

Box B

Scenario Analysis on Indebted Households' Spare Cash Flows and Prepayment Buffers

Scenario analysis can be used to gauge the effects of different paths for interest rates, inflation and unemployment on indebted households over the period ahead. This scenario analysis suggests that the bulk of owner-occupier variable-rate borrowers will be able to continue to service their debts through some combination of lower non-essential spending, lower saving and drawing down on existing savings buffers. This is the case in a scenario where the economy evolves in line with the economic outlook as presented in the February *Statement on Monetary Policy*, as well as in the case of a more substantial increase in unemployment. While a deterioration in labour market conditions would have a material impact on those households that lose work, with many at risk of falling behind on their mortgage payments, this analysis suggests that even in the case of a marked increase in unemployment, there are unlikely to be system-wide financial stability implications.

The scenarios

Our scenario analysis considers owner-occupiers with variable-rate mortgages (making up around two-fifths of outstanding housing credit) using loan-level data from the Bank's Securitisation dataset. These borrowers tend to hold savings in the form of mortgage offset and redraw accounts, both of which are visible in the dataset (unlike other forms of liquid savings).

The analysis examines how these households' *spare cash flows* – that is, their

income available to spend and/or save after meeting loan payments and essential living expenses – would evolve by the end of 2023 and how long their *existing savings buffers* would allow them to meet their loan payment and essential expenses beyond that point under two different scenarios. The scenarios and the underlying assumptions to the analysis are discussed in detail in the Technical Appendix below.

Baseline scenario

In the baseline scenario, the economy evolves over 2023 in line with the economic outlook as presented in the February 2023 *Statement on Monetary Policy*:

- Borrowers' incomes grow by 4¼ per cent over 2023 in line with growth in the Wage Price Index (WPI), and their expenditures increase by 4¾ per cent in line with inflation as measured by the Consumer Price Index (CPI).
- The unemployment rate rises by ¼ percentage point to 3¾ per cent.
- The cash rate is assumed to peak at around 3¾ per cent in line with survey-based forecasts and market pricing at the time of the February *Statement*.

Adverse scenario

The adverse scenario involves a larger increase in the unemployment rate in 2023. This scenario is calibrated from a decline in real GDP in the Bank's MARTIN model:

- The unemployment rate increases by 2 percentage points to 5½ per cent by December 2023. While not historically considered to be a high unemployment rate, this is calibrated to be a large shock over a short space of time, at just above the 90 per cent confidence interval around the baseline unemployment rate forecast.
- The underemployment rate rises by 2 percentage points to 8 per cent – that is, an equal share of workers to those who become unemployed manage to retain their jobs but have their hours reduced.
- WPI growth and CPI inflation are more moderate than in the baseline scenario due to weaker labour market conditions, at 3½ per cent and 3¾ per cent in year-ended terms, respectively, by December 2023.
- The cash rate assumption is unchanged from the baseline scenario. As is standard in sensitivity analysis, to assess how well borrowers could cope with a large shock we assume the cash rate does not decline as it might be expected to in such a downturn (see discussion below).

Households are assigned different probabilities of experiencing job loss (and in the case of the adverse scenario, hour losses) based on their income and whether they have a mortgage. Mortgagors and higher income earners (indebted or not) have historically been 40 per cent and 60 per cent less likely than non-mortgagors and low-income earners, respectively, to lose work in a downturn.

Most indebted households are expected to maintain positive spare cash flows in both scenarios ...

