS. We then applied economic scenarios, modelled propensities to become unemployed, and simulated the impacts of policy interventions. The latter was centred on the Australian Government's JobKeeper and JobSeeker measures, and the Coronavirus supplement.

We found that large scale job losses mirrored by the total number of Australians (3.5 million) on JobKeeper would have resulted in 1,336,000 households living in HAS without the intervention, after accounting for eligibility for CRA. The JobKeeper, JobSeeker and Coronavirus supplement were very effective in reducing the burden of housing costs, when working in conjunction with CRA. The number of households in HAS drops to 861,000 when these interventions are taken into account. We also found that the number of households in HAS, who also own an investment property, would have risen from a 49,000 baseline to 124,000 without these interventions. With the interventions, the number rises to 92,000 households.

As the interventions move through subsequent phases and are withdrawn, the number of households in HAS rises by a further 62,000 to 66,000, reaching 124,000 more households when the interventions are withdrawn altogether. However, this scenario assumes that current recipients of the income support measures do not regain employment.

Based on a survey of the literature, and a review of ABS statistics, we established two economic scenarios for 2021 – each of which is associated with assumed job losses by economic sector. We also referred to a 2021 scenario based on the pattern and distribution of job losses observed by an early study (D'Souza 2020). This is an important scenario to consider because the rapid introduction of the JobKeeper and related income support measures, and their relatively crude design, will almost certainly have caused labour market distortions. Data on the actual job losses observed prior to the introduction of these interventions may therefore represent a plausible outcome of realised job losses after the withdrawal of the interventions.

The analysis suggests that CRA, in isolation, is not sufficient to mitigate the impacts of an economic downturn in 2021 as measured by numbers of households living in HAS. Numbers will rise to at least 793,000, and could be as high as 893,000 (depending on which economic scenario is consulted). We calculated that a hypothetical phase four of JobKeeper, when combined with CRA, would be more than sufficient to reduce the total number of households in HAS to a figure below the original baseline.

We also found that rent relief measures (crudely modelled as a 25% rebate on rent) have a higher impact on numbers in HAS than CRA. For example, under our 'severe' 2021 economic scenario, HAS numbers are simulated as 893,000 after the application of CRA. This falls by 20 per cent when a hypothetical JobKeeper phase four intervention is factored in, but a further 30 per cent on application of a hypothetical 25 per cent rent relief.

5.2 Final remarks

Our aim in this report has been to provide insight into existing and possible future economic scenarios facing Australian workers and their households, and to examine the possible consequences to their ability to meet housing costs. We found that the number of households living in a precarious situation is very high, and will likely remain high even after a partial recovery in 2021 and the withdrawal of much of the Australian Government's income support measures. Without an extension of the JobKeeper income support measures beyond March 2021, the number of households living in HAS is likely to increase significantly. We find that the hypothetical phase four JobKeeper is more than sufficient to reduce the number of households in HAS below the baseline. This hypothetical extension would see a reduced JobKeeper payment ($650 per fortnight compared to $1,500 in phase one) and nil Coronavirus supplement (compared to $500 in phase one).

We therefore argue that the winding back and phasing out of income support interventions may be premature, and will likely increase the number of households potentially unable to meet their own housing costs. Consideration should be given to additional supports after March 2021, although there is a case for clearer targeting of supports towards those in greatest need.

The COVID-19 pandemic has had a disproportionate impact on younger workers, and those working in less secure public facing occupations. Lower income workers and private renters are disproportionately affected. We suggest that serious consideration should be given to the development of further support measures that would benefit the household categories identified. Consideration might be given to rent relief schemes since it is clear that these, working in conjunction with CRA, have a strong impact on reducing housing affordability stress. We note that a national 25 per cent rent relief scheme (in addition to the CRA and the hypothetical JobKeeper phase four) would reduce the number of HAS cases by 30 per cent—this is equivalent to $17.52 million per week or $73 per case per week.

Despite the obvious potential of rent relief schemes to safeguard the housing security of the worst affected, there is a surprising variety in what have, so far, been largely experimental rent relief schemes across Australia. With the exceptions of Western Australia, Tasmania and the Northern Territory, most jurisdictions have implemented land tax relief of 25 per cent to 50 per cent for a limited period. This is conditional on residential landlords demonstrating that rent relief has been passed on to tenants (whether partially or in full – the arrangements vary by state and territory). In some areas, partial deferments of tax liability have also been offered. However, there are remaining questions about the optimal design of such schemes, the correct balance between incentives to landlords and proportion passed on to tenants, the level of uptake, whether uptake should be voluntary or mandatory, and the impact of such interventions on improving housing outcomes for tenants. These remaining questions should be the urgent focus of any additional research in this area.

