

Bulletin

JANUARY 2024



RESERVE BANK OF AUSTRALIA

Bulletin

JANUARY 2024

Contents

1. Understanding the Post-pandemic Demand for Australia's Banknotes	1
2. Developments in Income and Consumption Across Household Groups	11
3. Inflation Expectations and Economic Literacy	19
4. What Do Firms Tell Us About the Inflation Outlook?	29
5. Bank Fees in Australia	36
6. The Committed Liquidity Facility: 2015-2022	43
7. Recent Developments in the Semi-government Bond Market	51

The *Bulletin* is published under the direction of the Bulletin editorial team: Beth Tasker and Gordana Peresin (Managing Editors), Amanda Martz (Advisor) and David Norman (Advisor).

The *Bulletin* is published quarterly in January, April, July and October and is available at www.rba.gov.au.
The next *Bulletin* is due for release on 18 April 2024.

The graphs in this publication were generated using Mathematica.

ISSN 1837–7211 (Online)

© Reserve Bank of Australia 2024

Apart from any use as permitted under the *Copyright Act 1968*, and the permissions explicitly granted below, all other rights are reserved in all materials contained in this publication.

All materials contained in this publication, with the exception of any Excluded Material as defined on the RBA website, are provided under a Creative Commons Attribution 4.0 International License. The materials covered by this licence may be used, reproduced, published, communicated to the public and adapted provided that the RBA is properly attributed in the following manner:

Source: Reserve Bank of Australia 2024 OR Source: RBA 2024

For the full copyright and disclaimer provisions which apply to this publication, including those provisions which relate to Excluded Material, see the RBA website.

Understanding the Post-pandemic Demand for Australia's Banknotes

Patrick Elkington and Rochelle Guttman^[*]



Photo: pampsix – Getty Images

Abstract

Banknotes can be used to make legitimate payments, but they can also be hoarded, lost or used to facilitate transactions in the shadow economy. Understanding how banknotes are used can assist policymakers in responding to changes in payment behaviour and demand for cash. This article examines the value of banknotes used for each component of cash demand and how it has changed since the COVID-19 pandemic. The share of banknotes used for transactional purposes is estimated to have fallen by 5 percentage points since early 2020, while cash use in the shadow economy has increased slightly and the proportion of banknotes that are lost has remained unchanged. Overall, the majority of banknotes on issue are currently used for non-transactional purposes, consistent with pre-pandemic trends.

Introduction

Demand for banknotes grew substantially over the COVID-19 pandemic period in many advanced economies. In Australia, the value of banknotes in circulation increased by 22 per cent, or \$19 billion, between March 2020 and its peak in December 2022. This followed a period of already-strong banknote demand; in the decade prior to the pandemic, banknote demand was growing faster than GDP (Flannigan and Parsons 2018; Flannigan and Staib 2017). Banknote demand has since

declined but remains close to its historical high. This strength, relative to growth in prices and the economy, is despite the ongoing decline in the use of cash for day-to-day transactions over many years (Mulqueeney and Livermore 2023). The dichotomy of strong banknote demand alongside falling transactional use suggests banknotes are being hoarded, likely for store-of wealth or precautionary savings purposes.

Changes in the denominational mix of banknotes that are on issue can provide insight into the

diverging trends of lower transactional versus higher hoarding demand for banknotes. Growth in low-denomination banknotes (\$5, \$10 and \$20) has been slow, increasing at around 1 per cent annualised on a per capita basis since 2007 (Graph 1). Low denominations are typically used for in-person transactions and for merchants to provide change, so subdued demand for these banknotes indicates a reduced use of cash for consumer spending. By contrast, demand for high-denomination banknotes (\$50 and \$100) has been strong and the key driver of growth in overall banknote demand; high denominations have grown by almost 5 per cent on an annualised per capita basis since 2007. This is consistent with an increased desire in the community to hold banknotes as a precaution or store-of-wealth, especially during times of economic uncertainty (Guttmann *et al* 2021).

This article quantifies the sources of demand for Australian banknotes to further understand the differences in transactional and hoarding demand, particularly since the pandemic. In doing so, we update estimates from Finlay, Staib and Wakefield (2018) to June 2023.^[1] Understanding the relative importance of each source of demand can assist the Reserve Bank in forming expectations about likely future developments in banknote demand, which is a key part of determining the Bank's annual banknote print orders. It can also assist in policymaking regarding cash access and distribution and contributes to our understanding

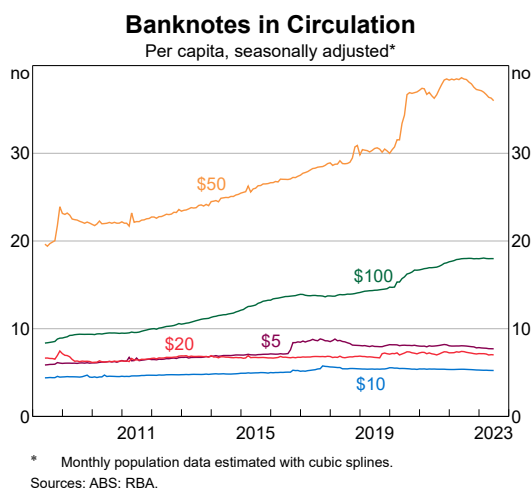
of the amount of cash used in Australia's shadow economy.

At a single point of time, banknotes in circulation will fall into one of the following categories:^[2]

- Banknotes that are used to facilitate **legitimate day-to-day transactions** in Australia.
- Banknotes that have been **lost or destroyed**.
- Banknotes that are used in the **shadow economy** (either to conceal legal transactions to avoid tax, to pay for illegal goods and services or to store wealth generated by the sale of illegal goods and services).
- Banknotes that are **hoarded** – that is, held, either domestically or overseas, as a store-of-value, for emergency liquidity or for other such purposes.

While individual banknotes on issue move between these categories every day, the share of banknotes attributed to each category is likely to be relatively stable over the short run. However, it is important to acknowledge that cash is an anonymous bearer instrument and so difficult to trace and analyse. To overcome this, where possible, we use a variety of techniques to estimate the share of banknotes attributed to each category, thereby producing a range of estimates rather than a single point estimate. Each estimation technique naturally relies on a range of assumptions, some of which are more realistic than others. While we cannot be definitive or exact about how banknotes are used in the economy, our confidence in broad trends is strengthened if we see similar results emerging across the various techniques.

Graph 1



Banknotes used for legitimate transactions

Australians typically use cash to complete everyday transactions, such as at the grocery store. This source of banknote demand – which we call ‘transactional demand’ – is difficult to estimate as the Bank does not track banknotes once issued into circulation. So, while we cannot directly observe or measure transactional demand, we use four different methods to approximate its size to obtain a range of estimates, based on Finlay, Staib and Wakefield (2018):

Table 1: Physical Locations of the Transactional Stock of Cash

Location	Description
Wallets	Cash held by consumers on their person.
Financial institution holdings	Cash held by financial institutions in bank branches, ATMs or cash depots.
Tills and self-checkouts	Cash held in cash registers, safes and self-serve checkouts at the start of the day. This is the minimum stock of banknotes that is held in cash registers at all times. It does not include cash held due to an increase in stocks from consumers' cash expenditure.
Unbanked business takings	Cash held by businesses that has not been banked.
Gaming machines	Cash held in gaming machines (e.g. poker machines) and associated safes.
Tourists	Cash held by tourists in Australia or about to enter Australia. This includes cash sourced overseas prior to entering Australia, cash sourced domestically after entering Australia and cash held by overseas foreign exchange businesses that service tourists about to enter Australia.

1. the counting method
2. the velocity method
3. the banknote processing method
4. the seasonality method.

Each of these methods is discussed in turn, before a final assessment on the proportion of banknotes used for legitimate transactions is made based on all these approaches.

Counting method

The first approach estimates the stock of cash across six physical locations that are commonly used to exchange or store cash for transactional purposes (Table 1). We aggregate these locations to form an economy-wide estimate of how much cash is used for legitimate transactions. While this approach is a useful and tangible method to estimate this stock, it relies on several assumptions and does not account for any cash not captured in these categories.

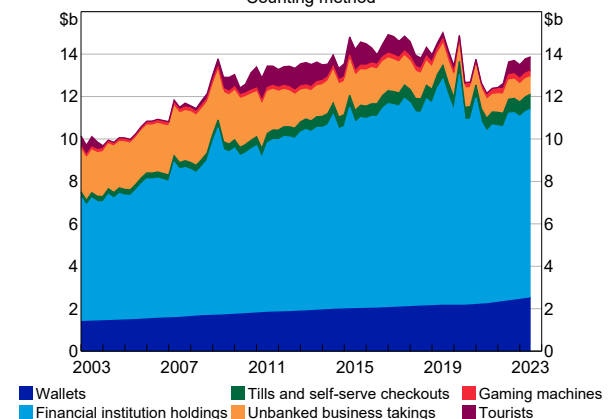
We estimate the stock of cash held in each of these locations by:

1. estimating the number of a given location (e.g. the number of tills and self-checkouts) and multiplying it by an average amount held per location (e.g. the amount of cash held in each till or self-checkout)
2. converting flow data to a stock by making assumptions about the velocity of cash (the number of times a banknote is used in a given period) through a particular location.

The counting method suggests that the transactional stock of cash fell from around \$15 billion in March 2020 to just below \$14 billion at the end of June 2023 (Graph 2). Over the first 18 months of the pandemic, the transactional stock fell to \$12 billion; while it has picked up slightly over the past two years, it remains around \$1 billion below its pre-pandemic peak. The estimated fall was mainly due to large declines in the cash holdings of financial institutions and unbanked business takings. This was partly offset by modest increases in wallet holdings, tills and self-checkouts, gaming machines and tourist cash holdings.

The decline in transactional demand has occurred alongside a significant increase in the value of banknotes on issue. As a share of banknotes on

Graph 2
Transactional Banknote Stock Estimates
Counting method



Sources: ABS; Australian Payments Network; Queensland Treasury; RBA calculations, based on data from Colmar Brunton, Ipsos, RBA and Roy Morgan Research; Tourism Research Australia; Wesfarmers; Woolworths Group.

issue, the transactional stock has fallen by around 4 percentage points since the pandemic to around 13 per cent.

Velocity method

A single banknote can be used for many transactions, so another way to approximate the stock of cash used for transactions is to estimate the flow of cash payments and convert this flow into a stock. The two concepts are defined in the following equation:

$$\begin{aligned} \text{Value of transactional stock} \\ &= \text{Value of cash payments} \\ &\div \text{Velocity of transactional stock} \end{aligned}$$

The domestic flow of cash payments is estimated by multiplying the value of total card payments from the Bank's Retail Payment Statistics by the cash-to-card payment ratio recorded in the Bank's Consumer Payments Survey (CPS) (Graph 3, top and middle panels). Cash payments made with cash sourced overseas is approximated by subtracting the value of card payments and ATM withdrawals made with an international card in Australia from total tourist spending estimates from the Australian Bureau of Statistics (ABS) and Tourism Research Australia. Through this method, we estimate that cash facilitated around \$8 billion worth of transactions in June 2023 – a decline of around 70 per cent since its peak in December 2008 (Graph 3, bottom panel). Cash has been used much less frequently since the pandemic; our estimates suggest that monthly cash payments have fallen by around \$1 billion.

We then estimate the velocity of transactional cash, which is the number of times the transactional stock is used to make a payment in a month. This is approximated by mapping out cash movements through the cash cycle. Banknotes start at a cash depot and are transported to an ATM or bank branch, before eventually ending up in a consumer's wallet or purse. Next, consumers spend these banknotes at a business before they are returned to a cash depot or bank branch and begin the cycle again. We calculate the average number of days it takes for cash to pass through a point in the cash cycle. For some legs of this journey we have accurate data, such as the number of

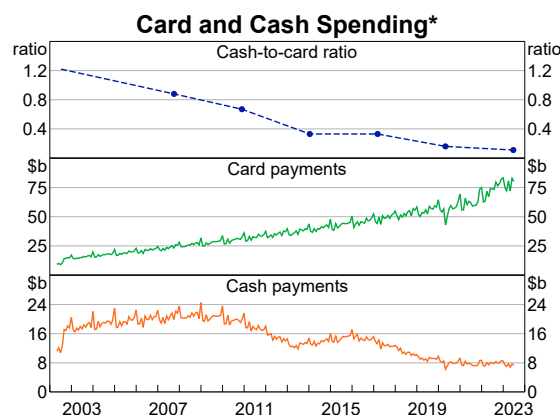
banknotes entering and leaving cash depots each day, and so can calculate the average time a banknote spends in a depot. For other aspects we need to use judgement.^[3]

We estimate that the velocity of cash has steadily declined since 2008 and fell sharply following the onset of the pandemic; lockdowns across Australia and the limited ability to spend cash were key drivers of this fall. Our estimates suggest that it takes almost six weeks for the entire transactional stock of cash to turn over; that is, the transactional velocity of cash is around 0.7 when measured on a turnover-per-month basis (Graph 4, top panel). Combining these two components suggests that the transactional stock of cash was in the range of \$9–12 billion at the end of June 2023, or 9–12 per cent of all banknotes on issue (Graph 4, bottom panel). This method suggests that since March 2020, the transactional stock has fallen by around \$1.5 billion, or 4 percentage points, which is consistent with results from the counting method above.

Banknote processing method

Our third approach quantifies the transactional stock of cash by estimating the rate at which banknotes pass from retailers and banks to cash depots. Since depots only process banknotes that are actively circulating and do not handle banknotes that are hoarded or lost, it can be used to approximate the transactional stock of cash.

Graph 3



* Card payments includes payments made by businesses using credit and debit cards; dashed line indicates points that have been interpolated or extrapolated; dots indicate direct estimates from the CPS. Sources: RBA calculations, based on data from Colmar Brunton, Ipsos, RBA and Roy Morgan Research; Tourism Research Australia.

The processing frequency of all denominations has declined over the past decade, reflecting a shift in consumer preferences away from using cash as a means of payment (Graph 5). The decline was particularly sharp over 2020 and has remained relatively steady thereafter. The processing frequency of \$5 and \$10 banknotes is low as retailers tend to keep these denominations as change, such that they cycle through cash depots less frequently. The \$50 denomination processing frequency has converged to that of the small denominations, which may suggest an increasing use for hoarding relative to transactional use.

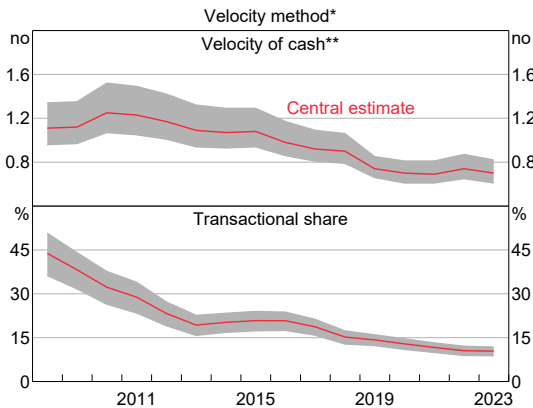
We can then estimate the transactional stock of cash by making two assumptions. First, we assume the non-transactional stock of cash consists only of

\$50 and \$100 banknotes, and so the lower denominations are only used for transactional purposes. Second, the processing frequency of the transactional stock of \$50 and \$100 banknotes is equal to the processing frequency of the \$20 denomination. Finally, this approach does not account for cash demand from the shadow economy, so we subtract estimates of the stock of cash used for that purpose (discussed further below).

The processing method suggests that around 26 per cent of banknotes in circulation were used for transactional purposes in June 2023. Since the pandemic began, the transactional stock of cash has fallen by 7 percentage points according to this method, which is a little larger than other estimates. However, it is likely that this method overestimates transactional demand, as it relies on strong assumptions about the use of each denomination. For example, the higher denominations that are used in transactions may be processed more often than the \$20 note. Almost all \$50 and \$100 banknotes received by retailers are likely to be banked and returned to cash depots, while the \$20 note is more likely to be given as change. This will result in higher transactional stock estimates.

Graph 4

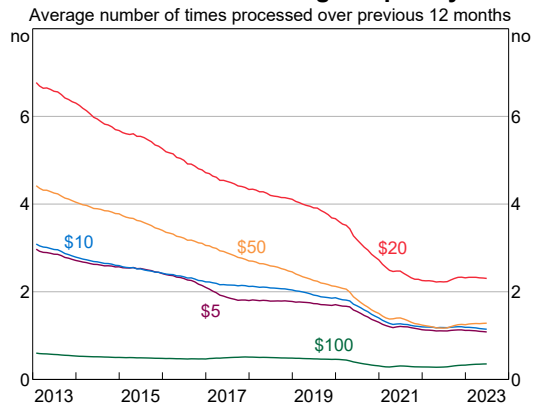
Transactional Banknote Stock Estimates



* Shaded region represents the upper and lower bounds using the range of velocity assumptions.
 ** Velocity of cash is the average turnover of the transactional stock per month.
 Source: RBA calculations, based on data from Colmar Brunton, Ipsos, RBA and Roy Morgan Research; Tourism Research Australia.

Graph 5

Banknote Processing Frequency



Source: RBA.

Seasonality method

The final approach for estimating the share of cash used in transactions is the seasonality of banknote demand method. Demand for cash displays a predictable (but weakening) seasonal pattern, with a peak around Christmas and a trough in the winter months. This mirrors the seasonality of consumer spending. As such, we can estimate the transactional share of cash by attributing all the seasonality of banknote demand to transactional purposes. Non-transactional cash demand is unlikely to exhibit a seasonal pattern.

To measure the seasonality of the transactional component of banknote demand, we use a proxy for cash spending – the value of banknotes lodged in cash depots each month. Banknote lodgements measure cash flowing from retailers into depots, which is a direct measure of cash spending. As such, seasonality present in banknote lodgements should also be present in cash spending.^[4] We adjust the

seasonality of the lodgement data with three estimates of the seasonality present in the velocity of transactional cash, and then average over the three estimates.

We estimate that 9–12 per cent of banknotes in circulation were used for legitimate transactional purposes in June 2023 under this method (Graph 6). Since the pandemic began, the transactional share of banknotes on issue declined by 2–3 percentage points, which is a little less than the decline suggested by other methods.^[5] In value terms, around \$9 billion of cash was used for transactions – a fall of \$1 billion since the pandemic began.

Overall assessment

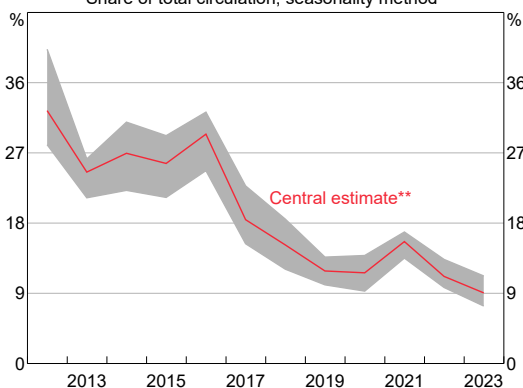
Taken together, these four methods suggest that between 9 per cent and 26 per cent of banknotes in circulation are used for legitimate transactions in Australia (Graph 7). On average since the pandemic began, the share of banknotes used for this purpose has fallen by around 5 percentage points, which is consistent with the pre-pandemic trend decline in cash use. Although each method presented above has limitations, the trends – and indeed the estimates from three of the four estimation methods – are broadly similar.