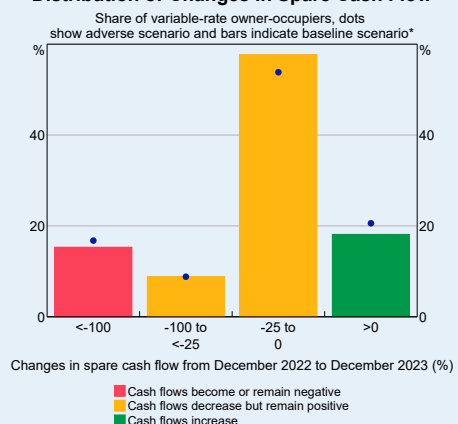
In **both scenarios**, most borrowers would see their spare cash flows decline but remain positive at the end of 2023, with some households also seeing their spare cash flows increase (Graph B.1).^[1]

In the **baseline scenario**, the share of borrowers with negative spare cash flow – that is, those whose scheduled mortgage payments and essential living expenses are projected to exceed their household disposable income – would reach around 15 per cent by the end of 2023, with many of these borrowers already projected to be in this position under the assumptions used in this model.

In the **adverse scenario**, the share of borrowers experiencing negative spare cash flows by December 2023 would increase slightly to 17 per cent.

Graph B.1

Distribution of Changes in Spare Cash Flow



* Baseline scenario assumes wages, inflation and unemployment evolve in line with February 2023 SMP forecasts. Adverse scenario assumes the unemployment rate and underemployment rate increase by 2 percentage points from December levels and wages and inflation moderate. Both scenarios assume the cash rate is held at around 3½ per cent.

Sources: ABS; HILDA Survey Release 21.0; Melbourne Institute; RBA; Securitisation System

... and while most have sufficient buffers, some would be at serious risk of financial stress

Borrowers with negative spare cash flow will need to draw down on their accumulated savings to finance their essential debt and living expenses, or they will need to make other adjustments, which could include increasing hours worked, cutting discretionary spending or substituting essential spending towards cheaper goods and services.

In the **baseline scenario**, assuming that households are unable to make adjustments to their working hours or essential spending, the analysis suggests that:

- around 14 per cent of borrowers would deplete their savings buffers by mid-2024 if they chose not to reduce their non-essential spending (Graph B.2)
- around 9 per cent of borrowers would still be at risk of depleting their savings over the same period, even if they reduced their non-essential spending by relatively extreme amounts (i.e. by 40–80 per cent).

In the **adverse scenario**, these shares are only slightly higher, with around 10 per cent of households depleting their buffers within six months even if they reduced their non-essential spending by 40–80 per cent. This increase is less than proportionate with the increase in unemployment because around half of households have sufficient buffers to weather even an extended period of unemployment (see below).

The risk of negative spare cash flows and insufficient buffers is unevenly distributed. As lower income borrowers tend to have lower spare cash flows and hold lower savings, they are generally more at risk of seeing their

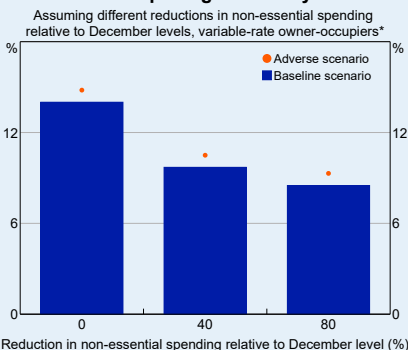
expenses exceed their income and their savings buffers being insufficient to weather periods of stress. First home buyers and borrowers with high debt relative to their income are also more at risk of having insufficient buffers if their spare cash flow becomes negative.

For most indebted households that lose work, spare cash flows become deeply negative, and many are at risk of depleting their buffers ...

Around two-fifths of households that experience job loss in either scenario would see their incomes fall by at least 40 per cent, while one-third of those that experience a loss of hours would record an income fall of at least 20 per cent by the end of 2023. The size of income shocks across households largely depends on the number of income earners per household, with single-income households (making up around two-fifths of all borrower households) accounting for two-thirds of households that see a fall in income of 40 per cent or more.

Graph B.2

Households Depleting Buffers by Mid-2024



* Baseline scenario assumes wages, inflation and unemployment evolve in line with February 2023 SMP forecasts. Adverse scenario assumes the unemployment rate and underemployment rate increase by 2 percentage points from December 2022 levels and wages and inflation moderate. Both scenarios assume the cash rate is held at around 3½ per cent.