References

ACT Revenue Office (2020) *COVID-19 Assistance*, accessed 7 August 2020, https://www.revenue.act.gov.au/covid-19-assistance.

Boone, L., Haugh, D., Pain, N. and Salins, V. (2020) 'Tackling the fallout from COVID-19' in *Economics in the Time of COVID-19*: 37.

Australian Government (2020a) *JobKeeper Payment*, Economic Response to the Coronavirus Factsheet, accessed 7 August 2020, https://treasury.gov.au/sites/default/files/2020-08/Fact_sheet-JobKeeper_Payment_0.pdf.

Australian Government (2020b) *Extension of Additional Income Support for Individuals*, Economic Response to the Coronavirus, accessed 7 August 2020, https://treasury.gov.au/sites/default/files/2020-07/Fact_sheet-Income_Support_for_Individuals.pdf.

Centrelink (2018) *A Guide to Australian Government Payments: 20 September–31 December 2018*, Australian Government, accessed 7 August 2020, https://www.servicesaustralia.gov.au/organisations/about-us/publications-and-resources/guide-australian-government-payments.

Chamberlain, G. (1980) 'Analysis of Covariance with Qualitative Data', *The Review of Economics Studies*, vol. 47, no. 1: 225–238.

Coates, B., Cowgill, M., Chen, T. and Mackey, W. (2020) *Shutdown: Estimating the COVID-19 employment shock*, Grattan Institute, Melbourne, Victoria.

Department of Health and Human Services (2020) *Coronavirus (COVID-19) Rent Relief Grant*, Australian Government, accessed 7 August 2020, https://www.housing.vic.gov.au/help-renting/rentrelief.

Services Australia (2020) *JobSeeker Payment*, Australian Government, accessed 7 August 2020, https://www.servicesaustralia.gov.au/individuals/services/centrelink/jobseeker-payment.

D'Souza, G. (2020) *Labour market tracking: first COVID-19 impacts hit young people hardest*, Committtee for Economic Development of Australia (CEDA), available: https://www.ceda.com.au/Digital-hub/Blogs/CEDA-Blog/June-2020/Labour-market-tracking-first-COVID-19-impacts-hit-young-people-hardest, accessed 4/6/2020

Greene, W. H. (2007) *Econometric Analysis*, 7th Ed. Prentice Hall, Upper Saddle River, New Jersey.

Hausman, J. (2001) 'Mismeasured Variables in Econometric Analysis: Problems from the Right and Problems for the Left', *The Journal of Economic Perspectives*, vol. 15, no.4: 57-67.

Heckman, J. J. (1979) 'Sample Selection Bias as a Specification Error', *Econometrica*, vol. 47: 153–161.

Little, R. J., and Su, H. L. (1987) 'Missing data adjustments for partially scaled variables', *Proceedings of the Section on Survey Research Methods*: 644–649.

International Monetary Fund (2020) *World Economic Outlook Update*, available: https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020, accessed 1 July 2020.

Kennedy, S., Thomson, J., and Vujanovic, P. (2006) *A primer on the macroeconomic effects of an influenza pandemic, Treasury working paper 2006-01*, Australian Government, The Treasury, Canberra, accessed 1/7/2020, https://treasury.gov.au/publication/2006-01-a-primer-on-the-macroeconomic-effects-of-an-influenza-pandemic.

Keogh-Brown, M.R., Smith, R.D., Edmunds, J.W. and Beutels, P. (2010) 'The macroeconomic impact of pandemic influenza: estimates from models of the United Kingdom, France, Belgium and The Netherlands', *European Journal of Health Economics*, vol. 11: 543-554.

Maliszewska, M., Mattoo, A. and Van Der Mensbrugghe, D. (2020) *The potential impact of COVID-19 on GDP and trade: A preliminary assessment*, World Bank: Washington.

