Forecasting the unfolding housing boom

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Overview

Like nearly every other advanced economy, Australian house prices increased during the pandemic, which was a marked break from the large declines seen in past recessions. Admittedly the pandemic was different in that interest rates were relatively low leading into the outbreak, but the striking resilience of prices stands as testament to the unprecedented and immediate easing of fiscal and monetary policy, particularly the success of the JobKeeper wage subsidy in limiting the rise in unemployment and banks deferring mortgage repayments for stressed home-owners.

With house prices picking up after languishing over recent years, Coolabah Capital Investments (CCI) has applied the Reserve Bank of Australia's (RBA) ground-breaking model of the housing market developed by Peter Tulip and Trent Saunders to produce internally-consistent forecasts for the next few years.[2] The model, which allows for feedback between housing construction, rents, vacancies and prices, points to a large gain in prices of around 25% through to the end of 2023, driven by low interest rates. (This is consistent with the forecasts previously released by CCI's chief investment officer, Christopher Joye.) Rising house prices and low rates should underpin a similar gain in real residential investment, although rents are expected to be weak given a relatively high vacancy rate.

The model estimates how the housing market will behave on the basis of past relationships, where CCI has calculated margins of error around the model's predictions based on past forecast errors. The estimated margins of error are wide, which is not surprising given the volatility of house prices and rents. Clearly, though, the pandemic has created significant additional uncertainty around the outlook given entirely new developments such as the closure of Australia's border and the move to working from home. That said, we believe that past behaviour provides a very useful starting point for considering the impact of any lasting changes from the outbreak.

The RBA should take comfort from rising house prices because higher asset prices are a key part of the transmission mechanism of both conventional and unconventional monetary policy (QE in its current form being an exception given banks do not offer long-term fixed-rate mortgages). While we expect the RBA will keep policy loose until it achieves its economic objectives, there is always the risk that banks lower lending standards as house prices strengthen, which would trigger a regulatory response that would challenge the model's forecasts. To date, though, regulators are only monitoring the situation given credit spreads for riskier mortgages remain unchanged with the RBA reporting that lending standards remain conservative.

A large rise in house prices would intensify concerns over affordability and inequality. Homes are very affordable insofar as debt-servicing costs are very low thanks to ultra-cheap mortgage rates, but raising a deposit remains a barrier to entering the market and home ownership has trended lower for the first home-buyer age group. Easy monetary policy reduces income inequality by lowering unemployment, but can add to wealth inequality, which reflects very low home ownership among low-income/resource households. CCI's view is that concerns over affordability and inequality are better addressed by government via the tax/transfer system. The other step that government can take is to address the longstanding inflexibility of the supply side of the housing market, which has seen lower interest rates manifested in higher house prices more than the construction of new homes.
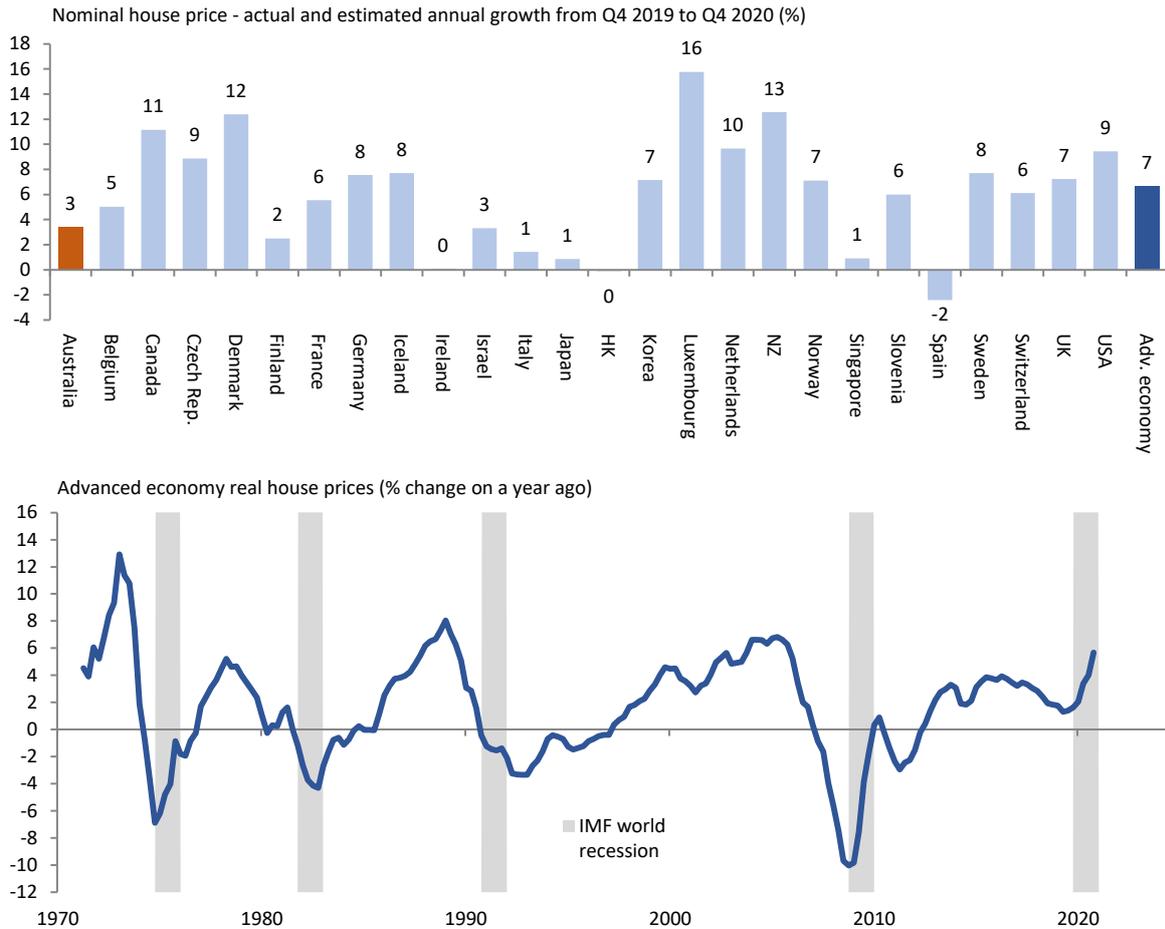
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[1] This note has benefitted from discussions with Peter Tulip.
[2] Peter is Chief Economist for the Centre for Independent Studies and Trent is Principal Economist for Queensland Treasury Corporation.

House prices increased worldwide during the pandemic

As the global economy has rebounded from the worst of the pandemic, a common and unusual feature of the recovery has been faster growth in house prices. Prices have risen in almost every advanced economy, up about 7% in aggregate from pre-pandemic levels.[3] This stands in stark contrast with past world recessions, where real house prices in the advanced economies – adjusting by consumer prices to compare across periods of high and low inflation – have typically fallen by 9% from their peak to trough.
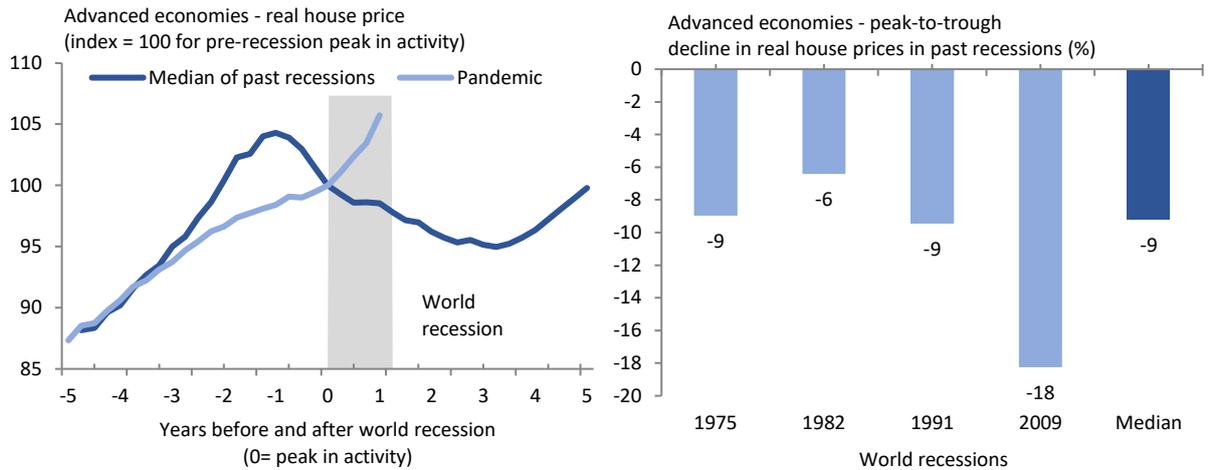
Figure 1: House prices have increased during the pandemic in nearly every advanced economy …