Sources: ABS; HILDA Survey Release 21.0; Melbourne Institute; RBA; Securitisation System

Given the large declines in incomes, most indebted households that experience job loss or reduced hours would end up with negative spare cash flows (Graph B.3):

- More than 80 per cent of households that experience job loss would have negative spare cash flows.
- Around half of households that lose a share of their hours would have negative spare cash flows.
- The rest of the households affected by job loss or reduced hours would retain positive (but generally declining) spare cash flows. Many of these are dual-income households that experience job or hour loss of a second-income earner (whose income makes up a small share of total household income) or that have low scheduled mortgage payments and expenses relative to their incomes.

With spare cash flows becoming deeply negative for most of these mortgagors, their ability to weather an extended period of unemployment depends in large part on the size of their existing prepayment buffers. The analysis suggests that around half of

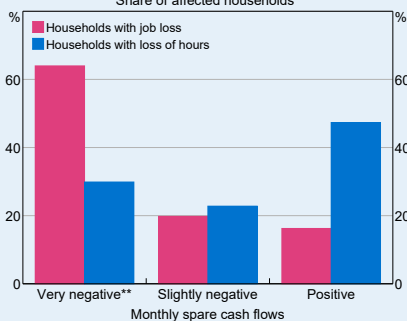
mortgagor households that experience job loss would have sufficient buffers to sustain their essential spending and minimum mortgage payments for *more* than six months if they were to maintain their current levels of non-essential spending (Graph B.4). If affected households were to cut their non-essential spending by 80 per cent, this share would increase to around 60 per cent. However, the remaining 40 per cent of indebted households experiencing job loss would be at risk of depleting their buffers within six months, even with substantial reductions in non-essential spending, unless they were able to find a new job quickly. For households experiencing loss in working hours, the share of borrowers who are at high risk of depleting their buffers within six months (after sharply cutting back on any non-essential expenditure) is smaller, at nearly 30 per cent.

... but the broader financial stability implications are likely to be limited

It is possible that the extent of financial stress could be larger than estimated in these scenarios. In the adverse scenario, for

Graph B.3

Distribution of Household Spare Cash Flow
Share of affected households*



* Only shows households for which at least one member experiences either shock; other members of households will see income continue to grow in line with the scenario's overall income growth assumption.

** Negative cash flow exceeding \$1,000 per month.

Sources: ABS; HILDA Survey Release 21.0; Melbourne Institute; RBA; Securitisation System

Graph B.4

Unemployed Households Depleting Buffers by Mid-2024
Share of households experiencing unemployment*



* Assumes different reductions in non-essential spending relative to December 2022 levels.

Sources: ABS; HILDA Survey Release 21.0; Melbourne Institute; RBA; Securitisation System

example, the increase in unemployment could lead to a larger-than-usual decline in wages growth than captured by the Bank's MARTIN model. Furthermore, the analysis only considers households' buffers until mid-2024; a prolonged period of high interest rates, inflation or unemployment beyond that horizon would result in more households eventually exhausting their savings buffers.

However, there are also several factors not accounted for in the scenarios that could work in the other direction, suggesting the increase in at-risk borrowers could be lower than presented above:

- *The adverse scenario does not allow for any monetary (or fiscal) policy response to the adverse economic conditions.* If the cash rate was to be lower than assumed in the scenario, it would reduce borrowers' minimum required mortgage payments. While this is unlikely to materially change the circumstances of many households that lose a job or have hours reduced given the large decline in income, it will ease financial pressures across households more broadly.
- *Even though the chances of finding new or additional employment may be reduced during severe downturns, not all individuals will remain unemployed or underemployed for long.* Households where a secondary (or other) income earner does not work full-time may be able to increase their labour supply and compensate for the fall in income from a primary income earner who has lost their job or hours.
- *The estimates make conservative assumptions about borrowers' incomes, expenditures and savings and are likely a lower bound of their available spare cash flows and an upper bound of how quickly*

households would deplete their buffers. For instance, all borrowers' incomes are assumed to grow in line with growth in the WPI from loan origination; however, broader measures of income tend to grow at a faster pace than WPI when the labour market is strong. Essential living expenses also capture a small share of discretionary expenditure.