Lost banknotes

There will inevitably be some banknotes that have been lost, destroyed, forgotten about or are sitting in numismatic currency collections, both domestically and internationally. While these are still considered as banknotes on issue, they are unavailable for spending. To estimate the value of these ‘lost banknotes’, we exploit the fact that some paper banknotes – which were last issued in the early to mid-1990s but are still legal tender – have yet to be returned to the Bank for destruction. We assume that these outstanding banknotes are lost, calculate an implied annual loss rate, and then apply this rate to the amount of outstanding polymer banknotes. Note that paper banknotes are still being returned to the Bank, despite being replaced by polymer banknotes more than 25 years ago, and so our measure is inherently uncertain.

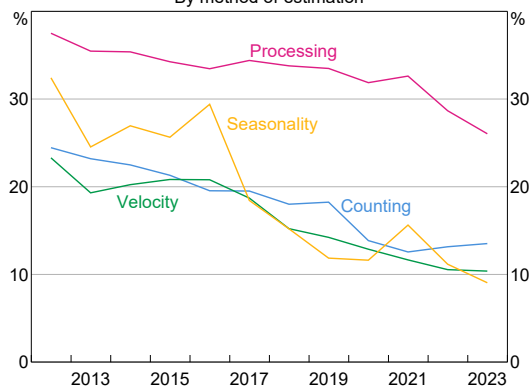
The loss rate is greatest for the lowest denominations (\$5 and \$10), followed by the highest denominations (\$50 and \$100) and is smallest for the middle denomination (\$20) (Graph 8). This may be due to people showing less care towards banknotes of lower value, while high-denomination banknotes may be hoarded and eventually forgotten about or misplaced. Although the loss rate of paper banknotes serves as an indicator for polymer banknotes, it may not be an accurate reflection. For instance, polymer banknotes are more durable than paper banknotes, which implies that fewer polymer banknotes would be destroyed. On the other hand, greater international

Graph 6
Transactional Banknote Stock Estimates
Share of total circulation, seasonality method*



* Seasonality of cash payments is proxied by banknote lodgements at cash depots.
** Shaded region represents the upper and lower bounds from three estimates of the seasonality present in the velocity of transactional cash. Central estimate is the average across each of the proxies.
Sources: ABS; RBA calculations, based on data from Colmar Brunton, Ipsos, RBA and Roy Morgan Research; Tourism Research Australia.

Graph 7
Transactional Share of Banknotes on Issue
By method of estimation



Source: RBA calculations.

demand for Australian banknotes over recent decades may result in a greater flow of banknotes leaving the country, some of which may be lost.

We use the minimum and maximum loss rates of the paper denomination to estimate a range for the amount of lost banknotes. This suggests that \$5–9 billion, or roughly 5–9 per cent of banknotes in circulation, were lost, destroyed, forgotten or sitting in numismatic currency collections as of June 2023. Unsurprisingly, the share of banknotes that are lost has remained broadly unchanged in recent years and was not affected by the pandemic.

Banknotes used in the shadow economy

As physical cash is difficult to trace, it can be used to facilitate activity in the 'shadow' economy. The ABS defines the shadow economy as consisting of both underground production (concealing of legal activities to avoid taxation) and illegal production (such as illegal drug production and sale) (ABS 2013). To estimate the stock of banknotes used in the shadow economy, we first estimate the size of the shadow economy and then use the estimates of banknote velocity described above to convert this flow into the amount of cash used to facilitate these transactions. For simplicity, we assume that all shadow economy transactions are made with cash. Using ABS estimates of the shadow economy from 2012, and scaling it to more recent GDP figures, we estimate that the stock of cash used in underground production was \$4.2 billion and the stock of cash used on illegal drugs was around

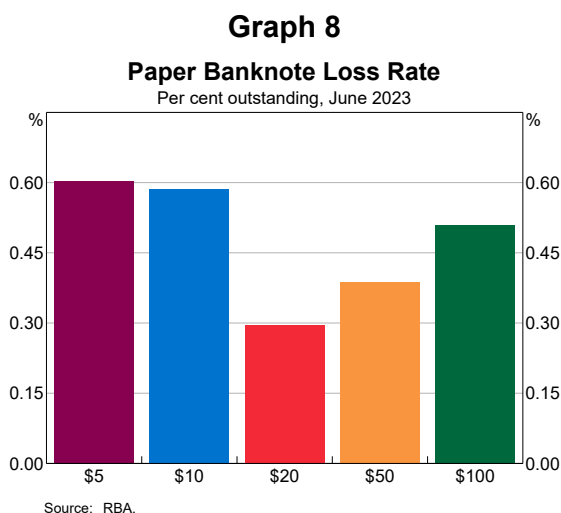
\$1.1 billion in June 2023. This implies that the stock of cash used to facilitate shadow economy transactions was \$5.3 billion, which is just above 5 per cent of the total banknotes on issue at that time. The Black Economy Task Force estimates that the size of the shadow economy is twice as large as estimated by the ABS (BETF 2017). Using this data source suggests that \$10.5 billion of cash, or around 10 per cent of banknotes on issue, is used to facilitate shadow economy activities. Note, these estimates assume that the share of the economy devoted to underground and illicit activities, as well as the proportion of such activities that are facilitated by cash, has remained unchanged over time.^[6]

We also calculate the stock of cash based on estimates of the size of the drug market. Expenditure on drugs is calculated based on data from the Australian Criminal Intelligence Commission (ACIC) on the volume of drugs consumed via wastewater analysis and from the 2019 Australian Institute of Health and Welfare National Drug Strategy Household Survey (ACIC 2023; AIHW 2020). These results suggest that \$14.1 billion was spent on illicit drugs in 2022/23, so dividing by the transactional velocity implies that the stock of cash used to facilitate purchases of illicit drugs was \$1.6 billion, or almost 2 per cent of cash-in-circulation in June 2023. In addition, drug suppliers are also likely to hold large volumes of cash in reserve; ACIC (2022a) data suggest that this is 2 per cent of total sales. These results suggest that total cash hoarding by the illicit drug supply chain is up to \$800 million, which is up to roughly 1 per cent of all banknotes on issue.

In sum, we estimate the stock of cash used in the shadow economy in June 2023 was around \$7–11 billion, or 7–11 per cent of total banknotes in circulation. This has edged up slightly since the pandemic, although these estimates have a high degree of uncertainty.

Hoarding

Hoarding, both domestically and internationally, is the most significant component of banknote demand. Hoarding is usually done for store-of-wealth or precautionary motives. We define



hoarded banknotes as those held for legitimate reasons other than financing everyday transactions or those that are lost. Given the difficulty in quantifying the stock of cash that is hoarded domestically or internationally, we apply three methods to directly estimate the stock of hoarded banknotes:

1. Using fire-damaged banknote claims data from the Bank's damaged banknote facility suggests that 2 per cent of banknotes in circulation were hoarded domestically in June 2023.
2. Scaling cash holdings data from the Bank's 2022 CPS to economy-wide levels estimates that 7–15 per cent of cash in circulation was hoarded domestically in June 2023.
3. Aggregating wholesale currency shipments to and from Australia suggests that 0–20 per cent of cash in circulation was likely to be hoarded internationally in June 2023.

Each of these approaches is inherently limited: the first approach assumes that fire-damaged households are representative of all households across Australia; and the second approach relies on respondents accurately reporting the amount of cash they store at home (respondents with large physical cash holdings may be less likely to participate in the survey or report the true value of their holdings). The third approach is subject to significant uncertainty and does not capture all international flows of Australian banknotes.

While these direct methods suggest hoarded banknotes account for up to 35 per cent of all banknotes outstanding, this is likely to be an underestimate. Alternatively, we can compute the share of banknotes that are hoarded as the residual of other estimates discussed above. Assuming there are no other locations that cash could be, we take the residual of our transactional estimates and subtract the stock of cash that is lost and the stock of cash that is used in the shadow economy. This suggests that roughly 55–80 per cent of banknotes in circulation in June 2023 were hoarded, either domestically or internationally. This is closer to international estimates of hoarding in Germany and the euro area, for example (Bartzsch and Uhl 2017; Zamora-Pérez 2021). In value terms, the hoarding

component of banknote demand accounted for between \$56 billion and \$81 billion. This share has grown since the onset of the pandemic by around 5 percentage points, which indicates that much of the increase in banknote demand over this period was for hoarding purposes.^[7]

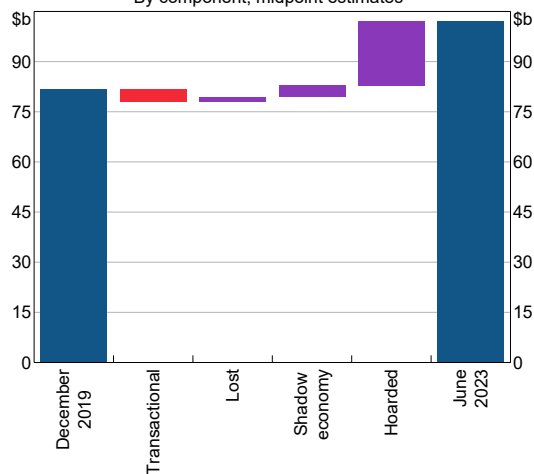
Conclusion

Against the backdrop of declining cash use for day-to-day transactions, it is useful to understand how banknote use has changed in recent years. We estimate that of all the banknotes currently in circulation:

- 9–26 per cent are used for transactional purposes
- 5–9 per cent are lost
- 7–11 per cent are used in the shadow economy
- 55–80 per cent are hoarded domestically or internationally.

The estimated share of banknotes used for transactions has declined by around 5 percentage points since the onset of the pandemic and is consistent with the decline in cash payments, as shown in the Bank's latest CPS. Non-transactional banknote demand, particularly from hoarding, appears to have driven the significant increase in the value of banknotes on issue since the pandemic began (Graph 9).

Graph 9
Value of Banknotes in Circulation
 By component, midpoint estimates*



* Red bars indicate a decline in this component. Purple bars represent an increase in this component.
 Source: RBA calculations.

This analysis allows us to draw some broader conclusions. First, declining transactional velocity of cash and an increased share of banknotes that are hoarded means that most Australian banknotes will have a longer lifespan compared with the past. Second, fewer banknotes used for transactions will lead to lower cash processing volumes, which

further increases financial pressures across the wholesale banknote distribution industry (RBA 2021). And finally, these results provide further evidence that the pandemic has had a lasting effect on payment behaviour in Australia (Mulqueoney and Livermore 2023; Guttman *et al* 2021). ✖

Endnotes

- [*] Patrick Elkington is from Note Issue Department and Rochelle Guttman completed this work while in Note Issue Department.
- [1] We use the same methodology, data sources and assumptions as Finlay, Staib and Wakefield (2018). Accordingly, the technical details underlying the analysis in this article, as well as a more detailed discussion of the assumptions and limitations of the analysis, can be found in that paper.
- [2] Banknotes that are stored at the Reserve Bank – either because they are newly printed or have been returned via a commercial bank – or are deemed unfit and have been destroyed are considered 'out-of-circulation' and are not included in the calculations.
- [3] We have made some small changes to the methodology. For instance, liaison with banks and ATM deployers suggest that some cash replenishments occur less frequently, and ATM refills are larger than prior to the pandemic.
- [4] Estimating the transactional stock using retail sales to proxy cash spending leads to similar results. Nonetheless, not all retail sales are conducted with cash, so the seasonality of retail sales may not accurately approximate the seasonality of cash payments. For instance, consumers could be more likely to use credit cards around Christmas, which would lead to a higher seasonal peak than cash payments.
- [5] Zamora-Pérez (2021) uses the seasonality method to estimate the share of euro banknotes used for transactions and shows that the transactional share has steadily fallen since 2003.
- [6] The use of electronic forms of payment (such as cryptocurrencies) to facilitate transactions in the shadow economy has grown over recent years (ACIC 2022b). This suggests that the proportion of such activities paid with cash may have declined.
- [7] Results from the 2022 CPS show that the distribution of hoarded cash is likely to be highly skewed, with 60 per cent of respondents indicating they do not hold any cash outside of their wallet. Instead, large amounts of cash are likely hoarded among a relatively small number of individuals (Mulqueoney and Livermore 2023).

References

- ABS (Australian Bureau of Statistics) (2013), 'Information Paper: The Non-Observed Economy and Australia's GDP, 2012', ABS Cat No 5204.0.55.008.
- ACIC (Australian Criminal Intelligence Commission) (2022a), 'Annual Report 2021–22', September.
- ACIC (2022b), 'Submission to the Inquiry into the Impact of Illicit Drugs being Traded Online', Submission to the Parliamentary Joint Committee on Law Enforcement, December.
- ACIC (2023), 'National Wastewater Drug Monitoring Program – Report 18', March.
- AIHW (Australian Institute of Health and Welfare) (2020), 'National Drug Strategy Household Survey 2019', July.
- Bartzsch N and M Uhl (2017), 'Domestic and Foreign Demand for Euro Banknotes Issued in Germany', International Cash Conference, Deutsche Bundesbank, 25–27 April.
- BETF (Black Economy Taskforce) (2017), 'Black Economy Taskforce: Final Report', Australian Treasury, October.
- Finlay R, A Staib and M Wakefield (2018), 'Where's the Money? An Investigation into the Whereabouts and Uses of Australian Banknotes', RBA Research Discussion Paper No 2018-12.
- Flannigan G and S Parsons (2018), 'High-Denomination Banknotes in Circulation: A Cross-Country Analysis', RBA *Bulletin*, March.
- Flannigan G and A Staib (2017), 'The Growing Demand for Cash', RBA *Bulletin*, September.
- Guttman R, C Pavlik, B Ung and G Wang (2021), 'Cash Demand during COVID-19', RBA *Bulletin*, March.
- Mulqueoney J and T Livermore (2023), 'Cash Use and Attitudes in Australia', RBA *Bulletin*, June.

Reserve Bank of Australia (RBA) (2021), 'Review of Banknote Distribution Arrangements: Issues Paper', November.
Zamora-Pérez A (2021), 'The Paradox of Banknotes: Understanding the Demand for Cash Beyond Transactional Cash Use', *ECB Economic Bulletin*, March.

Developments in Income and Consumption Across Household Groups

Benjamin Beckers, Ashwin Clarke, Amelia Gao, Madeleine James and Ryan Morgan^[*]



Photo: d3sign – Getty Images

Abstract

Data on spending by income and mortgage status suggest that growth in consumption has slowed significantly over the past year or so across most household groups as cost-of-living pressures have weighed on household finances. High inflation has decreased the purchasing power of all households and has had a relatively similar effect on real disposable incomes across different groups. While higher interest rates have also weighed heavily on the incomes of mortgage households, many of these households have larger financial buffers, which have helped to offset the aggregate impact of interest rates on their spending so far. Resilient growth in nominal incomes has helped to support the spending of many lower income households and renters. Nonetheless, many of these households have lower financial buffers and so increases in their cost of living are more likely to have caused financial stress with all its adverse impacts on their wellbeing. Indeed, many households are experiencing acute challenges in the face of high inflation and higher interest rates. This article explores these recent developments in consumption across household groups.

Introduction

Household consumption represents around half of all economic activity in Australia and is a key part of activity affected by monetary policy. Aggregate consumption outcomes are most relevant for the

setting of monetary policy, but these outcomes are driven by individual households whose experiences can differ substantially from the average. This article reviews recent developments in consumption and one of its main determinants – income – across

household groups, to better understand the drivers of aggregate consumption.

Aggregate developments

In the long run, households' income and wealth determine consumption (Graph 1). This is consistent with households' budget constraints; generally, households can only spend the income they receive, draw down on their wealth or borrow funds.^[1]

Consumption outcomes can differ from what might be expected from these long-run relationships for many reasons. Households may decide to save more during periods of uncertainty about their future income; this occurred, for example, during the global financial crisis (GFC). Social restrictions introduced during the pandemic also limited consumption opportunities, leading to consumption outcomes much weaker than implied by developments in incomes and wealth (Bishop, Boulter and Rosewall 2022). However, consumption patterns tend to return to levels consistent with long-run relationships over time; the direct effects of the pandemic on consumption outcomes had largely reversed at the aggregate level by around mid-2022.

Consumption growth has slowed significantly over the past year. This is primarily because real disposable income – which is the income left over for consumption or saving after tax and interest payments, adjusted for inflation – has declined by 5.5 per cent since early 2022, the largest decrease

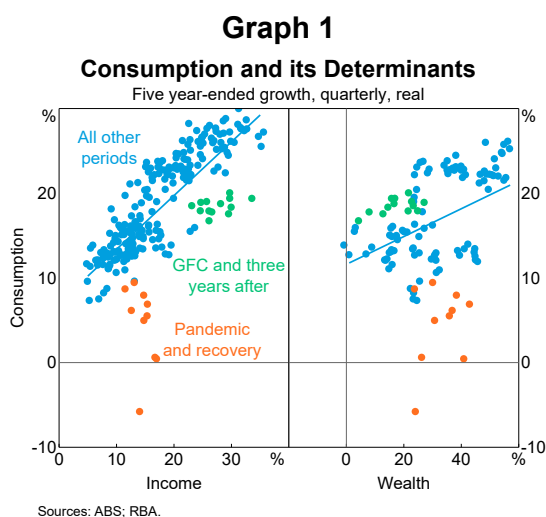
observed in around three decades (Graph 2). The decline in real disposable income has occurred despite very strong growth in labour income, which is the income received by households from their jobs, and reflects the following factors:

- *Inflation*, which reduces the purchasing power of nominal income, has been very high in recent times. High inflation has affected all households and has been the main factor weighing on real disposable incomes in aggregate.
- *Tax payable*, which is the taxes households pay to the federal government, has been growing at a higher rate than its pre-pandemic average. This is because of strong growth in nominal gross incomes and also because the tax share of income increased as gross nominal incomes have risen relative to income tax thresholds (which are not automatically indexed to inflation), so-called 'bracket creep'.
- *Net interest payments*, which are the value of interest paid on household debt (mainly mortgage debt) minus the interest received on households' interest-bearing assets (such as deposits), have increased alongside higher interest rates. The effect of higher interest rates has varied materially across different households depending on whether the household is a net saver or borrower (discussed further below).

