RESERVE BANK OF AUSTRALIA

EC Policy Meeting

23 June 2022

RESERVE BANK OF AUSTRALIA

Households and interest rate rises

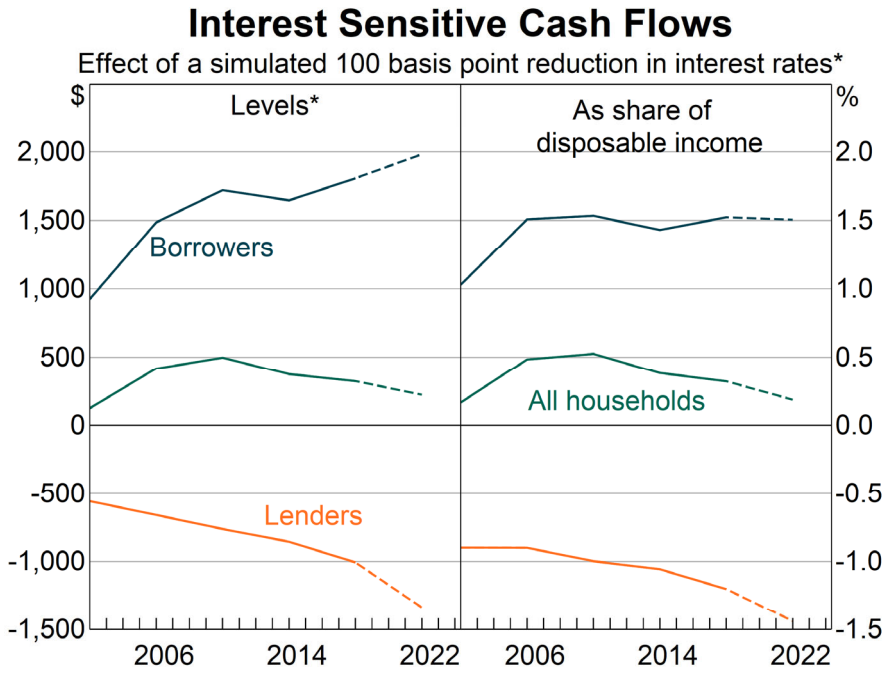
Two questions

- Are there reasons to think that the cash flow channel will be different?

- Does this put pressure on groups of households across the income distribution?

The cash flow channel

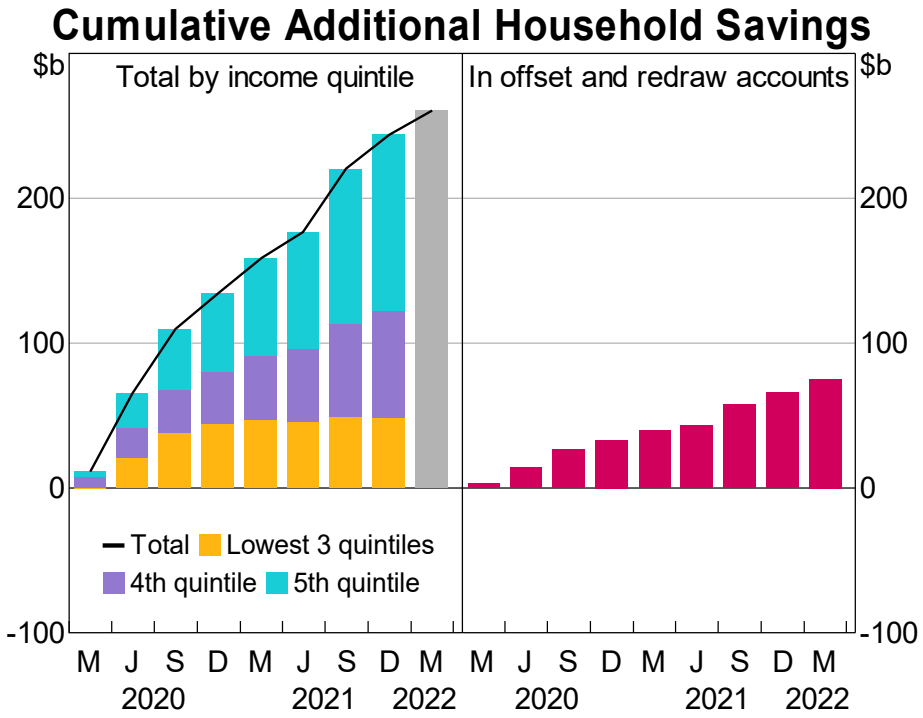
The cash flow channel



* Means, 2018 prices. Dotted lines show scenario assuming all growth in household debt has gone to borrowers, and in household interest-sensitive assets has gone to lenders. Income for both groups assumed to grow at the same rate and borrower share assumed unchanged.

Sources: Author's calculations; HILDA Survey Release 18.0

Households have extra savings buffers



Sources: ABS; RBA; Roy Morgan Survey

Is the cash flow channel different?

Monetary policy transmission

Responses of Household Cash Flow

To a 100bps contractionary monetary policy shock, by income quintile

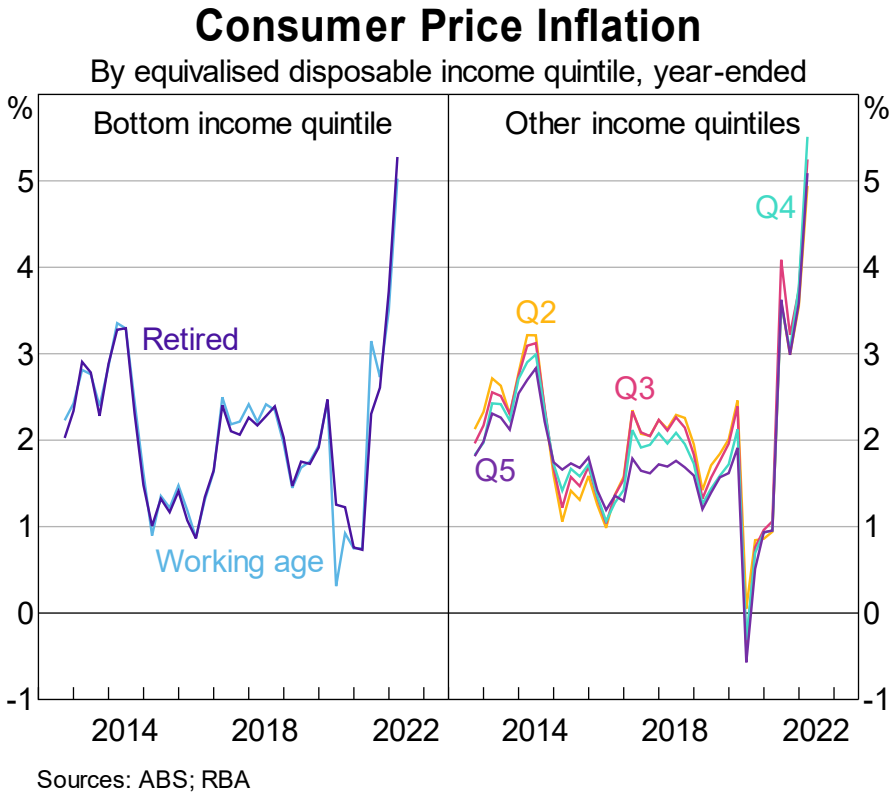
* Solid line represents households in the bottom quintile with heads not in working age (between 20 and 65). Dashed line represents households in the bottom quintile with heads in working age

** Total equivalised disposable income excluding interest income and Government bonus payments

*** Change in interest-sensitive cash flow as a percentage of total equivalised disposable income, following Penrose (2020) and using 2018 data

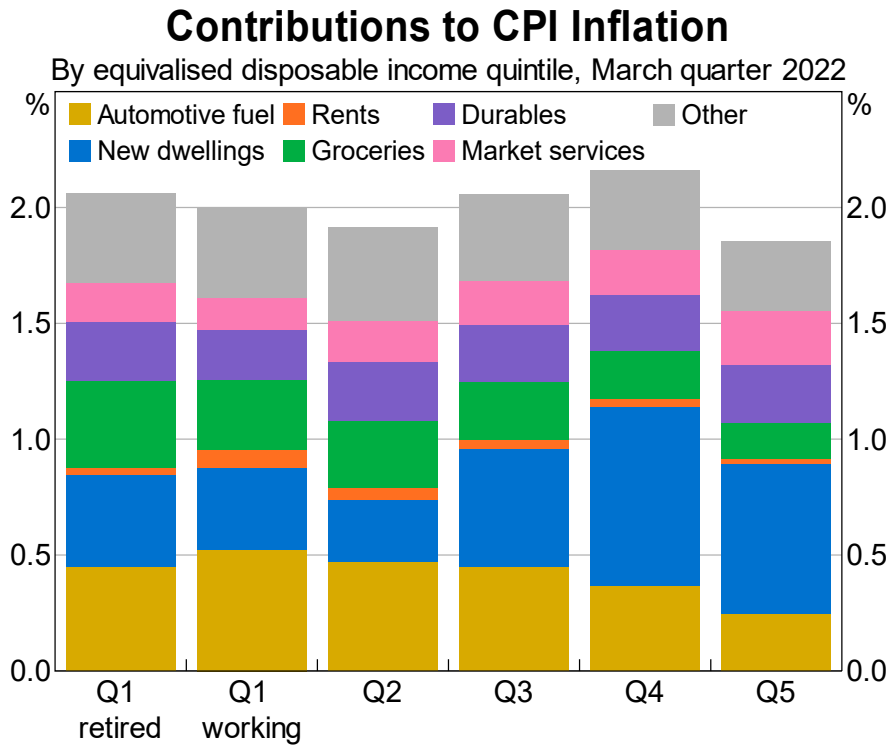
Sources: Author's calculations; Beckers (2020); HILDA 20.0

Cost of living pressures



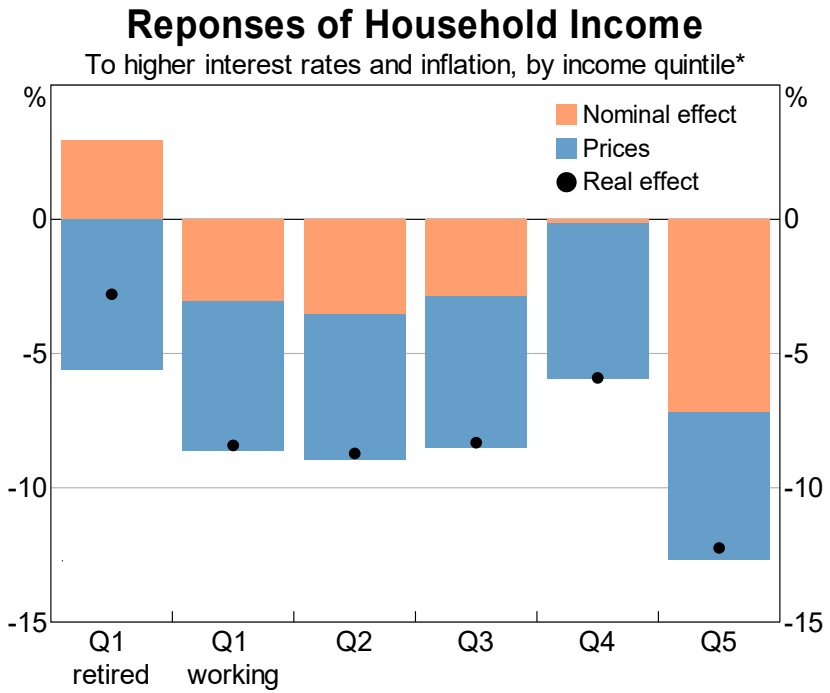
Sources: ABS; RBA

Cost of living pressures



Sources: ABS; RBA

Cost of living pressures

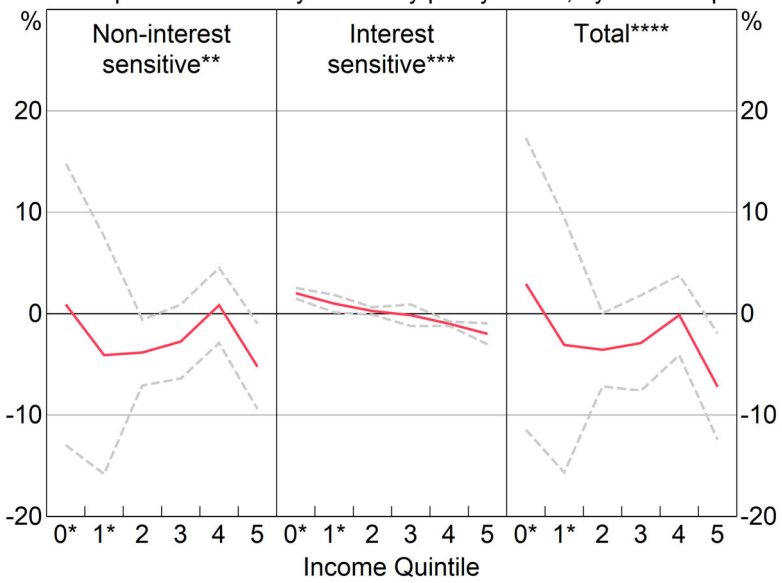


* Estimated change in real household disposable income from a 100 bps increase in the cash rate and a simple scenario for March quarter 2023 year-ended inflation, by equivalised disposable income quintile.

Sources: ABS; RBA

Responses of Household Cash Flow

To a 100bps contractionary monetary policy shock, by income quintile



* Group 0 consists of households in the bottom quintile with heads not in working age (between 20 and 65). Group 1 consists of households in the bottom quintile with heads in working age

** Total equivalised disposable income excluding interest income and Government bonus payments

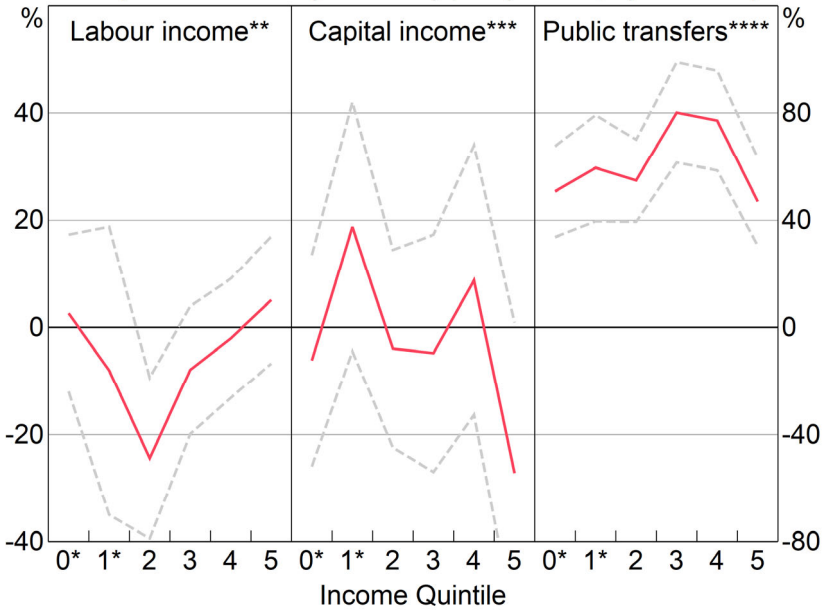
*** Change in interest-sensitive cash flow as a percentage of total equivalised disposable income, following Penrose (2020)

**** 95 per cent confidence interval in grey dashed line

Sources: Author's calculations; Beckers (2020); HILDA 20.0

Responses of Household Income Components

To a 100bps contractionary monetary policy shock, by income quintile



* Group 0 consists of households in the bottom quintile with heads not in working age (between 20 and 65). Group 1 consists of households in the bottom quintile with heads in working age

** Wages and salaries

*** Business income and investment income excluding interest income

**** Government transfers and assistance, excluding bonuses

Sources: Author's calculations; Beckers (2020); HILDA 20.0

HAS THE CASH FLOW CHANNEL CHANGED?[1]

With interest rates rising rapidly, this note considers whether the direct effect of monetary policy on households' cash flows (the 'cash flow channel') is likely to have changed significantly in aggregate compared with previous cycles. We draw together existing work from across the Bank to show that in aggregate the household cash flow channel appears broadly unchanged since the onset of the pandemic. However, the higher gross debt and asset stock positions of the household sector raise the degree of uncertainty around the consumption response to rising interest rates. In particular, if more households become liquidity constrained than in the past, this would result in a larger-than-expected reduction in consumption in response to rising interest rates.

Markets and economists expect interest rates to continue to rise over coming months. This will raise savers' interest earnings, and borrowers' interest payments. In turn, this will flow through to households' disposable income, and savings and consumption decisions: the household cash flow channel of monetary policy. The Bank incorporates the cash flow channel into its forecasting models, based on historical relationships between interest rates, aggregate interest-sensitive household cash flows and consumption. However, several factors may have influenced the cash flow channel since the onset of the pandemic, meaning that interest rate increases could have a different effect on household cash flows and spending compared to history, and therefore compared to what is built into our forecasts:

1. household balance sheets have grown rapidly in recent years during the period of low interest rates;
2. households start from the position of having accumulated significant savings in aggregate as a result of the pandemic and the savings rate remains elevated;
3. the starting level of interest rates is lower, reducing the response of overall mortgage payments to changes in interest rates;
4. the share of fixed-rate loans is relatively high, influencing the timing of pass-through of the cash rate to lending rates faced by households; and,
5. the coincidence of rising interest rates and higher inflation may generate a larger-than-usual consumption response, depending on which groups of households are most affected and differences in marginal propensities to consume (MPC) across the income distribution. We do not discuss this issue here, instead leaving it to a companion note, and (forthcoming).

Existing work from across the Bank has looked at the first four factors. We attempt to bring this work together into an overall assessment of whether the aggregate cash flow channel of monetary policy is likely to differ in the current hiking cycle, in order to inform the Bank's forecasts (Table 1).

Table 1: Could the cash flow channel be bigger or smaller than before?

Larger household balance sheets	↔	Effects for borrowers and savers net out in aggregate
– *Higher household debt*	↑	Could mean more households under stress → ↓ in consumption
– *Higher household savings*	↓	Lessens the consumption response to a reduction in cash flow
The low level of interest rates	↔	Is not material and becomes less so as interest rates rise
Higher fixed-rate loan share	↔	Pass through a little less immediate but still more or less complete

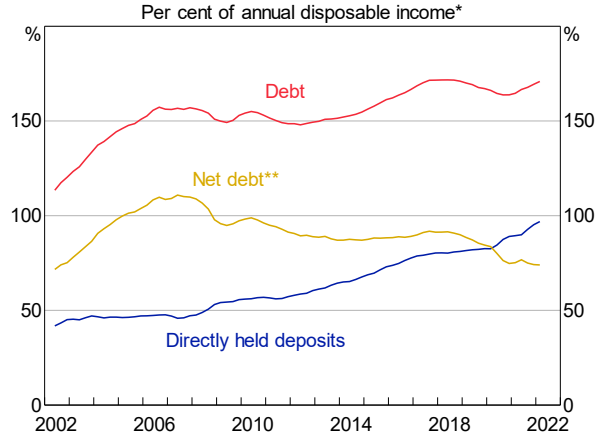
1 The authors would like to thank and Tom Rosewall for their assistance with and/or comments on this work.

Household balance sheets have grown rapidly

The stock of household debt has increased but so has the stock of liquid savings …

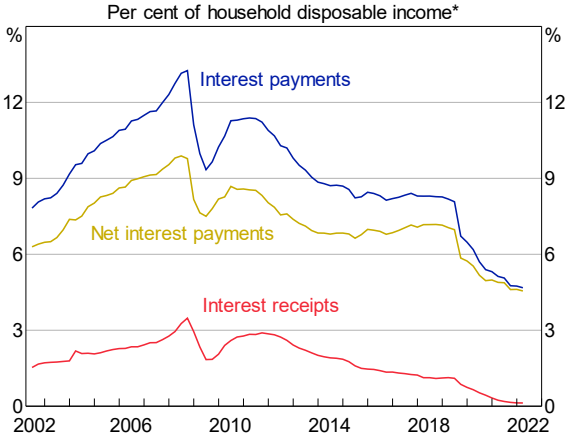
A key determinant of the pass-through of changes in lending and deposit rates to household cash flows is the stock of interest-sensitive assets (deposits) and liabilities (loans) held by households. Over the 2010s there was an increase in the stock of gross household debt relative to income (Graph 1). Deposits also increased and, more recently a sizeable proportion of this has flowed into accounts linked to household mortgages (Reschke 2022). As such, household interest-sensitive net debt remained broadly stable as a share of income until around 2019, and has since declined. Households' net interest payments as a share of income followed a similar pattern to net debt, and a steep decline in net interest payments since 2019 has been facilitated by declining housing loan interest rates (while deposit rates remained low and bounded close to zero) (Graph 2).

Graph 1
Household Debt and Deposits
Per cent of annual disposable income*



* Excludes unincorporated enterprises; disposable income is after tax and before the deduction of interest payments.
** Total debt less directly held deposits.
Sources: ABS; APRA; RBA

Graph 2
Interest Payments and Receipts
Per cent of household disposable income*



* Household sector excludes unincorporated enterprises; disposable income is before the deduction of interest payments.
Sources: ABS; APRA; RBA

… leaving the total cash flow effect little changed in aggregate …

While net interest-sensitive debt is a little lower relative to income, the larger gross stock of debt could still lead to a larger cash flow channel of monetary policy, particularly if the debt stock mainly accrued to households with higher MPCs. However, Penrose (2020) found that the size of the cash flow channel was little changed between 2006 and 2018. This analysis divided households into two groups – net borrowers and net lenders[2] – and considered how the spending of each group would respond to observed changes in debt and assets, given their estimated marginal propensities to consume (MPCs). The effect of larger balance sheets was broadly offset by a small decline in MPCs, a fall in the share of net debtors, and the lower starting level of interest rates (which lower the sensitivity of mortgage payments to interest rate changes) (Graph 3 and Table 1).

We use aggregate data to construct a simple scenario to provide a sense of whether further increases in the gross size of household balance sheets since 2018 could affect the cash flow channel via the distribution of households by net borrowers and lenders (a full update is not possible due to the absence of timely household-level data on debt and assets). We make the simple assumptions that borrower households accounted for the entire increase in household debt (18 per cent from December 2017 to

2 Based on their net position in interest sensitive assets and debt.

December 2021), while lender households accumulated all of the extra deposits (35 per cent over the same period). All households are assumed to experience similar income and consumption growth (20 and 10 per cent, respectively), and all other relevant factors such as the share of borrowers and lenders, and MPCs, are assumed to be unchanged.

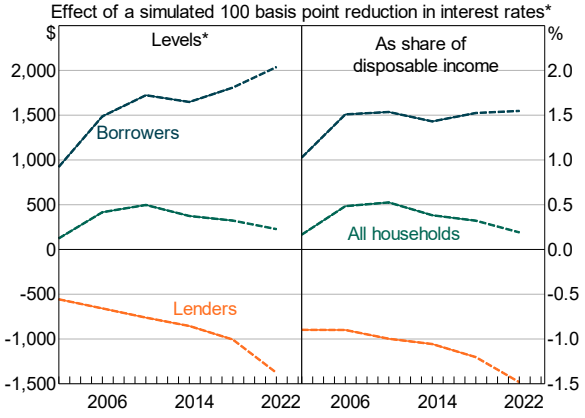
To be clear, some of these simplifying assumptions are intended to give somewhat of an 'upper bound'. For instance, as discussed below, a large share of deposits accumulated since the onset of the pandemic have flowed into mortgage offset accounts, meaning that this analysis would overstate the change in cash flows for net borrower households. Others, such as the assumption that all households had similar income growth, could lead us to over or understate the estimates, particularly if the differential income growth loosens or tightens liquidity constraints for borrower households, and therefore their MPCs. More generally, the results will be highly sensitive to changes in MPCs, the distribution of which are crucial for aggregate economic outcomes (Ballantyne 2021).

Table 1, and the dotted lines in Graph 3, show the results. Under the scenario, and abstracting from the current lower level of interest rates, a 100 basis point increase in interest rates leads to a larger dollar rise in borrower interest payments compared to 2018. However, as a share of income the effect of higher rates is broadly unchanged. Taking into account existing estimates of MPC across households, under the scenario the response of durables consumption remains similar to the estimates for 2006 and 2018.

Graph 3

Interest Sensitive Cash Flows

Effect of a simulated 100 basis point reduction in interest rates*



* Means, 2018 prices. Dotted lines show scenario assuming all growth in household debt has gone to borrowers, and in household interest-sensitive assets has gone to lenders. Income for both groups assumed to grow at the same rate and borrower share assumed unchanged.