- *The scenarios incorporate households' savings buffers as at the end of 2022, but many households have continued to add to their prepayment balances since the start of 2023.* If households that maintain positive cash flows over 2023 continue to save, their buffers will be higher than assumed under the scenarios. Additionally, the scenarios do not allow for savings outside of those held as prepayment buffers to be used to absorb shocks – if other sources of liquid savings or wealth can be drawn on, this would increase the resilience of borrowers to the loss of hours or employment.
- *The response of lenders could help to ease financial stress in the event of losing work.* For example, borrowers affected by income losses would qualify for hardship arrangements from their lenders. This could include temporary mortgage holidays, switching temporarily to interest-only mortgage arrangements or extending the loan term.

However, even with policy responding and hardship arrangements in place, some borrowers will not feasibly be able to service their loan. In this case, provided their property can be sold for more than their loan amount (i.e. they are not in negative equity), these borrowers could sell their property and pay back their loan without going into default. The share of borrowers in negative

equity remains extremely low due to strong housing price growth and generally sound lending standards over recent years. This allows the homeowner to sell the property without loss and limits the extent of defaults that would lead to bank losses. Indeed, previous stress-testing exercises for the Australian banking system indicate that there are unlikely to be system-wide financial stability implications from a much larger deterioration in the labour market than considered in the adverse scenario here, given banks' strong capital positions and lending standards.^[2]

Technical Appendix

This Technical Appendix outlines the methodology and assumptions underpinning the scenario analysis above. The scenario analysis is designed to be illustrative due to the many assumptions that underpin the methodology. It draws on loan-level data from the Bank's Securitisation dataset as of December 2022 for approximately 1.5 million owner-occupier variable-rate loan facilities, covering around one-third of this segment of the Australian mortgage market by value.

Modelling borrowers' spare cash flows and buffers

The aim of the scenario analysis is to assess the ability of borrowers to service their loans and meet their essential consumption needs under different assumptions for mortgage payments, growth in income and inflation. This is captured by modelling spare cash flows (SCF), defined as:

$$SCF = \text{disposable income} - \text{scheduled mortgage payments} - \text{essential spending}$$

Borrowers with positive SCF can choose what share of their SCF to devote to non-essential

spending and what share to save. Higher interest rates, inflation and adverse income shocks (such as unemployment) all cause SCFs to fall:

- **Borrowers whose SCF declines but remains positive** will need to adjust through some combination of reducing their non-essential spending, reducing how much they save and drawing down on their prepayment buffers.
- **Borrowers whose SCF becomes negative** can no longer save and *must* draw down on their prepayment buffers (assuming they cannot adjust scheduled mortgage payments and/or essential spending, see discussion below). These borrowers will not necessarily have to reduce their non-essential spending, provided they have sufficient stocks of prepayment buffers and are willing to reduce these buffers more quickly than otherwise.

The scenarios

Two scenarios are considered: a baseline scenario; and an adverse scenario.

Baseline scenario

In the baseline scenario, the economy evolves over 2023 in line with the central forecast from the February 2023 *Statement on Monetary Policy*. In this scenario, it is assumed that:

- Borrowers' gross incomes grow by 4¼ per cent, in line with the forecast for the WPI from the December quarter of 2022 to the December quarter of 2023.
- Borrowers' expenditures (in the absence of any reduction in quantities consumed) are assumed to increase by 4¾ per cent, in line with the forecast for CPI inflation

from the December quarter of 2022 to the December quarter of 2023.