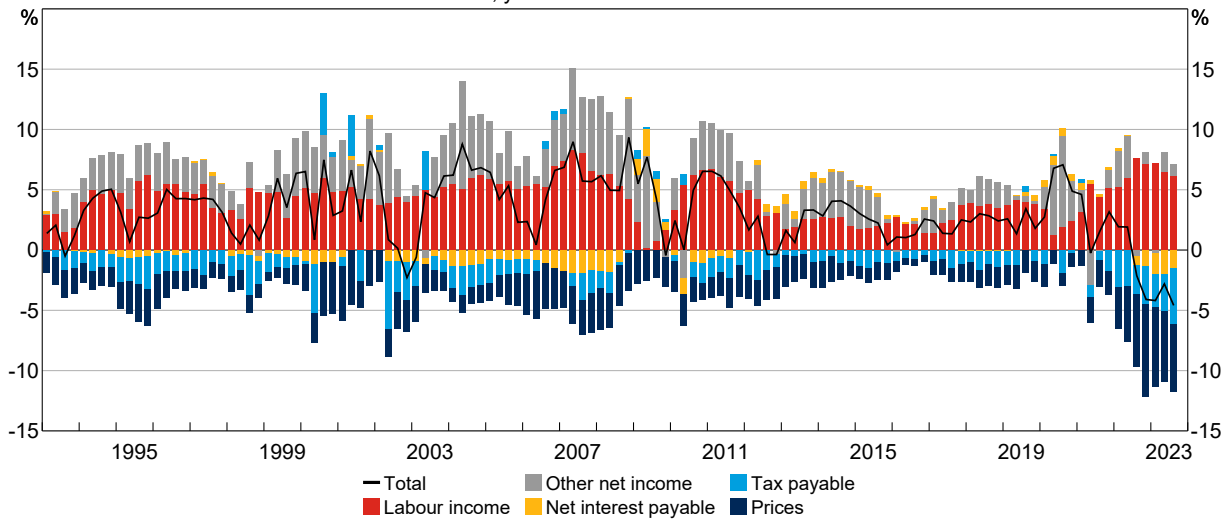
In contrast to declining real disposable incomes, real household wealth has grown strongly over recent years, driven primarily by strong growth in housing prices (Graph 3). Higher-than-usual savings during the pandemic also supported this increase; while these additional savings account for a modest proportion of total wealth, they have provided a meaningful boost to liquid wealth such as holdings of bank deposits.

Developments across household groups

This section focuses on developments across household income levels and by housing tenure (i.e. whether households rent, own their home with a mortgage or own their home outright). There are of course large differences in the experiences of households within the same income quintile or in the same housing tenure group. Nonetheless, the



Graph 2
Household Disposable Income Growth
Real, year-ended with contributions



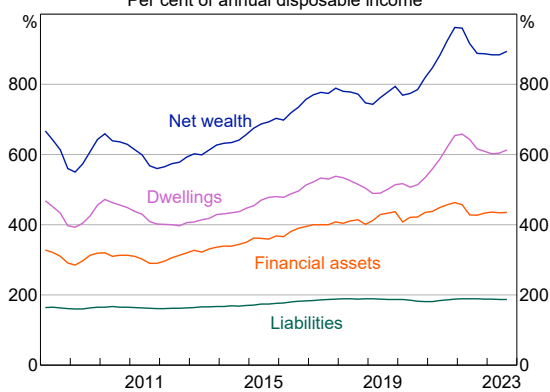
Sources: ABS; RBA.

pressures that households within a group face can be similar. While changes to households' incomes and wealth are examined separately across income and housing tenure groups, there is a clear relationship between the two groups. Households in the lowest two income quintiles, with annual disposable household incomes up to around \$70,000, are most often either renters or outright owners. By contrast, mortgagors comprise the largest group of households in the upper two income quintiles (with incomes starting from \$84,000) (Graph 4).

Real disposable income growth

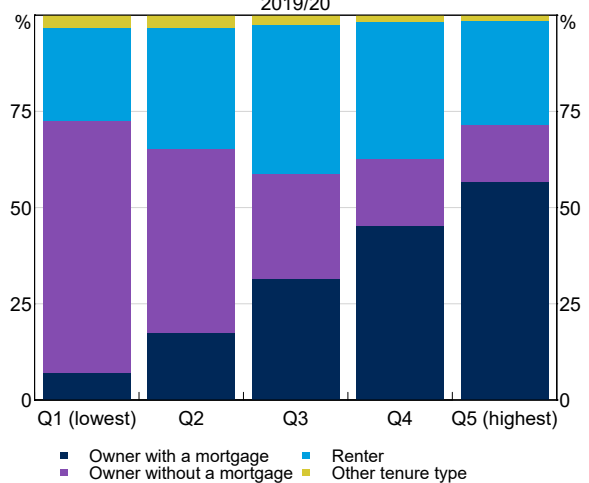
Real disposable income growth is estimated to have been weak or negative over recent years for almost all household groups across the income distribution (Graph 5).^[2] The largest common driver of these declines has been *inflation*, which has reduced real incomes at a similar rate across all income quintiles; evidence suggests that inflation *rates* have been similar across different households despite some differences in consumption baskets (Wood, Chan and Coates 2023).

Graph 3
Household Assets and Liabilities
Per cent of annual disposable income*



* Disposable income before the deduction of interest payments.
Sources: ABS; RBA.

Graph 4
Housing Tenure by Income Quintile*
2019/20



*Modelled annual household disposable income. Income quintile upper bounds for modelled 2019/2020 income are: \$44,000 for Q1; \$70,000 for Q2; \$84,000 for Q3; \$122,000 for Q4; and \$207,000 for Q5.
Sources: ABS; RBA.

Partly offsetting the increase in inflation has been strong growth in *nominal incomes after tax* across all income quintiles. Variation in nominal income growth across groups, which has been stronger for households in the lowest income quintiles, accounts for most of the differences in real income growth across these groups. Growth in the incomes of the two lowest income quintiles has been driven by retirees, who make up a large share of households in these quintiles. Their incomes have been supported by the indexation of pensions to inflation. Retirees as a group were also more likely to have benefited from higher interest rates as interest income tends to account for a greater share of their income than other households. For most other households, the increase in interest income has been small. Working lower income households have also seen stronger growth in their wages, in part reflecting decisions in recent years by the Fair Work Commission on minimum and award wages, and in part reflecting that these households have been more likely to have increased their work hours in the strong labour market over this period. These developments have to some extent protected the real incomes of low-income households, who

typically are the most vulnerable to a financial shock as they have lower financial buffers (see below).

By income quintile, the change in *housing costs* – which measures the increase in rents as well as higher interest rates on mortgages – has increased more evenly, because there is a mix of housing tenures across the income distribution. Housing costs have tended to weigh a little more on households in the higher income quintiles because these households are more likely to be mortgagors. The smaller increase in housing costs for lower income households reflects the high share of retirees in these groups; retirees tend to be more likely to own their home outright. That said, mortgagors in these lower income quintiles have seen large increases in their housing costs.

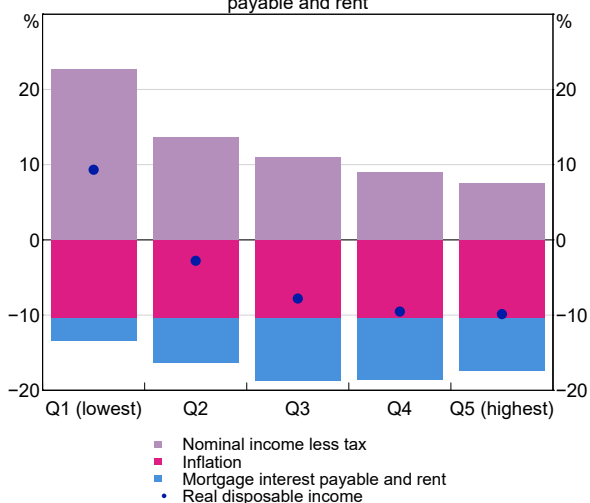
The effect of housing costs on household disposable incomes has varied significantly across housing tenures. Most households that had a mortgage in early 2022 (before the cash rate began to increase) have seen their scheduled mortgage payments increase by between 30 per cent and 50 per cent. For the median mortgagor, real disposable income is estimated to have fallen by 15 per cent, as high inflation and higher housing costs have more than offset solid labour income growth. Renters have experienced a sharp increase in their rent payments because of the tight rental market. For the median renter, real disposable income is estimated to have fallen by 4 per cent despite strong nominal income growth, driven by high inflation and higher rents. By contrast, outright owners do not pay rents or have mortgage payments (but do have other costs, such as council rates).

It is important to note that these are estimates based on modelled changes in incomes and expenses for broad groups of households using a range of assumptions.^[3] Within each group, there is a very wide range of outcomes for real disposable incomes around this average. Further, larger decreases in real income for households on higher incomes or with mortgages do not necessarily translate into more severe budget pressures or higher levels of financial stress for these households. For higher income households, real incomes have declined from higher levels and these households

Graph 5

Approximate Household Disposable Income Growth by Income Quintile*

Change between December 2021 and June 2023, as a share of 2021 disposable income after mortgage interest payable and rent



* Includes employed and retired households without investment properties. Nominal income less tax is the total change in household net income after tax. Inflation is the percentage change in the ABS Consumer Price Index ex Rents series. Mortgage interest payable and rent is the total change in expenditure on mortgage interest and rent. Changes are between December 2021 and June 2023.

Sources: ABS; ATO; RBA; SIH 2019/20.

typically have more scope to adjust saving and consumption patterns before experiencing financial stress (RBA 2023). By contrast, lower income households (including many renters) often devote a larger share of their income to spending on essential items and their housing costs, and many have a low level of liquid savings. In turn, these households are more likely to experience financial stress with all its adverse impacts on their wellbeing as a result of budgetary pressures (Bullock 2023).

Community services organisations in the Reserve Bank’s liaison program have reported an increase in calls on their services. While these calls continue to be dominated by renters, mortgagors are also more often turning to these services for help. Consistent with this, estimates from the Bank’s Securitisation dataset suggest that there is a small but growing share of mortgagors facing significant pressures on their budgets.

Spending growth

Despite pressures on incomes varying across households, timely transaction-based spending data suggest that nominal spending growth has slowed across all household groups split by income quintiles and mortgagors and non-mortgagor status (Graph 6).^[4]

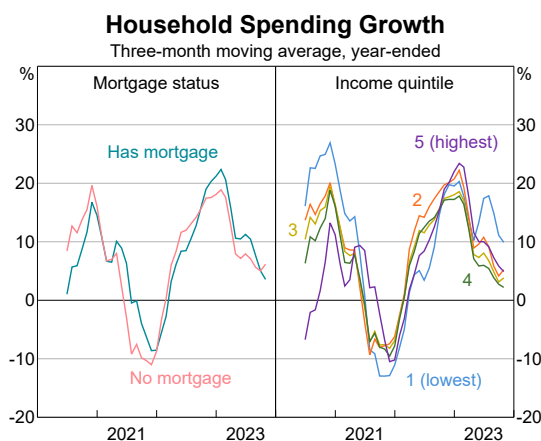
Spending growth for the lowest income quintile has also slowed over the past year but has tended to be more resilient than for other household groups in recent quarters. This is consistent with employed households in this group experiencing relatively stronger growth in their real incomes because of

the strong labour market over the past year. This group also includes a high proportion of retirees whose income growth has been relatively solid, in part owing to the indexation of government transfers such as the age pension. The slower decline in nominal spending growth among retirees is also clear in other data sources, which show that spending growth for individuals older than 60 years has slowed, but has been a little stronger than spending growth by younger individuals over the past year (Graph 7). An additional explanation for the relatively slower fall in spending growth by retirees recently is that they have been slower than younger households to resume consumption of discretionary services (e.g. dining out or attending large events) following the removal of social restrictions.

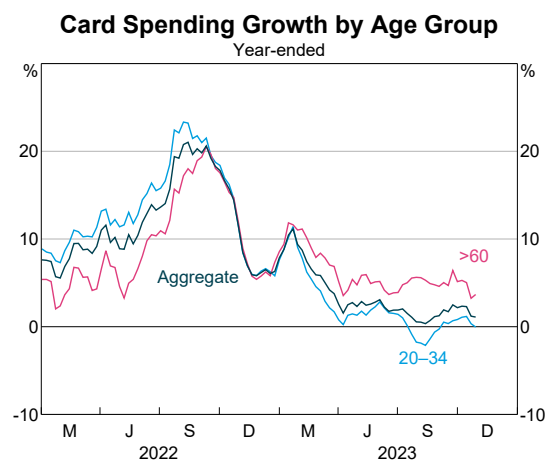
Wealth and savings

Timely data on household wealth and savings across the distribution was not available at the time of publication of this article.^[5] For this reason, this section focuses mainly on the relative size of financial buffers across households, rather than recent changes. Households in the highest three income groups and mortgagors have seen larger falls in their real disposable incomes than other groups. However, these groups tend to have the largest financial buffers and have been able to save less or draw down on their savings to lessen the impact on their spending (RBA 2023).

Graph 6



Graph 7



The two types of financial buffers these households have primarily been able to draw down on are:^[6]

- *Their flow of savings* – that is, the unspent income they can redirect from saving to spending before drawing down on their savings or reducing their spending when faced with a decline in their real disposable income. Higher income households tend to have higher savings rates than lower income households. This means that higher income households have more scope to reduce the amount they save to support consumption in response to a fall in income (Graph 8, top panel).
- *Their wealth* – which tends to be strongly related to the value of housing assets they hold. Higher income households tend to have a higher level of wealth (Graph 8, bottom panel). While liquid wealth tends to be more similar across income groups, many lower income households hold very low levels of liquid assets (with many having liquid wealth less than their fortnightly income) (Wang 2022).

A comparison across housing tenures provides two additional insights. Besides having substantial housing assets, outright homeowners tend to have significantly more liquid savings than other housing tenures, primarily because many outright owners are older and have had time to accumulate savings. Mortgagors are wealthier and have a higher flow of savings than renters, consistent with them being in the higher income groups. Most of the liquid assets

held by mortgagors are in the form of offset and redraw account balances, which are sizeable for most borrowers. Around 45 per cent of all borrowers had prepayment buffers equivalent to more than one year’s worth of their minimum payments at the current interest rate. There is evidence that some mortgagors have been drawing on their offset accounts to finance regular spending (RBA 2023).

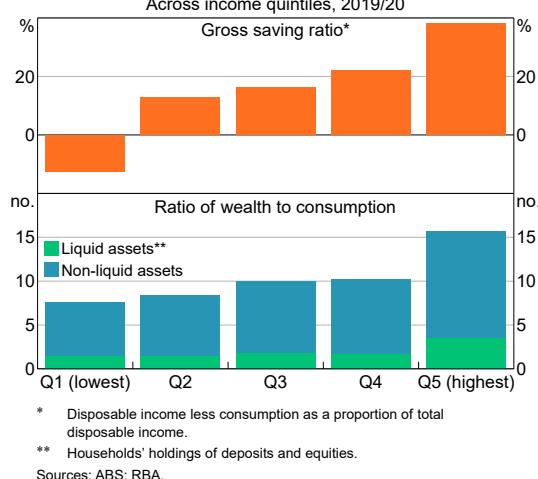
Conclusion

Understanding developments among household groups can provide insights on the drivers of consumption. While inflation has weighed to a similar extent on the purchasing power of incomes for all households, differences in nominal income growth and changes in housing costs have led to larger differences in real disposable income growth across different household types. Growth in spending across all household groups has slowed. While mortgagors have faced a large increase in their housing costs, they have in aggregate been able to attenuate the impact of higher mortgage payments on their spending, including by reducing their rate of savings or drawing down on their liquid wealth. The strong labour market has also helped to support the spending of lower income households and renters. That said, many of these households have lower financial buffers and the increased cost of living is more likely to have caused financial stress with all its adverse impacts on their wellbeing. Indeed, many individual households have been acutely affected by the current challenging conditions and are experiencing significant financial pressure. ✖

Appendix A: Methodology used to model changes in real disposable income

Data from the Australian Bureau of Statistics (ABS) Survey of Income and Housing (SIH) is used to approximate changes in household real disposable incomes across household groups separated by income quintiles and housing tenure. The survey provides us with data on the incomes of each household and their deductions across a broad range of sources as well as information on households’ assets and liabilities.

Graph 8
Household Financial Buffers
Across income quintiles, 2019/20



The latest SIH survey was conducted in the 2019/20 financial year. To calculate recent changes in household incomes, we project the income stream of each household, as well as their assets and liabilities, forward to the December quarter of 2021 and the June quarter of 2023, based on a range of sources such as the National Accounts and interest rate data published by the Reserve Bank. To estimate the growth in *real disposable* income experienced by each household, we deflate each household's estimated nominal income less tax by inflation and subtract growth in housing costs (rent or interest paid on mortgages). These projections are then aggregated across each household group by income quintile and housing tenure.

Income less tax is calculated as the sum of (projected) labour income, business income, transfer income, superannuation income and investment income. The methodology underlying each component of nominal income less tax is as follows:

- Between the survey period and December 2021, *employee income* is grown forward by observed growth in the Wage Price Index (WPI). From December 2021 to June 2023, we grow employee income forward by Single-Touch Payroll (STP) data from the Australia Taxation Office. The STP data allow us to capture observed differences in income growth depending on the modelled net income quintile of the household; this is not possible using data published with the WPI.
- Business income is grown forward by growth in Unincorporated Gross Operating Profits (GOP) less Finance and Insurance Unincorporated GOP from the ABS.
- Transfer income is grown forward by observed growth in the Consumer Price Index (CPI).
- Superannuation income is grown forward by the value of observed pension benefit payments from the Australian Prudential Regulation Authority.
- For investment income:
 - Interest income from deposits is estimated using the average outstanding paid deposit rate for households series published by the Reserve Bank, multiplied by the estimated deposit balance of the household. The deposit balance of the household is grown forward from the date of the survey by around 35 per cent.
 - Interest income from bonds is estimated as the 10-year Australian Government Security bond yield, multiplied by the estimated bond holdings of the household. The value of bond holdings is grown forward from the date of the survey by around 110 per cent. The survey does not provide further detail about household bond holdings by maturity.
 - Dividend income from shareholdings is estimated as the one-year rolling ASX 200 index dividend yield multiplied by the estimated value of shareholdings of the household. The value of shareholdings is grown forward from the date of the survey by around 24 per cent in line with the growth in household shareholdings observed in the National Accounts.

Housing costs faced by the household are either mortgage interest payments or rents depending on whether the household has a mortgage or rents their own home. We assume the housing costs of outright owners is constant. We exclude the principal component on mortgage payments; in the National Accounts, these payments are considered savings as they increase the equity value held by the mortgagors in their homes. We derive our estimates as follows:

- To estimate mortgage interest payments, we first derive mortgage debt by taking recorded loan balances for mortgagors in the survey and growing them forward in line with observed growth in owner-occupier housing credit from the date of the survey. To derive interest payments, we subtract offset balances from outstanding mortgage debt for each household. We then apply the average outstanding variable-rate owner-occupied mortgage rate. For the purposes of this exercise, we assume there are no fixed-rate mortgages.

- To estimate rents, we grow forward recorded rent payments from the survey by rent inflation in the CPI.
- Other housing costs such as council, water or strata rates are not modelled explicitly but are captured by total CPI inflation.

Inflation is the growth in the CPI between December 2021 and June 2023. This inflation rate is applied to all households evenly. More detailed modelling suggests differences in experienced inflation rates across income quintiles are very small (Wood, Chan and Coates 2023).