Nominal house price - actual and estimated annual growth from Q4 2019 to Q4 2020 (%)

Advanced economy real house prices (% change on a year ago)

Note: The advanced economies comprise: Australia, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Singapore, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and United States. The world recession dates were from the International Monetary Fund and were 1975, 1982, 1991, 2009 and 2020. Advanced economy prices were constructed using PPP weights.
Source: Australian Bureau of Statistics, Bank for International Settlements, CoreLogic, Federal Reserve Bank of Dallas, Federal Reserve Bank of St Louis, Melbourne Institute, Real Estate Institute of New Zealand, Reserve Bank of New Zealand, World Bank, Coolabah Capital Investments

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[3] This includes estimates for some countries that have not reported Q4 2020 prices.

Figure 2: … which contrasts with the large real price declines in past recessions

Advanced economies - real house price
(index = 100 for pre-recession peak in activity)

Advanced economies - peak-to-trough
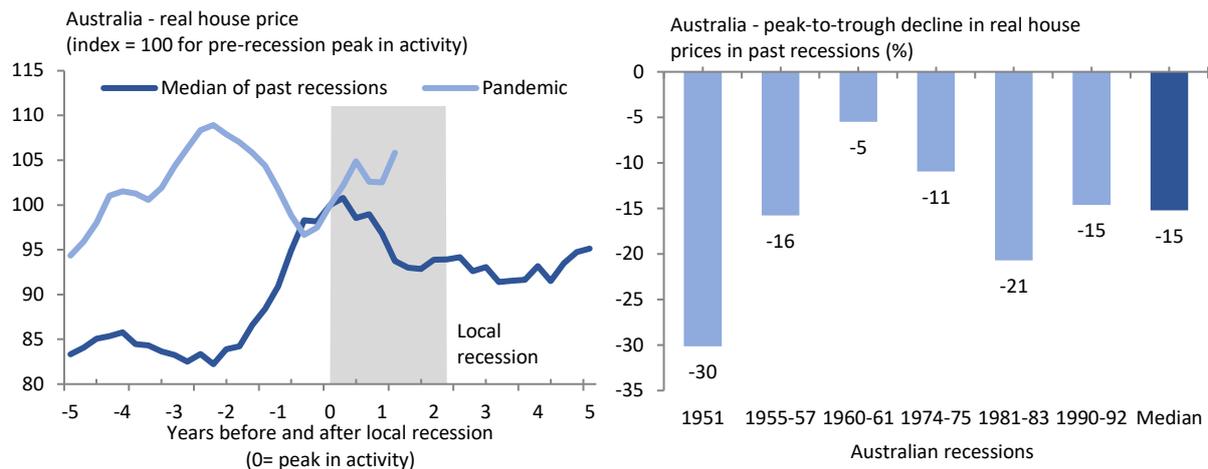decline in real house prices in past recessions (%)

Note: The advanced economies and world recession dates are as listed for the previous figure.
Source: Australian Bureau of Statistics, Bank for International Settlements, CoreLogic, Federal Reserve Bank of Dallas, Federal Reserve Bank of St Louis, Real Estate Institute of New Zealand, Reserve Bank of New Zealand, Coolabah Capital Investments

The same holds true for Australia, with national house prices up 7% so far this year from pre-virus levels, even after dipping by about 1% at the worst point of the pandemic.[4] In real terms, prices are up about 6% from prior to the pandemic, which contrasts with past recessions where the median peak-to-trough decline has been 15%. Even during the global financial crisis – which the RBA classes as a brief slowdown rather than a recession – real house prices fell by 9%.

Figure 3: Australian house prices have also increased during the pandemic, contrasting with the large falls seen in past recessions

Australian real house prices (% change on a year ago)

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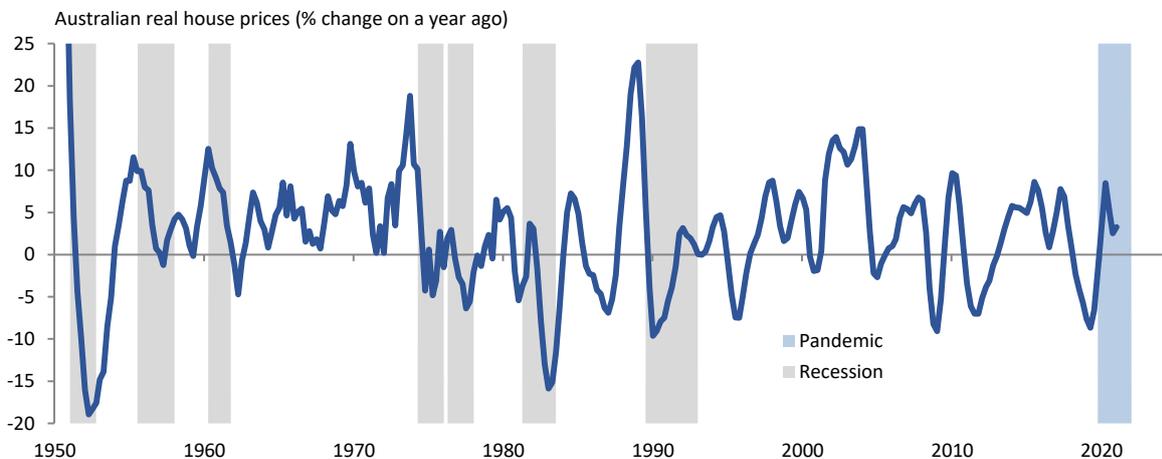
[4] Note that house prices are reported as quarterly averages to be consistent with Australia's quarterly CPI when calculating real house prices. The Q1 2021 headline and trimmed CPIs CCI are estimates.

Australia - real house price
(index = 100 for pre-recession peak in activity)

Australia - peak-to-trough decline in real house
prices in past recessions (%)

Note: House prices prior to the mid 1960s are interpolated from annual observations. The recession dates are from the Melbourne Institute and Waterman. The late 1970s recession was excluded from the analysis because it closely followed the mid 1970s recession. Massive house price gains in 1950 and 1951 were truncated in the first chart because they reflected the removal of war-time price controls. The Q1 2021 CPI was estimated by CCI.
Source: Abelson, Australian Bureau of Statistics, Bank for International Settlements, CoreLogic, Melbourne Institute, Stapledon, Waterman, Coolabah Capital Investments

Unprecedented policy action supported the housing market during the pandemic

The resilience of prices during the pandemic stands as testament to an aggressive and generally unprecedented fiscal and monetary policy response across the advanced economies, with a critical role played by job retention schemes in many countries.