References

McKibbin, W. and Fernando, R. (2020) *The Global Macroeconomic Impacts of COVID-19: Seven Scenarios*, Centre for Applied Macroeconomic Analysis, Australian National Unversity, Canberra, accessed 1 July 2020, https://cama.crawford.anu.edu.au/publication/cama-working-paper-series/16221/global-macroeconomic-impacts-covid-19-seven-scenarios.

Wilkins, R. (2020) *Who's hit hardest by the economic effects of COVID-19?* Research Insights No. 10/20, Melbourne Institute: Applied Economic and Social Research, University of Melbourne, Melbourne, accessed 1 July 2020, https://melbourneinstitute.unimelb.edu.au/__data/assets/pdf_file/0006/3387039/ri2020n10.pdf.

Hérault, N., Kabátek, J., Kalb, G., and Meekes, J. (2020) *Did JobSeeker and JobKeeper achieve their aims?* Research Insights No.12/20, Melbourne Institute: Applied Economic and Social Research, University of Melbourne, Melbourne, accessed 1 July 2020, https://melbourneinstitute.unimelb.edu.au/__data/assets/pdf_file/0004/3396415/ri2020n12.pdf.

Mundlak, Y. (1978) 'On the Pooling of Time Series and Cross Section Data', *Econometrica*, vol. 46, no. 1: 69–85.

Organisation for Economic Co-operation and Development (OECD) (2020) *Economic Outlook June 2020: The world economy on a tightrope*, accessed 1 July 2020, http://www.oecd.org/economic-outlook/june-2020/.

Ong, R., Wood, G., Cigdem-Bayram, M. and Salazar, S. (2019) *Mortgage stress and precarious home ownership: implications for older Australians*, AHURI Final Report No. 319, Australian Housing and Urban Research Institue, Melbourne, accessed 1/7/2020, available: https://www.ahuri.edu.au/research/final-reports/319.

del Rio-Chanona, R.M., Mealy, P., Pichler, A., Lafond, F. and Farmer, D. (2020) Supply and demand shocks in the COVID-19 pandemic: An industry and occupation perspective, accessed 1 July 2020, https://arxiv.org/abs/2004.06759

Romano, F. (2020) An Estimate of the Economic Impact of COVID-19 on Australia accessed 1/7/2020 , https://ssrn.com/abstract=3581382.

Rowley, S. and Ong, R. (2012) *Housing Affordability, Housing Stress and Household Wellbeing in Australia*, Final Report No. 192, Australian Housing and Urban Research Institute, Melbourne, accessed 1 July 2020, available: https://www.ahuri.edu.au/research/final-reports/192.

Rowley, S., Leishman, C., Baker, E., Bentley, R. and Lester, L. (2017) *Modelling housing need in Australia to 2025*, Final Report No. 192, Australian Housing and Urban Research Institute, Melbourne, accessed 1 July 2020, available: https://www.ahuri.edu.au/research/final-reports/287.

Semykina, A. and J. M. Wooldridge (2011) 'Estimation of Dynamic Panel Data Models with Sample Selection', *Journal of Applied Econometrics* (DOI: 10.1002/jae.1266).

Smith, R.D., Keogh-Brown, M.R. and Barnett, T. (2011) 'Estimating the economic impact of pandemic influenza: An application of the computable general equilibrium model to the UK', *Social Science and Medicine*, vol. 73: 235-244.

Thorpe, J., Loughridge, J. and Picton, M. (2020) *The possible economic consequences of a novel coronavirus (COVID-19) pandemic*, PwC.

The Treasury (2020) *The JobKeeper Payment: three month review*, Australian Government, Canberra, accessed 1 July 2020 , https://treasury.gov.au/publication/jobkeeper-review.

Vella, F. (1998) 'Estimating Models with Sample Selection Bias: A survey', *Journal of Human Resources*, vol. 33: 127–169.

Vella, F. and Verbeek, M. (1999) 'Two-step estimation of Panel Data Models with Censored Endogenous Variables and Selection Bias', *Journal of Econometrics*, vol. 90: 239–263.

Verbeek, M. and Nijman, T. E. (1996) 'Incomplete Panels and Selection Bias. The Econometrics of Panel Data', in L. Mátyás and P. Sevestre (eds), *The Econometrics of Panel Data*, Kluwer Academic Publishers, Dordrecht: 449–490.

Wood, G. and Ong, R. (2017) 'The Australian housing system: a quiet revolution?', *Australian Economic Review*, vol. 50, no.2: 197-204.