Endnotes

- [*] The authors are from Economic Analysis and Financial Stability departments. They would like to thank Jonathan Hambur, Michelle Lewis, Claude Lopez, Marcus Miller, Shivali Raj, Tom Rosewall and Tom Williams for their comments on early versions of this article.
- [1] ‘Traditional’ wealth effects in economic literature occur when wealth unexpectedly increases so households have more resources to support and therefore smooth consumption over their lifetime (Friedman 1957; Ando and Modigliani 1963). See May, Nodari and Rees (2019) for an overview of wealth effects.
- [2] For each income group, estimates of the total change in real disposable incomes across all households in that group are shown. Only employed or retired households are included. These estimates are obtained by growing forward incomes from various income sources, as well as asset and debt holdings of households observed in the 2019/20 Survey of Income and Housing, based on mostly aggregate trends observed in incomes, inflation, interest rates and yields on assets between 2019 and June 2023. Only labour incomes are grown forward at different rates based on the modelled net income quintile of the household as of December 2021. See Appendix A for details on the modelling.
- [3] These measures also do not line up perfectly with the aggregate measures in the Australian National Accounts due to differences in the sample of households modelled, data limitations and assumptions made in the modelling of real disposable income growth across the distribution. See Appendix A for details on how these estimates are derived.
- [4] The availability of distributional data on consumption has been very limited historically. New data sources, such as card spending from banks, are yielding insights on household spending across household characteristics and geographic areas. These data are typically timely and detailed but have a range of limitations. Most notably, these sources offer an incomplete read on consumption and suffer from significant compositional shifts among customers and payment types, which can be difficult to control for. Notwithstanding these limitations, these datasets are still useful in understanding the dispersion of spending growth across household groups.
- [5] This article was finalised before the release of more timely data on wealth from the survey on Household, Income and Labour Dynamics in Australia.
- [6] Households can also borrow money, though little data is available on the distribution of growth in funds borrowed by households. In general, growth in total household borrowings (household credit growth) has been modest in recent quarters.

References

- Ando A and F Modigliani (1963), ‘The “Life-Cycle” Hypothesis of Saving: Aggregate Implications and Tests’, *American Economic Review*, 53(1), pp 55–84.
- Bishop R, J Boulter and T Rosewall (2022), ‘Tracking Consumption during the COVID-19 Pandemic’, *RBA Bulletin*, March.
- Bullock M (2023), ‘Monetary Policy in Australia: Complementarities and Trade-offs’, Speech at the 2023 Commonwealth Bank Global Markets Conference, Sydney, 24 October.
- Friedman M (1957), *A Theory of the Consumption Function*, National Bureau of Economic Research, Cambridge, MA.
- May D, G Nodari and D Rees (2019), ‘Wealth and Consumption’, *RBA Bulletin*, March.
- RBA (2023), *Financial Stability Review*, October.
- Wang L (2022), ‘Household Liquidity Buffers and Financial Stress’, *RBA Bulletin*, June.
- Wood D, I Chan and B Coates (2023), ‘Inflation and Inequality: How High Inflation is Affecting Different Australian Households’, Working paper prepared for RBA Annual Conference, Sydney, 25–26 September.

Inflation Expectations and Economic Literacy

Madeleine McCowage and Peter Rickards^[*]



Photo: Philippe LEJEANVRE – Getty Images

Abstract

The level of community awareness and understanding of basic economic issues can influence a central bank's ability to achieve its goals, such as by anchoring the public's inflation expectations in line with its inflation target. This article draws on novel data from a large-scale survey of Australian adults about their knowledge of the Reserve Bank's inflation target and their expectations for inflation over the short and medium term. Responses to these questions varied significantly according to the socio-demographic characteristics of the survey respondents and their level of economic literacy. The results of this study point to the need for clear communication about the Bank's inflation objectives that caters for variations in awareness and understanding of economic issues across different socio-demographic groups.

Introduction

For both individuals and society at large, there are significant benefits of being economically literate (McCowage and Dwyer 2022). From the perspective of a central bank, the level of community awareness and understanding of both economic developments and the objectives of monetary policy may shape behaviours and attitudes that matter for its ability to achieve its goals – such as by anchoring the public's inflation expectations. For this reason, central banks around the world have

increasingly sought to better understand how well members of the public understand their actions and communications, and if this is associated with economic behaviours.

This article presents insights into aspects of economic literacy in Australia that are especially relevant to the Reserve Bank. Specifically, it draws on survey data that reveal the extent to which Australian adults can correctly identify the Bank's inflation target, and which collate their inflation expectations over the short and medium term. How

Table 1: Survey Questions on the RBA's Inflation Target and Inflation Expectations

Topic area	Question
RBA's inflation target	As far as you know, what is the Reserve Bank of Australia's target range for inflation? (a) 0–1 per cent (b) 1–2 per cent (c) 2–3 per cent (d) 3–4 per cent (e) 4–5 per cent (f) 5–6 per cent (g) 6–7 per cent (h) 7–8 per cent (i) 8–9 per cent (j) 9–10 per cent (k) don't know / uncertain
12-month ahead inflation expectations	Inflation is the rate of increase or decrease in prices of goods and services purchased by households. What do you expect the rate of inflation will be <i>over the next 12 months</i> ? In percentage terms, please give your best guess. If you do not think there will be any inflation in the next 12 months, please enter a '0'. If you expect deflation (opposite of inflation), enter a negative value. If you expect inflation, enter a positive value. Over the next 12 months, I expect the rate of inflation to be ___ %
Medium-term inflation expectations	We would now like to know what you think the inflation rate will be further into the future. Inflation is the rate of increase or decrease in prices of goods and services purchased by households. What do you expect the inflation rate will be over the 12-month period between January 2025 and January 2026 (in 3 years' time)? In percentage terms, please give your best guess. I expect the rate of inflation to be ___ %

Source: RBA.

these variables differ across socio-demographic groups, notably between males and females, is also explored. The article builds on previous Bank research that provided a first read on the general community's measured understanding of issues related to core areas of macroeconomics, which showed significant differences in economic literacy across socio-demographic groups (McCowage 2023).

The data

Data used in this article are drawn from the results of a novel survey of a representative sample of 3,000 Australian adults conducted in January 2023 by the Behavioural Insights Team (BIT) on behalf of the Bank's public education program.^[1] This dataset was introduced in the Bank's initial work on the measurement of economic literacy (McCowage 2023). The survey was conducted in a way that allowed us to see how respondents' understanding of economic concepts was influenced by the information source and context

provided; the survey also included a range of other multiple-choice questions that tested economic literacy and other behaviours. The questions that are the focus of this article are given in Table 1.

These data are novel compared with existing data on consumer inflation expectations for a number of reasons, including that they enable us to:

- consider how inflation expectations relate to a new set of variables, such as knowledge of the Bank's inflation target and respondents' level of economic literacy (measured as a score tallying how many of five questions on core macroeconomic topics were answered correctly; see McCowage 2023 for details)^[2]
- examine the role of respondents' level of engagement with economic news in their day-to-day lives, at least through written or online channels (proxied by respondents' answers to the survey question 'How often do you read or visit a website for economics or business news?', with possible responses of 'every day', 'about

once a week, 'about once a month' and 'never or hardly ever')

- look at inflation expectations over longer horizons than have previously been asked of households in Australia.

Knowledge of the Reserve Bank's inflation target

The most common response to the question on the Bank's inflation target was 'don't know/uncertain' (Graph 1). Just over 20 per cent of respondents correctly identified the target range for inflation as 2–3 per cent, and around 40 per cent answered in the 'ballpark' of this correct response (answering 1–2, 2–3 or 3–4 per cent).

So, is a 20 per cent correct response rate to this question high or low? Researchers in other countries have found broadly similar results – for example, Coibion, Gorodnichenko and Weber (2022) found in a 2018 survey that less than 20 per cent of households in the United States could identify the Federal Reserve's inflation target.^[3] In most cases, researchers have characterised their findings of similar magnitude as evidence that household understanding of monetary policy objectives is limited.

Given limited knowledge of Australia's inflation target in the overall population, does knowledge vary among socio-demographic groups? We found that it varied markedly (Graph 2). Those who reported to be engaged with economic news had

the highest share of correct responses to the question about the inflation target, with 30 per cent of this group answering the question correctly. This is not surprising – for a fact-based question that tests knowledge recall such as this, regular exposure to economic content inevitably increases the chance of a correct response. Those who had studied economics or finance also had a relatively high correct response rate to the inflation target question, at just under 30 per cent. Among those most likely to report that they did not know the Bank's inflation target were unemployed persons, females, young people and those who are not engaged with economic news.

Given the variations in knowledge about the inflation target among different groups in our sample, what socio-demographic characteristics were most important? To establish this, a simple regression model was estimated. The results confirmed that being employed, engaged with economic news or male are the most important factors associated with knowing the Bank's inflation target, all else equal (Appendix A).

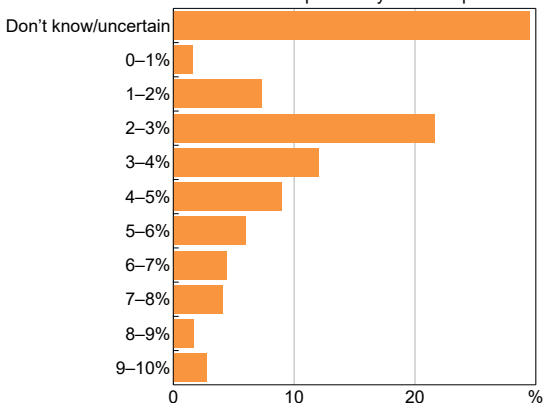
Inflation expectations

Given the importance of household inflation expectations for economic outcomes, the survey also asked respondents what they expected the rate of inflation to be in the next 12 months and in three years' time. The three-year horizon is novel because traditionally such inflation expectations are inferred from financial assets with a three-year maturity. Across the board, respondents reported

Graph 1

As Far as You Know, What is the RBA's Target Range for Inflation?

Share of responses by answer option

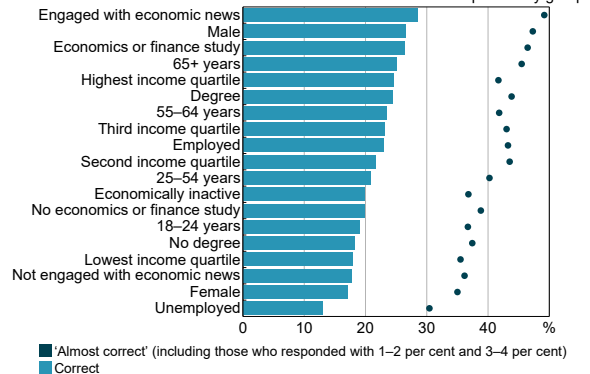


Source: RBA.

Graph 2

Who Knows the RBA's Inflation Target?

Share of correct and almost correct responses by group



Source: RBA.

above-target inflation expectations, consistent with actual inflation outcomes as of January 2023 (Graph 3). Above-target inflation expectations were also consistent with results in other surveys of consumers, like the Melbourne Institute Survey of Consumer Inflationary Expectations, which is taken monthly (Haidari and Nolan 2022). Also consistent with the Melbourne Institute survey is the tendency of respondents to report expectations that are a multiple of five, indicating digit preferencing and rounding, although the surveys' questions were formulated differently.^[4]

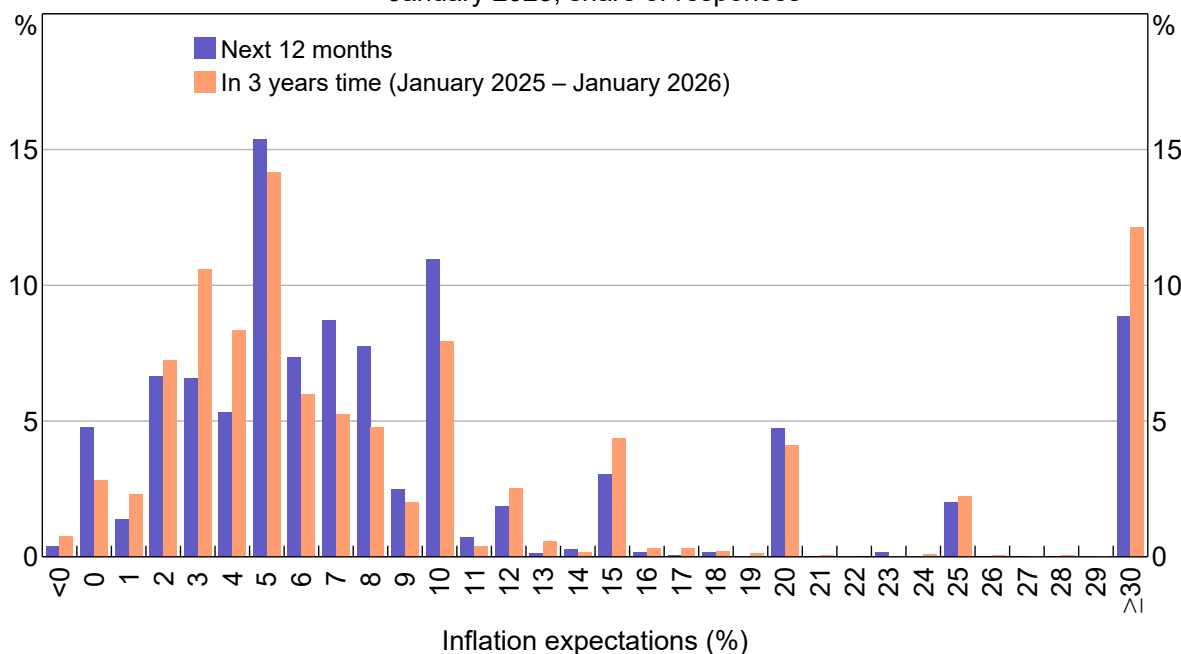
While the high-level data are consistent with the Melbourne Institute survey, the BIT survey enabled us to consider the interaction of individual expectations with engagement with economic news, economic literacy and knowledge of the Bank's inflation target, as mentioned above. We were also able to investigate inflation expectations given the respondent's sex (data on which are also included in the Melbourne Institute survey).^[5] Findings are presented for inflation expectations in the year ahead, consistent with existing surveys.^[6]

Inflation expectations, by sex

Inflation expectations among male and female survey respondents differ markedly (with these differences being statistically significant), consistent with overseas survey findings as well as the Melbourne Institute survey (Haidari and Nolan 2022). The median expectation for 12-month ahead inflation for males was 6 per cent, broadly in line with central bank and private sector forecasts. By contrast, the median female expectation was 8 per cent.

Graph 4 shows the clear difference in the distribution of 12-month expectations for inflation among males and females. (Interestingly, differences in inflation expectations for those who had or had not previously studied economics or finance look very similar to the differences between males and females.) In large part, differences are driven by the extent to which participants 'round' their inflation expectation to the nearest 5 per cent (e.g. 5, 10, 15, 20 per cent). Female survey respondents rounded expectations much more frequently than their male counterparts. As a result

Graph 3
Distribution of Inflation Expectations*
 January 2023, share of responses



* Grouped into one percentage point interval; frequencies shown are including and above the number indicated on the x axis.

Source: RBA.

of the rounding occurring at higher integers, the overall average and median expectation for female respondents were higher than for males. Surveys undertaken overseas have shown similar patterns (Binder 2017a).

The clustering of responses around round numbers could point to uncertainty among respondents on the level of inflation, or even the concept of inflation. In the United States, Binder (2017b) found that survey participants who round their expectations are likely to be more uncertain about their responses, and this may suggest a lower level of understanding about inflation more generally.

Inflation expectations and engagement with economic news

Those who reported themselves as being more engaged with economic news appeared to have inflation expectations that were closer to those of the Bank and professional forecasters compared with those who were less engaged (Graph 5). At the time of the survey, the Bank and professional forecasters expected inflation to be around 5–6 per cent over 2023. Participants who self-reported as being engaged with economic news had inflation expectations that were much more tightly clustered around this rate than those who were not as engaged. (This is shown by the greater density of inflation expectations of 5–6 per cent for those who were engaged with economic news, especially those who engaged daily.) This is broadly what might be expected from individuals who are

engaged with the news – they are able to stay more up to date in a changing inflation landscape and report more anchored inflation forecasts.

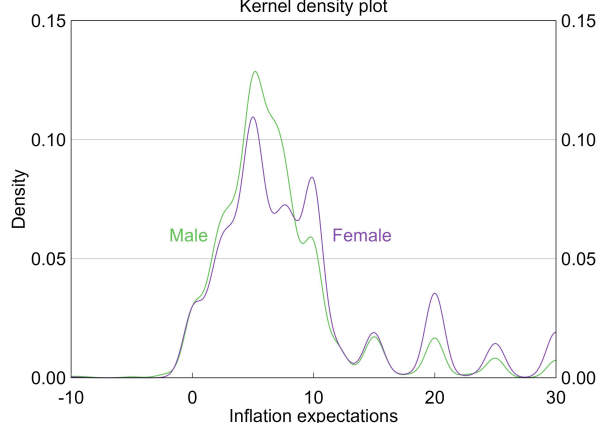
Inflation expectations and economic literacy

There appears to be a strong link between respondents' inflation expectations and their assessed level of economic literacy within the survey. Respondents' economic literacy was determined by how many of five economic literacy questions were answered correctly, tallied to generate a 'score' between zero and five (McCowage 2023).

Twelve-month ahead inflation expectations converged towards those of the Bank and professional forecasters as respondents' economic literacy scores rose (Graph 6). For those with an economic literacy score of zero, the average inflation expectation was around 13.5 per cent. By contrast, for those with a score of five, the average expectation was around 6.5 per cent – broadly in line with Bank and professional forecasts. Considering the split by sex (as shown in Graph 4), there was less variation in male respondents' inflation expectations across economic literacy scores. By contrast, females reported more varied expectations. Females with lower economic literacy reported an average expectation of nearly 17 per cent, whereas those with the highest economic literacy reported expectations of 7 per cent.

Graph 4

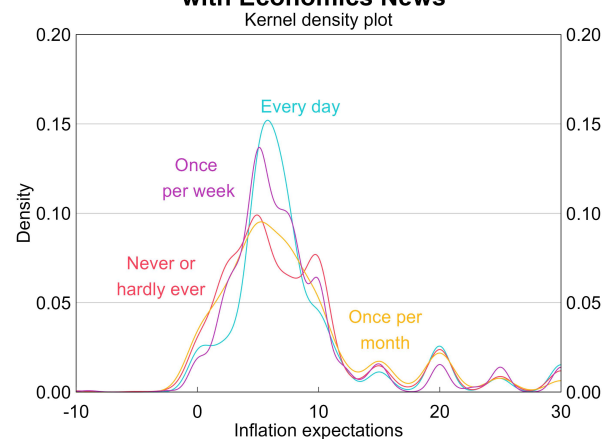
Inflation Expectations by Sex*



* 12-month ahead inflation expectations as at January 2023; responses below -10 or above 30 are excluded.
Source: RBA.

Graph 5

Inflation Expectations by Engagement with Economic News*



* 12-month ahead inflation expectations as at January 2023; responses below -10 or above 30 are excluded.
Source: RBA.

Inflation expectations and knowledge of the Bank’s inflation target

An important reason why central banks may wish to build and support community knowledge of their inflation targets is to shape inflation expectations. If more households understand the target range of inflation that central banks are striving to achieve, and they see the central bank’s commitment to this objective as credible, they may be more likely to expect inflation outcomes within that range. This, in turn, has implications for their behaviour.