In Australia's case, key policies to support the housing market included:

- **A gigantic job retention scheme and a temporary increase in welfare payments.** The JobKeeper wage subsidy was the largest single stimulus measure adopted by the Commonwealth, costing 7.5% of GDP at its peak last year. At its height, the Commonwealth subsidised more than 3.5mn workers, which equated to about one-third of private-sector employment or 20% of the private-sector wages bill. The Commonwealth also temporarily increased welfare payments and relaxed job search requirements for people on unemployment benefits. The combined boost from these policies saw peaks in net business and net household cash flows of 8% and 14% of GDP last year, which compared with pre-pandemic levels of zero and 2%, respectively.

- **Record low mortgage rates.** The standard variable mortgage rate has fallen to 4.5%, which is the lowest rate since the 1950s, but the average rate on new loans to owner-occupiers has dropped to a record low 2.5% for owner-occupiers and 2.9% for investors. Low mortgage rates have been underpinned by a record low cash rate of 0.1%, the RBA's Term Funding Facility and the 3-year bond yield target of 0.1%.

- **Mortgage payment deferrals and a moratorium on rent increases and evictions for stressed households.** Forced selling of homes was reduced by banks offering to defer mortgage repayments for stressed households. At the worst point of the pandemic, mortgages with some form of payment deferral peaked at 10% of the value of all home loans. Some state governments, such as New South Wales and Victoria, also temporarily restricted rent increases and evictions for stressed renters.

- **A government subsidy to encourage construction.** The Commonwealth Homebuilder scheme has brought forward significant demand for new homes, mostly from first home-buyers, greatly

reinforcing the boost from ultra-low interest rates and state government incentives and all at a low cost of less than $1bn. For example, new loans to owner-occupiers for the construction and purchase of new homes have roughly doubled from pre-pandemic levels to about 3.3% of GDP, which is the highest level in decades.

Another factor that likely helped house prices was that interest rates across the advanced economies were falling from relatively low levels prior to the pandemic. This contrasts with the role played by high interest rates in triggering past recessions, either when a central bank engineered a recession to bring inflation under control or rates were raised too high because of a policy mistake.

Figure 4: Unprecedented fiscal stimulus, support for stressed households, and ultra-low mortgage rates have supported Australia's housing market

Mortgage rate (%)

New home loans for the construction and purchase of new homes (% of GDP)
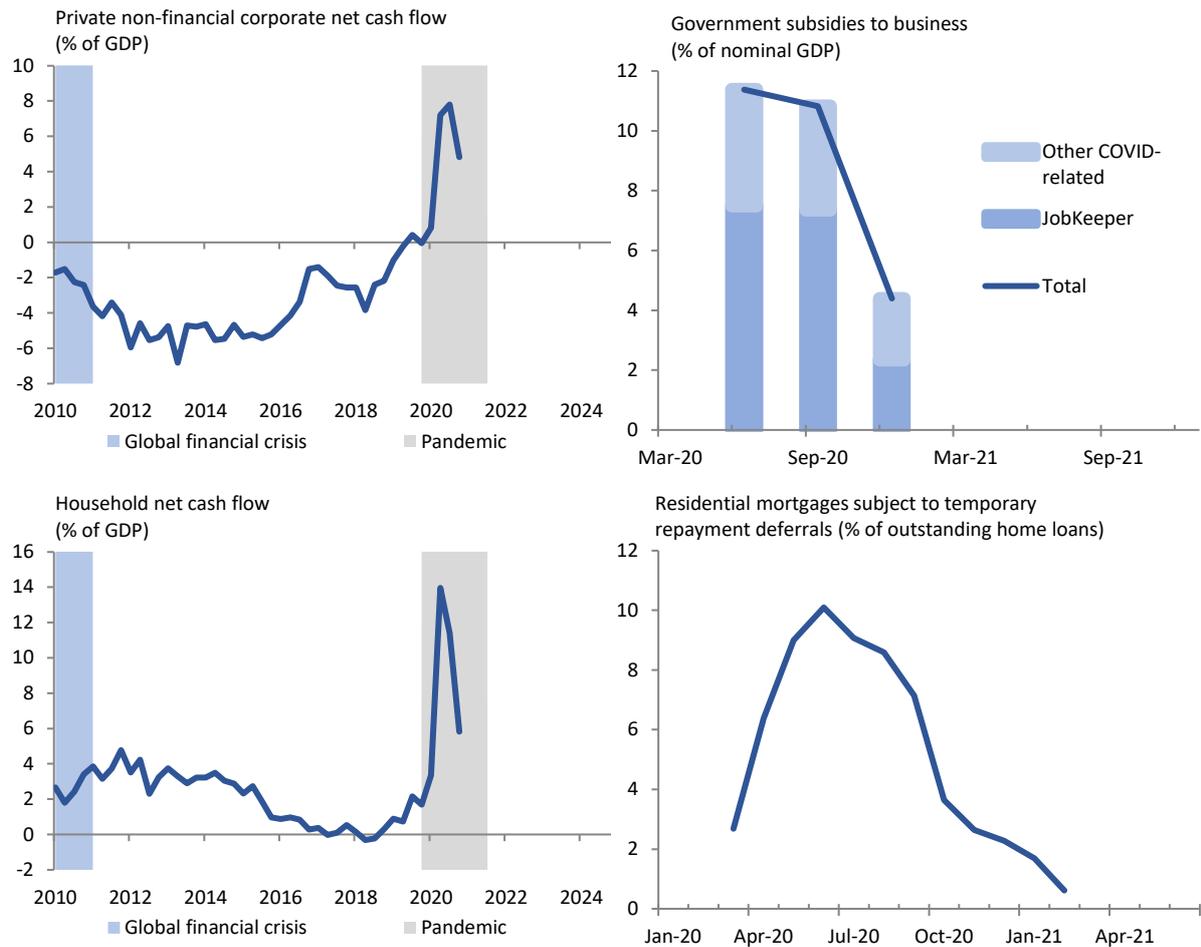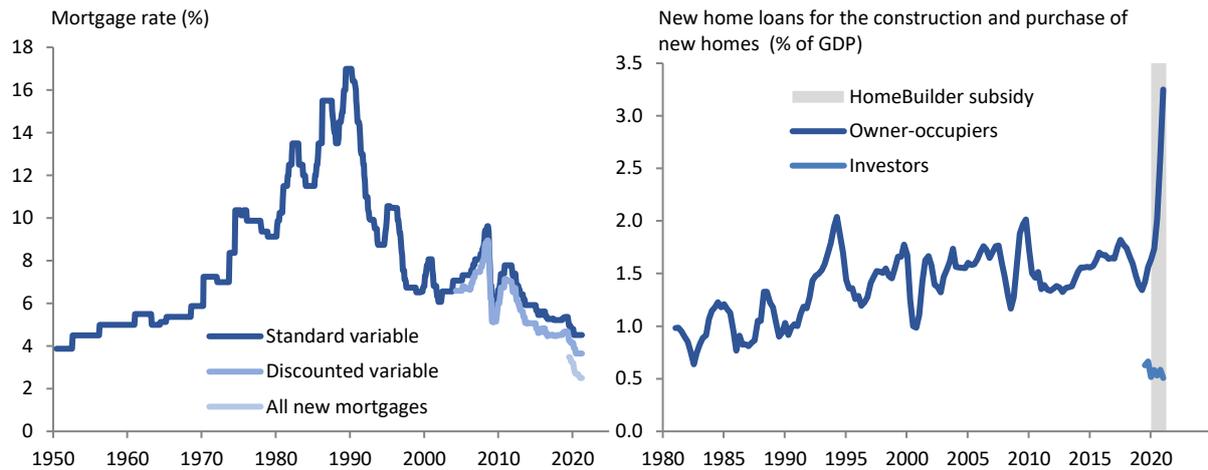
Note: Net cash flow is the national accounts measure of net lending. The Q1 2021 estimate for new home loans for the construction and purchase of new homes is based on January and February loans expressed at a quarterly rate and divided by a CCI estimate for nominal GDP. Investor loans are not adjusted for seasonality.
Source: Australian Banking Association, Australian Prudential and Regulation Authority, Australian Bureau of Statistics, Reserve Bank of Australia, Coolabah Capital Investments
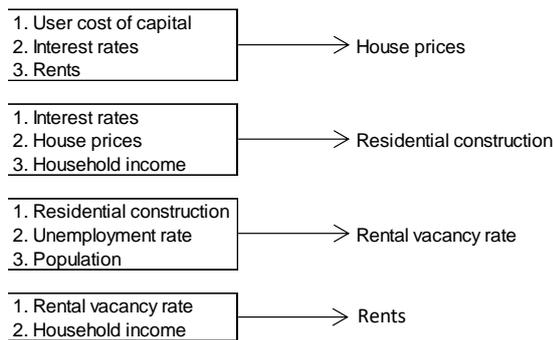
The RBA housing market model points to sharply higher house prices