International Monetary Fund (2020) *World Economic Update, June 2020, A Crisis Like No Other, An Uncertain Recovery*, accessed 1 July 2020, https://www.imf.org/~/media/Files/Publications/WEO/2020/Update/June/English/WEOENG202006.ashx?la=en.

Yates, J. (2007) *Housing Affordability and Financial Stress*, NRV3 Research Paper 6, Australian Housing and Urban Research Institute, Melbourne, accessed 1/7/2020, available: https://www.ahuri.edu.au/research/nrv-research-papers/nrv3-6.

Appendix 1: Descriptive statistics

DESCRIPTIVE STATSTICS

	All People					
	Male	Percent	Female	Percent	Total	Percent
Education level						
Year11 and below	1898	23.0%	2452	26.8%	4350	25.0%
Year 12	1289	15.6%	1378	15.0%	2667	15.3%
Certificate	2366	28.6%	1676	18.3%	4042	23.2%
Diploma	733	8.9%	960	10.5%	1693	9.7%
Degree	1091	13.2%	1520	16.6%	2611	15.0%
Postgrad	883	10.7%	1176	12.8%	2059	11.8%
Total	**8260**	**100.0%**	**9162**	**100.0%**	**17422**	**100.0%**
Age group						
16-19	529	8.0%	478	6.6%	1007	7.3%
20-24	701	10.6%	762	10.6%	1463	10.6%
25-29	869	13.1%	906	12.6%	1775	12.8%
30-34	802	12.1%	898	12.5%	1700	12.3%
35-39	648	9.8%	681	9.5%	1329	9.6%
40-44	588	8.9%	666	9.3%	1254	9.1%
45-49	641	9.7%	715	9.9%	1356	9.8%
50-64	1840	27.8%	2092	29.1%	3932	28.5%
Total	**6618**	**100.0%**	**7198**	**100.0%**	**13816**	**100.0%**
Labour Market Status						
Employed Full-time	4535	54.9%	2837	31.0%	7372	42.3%
Employed Part-time	1112	13.5%	2608	28.5%	3720	21.4%
Unemployed	361	4.4%	299	3.3%	660	3.8%
NLF	2245	27.2%	3415	37.3%	5660	32.5%
Total	**8253**	**100.0%**	**9159**	**100.0%**	**17412**	**100.0%**

Appendix 1: Descriptive statistics

	All People					
	Male	Percent	Female	Percent	Total	Percent
State or Territory						
NSW	2390	28.9%	2651	28.9%	5041	28.9%
VIC	2103	25.4%	2352	25.7%	4455	25.6%
QLD	1773	21.4%	1987	21.7%	3760	21.6%
SA	757	9.2%	818	8.9%	1575	9.0%
WA	745	9.0%	808	8.8%	1553	8.9%
TAS	269	3.3%	290	3.2%	559	3.2%
NT	68	0.8%	70	0.8%	138	0.8%
ACT	161	1.9%	189	2.1%	350	2.0%
Total	**8266**	**100.0%**	**9165**	**100.0%**	**17431**	**100.0%**
Marital status						
Married/Defacto	5374	65.0%	5582	60.9%	10956	62.9%
Widowed	171	2.1%	646	7.1%	817	4.7%
Divorced	378	4.6%	675	7.4%	1053	6.0%
Separated	196	2.4%	265	2.9%	461	2.6%
Never married	2146	26.0%	1992	21.7%	4138	23.7%
Total	**8265**	**100.0%**	**9160**	**100.0%**	**17425**	**100.0%**
Household structure						
Lone Person	1357	16.9%	1520	17.0%	2877	16.9%
Couple	2670	33.2%	2757	30.8%	5427	31.9%
Family 2 Adults	3481	43.3%	3536	39.5%	7017	41.3%
Family Lone Parent	537	6.7%	1149	12.8%	1686	9.9%
Total	**8045**	**100.0%**	**8962**	**100.0%**	**17007**	**100.0%**
Country of birth						
Australia	6609	80.0%	7273	79.4%	13882	79.7%
English speaking background	767	9.3%	769	8.4%	1536	8.8%
Other countries	888	10.7%	1121	12.2%	2009	11.5%
Total	**8264**	**100.0%**	**9163**	**100.0%**	**17427**	**100.0%**
Resided children Under 4						
No	7383	89.3%	8106	88.4%	15489	88.9%
Yes	883	10.7%	1059	11.6%	1942	11.1%
Total	**8266**	**100.0%**	**9165**	**100.0%**	**17431**	**100.0%**