- The cash rate peaks at around 3¾ per cent in line with expectations derived from surveys of professional economists and financial market pricing at the time of the February *Statement*. Rate rises are assumed to be fully passed through to variable-rate loan payments. Borrowers' scheduled mortgage payments are adjusted for higher mortgage rates using the credit foncier model.^[3]
- The unemployment rate rises to 3¾ per cent by the end of 2024.

Adverse scenario

The adverse scenario assumes a very sharp drop in aggregate demand, leading to a larger-than-expected increase in unemployment. Informed by the Bank's MARTIN model, the scenario assumes that:^[4]

- The unemployment rate increases by 2 percentage points from its December 2022 level to 5½ per cent. This is a slightly larger increase than the 90 per cent confidence interval around the baseline forecast. All individuals who lose their job see their after-tax income fall to the level of unemployment benefits.
- The underemployment rate also increases by 2 percentage points.^[5] Informed by historical experience (as observed in the Melbourne Institute's Household, Income and Labour Dynamics in Australia (HILDA) Survey), 35 per cent of individuals who experience a decline in working hours are assumed to lose 10 per cent of their hours (and hence pre-tax income), while 40 per cent of individuals lose 35 per cent of their

hours and the remaining 25 per cent lose 70 per cent of their hours.^[6] These individuals are assumed to also experience a nominal wage freeze.^[7]

- The weaker labour market weighs on wages growth and inflation. Wages growth is ¾ of a percentage point below the February 2023 *Statement* baseline forecast over 2023 and CPI inflation is 1 percentage point below the baseline forecast over the same period.
- The path of interest rates is unchanged from the baseline scenario; this allows us to gauge the magnitude of the effects of the downturn in the absence of any policy response.

The assumptions for wages growth, inflation and changes in interest rates affect all borrowers. By contrast, job loss or reduced working hours affect only some individuals and not all individuals are equally at risk of losing their job or working hours during economic downturns. In general, mortgagors are less likely to lose work than non-mortgagors, and lower income workers are more likely to lose work than those on higher incomes. Therefore, each borrower in the data is assigned a probability of becoming unemployed or underemployed depending on these characteristics. To inform these probabilities, a logit model of the probability of job (or hours) loss as a function of worker characteristics is estimated using data from the HILDA Survey (Table B.1).

Informed by these regression results, it is assumed that borrowers in the lowest income quintile are twice as likely to become unemployed as those in the top three income quintiles, and borrowers in the second income quintile are 1½ times more likely to lose their job than those in the top three income quintiles. A broadly similar

Table B1: Unemployment Model Estimates

Probability of becoming unemployed

Odds ratios	
Income quintile 1	2.18***
Income quintile 2	1.39***
Income quintile 3	1.07
Income quintile 4	0.83*
Income quintile 5	Excluded category
Mortgagor	0.62***
Individual-level fixed effects	No
N	176,935

(a) Note: ***, * denote statistically significant at the 1 and 10 per cent levels, respectively.

Sources: HILDA Survey Wave 21; RBA

pattern is observed and therefore assumed for losses in working hours. Further, indebted mortgagors are estimated to be around 40 per cent less likely to experience job loss than renters or outright owners (independent of their level of income). Job and working hour losses are assigned to individual income-earners in the loan-level data using a Monte Carlo simulation with 1,000 draws accounting for their individual probability of becoming unemployed or underemployed. The graphs in Box B show average outcomes over all 1,000 draws.

Additional assumptions and data limitations

The Securitisation dataset reports data for individual loan facilities, not households.

For simplicity, it is assumed that each facility belongs to a different household unless different loans can be uniquely assigned to one household.^[8] As some mortgagors have multiple loan facilities, including on investment properties, they may have larger assets (and larger debts) than captured in this exercise. While they are more exposed to higher mortgage rates and could see their

SCFs become more deeply negative, these mortgagors may therefore also have more scope to service the loan on their owner-occupier property – for instance, by selling any investment properties.