With Australian house prices picking up over the past year, CCI has updated and re-estimated the innovative Saunders-Tulip (ST) model of the housing market to forecast prices over the next few years.[5] This model was developed at the RBA by Peter Tulip, who is now Chief Economist at the Centre for Independent Studies, and Trent Saunders, who is now Principal Economist at the Queensland Treasury Corporation. The model incorporates earlier RBA analysis of house prices by Peter and Ryan Fox, who is an RBA economist.

The ST model is used by the RBA to analyse the relationships between interest rates, residential investment, rents and house prices. CCI has used it to calculate internally-consistent forecasts that allow for feedback between quantities and prices. The model contrasts with the usual academic approach of estimating house prices using a single equation and provides richer detail on the housing market than the RBA's MARTIN macroeconomic model.

Focusing on house prices, the model embeds a long-run relationship between real house prices and the ratio of real rents to the user cost of housing, where the user cost captures the cost of owning a home (i.e., interest payments and various running costs less expected capital appreciation). This means that house prices adjust over the long term to keep the cost of owning a home close to the cost of renting. In the short term, the model allows for a gradual adjustment of prices to this long-run equilibrium, as well as the momentum in house prices and the short-run impact of real interest rates.

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[5] The code was modified slightly on advice kindly provided by Peter Tulip and some inputs were adjusted for seasonality.

Figure 5: Simplified key relationships in the ST model

Inputs	Output
1. User cost of capital 2. Interest rates 3. Rents	→ House prices
1. Interest rates 2. House prices 3. Household income	→ Residential construction
1. Residential construction 2. Unemployment rate 3. Population	→ Rental vacancy rate
1. Rental vacancy rate 2. Household income	→ Rents

Source: Reserve Bank of Australia, Coolabah Capital Investments

In estimating the ST model, some inputs, such as household income, working-age population and inflation, are driven by past trends, while the unemployment rate is determined by an Okun's Law relationship with income. In using the model to forecast house prices, we overwrote these estimates with forecasts from the RBA's latest Statement on Monetary Policy and the Commonwealth's budget update. Interest rates were based on market pricing prevailing at the end of last year, when the curve was near zero out to three years.

On this basis, the model points to:

- **Stronger house prices.** There is a strong incentive to own a home with the low expected mortgage rate – reflecting market pricing of low interest rates over the next few years – holding down the user cost of capital, such that national house prices are forecast to increase by about 8% over the course of 2021, about 9% over 2022, and about 7% over 2023 for a cumulative gain of 25%.

- **Stronger residential investment.** Real residential investment is expected to rise by a similar amount of 26% over three years, although the gain is more front-loaded, with a forecast increase of about 17% over the course of 2021, roughly 5% over 2022, and about 2% over 2023. Higher investment reflects the incentive of rising house prices and low mortgage rates.

- **Weaker rents.** Rents are forecast to continue falling after dropping 1% over the 2020. Rents are expected to decline by about 1% over 2021 and the same again in 2022 as the vacancy rate remains relatively high, peaking at 3.8% given weakness in the working-age population. Rents are then expected to fall 0.5% over 2023 before broadly stabilising over the following year.

Of these forecasts, the rent and vacancy rate estimates appear somewhat pessimistic given survey data show a pick-up in advertised rents, mainly for houses than apartments. That said, the relationship between advertised vacancies and rents for the stock of all rental properties is very loose. In contrast, the forecast increase in house prices appears on track with national prices up over 3.5% in Q1 2021 and five capital-city prices about 0.5% higher in Q2 to date.

Figure 6: Model forecasts and confidence intervals

				Forecast: Q4 2021	Q4 2022	Q4 2023
	Q4 2018	Q4 2019	Q4 2020			
National house prices						
- % change on a year ago	-4	0	3	8	9	7
- % cumulative forecast gain				8	17	25
with +/-1 RMSE band				1-15	9-26	14-36

Source: Australian Bureau of Statistics, CoreLogic, Reserve Bank of Australia, Coolabah Capital Investments

Figure 7: The ST model points to higher house prices, increased construction, a higher vacancy rate and slightly lower rents
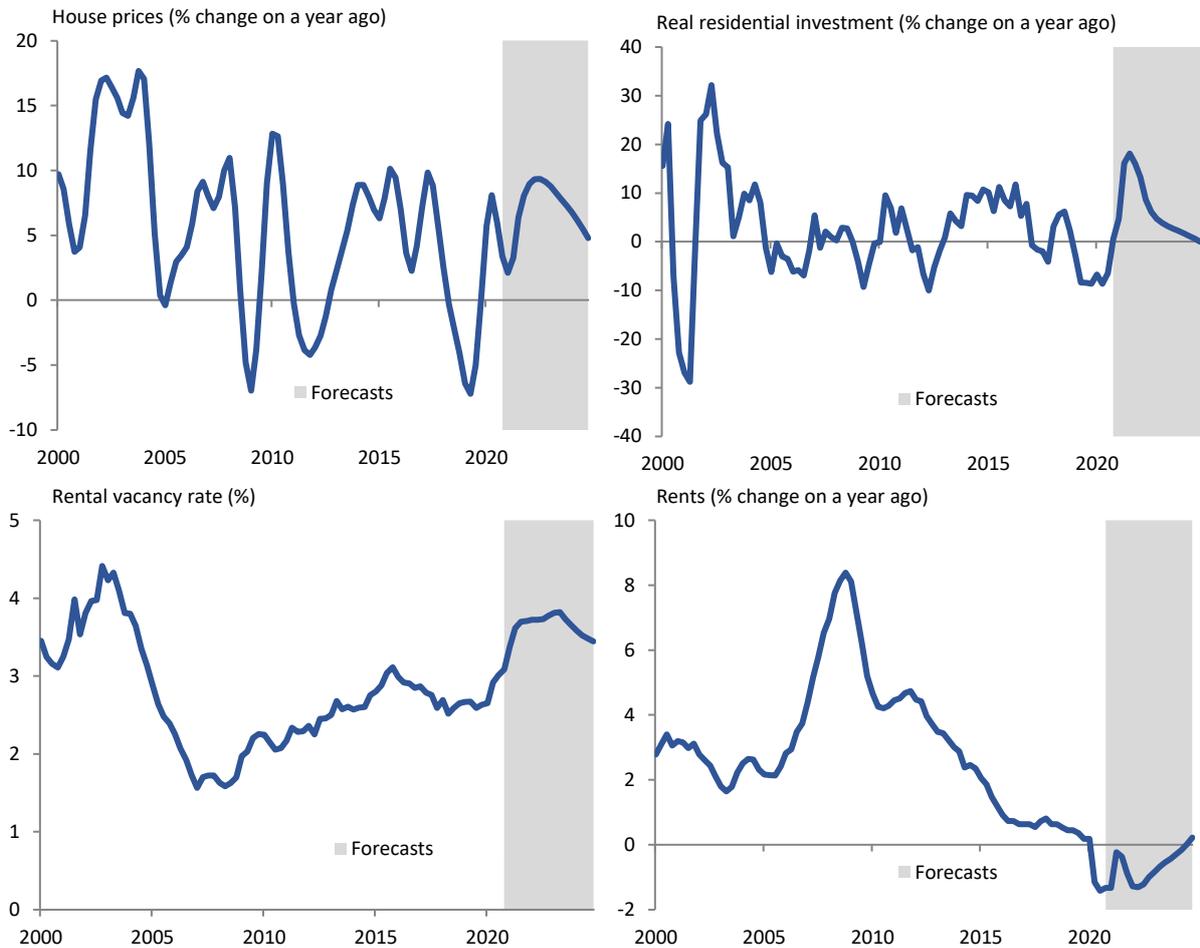
Source: Australian Bureau of Statistics, CoreLogic, Department of Finance, Real Estate Institute of Australia, Reserve Bank of Australia, Coolabah Capital Investments