Higher responses to the question on the Bank’s inflation target were associated with higher inflation expectations among survey respondents (Graph 7). This relationship is statistically significant even after accounting for the effects of other characteristics of respondents.^[7] Indeed, regression analysis shows it is almost one-for-one: for each step-up in the response to the Bank’s inflation target question (e.g. from 3–4 per cent to 4–5 per cent), inflation expectations for the coming 12 months were 0.8 percentage points higher, all else equal.^[8] It is of course possible that both knowledge of the inflation target and inflation expectations are being driven by another outside factor, such as economic literacy.

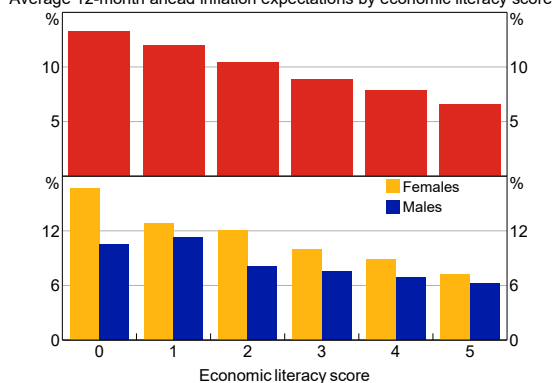
Data considerations

The data presented in this article are novel and shed light on the public’s understanding of economic developments and monetary policy. But it is important to acknowledge their limitations. For one,

we cannot control for the media and macroeconomic environment at the time of the survey. Heightened reporting of central bank activity, high inflation outcomes and monetary policy tightening at the time of the survey (January 2023) may have affected the extent to which survey respondents knew about the Bank’s inflation target or influenced their inflation expectations. Repeating the survey over time would help identify whether our findings were affected by prevailing media or macroeconomic conditions.

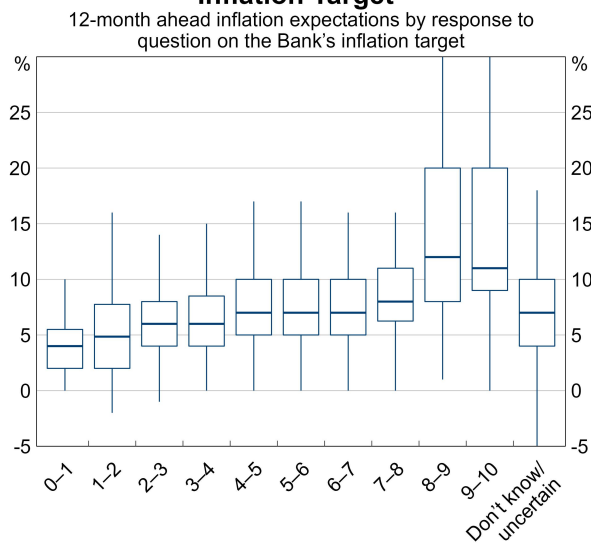
The survey also cannot tell us anything about respondents’ conceptual understanding of inflation or the Bank’s policy objectives and framework. For instance, some respondents may understand *why* the Bank has an inflation target and its importance but could not recall the exact level of the target. Arguably, the former is what matters for economic literacy. Further, the survey cannot tell us the degree of conviction (or otherwise) in reported inflation expectations among respondents – were some respondents simply guessing or did they truly expect much higher inflation outcomes? This matters for the extent to which these findings might translate to real economic behaviours, such as decisions around investment or wage negotiations.

Graph 6
Inflation Expectations and Economic Literacy
 Average 12-month ahead inflation expectations by economic literacy score*



* Excludes responses below -10% or above 50%.
 Source: RBA.

Graph 7
Inflation Expectations and the Bank’s Inflation Target*
 12-month ahead inflation expectations by response to question on the Bank’s inflation target



* Box-and-whisker plot showing the median, 25th and 75th percentiles as well as the minimum and maximum values (excluding extreme outliers).
 Source: RBA.

Conclusion

This article has presented new descriptive findings about knowledge of the Bank's inflation target and inflation expectations in the Australian community. The data show that overall knowledge of the Bank's objectives is limited, but in line with overseas estimates. Males, as well as individuals who were more engaged with economic news, typically reported much more 'anchored' inflation expectations than others. Individuals with higher levels of economic literacy (which itself is related strongly to sex and previous education) or with closer-to-accurate responses for the Bank's inflation target question also reported much more anchored inflation expectations. These results speak to the importance of simple, targeted communication from central banks so that the public can better understand their objectives and policy decisions – and thereby build greater trust in these institutions (Christelis *et al* 2020).

Future research could seek to understand the barriers to people's understanding of economic topics. Is it that the public simply does not understand concepts like inflation? If so, is this because material on these topics – from the Bank or the media – is typically pitched at a level that is too technical for the community to grasp? Is the material lacking clarity? Is formal education on these topics lacking? Or do individuals not realise how inflation and/or monetary policy outcomes affect them, so they do not engage with such issues given they have scarce time to process the available information (so-called 'rational inattention' (Reis 2006))? There could be many reasons behind these results and, in turn, many ways to respond. A good place to start in cultivating a greater awareness of the inflation target and more informed inflation expectations would appear to be encouraging engagement with economic news and articulating the benefits of understanding economics. ✖

Appendix A: Regression specification and output: Propensity to know the Bank's inflation target

A simple model of the likelihood of respondents knowing the Bank's inflation target was run:

$$\begin{aligned} &\text{Probability of correct response to RBA inflation target question}_i \\ &= \alpha + \beta_1 \text{Female}_i + \beta_2 \text{Age}_i + \beta_3 \text{IncomeQuartile}_i + \beta_4 \text{Degree}_i \\ &+ \beta_5 \text{StudiedEcon}_i + \beta_6 \text{EmploymentCategory}_i + \beta_7 \text{EconEngaged}_i + \varepsilon_i \end{aligned}$$

where, for each respondent i :

- Probability of correct response to RBA inflation target question $_i$ is the likelihood of a correct response to this question (between 0 and 1)
- Female $_i$ is 1 if the respondent is female (and 0 if they are male)
- Age $_i$ is the respondent's age in years
- IncomeQuartile $_i$ is a categorical variable between 1 and 4 for the respondent's income quartile
- Degree $_i$ is 1 if the respondent has a university degree
- StudiedEcon $_i$ is 1 if the respondent has studied economics or finance
- EmploymentCategory $_i$ is 1 if the individual is unemployed, 2 if economically inactive, 3 if employed
- EconEngaged $_i$ is 1 if the respondent reports that they read or visit websites for economics or business news every day or once a week (and 0 if they responded once a month or never/hardly ever).

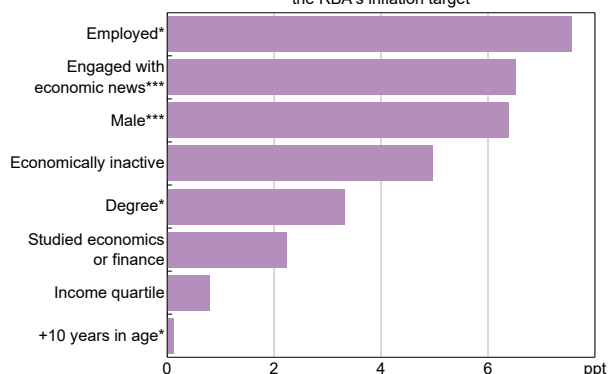
Probit and logit models were estimated, which was appropriate given the outcome variable (whether the inflation target question was answered correctly) is binary.

Table A1: RBA's Inflation Target – Regression ResultsAverage marginal effects^(a)

Outcome Estimation method	Probability of knowing the RBA's inflation target	
	Probit	Logit
Female	−0.0638*** (−4.08)	−0.0640*** (−4.04)
Age (years)	0.00113* (2.32)	0.00111* (2.27)
Income quartile	0.00803 (1.0)	0.00751 (0.93)
Degree	0.0331* (2.87)	0.0328* (2.04)
Studied economics	0.0224 (1.27)	0.0198 (1.12)
Economically inactive	0.0497 (1.52)	0.0499 (1.49)
Employed	0.0756* (2.39)	0.0743* (2.28)
Engaged with economic news	0.0652*** (3.95)	0.0646*** (3.90)
Observations	2,999	2,999
Pseudo R ²	0.0284	0.0280

(a) * if p<0.05, ** if p<0.01, *** if p<0.001.

Source: RBA.

Graph A1**RBA's Inflation Target
Question — Probit Regression Results**Marginal effects on the probability of knowing
the RBA's inflation target

* if p<0.05, ** if p<0.01, *** if p<0.001.

Source: RBA.

Endnotes

- [*] Madeleine McCowage completed this work while manager of the Bank's education program, and Peter Rickards is an RBA Lead Analyst currently pursuing postgraduate studies at the University of Oxford. The authors would like to thank Jacqui Dwyer for establishing and championing research on economic literacy in Australia at the Reserve Bank, and for her invaluable support in drafting this article.
- [1] BIT is based in the United Kingdom and collects data for 'social purpose' research, working with universities, private consultancies, international agencies, government agencies and central banks.
- [2] Since the BIT survey, La Cava (2023) conducted an experiment, also with a sample of 3,000 Australian adults, in which a treatment group were told what the Bank's inflation target was; the author then estimated the effect of this communication on their inflation expectations. La Cava's approach differs from the research presented in this article where the sample population's actual knowledge of the inflation target, measured level of economic literacy and engagement with economic news were known.
- [3] These authors also found that almost 40 per cent of respondents answered that the Fed was targeting an inflation rate of 10 per cent or more, and that low-income and less-educated individuals had higher average beliefs about the Fed's inflation target. Furthermore, a 2018 survey of firms in the United States by Coibion *et al* (2020) found that 25 per cent could correctly identify the Fed's 2 per cent inflation target, while 60 per cent 'did not know'. Kumar *et al* (2015) found that only 30 per cent of firm managers in a New Zealand survey could correctly identify, out of five multiple choices, that the central bank's primary objective is to keep inflation low and stable (the multiple-choice options were 'keep the exchange rate stable', 'promote full employment', 'keep interest rates low and stable' and 'help the government finance its spending'); these authors also found that only 12 per cent of respondents correctly identified the midpoint of the Reserve Bank of New Zealand's (RBNZ) inflation target, although another 25 per cent could identify the bottom and top of the RBNZ's range. Van der Cruysen, Jansen and de Haan (2015) found that only half of Dutch respondents could identify (from two options) that the European Central Bank (ECB) targets inflation close to but just below 2 per cent; from 11 statements about the ECB's objectives, respondents answered less than five correctly on average. See Binder (2017a) for a helpful review of studies investigating household awareness of central bank activities.
- [4] The Melbourne Institute Survey of Consumer Inflationary Expectations asks 'I'd like to find out what you think will happen to prices. Thinking about the prices of things you buy, by this time next year, do you think they'll have gone up, down, or stayed the same?' Respondents can choose from (A) Up, (B) Down, (C) The same, (D) Don't know/uncertain. If they answer (A), they are then asked: 'By what percentage do you think prices will have gone UP by this time next year?' If they answer (B), they are then asked: 'By what percentage do you think prices will have gone DOWN by this time next year?' Anyone who answers 'the same' is assigned an inflation expectation of zero. This typically accounts for a large share of responses to the Melbourne Institute survey.
- [5] BIT collected information on age, gender, education, location, income and employment status using the pre-screening questions in their platform; there was little scope to change the question on gender to directly match the current ABS Standard (which specifies sex at birth or an alternative title).
- [6] Across all the categories discussed below (i.e. gender, engagement, economic literacy and knowledge of the Bank's inflation target), the results and conclusions drawn are similar when considering three-year-ahead inflation expectations.
- [7] This is according to regression analysis controlling for the main socio-demographic factors available on respondents. Observations for those who responded 'don't know or uncertain' to the question on the Bank's inflation target were excluded from this regression.
- [8] In a separate survey of Australian adults, La Cava (2023) found that respondents who were randomly assigned information about the Bank's inflation target were significantly less likely to believe that current and future inflation were well above the target. The effect of the communication on inflation beliefs was stronger for people who typically report themselves to be less economically literate, including respondents who identified as female, had lower levels of educational attainment or had an 'average' understanding of inflation.

References

- Binder C (2017a), 'Fed Speak on Main Street: Central Bank Communication and Household Expectations', *Journal of Macroeconomics*, 52, pp 238–251.
- Binder C (2017b), 'Measuring Uncertainty Based on Rounding: New Method and Application to Inflation Expectations', *Journal of Monetary Economics*, 90, pp 1–12.
- Christelis D, D Georgarakos, T Jappelli and M van Rooij (2020), 'Trust in the Central Bank and Inflation Expectations', *International Journal of Central Banking*, 16(6), pp 1–38.
- Coibion O, Y Gorodnichenko, S Kumar and M Pedemonte (2020), 'Inflation Expectations as a Policy Tool?', *Journal of International Economics*, 124, Art 103297.

Coibion O, Y Gorodnichenko and M Weber (2022), 'Monetary Policy Communications and Their Effects on Household Inflation Expectations', *Journal of Political Economy*, 130(6), pp 1537–1584.

Haidari Y and G Nolan (2022), 'Sentiment, Uncertainty and Households' Inflation Expectations', *RBA Bulletin*, September.

La Cava G (2023), 'Open Mouth Operations: Does Communication of the RBA's Inflation Target Affect Consumers' Beliefs About Inflation?', e61 Institute Micro Note No 10.

McCowage M (2023), 'Economic Literacy in Australia: A First Look', *RBA Bulletin*, September.

McCowage M and J Dwyer (2022), 'Economic Literacy: What Is It and Why Is It Important?', *RBA Bulletin*, December.

Reis R (2006), 'Inattentive Consumers', *Journal of Monetary Economics*, 54, pp 1761–1800.

van der Cruysen C, D Jansen and J de Haan (2015), 'How Much Does the Public Know about the ECB's Monetary Policy? Evidence from a Survey of Dutch Households', *International Journal of Central Banking*, 11(4), pp 169–218.

What Do Firms Tell Us About the Inflation Outlook?

Amardeep Johal, Jonathan Kemp, Kate McLoughlin and Max Zang^[*]



Photo: Yuichiro Chino – Getty Images

Abstract

The Reserve Bank's liaison program collects information from firms in Australia about current economic conditions and their expectations for future conditions, including their own prices. Firms' observations provide a timely read on inflation. Over the past six months, firms have generally expected their prices growth to continue to moderate, but on average to remain above the Bank's inflation target range of 2–3 per cent. Firms have reported that large cost increases over recent years are still flowing through to some parts of the supply chain and have indicated that this is the primary driver of their decisions to increase prices at a faster-than-normal rate. Slower growth in demand and increased competition are expected to result in a further slowing in growth of firms' prices over coming quarters.

Introduction

The Reserve Bank's liaison program is an important input into the Bank's understanding of economic conditions, including inflation. The liaison program gathers economic intelligence through interviews with firms conducted continuously throughout the year on a wide range of topics.^[1] Around 700 meetings with firms are held annually. The information collected offers a live – albeit partial – read on what is happening in the economy and

why. It also gives the Bank insight into firms' expectations for the future.

Nature of the inflation information collected

In terms of inflation-related information, over the past two decades firms in the liaison program have been consistently asked two core questions about prices, as well as other questions about wages and costs. Specifically, firms have been asked how much their prices have changed on average over the

12 months preceding each interview (their ‘year-ended price growth outcome’) and their expectations for average price changes over the 12 months following the interview (their ‘year-ended price growth expectation’). These questions have been asked alongside other questions on the drivers of their price changes and related topical questions that vary over time.

The Bank organises information on prices collected from liaison interviews into four broad categories:

- **numerical** year-ended average price growth outcomes and expectations from firms
- qualitative information on the drivers of pricing decisions that are recorded as **text**
- quantitative **staff scores** on an ordinal scale from –5 to +5, adjusted for what is ‘normal’ or ‘average’ for each firm^[2]
- supplementary information collected episodically by interview, recorded as **survey data**.

This article shares recent insights from the Bank’s liaison on prices, including a supplementary pricing survey of firms conducted by the Bank in 2023. The article also discusses deeper topic-specific analysis of the dataset of information collected over the life of the program that has been made possible by investment in upgrading and expanding data analytics capability, including through use of artificial intelligence.^[3] The entire liaison dataset analysed includes around 20 million words on economic conditions collected from firms and around 150,000 staff scores for key economic variables assigned based on the conditions reported by firms.

Results of pricing survey

A targeted group of 80 firms participated in supplementary survey interviews over August and September 2023.^[4] The objective of the survey was to increase the Bank’s understanding of the factors firms were considering in making pricing decisions and as such to support the Bank’s analysis of inflation. Firms were interviewed in detail on their pricing decisions to complement information from other liaison meetings, data and business surveys. For the survey, firms were selected on the basis of

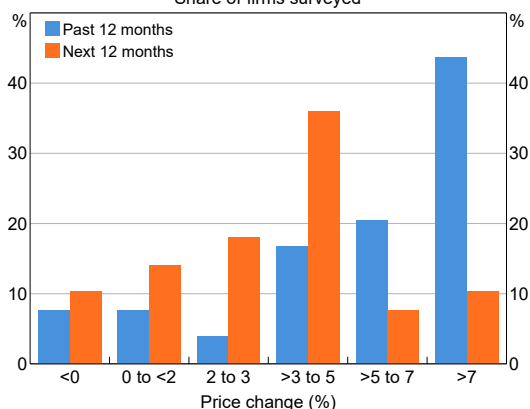
ensuring a broadly representative sample of the products and services included in Australia’s Consumer Price Index (CPI).

Answers to the survey at the time indicated that the growth in firms’ prices had slowed considerably but would remain above the inflation target range over the year ahead. The median year-ended price growth outcome of firms in the 2023 survey was around 7 per cent (Graph 1).^[5] Sixty-nine of the 80 firms surveyed had increased their prices in the 12 months before the survey, an unusually high share in the history of the liaison program, reflecting the breadth of inflationary pressures in the economy. The median reported year-ended price growth expectation for the 12 months ahead was 4 per cent. The expected moderation in price growth was broadly based among firms across different industries, though there was some variation within industries. Services firms expected their price growth to come down more slowly, on average, than goods firms (Graph 2).

While firms’ pricing intentions were consistent with an easing in the pace of inflation, it was notable that their average expected price growth would remain above the Bank’s inflation target range of 2–3 per cent over the year ahead. Only a few firms surveyed expected to reduce prices on average across their product range over the 12 months following the survey.

Graph 1

Size of Price Changes
Share of firms surveyed



Source: RBA.

Drivers of prices growth

Firms were asked about the role of their non-labour costs, labour costs, demand, their competitors' behaviours and the exchange rate in driving their year-ended price growth outcome over the previous 12 months. For each of these factors, firms rated the significance of each factor on a four-point scale – from 'unimportant' to 'very important'. The cost factors were cited as the most important drivers of pricing decisions over the prior year (Graph 3). Firms said that over recent months slowing demand conditions and competitors' behaviours had become more important considerations and were expected to remain important over the period ahead.