Appendix 1: Descriptive statistics

	All People					
	Male	Percent	Female	Percent	Total	Percent
Long term health condition						
No	5928	71.8%	6376	69.6%	12304	70.6%
Yes	2334	28.2%	2788	30.4%	5122	29.4%
Total	**8262**	**100.0%**	**9164**	**100.0%**	**17426**	**100.0%**
Separated from spouse						
No	8052	97.4%	8860	96.7%	16912	97.0%
Yes	214	2.6%	305	3.3%	519	3.0%
Total	**8266**	**100.0%**	**9165**	**100.0%**	**17431**	**100.0%**
Acquired Education						
No	8053	97.4%	8886	97.0%	16939	97.2%
Yes	213	2.6%	279	3.0%	492	2.8%
Total	**8266**	**100.0%**	**9165**	**100.0%**	**17431**	**100.0%**
Acquired child						
No	8088	97.8%	8998	98.2%	17086	98.0%
Yes	178	2.2%	167	1.8%	345	2.0%
Total	**8266**	**100.0%**	**9165**	**100.0%**	**17431**	**100.0%**
Household head						
No	2968	35.9%	5196	56.7%	8164	46.8%
Yes	5298	64.1%	3969	43.3%	9267	53.2%
Total	**8266**	**100.0%**	**9165**	**100.0%**	**17431**	**100.0%**

	Male	Mean	Female	Mean	Total	Mean
Mental Health Score [0:100]	7406	73.8	8363	71.4	15769	72.6
General Health Score [0:100]	7369	66.2	8319	66.2	15688	66.2
Time in Australia [Years]	8266	41.0	9165	41.8	17431	41.4
Gross State Product Percapita	8266	73.8	9165	73.8	17431	73.77
Unemp. Rate (ABS) [State/sex/AgeGp]	6396	4.7	6965	4.2	13361	4.4
Mean Earning (ABS) [State/Sex]	8266	1431	9165	973	17431	1191

Source: HILDA waves 9 to 18.

DESCRIPTIVE STATSTICS

	Households					
	Male	Percent	Female	Percent	Total	Percent
Education level						
Year11 and below	1005	19.0%	1079	27.2%	2084	22.5%
Year 12	670	12.7%	475	12.0%	1145	12.4%
Certificate	1645	31.1%	727	18.3%	2372	25.6%
Diploma	529	10.0%	418	10.5%	947	10.2%
Degree	767	14.5%	679	17.1%	1446	15.6%
Postgrad	678	12.8%	590	14.9%	1268	13.7%
Total	**5294**	**100.0%**	**3968**	**100.0%**	**9262**	**100.0%**
Age group						
16-19	55	1.3%	47	1.6%	102	1.4%
20-24	286	6.7%	230	8.0%	516	7.2%
25-29	563	13.2%	378	13.2%	941	13.2%
30-34	627	14.7%	333	11.6%	960	13.4%
35-39	517	12.1%	270	9.4%	787	11.0%
40-44	451	10.6%	267	9.3%	718	10.1%
45-49	463	10.8%	336	11.7%	799	11.2%
50-64	1310	30.7%	1008	35.1%	2318	32.5%
Total	**4272**	**100.0%**	**2869**	**100.0%**	**7141**	**100.0%**
Labour Market Status						
Employed Full-time	3446	65.1%	1549	39.0%	4995	53.9%
Employed Part-time	486	9.2%	793	20.0%	1279	13.8%
Unemployed	142	2.7%	89	2.2%	231	2.5%
NLF	1218	23.0%	1537	38.7%	2755	29.8%
Total	**5292**	**100.0%**	**3968**	**100.0%**	**9260**	**100.0%**
State or Territory						
NSW	1569	29.6%	1099	27.7%	2668	28.8%
VIC	1337	25.2%	999	25.2%	2336	25.2%
QLD	1132	21.4%	899	22.7%	2031	21.9%
SA	459	8.7%	381	9.6%	840	9.1%
WA	487	9.2%	344	8.7%	831	9.0%
TAS	164	3.1%	138	3.5%	302	3.3%
NT	44	0.8%	28	0.7%	72	0.8%
ACT	106	2.0%	81	2.0%	187	2.0%
Total	**5298**	**100.0%**	**3969**	**100.0%**	**9267**	**100.0%**