Sources: Author's calculations; HILDA Survey Release 18.0

Table 1: The Aggregate Cash Flow Channel and Effect on Consumption

Response to a 100 bps interest rate cut, mean, 2018 prices

	2006		2018		2022*	
	Borrowers	**Lenders**	**Borrowers**	**Lenders**	**Borrowers**	**Lenders**
Interest rate change (bps) (Δr)	-100	-100	-100	-100	-100	-100
Mean net interest earning assets ($)	-203,429	64,277	-275,415	97,765	-326,523	140,537
Mean change in cash flows ($) ($\overline{\Delta Y}$)	1,473	-653	1,745	-1003	2,069	-1,442
MPC	0.057	0.020	0.050	0.016	0.050	0.016
Change in annual durables spending ($) ($MPC * \overline{\Delta Y}$)	84	-13	87	-16	103	-23
Share of households that are borrowers (%)	50		47		47	
Aggregate growth in durables consumption (%)	**0.35**		**0.34**		**0.35**	

Note: Interest rates and residual maturity of loans assumed unchanged at 2018 levels. Changes in other variables as in text.
Sources: Author's calculations; HILDA Survey Release 18.0

…although there are risks around the consumption response

Despite the neutral aggregate result, the larger gross balance sheet positions imply a larger degree of redistribution between net borrowing and net lending households. If these larger gross changes lead more households to become liquidity constrained, which could sharply increase their propensity to reduce consumption when interest rates rise, then the overall consumption response could be larger. However, Kearns, Major and Norman (2020) found that liquidity constraints were not an important source of vulnerability for household consumption. La Cava and Wang (2021) found that the share of hand-to-mouth households had declined up to 2018. Up-to-date data is not available to determine how this share has evolved since the onset of the pandemic, but we are able to examine households' saving buffers (discussed below).

On the other hand, while the low level of interest rates may contribute to a smaller (absolute) consumption response, incorporating this does not change the above analysis substantially. The existing analysis assumes rates are moving between 3.71 per cent and 4.71 per cent, which changes durables consumption by 0.35 per cent. Moving between 2.71 per cent and 3.71 per cent reduces this effect only marginally to 0.33 per cent, which is still broadly in line with historical levels.[3] For a given loan with $600,000 principal, and around 30 years to maturity, the effect on repayments is around $250 per year smaller at the lower starting level of interest rates.[4] In addition, the effect of the low interest rate environment becomes less important the further rates rise.

Savings buffers are higher

The elevated savings rate, along with strength in the labour market, is likely to facilitate some consumption smoothing in the face of rising interest rates. This has the potential to lessen the consumption response to monetary policy induced changes in cash flows.

The flow of savings remains high in aggregate, providing a buffer to interest rate rises

The current aggregate household saving ratio remains well above its historical average, despite household consumption surpassing its pre-COVID levels (Graph 4). This leaves more space than was the case prior to the onset of the pandemic before households need to eat into their accumulated savings buffers in order to maintain consumption. Households also have access to a significant stock of wealth, of which the liquid proportion almost matches the value of gross household debt (Graph 5; Wang 2022).

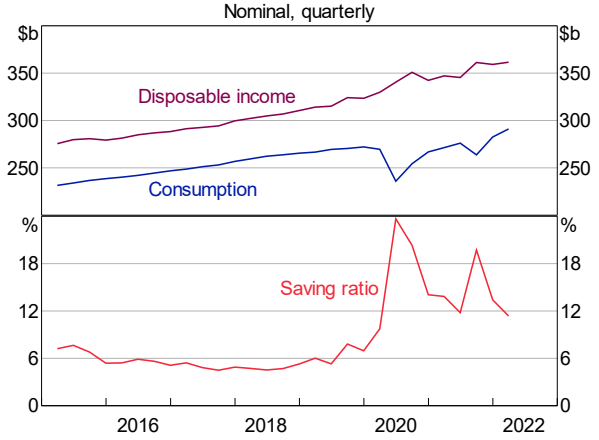
Households have also accumulated savings buffers over the pandemic…

Since the onset of the pandemic, households in aggregate have accrued an estimated $260 billion in savings in excess of their pre-COVID trend, driven by strong income growth and reduced consumption opportunities. Around 30 per cent, or $75 billion, of the additional savings are accounted for in offset and redraw accounts, with another 40 per cent sitting in deposit accounts (Graph 6). These accumulated excess savings only account for around 2 per cent of total household wealth – taking into account the entire stock of household assets implies that buffers in aggregate are much higher (Graph 5).

3 This starting interest rates is also broadly in line with the April 2022 outstanding housing lending rate of 2.63 per cent.

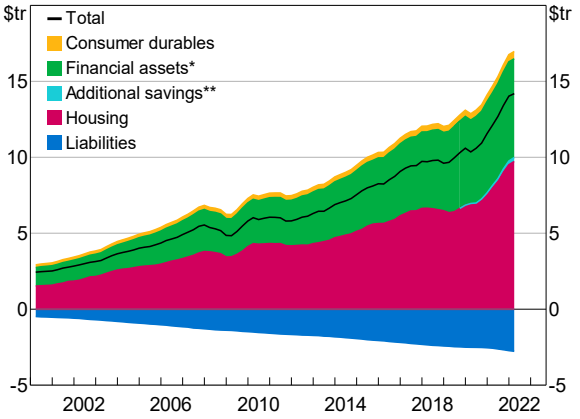
4 The average value of a new owner-occupier housing loan, see Reschke 2002.

Graph 4
Household Consumption and Income



Sources: ABS; RBA

Graph 5
Household Net Wealth



* Excluding estimate of additional savings
** Cumulative gross savings in excess of the average gross savings rates for 2018 and 2019

Sources: ABS; RBA

… which have accrued mainly to higher income households …

While the distribution of excess savings across households is uncertain, Wang (2022) shows that highly indebted households typically have higher stocks of liquid assets. Survey and de-identified bank data also suggest the additional savings have mostly accrued to higher-income households, who generally hold most housing debt and are expected to experience the biggest increase in mortgage repayments as interest rates rise (Graph 7). In addition, Gao (2022) found that the majority of indebted households are well-placed to service higher repayments and updated work shows that there would be limited impact on a little over one third of borrowers from a 300 basis point rise in interest rates (Bullock 2022).[5]

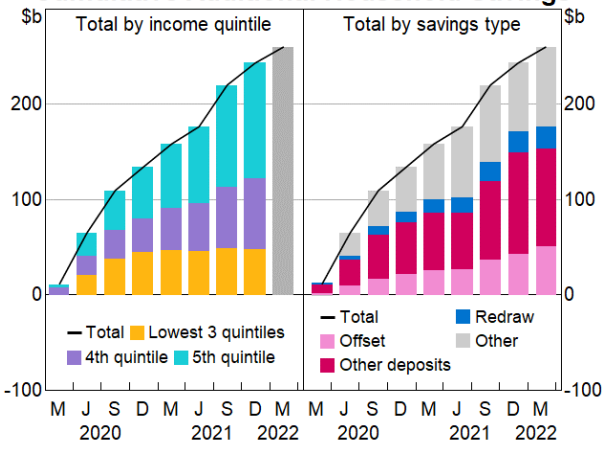
… though lower income households have also built up additional savings

Lower income households also appear to have built up saving buffers over the pandemic that may help them to smooth consumption in the face of rising interest rates. HILDA survey data indicate a larger share of low-income households who were able to save in 2020 compared with pre-pandemic times. Timelier de-identified bank data suggest that lower-income individuals experienced the strongest growth in their savings since the onset of COVID-19 (in percentage terms).[6]

5 Reschke (2022a) also found that prior to the May Board meeting over three quarters of variable-rate borrowers would need to increase their regular repayments following an interest rate increase of 75 basis points. However, once additional repayments and balances in offset accounts are considered the majority of indebted households are well-placed to service higher repayments.

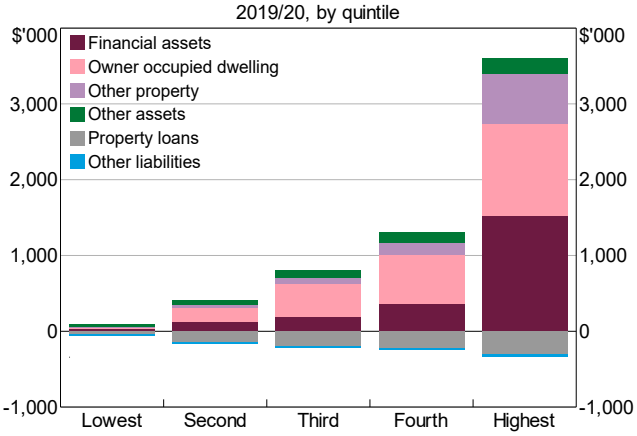
6 These de-identified bank data are constructed at an individual level and only include those with employment income in the past year.

Graph 6
Cumulative Additional Household Savings



Sources: ABS; RBA; Roy Morgan Survey

Graph 7
Household Net Wealth
2019/20, by quintile



Sources: ABS; RBA

More loans are at fixed rates and deposits at variable rates

More mortgage debt has fixed interest rates, slowing the pass through to borrowers

As discussed in Faferko (2022), the share of fixed-rate housing credit has increased from 20 per cent in early 2020 to be around 35 per cent at the end of May this year. The increase in fixed-rate housing credit outstanding will delay the timing of interest rate pass through to household balance sheets, all else equal. Compared to our standard assumption of immediate one-for-one pass through, rates are likely to be around 100 basis points lower by May 2023, but only around 35 basis points lower by the end of the forecast horizon (Graph 8). Shaw (2021) also found that pass-through to the average outstanding lending rate from cash rate increases in the years ahead is likely to be a little less immediate, but still more or less complete.

Some borrowers will experience large payment changes when rates reset

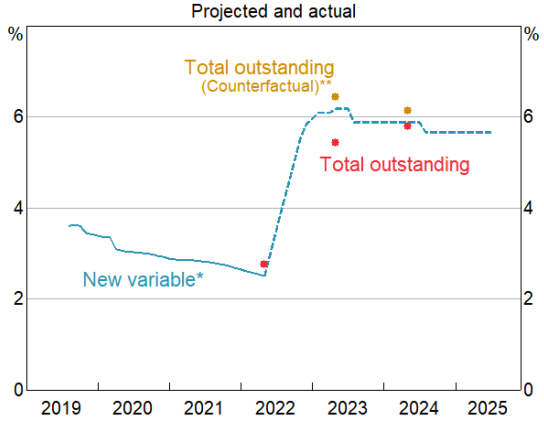
Gao (2022) found that roughly 30 per cent of households were paying a fixed rate that was lower than the existing variable rate in February 2022, and this share has risen since then (Bullock 2022). These borrowers could potentially face a larger-than-average shock to disposable income once their fixed-rate loan period expires. While this could lead to larger consumption responses when the loans expire, some of these households would have taken advantage of their lower required repayments in the intervening period to increase savings, potentially allowing them to build a buffer and smooth their consumption.[7] Indeed, Lim, McCowage and Reschke (2022) find some evidence that fixed-rate borrowers with access to offset accounts increased their repayments by more than variable-rate borrowers since interest rate expectations began to rise last year.

7 Evidence from overseas suggests that the prevalence of fixed-rate loans changes the *timing* of monetary policy transmission via the cash flow channel (McKay 2022). McKay also cites Wong, 2021, which finds that the response of aggregate consumption to changes in the policy rate is larger in predominantly variable rate economies. Despite the pick-up in the share of fixed-rate loans in Australia, the majority of loans still have a variable interest rate.

More deposits also have variable rates, suggesting slightly faster pass through to depositors

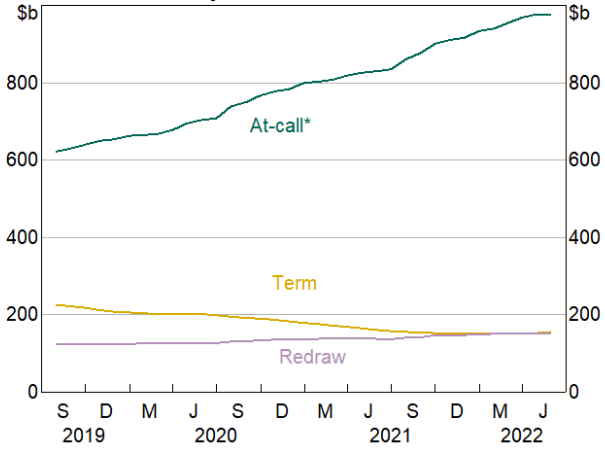
The share of deposits in at-call and non-interest bearing accounts has also increased over recent years as the spread between interest rates on term and at-call deposits has declined (Graph 9). This will speed up the pass through of interest rate rises to borrowers' interest income, to the extent that cash rate changes are passed through to variable-rate deposit accounts immediately and depositors switch back to (higher interest earning) term deposits.[8]

Graph 8
Housing Interest Rates
Projected and actual



* Actual data to end April 2022; dashed line assumes the average new variable rate increases in line with the cash rate target and then follows forward OIS pricing as at 20 July 2022.
** Assumes no fixed-rate credit outstanding.
Sources: APRA; Bloomberg; RBA

Graph 9
Household Deposits and Redraw Balances



* Includes deposits in housing loan offset accounts and non-interest bearing deposits.
Sources: APRA; RBA

The cash flow channel is likely to be broadly similar but this is uncertain

Our overall assessment is that the effect of cash flow channel of monetary policy on the household sector in aggregate is broadly unchanged, but there is a high degree of uncertainty around this. The size of the shock, and its coincidence with rising cost of living pressures could lead to more households becoming constrained and to larger consumption responses. Forthcoming work by and will examine the distributional effects of rising interest rates and cost of living pressures in more detail, while work by will explore similar issues for a sample of indebted households using the securitisation dataset. Working the other way, large increase in household saving buffers and flows across the income distribution since the onset of the pandemic are likely to facilitate some consumption smoothing in the face of rising interest rates.

It is important to keep in mind that the cash flow channel is only one component of the monetary policy transmission mechanism. Estimates from MARTIN, care of and , show that the change in near-term cash rate expectations between the *May 2022 Statement on Monetary Policy* and mid June (although the OIS curve has moved a bit since then) reduce 2022 year-ended growth by around 0.1 percentage points and 2023 year-ended growth by roughly 0.8 percentage points, while the effects are even larger when incorporating the change in cash rate expectations since November last year (Graph 10). Crude estimates using MARTIN suggest that the household cash flow channel accounts for

8 One factor that could delay pass through to deposit rates is the high share of deposits that are currently at the zero lower bound (Brassil 2022). Larger increases in the cash rate may be required before interest rates start to increase on these deposits.

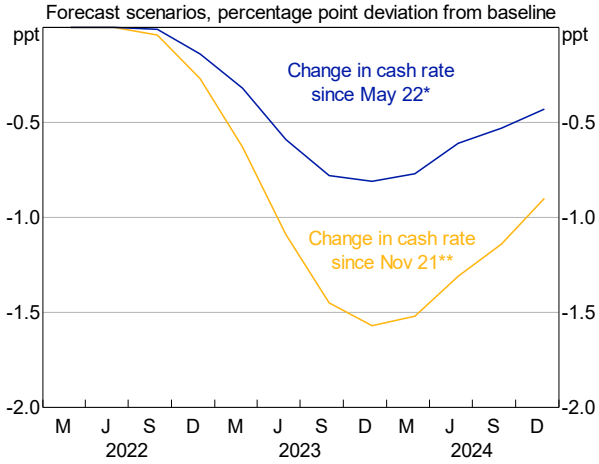
around 10 per cent of this change, though this is a little lower than the results from our rough update of Penrose (2020) would suggest.

While not considered here, it is also possible that other aspects of monetary policy pass through via households could differ to past cycles. For example, if the earlier and sharper increase in interest rates causes households to lower their preferred level of debt, this could lead to a larger fall in consumption – the 'debt-overhang' effect (Price, Beckers and La Cava 2019).

Graph 10

GDP Growth (Year-ended)

Forecast scenarios, percentage point deviation from baseline



* Shock equals the difference between May 2022 SMP cash rate forecast and cash rate expectations as at June 15 2022.

** Shock equals the difference between November 2021 SMP cash rate forecast and cash rate expectations as at June 15 2022.

Sources: ABS; RBA

Economic Group
3 August 2022

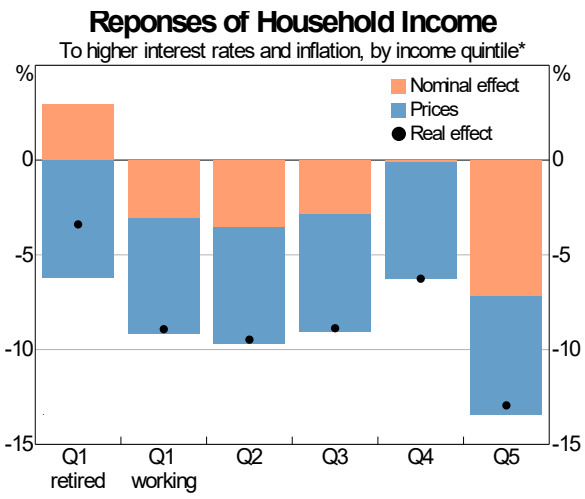
DISTRIBUTIONAL EFFECTS OF INTEREST RATE AND PRICE INCREASES ON INCOME[1]

Rising interest rates and high inflation are putting pressure on household budgets. The distributional effects of these two shocks may interact to push more households to their budget constraints than usual, generating a larger-than-expected negative consumption response. Understanding the effects of both shocks on household cash flows across the distribution of income is therefore important for our consumption outlook. We find that the effect of the monetary policy shock is largest for households in the top income quintile, reflecting loss of capital income and higher interest payments on debt. There is also a sizeable negative effect on lower-income households, reflecting loss of labour income. By contrast, the available evidence suggests that recent inflation has had a similar effect on real incomes at the income-quintile level based on broad consumption patterns. Taken together, our results suggest that increases in interest rates and prices may not interact in a way that amplifies their usual effects via distributional impacts.

The negative real income shock from rising interest rates and cost of living pressures is largest for the highest-income households, followed by lower-income households

- To assess the marginal effect of higher interest rates and inflation on household real income across the income distribution, we estimate the nominal one-year effect of a 100 basis point contractionary monetary policy shock, and combine that with a simple scenario for inflation over the next year for each income quintile (Graph 1). We focus on the relative effects across income quintiles, rather than the absolute size of the real income shock. [2]
- The effect of higher interest rates drives differences across income quintiles.
    - Nominal income declines are largest for the top quintile (particularly non-working age), reflecting loss of capital income and higher interest payments.
    - Lower-income quintiles also experience large declines, reflecting a loss of labour income.

Graph 1



* Estimated change in real household disposable income from a 100 bps increase in the cash rate and a simple scenario for June quarter 2023 year-ended inflation, by equivalised disposable income quintile.

Sources: ABS; Beckers (2020); HILDA 20.0; RBA

- In contrast, in our simple inflation scenario the differences in inflation between quintiles are small, so inflation weighs on real income reasonably uniformly across the distribution.
    - This likely understates the impact of recent inflation on low-income households, whose consumption is more skewed towards non-discretionary goods like food and fuel and so have less ability to substitute. By contrast, inflation for the upper income quintiles was driven by dwelling construction, which is an infrequently purchased good.
- Households at the top of the income distribution may be able to smooth their consumption given strong savings rates and buffers built through the pandemic (Garner et al. 2022). Households in the lower income quintiles may not be able to smooth their consumption due to lower buffers, though de-identified bank data does show that even lower-income households built up some additional savings over the COVID period. The effect of price rises on lower-income households is also mitigated to some extent by the indexation of social assistance payments to inflation twice per year.
    - Upcoming work will quantify the consumption response using distributional information on MPCs (drawing on Ballantyne 2021).

1 We would like to thank and for their help with this note.

2 We focus on 100 basis points for simplicity and given our concern with relative, not absolute effects. We also abstract from nominal income growth, given we have little information about future income growth across the distribution.

- Forthcoming work by in HBC will examine which households are most vulnerable to mortgage payment difficulties from the joint shock of higher interest rates and inflation, and how much of a savings buffer they have to withstand the shock.

Effects of monetary policy on nominal income across the income distribution

To assess the effect of monetary policy on households across the income distribution we examine two channels of monetary policy pass-through:

1. Economic activity channel: the effect on non-interest sensitive income such as wages and salaries, business income, investment income excluding interest income (e.g. rent, dividends and royalties), public transfers (excluding bonus payments), private transfers, less tax; and
2. The cash flow channel: the effect on interest income from interest-bearing assets, less interest payments from interest-bearing debt.

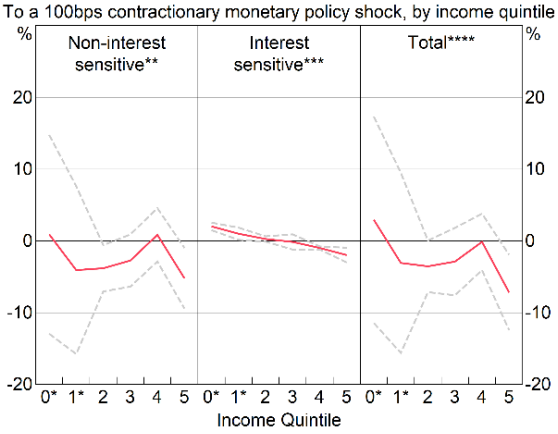
For the first channel, we follow Nguyen (2022) and use panel Local Projections regressions to estimate the response of non-interest sensitive cash flow to a 100 basis point contractionary monetary policy shock (Beckers 2020) over one year.[3] For the cash flow channel, we adapt Penrose (2020) to calculate the changes in interest-sensitive cash flow in response to a 100 basis point increase in interest rates.

We estimate these responses separately for each quintile of the distribution of household equivalised disposable income. For the lowest quintile, we split the working age and non-working age populations since the responses are likely to differ substantially.

Graph 2

Responses of Household Cash Flow

To a 100bps contractionary monetary policy shock, by income quintile



* Group 0 consists of households in the bottom quintile with heads not in working age (between 20 and 65). Group 1 consists of households in the bottom quintile with heads in working age

** Total equivalised disposable income excluding interest income and Government bonus payments

*** Change in interest-sensitive cash flow as a percentage of total equivalised disposable income, following Penrose (2020)

**** 95 per cent confidence interval in grey dashed line

Sources: Author's calculations; Beckers (2020); HILDA 20.0

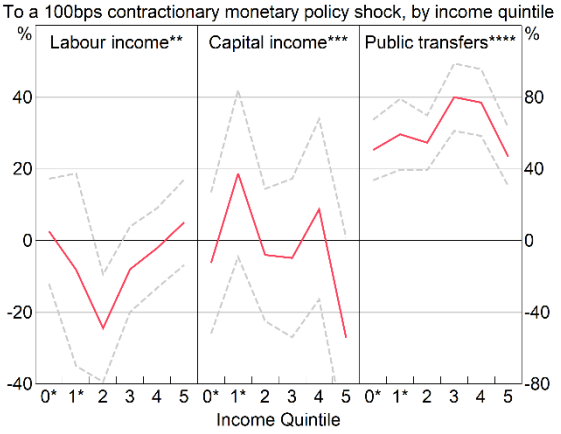
- The economic activity channel is strongest at the top and the bottom of the income distribution (Graph 2 left). This is also observed in Sweden (Amberg et al. 2021).
    - Labour income drives the responses for low income households (Graph 3 left), as in Nguyen (2022), while capital income drives the decline in income at the top (Graph 3 middle).
    - Public transfers generally rise following a contractionary monetary policy shock (Graph 3 right). This offsets a moderate portion of lost labour income at the lower end of the distribution, given that transfers make up a sizeable share of total income for these households (Graph 4).
    - Focusing on the working age population (Appendix A), the income decline for high income households is more muted, and low income households display the largest decline.
- The effect of the cash flow channel declines along the income distribution (Graph 2 middle) with low income households benefiting the most from an increase in cash rates as they hold more interest-bearing assets. By contrast, high-income households experience sharp decline in interest sensitive cash flow as they hold disproportionately more interest-bearing debt.
- The economic activity channel of monetary policy is relatively more important (Graph 2 right), consistent with results from heterogeneous agent macro-model literature (Kaplan et al. 2018).

3 It's important to note that the effects of 'shocks' may differ to the 'broader' impacts of anticipated monetary policy. For example, these shocks tend to be relatively short-lived but can still have substantial macroeconomic effects (Beckers 2020).