Costs and profit margin considerations

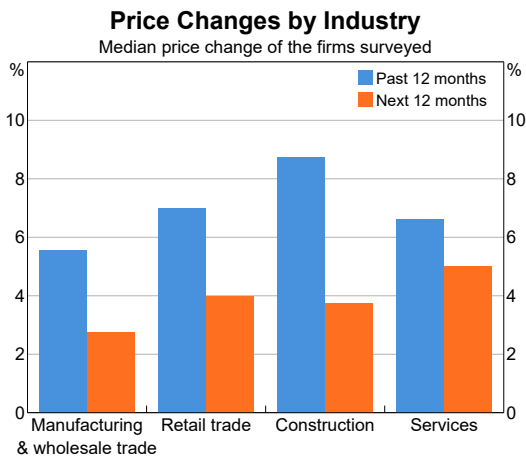
Firms generally highlighted the importance of costs in determining their prices over the previous 12 months, but they placed different weights on labour and non-labour costs. These weights broadly accorded with their composition in each firm's total costs. For example, labour tended to be a larger share of costs at services firms, and these firms were more likely to cite labour costs as a 'very important' factor in their price setting than goods firms. Goods firms instead typically cited non-labour costs as 'very important'. This split is useful in explaining the outlook for firms' prices with the lift in wages growth over the past year underpinning the strength in price increases by services firms, and the

easing in imported goods costs flowing through to goods firms' prices.

Firms said a desire to rebuild or maintain their net profit margins (a firm's revenue less costs) in the high inflation environment was affecting the outlook for prices. Some firms reported that they had maintained stable margins over the prior 12 months by increasing their prices. Firms in the survey sample that were able to maintain stable margins had increased their prices on average by more than other firms. The median price increase for firms with stable margins was around 10 per cent, compared with around 6 per cent for other firms (Graph 4). Firms surveyed that expanded their margins over the prior year had not generally increased their prices more strongly than other firms.

Some firms reported that they were unable to pass through the full increase in their costs because of growing competition in their market or because they were concerned about demand. Average margins declined over the prior 12 months for these firms. A majority of those reporting a decline in their margins also reported having a share of their market below 20 per cent.

Graph 2

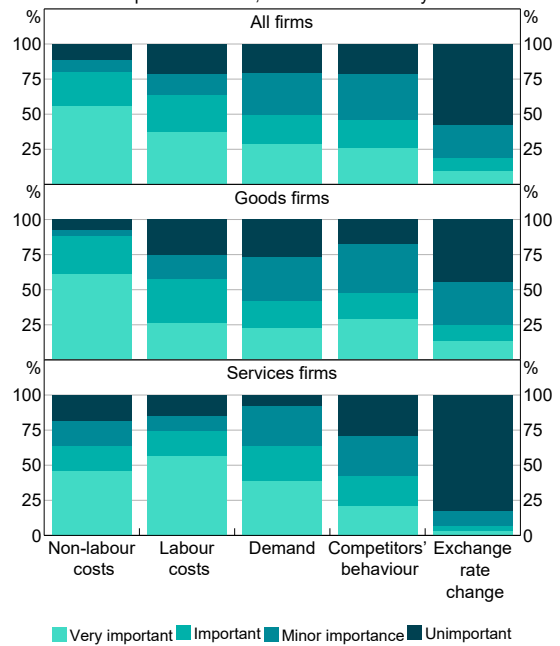


Source: RBA.

Graph 3

Drivers of Price Changes

In past 12 months, share of firms surveyed



Source: RBA.

Looking ahead, firms in the survey that expected their margins to narrow over the 12 months to August 2024 intended to increase their prices modestly over that period, on average by 1 per cent. By contrast, firms that expected to expand or maintain margin over that period expected to increase their prices on average by around 4 per cent.

Effect of demand on inflationary pressures

Several firms indicated that demand had been so strong over recent years that many customers had been willing to pay more to secure goods and services and that customers were relatively accepting of price increases, compared to some previous periods. As such, many firms surveyed cited demand as an important factor in their pricing decisions, but the share that did so was lower than for costs. This finding is consistent with a survey of firms in the Bank’s liaison program in 2008, a previous period of high inflation, when costs were reported as a more important driver of prices than demand (Park, Rayner and D’Arcy 2010). Recent Bank analysis of the text of earnings calls conducted by listed Australian companies from 2007–2023 also found that sentiment about final prices had a significantly stronger association with sentiment about input costs than it did with sentiment about demand in that period (Windsor and Zang 2023).^[6]

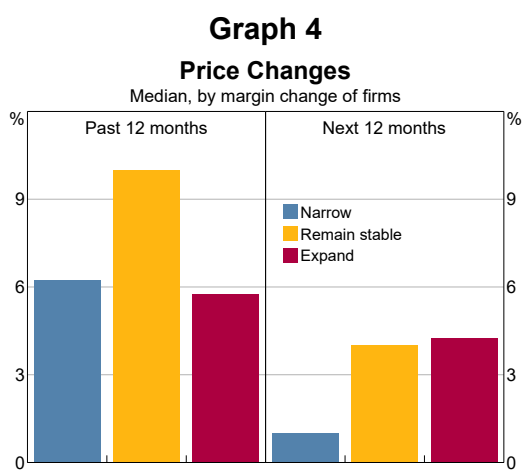
Firms expected the role of demand in their pricing decisions to increase in the 12 months following the survey as both costs and demand growth were expected to moderate. Some firms highlighted that

discounting activity increased in early 2023 as consumer demand slowed. This was most apparent among consumer-facing firms such as retailers. Reports in liaison of some discounting among residential construction-related firms had also begun to be more prevalent in early 2023, and in the survey some firms noted that discounting had become ‘aggressive’ in this industry and that this could lead to further stress and insolvencies in the industry.

Competitive pricing

In general, firms’ responses to the survey indicated that the level of competition in their market was not a primary driver of price outcomes over the preceding 12 months. There was little difference between the median reported price outcomes of firms that rated the level of competition in their market as significant and those that did not. However, a small number of firms that rated competition as low made notably larger price increases than the median increase. Similarly, some firms that saw themselves as price leaders in their market increased their prices by notably more than the median price outcome over the 12 months preceding the survey.

However, a noticeable theme from the 2023 survey, which also became more prominent in messages from the broader liaison program as the year evolved, was that in forward-looking pricing decisions price competition was intensifying and was likely to put downward pressure on prices in the 12 months following. This compares to the preceding years when strong demand, together with the sharp rise in costs, resulted in greater acceptance of price increases both along the supply chain and by consumers. Looking forward, firms in the survey that rated their industry as having a relatively high level of competition on average expected somewhat lower price growth over the 12 months to August 2024 than those that said competition was relatively low in their industry.



Source: RBA.

Effect of exchange rate on prices

At the time of the survey, only a small number of firms identified changes in the exchange rate as an important driver of their pricing decisions over the previous 12 months. This was consistent with a

broadly stable exchange rate in the 12 months before the survey. Firms where the primary business activity involves purchasing goods were asked whether they mainly import these goods directly or buy from domestic wholesalers. As would be expected, those firms that directly import most of their goods were more likely to identify exchange rates as important in their general pricing decisions than other firms; in many cases, importing firms employ hedging strategies to manage the effects of exchange rate moves.

Insights from liaison about inflation in recent months

Over the latter part of 2023, firms continued to report through the broader ongoing liaison program that substantial upwards pressure on their prices persisted.

Slightly more than three-quarters of firms in the liaison program are still increasing their prices. Reports from firms on their expected price increases suggest this share will remain relatively steady over the coming 12 months, well above the historical average share. The share of firms expecting to increase their prices at a pace that they characterise as above average also remains elevated, although it has declined in recent quarters (Graph 5).

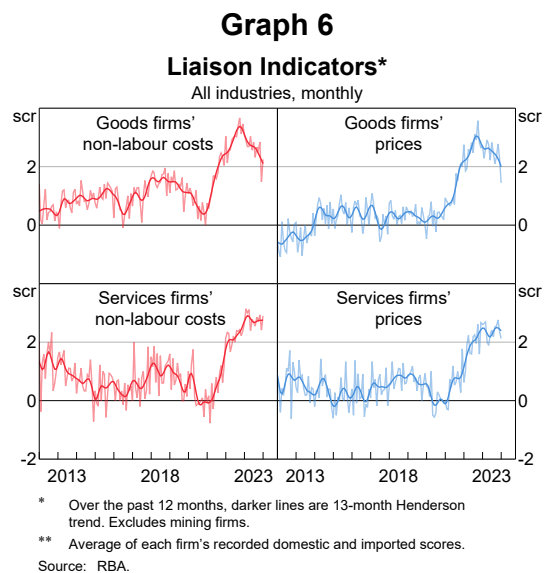
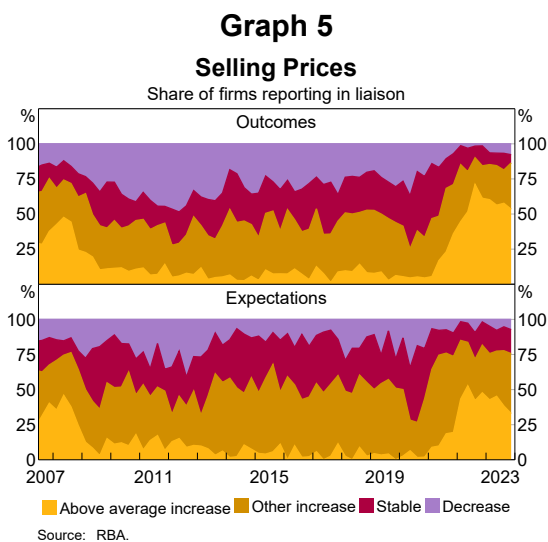
Elevated non-labour cost and price pressures remain broadly based (Graph 6). The qualitative messages firms provide in interviews have also offered valuable explanations of why prices are changing (or not), which have helped the Bank to

understand pricing conditions for different industries and inflation risks. Some key drivers of persistent upward pressures on domestic costs over the past year have been energy, logistics (including fuel) and insurance. These cost increases are in addition to substantial increases in unit labour costs over recent years, which are impacting services firms more than goods firms because of labour's larger share of their costs.

The weight of recent evidence from firms, alongside other data and survey information, has suggested that prices growth may moderate more slowly than previously anticipated. This is despite firms in some goods-related industries saying they are 'reaching the limit' of price increases that they can put through given softer demand conditions. Records of discussions with firms in liaison, and the artificial intelligence summary indicators of topic frequency and sentiment scores derived from these text records, similarly illustrates a slowing in the moderation of cost and price inflation over late 2023, alongside inflation indicators from other sources (Graph 7).^[7]

Firms' views provide a reasonable read on official data

The numerical estimates of the price growth firms report they have implemented over the previous 12 months and of the price growth they intend to implement over the coming 12 months have historically had a reasonable correlation with year-



ended official measures of inflation (Graph 8).^[8] Periods where a large share of firms in the program have been reporting price increases greater than 3 per cent have also broadly coincided with periods when large shares of the components of Australia’s CPI basket are growing above the target range (Graph 9).

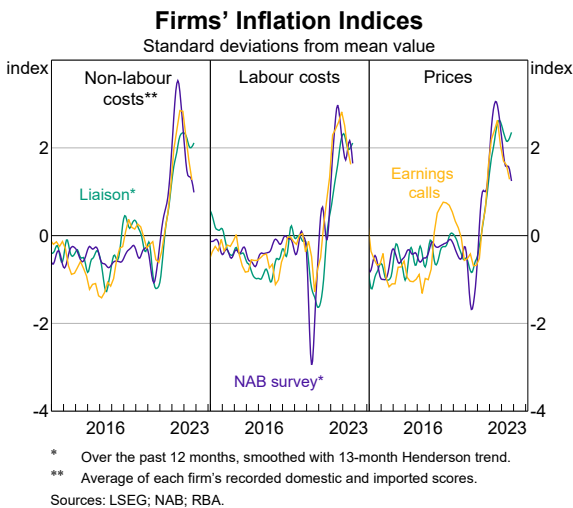
Data analytics have also allowed the Bank to examine more holistically the information firms report and how it changes over time, including the distribution of firms’ outcomes, to inform the Bank’s assessments of inflation. Over time, the range of price outcomes reported across firms has stayed fairly stable. But since the start of 2021, three changes in firms’ pricing can be observed

(Graph 10). First, fewer firms have reported price decreases. Second, more firms than usual have reported very large price increases. Third, a larger share of firms has reported small positive increases.

Conclusion

Liaison information suggests a continued moderation in prices growth over the coming year. The pace of that slowing is uncertain and the share of firms expecting above-average increases is still much higher than prior to the pandemic. Inflationary pressures remain generally broadly based across firms and industries, reflecting some domestic costs continuing to grow strongly. Liaison provides some evidence that slower demand growth is playing a role in firms’ pricing decisions, helping to achieve a better balance

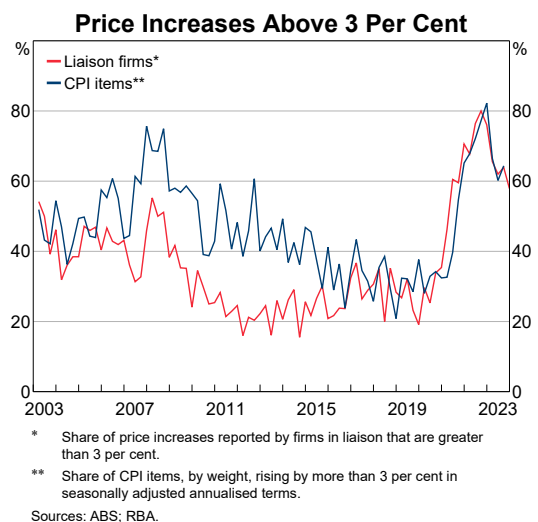
Graph 7



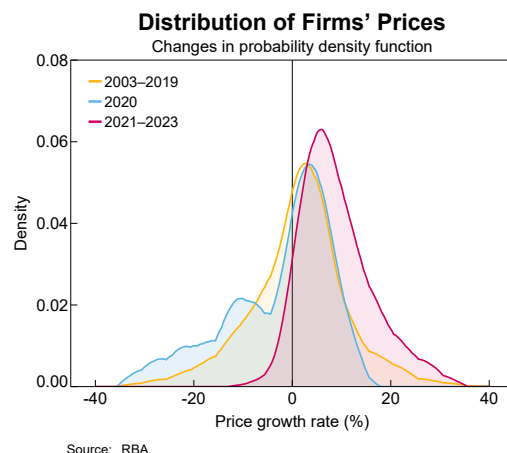
Graph 8



Graph 9



Graph 10



between the level of demand and supply, which is needed to return inflation back towards the target range. If demand weakens quickly, the pace of moderation in prices growth could accelerate. In the 2023 pricing survey, firms suggested that while costs were the most important drivers of their price increases, a softening in demand was likely to be a more important factor in driving a slowing in prices

growth in the following 12 months. Pricing surveys conducted by the liaison program between 2004 and 2010 found that firms typically increase prices in response to a rise in costs but decrease prices in response to a competitor's price cut or a fall in demand (Park, Rayner and D'Arcy 2010). ❖

Endnotes

- [*] The authors are from Economic Analysis and Economic Research departments. The authors wish to thank Anne Kroehn and Andrea Hetherington for running the pricing survey, and Patrick Chan, Lorenzo Casaol and Callan Windsor for their analytical inputs. We would also like to thank the firms that continue to support the program through their participation.
- [1] All references in this article to 'firms' are to firms in the liaison program, not all firms in the Australian economy.
- [2] Further information on the Bank's liaison program, including detailed information on how information is collected and how staff scores are assigned, is provided in Dwyer, McLoughlin and Walker (2022).
- [3] The Reserve Bank's data science team has built an information retrieval tool using natural language processing techniques – a field that uses computers to process and analyse large amounts of text – to store the textual content of liaison notes, linked to metadata, staff scores and other quantitative information firms have provided over time. In the database, each paragraph of text is enriched with machine learning generated tags, which provide information on the topic and sentiment of the text.
- [4] Around 200 firms were invited to participate.
- [5] This was somewhat higher than the 5.4 per cent increase in the CPI in the year to the September 2023 quarter. As noted elsewhere in this article, the numerical percentage estimates of year-ended average price growth from liaison have a reasonable correlation with official measures such as CPI. Firms report the most recent data available to them at the time of each meeting, though the outcomes they report may relate to a period some time prior to the meeting and the sample of firms varies through the quarter. As such, caution is applied in interpreting point estimates.
- [6] A survey of firms in the United Kingdom during the pandemic also found that supply-side pressures (energy prices and shortages of labour and materials) accounted for most of the inflation there, rather than demand, as the demand shock of the pandemic still persisted for many firms (Bunn *et al* 2022). Demand was cited by respondents to a Federal Reserve survey of US firms as the most important factor influencing price setting during late 2022 and early 2023, above costs; interviews alongside the survey suggest that for these firms the potential demand response to a proposed price change is assessed before cost increases are passed through (Dogra *et al* 2023).
- [7] See Windsor and Zang (2023) for background on the construction of the earnings calls measure.
- [8] Granger causality tests for predictive or contemporaneous relationships show that information in both the numerical percentage estimates of the price growth firms provide and staff scores of the broader set of information firms provide can help to predict CPI and Producer Price Index (PPI) inflation in the reference quarter, after considering the past values of both variables, and vice versa.

References

- Bunn P, L Anayi, N Bloom, P Mizen, G Thwaites and I Yotzov (2022), 'Firming Up Price Inflation', Bank of England Staff Working Paper No 993.
- Dogra K, S Heise, ES Knotek II, BH Meyer, RW Rich, RS Schoenle, G Topa, W van der Klaauw and WB de Bruin (2023), 'Estimates of Cost-Price Passthrough from Business Survey Data', Federal Reserve Bank of New York Staff Report No 1062.
- Dwyer J, K McLoughlin and A Walker (2022), 'The Reserve Bank's Liaison Program Turns 21', *RBA Bulletin*, September.
- Park A, V Rayner and P D'Arcy (2010), 'Price-setting Behaviour – Insights from Australian Firms', *RBA Bulletin*, June.
- Windsor C and M Zang (2023), 'Firms' Price-setting Behaviour: Insights from Earnings Calls', RBA Research Discussion Paper No 2023-06.