There are key uncertainties around the ST model's predictions

Tulip and Saunders discuss the limitations of the ST model in their research discussion paper, but three important risks are worth emphasising.

The first is that the closure of the international border has caused the working-age population to stall for the first time in over a century.[6] In our analysis, we have assumed that the population will grow in line with Commonwealth government forecasts that show an eventual resumption of growth when the border is gradually re-opened. The model then lets the vacancy rate and hence rents react as they have in the past. However, past experience may not be a reliable guide given the closure of the border is unprecedented in peacetime.

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[6] The age distribution of the population is only available annually from the 1920s, but it is likely that the working-age population contracted in World War 1.

Figure 8: The working-age population has stalled for the first time in over a century
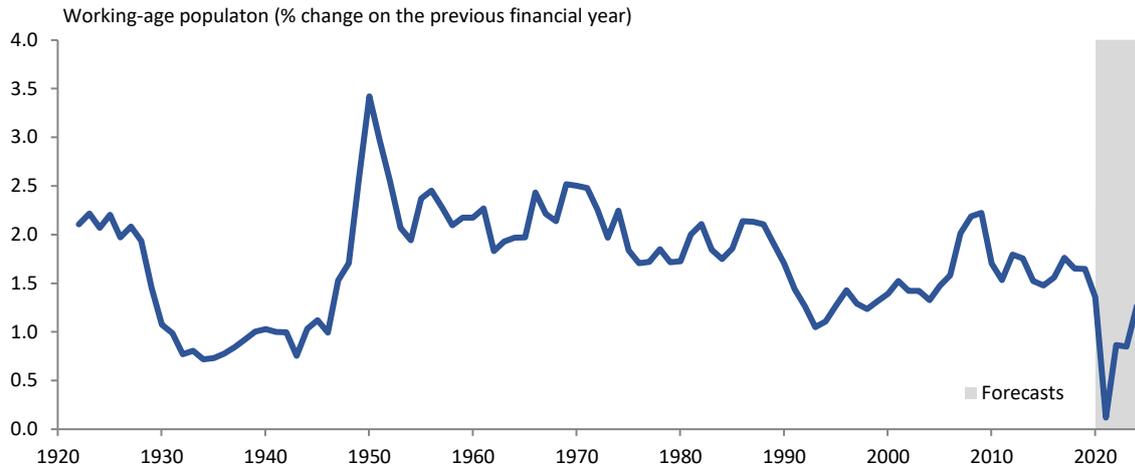
Note: The forecasts are aligned with the Commonwealth government's forecasts of the total population
Source: Australian Bureau of Statistics, Department of Finance, Reserve Bank of Australia, Coolabah Capital Investments

A second uncertainty relates to the role of investors in the housing market. The ST housing model is based on the experience of owner-occupiers, whereas investors account for about 30% of the private-sector housing stock (note, though, that the line between private and public housing is somewhat blurred given that about half of private renters receive modest government rent assistance).[7] The range of mortgage rates show banks increased the credit premium charged to investors in 2017 when the spread between investor and owner-occupier mortgage rates nearly doubled to about 60bp, although the spread has been stable since that point.

Figure 9: Investors account for about 30% of the housing stock and pay a higher interest rate than owner-occupiers
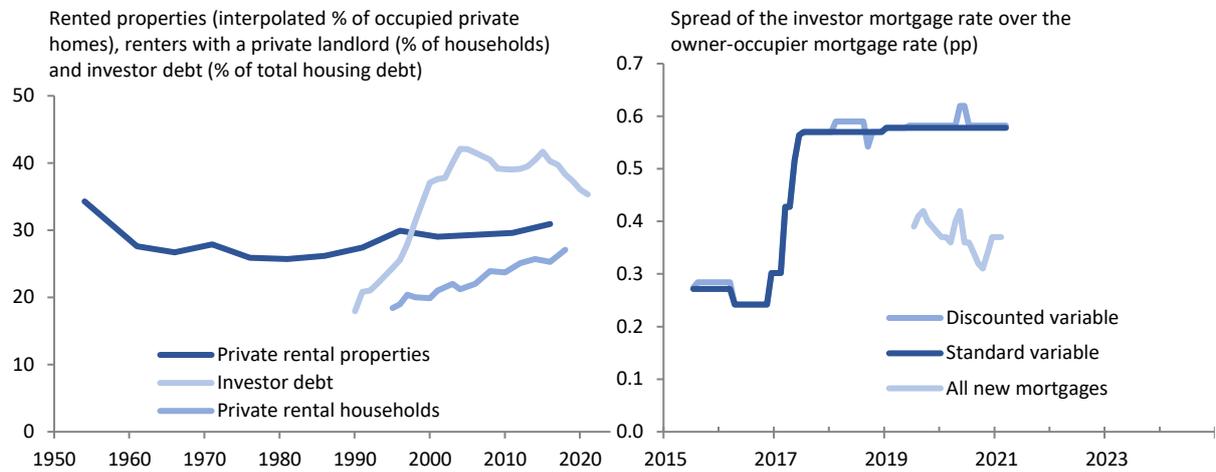
Source: Australian Bureau of Statistics, Reserve Bank of Australia, Coolabah Capital Investments

A third related uncertainty concerns lending standards, which are not incorporated into the ST model. The Australian Prudential Regulation Authority (APRA) took a number of steps from 2014 to 2017 that curbed lending to investors and interest-only loans. In APRA's review of these measures, it concluded that they led to a "marked strengthening in residential mortgage standards and improvements in the risk profile of mortgage lending". Since that time, lending standards have remained conservative, with

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[7] In Q2 2018, 52% of private renters were on Commonwealth rental assistance, or 1.3mn households out of the 2.5mn households that rented private homes. The Department of Social Security reports that 1.7mn households were on rental assistance in Q4 2020.

the RBA recently noting that "mortgage lending standards are largely unchanged, but there has been some unwinding of the slight tightening in lending conditions early in the pandemic".

## Measuring uncertainty around the outlook for house prices and rents

Mindful of these risks, CCI calculated simple margins of error around the forecasts for house prices and rents to convey the overall uncertainty around the model's predictions, where the uncertainty reflects: (1) the difficulty in modelling the relationships in the housing market; (2) factors outside the scope of the model that influence the market, such as the above-mentioned role of investors and credit conditions; and (3) the imprecision of forecast inputs, such as relying on market pricing as a guide to the outlook for interest rates.