Appendix 1: Descriptive statistics

	Households					
	Male	Percent	Female	Percent	Total	Percent
Marital status						
Married/Defacto	3642	68.8%	1622	40.9%	5264	56.8%
Widowed	147	2.8%	553	13.9%	700	7.6%
Divorced	339	6.4%	589	14.9%	928	10.0%
Separated	173	3.3%	234	5.9%	407	4.4%
Never married	996	18.8%	968	24.4%	1964	21.2%
Total	**5297**	**100.0%**	**3966**	**100.0%**	**9263**	**100.0%**
Household structure						
Lone Person	1357	26.1%	1520	39.2%	2877	31.7%
Couple	1674	32.2%	927	23.9%	2601	28.6%
Family 2 Adults	1989	38.2%	701	18.1%	2690	29.6%
Family Lone Parent	183	3.5%	729	18.8%	912	10.0%
Total	**5203**	**100.0%**	**3877**	**100.0%**	**9080**	**100.0%**
Country of birth						
Australia	4199	79.3%	3143	79.2%	7342	79.3%
English speaking background	505	9.5%	365	9.2%	870	9.4%
Other countries	592	11.2%	459	11.6%	1051	11.3%
Total	**5296**	**100.0%**	**3967**	**100.0%**	**9263**	**100.0%**
Resided children Under 4						
No	4575	86.4%	3688	92.9%	8263	89.2%
Yes	723	13.6%	281	7.1%	1004	10.8%
Total	**5298**	**100.0%**	**3969**	**100.0%**	**9267**	**100.0%**
Long term health condition						
No	3838	72.5%	2554	64.3%	6392	69.0%
Yes	1459	27.5%	1415	35.7%	2874	31.0%
Total	**5297**	**100.0%**	**3969**	**100.0%**	**9266**	**100.0%**
Separated from spouse						
No	5143	97.1%	3769	95.0%	8912	96.2%
Yes	155	2.9%	200	5.0%	355	3.8%
Total	**5298**	**100.0%**	**3969**	**100.0%**	**9267**	**100.0%**
Acquired Education						
No	5234	98.8%	3881	97.8%	9115	98.4%
Yes	64	1.2%	88	2.2%	152	1.6%
Total	**5298**	**100.0%**	**3969**	**100.0%**	**9267**	**100.0%**

Appendix 1: Descriptive statistics

	Households					
	Male	Percent	Female	Percent	Total	Percent
Acquired child						
No	5183	97.8%	3921	98.8%	9104	98.2%
Yes	115	2.2%	48	1.2%	163	1.8%
Total	**5298**	**100.0%**	**3969**	**100.0%**	**9267**	**100.0%**

	Male	Mean	Female	Mean	Total	Mean
Mental Health Score [0:100]	4732	74.6	3588	71.6	8320	73.3
General Health Score [0:100]	4711	66.1	3564	65.2	8275	65.7
Time in Australia [Years]	5298	43.6	3969	47.1	9267	45.1
Gross State Product Percapita	5298	74.0	3969	73.5	9267	73.8
Unemployment Rate (ABS) [State/sex/AgeGp]	4137	4.0	2765	3.7	6902	3.9
Mean Earning (ABS) [State/Sex]	5298	1433	3969	971	9267	1235

Source: HILDA waves 9 to 18.

Appendix 2: Employment model results

Models (Predicts Unemployment)

	Participation					
	Female			Male		
	Coef.	z-statistic	P>|z|	Coef.	z-statistic	P>|z|
Education						
Year 11 or less	Reference			Reference		
Year 12	-0.253	-6.090	0.000	-0.235	-6.710	0.000
Certificate	-0.196	-5.070	0.000	-0.294	-8.440	0.000
Diploma	-0.185	-3.180	0.001	-0.326	-7.470	0.000
Degree	-0.290	-5.530	0.000	-0.438	-10.960	0.000
Postgrad	-0.229	-4.070	0.000	-0.588	-13.150	0.000
Age group						
50-64	Reference			Reference		
16-19	0.671	2.870	0.004	0.426	2.400	0.016
20-24	0.637	3.710	0.000	0.503	3.480	0.001
25-29	0.599	4.190	0.000	0.502	3.920	0.000
30-34	0.478	3.920	0.000	0.451	4.010	0.000
35-39	0.370	3.510	0.000	0.361	3.880	0.000
40-44	0.292	3.560	0.000	0.206	3.040	0.002
45-49	0.115	1.890	0.058	0.104	2.260	0.024
Labour force status (t-1)						
Full-time	Reference					
Part-Time	0.670	17.730	0.000	0.515	17.520	0.000
Unemployed	1.119	23.940	0.000	1.309	30.940	0.000
Not in Labour Force	2.170	48.900	0.000	2.159	52.420	0.000