Graph 3

Responses of Household Income Components

To a 100bps contractionary monetary policy shock, by income quintile



* Group 0 consists of households in the bottom quintile with heads not in working age (between 20 and 65). Group 1 consists of households in the bottom quintile with heads in working age

** Wages and salaries

*** Business income and investment income excluding interest income

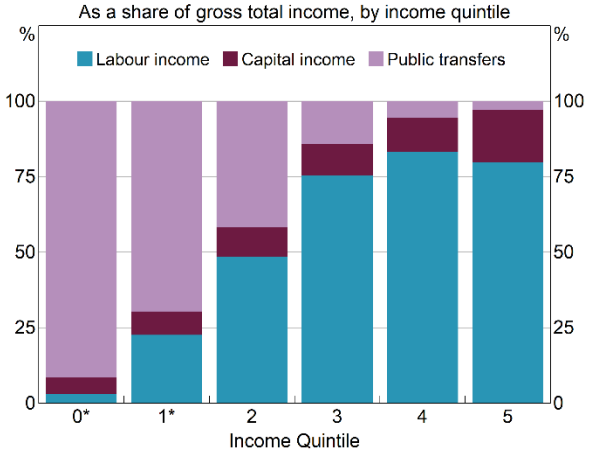
**** Government transfers and assistance, excluding bonuses

Sources: Author's calculations; Beckers (2020); HILDA 20.0

Graph 4

Composition of Household Income

As a share of gross total income, by income quintile



* Group 0 consists of households in the bottom quintile with heads not in working age (between 20 and 65). Group 1 consists of households in the bottom quintile with heads in working age

Sources: Author's calculations; HILDA Release 20.0

Inflation across the income distribution

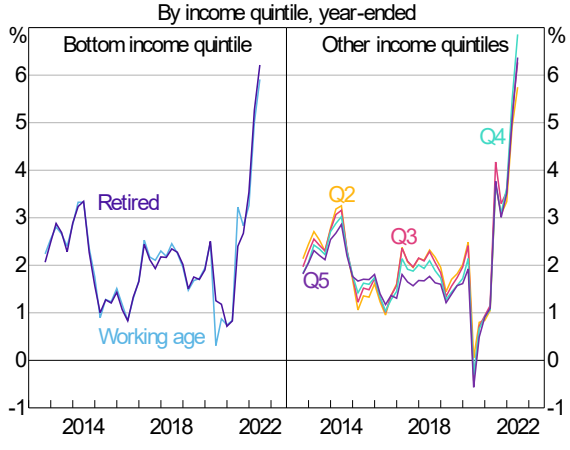
We assess the extent to which the recent rise in prices affects different households by constructing CPIs for each income quintile. We use household-level expenditure data from the ABS' Household Expenditure Survey to derive the relative consumption basket of each quintile, which PWL transform into CPIs using the prices for each detailed expense category.[4] Our CPIs for each income quintile are quantitatively very similar to those produced by Van Kints and Breunig (2021). The approach is similar to Wong (2019), who creates 'living cost indices' (LCIs) for income quintiles. The main difference is that LCIs include mortgage interest costs. As interest costs are already captured in the above analysis, the CPI approach is more appropriate for our analysis.

- Historically inflation outcomes have tended to be similar across the income distribution (Graph 5). This is consistent with Wong (2019) when mortgage interest costs are excluded. In the past 10 years, inflation for working age households in the bottom quintile was a little over 2 percentage points higher than inflation for the top quintile.
- Over the past year, inflation was highest for the upper quintiles, driven by construction costs for new dwellings (Graph 6). Fuel and groceries were relatively larger contributors to inflation for the lower quintiles.

Graph 5

Consumer Price Inflation

By income quintile, year-ended

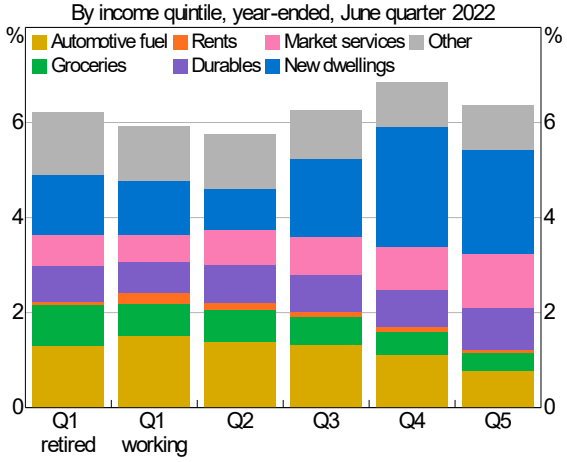


Sources: ABS; RBA

Graph 6

Contributions to CPI Inflation

By income quintile, year-ended, June quarter 2022



Sources: ABS; RBA

4 Huge thank you to for his guidance and assistance in constructing the indices. For more information on the methodology and assumptions, please see Appendix B.

- For our simple scenario of inflation over the next year, we made rough assumptions about prices of new dwelling construction, fuel, rents and food with PWL's input. We used these assumptions to produce June quarter 2023 year-ended inflation rates for each quintile that are consistent with PWL's aggregate CPI forecast (Table 1). The differences between quintiles are expected to narrow as strong price growth in dwelling construction slows down, and even more if fuel prices decline.
- The relatively small differences between inflation rates expected across income quintiles for the coming year suggest that inflation will have a limited impact on the distribution of real income at the quintile level. However, our methodology likely understates variation in inflation due to households facing different prices for similar products, household-level variation within quintiles and differing abilities to substitute away from more expensive goods (see Appendix C for more details).

Table 1: Consumer Price Inflation Scenario

June quarter 2023, year-ended

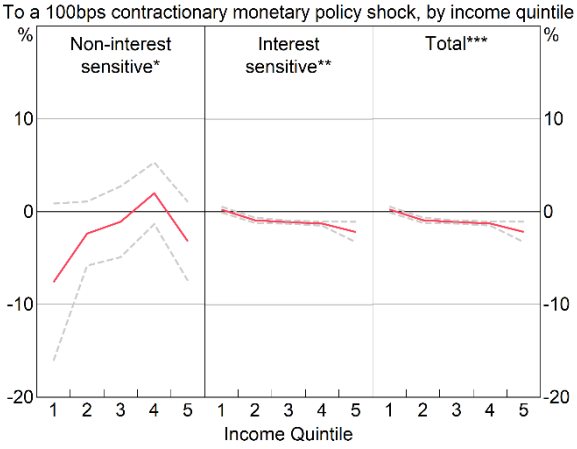
	Q1, retired	Q1, working	Q2	Q3	Q4	Q5
Inflation (%)	6.20	6.09	6.16	6.17	6.15	6.23

Sources: ABS; RBA

Economic Group
12 August 2022

Appendix A: Responses to monetary policy – working age sample

Graph A1
Responses of Working Age Household Cash Flow
To a 100bps contractionary monetary policy shock, by income quintile



* Total equivalised disposable income excluding interest income and Government bonus payments
** Change in interest-sensitive cash flow as a percentage of total equivalised disposable income, following Penrose (2020)
*** 90 per cent confidence interval in grey dashed line
Sources: Author's calculations; Beckers (2020); HILDA 20.0

Appendix B: Methodology for constructing CPI by income quintile

The 2015-16 ABS Household Expenditure Survey (HES) was used to construct CPIs for each income quintile. The steps involved were:

1) Converting HES expense categories to CPI expense categories.
   - Households report weekly expenditure on roughly 700 different expense categories (ECs) in the HES. The CPI consumption basket is made up of 87 ECs. The ABS has a concordance between HES and CPI ECs; see here. Some HES categories do not map perfectly into CPI categories, and so are partitioned between multiple CPI ECs. The ABS provided us with unpublished data on the proportions used to split some HES ECs between CPI ECs; see here.
   - Using the correspondence, we get total weekly expenditure of each household i on CPI EC c
2) Deriving the consumption basket and relative weights for each income quintile.
   - Household-level data from the HES is used to construct equivalised disposable income quintiles. The sample is restricted to metropolitan households (using the ASGS classification) to align with the definition of CPI, leaving around 7,500 households in the sample.
   - 5 ECs are not sourced from the HES (see next step). They are dropped from this step.
   - For each HES-sourced CPI expense category c = 1,…,82 and each income quintile q = 1,…,5, calculate:

$$Average\ expenditure\ share_{c,q} = \frac{\sum_{i=1}^{N_q}(exp_{i,c,q} \cdot hhwt_{i,q})}{\sum_{i=1}^{N_q}(exp_{i,q} \cdot hhwt_{i,q})}$$

$$Average\ expenditure\ share_{c} = \frac{\sum_{i=1}^{N}(exp_{i,c} \cdot hhwt_{i})}{\sum_{i=1}^{N}(exp_{i} \cdot hhwt_{i})}$$

$$Relative\ weight_{c,q} = \frac{Average\ expenditure\ share_{c,q}}{Average\ expenditure\ share_{c}}$$

Where exp refers to weekly expenditure in \$, $hhwt$ is the household population weight, N is the total number of households in the sample and N_q is the number of households in quintile q.

3) Deriving relative weights for CPI expense categories that are not sourced from the HES.
    - Expenditure on some CPI ECs is not sourced from the HES, either because the HES definitions do not align with the CPI definitions, or they are not reported on in the HES at all. The ABS use national-level data sources for these items, which are not available by income quintile.
    - We use assumptions derived from relevant household- and loan-level data to derive average expenditure shares and relative weights for these categories:
        - New dwelling purchases by owner-occupiers: share of households in each quintile either constructing a new dwelling in the past 3 years, or taking out a new loan for alterations and additions in the past 3 years.
        - Tertiary education: average number of students in tertiary education living in the household for each quintile.
        - Insurance: average value of dwelling, dwelling contents and motor vehicles for each quintile, assuming insurance is proportional to the value of assets covered.
        - Deposit and loan facilities (direct charges): this is a very small component of CPI, assume relative weight of 1 for all quintiles.
        - Other financial services: use average number of new dwellings purchased and investment properties for each quintile as a proxy for use of real estate services, and average value of shares as a proxy for use of stockbroking services.
    - Note that before the relative weights are calculated in step 2, $Average\ expenditure\ share_{c,q}$ are scaled down so that they sum to:

$$100 - (sum\ of\ non\ HES\ expenditure\ shares_q)$$

4) Using PWL infrastructure and price indices for the detailed CPI ECs, relative weights transformed into headline CPIs for each quintile.

Additional assumptions:

- The ABS notes that the 2015-16 HES estimated expenditure for alcohol at a little under half, and tobacco at a little over one third of the respective National Accounts estimates. Thus, reported expenditure on alcohol is scaled up by a factor of 2, and reported expenditure on tobacco scaled up by a factor of 3. These scaling factors were applied uniformly across the income quintiles.

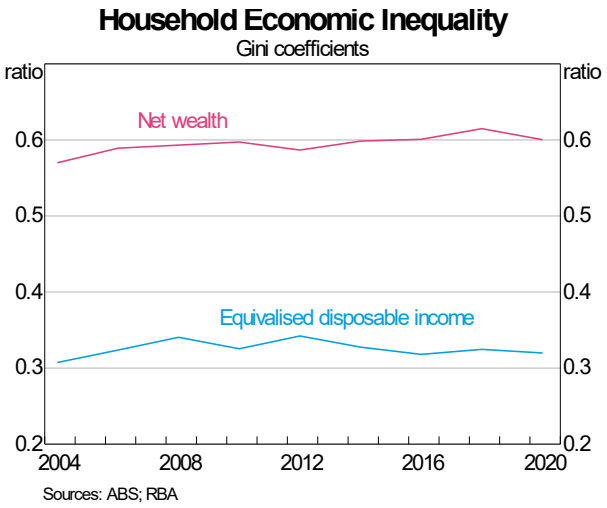
Appendix C: Limitations of CPI by income quintile methodology

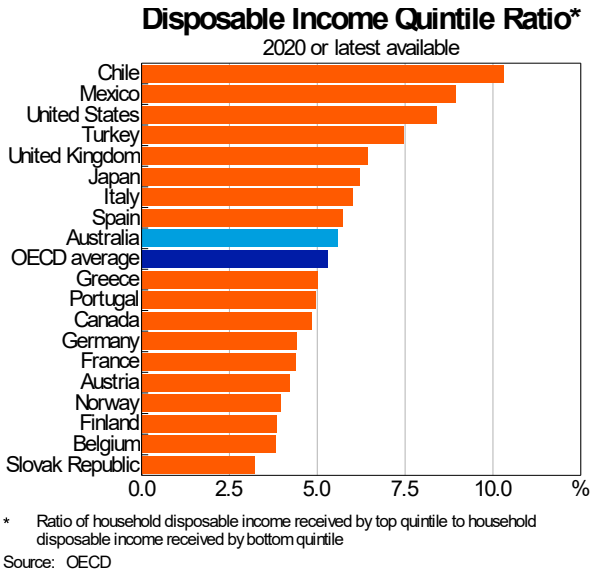
- Our methodology understates the inflation variation across income quintiles. We assume that each quintile faces the same prices for the same goods, and that within a given CPI EC (e.g. 'Bread'), all households consume the same mix of goods (e.g. sourdough and multigrain). In reality, there is considerable heterogeneity in the types of goods purchased and prices faced. Using US household spending data on both prices and quantities for specific goods, Kaplan and Schulhofer-Wohl (2017) found that most of the variation in household-level inflation rates came from different prices paid for the same goods or a different mix of goods within the broad categories, rather than different consumption baskets defined by the broad categories.
- We assume that the relative weights for each quintile and CPI EC – the expenditure share of the quintile on the EC relative to the expenditure share of all households on the EC – remain constant over the sample. This assumption will be less accurate the further away from the survey period 2015-16. For example, if the prices faced by one income quintile change at a different rate to the prices faced by other quintiles over time, the underlying consumption shares may change at different rates, reducing the accuracy of the relative weights.

- The CPI has some upward bias as consumers can substitute away from goods with higher relative price changes. This substitution bias is likely smaller for lower-income households, whose consumption is more skewed towards non-discretionary goods. Consequently, the lower income quintiles may be feeling inflation more acutely than the upper quintiles, despite the headline indices suggesting otherwise.
- Income quintiles are broad groups that mask a lot of household-level variation in consumption baskets. It is possible that some groups of the population are experiencing much higher cost of living pressures than suggested in this analysis.

HOUSEHOLD ECONOMIC INEQUALITY IN AUSTRALIA

- Income and consumption inequality ↑ since 1990s, but unchg. over past decade.
  - ↓ a little since pandemic: income support shielded low-income, >> ↑ in wage income inequality.
- Wealth inequality much higher than income inequality, but stable since the early 2000s.
- Income inequality in Australia close to OECD average.
- Current inflation broadly similar across income distribution, but recent price increases in food and fuel hit low-income households the most.





Monetary policy (MP) and inequality

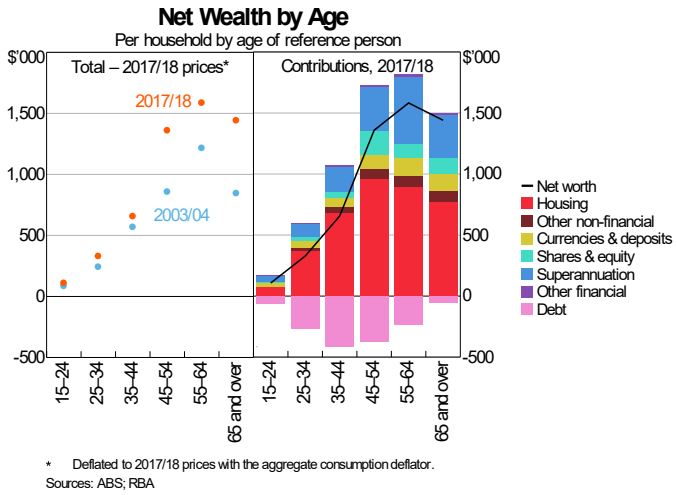
- LR: changes in inequality mostly due to factors spanning generations, not cyclical ones.
- Transmission of MP depends on distributions of income and wealth. E.g.:
  - Cash flow channel: ↑ interest rates shifts income to savers (low MPCs, hence ↓ spending)
  - Wealth channel: ↑interest rates weigh more on housing prices in expensive areas (partly due to land supply constraints)
    - Prices for top 25% properties ↓ faster than other value segments since April 2022.
- MP also affects distributions of income and wealth, but net effects on inequality small and temporary.
  - Cashflow channel:↑ interest rates ↓ income inequality as high income households indebted, low income households receive interest.
  - Economic activity channels: ↑ interest rates ↓ labour income more for low-income workers and ↓ capital income more for high-income households.

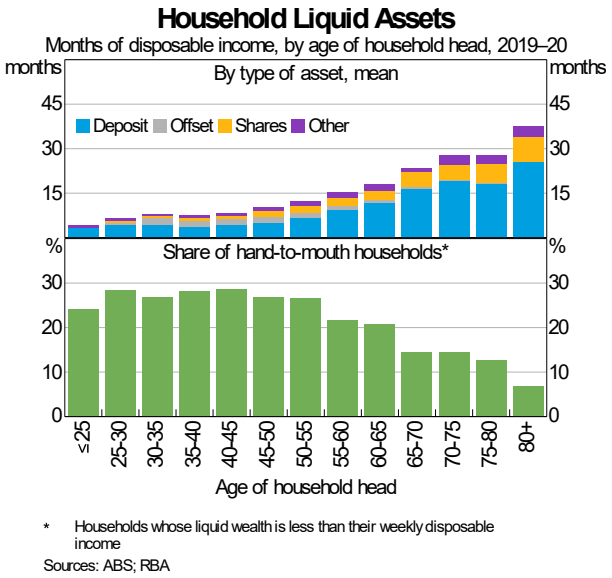
Domestic Activity & Trade and Economic Research
September 2022

RETIREES AND SAVERS

Retirees' balance sheets

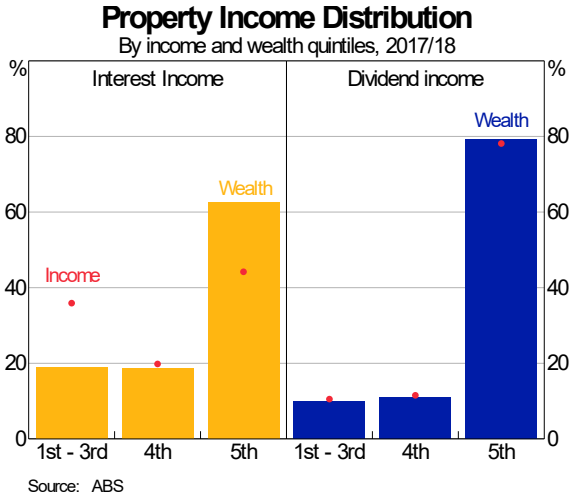
- In 2021, 17% of Australians were 65+, 29% were 55+ (or around 7.4m Australians).
  - In 2020, ~40% of households 65+ were in lowest income quintile, but typically wealthier than other lower-income households.
- In 2020, ~80% of households 65+ own housing assets.

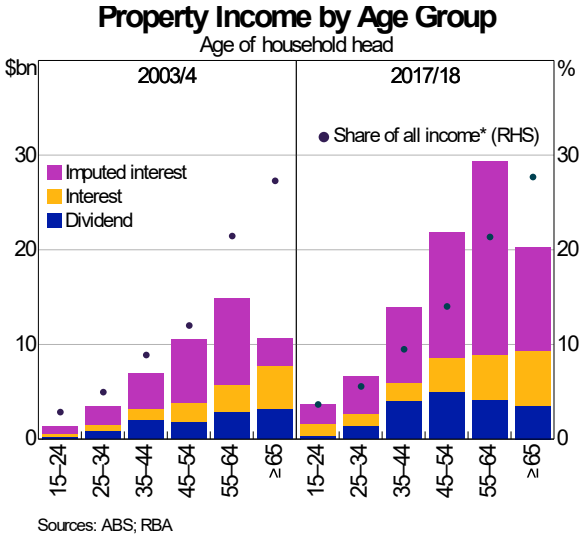


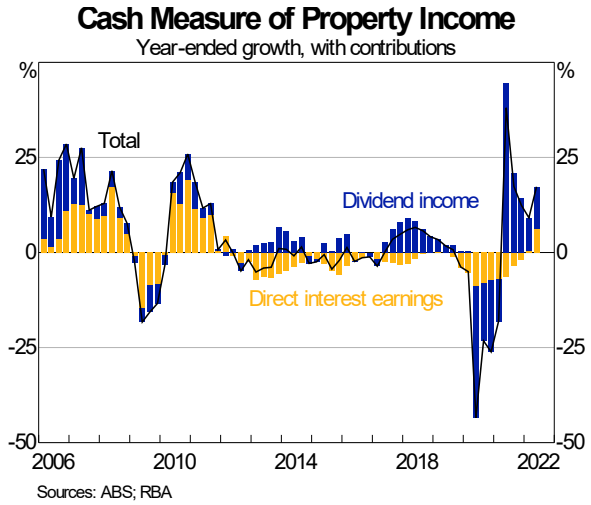


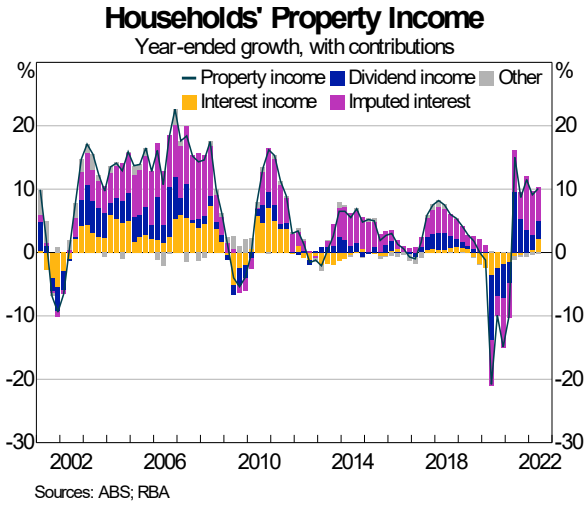
Impact of monetary policy on savers, depositors & self-funded retirees

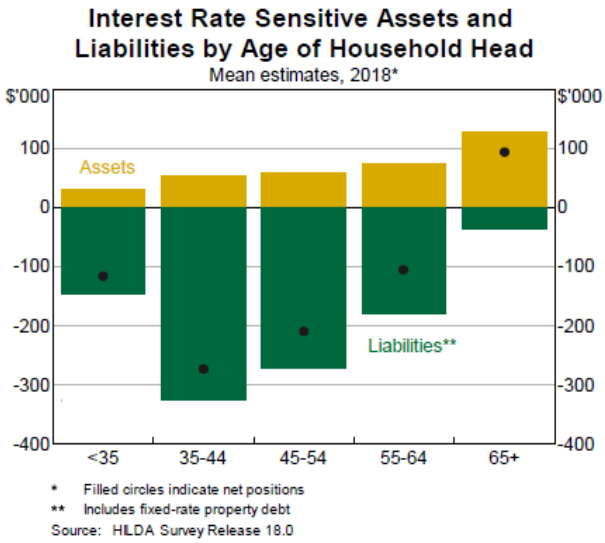
- Household financial income ↑ strongly over past year, reflecting dividend payments. Interest income ↑ strongly in JQ 2022 due to increases in interest rates.
- Monetary policy ↑: two-sided effects on self-funded retirees (~40% of households > retirement age).
  - On the upside: interest more important for older households than younger.
    - 2020 HILDA data: 2% of households aged 65+ earned >20% of gross income from interest (more if include interest via super).
    - 65+: interest income average ~2% of gross regular income.
  - On the downside: income of net savers ↓through lower asset prices and capital income.











Domestic Activity & Trade, Households, Businesses & Credit, and Economic Research
September 2022

From:
Sent: Wednesday, 5 October 2022 8:13 PM
To:
Cc:
Subject: Re: Inflation across the income distribution [SEC=OFFICIAL]

Hi thanks for the heads up. I'm very much looking forward to reading and s note.
Thanks

On 5 Oct 2022, at 5:13 pm, @rba.gov.au> wrote:

Hi Luci,

Just letting you know that and have been doing similar work with US data. Their note is close to finalised, and was going to be sent to DAT and FS for comment when they find time to do a few extra things (maybe next week, but don't want to over-promise!).

Their note looks at the distribution of household finances and income more broadly, including wages growth and accumulated savings. One observation is that in the US (and possibly elsewhere), wages growth is stronger for low income households and that is more than offsetting the higher inflation those households are experiencing. Will leave the rest of their findings to when they are ready to share their note!