The margins of error, or confidence intervals, were proxied by the model's +/-1 root mean squared errors (RMSEs) calculated for forecasts out to three years. The RMSEs were based on quasi real-time forecasts over the period from 2014 to now.[8] Assuming that the forecast errors are normally distributed, house prices and rents should end up within their respective ranges about two-thirds of the time. On this basis, we estimate that the +/-1 RMSE ranges around house prices and rents are:

- House prices are forecast to increase by 8% over 2021 (range: 1 to 15%), by a cumulative 17% through to end-2022 (range: 9 to 26%) and by a total of 25% through to end-2023 (range: 14 to 36%).

- Rents are forecast to fall by 1% over 2021 (range: -2% to zero), by a total of 2% by through to end-2022 (range: -5% to 1%) and by the same total of 2% through to end-2023 (range: -7 to 2%).

The ranges are large, but not surprising considering that house prices and rents are volatile. For example, the standard deviation of annual growth in house prices over recent decades is nearly 7.5pp, while the standard deviation of growth in rents is almost 3.5pp. By way of comparison, the volatility of annual growth in other key economic indicators over the same period is less than 2pp for employment, 2pp for real GDP, and just under 3pp for the headline CPI.

Figure 10: There is considerable uncertainty around the model's forecasts for house prices and rents
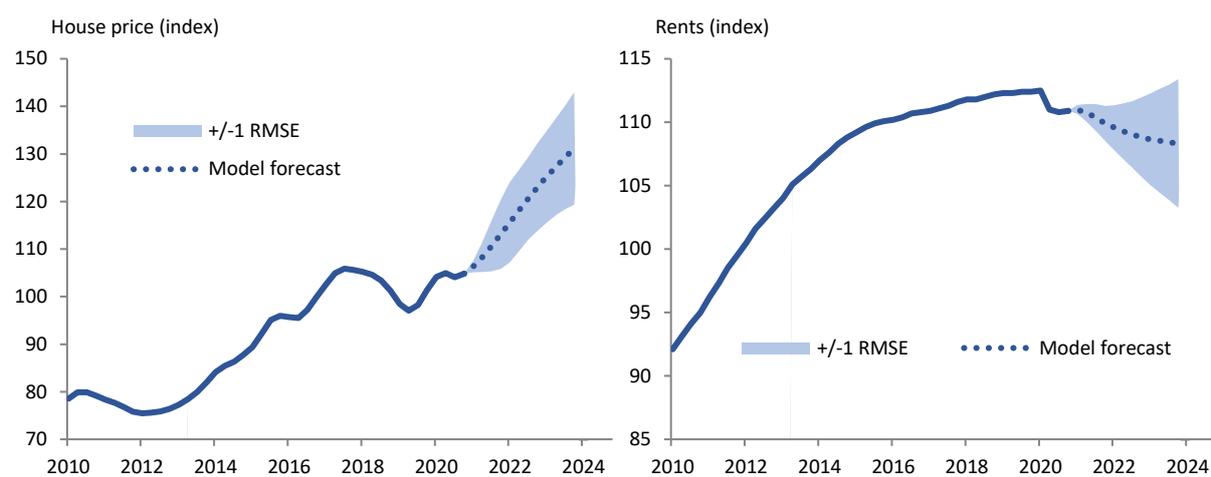
Source: Australian Bureau of Statistics, CoreLogic, Reserve Bank of Australia, Coolabah Capital Investments

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[8] The forecasts were prepared by estimating the model every quarter and preparing updated forecasts based on the information to that point. These were quasi-real-time forecasts in that we used the latest available data for the model inputs, which capture revisions to history, mostly to the activity indicators.
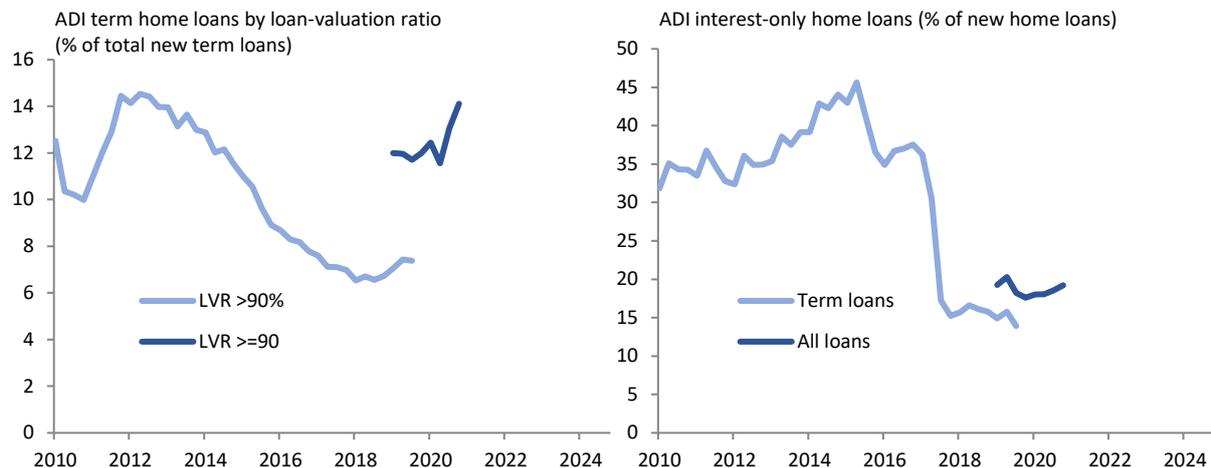
Regulators will take action if banks relax credit standards as prices strengthen
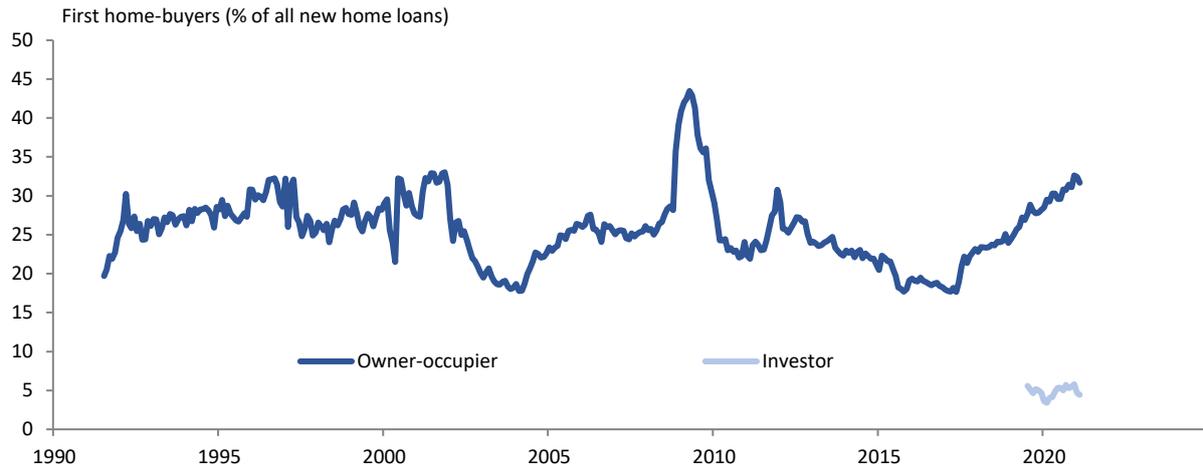
The recovery in house prices to date is a reassuring development for the RBA in that higher house prices signal that policy is working, where higher asset prices are a key part of the transmission mechanism of both conventional and unconventional monetary policy (QE in its current form is an exception because the RBA is buying long-dated government bonds and there are very few fixed-rate mortgages with a term of more than 4 years). Put another way, if prices had fallen sharply in line with past recessions, it would have delayed the already-long time it will likely take for the RBA to achieve its employment and inflation objectives.