Appendix 2: Employment model results

	Participation					
	Female			Male		
	Coef.	z-statistic	P>|z|	Coef.	z-statistic	P>|z|
State						
NSW	Reference			Reference		
VIC	-0.032	-0.560	0.573	-0.172	-4.010	0.000
QLD	0.065	1.280	0.202	-0.046	-1.110	0.269
SA	0.051	0.540	0.586	-0.184	-2.630	0.008
WA	-0.202	-1.140	0.253	-0.070	-0.330	0.742
NT	-0.875	-2.790	0.005	-0.041	-0.220	0.823
ACT	-0.108	-0.660	0.512	0.243	2.010	0.044
Marital status						
Married/Defacto	Reference			Reference		
Widowed	0.200	1.290	0.198	-0.159	-1.600	0.110
Divorced	0.114	1.470	0.142	-0.093	-1.500	0.132
Separated	-0.006	-0.060	0.949	-0.120	-1.680	0.093
Never married	0.362	6.330	0.000	0.004	0.080	0.938
Household structure						
Lone Person	Reference			Reference		
Couple	0.027	0.400	0.688	-0.178	-3.000	0.003
Adults & Child(ren)	-0.089	-1.630	0.102	-0.200	-3.740	0.000
Lone Parent	-0.069	-1.260	0.206	-0.032	-0.720	0.472
Country of birth						
Australia	Reference			Reference		
English Speaking Background	-0.110	-1.700	0.089	-0.022	-0.430	0.664
Other countries	0.066	1.030	0.304	0.148	2.850	0.004
Child Under 4yrs						
No	Reference			Reference		
Yes	0.181	3.510	0.000	0.653	19.610	0.000
Long term health condition						
No	Reference			Reference		
Yes	0.437	15.070	0.000	0.320	12.890	0.000
Household head						
No	Reference			Reference		
Yes	-0.134	-4.110	0.000	-0.197	-7.260	0.000

Appendix 2: Employment model results

	Participation					
	Female			Male		
	Coef.	z-statistic	P>|z|	Coef.	z-statistic	P>|z|
Became separated						
No	Reference			Reference		
Yes	-0.046	-0.740	0.460	-0.121	-2.390	0.017
Acquired education						
No	Reference			Reference		
Yes	-0.487	-7.370	0.000	-0.363	-6.610	0.000
Acquired child						
No	Reference			Reference		
Yes	0.226	2.870	0.004	1.026	17.800	0.000
Mental Health Index	-0.003	-2.370	0.018	-0.004	-5.160	0.000
General Health Index	-0.005	-3.940	0.000	0.000	-0.360	0.719
Mean Earnings (t-1)	0.423	0.820	0.411	0.318	0.650	0.519
Time in Australia	-0.038	-3.720	0.000	-0.021	-2.350	0.019
Gross state product/cap.	-0.007	-1.040	0.300	-0.014	-2.430	0.015
Unemployment rate	0.770	2.900	0.004	0.683	3.470	0.001
Age Squared	0.075	6.000	0.000	0.062	6.020	0.000
Sample Size	**44,605**			**50,490**		

Notes: (i) Model is Panel Probit (see Section 3.2.2 "Labour Market Status Model").

Source: HILDA waves 9 to 18.