Asian & International Macroeconomics | Economic Analysis Department
RESERVE BANK OF AUSTRALIA | 65 Martin Place, Sydney NSW 2000
| w: www.rba.gov.au

From: ELLIS, Luci
Sent: Wednesday, 5 October 2022 2:35 PM
To: @rba.gov.au>
Cc: EC - Senior Managers and above ; EA - DAT ; EA - PWL Prices

Subject: RE: Inflation across the income distribution [SEC=OFFICIAL]

Well done and for such a quick and comprehensive turnaround on this issue. It has been illuminating.

L

From:
Sent: Wednesday, 5 October 2022 2:29 PM
To: LOWE, Phil
Cc: EC - Senior Managers and above EA - DAT ; EA - PWL Prices ; BULLOCK, Michele

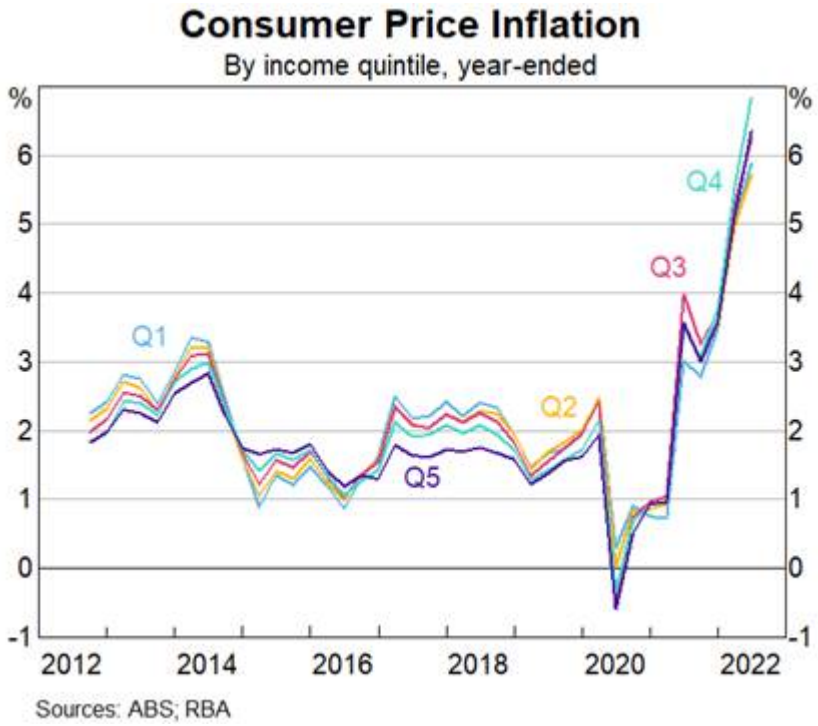
Subject: Inflation across the income distribution [SEC=OFFICIAL]

Hi Phil,

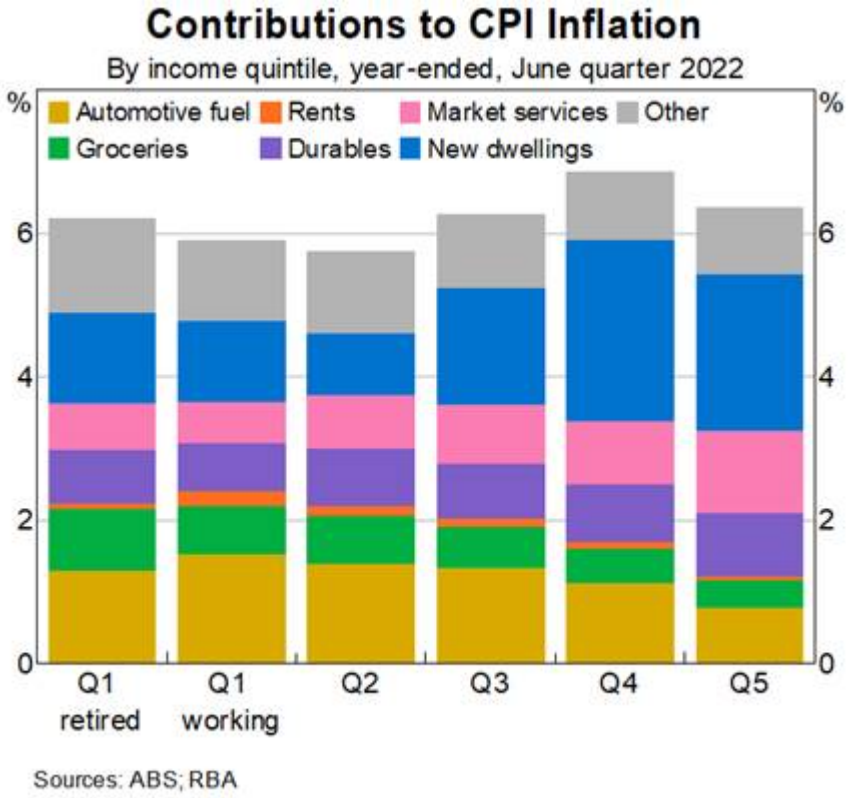
You asked about inflation rates across the income distribution.

and have looked into this. With help from in PWL, they constructed CPIs for each income quintile. To do this they used detailed household-level expenditure data from the ABS' Household Expenditure Survey, combined with published CPI components.

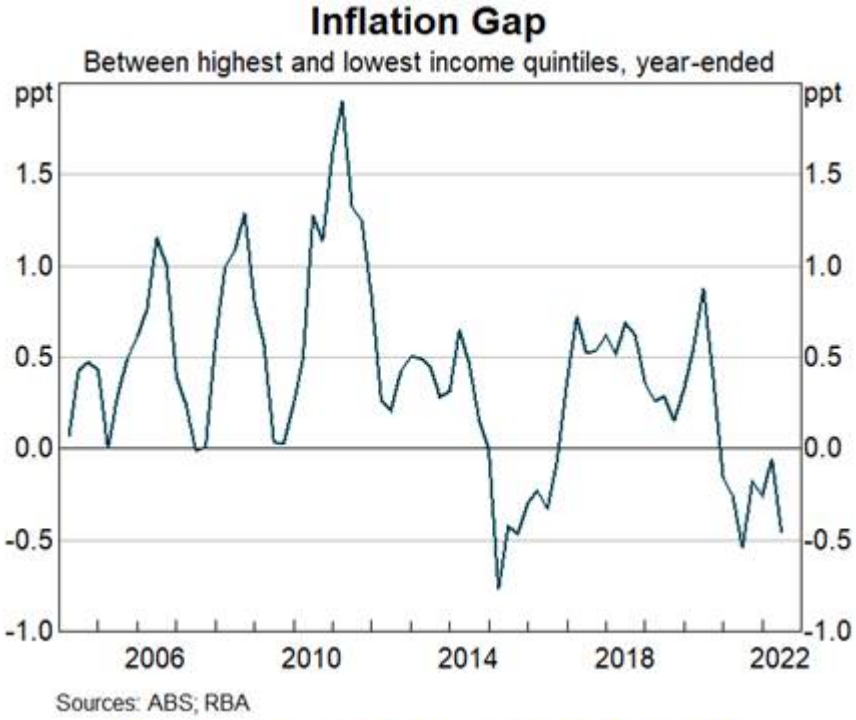
Their key finding is that the differences across the distribution have been surprisingly small (final observation is June quarter 2022).

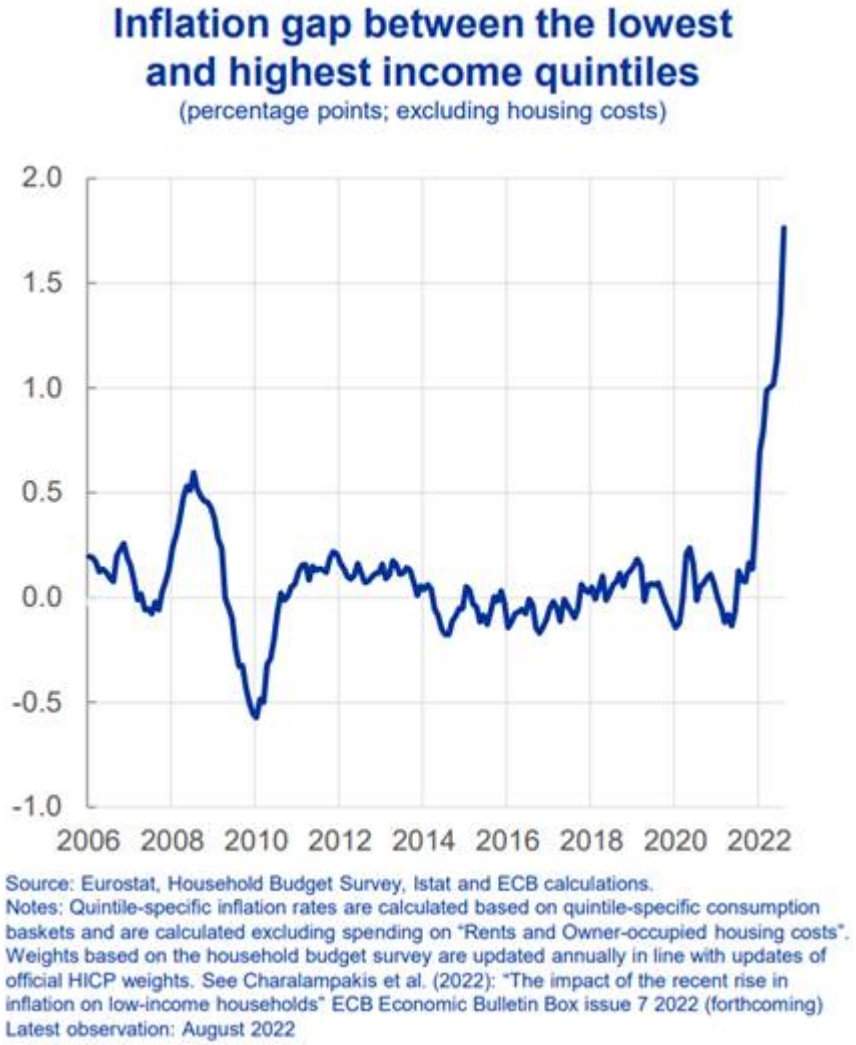


Over the past year, inflation has been highest for the upper quintiles, driven by construction costs for new dwellings (these costs represent a larger share of the basket for higher quintiles). Fuel and groceries were relatively larger contributors to inflation for the lower quintiles.

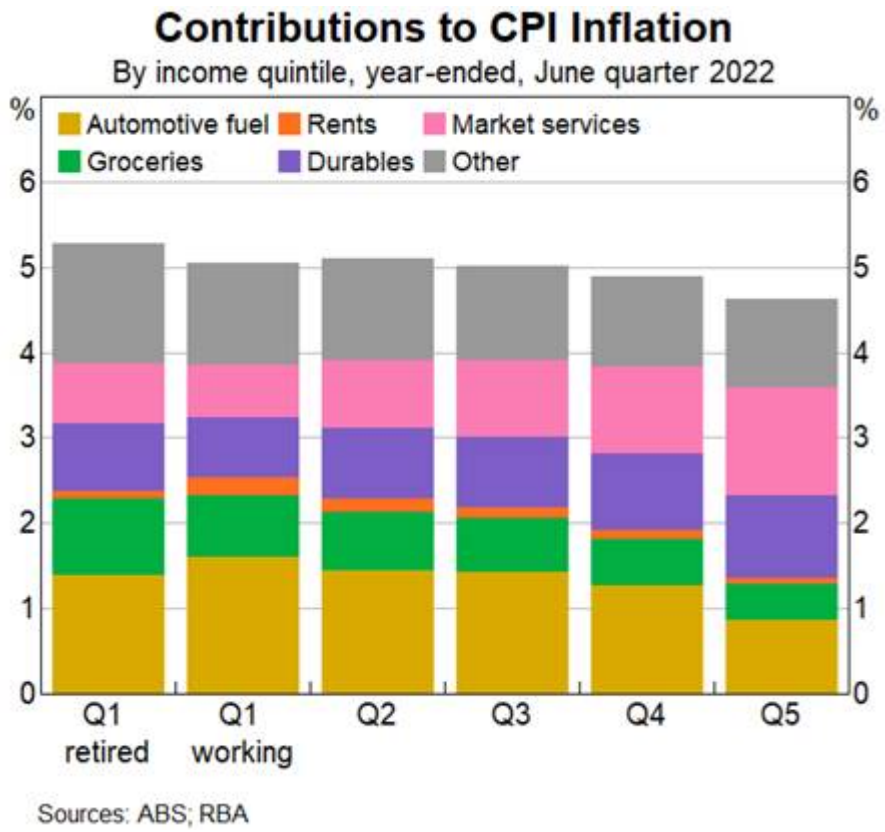


Overall, the picture looks quite different to the one in Isabel Schnabel's speech:





The large increases in new dwelling construction costs play a role in the findings for Australia, but even when we strip that component out completely (by assuming that it's not measured in the CPI), inflation for the highest quintile over the year to June quarter is only ½ ppt higher than that for the lowest quintile.



Big thanks to for putting these graph updates together. See D22/169592 for more details.

Domestic Activity and Trade | Economic Analysis Department
RESERVE BANK OF AUSTRALIA | 65 Martin Place, Sydney NSW 2000

HILDA Survey Disclaimer Notice

This package of documents includes instances where unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey are used.

The unit record data from the HILDA Survey was obtained from the Australian Data Archive, which is hosted by The Australian National University. The HILDA Survey 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 based on the data, however, are those of the authors and should not be attributed to the Australian Government, DSS, the Melbourne Institute, the Australian Data Archive or The Australian National University and none of those entities bear any responsibility for the analysis or interpretation of the unit record data from the HILDA Survey provided by the authors.

From:
Sent: Friday, 7 October 2022 3:23 PM
To:
Subject: RE: Note FS: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows [SEC=OFFICIAL]

Thanks . No suggestions unfortunately.
Cheers

From:
Sent: Friday, 7 October 2022 3:21 PM
To:
Subject: RE: Note FS: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows [SEC=OFFICIAL]

Thanks for your email.

It is true that securitised loans in general tend to be more credit-worthy borrowers, which could bias our results. There are some other limitations of the sec data, such as under-representation of recent loans due to a lag between loan origination and securitisation and fix-rate loans being less likely to be securitised. We have been doing some work to try to address these issues (i.e. estimating sample weights to adjust loans in the sec data to be more representative of the overall mortgage market), and hopefully that note will be ready to share in the next month or so. In the meanwhile, feel free to reach out if you have any suggestions or thoughts on overcoming sec data limitations.

Thanks,

From:
Sent: Friday, 7 October 2022 1:48 PM
To:
Subject: RE: Note FS: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows [SEC=OFFICIAL]

Hi
Interesting. How much should we worry about the representativeness of the sec database for this issue? Previous work suggests that self-secs are better than average: D17/363174
Cheers

From:
Sent: Friday, 7 October 2022 12:23 PM
To: Notes policy groups
Cc:
Subject: Note FS: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows

This note presents scenario analysis on the combined impact of higher interest rates and declining real wages on indebted households' financial positions. Using loan-level information from the Securitisation Dataset on owner-occupiers with variable rate loans it finds that:

- Many households will be able to manage reductions in their spare cash flows (their income after meeting loan repayments and essential living expenses) by reducing their non-essential spending and/or their rate of saving.
- However, a small share of borrowers with lower savings and high debt will need to draw down on – and could ultimately deplete– their accumulated payment buffers and could therefore encounter mortgage payment difficulties.
- Based on the Bank's central scenario for employment and income growth (as at August SMP), the share of households at high risk of falling into arrears is nevertheless expected to remain low, limiting direct risks to the stability of the financial system. However, with risks increasing for some vulnerable indebted households, FS will continue to closely monitor timely leading indicators of financial stress.

This analysis was released this morning in Box B of the October Financial Stability Review.

For more details, please see: D22/270451

Future extensions to this work could consider the impact of changes in the incidence of unemployment, as well as more nuanced assumptions around the likely consumption response based on individual borrower characteristics.

This note was written with and

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THE IMPACT OF RISING INTEREST RATES AND INFLATION ON INDEBTED HOUSEHOLDS' CASH FLOWS[1]

This analysis forms part of the October 2022 Financial Stability Review Box B.

The balance sheets of Australian households are – in aggregate – in strong shape. However, rising interest rates and inflation have increased indebted households' loan payments and living expenses, with further increases in prospect. In recent months, most indebted households have experienced a decline in 'spare cash flows', which is the income they have available to spend or save after meeting their loan payments and essential living expenses. There is uncertainty about how indebted households will respond to this pressure on their budgets. This is partly because there are a number of adjustments households could make – some might reduce their non-essential spending and/or how much they save, while others may need to utilise at least a portion of their previously accumulated savings (which in aggregate are very large).

Although most households are likely to be able to weather increased pressure on their finances for some time, many will need to curtail their consumption and some could ultimately see their savings buffers exhausted. If these households have limited ability to make other adjustments to their financial situation (e.g. by increasing their hours worked) and pressure on their finances continues, they could fall into arrears on their loan obligations; some may eventually need to sell their homes or may even enter into foreclosure. Based on the Reserve Bank's central scenario for employment and income growth, the share of households at high risk of falling into arrears is expected to remain low over the coming years, limiting direct risks to the stability of the financial system as a whole. However, with risks increasing for some vulnerable indebted households, the Bank will continue to closely monitor timely leading indicators of financial stress.

Given market expectations for future interest rate increases and the outlook for inflation and income growth, illustrative scenarios and sensitivity analysis can be used to gauge the potential impact of rising interest rates and inflation on households' spare cash flows. This Box focuses on households with owner-occupier variable-rate loans. These borrowers collectively account for around two-fifths of outstanding housing credit; much of their saving (in flow and stock terms) takes the form of mortgage prepayments and is therefore visible in the available data (in contrast to fixed-rate borrowers and investors). While the analysis that follows is subject to considerable uncertainty (related to both the economic outlook and borrowers' responses to it), it suggests that just over half of these borrowers would see their spare cash flows decline by more than 20 per cent over the next couple of years, including around 15 per cent whose spare cash flows will turn negative. While a relatively small share of the sample of households appears to be at high risk of falling behind on their loan payments, most borrowers will likely be able to manage for at least two years by reducing their non-essential spending, reducing their saving flows and/or drawing down on their accumulated prepayment buffers. Should labour and housing market conditions deteriorate further than assumed in the Bank's central scenario over the coming years, a larger share of households would be expected to fall into arrears on their mortgages.

Higher interest rates and inflation have reduced indebted households' spare cash flows

The effect of rising loan payments and living expenses on spare cash flows will vary across households, with the most important determinant being the amount of debt a household owes relative to their income. Household income levels are a second source of variation as lower income households tend to spend a larger proportion of their incomes on (unavoidable) essential living expenses.[2]

Graph 1 shows what the change in spare cash flows could be for eight hypothetical households with varying combinations of debt and income. The analysis is calibrated using recent outcomes for interest rates, inflation and wages growth, as well as short-range projections for inflation and wages growth. Specifically, it assumes the following:

1 We would like to thank James Bishop for helpful comments and suggestions on this work, as well as participants at the FS and EA seminars.

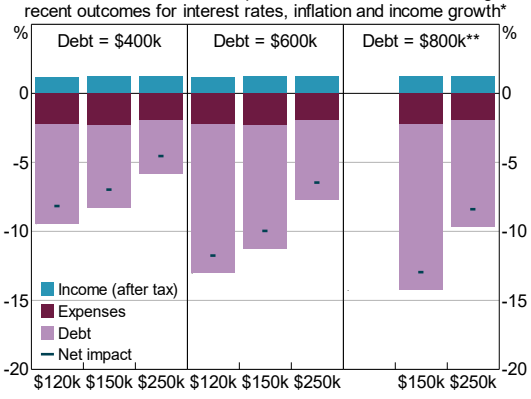
2 Lower income households may also be subject to a higher effective rate of inflation if they are less able to substitute away from purchases of goods and services with more rapidly rising prices, but this is not explicitly accounted for in this analysis.

- Interest rate increases of 2½ percentage points (the cumulative increase between May and October) are passed through fully and immediately to lending rates and loan payments (though in practice this can take up to a few months).
- Essential living expenses are based on the Household Expenditure Measure (HEM) benchmark and assumed to rise in line with actual and forecast headline consumer price inflation (CPI) over the six months to September.[3] Note the HEM benchmark, which is used by lenders in assessing whether a potential borrower can service a loan, incorporates spending on non-discretionary goods and services (such as groceries and fuel) as well as a small amount of discretionary expenditure (such as entertainment and meals out). Additional adjustments are made to factor in some other expenses that are excluded from the HEM (most notably private health insurance and school fees) resulting in a relatively broad measure of essential consumption.[4]
- Indebted household incomes increase in line with the actual and forecast Wage Price Index (WPI) over the six months to September. The choice to use WPI to forecast income growth rather than a broader measure of household income reflects a judgement that non-wage sources of income such as social assistance benefits or investment income (including from superannuation) that are included in broader measures of income are less likely to be the main sources of income for indebted households than renters and outright owners. It is also a conservative choice in that growth in the WPI typically lags that of broader measures of labour compensation when labour markets are tight.

Graph 1

Illustrative Effect of Interest Rates and Inflation on Hypothetical Borrowers' Spare Cash Flows

As a share of household disposable income, calibrated using recent outcomes for interest rates, inflation and income growth*



* Assumes full pass-through of 250bps of interest rate increases to loan repayments, essential (HEM-based) living expenses and income rise in line with expected growth in headline consumer price inflation and wage price inflation over the six months to September 2022. Hypothetical households' income and expenses reflect estimates for a couple family with two dependent children.

** $120k income borrower would not be approved for $800k debt.

Sources: ABS; Melbourne Institute; RBA

For a highly indebted household earning $150,000 of gross income (around the median income for a couple family with dependent children) with $800,000 in debt, the net effect would be a reduction in monthly spare cash flow (relative to April 2022 levels) of around $1,300 – or 13 per cent of household disposable income. Around 80 per cent of the overall reduction in spare cash flows for this hypothetical household would be due to the impact of rising interest rates on their mortgage payments, with inflation playing a much smaller role. For a household with the same income but with $600,000 in debt (around the average loan size for owner-occupier dwellings), the net decline in spare cash flow would be 10 per cent of disposable income. Households that have borrowed more recently tend to have larger debts than earlier cohorts and so are likely to be more affected than other borrowers. For a given amount of debt, households with lower incomes than these hypothetical borrowers would also likely be more affected.

3 CPI has been used as forecasts are readily available. Some components of the CPI basket, such as new dwellings and rents, are unlikely to be applicable to indebted homeowners.

4 For simplicity, households with one loan applicant are assumed to have no dependants whereas households with two loan applicants are assumed to have two dependants.

Scenario analysis suggests that further declines in spare cash flow are likely

Financial market pricing and surveys of economists indicate that further increases in the cash rate are expected over the next two years, alongside inflation outpacing growth in base wages. To estimate the combined impact of these forces, scenario analysis can be used to gauge the effect on individual borrowers over the next couple of years, drawing on the Bank's Securitisation Dataset. The scenario assumes that interest rates rise by a further 1 percentage point from October 2022 levels by the end of 2023 (broadly in line with market pricing) and are fully passed through to variable-rate loan payments. Indebted households' living expenses and incomes are assumed to increase in line with the August 2022 *Statement on Monetary Policy* forecasts for CPI and WPI growth, respectively. Essential living expenses for each household are again calibrated using adjusted HEM benchmark estimates and information on borrowers' incomes and so include a small amount of discretionary consumption.

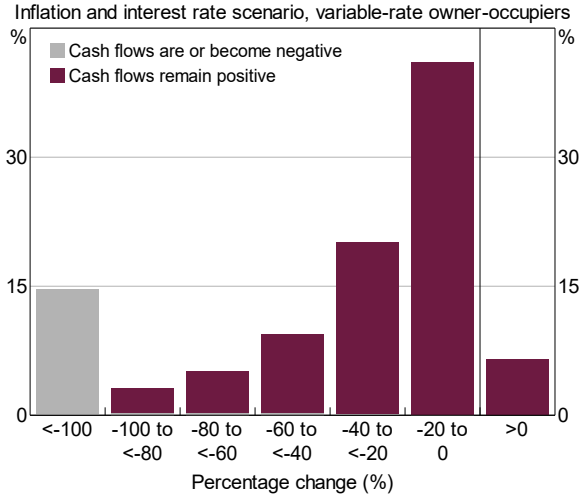
Under this scenario:

- Just over half of variable-rate owner-occupier borrowers would see their spare cash flows decline by more than 20 per cent over the next couple of years, including around 15 per cent of households whose spare cash flows would become negative as the combined burden of higher interest payments and the higher cost of essential goods and services exceeds their initial spare cash flows. This latter group of (typically low income, highly indebted) households would likely be forced to draw down on their stocks of saving in order to continue to meet their loan payments and essential living expenses. Some may have a limited ability to do this, given that low-income and highly indebted households typically have lower savings buffers.
- Another 40 per cent of variable-rate owner-occupier borrowers would face a more moderate decrease in their monthly spare cash flows of less than 20 per cent from their mid-2022 levels, but would be able to accommodate this through reduced non-essential consumption and/or saving flows.
- The remainder of variable-rate owner-occupier borrowers (around 5 per cent) would experience an increase in their cash flows. This group are typically high-income borrowers who spend a low share of their income on essential living expenses and have very low levels of debt, such that the dollar value of their expected income growth would exceed that of their (loan and living) expenses.