With prices continuing to increase, CCI's expectation is that the RBA would anticipate much the same gain over the next few years. Although the RBA has been clear in its forward guidance that policy will remain accommodative for several years until it meets its economic goals, there is some risk that monetary policy is tightened sooner than expected, which is a tension evident in recent market pricing of rate rises starting next year. CCI's base case is, however, that policy will need to remain accommodative for an extended period given that history shows it has been very difficult to achieve full employment in recent decades.

Another risk is that banks reduce lending standards as the housing market strengthens, which would trigger a regulatory response. The above-mentioned regulatory controls imposed in the late 2010s restrained investor and interest-only lending and contributed to the pre-pandemic decline in house prices. While the Council of Financial Regulators is closely monitoring the housing market, the RBA has indicated that lending standards remain conservative, while credit spreads on risker mortgages remain unchanged. There has been a pick-up in high loan-to-valuation ratio lending, but this is to be expected given the surge in demand from first home-buyers, who normally have a small deposit.

Figure 11: First home-buyers have contributed to a pick-up in high loan-valuation ratio lending, but riskier interest-only loans remain depressed

ADI term home loans by loan-valuation ratio
(% of total new term loans)

ADI interest-only home loans (% of new home loans)

First home-buyers (% of all new home loans)

Note: ADI = authorised deposit-taking institution. LVR = loan-valuation ratio.
Source: Australian Bureau of Statistics, Australian Prudential Regulation Authority, Coolabah Capital Investments

Although some commentators point to a more pressing need for regulatory intervention based on the New Zealand experience, New Zealand's housing market is very different, with strong investor-led growth in debt rapidly propelling house prices to an all-time high during the pandemic. This has triggered a regulatory response from the Reserve Bank of New Zealand, with the New Zealand government also taking action to restrain investor lending and improve housing affordability. In contrast, the starting point for Australia is markedly different. Even with the gain during the pandemic, real house prices are yet to surpass the peak reached in 2017, while credit growth is slowly lifting from depressed levels on strength in lending to owner-occupiers.

Figure 12: New Zealand regulators have taken action to restrain an investor-led boom

House price by country (index)

Housing debt (% change on a year ago)
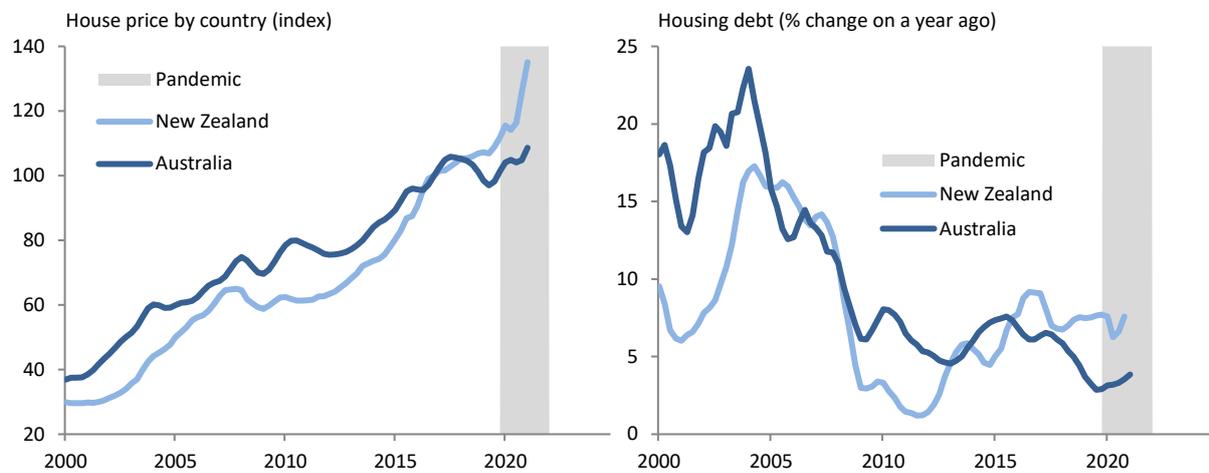
Note: New Zealand prices in Q1 2021 are the average of the quarter to date.
Source: Australian Bureau of Statistics, CoreLogic, Real Estate Institute of New Zealand, Reserve Bank of Australia, Reserve Bank of New Zealand, Coolabah Capital Investments

Inequality and affordability concerns are better addressed by government

Separate to the risk that lenders relax lending standards as the housing market strengthens, double-digit gains in house prices should intensify the ongoing debate over the impact of easy monetary policy on housing affordability and inequality.

Housing is very affordable as measured by the serviceability of a mortgage given ultra-low interest rates, but the time taken to raise a deposit remains a key barrier to entry. That is, on a simple calculation it still takes more than two years for a household on an average income to raise the 10%