Income (pre-tax) is reported in the Securitisation data only at loan

origination. Borrowers' incomes are grown forward from the point of origination until December 2022 in line with observed WPI growth.^[9] After-tax income is calculated using individual income tax rate brackets for the 2022/23 financial year. The sum of primary and non-primary borrowers' after-tax incomes is used as a proxy for household disposable income. These assumptions have the following bearings on the estimates:

- WPI growth is a conservative measure of income growth. Household disposable income when measured by compensation of employees or average earnings from the National Accounts tends to outpace WPI growth when the labour market is strong.
- The income estimate will be less accurate for older loans as individual borrowers

experience different income growth paths not captured by the WPI, idiosyncratic shocks and changes to their living arrangements over time. Older loans are, however, on average less risky as these borrowers have demonstrated repayment ability and have had more time to build buffers and equity in their home.

- It is known that some borrowers under-report their income when applying for loans, in particular by omitting more complex income sources (such as investment income) if this is not needed for the loan to be approved. This is arguably more likely for borrowers with higher incomes. As a result, these borrowers will likely have larger spare cash flows and so would tend to face less financial stress than estimated.

Living expenses cannot be directly observed from the Securitisation data.

Essential living expenses are proxied by the Melbourne Institute's Household Expenditure Measure (HEM), which 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). Living expenses are assumed to rise in line with actual and expected CPI and are mapped to each loan facility using borrower incomes and the number of debtors. Further assumptions include:

- When estimating expenses, loans with only one debtor are assumed to be single households with zero dependants and loans with multiple debtors are taken to

be couple households with two dependants. 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.

- A relatively broad measure of essential consumption is used to factor in some other expenses that are excluded from the HEM (mainly private health insurance and school fees). To do this, the HEM benchmark is scaled up using scaling factors derived from the Household Expenditure Survey (HES).^[10] The adjustment suggests that households may have additional scope to cut back their 'essential' spending if necessary.

Saving flows (a component of SCF) can be estimated by assuming that all saving for owner-occupiers with variable-rate loans is in the form of mortgage prepayments and then observing the month-on-month change in prepayments for a given loan.

Under this approach, non-essential spending can therefore be computed as the residual from the household budget constraint.

Saving flows are, however, highly seasonal and volatile. To remove seasonality and volatility in savings, the data is cleaned as follows:

- For each loan, the average saving share (i.e. the share of SCF dedicated to saving) over the past 12 months or, if the loan was securitised within the past 12 months, over its history is computed. The remainder is the share of SCF dedicated to non-essential spending.
- For December 2022, the distribution of the saving shares is constructed for each

Table B2: Share of Spare Cash Flow Dedicated to Saving

Interquartile for each group

Originated since March 2020	LTI ratio greater than 4	SCF as a share of income greater than 50 per cent	25th percentile	75th percentile
Yes	No	No	0.09	0.55
Yes	No	Yes	0.04	0.38
Yes	Yes	No	0.12	0.57
Yes	Yes	Yes	0.05	0.12
No	No	No	0.10	0.54
No	No	Yes	0.03	0.29
No	Yes	No	0.14	0.62
No	Yes	Yes	0.04	0.39

Sources: RBA; Securitisation System

combination of the following binary classifiers (eight combinations in total):

- loan originated since March 2020
- LTI ratio greater than 4
- SCF as a share of income greater than 50 per cent.
- The interquartile range of the share of spare cash flow devoted to saving is calculated for each of those combinations. Loans with saving shares above (below) the interquartile range are assigned the 75th (25th) percentile of the saving share (Table B.2).^[11]

Households with negative SCFs are assumed to no longer save and reduce their non-essential spending (to different extents shown in the graphs in Box B).