Graph 2

Distribution of Changes in Spare Cash Flows*

Inflation and interest rate scenario, variable-rate owner-occupiers



* Cash flow is estimated as income net of mortgage payments and essential living expenses; assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; Melbourne Institute; RBA; Securitisation System

It is important to note that these estimates are only indicative and are not firm predictions. They do not allow for variation in inflation or wages growth across individual households, nor do they make provisions for households to respond to declining spare cash flows (e.g. by working more hours). Some lower risk borrowers (e.g. those with a low outstanding loan-to-valuation ratio) may be able to respond by refinancing their debt at lower interest rates; other borrowers may have additional scope to reduce their consumption (the

measure of 'essential' living expenses assumes borrowers will maintain at least some discretionary spending).[5] It is also possible that some borrowers hold their savings in other less-visible forms than mortgage offset or redraw accounts and so have additional liquid buffers to draw on. Working in the opposite direction, the results abstract from a possible rise in unemployment over this horizon, which would reduce the cash flows of affected households significantly.[6]

Overall, most borrowers are likely to be well placed to adjust their finances, with only a small share appearing vulnerable to falling into arrears

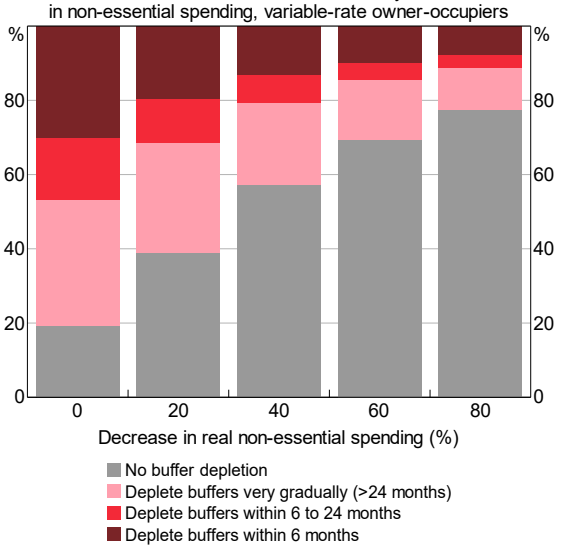
The declines in spare cash flow implied by this exercise would place some pressure on household budgets. However, there is uncertainty around how households would respond. In particular, it is not clear to what extent households would choose to prioritise maintaining their current non-essential consumption over adjusting their saving behaviour. Changes in household wealth are likely to have a bearing on this decision.

At one extreme, if the cumulative reductions to cash flows implied by the scenario were realised and households choose not to reduce their real non-essential spending and instead draw down on existing prepayment buffers, just over half of variable-rate owner-occupiers are estimated to have prepayment buffers large enough to allow them to meet their loan payments and essential living expenses for at least two years (Graph 3). If households were instead to choose to reduce their real non-essential spending by 20 per cent, the share of borrowers with more than two years' worth of prepayment buffers would increase to around 70 per cent. For simplicity, the scenario uses borrowers' prepayment buffers as at June 2022 rather than a projection of what these buffers could be at the end of 2023. As a result, it likely understates the available buffers of borrowers with large spare cash flows and overstates the available buffers of households with low spare cash flows (some of which may have already started to draw down their buffers).

Graph 3

Distribution of Time until Buffers are Depleted*

Inflation and interest rate scenario, sensitivity to reductions in non-essential spending, variable-rate owner-occupiers



* Assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; Melbourne Institute; RBA; Securitisation System

At the other extreme, some households may choose to cut their non-essential spending quite sharply – either to retain their savings buffers or because they need to in order to meet loan payments. In this scenario, the vast majority of variable-rate owner-occupier borrowers would not need to deplete their buffers much at all. However, there remains around 8 per cent of variable-rate owner-occupier borrowers who would fully exhaust their prepayment buffers within six months, even if they were to cut their real non-essential

5 Specifically, the HEM benchmark incorporates the 25th percentile of household expenditure on discretionary basics in the ABS Household Expenditure Survey based on the household's income level and number of dependants (along with the median expenditure on non-discretionary basics).

6 Kearns J, M Major and D Norman (2020), 'How Risky is Australian Household Debt?', RBA Research Discussion Paper No 2021-05.

spending by a relatively extreme 80 per cent; around 40 per cent of these borrowers are in the lowest quartile of the income distribution and so are already more vulnerable to falling behind on their loan payments. In practice, many borrowers in this position may attempt to make other adjustments, such as supplementing their income or adjusting their current spending patterns in anticipation of future increases in their expenses.

Overall, most owner-occupiers with variable-rate loans appear well placed to adjust to rising expenses over the next couple of years through a combination of reducing non-essential spending, lowering saving rates (i.e. reducing excess mortgage payments) or by gradually drawing down on (in some cases very large) prepayment buffers. It is also possible that some households have other liquid financial assets on which they could draw to support their consumption and loan payment obligations (though this possibility is precluded from the analysis due to data limitations). Higher interest rates and inflation will slow aggregate household consumption and the pace of economic growth more broadly, but the direct financial stability risks posed by vulnerable borrowers appears modest. A large increase in unemployment combined with a historically large decline in housing prices would pose a more material risk to loan arrears and defaults, and therefore financial stability.

Households Businesses & Credit
Financial Stability Department
7 October 2022

For appendices, please see: D22/270457

APPENDIX TO THE IMPACT OF RISING INTEREST RATES AND INFLATION ON INDEBTED HOUSEHOLDS' CASH FLOWS

Appendix A: Calculation of household spare cash flows

Household spare cash flow (SCF) is defined as:

$$SCF = income - essential\ living\ expenses - mortgage\ payments$$

The SCF is calculated for households with variable-rate owner-occupier loans in the Securitisation Dataset. These borrowers collectively account for around two-fifths of outstanding housing credit. The SCF captures the income households have available to spend or save after meeting their loan payments and essential living expenses.

The components of the SCF and their assumptions are described below.

Income:

- It is reported in the Securitisation Dataset at loan origination.
- We assume borrower incomes grow in line with WPI from the point of origination, and in line with Bank's WPI forecasts at August 2022 SMP going forward. It is a conservative choice to use WPI to grow forward incomes (see Appendix B for detail).
- After-tax income is calculated using individual income tax rate brackets for the 2022-23 FY. Sum of primary and non-primary borrower after-tax income is used as a proxy for household disposable income.
- It is possible that some borrowers are likely to under declare their income when applying for loans, neglecting to report more complex incomes such as investment income if they are not required in order for the loan to be approved.

Living expenses:

- Expenses come from the Melbourne Institute's Household Expenditure Measure (HEM) and are assigned to each household based on their income and number of debtors.
- The HEM benchmark is the minimum living expenses measure used by the Australian banks in assessing loan serviceability. The measure captures the median household's expenditure on 'absolute basics' (e.g. most food items, utilities and transport costs) and the 25th percentile of spending on 'discretionary basics' (e.g. take-away food, restaurants and entertainment).
- We focus on two types of households: single with zero dependants and couple with two dependants. When applying expenses, loans with number of debtors equal to 1 are assumed to be single households and loans with number of debtors > 1 are taken as couple households. These assumptions reflect the most common number of dependants in each family type. In practice, living expenses could be higher or lower than what is assumed in this exercise depending on the actual number of dependants in a family.
- The HEM benchmark is scaled up using scaling factors derived from the Household Expenditure Survey (see Alfonzetti 2021 for more detail). This adjustment is made to factor in some other expenses that are excluded from the HEM (mainly private health insurance and school fees), which has resulted in a relatively broad measure of essential consumption.

Table A1: HEM Scaling Factors

	Equivalised Disposable Income Quartile			
	1	2	3	4
Single households with 0 dependants	1	1.17	1.17	1.29
Couple households with 2 dependants	1.14	1.20	1.38	1.53

Sources: ABS; Melbourne Institute; RBA

Mortgage payments:

- Payments are estimated for each loan using the credit foncier formula, based on the outstanding loan balances, remaining loan term and current interest rates.

Appendix B: Sensitivity analysis

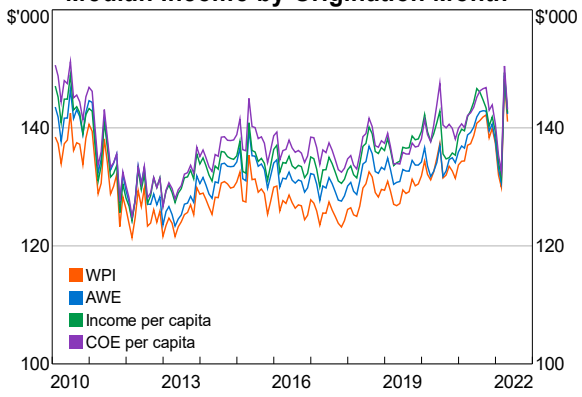
Income measures

The choice of WPI to forecast income growth rather than a broader measure of household income is deliberately conservative, as it reflects a judgement that non-wage sources of income (such as social assistance benefits or investment income) are less likely to be the main sources of income for indebted households than for renters and outright owners. In addition, unlike Average Weekly Earnings (AWE) and the national accounts measure of income, WPI is not influenced by changes in the composition of the labour force, hours worked, or changes in characteristics of employees and is therefore more appropriate as a benchmark for the income growth of individuals.

It is also evident from the data that using WPI to adjust incomes gives conservative figures, whereas median indexed income is relatively large if we allow incomes to grow at the average rate of national accounts income growth since loan origination (Graph B1). In aggregate, however, the share of households in each of these income buckets is similar across different income measures (Graph B2). Using other measures of labour compensation provides results that are only marginally more benign than current findings.

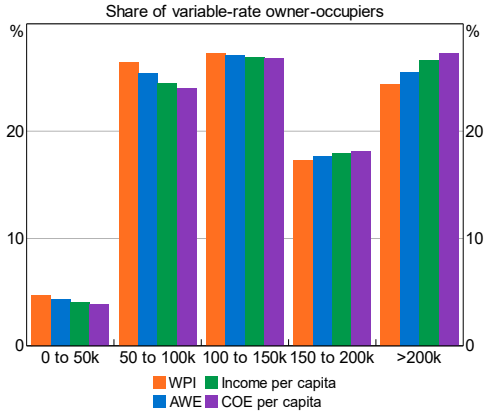
This approach (regardless of which income measures we use) is likely to underestimate incomes of younger workers, as they are likely to experience faster wage growth than older workers. Borrower characteristics (such as age) are not available in the dataset, although it could be possible in future work to make some loose assumptions to incorporate different rates of income growth based on whether they borrowers are first homebuyers.

Graph B1
Median Income by Origination Month*



* Gross income.
Sources: ABS; Melbourne Institute; RBA; Securitisation System

Graph B2
Distribution of Household Income*
Share of variable-rate owner-occupiers



* Gross income.
Sources: RBA; Securitisation System

HEM expenses

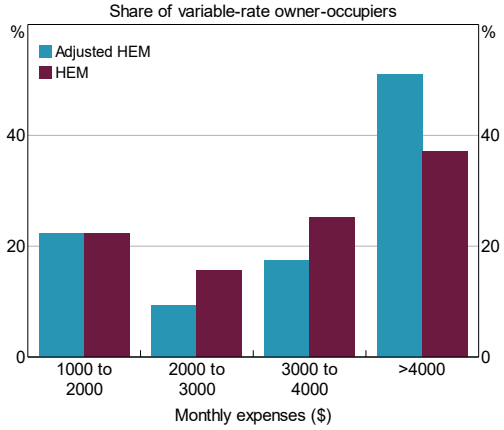
In the analysis, we use adjusted HEM benchmark estimates as a proxy for essential living expenses. For around half of borrowers, their monthly living expenses (scaled HEM) are greater than $4000. This compares to around 37 per cent of borrowers with HEM greater than $4000 (Graph B3).

As adjusted HEM is a broad measure of essential living expenses, some borrowers may have additional scope to reduce their consumption if required. If we use minimum living expenses instead (the HEM benchmark), the share of borrowers facing negative spare cash flows decreases to 6½ per cent from 15 per cent (Graph B4). In addition, analysis in the main note suggests that around 8 per cent of variable-rate owner-occupier borrowers who would fully exhaust their prepayment buffers within six months, even if they were to cut their real non-essential spending by a relatively extreme 80 per cent (i.e. their spending approaches the adjusted HEM estimates). The share of these more vulnerable borrowers decreases to 4¾ per cent if using the HEM benchmark.

Graph B3

Distribution of Living Expenses

Share of variable-rate owner-occupiers

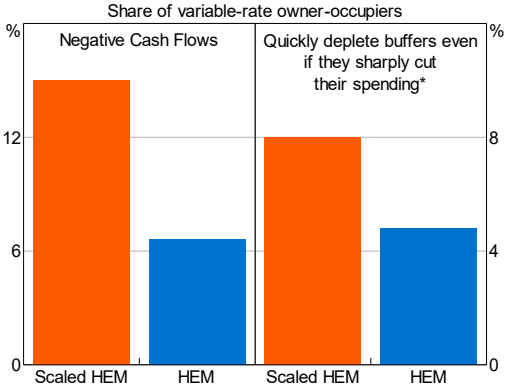


Sources: ABS; Melbourne Institute; RBA; Securitisation System

Graph B4

Vulnerable Borrowers

Share of variable-rate owner-occupiers



* Borrowers would fully deplete their buffers within 6 months even if they cut their non-essential spending by 80 per cent.

Sources: ABS; Melbourne Institute; RBA; Securitisation System

Appendix C: Future work

This analysis doesn't consider changes in the incidence of unemployment. Future work may also consider nuanced assumptions at the loan level for changes in consumption based on borrower characteristics (e.g. the level of their prepayment buffers, the pace at which they accumulated 'excess' buffers during the pandemic or by adopting some assumptions about the minimum (positive) levels of buffers that borrowers would be prepared to accept). It would be useful to additionally consider more severe paths for inflation and the cash rate rather than conditioning on the central forecast and see how sensitive the results are to different scenarios.

Households Businesses & Credit
Financial Stability Department
7 October 2022

THE IMPACT OF RISING INTEREST RATES AND INFLATION ON INDEBTED HOUSEHOLDS' CASH FLOWS[1]

This analysis forms part of the October 2022 Financial Stability Review Box B.

The balance sheets of Australian households are – in aggregate – in strong shape. However, rising interest rates and inflation have increased indebted households' loan payments and living expenses, with further increases in prospect. In recent months, most indebted households have experienced a decline in 'spare cash flows', which is the income they have available to spend or save after meeting their loan payments and essential living expenses. There is uncertainty about how indebted households will respond to this pressure on their budgets. This is partly because there are a number of adjustments households could make – some might reduce their non-essential spending and/or how much they save, while others may need to utilise at least a portion of their previously accumulated savings (which in aggregate are very large).

Although most households are likely to be able to weather increased pressure on their finances for some time, many will need to curtail their consumption and some could ultimately see their savings buffers exhausted. If these households have limited ability to make other adjustments to their financial situation (e.g. by increasing their hours worked) and pressure on their finances continues, they could fall into arrears on their loan obligations; some may eventually need to sell their homes or may even enter into foreclosure. Based on the Reserve Bank's central scenario for employment and income growth, the share of households at high risk of falling into arrears is expected to remain low over the coming years, limiting direct risks to the stability of the financial system as a whole. However, with risks increasing for some vulnerable indebted households, the Bank will continue to closely monitor timely leading indicators of financial stress.

Given market expectations for future interest rate increases and the outlook for inflation and income growth, illustrative scenarios and sensitivity analysis can be used to gauge the potential impact of rising interest rates and inflation on households' spare cash flows. This Box focuses on households with owner-occupier variable-rate loans. These borrowers collectively account for around two-fifths of outstanding housing credit; much of their saving (in flow and stock terms) takes the form of mortgage prepayments and is therefore visible in the available data (in contrast to fixed-rate borrowers and investors). While the analysis that follows is subject to considerable uncertainty (related to both the economic outlook and borrowers' responses to it), it suggests that just over half of these borrowers would see their spare cash flows decline by more than 20 per cent over the next couple of years, including around 15 per cent whose spare cash flows will turn negative. While a relatively small share of the sample of households appears to be at high risk of falling behind on their loan payments, most borrowers will likely be able to manage for at least two years by reducing their non-essential spending, reducing their saving flows and/or drawing down on their accumulated prepayment buffers. Should labour and housing market conditions deteriorate further than assumed in the Bank's central scenario over the coming years, a larger share of households would be expected to fall into arrears on their mortgages.

Higher interest rates and inflation have reduced indebted households' spare cash flows

The effect of rising loan payments and living expenses on spare cash flows will vary across households, with the most important determinant being the amount of debt a household owes relative to their income. Household income levels are a second source of variation as lower income households tend to spend a larger proportion of their incomes on (unavoidable) essential living expenses.[2]

Graph 1 shows what the change in spare cash flows could be for eight hypothetical households with varying combinations of debt and income. The analysis is calibrated using recent outcomes for interest rates, inflation and wages growth, as well as short-range projections for inflation and wages growth. Specifically, it assumes the following:

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- Interest rate increases of 2½ percentage points (the cumulative increase between May and October) are passed through fully and immediately to lending rates and loan payments (though in practice this can take up to a few months).
- Essential living expenses are based on the Household Expenditure Measure (HEM) benchmark and assumed to rise in line with actual and forecast headline consumer price inflation (CPI) over the six months to September.[3] Note the HEM benchmark, which is used by lenders in assessing whether a potential borrower can service a loan, incorporates spending on non-discretionary goods and services (such as groceries and fuel) as well as a small amount of discretionary expenditure (such as entertainment and meals out). Additional adjustments are made to factor in some other expenses that are excluded from the HEM (most notably private health insurance and school fees) resulting in a relatively broad measure of essential consumption.[4]
- Indebted household incomes increase in line with the actual and forecast Wage Price Index (WPI) over the six months to September. The choice to use WPI to forecast income growth rather than a broader measure of household income reflects a judgement that non-wage sources of income such as social assistance benefits or investment income (including from superannuation) that are included in broader measures of income are less likely to be the main sources of income for indebted households than renters and outright owners. It is also a conservative choice in that growth in the WPI typically lags that of broader measures of labour compensation when labour markets are tight.

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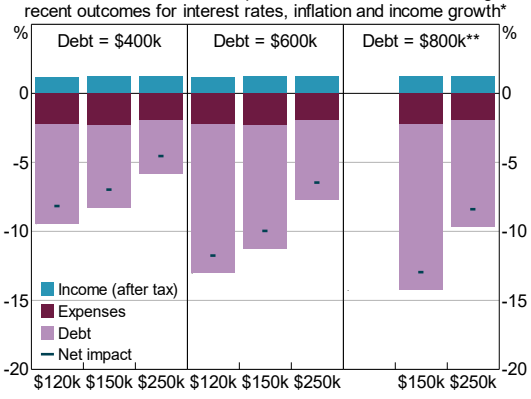
As a share of household disposable income, calibrated using recent outcomes for interest rates, inflation and income growth*



* Assumes full pass-through of 250bps of interest rate increases to loan repayments, essential (HEM-based) living expenses and income rise in line with expected growth in headline consumer price inflation and wage price inflation over the six months to September 2022. Hypothetical households' income and expenses reflect estimates for a couple family with two dependent children.

** $120k income borrower would not be approved for $800k debt.

Sources: ABS; Melbourne Institute; RBA

For a highly indebted household earning $150,000 of gross income (around the median income for a couple family with dependent children) with $800,000 in debt, the net effect would be a reduction in monthly spare cash flow (relative to April 2022 levels) of around $1,300 – or 13 per cent of household disposable income. Around 80 per cent of the overall reduction in spare cash flows for this hypothetical household would be due to the impact of rising interest rates on their mortgage payments, with inflation playing a much smaller role. For a household with the same income but with $600,000 in debt (around the average loan size for owner-occupier dwellings), the net decline in spare cash flow would be 10 per cent of disposable income. Households that have borrowed more recently tend to have larger debts than earlier cohorts and so are likely to be more affected than other borrowers. For a given amount of debt, households with lower incomes than these hypothetical borrowers would also likely be more affected.

3 CPI has been used as forecasts are readily available. Some components of the CPI basket, such as new dwellings and rents, are unlikely to be applicable to indebted homeowners.

4 For simplicity, households with one loan applicant are assumed to have no dependants whereas households with two loan applicants are assumed to have two dependants.

Scenario analysis suggests that further declines in spare cash flow are likely

Financial market pricing and surveys of economists indicate that further increases in the cash rate are expected over the next two years, alongside inflation outpacing growth in base wages. To estimate the combined impact of these forces, scenario analysis can be used to gauge the effect on individual borrowers over the next couple of years, drawing on the Bank's Securitisation Dataset. The scenario assumes that interest rates rise by a further 1 percentage point from October 2022 levels by the end of 2023 (broadly in line with market pricing) and are fully passed through to variable-rate loan payments. Indebted households' living expenses and incomes are assumed to increase in line with the August 2022 *Statement on Monetary Policy* forecasts for CPI and WPI growth, respectively. Essential living expenses for each household are again calibrated using adjusted HEM benchmark estimates and information on borrowers' incomes and so include a small amount of discretionary consumption.

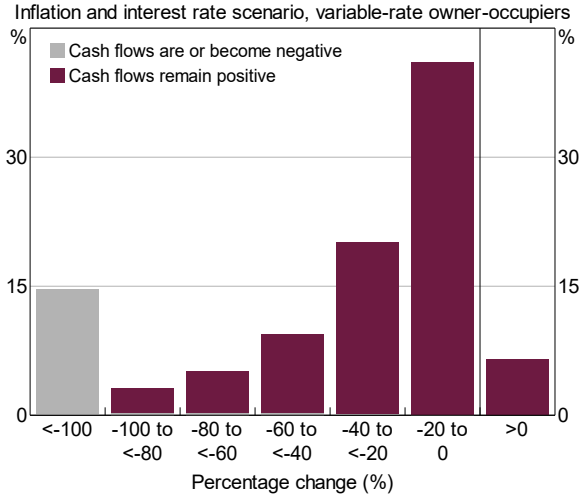
Under this scenario:

- Just over half of variable-rate owner-occupier borrowers would see their spare cash flows decline by more than 20 per cent over the next couple of years, including around 15 per cent of households whose spare cash flows would become negative as the combined burden of higher interest payments and the higher cost of essential goods and services exceeds their initial spare cash flows. This latter group of (typically low income, highly indebted) households would likely be forced to draw down on their stocks of saving in order to continue to meet their loan payments and essential living expenses. Some may have a limited ability to do this, given that low-income and highly indebted households typically have lower savings buffers.
- Another 40 per cent of variable-rate owner-occupier borrowers would face a more moderate decrease in their monthly spare cash flows of less than 20 per cent from their mid-2022 levels, but would be able to accommodate this through reduced non-essential consumption and/or saving flows.
- The remainder of variable-rate owner-occupier borrowers (around 5 per cent) would experience an increase in their cash flows. This group are typically high-income borrowers who spend a low share of their income on essential living expenses and have very low levels of debt, such that the dollar value of their expected income growth would exceed that of their (loan and living) expenses.