	Employment					
	Female			Male		
	Coef.	z-statistic	P>|z|	Coef.	z-statistic	P>|z|
Education						
Year 11 or less	Reference			Reference		
Year 12	-0.279	-5.570	0.000	-0.316	-6.150	0.000
Certificate	-0.202	-4.260	0.000	-0.159	-3.070	0.002
Diploma	-0.339	-4.620	0.000	-0.282	-4.330	0.000
Degree	-0.327	-5.360	0.000	-0.603	-9.110	0.000
Postgrad	-0.305	-4.280	0.000	-0.457	-6.100	0.000

Appendix 2: Employment model results

	Employment					
	Female			Male		
	Coef.	z-statistic	P>|z|	Coef.	z-statistic	P>|z|
Age group						
50-64	Reference			Reference		
16-19	0.299	0.930	0.353	-0.354	-1.150	0.249
20-24	0.372	1.560	0.118	-0.225	-0.890	0.375
25-29	0.312	1.540	0.125	-0.402	-1.750	0.080
30-34	0.217	1.230	0.217	-0.443	-2.160	0.031
35-39	0.125	0.830	0.406	-0.184	-1.090	0.277
40-44	0.208	1.770	0.077	-0.075	-0.600	0.550
45-49	0.076	0.870	0.385	0.045	0.520	0.605
Labour force status (t-1)						
Full-time						
Part-Time	0.215	4.230	0.000	0.111	2.370	0.018
Unemployed	1.249	16.350	0.000	1.447	15.930	0.000
Not in Labour Force	1.123	7.750	0.000	1.482	10.120	0.000
State						
NSW	Reference			Reference		
VIC	0.141	1.990	0.047	0.248	3.390	0.001
QLD	0.243	3.910	0.000	0.249	3.690	0.000
SA	0.334	2.840	0.004	0.333	2.790	0.005
WA	-0.332	-1.500	0.134	-0.151	-0.460	0.649
NT	-0.526	-1.510	0.131	-0.140	-0.480	0.633
ACT	-0.334	-1.670	0.095	-0.642	-2.820	0.005
Marital status						
Married/Defacto	Reference			Reference		
Widowed	0.078	0.300	0.767	0.277	1.750	0.081
Divorced	0.066	0.610	0.544	0.353	3.800	0.000
Separated	-0.005	-0.050	0.963	0.159	1.400	0.161
Never married	0.043	0.630	0.527	0.211	2.930	0.003
Household structure						
Lone Person	Reference			Reference		
Couple	-0.262	-3.200	0.001	0.008	0.100	0.922
Adults & Child(ren)	-0.234	-3.610	0.000	-0.164	-2.130	0.033
Lone Parent	-0.020	-0.300	0.763	-0.098	-1.520	0.128

Appendix 2: Employment model results

	Employment					
	Female			Male		
	Coef.	z-statistic	P>|z|	Coef.	z-statistic	P>|z|
Country of birth						
Australia	Reference			Reference		
English Speaking Background	-0.008	-0.100	0.920	-0.018	-0.190	0.847
Other countries	0.044	0.570	0.565	-0.040	-0.450	0.653
Child Under 4yrs						
No	Reference			Reference		
Yes	0.025	0.430	0.669	-0.051	-0.670	0.502
Long term health condition						
No	Reference			Reference		
Yes	0.167	3.660	0.000	0.158	3.550	0.000
Household head						
No	Reference			Reference		
Yes	-0.309	-7.750	0.000	-0.139	-2.940	0.003
Became separated						
No	Reference			Reference		
Yes	0.114	1.630	0.103	0.116	1.720	0.085
Acquired education						
No	Reference			Reference		
Yes	0.128	1.850	0.064	-0.016	-0.230	0.815
Acquired child						
No	Reference			Reference		
Yes	0.053	0.620	0.538	0.404	3.000	0.003
Mental Health Index	-0.010	-7.340	0.000	-0.004	-3.250	0.001
General Health Index	0.005	3.550	0.000	0.001	0.620	0.534
Mean Earnings (t-1)	-0.179	-0.280	0.777	0.157	0.200	0.840
Time in Australia	-0.010	-0.670	0.504	-0.022	-1.630	0.104
Gross state product/cap.	0.014	1.510	0.132	0.007	0.650	0.513
Unemployment rate	0.480	1.120	0.261	0.940	2.370	0.018
Age Squared	0.016	0.790	0.429	0.002	0.130	0.897
Sample Size	**38,524**			**37,512**		

Notes (i) Model is Panel Probit (see Section 3.2.2 "Labour Market Status Model").

Source: HILDA waves 9 to 18.

Australian Housing and Urban Research Institute
Level 12, 460 Bourke Street
Melbourne VIC 3000
Australia
+61 3 9660 2300
information@ahuri.edu.au
ahuri.edu.au
twitter.com/AHURI_Research
facebook.com/AHURI.AUS
Australian Housing and Urban Research Institute