Bank Fees in Australia

Jessica Dunphy^[*]

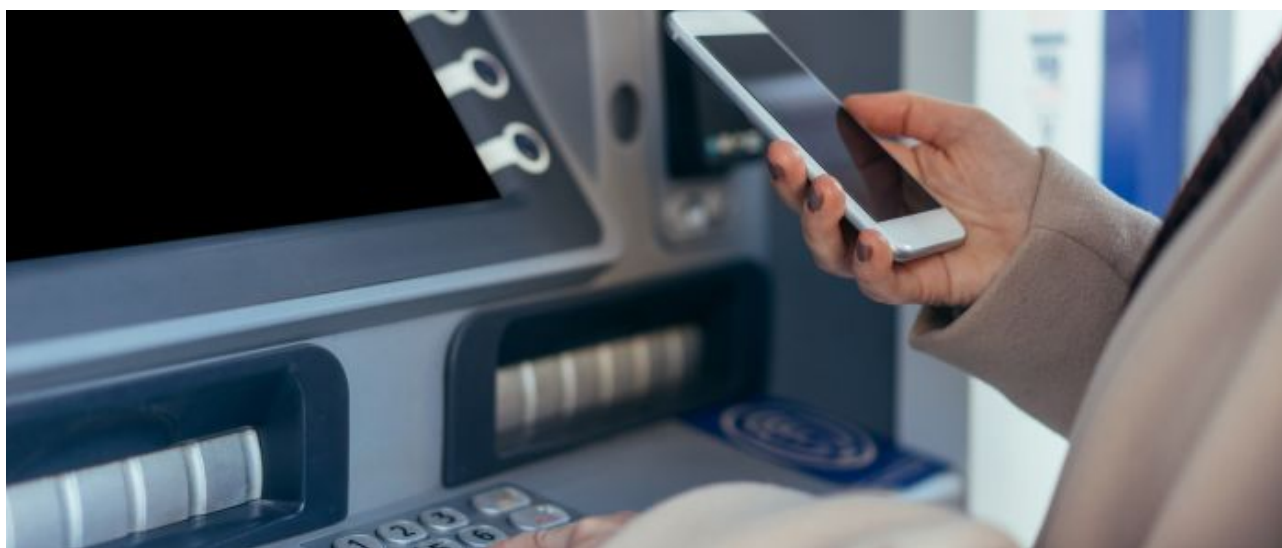


Photo: hsyncoban – Getty Images

Abstract

This article updates Reserve Bank research on bank fees charged to Australian households, businesses and government. Over the year to June 2023, total fees charged by banks fell by around 4 per cent. Fees comprised just 5 per cent of banks' total revenue over the period, while over 50 per cent came from interest earnings on loans. By customer, most fees were paid by large businesses, as was the case in previous years. However, fee earnings from businesses and government declined over 2022/23, in part reflecting lower merchant services fees. On the other hand, fee income from households increased, driven by higher revenue from charges on credit cards related to international travel and increased revenue from break fees on term deposits.

Introduction

Since 1997, the Reserve Bank has collected information on the fees charged to households and businesses by banks through their Australian operations. This article adds to and builds on this information by covering the year to June 2023.^[1] The 2022/23 data captured 45 lenders, which account for around 88 per cent of total credit outstanding.

During 2022/23, inflation reached its highest level since 1990, the cash rate increased by 325 basis points, credit growth eased significantly, and economic growth slowed following a strong rebound after the COVID-19 pandemic. Increases in

the cash rate flowed through to higher interest rates on deposits and on loans to households and businesses (Graph 1). Although inflation and higher interest rates weighed on real disposable incomes, household and business spending were supported by low unemployment, strong balance sheets and the ongoing effect of extraordinary policy support during the pandemic. International travel also recovered strongly after borders reopened in early 2022 (RBA 2023a).

Total fee revenue

Banks' total fee revenue fell over the year to June 2023, marking the sixth consecutive year of declines

Table 1: Bank Fees^(a)

	Households		Institutions ^(b)		Total	
	Levels (\$ million)	Growth (per cent)	Levels (\$ million)	Growth (per cent)	Levels (\$ million)	Growth (per cent)
2019/20	3,559	-10.2	7,881	-5.1	11,439	-6.8
2020/21	3,454	-9.5	11,545	-3.5	14,999	-4.9
2021/22	3,213	-7.0	11,255	-2.5	14,469	-3.5
2022/23	3,369	4.8	10,554	-6.2	13,923	-3.8

(a) There is a series break between 2020 and 2021 for all series; growth rates for the year to the end of June 2021 have been break-adjusted to account for series breaks. All figures have been rounded.

(b) Include businesses and government.

Sources: APRA; RBA.

(Graph 2). Lending fees declined as a share of assets, while deposit fees remained broadly steady as a share of total deposits, at a relatively low level. Fees contributed a modest and declining share of banks' income, comprising just 5 per cent of reporting banks' total revenue, compared with over 50 per cent from interest on lending (Graph 3).

By type of customer, the largest share of fees continued to be paid by large businesses, at over 40 per cent of total bank fees (Graph 4; Table 1). Most of the remainder was split roughly evenly between households and medium-sized businesses, with each paying just under one-quarter of total bank fees.

Fees charged to households

Fee revenue from households grew by around 5 per cent in the year to June 2023 (Table 2; Graph 5). A key driver of this growth was a rise in international travel, with more households using their Australian credit and debit cards overseas, for which banks often charge flat and/or transaction fees (Duncan 2023). Revenue from break fees on term deposits – charged when a depositor withdraws their funds early – also boosted fee income, as rising interest rates encouraged households to switch between deposit products (ASIC 2023).

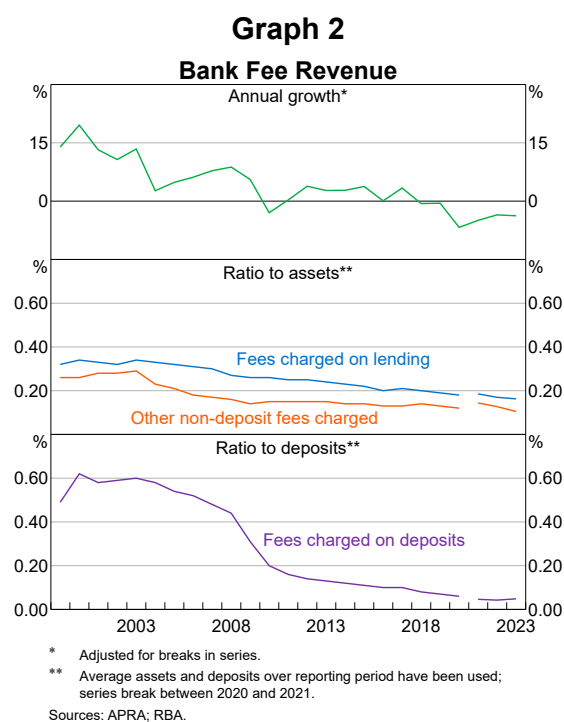
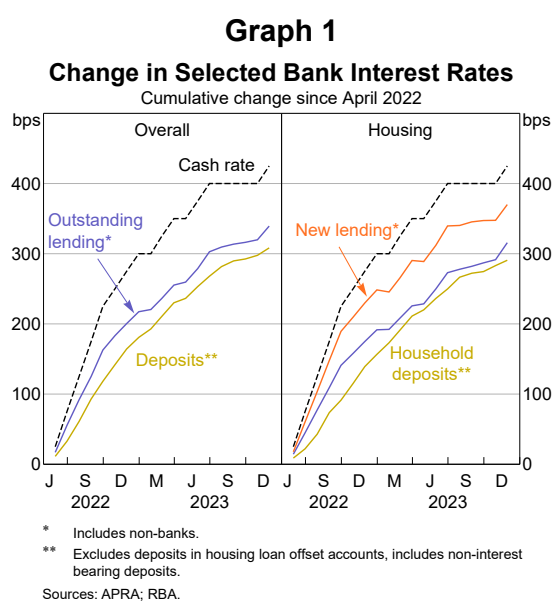


Table 2: Fees Charged to Households^(a)

	2020/21	2021/22	2022/23	
	(\$ million)	(\$ million)	(\$ million)	(per cent)
Loans	3,065	2,567	2,542	-1
– Housing	1,660	1,123	811	-28
– Personal	379	329	290	-12
– Credit cards	916	1,115	1,429	28
Deposits	457	606	796	31
Other	42	40	43	6
Total	3,454	3,213	3,369	5

(a) Levels for the year to the end of June 2021 have been break-adjusted to account for series breaks. All figures have been rounded.

Sources: APRA; RBA.

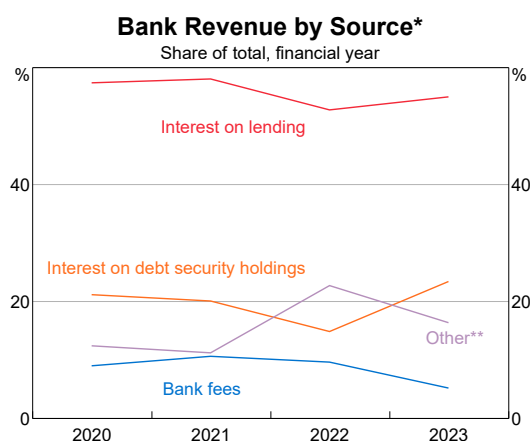
By contrast, earnings from fees on housing loans and personal loans declined year on year. Slower credit growth resulted in less income from establishment fees on new lending. Strong competition in the mortgage market further reduced housing loan fee revenue as banks offered financial incentives like cashback deals to attract customers; cashback deals are subtracted from fee earnings. As a result of these changes, credit cards overtook housing loans this year to be the largest source of banks' fee income from households (Graph 6).

The aggregate increase in revenue from fees on households over 2022/23 follows five years of declines. In previous years, banks removed fees partly in response to the 2018 Royal Commission

into Misconduct in the Banking, Superannuation and Financial Services Industry (ABA 2020). Competitive behaviour may also have played a role in the decline in total fees charged to households, as banks competed for market share. The ACCC (2023) Retail Deposits Inquiry noted that banks use fees to recoup operational costs from customers and recommended more transparency for consumers about these fees, which could affect banks' pricing decisions in the future.

Fee revenue from credit cards and personal loans

Credit cards are now the largest source of bank fees paid by households. Strong growth in credit card fee income in 2022/23 largely reflected increased

Graph 3

* Banks that report fee data; adjusted for series breaks.

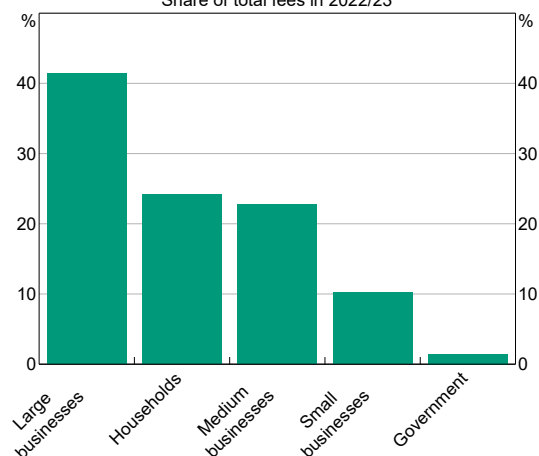
** Includes all other interest and non-interest revenue.

Sources: APRA; RBA.

Graph 4

Bank Fees by Customer

Share of total fees in 2022/23



Sources: APRA; RBA.

use of domestic credit cards while travelling overseas (Graph 7). Higher credit card fee revenue was mostly in the form of foreign currency conversion charges. Demand for foreign currency travel cards also boosted other fee income. The growth in credit card fee income was partially offset by a decline in revenue from missed payment fees, in line with the trend decline in the share of credit cards accruing interest.

Over 2022/23, credit card fees were a little under 1 per cent of the total value of credit card transactions, which is the highest share since the late 2000s. Account servicing charges – largely consisting of annual card fees – continue to be the main source of banks' credit card fee income, followed by transaction fees. Meanwhile, income

from fees on personal loans declined sharply over the period. Personal credit excluding credit cards declined year on year, reducing banks' earnings from establishment fees.

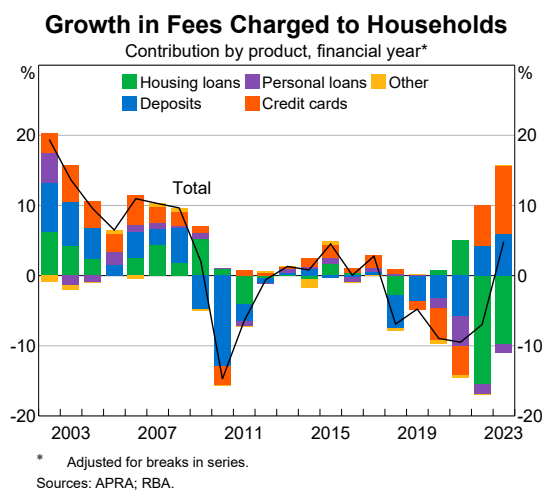
Fee revenue from home loans

Fee income from housing loans fell alongside easing housing credit growth and strong competition in the mortgage market (RBA 2023b) (Graph 8). Account servicing fees comprise most of the housing loan fees banks charge, capturing application, establishment and settlement charges on new mortgages. Banks continued to offer cashback deals in 2022/23 – where a lender offers an incentive to new customers for refinancing their home loan – reducing net earnings from fees. Banks have since largely withdrawn these cashback deals from the market (Bristow 2023). Revenue from housing loan break fees – which are charged when a customer terminates a contract early – also declined. As mortgage rates increased, there was less incentive for consumers to break their existing fixed-rate housing loan as there was unlikely to be a lower rate on offer.

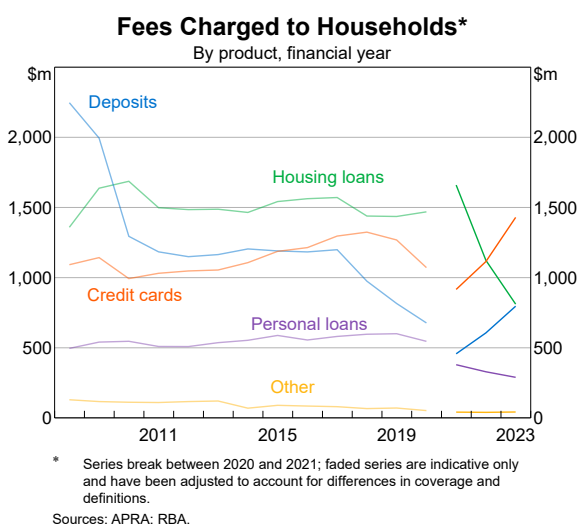
Fee revenue from deposits

Fee income on deposits grew strongly as households chose to exit term deposits early to take advantage of rising interest rates across deposit products (RBA 2023b). Banks' income from transaction and account servicing fees also rose, with increased international travel boosting

Graph 5



Graph 6



Graph 7

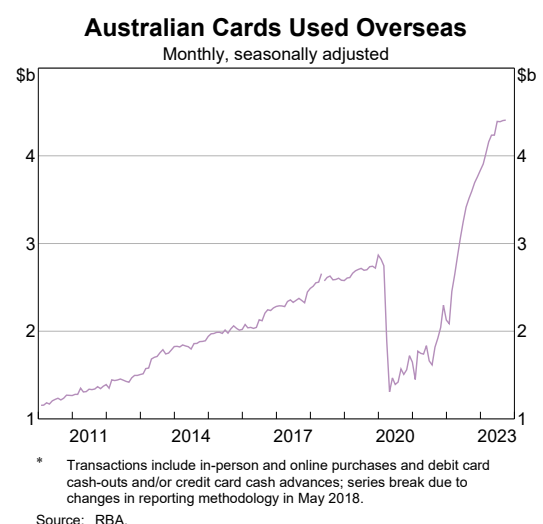


Table 3: Fees Charged to Institutions^(a)

	2020/21	2021/22	2022/23	
	(\$ million)	(\$ million)	(\$ million)	(per cent)
Loans	4,854	5,109	5,146	1
Merchant service fees	2,966	2,782	2,413	-13
Deposit accounts	505	546	577	6
Other ^(b)	3,219	2,819	2,417	-14
Total	11,545	11,255	10,554	-6

(a) Includes businesses and government. Levels for the year to the end of June 2021 have been break-adjusted to account for series breaks. All figures have been rounded.

(b) Includes bills of exchange.

Sources: APRA; RBA

demand for travel cards, foreign currency transactions and overseas ATM withdrawals.

Fees charged to businesses and government

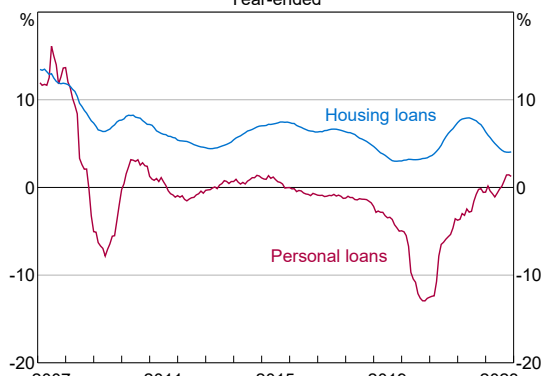
Total fees charged to institutional customers declined in the year to June 2023 for the fourth consecutive year (Table 3; Graph 9). Customer shares were stable, with large businesses continuing to pay the majority of banks' fees. This year's decline was driven by a decrease in fee income from merchant services (i.e. the fees charged to businesses and governments for providing payment processing services). This reflected the ongoing shift in consumer preferences away from credit cards and towards debit cards, which have lower merchant fees. Reported fees charged also declined because of the growing market share of

retail payments service providers not captured in the available data.

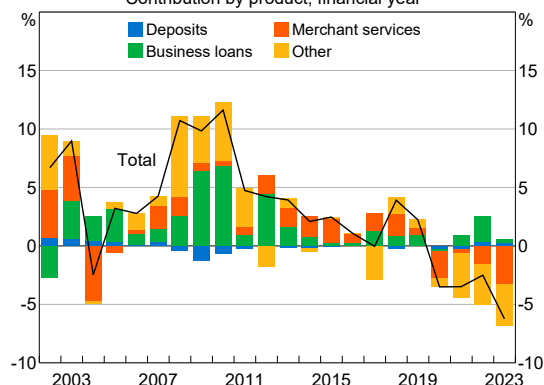
By contrast, growth in fees earned on business loans – the largest component of banks' institutional fee income – was largely flat due to slowing business credit growth. Nevertheless, fee income from these loans continues to comprise almost one-half of banks' total fee earnings (Graph 10). Fees on business loans are typically higher than housing loans, because business loans are larger and more complex.

Fee revenue from business loans

Fees charged on loans were flat over the year, reflecting the broad-based easing in business credit growth (Graph 11). As a result, revenue from fees on business loans fell as a share of business credit outstanding. As with households, the majority of

Graph 8**Household Credit Growth***
Year-ended

* Seasonally and break-adjusted; personal loans includes credit cards.
Sources: APRA; RBA.

Graph 9**Growth in Fees Charged to Institutions**
Contribution by product, financial year*

* Adjusted for breaks in series.
Sources: APRA; RBA.

banks' institutional fee income continues to come from the application, establishment and settlement charges associated with loans. Large businesses pay most of these fees, but small businesses' establishment costs are relatively larger compared to their loans.

Fee revenue from merchant services

Merchant service fee revenue fell by 13 per cent over the year to June 2023 (Graph 12). Banks typically charge a combination of fixed fees (such as for card payment terminals) and transaction fees for each card payment. Fees earned on merchant services declined in line with the value of credit and debit card transactions.