Graph 2

Distribution of Changes in Spare Cash Flows*

Inflation and interest rate scenario, variable-rate owner-occupiers



* Cash flow is estimated as income net of mortgage payments and essential living expenses; assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; Melbourne Institute; RBA; Securitisation System

It is important to note that these estimates are only indicative and are not firm predictions. They do not allow for variation in inflation or wages growth across individual households, nor do they make provisions for households to respond to declining spare cash flows (e.g. by working more hours). Some lower risk borrowers (e.g. those with a low outstanding loan-to-valuation ratio) may be able to respond by refinancing their debt at lower interest rates; other borrowers may have additional scope to reduce their consumption (the

measure of 'essential' living expenses assumes borrowers will maintain at least some discretionary spending).[5] It is also possible that some borrowers hold their savings in other less-visible forms than mortgage offset or redraw accounts and so have additional liquid buffers to draw on. Working in the opposite direction, the results abstract from a possible rise in unemployment over this horizon, which would reduce the cash flows of affected households significantly.[6]

Overall, most borrowers are likely to be well placed to adjust their finances, with only a small share appearing vulnerable to falling into arrears

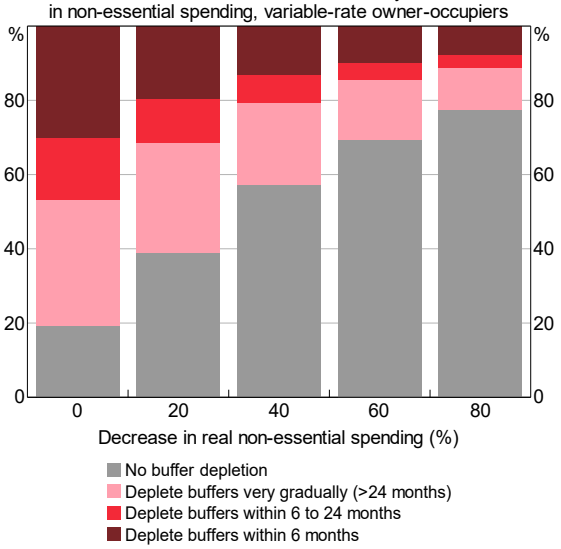
The declines in spare cash flow implied by this exercise would place some pressure on household budgets. However, there is uncertainty around how households would respond. In particular, it is not clear to what extent households would choose to prioritise maintaining their current non-essential consumption over adjusting their saving behaviour. Changes in household wealth are likely to have a bearing on this decision.

At one extreme, if the cumulative reductions to cash flows implied by the scenario were realised and households choose not to reduce their real non-essential spending and instead draw down on existing prepayment buffers, just over half of variable-rate owner-occupiers are estimated to have prepayment buffers large enough to allow them to meet their loan payments and essential living expenses for at least two years (Graph 3). If households were instead to choose to reduce their real non-essential spending by 20 per cent, the share of borrowers with more than two years' worth of prepayment buffers would increase to around 70 per cent. For simplicity, the scenario uses borrowers' prepayment buffers as at June 2022 rather than a projection of what these buffers could be at the end of 2023. As a result, it likely understates the available buffers of borrowers with large spare cash flows and overstates the available buffers of households with low spare cash flows (some of which may have already started to draw down their buffers).

Graph 3

Distribution of Time until Buffers are Depleted*

Inflation and interest rate scenario, sensitivity to reductions in non-essential spending, variable-rate owner-occupiers



* Assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; Melbourne Institute; RBA; Securitisation System

At the other extreme, some households may choose to cut their non-essential spending quite sharply – either to retain their savings buffers or because they need to in order to meet loan payments. In this scenario, the vast majority of variable-rate owner-occupier borrowers would not need to deplete their buffers much at all. However, there remains around 8 per cent of variable-rate owner-occupier borrowers who would fully exhaust their prepayment buffers within six months, even if they were to cut their real non-essential

5 Specifically, the HEM benchmark incorporates the 25th percentile of household expenditure on discretionary basics in the ABS Household Expenditure Survey based on the household's income level and number of dependants (along with the median expenditure on non-discretionary basics).

6 Kearns J, M Major and D Norman (2020), 'How Risky is Australian Household Debt?', RBA Research Discussion Paper No 2021-05.

spending by a relatively extreme 80 per cent; around 40 per cent of these borrowers are in the lowest quartile of the income distribution and so are already more vulnerable to falling behind on their loan payments. In practice, many borrowers in this position may attempt to make other adjustments, such as supplementing their income or adjusting their current spending patterns in anticipation of future increases in their expenses.

Overall, most owner-occupiers with variable-rate loans appear well placed to adjust to rising expenses over the next couple of years through a combination of reducing non-essential spending, lowering saving rates (i.e. reducing excess mortgage payments) or by gradually drawing down on (in some cases very large) prepayment buffers. It is also possible that some households have other liquid financial assets on which they could draw to support their consumption and loan payment obligations (though this possibility is precluded from the analysis due to data limitations). Higher interest rates and inflation will slow aggregate household consumption and the pace of economic growth more broadly, but the direct financial stability risks posed by vulnerable borrowers appears modest. A large increase in unemployment combined with a historically large decline in housing prices would pose a more material risk to loan arrears and defaults, and therefore financial stability.

Households Businesses & Credit
Financial Stability Department
7 October 2022

For appendices, please see: D22/270457

From: JONES, Bradley
Sent: Thursday, 29 September 2022 4:20 PM
To:
Cc:
Subject: RE: For our catch up [SEC=OFFICIAL]

Thanks and

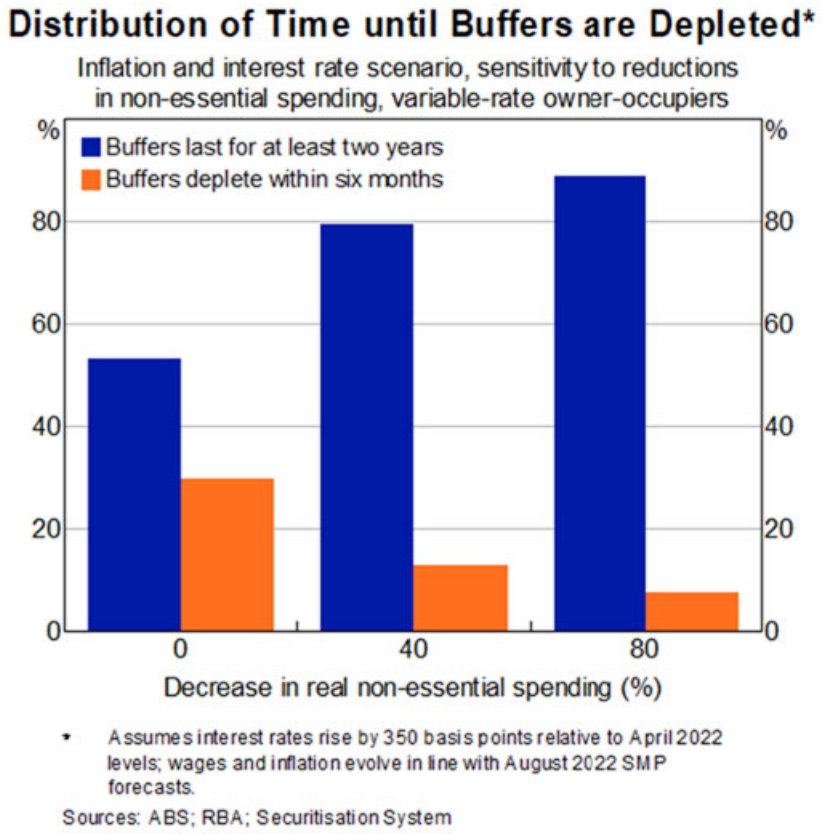
From:
Sent: Thursday, 29 September 2022 4:04 PM
To: JONES, Bradley
Cc:
Subject: RE: For our catch up [SEC=OFFICIAL]

Brad,

(cc'd) and I have discussed the below chart, and the answer to your question is that borrowers will deplete their buffers for two reasons:

1) Because their spare cash flows become negative (ie grey column in distribution of changes in spare cash flows chart) or
2) Because their spare cash flows remain positive but fall below their desired level of discretionary consumption (0 per cent category below, this desired level = 100% of their current real non-essential spending).

So this chart can be thought of as exploring the different margins of adjustment. Borrowers in the 0 per cent category are less inclined to want to preserve their buffers, whereas borrowers in the 80 per cent category are very much inclined towards preserving them. The fact that there are still some borrowers in the orange column for the 80 per cent category suggest there are some that are highly vulnerable even if they take all (or some would argue beyond) reasonable steps to preserve their buffers by cutting back consumption.



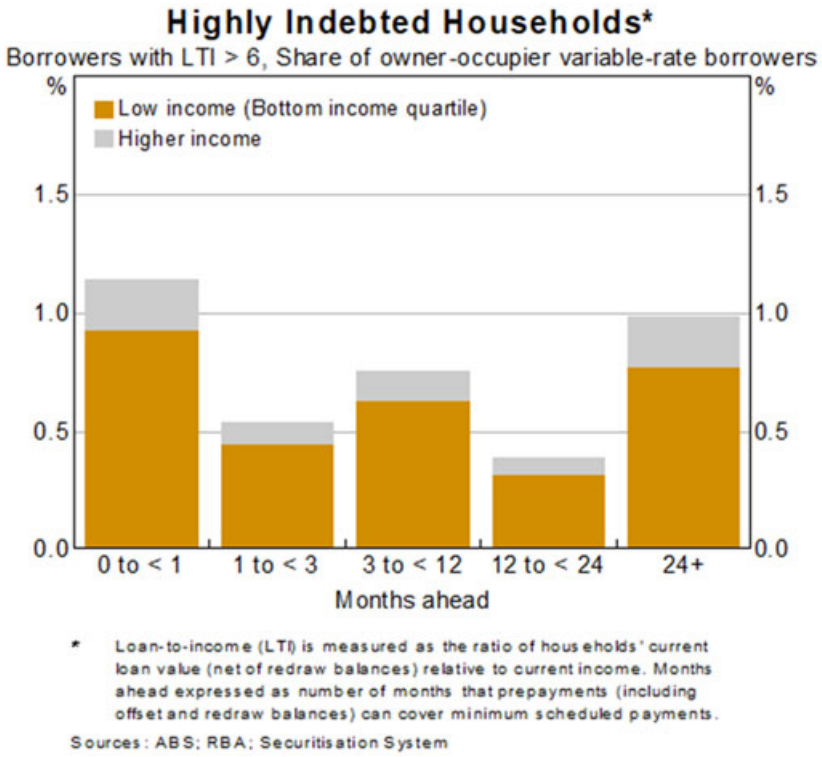
Happy to discuss further,

From: JONES, Bradley
Sent: Thursday, 29 September 2022 2:33 PM
To:
Subject: For our catch up [SEC=OFFICIAL]

Hi all

Thanks for pulling together the board graphs. Just a few follow ups:

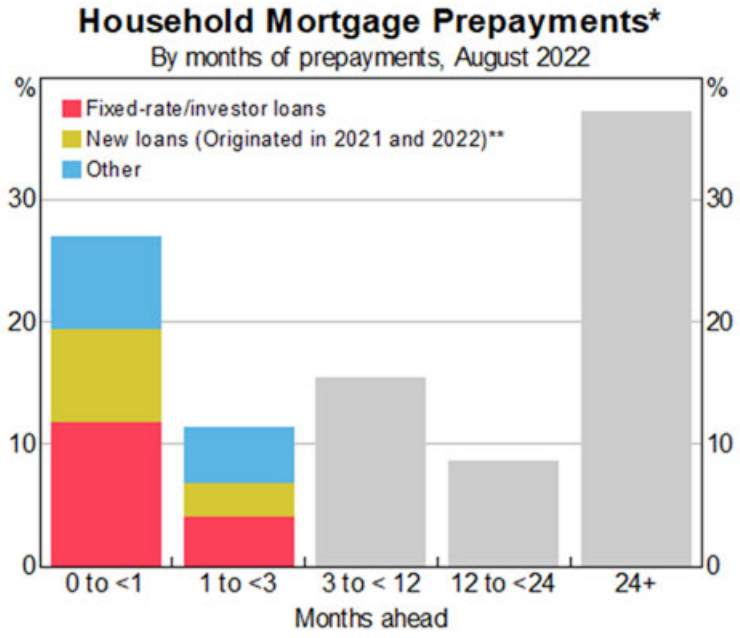
- Can we combine the two columns on the left (so just have a single grouping for 0 to 3 months buffer) and the two on the right (so we just have a single grouping for more than 1 year)



* Loan-to-income (LTI) is measured as the ratio of households' current loan value (net of redraw balances) relative to current income. Months ahead expressed as number of months that prepayments (including offset and redraw balances) can cover minimum scheduled payments.

Sources: ABS; RBA; Securitisation System

- Is the reason we don't continue the colour coding out beyond 3 months because we don't have visibility over fixed-rate borrowers and investors



* Months ahead expressed as number of months that prepayments (including offset and redraw balances) can cover minimum scheduled payments.

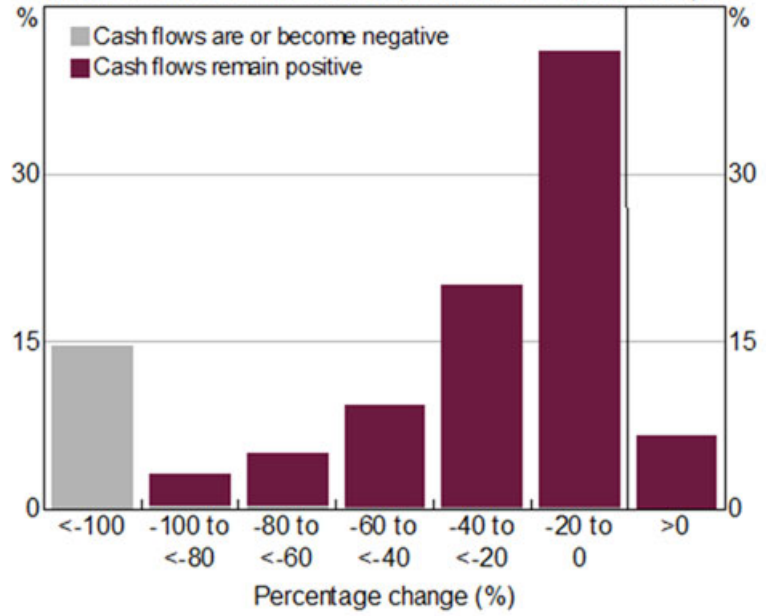
** These are somewhat under-represented in the Securitisation data.

Sources: RBA; Securitisation System

- Change colours (red for the far left bar, green for the far right bar, and orange or yellow for the ones in the middle) and condense into 1/3 buckets (0-33%, 33-66, 66-99)

Distribution of Changes in Spare Cash Flows*

Inflation and interest rate scenario, variable-rate owner-occupiers



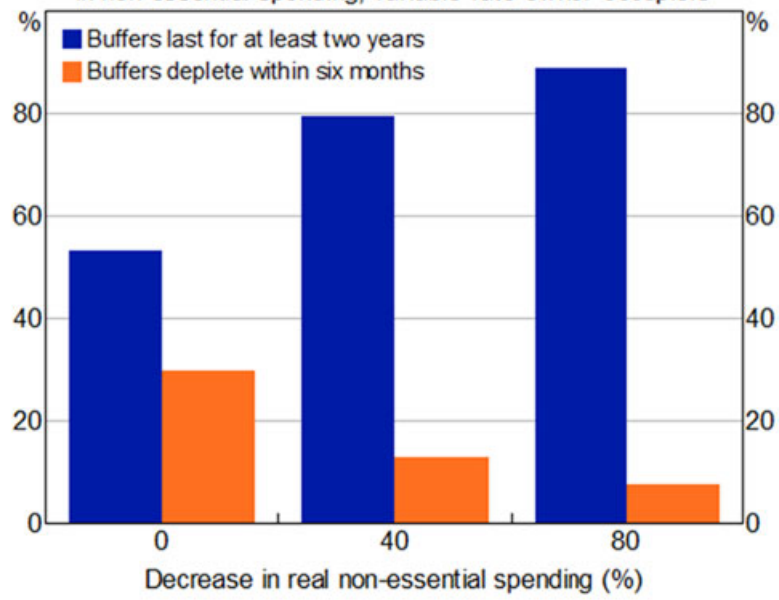
* Cash flow is estimated as income net of mortgage payments and living expenses; assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; RBA; Securitisation System

- Do these buffer calculations assume that spare cash flow is completely absorbed?

Distribution of Time until Buffers are Depleted*

Inflation and interest rate scenario, sensitivity to reductions in non-essential spending, variable-rate owner-occupiers



* Assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; RBA; Securitisation System

From: JONES, Bradley
Sent: Thursday, 15 September 2022 6:46 PM
To:
Cc: CASSIDY, Natasha
Subject: RE: Box B - Spare cash flow chart [SEC=OFFICIAL]

Thanks . What I take from your description is that both charts provide a lens through which to assess the issue – neither one by itself can fully do it justice.

Brad

From:
Sent: Thursday, 15 September 2022 3:13 PM
To: JONES, Bradley
Cc: CASSIDY, Natasha
Subject: Box B - Spare cash flow chart

Hi Brad,

On your point of whether we should represent changes in spare cash flows (SCF) as a % of income in Box B, we agree that there are some advantages to doing this but there are some other considerations that led us to use the percentage change in SCF.

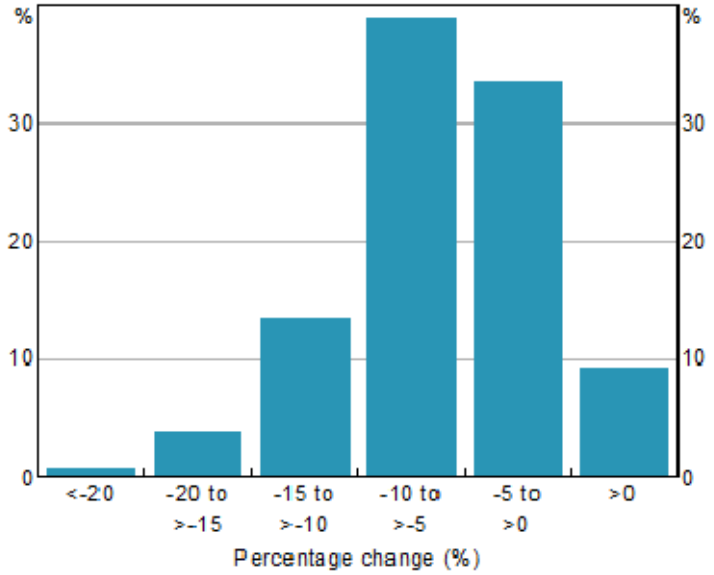
- In the 8.50 chat, presented a version that shows the change in SCF relative to income (G1). Phil raised a point that a 5-10 per cent decline as share of household income seemed to be alarmist. So we shifted to the percentage change in SCF as an alternative option (G2).
- It is true that for households with a small SCF to start with, even a small decline will turn into a large percentage change. But we think this is an important point to capture – that these households with very low financial margins are the vulnerable ones. These households also tend to be low-income borrowers who have fewer margins of adjustment when faced with shocks.
- The % change in SCF has the advantage of directly identifying borrowers who have no choice but to draw down on their buffers (for all borrowers in the <100% category there is no scope to finance the shortfall through reduced non-essential consumption or saving). We have put through some minor drafting changes to the box to draw this out more clearly.

Happy to chat more about this.

G1 **G2**

Change in Cash Flow Relative to Income*

Share of variable-rate owner-occupier loans, June 2022

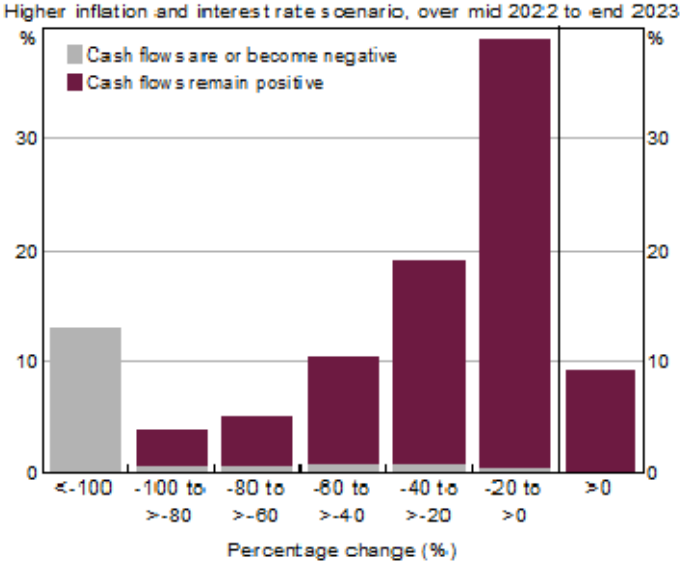


* Assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: RBA; Securitisation System

Change in Spare Cash Flows*

Higher inflation and interest rate scenario, over mid 2022 to end 2023



* Cash flow is estimated as income net of mortgage repayments and living expenses; as a share of variable-rate owner-occupier loans in June 2022; assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: RBA; Securitisation System

Thanks,

Households, Businesses and Credit | Financial Stability
RESERVE BANK OF AUSTRALIA | 65 Martin Place, Sydney NSW 2000
w: www.rba.gov.au

From: JONES, Bradley
Sent: Wednesday, 14 September 2022 11:51 AM
To:
Cc:
Subject: RE: Household resilience materials [SEC=OFFICIAL]

This is very helpful, thanks

From:
Sent: Wednesday, 14 September 2022 11:43 AM
To: JONES, Bradley
Cc:
Subject: Household resilience materials [SEC=OFFICIAL]

Brad

Thanks for your time yesterday. Coming back to you on a few questions we discussed.

Very happy to talk through any of these points in more detail.

Thanks

How well-placed are households to withstand increases in interest rates and inflation?

- The household cash flows box (as well as Chapter 2 of the FSR) captures our most recent analysis and thinking on this question. Prior internal notes are a bit dated now, so if you're keen for more details we are very happy to unpack the FSR analysis further.
- As you mentioned, much of the increase in prepayment buffers has occurred at the upper end of the income distribution (chart 1), though it is also worth noting that households at the upper-end of the income distribution tend to have the most debt (chart 2).

Chart 1

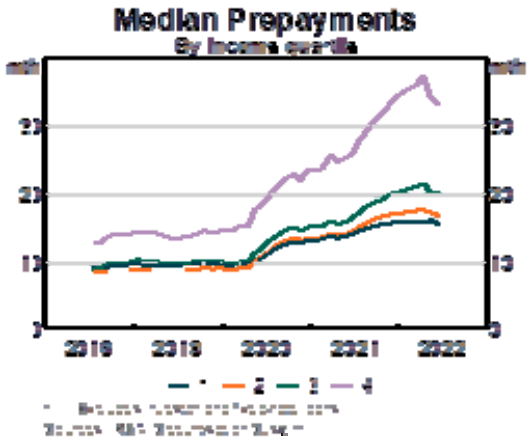
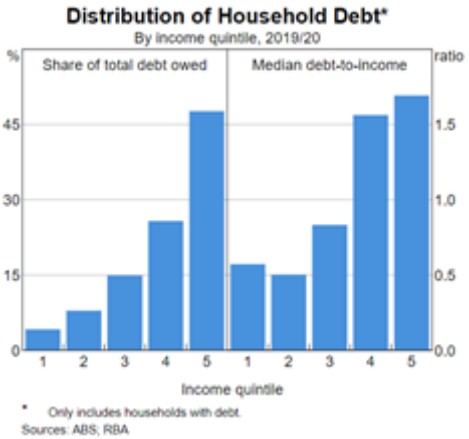


Chart 2



Where might our blind spots be on the analysis on prepayment buffers?

Most of our scenario analysis leverages data from the RBA's securitisation dataset, which has known representativeness issues (is the expert on this and is well-placed to answer further questions):

- Recent loans (which we call out as more likely to be vulnerable) are understated, due to a lag between loan origination and securitisation. Average equity and prepayment buffers are therefore likely overstated.

- Fixed-rate loans are significantly less likely to be securitised. Given an elevated share of recent loans are fixed-rate, this compounds the exclusion of many newer loans in the dataset.
- We are not able to observe the liquid asset holdings of fixed-rate borrowers or investors very well in securitisation data (as they don't tend to use redraws/offsets), which presents a bit of a blind spot.
- Info on borrower characteristics is also fairly limited (e.g. we only have income at origination).
- Securitised loans in general tend to be to more credit-worthy borrowers (lower LVR, arrears rates etc). If you're interested in a comprehensive assessment of the representativeness of securitisation data, see: The Representativeness of Self-securitised Loans (Note).

Household Expenditure Measure (HEM)

- HEM is computed by the Melbourne Institute as the sum of the median expenditure on absolute basics (food, utilities, etc.) and the 25th percentile of discretionary basics (restaurants, recreation, etc.).
- This is computed for each income bucket and family type combination (single or couple households with 0/1/2/3 children).
- HEM is based on the ABS Household Expenditure Survey (HES) which is collected every 6 years, though is updated quarterly in line with CPI.
- In mortgage serviceability assessments, banks typically use the higher of a customer's actual reported expenses or HEM. HEM has historically been used in the majority of banks' assessments, as customers tend to understate their expenses. Post Royal Commission there was a lot more focus by the banks on expense verification, which did lead to a shift towards actual expenses for a time. Anecdotally, this focus has more recently been wound back somewhat again.
- Some criticisms of HEM are that it underestimates actual expenses for households (it excludes categories such as health insurance and school fees, for example). We adjust for these categories in our internal analysis.