Households with smaller but positive SCFs in December 2023 than in December 2022 are assumed to first reduce their saving inflows to maintain their non-essential spending to the largest extent possible. If their SCF is no longer sufficient to maintain their December 2022 non-essential spending levels even after

ceasing to save, they are assumed to reduce their non-essential spending at the same rate as households with negative SCFs.

Households' prepayment buffers are observed in December 2022 and are assumed to remain unchanged over 2023.

This is for simplicity as the evolution of SCFs over each month in 2023 is not modelled. As borrowers with high SCFs over 2023 are more likely to build buffers than those with low SCFs, it will understate the amount of buffers for the former and overstate them for the latter. Borrowers with negative SCFs over 2023 will likely start with smaller buffers than assumed.

Households are assumed to have no other liquid financial assets to draw down. This will generally understate the amount of buffers available to households.

It is assumed that borrowers cannot adjust their essential spending or scheduled mortgage payments, and that any unemployment shocks are persistent.

These assumptions are likely unrealistic in

practice with households – at least in the medium term – usually able to reduce their essential spending somewhat (e.g. by substituting towards less expensive items or delaying some purchases) and possibly regaining employment or additional hours. In the short term, lenders also face incentives to

work with borrowers to avoid default on loans, and could provide short-term mortgage payment relief in some circumstances. ↘

Endnotes

- [1] Households spare cash flow can increase if their income growth exceeds increases in essential expenditures and scheduled mortgage payments. Most households that experience increases in spare cash flows have high incomes and spend a lower share of their income on essential expenditures and scheduled mortgage payments. The share of households with increasing spare cash flows is larger in the adverse scenario as real income growth is marginally stronger than in the baseline scenario.
- [2] See RBA (2022), 'Box D: Stress Testing and Australian Bank Resilience', *Financial Stability Review*, October.
- [3] A credit-foncier loan requires a constant annual payment (M) over the life of the loan, which is calculated as $M = \frac{Vr}{1 - (1+r)^{-N}}$ where V is the loan balance at origination, r is the (annual) nominal interest rate and N is the number of years remaining in the term of the loan. See La Cava G, H Hughson and G Kaplan (2016), 'The Household Cash Flow Channel of Monetary Policy', RBA Research Discussion Paper No 2016-12.
- [4] The scenario is calibrated by imposing a 4¾ per cent fall in real GDP in the March quarter of 2023, which is sustained over three quarters relative to the baseline, based on a 3¾ per cent fall in consumption, and around 20 per cent declines in business, dwelling and government investment. The declines in these GDP components are in line with or slightly bigger than most declines since 1990, but the shock to real GDP is historically large due to the joint occurrence of the declines in the subcomponents.
- [5] This is broadly in line with the historical co-movement between the two series. It is assumed that all the adjustment in unemployment and underemployment rates comes through job and hour losses rather than changes to labour supply (i.e. changes in the participation rate or population growth) or the job finding rate.
- [6] This is a rough approximation of the distribution of involuntary, annual falls in working hours at the individual worker level between 2001 and 2021.
- [7] It is assumed that individuals who experience a reduction in working hours would retain their job rather than moving into unemployment even if their reduced income falls below unemployment benefits.
- [8] Borrower IDs are available in the data, but these are not always unique. If borrowers have loans with the same lender, these loans can be identified and grouped, but this is generally not possible for borrowers who hold loans with multiple lenders.
- [9] The choice to use WPI rather than a broader measure of household income growth to grow income forward 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 compared with 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 during strong labour market conditions.
- [10] To derive scaling factors, expenses in the HES are classified as best as possible into 'absolute' and 'discretionary basic' expenses. Using these

updated categories, the median absolute basic spending plus the 25th percentile of discretionary basic expenditures is calculated for households within each income quintile. Each household's HEM estimate is then multiplied by the ratio between this new calculated spending measure

and the HEM across households in the respective income quintile.

- [11] The results in Box B are robust to removing outliers or assigning the median saving share to those outliers.