deposit on an average-priced home. This is near the maximum time taken to raise a deposit in the past couple of decades and is likely a factor behind the pronounced trend decline in home ownership rate for the first home-buyer age group (the aggregate home ownership rate has drifted a little lower, with the ageing of the population mitigating the decline).
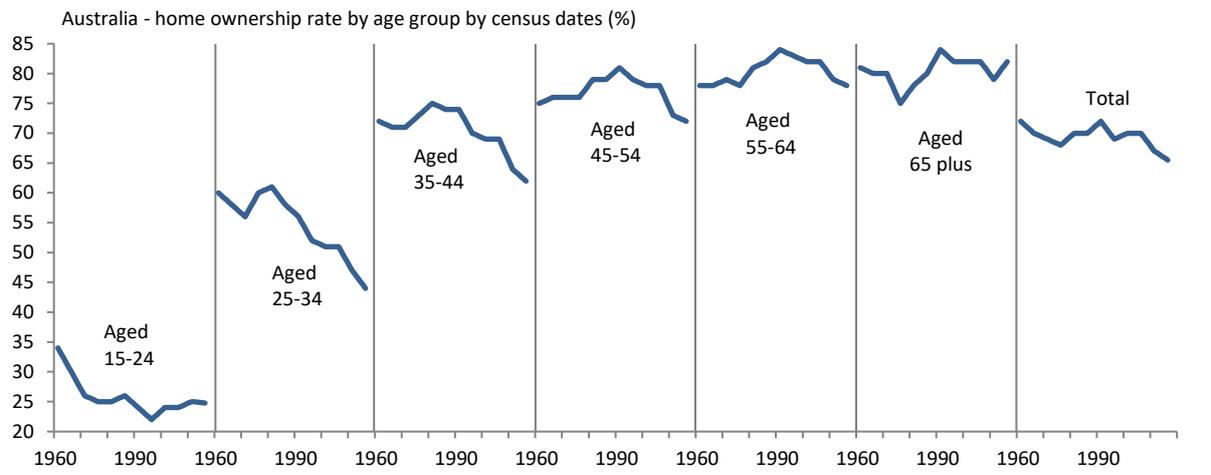
Figure 13: Raising a deposit remains a key barrier to buying a home
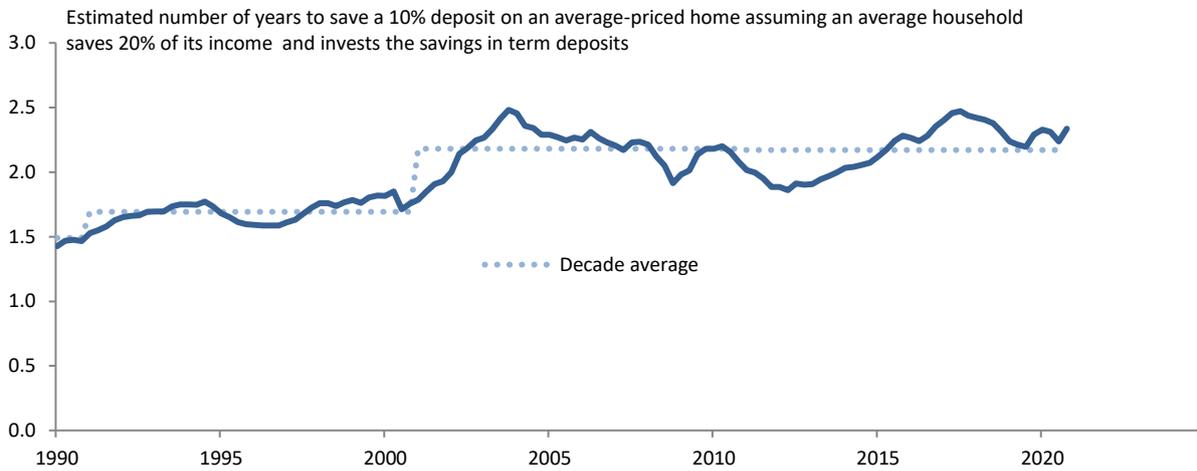
Note: The estimates for the 1990s are experimental.
Source: Australian Bureau of Statistics, CoreLogic, Reserve Bank of Australia, Coolabah Capital Investments
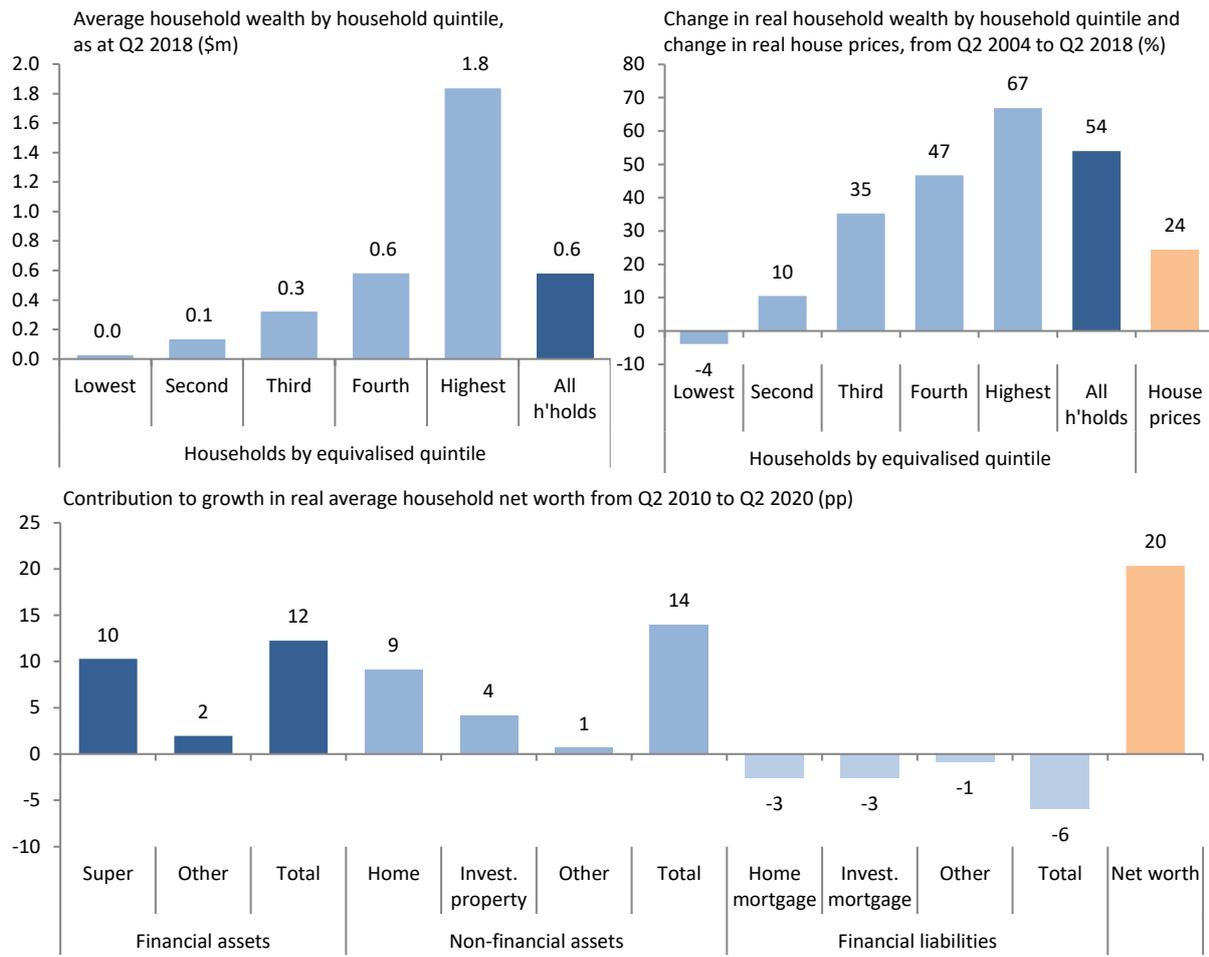
Figure 14: Home ownership remains high on average, but has declined sharply for the first home-buyer age group

Source: Australian Bureau of Statistics, Australian Parliament House, Coolabah Capital Investments

As for inequality, easy monetary policy strongly *reduces* income inequality by boosting employment and reducing unemployment. However, higher house prices can increase wealth inequality, where inequality is driven by very low home ownership among low-income/resource households. Superannuation has been the largest contributor to the average gain in real wealth per household over the ten years to 2020, contributing about 10pp to the 20% increase in total net worth. Housing has been a close second, contributing about 8pp net of mortgages (the family home contributed about a net 7pp with investment properties adding approximately a net 2pp).

Figure 15: Home ownership and superannuation are the main drivers of wealth

Average household wealth by household quintile, as at Q2 2018 ($m)

Change in real household wealth by household quintile and change in real house prices, from Q2 2004 to Q2 2018 (%)

Contribution to growth in real average household net worth from Q2 2010 to Q2 2020 (pp)

Note: Data on the distribution of wealth by household quintile are not yet available for Q2 2020. Q2 2020 net worth estimates are preliminary.
Source: Australian Bureau of Statistics, CoreLogic, Coolabah Capital Investments

In CCI's view, concerns about housing affordability and wealth inequality are better addressed by government via taxes and transfers than by modifying monetary policy. The other important related issue that can be addressed by government is the inflexible supply side of the housing market, where shocks to the housing market end up more in higher house prices than the construction of new homes.

The supply-side inflexibility is clear from the extremely low price elasticity of the housing stock in Australia as first documented in 2003 by Joye et al. For example, the Australian Housing and Urban Research Institute (AHURI) – which advises the Commonwealth government on the housing market – estimated that a 1% increase real house prices would underpin an increase in the stock of housing of only 0.1%. This is the same elasticity as implied by the ST model, although work led by University of New South Wales academic Glenn Otto estimated modestly higher elasticities of 0.3-0.4 for New South Wales.

Such an inflexible supply side of the housing market is similar to the housing markets of European advanced economies, although the difference is that the Australia's population has historically grown at nearly the fastest rate in all the developed markets. As AHURI put it, "as [Australia's population is typically] increasing at 1% or more per annum …, [the] elasticity estimates suggest that (all else constant) we require large increases in real house prices in order to meet even modest increases in housing demand". This means that the impact of positive shocks to house prices – such as lower interest rates – end up greatly magnified by a sclerotic supply response.

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