From: JONES, Bradley
Sent: Friday, 2 September 2022 6:08 PM
To:
Cc:
Subject: RE: Note FS: ADIs' Housing Loan Characteristics Update - March Quarter and July Monthly [SEC=OFFICIAL]

Thanks and for the note. Over the coming weeks I'd be interested to hear more about some of these Net Income Surplus trends – maybe just arrange with a time to sit down for 15mins to go through some of the charts. Cheers, Brad

---

From:
Sent: Friday, 2 September 2022 2:48 PM
To:
Subject: FCM presentation [SEC=OFFICIAL]

Hi

Great presentation today! I had a few thoughts:

- If we want to think about FS/tail risks, would it be useful to additionally consider more-extreme paths for inflation and the cash rate rather than conditioning on the central forecast? For example, an interesting scenario might be to use an inflation path that is consistent with the 90 per cent confidence interval around the inflation forecast from the SMP and a cash-rate path that is consistent with a 90 per cent confidence interval around the market-implied path based on historical forecast errors (like in this old note). An alternative would be obtain a relatively extreme scenario from stochastic simulation of MARTIN.
- When considering how households will respond to the decline in real disposable income, it may be useful to think about whether the decline in income is expected to be transitory or persistent. Theory would suggest that if households expect the decline to be transitory they would tend to smooth consumption by saving less, whereas if the decline is expected to be persistent they would adjust more at the consumption margin.
- I wasn't exactly sure what to take away from the 'highly vulnerable' share given that its definition is somewhat arbitrary. I guess that it is just one way to try to summarise the results of the exercise in a single number – is that fair? It seems like that would be particularly useful if you wanted to compare results across different scenarios. An interesting exercise would be to see how sensitive that share is to changes in the assumed paths for inflation and the cash rate (particularly as the paths become more extreme).

Cheers,

Economic Research Department
RESERVE BANK OF AUSTRALIA | 65 Martin Place, Sydney
w: www.rba.gov.au

From:
Sent: Friday, 2 September 2022 11:55 AM
To:
Cc: ROSEWALL, Tom
Subject: FW: Presentation slides for Friday Coffee [SEC=OFFICIAL]

Dear

I thoroughly enjoyed your presentation this morning – super helpful scenarios around the impact of cash flow shocks to borrowers!

Regarding your key graph in slides 16-18, my main comment is that community services providers consistently note households will prioritise keeping a roof over their heads at all costs. So I would focus on the RHS of these graphs when thinking about what % of borrowers are likely to default/need to sell their homes. My question stemming from this is 'what impact would 6% of indebted owner-occupiers selling/defaulting have on a) financial stability (FS), and b) house price forecasts and consumption wealth effects (DAT)?'

I would combine the above impact with a 10% fall in discretionary spending for the remaining 95% of indebted households in thinking about the key scenario/implications to take away from your work.

Your analysis also re-iterates the importance of thinking about lags in the impact of changes to interest rates.

I hope this is helpful, and thanks again!

Western Australian Office
RESERVE BANK OF AUSTRALIA | Level 11, 216 St Georges Terrace, Perth WA 6000
w: www.rba.gov.au

From:
Sent: Friday, 2 September 2022 8:30 AM
To: EC - Economic Group
Cc:

Subject: Presentation slides for Friday Coffee [SEC=OFFICIAL]

Good morning everyone

At today's FCM, we have two presentations:

- Sensitivity of indebted households to cash flow shocks - Michelle Wright and Amelia Gao (slides: D22/234392)

See you then☺

Kind regards

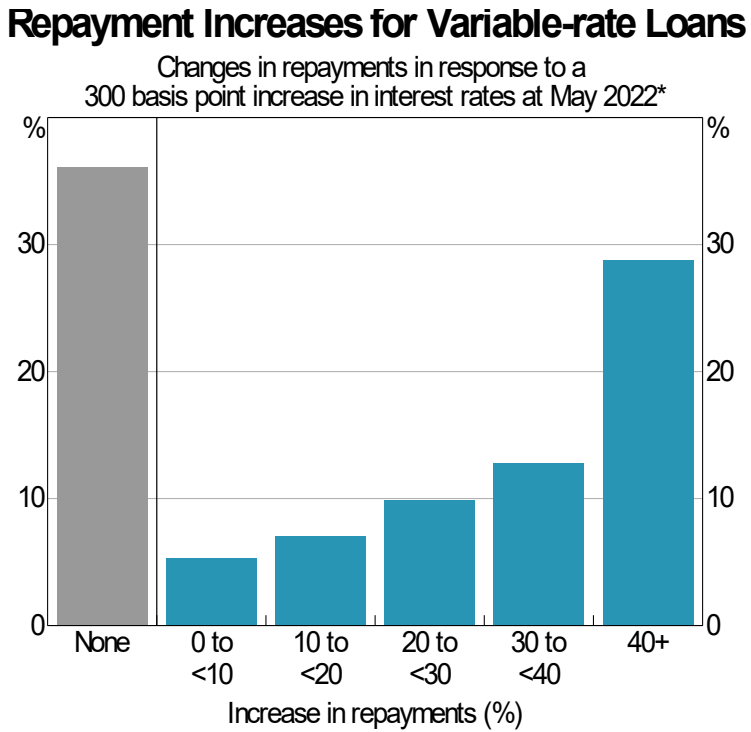
Asian & International Macroeconomics
RESERVE BANK OF AUSTRALIA | 65 Martin Place, Sydney NSW 2000
w: www.rba.gov.au

RESERVE BANK OF AUSTRALIA

Sensitivity of indebted households to cash flow shocks

EC Friday Coffee Meeting
2 September, 2022

Scenario for April FSR:



* Changes between new required repayments and average monthly payments over the past year; share of variable-rate loans (excluding split loans) as at May 2022.

Sources: RBA; Securitisation System

Extended scenario for October FSR:

- Rising interest rates (as per April FSR) and

- Rising inflation (new)

Both shocks affect borrower **spare cash flows**

Extended scenario for October FSR:

When faced with a decline in spare cash flows, households can

- Cut back on discretionary consumption
- Save less, or drawdown on previously accumulated savings
- Or both

Outline

1. Data and sample

2. Method of estimating spare cash flows

3. Scenario assumptions

4. What share of borrowers would be vulnerable if they could adjust to lower cash flows by
   - reducing discretionary spending,
   - reducing their saving or
   - taking a combination of two approaches

Data and sample

- Securitisation Dataset
  - Loan-level data
  - One-third of the total value of housing loans in Australia

- Sample: owner-occupier variable-rate loans
  - Flows into offset and redraw accounts ≈ saving inflows
  - Offset and redraw balances ≈ saving

Cash flow estimates

$$Cash\ flow = income - expenses - repayments$$

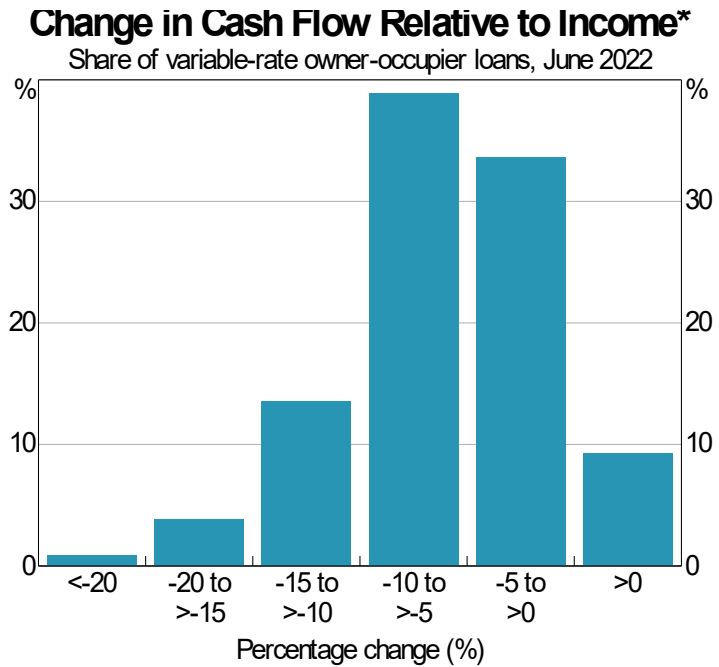
- Income:
  - After-tax income (primary + non-primary borrower income)
- Expenses:
  - Scaled Household Expenditure Measure (HEM)
  - Mapped to Securitisation Dataset based on income bucket and family type
- Repayments:
  - Required repayments using the credit foncier formula

Scenarios

- Interest rates will increase by a further 125bps from their current levels (or a cumulative 300bps from April)

- Inflation: 8%
- Wages growth: 5%
  - Cumulative change from JQ 2022 to DQ 2023 (August SMP)

Effects on spare cash flows



* Assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: RBA; Securitisation System

Adjustments

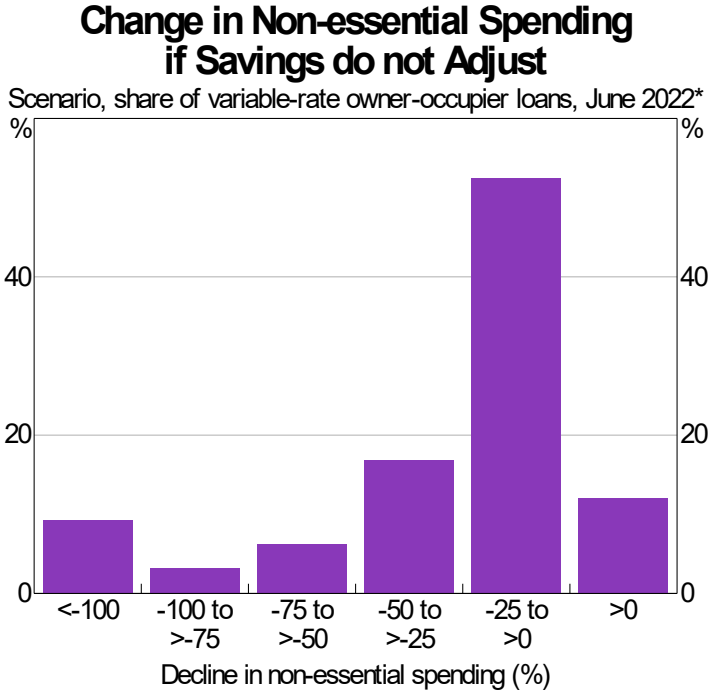
- Adjustment 1: Reduce non-essential spending, but maintain saving rate
- Adjustment 2: Reduce saving, but maintain spending
- Adjustment 3: Both

Adjustment 1: Reduce non-essential spending, but maintain saving inflows

- $Non\text{–}essential\ spending = income - HEM - total\ payments\ including\ to\ offset\ and\ redraw$

- Flows into offset and redraw as a proxy for saving inflows

Adjustment 1: Reduce non-essential spending, but maintain saving inflows



* Holding savings unchanged; assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

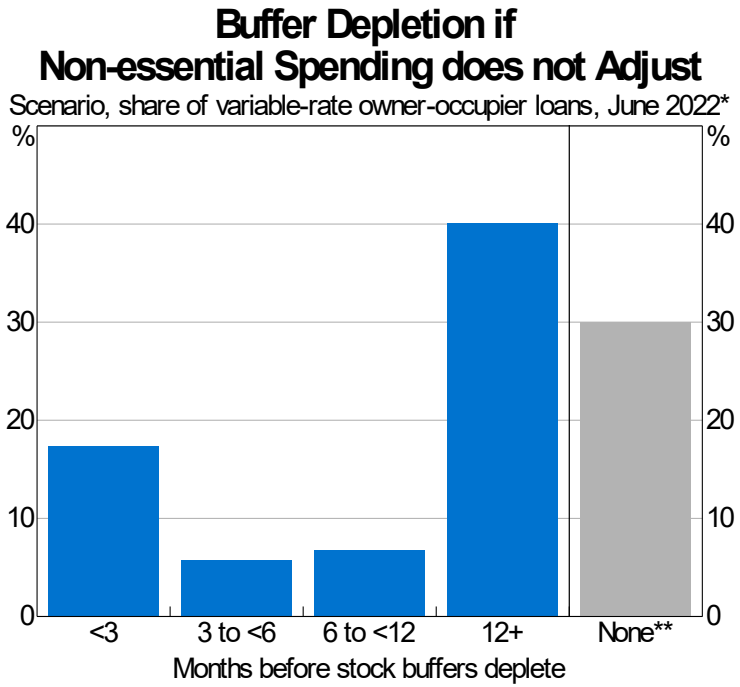
Sources: RBA; Securitisation System

Adjustment 2: Reduce saving, but maintain spending

- If decline in spare cash flows < recent saving level, continue to save but at a slower rate

- Otherwise, start drawing down on accumulated pile of saving (if available)

Adjustment 2: Reduce saving, but maintain spending



* Holding non-essential spending unchanged; assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

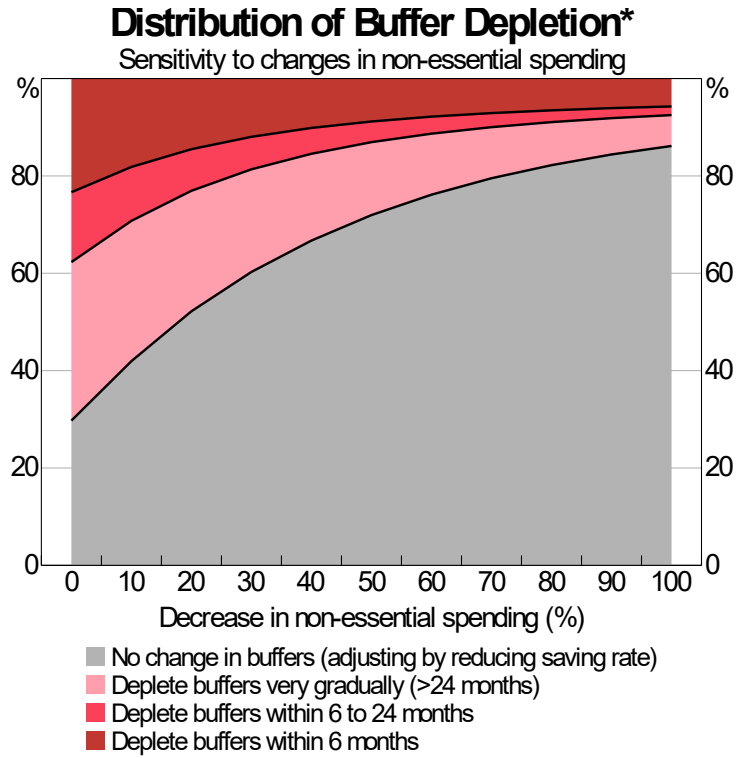
** These borrowers have enough historical excess payments to cover additional costs.

Sources: RBA; Securitisation System

Adjustment 3: Combination of both

- Most vulnerable households
  - Those with little room to cut discretionary spending and low accumulated saving
- Least vulnerable households
  - Those with lots of room to cut discretionary spending and large accumulated saving
- Households in the middle

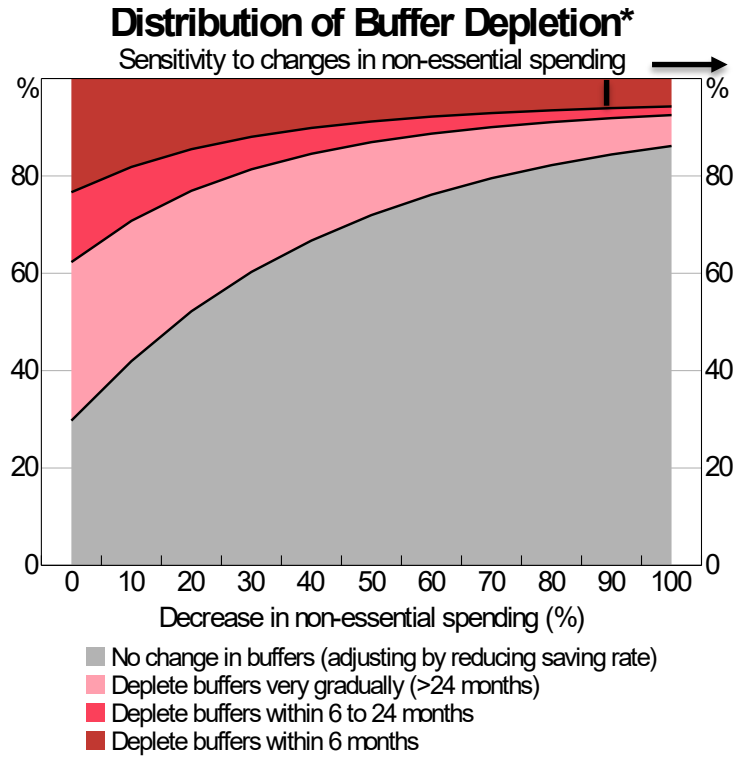
Adjustment 3: Combination of both



* As a share of owner-occupier variable-rate loans in June; assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: RBA; Securitisation System

Adjustment 3: Combination of both



* As a share of owner-occupier variable-rate loans in June; assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: RBA; Securitisation System

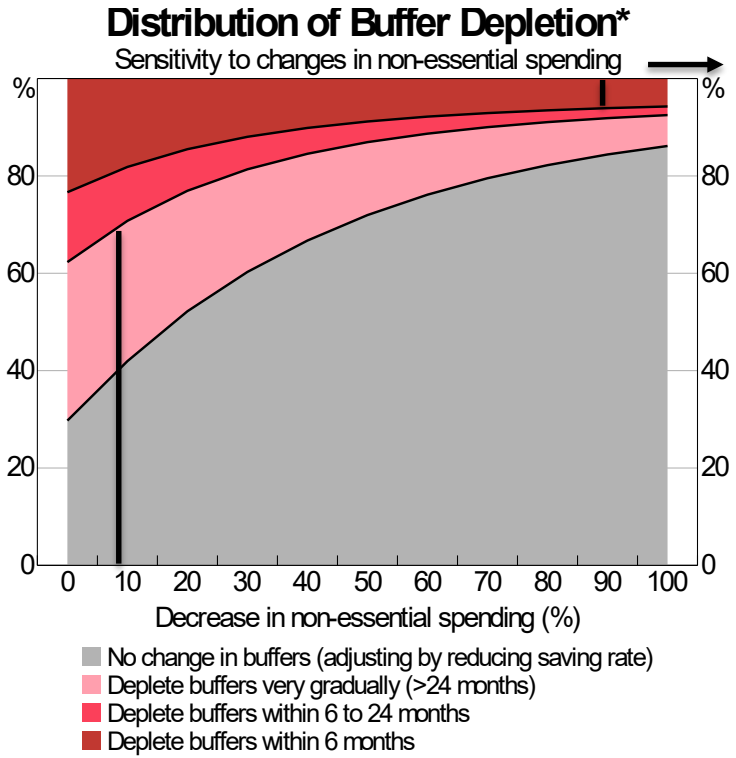
Highly vulnerable (6%)

Fully deplete stock buffer within 6 months, after reducing non-essential spending by 90 per cent

Adjustment 3: Combination of both

Not vulnerable (71%)

Large stock buffer to absorb the shock for at least 2 years, after cutting non-essential spending by 10 per cent



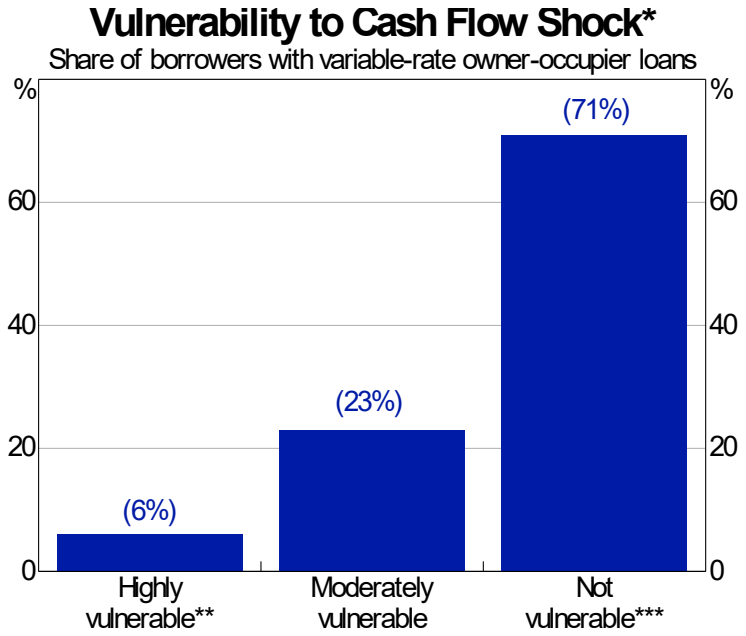
* As a share of owner-occupier variable-rate loans in June; assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: RBA; Securitisation System

Highly vulnerable (6%)

Fully deplete stock buffer within 6 months, after reducing non-essential spending by 90 per cent

Adjustment 3: Combination of both



* Assumes interest rates rise by 300 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

** Fully deplete any prepayment buffer within 6 months, after reducing non-essential spending by 90 per cent.

*** Prepayment buffer large enough to absorb the shock for at least two years, after cutting non-essential spending by 10 per cent.

Sources: RBA; Securitisation System

Conclusion

- Rising interest rates and prices will reduce households' spare cash flows
- Around 5 per cent of households would be highly vulnerable to shocks
- Another three-quarters would be resilient

Spares

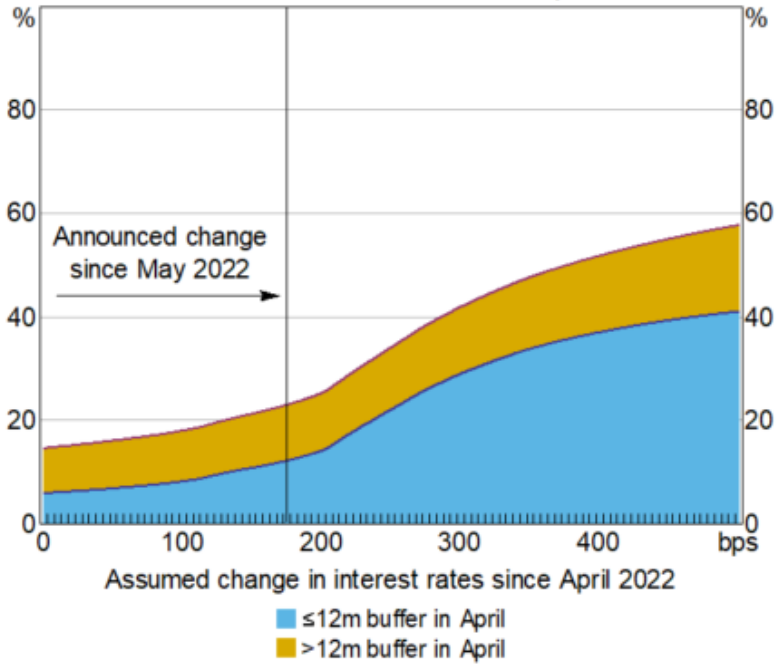
Implications

- Indebted households: 1/3
- Discretionary consumption: ~35%
- Not vulnerable households: 71%

- 71 per cent of 1/3 of households might be expected to reduce 30 per cent of their consumption by up to 10 per cent

Share of Variable Rate Loans with Payment Increases Greater than 20 per cent

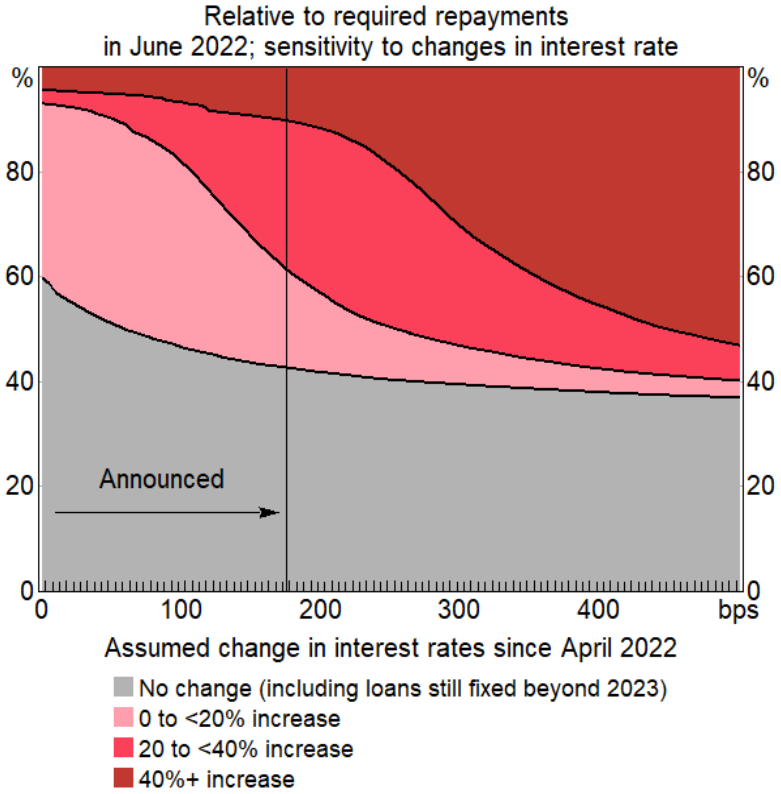
Under different interest rate assumptions



* Difference between new required payments and average monthly payments (including flows to and from offset and redraw facilities) over the year to April 2022; excludes split loans.

Sources: RBA; Securitisation System

Distribution of Required Repayment Increases for Fixed-rate Loans*

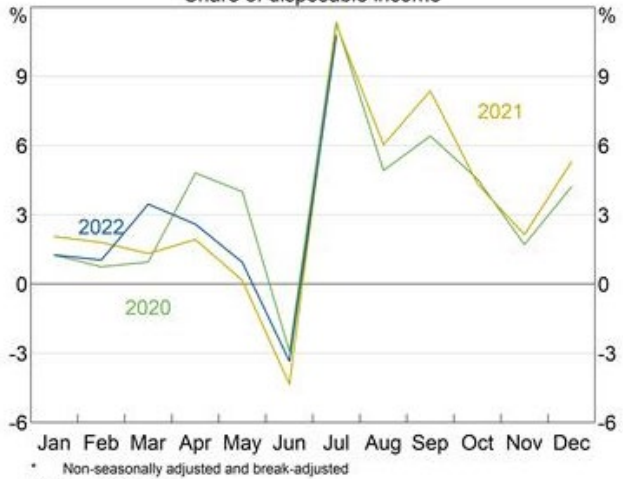


* Fixed rate loans that expire in 2022 and 2023 are assumed to roll onto the average variable rate (which depends on the assumed change in rates); fixed-rate loans that expire beyond 2023 are in the 'None' category; vertical line denotes changes as at Aug 2020 Board meeting

Sources: RBA; Securitisation System

Net Flows into Offset and Redraw Accounts

Share of disposable income

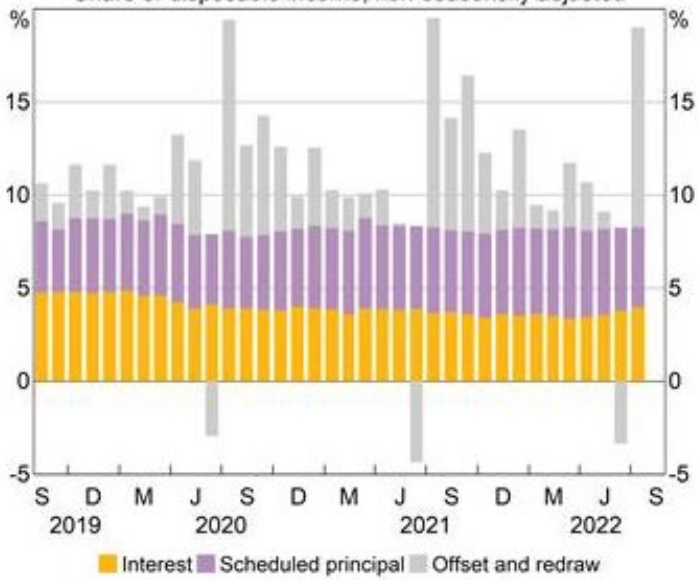


* Non-seasonally adjusted and break-adjusted

Source: APRA; RBA

Housing Loan Payments - Monthly*

Share of disposable income; non-seasonally adjusted

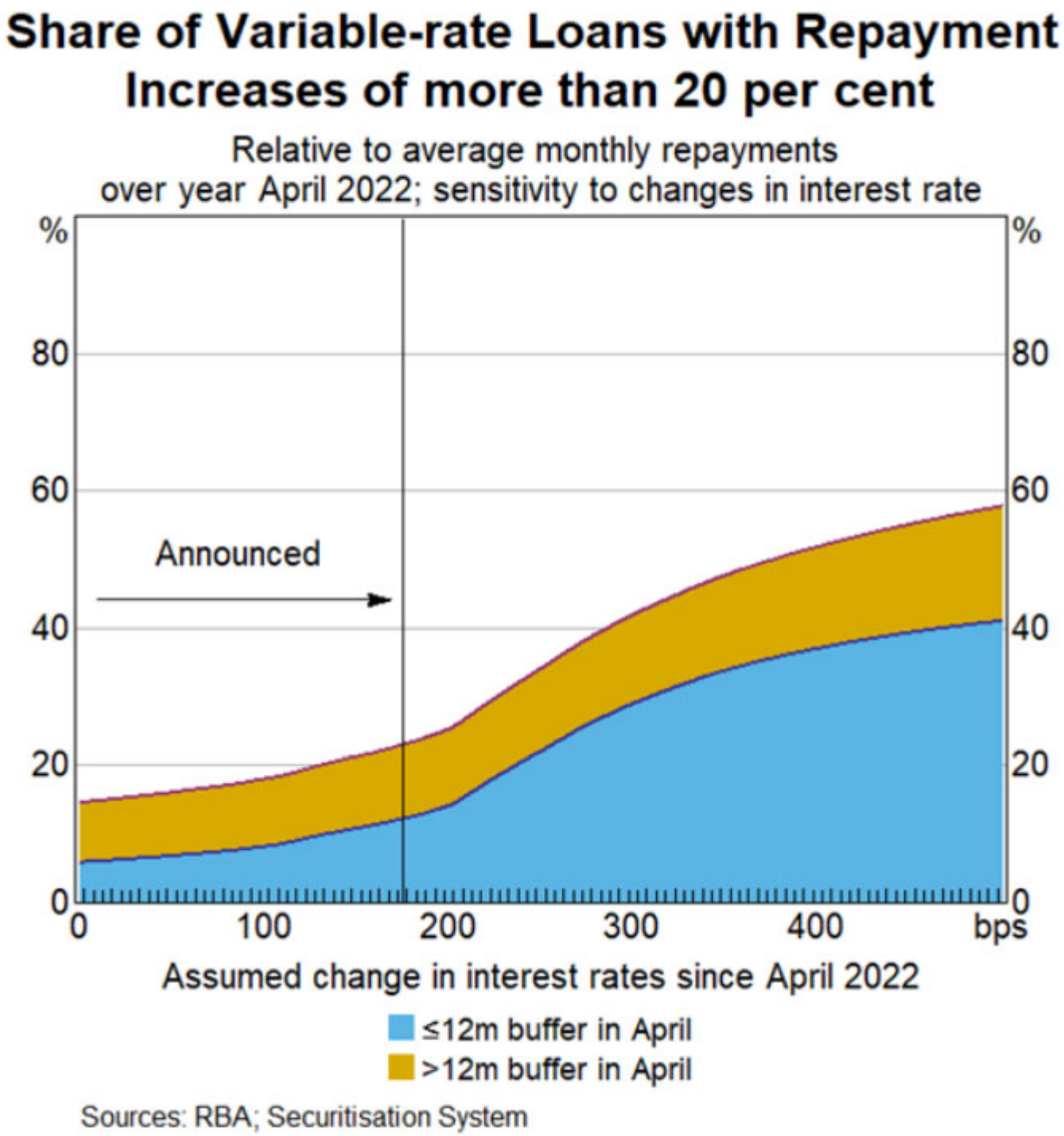


* Break-adjusted.

Sources: ABS; APRA; RBA

From:
Sent: Thursday, 1 September 2022 4:12 PM
To:
Cc:
Subject: RE: Charts for 8:50 [SEC=OFFICIAL]

Not the ideal solution, but I've snipped out the asterisk and footnotes for the first chart:



From:
Sent: Thursday, 1 September 2022 3:48 PM
To:

Cc:
Subject: Charts for 8:50

Hi

I have attached the fixed-rate loans and vulnerability charts (with no footnote). Unfortunately, we couldn't locate graphit files for other two charts (variable-rate and negative equity charts).

All charts in the cash flow slide deck have been updated using scaled HEM throughout the analysis. Feel free to use them as spares.

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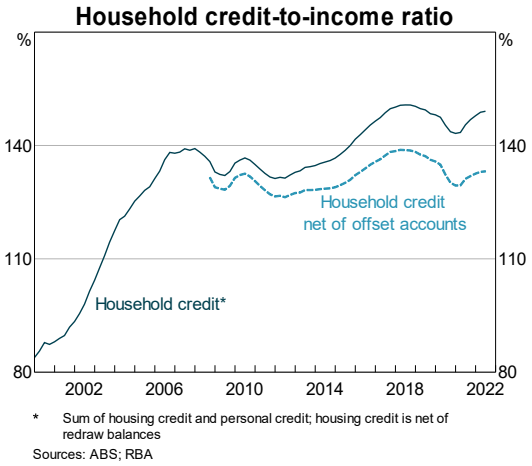
HOUESHOLD FINANCIAL HEALTH – SEPTEMBER 2022

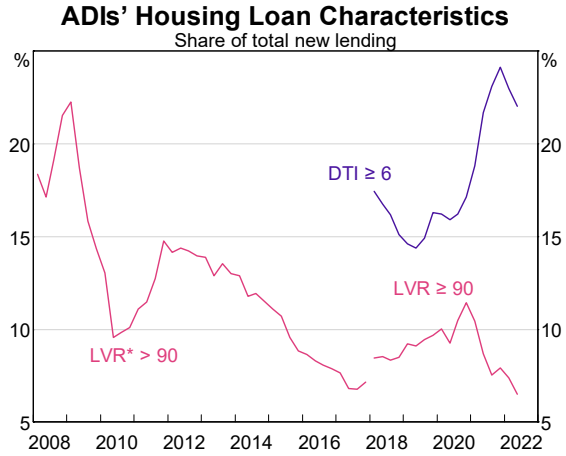
Resilience to income shocks:

- Aggregate household credit to income ~150%; lower when netting out offset accounts.
- Share of *new* lending at DTI≥6 declined from peak in Dec quarter but remains elevated.
    - High DTI lending flows remain concentrated in the 6 <DTI <7 range.



* Sum of housing credit and personal credit; housing credit is net of redraw balances

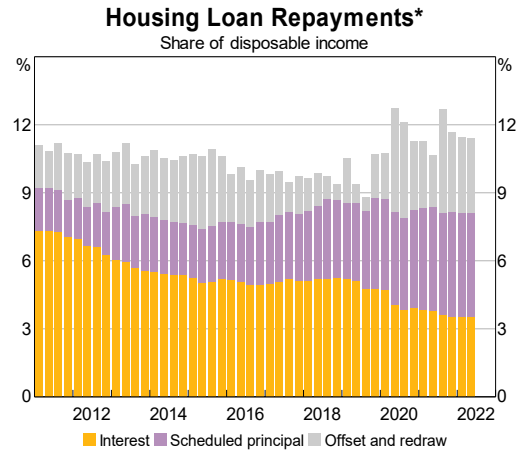
Sources: ABS; RBA



* LVR series breaks at March 2018 due to reporting changes.

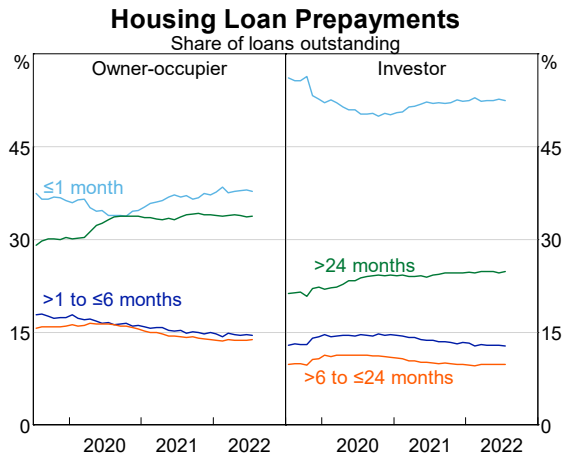
Sources: APRA; RBA

- Flows into offset & redraw accounts ↓ from Sep qtr '21 highs, but remain higher than pre-pandemic.
    - Pace of savings lower now than in 2020/2021 bc more consumption opportunities.
- Share of loans with low mortgage prepayment buffers (<1 month) steady over past 6 months



* Seasonally adjusted and break-adjusted.

Sources: ABS; APRA; RBA



Sources: APRA; RBA

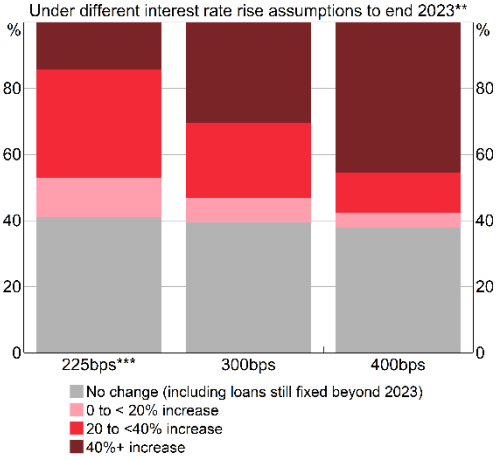
Resilience to interest rate shocks:

- Rate rises to date have been less than APRA's minimum serviceability buffer.
    - Buffers ↑ to a least 300bps over loan rate in Oct 2021 from at least 250bps
- Fixed rate borrowers
    - Most fixed terms expire by end 2023
    - ~30% of borrowers will see repayments rise >40% when roll off fixed term if interest rates rise by a further 75 bps (i.e. 300 bps in total since start of tightening cycle) in line with market path

- Variable rate borrowers
    - 40% will see repayments rise >20% if interest rates rise further 75 bps; but ~35% will face no increase relative to their average monthly payments over the past year.
    - 23% of variable OO loans will have DSR > 30% if rates rise further 75 bps; among these borrowers, ¾ will be in the lower half of the income distribution, while ⅓ will have <1 month buffer.

Distribution of Required Repayment Increases for Fixed-rate Loans*

Under different interest rate rise assumptions to end 2023**



* Fixed rate loans that expire in 2022 and 2023 are assumed to roll onto the average variable rate (which depends on the assumed change in rates); fixed rate loans that expire beyond 2023 are in the 'None' category.

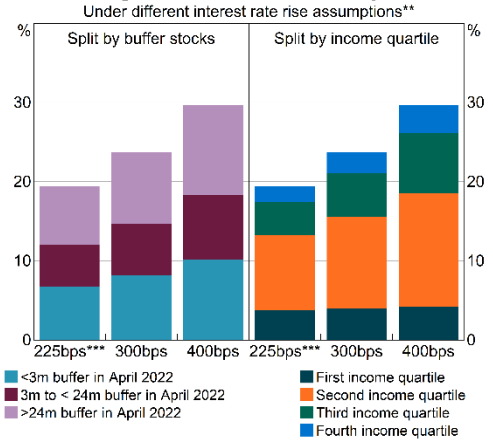
** Relative to the start of the monetary policy tightening cycle.

*** Changes announced as at Sep 2022 Board meeting.

Sources: RBA; Securitisation System

Share of Variable Rate Loans with Loan Servicing Ratio Greater than 30 per cent*

Under different interest rate rise assumptions**



* New minimum loan servicing ratio for a given rise in interest rates; excludes split loans.

** Relative to the start of the monetary policy tightening cycle.

*** Changes announced as at Sep 2022 Board meeting.

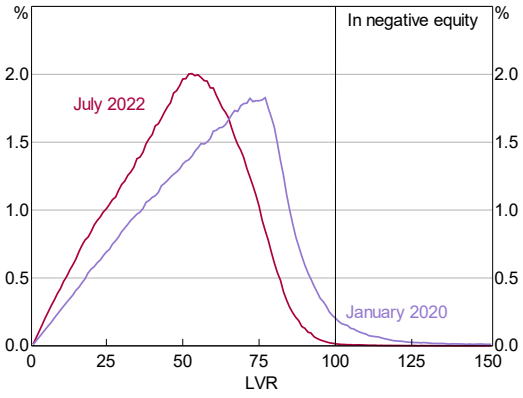
Sources: RBA; Securitisation System

Resilience to housing price shocks:

- Share of HHs with high outstanding LVRs (≥90) remains very low: ~½% in July 2022.
- Share of loan balances in negative equity estimated to be very low < ¼ %. Increases to 0.7% if housing prices ↓ by 10% and 4% with a ↓ by 20%. Recent FHBs would be most affected.

Outstanding LVR Distribution*

Share of balances

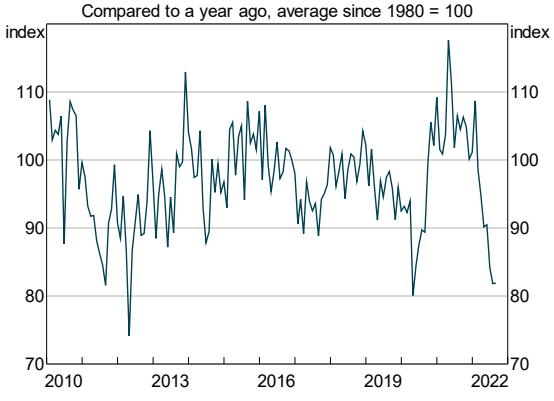


* Loan balances adjusted for redraw and offset account balances; property prices estimated using SA3 price indices

Sources: ABS; CoreLogic; RBA; Securitisation System

Households' Financial Position

Compared to a year ago, average since 1980 = 100



Source: Westpac-Melbourne Institute

Broader measures of stress

- While households well placed to service higher repayments, higher IR/inflation will require HH to ↓ discretionary spending or ↓ savings buffers. Consumer sentiment around pandemic-lows but no signs of stress in other leading indicators yet (closely monitoring).
- Inflation has a disproportionate impact on renters – large share are low income households

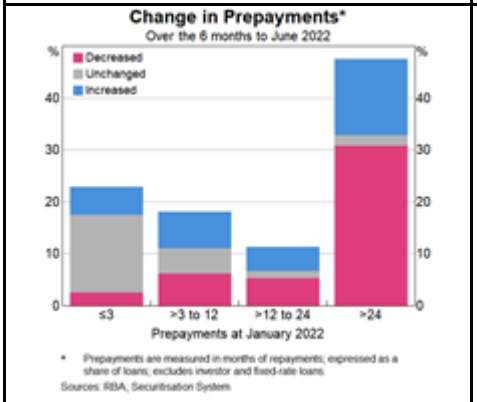
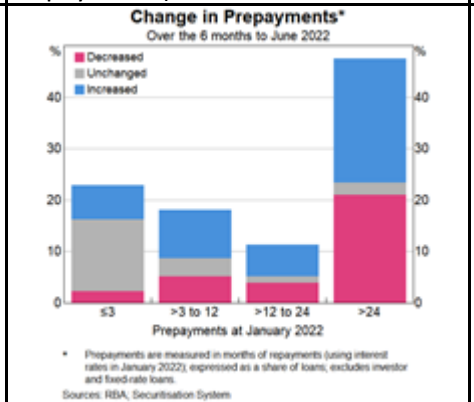
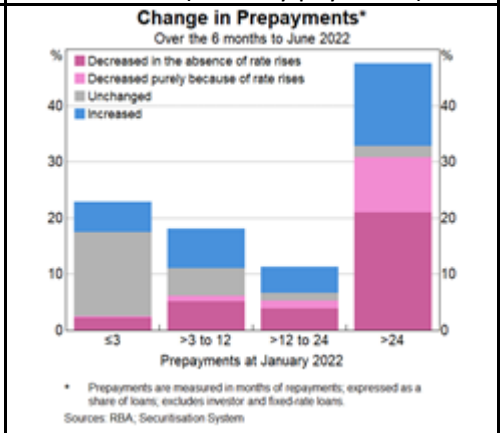
From:
Sent: Wednesday, 17 August 2022 4:18 PM
To:
Subject: Graph iterations [SEC=OFFICIAL]

Hi

A few different iterations of chart 2.4 below. I think the key takeaways will depend on the char that is chosen, but for me the key messages are:

-Flows into prepayment facilities remain high
-Declines in flows have mostly taken place among borrowers which already have very high buffers.
-Borrowers are still accumulating buffers at a faster rate than three years ago
-New loans (the most vulnerable) may have lower stocks of buffers, but they are accumulating buffers at a faster rate.

Sorry that there are so many angles – happy to chat any time.

Change in months of repayments	Change in dollar terms (looking through higher monthly repayments)	Decomposing falling numerator (buffer values) from rising denominator (monthly payments)
		

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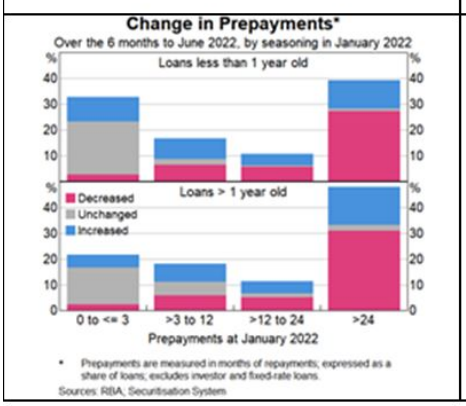
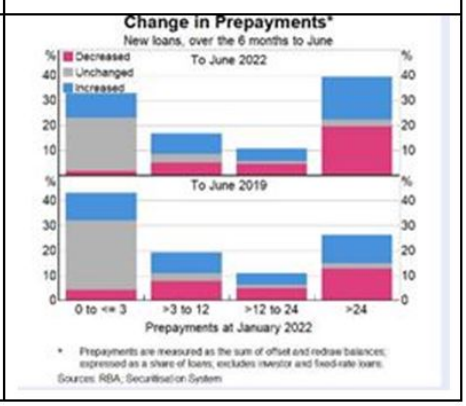
Comparison of buffer changes in new vs old loans	Comparison of <u>new</u> loans now compared to three years ago
	

From:
Sent: Friday, 15 July 2022 1:10 PM
To: BULLOCK, Michele
Cc: CASSIDY, Natasha
Subject: RE: Speech [SEC=OFFICIAL]

Hi Michele,

Thanks for your edits to the scenario analysis section. We don't think the current wording/analysis is overly alarmist. It doesn't suggest that a large proportion of households would encounter financial stress, but rather that they would encounter materially higher repayments. Almost all households would still remain below a DSR of 30, so these large increases would be happening from a very low base relative to incomes. Hopefully all of the earlier material on the resilience of households will impress in the listener that that we are well placed to handle these higher repayments:

1) Most borrowers have been assessed at 300bps or more above loan rates (so their cash flows should remain positive under this scenario);
2) Large stocks of buffers can be drawn down on for the small cohort whose cash flows will turn negative; and
3) Wages growth is likely to expand HH financial margins (even if outpaced by CPI).

The scenario analysis perhaps also provides some balance to these positive opening messages (which imply large IR increases may be needed given high HH resilience). I.e. if repayment increases will be very large, perhaps these large increases in interest rates won't in fact be required.

The other thing to note is that we are also likely to include a similar scenario in the October FSR, so we are keen to ensure that we are presenting a message consistent with this speech to the extent possible.

On comments - we have addressed / are addressing these, and will remove once able to access the doc.

Thanks and very happy to discuss our views further.
HH team

From: BULLOCK, Michele
Sent: Friday, 15 July 2022 9:40 AM
To:
Cc: CASSIDY, Natasha

Subject: RE: Speech [SEC=OFFICIAL]

Hi team,

Here is the latest version. I got a bit worried about the scenario analysis – did it look too alarmist? But I have pared back the material and put some qualifiers in – see what you think. A few questions from Rachel to address as well.

Michele

D22/124780 v
D22/124780 e

From:
Sent: Thursday, 7 July 2022 2:38 PM
To: BULLOCK, Michele
Cc: CASSIDY, Natasha

Subject: Speech

Hi Michele,

Please see an initial draft of the speech: https://portal.rba.gov.au/sites/fs/fshub/HBCText/Initial%20Draft%20-%20ESA%20Business%20Lunch%20-%2019%20July.docx

We have left a few comments in the document on areas where we are particularly keen for feedback. Happy to talk through them in the meeting.

Thanks,

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