Structural changes in the merchant services market also contributed to lower income over the

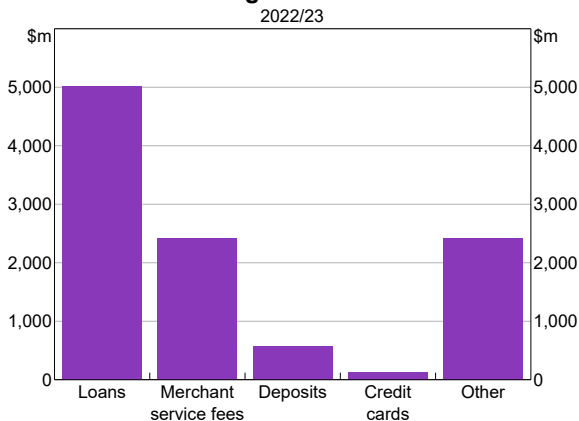
reporting period. An ongoing shift to debit from credit cards has weighed on fee revenue, as debit cards typically attract a lower fee per transaction than credit cards (Graph 13) (Gill, Holland and Wiley 2022). This trend decline is partially offset by the growing share of debit card transactions on which fees are charged (Livermore *et al* 2023). In addition, some banks sold their merchant services business to entities not required to report their fee income to the Australian Prudential Regulation Authority, meaning these data are no longer captured (ANZ 2022; Bendigo Bank 2021).

Other fee revenue

Other fees charged to institutions declined by 14 per cent over the reporting period. The reporting

Graph 10

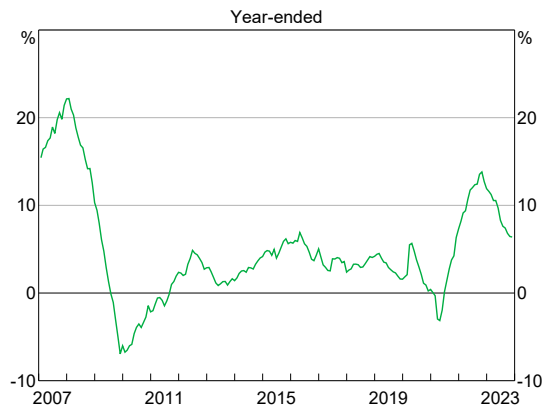
Fees Charged to Institutions



Source: APRA/RBA.

Graph 11

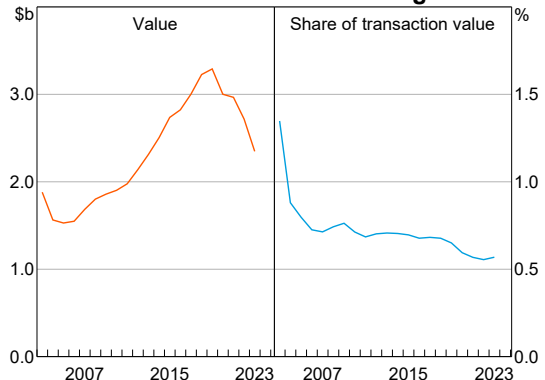
Business Credit Growth*



* Break and seasonally adjusted. Sources: APRA; RBA.

Graph 12

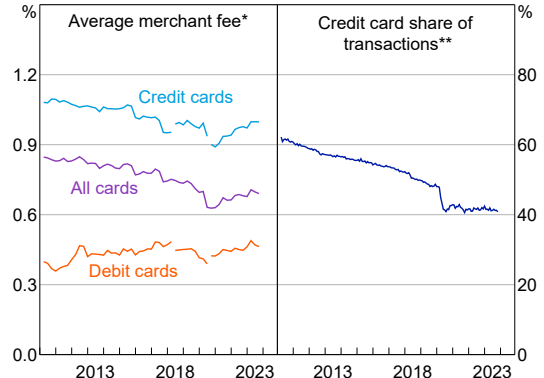
Merchant Service Fees Charged*



* Adjusted for breaks in series. Sources: APRA; RBA.

Graph 13

Merchant Fees and Card Transactions



* Prior to changes in reporting methodology in June 2018, the average fee reported for scheme debit cards was slightly overstated and the average fee reported for scheme credit cards was slightly understated; the overall average fee was unaffected by the 2018 reporting change. There was also a change in the calculation of the average merchant fees for debit and credit cards in September 2020.

** By value; seasonally adjusted. Source: RBA.

of 'other fees charged' was revised when the Economic and Financial Statistics Collection replaced the RBA Bank Fee Survey from 2020/21 (Sparks and Fitzpatrick 2022). Other fees charged now includes fees that were previously recorded as interest income. This year's decline reflects in part a fall in fee income from advisory and merger and acquisition services amid tighter financial conditions and a less favourable economic outlook. Lower fee revenue from commercial bills also weighed on banks' total fee revenue.

Conclusion

Fees charged by banks through their domestic operations represent a small share of banks' total earnings, declining to 5 per cent of total revenue in 2022/23. By customer, fee revenue from households increased, as households exited term deposits early amid rising interest rates and increased their demand for international card transactions. By contrast, institutional fee revenue fell over the period, reflecting lower merchant service fee income and a decline in income from other miscellaneous charges. Large businesses continue to account for the largest share of fees to banks, paying over 40 per cent of bank fees in 2022/23. ↗

Endnotes

- [*] The author is from Domestic Markets Department.
- [1] These data may differ from previous years due to data revisions affecting both the revised period and break adjustments. See Nunn (2023) for 2021/22 vintage data.

References

- ABA (Australian Banking Association) (2020), 'Royal Commission Changes to Banking Code Go Live Tomorrow', News Release, 29 February.
- ACCC (2023), 'Retail Deposits Inquiry', Report, December.
- ANZ (2022), 'ANZ Commences Joint Venture with Worldline', Media Release, 1 April.
- ASIC (Australian Securities and Investments Commission) (2023), 'Term Deposits', MoneySmart.gov.au.
- Bendigo Bank (2021), 'Bendigo Bank and Tyro Proposition Comes to Life', Media Release, 11 August.
- Bristow M (2023), 'Which Banks Are Scrapping Their Cashback Offers? And Who Is Still Offering Them?', RateCity News Release, 5 September.
- Duncan A (2023), 'Travel Money Cards vs Credit Cards vs Debit Cards', CANSTAR, 27 September.
- Gill T, C Holland and G Wiley (2022), 'The Cost of Card Payments for Merchants', RBA *Bulletin*, September.
- Livermore T, J Mulqueeney, T Nguyen and B Watson (2023), 'The Evolution of Consumer Payments in Australia: Results from the 2022 Consumer Payments Survey', RBA Research Discussion Paper No 2023-08.
- Nunn L (2023), 'Bank Fees in Australia', RBA *Bulletin*, March.
- RBA (Reserve Bank of Australia) (2023a), 'Domestic Economic Conditions', *Statement on Monetary Policy*, February.
- RBA (2023b), 'Domestic Financial Conditions', *Statement on Monetary Policy*, August.
- Sparks K and R Fitzpatrick (2022), 'Bank Fees in Australia', RBA *Bulletin*, June.

The Committed Liquidity Facility: 2015–2022

Fabio Rustia, Carl Schwartz and Nick Stenner^[*]



Photo: SusanneB – Getty Images

Abstract

The Reserve Bank's Committed Liquidity Facility (CLF) was used from 2015–2022 to enhance the resilience of the banking system to times of liquidity stress. Banks must hold high-quality liquid assets (HQLA), including government securities, as a buffer against liquidity stress. Historically, the low level of government debt in Australia limited the amount that banks could reasonably hold, and so the CLF was introduced in 2015 as an alternative. Over time, however, the amount of government debt on issue and system liquidity increased significantly due to fiscal and monetary policy measures implemented to support the Australian economy during the COVID-19 pandemic. In response to this significant increase in HQLA, the size of the CLF was gradually reduced so that it was no longer in use at the beginning of 2023. This article provides an overview of the CLF and discusses its introduction and why it is no longer in use.

Introduction

The Reserve Bank provided the Committed Liquidity Facility (CLF) from 2015–2022 as part of Australia's implementation of the Basel III liquidity standard to strengthen the resilience of the banking system to periods of liquidity stress. In particular, the liquidity coverage ratio (LCR) under the Basel standard requires banks to have enough high-quality liquid assets (HQLA) to cover their net cash outflows (NCOs) in a 30-day liquidity stress scenario. Under

Basel III, jurisdictions with a clear shortage of domestic-currency HQLA can use other approaches to enable financial institutions to satisfy the LCR – including the central bank offering a CLF.

The Reserve Bank provided the CLF to banks for an annual fee based on the size of the Reserve Bank's commitment through the CLF to the relevant bank, regardless of whether the bank drew down on the facility or not. The Australian Prudential Regulation Authority (APRA) administers the LCR in Australia

and from 2015–2022 made use of the CLF to help banks to meet their requirements.

This article provides an overview of the CLF, explains how it worked and discusses why it is no longer in use.

Overview of the CLF

HQLA are assets that banks can use to cover their short-term liquidity needs. For securities to be considered HQLA, they need to be low risk and be traded in an active and sizeable market. The Australian dollar securities that have been assessed by APRA to be HQLA are Australian Government Securities (AGS) and securities issued by the central borrowing authorities of the states and territories (semis).^[1] While AGS and semis are actively traded in financial markets, there has historically been relatively little trading in other key types of Australian dollar securities, such as asset-backed securities and corporate bonds (Graph 1).^[2] The only other forms of HQLA available in Australian dollars are liabilities of the Reserve Bank – namely, banknotes and Exchange Settlement (ES) balances.

At the time the CLF was announced in 2011, the stock of AGS and semis had historically been insufficient for banks to meet their liquidity needs. At the time the CLF became operational in 2015, government debt in Australia was around 40 per cent of GDP, which was low relative to the

HQLA needed to meet banks’ LCR requirement (Graph 2). In the absence of something like a CLF, banks would collectively have had to hold around two-thirds of the value of all AGS and semis outstanding to meet LCR requirements. If banks had held that share of HQLA securities, it would have reduced the liquidity of those securities, undermining the purpose of holding them as HQLA.

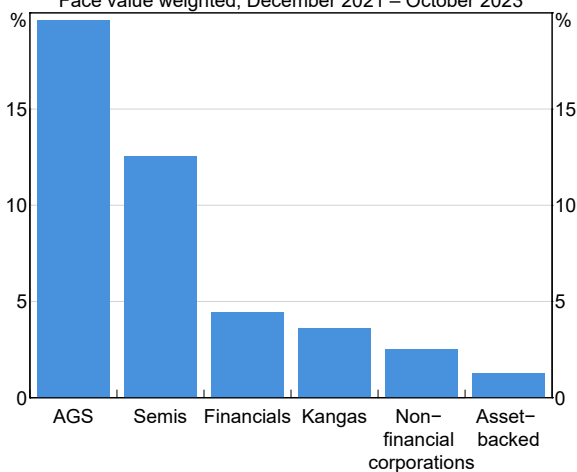
To avoid the situation of banks holding unduly high shares of the AGS and semis markets, APRA permitted certain banks subject to the LCR requirement to make use of the CLF provided by the Reserve Bank. Before doing so, banks had to apply to APRA for approval to access the CLF. They also had to demonstrate that every reasonable effort had been made to manage liquidity risk independently rather than relying on the CLF.

The CLF involved the Reserve Bank making a commitment to a bank to provide liquidity to cover any shortfall between that bank’s ‘reasonable’ holdings of HQLA (i.e. the amount that could be held without impairing market functioning or liquidity) and the LCR requirement. The CLF bank could then access this committed amount of liquidity if it was required during a period of liquidity stress. High-quality Australian dollar securities that met Reserve Bank criteria were required as collateral to access the CLF, including self-securitised residential mortgage-backed securities, securities issued by authorised deposit-

Graph 1

Monthly Turnover Ratio for AUD Bonds*

Face value weighted; December 2021 – October 2023

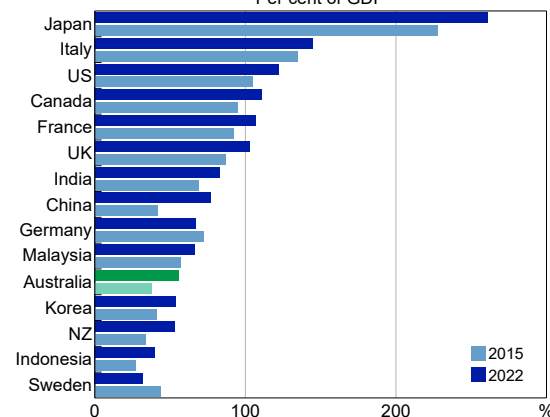


* Excludes trades with the RBA. Sources: ASX Information Services; RBA.

Graph 2

General Government Gross Debt

Per cent of GDP



Source: IMF.

taking institutions and supnationals, and asset-backed securities.

To access the CLF (i.e. to draw on CLF funds), a CLF bank had to make a formal request to the Reserve Bank, including providing an attestation from the chief executive-officer of the bank that it had positive net worth. The bank also needed to have positive net worth in the opinion of the Reserve Bank.

Jurisdictions with low levels of government debt have used a range of approaches under Basel III's alternative liquidity approaches to address a shortage of domestic currency HQLA. Australia is one of a small number of countries that put in place a CLF. Some other jurisdictions have allowed financial institutions to hold HQLA in foreign currencies to cover their liquidity needs in domestic currency. However, the main downside of this approach is that it relies on foreign exchange markets to be functioning smoothly in a time of stress and increases the foreign currency exposures in the banking system. Another approach has been to classify a broader range of domestic currency securities as HQLA. This approach was not taken in Australia due to Australian dollar securities other than AGS and semis being considered insufficiently liquid.

Design of the CLF

The total size of the CLF was the difference between the aggregate liquidity requirements of CLF banks and the aggregate amount of HQLA securities that the Reserve Bank assessed the CLF banks could 'reasonably' hold to fulfil these requirements without impairing bond market liquidity. The liquidity requirements of individual CLF banks were assessed by APRA. The requirements included an allowance for banks to have buffers over the minimum requirement of covering 100 per cent of their total projected NCOs over a 30-day period. The requirements also took account of the banks' projected holdings of other HQLA (i.e. banknotes, surplus ES balances and undrawn Term Funding Facility (TFF) allowances when they were available). Banks could access their committed amount of liquidity if it was required in a period of liquidity

stress, subject to the bank having satisfied several conditions.^[3]

From 2015–2019, the CLF operated as follows. APRA adjusted the size of the CLF at the beginning of each calendar year based on estimates of requirements in the year ahead (Table 1). Then, in mid-June, the Reserve Bank would publish its estimate of reasonable holdings of AGS and semis for December of the following year. APRA then asked CLF banks to produce a forecast of their Australian dollar-denominated NCOs and HQLA holdings, and their requested CLF amounts, for the following calendar year. From 2020, however, large changes in the stock of government bonds outstanding and changes in bank funding and liquidity led APRA to gradually adjust the size of the CLF lower so that it was no longer in use at the beginning of 2023, as discussed below.

Factors leading to the reduction in size of the CLF

Increase in supply of government debt

The reduction in the size of the CLF reflects, in part, the sharp increase in the stock of AGS and semis outstanding because of issuance to finance governments' support measures that were provided in response to the COVID-19 pandemic (Graph 3). In addition, the stock of government securities was projected to increase further over coming years. The increase in the stock of AGS and semis outstanding meant that banks could hold more of these securities – both in absolute value and as a share of stock outstanding – without unduly affecting market functioning. As a result, the size of the CLF required to cover the shortfall between a bank's reasonable holdings of HQLA and its LCR requirements declined gradually each year.

From 2015–2019, the Reserve Bank assessed that CLF banks could reasonably hold 25 per cent of the stock of AGS and semis outstanding. This was informed by the fact that a large proportion of HQLA securities were owned by 'buy and hold' investors, who were generally price inelastic, and not making their securities available to borrow in repo markets. The 25 per cent reasonable holding assessment was subsequently revised in 2019 following a review of the CLF, with the Reserve

Table 1: Reasonable Holdings of HQLA Securities and the CLF

A\$ billion

Date	Projection of HQLA securities outstanding ^(a)	Locally incorporated LCR banks		
		Reasonable holdings of HQLA securities ^(a)	LCR requirements ^(b)	CLF amount ^(b)
31 Dec 2015	700	175	449	274
31 Dec 2016	780	195	441	246
31 Dec 2017	880	220	437	217
31 Dec 2018	905	226	474	248
31 Dec 2019	898	225	468	243
31 Dec 2020 ^(c)	1,340	362	550	188
31 Dec 2021	1,488	446	582	136
31 Dec 2022	1,608	563	<563	0 ^(d)

- (a) The Reserve Bank's 'Projection of HQLA securities outstanding' and assessment of 'Reasonable holdings of HQLA securities' for the end of the referenced calendar year.
- (b) 'LCR requirements' refers to the aggregate of APRA's assessment of the liquidity required for individual banks to meet their needs for a 30-calendar-day severe stress scenario. It reflects aggregate Australian dollar net cash outflows for the locally incorporated LCR banks at the end of the calendar year, including an allowance for the banks to have buffers over the minimum LCR requirement of 100 per cent, and taking into account banks' projected holdings of banknotes and ES balances. 'CLF amount' is the difference between the LCR requirements and reasonable holdings of HQLA securities, or zero where reasonable holdings exceed LCR requirements.
- (c) The Reserve Bank's projection of HQLA securities outstanding at the end of 2020 and assessment of the amount of these securities that can reasonably be held by locally incorporated LCR banks were updated in November 2020. APRA's assessment of CLF amounts was also updated in late 2020. The initial amounts determined for end-2020 as part of the usual annual CLF process and published in 2019 were as follows: projected HQLA securities outstanding of \$934 billion, reasonable holdings of \$243 billion and CLF amount of \$223 billion.
- (d) The CLF was reduced to zero on 1 January 2023.

Sources: APRA; RBA.

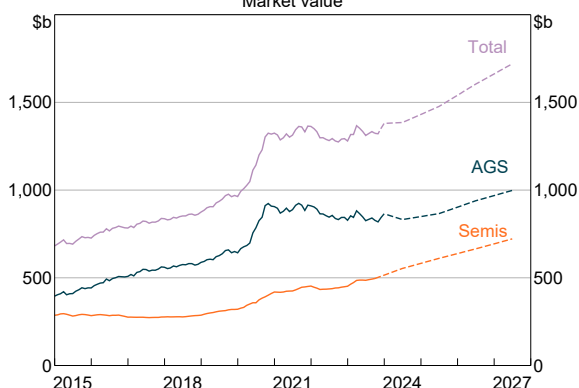
Bank assessing that the share of the stock of HQLA securities that could be reasonably held by CLF banks could increase at a pace of 1 percentage point per year from 25 per cent in 2019 to 30 per cent in 2024. This reflected the increase in the stock of AGS and semis outstanding over time,

as well as the fact that they had become more readily available in the market along with growth in the repo market (Bergmann, Connolly and Muscatello 2019).

This approach was reviewed anew following the sharp increase in the stock of AGS and semis outstanding in 2020, with the Reserve Bank assessing that the increase in the share of AGS and semis that banks could reasonably hold could occur more quickly. It was assessed that the share of the stock of HQLA securities that could be reasonably held by CLF banks could increase to 27 per cent of the stock outstanding by the end of 2020, to 30 per cent by the end of 2021, and 35 per cent by the end of 2022. CLF banks' combined holdings of AGS and semis increased substantially over 2020, although their AGS holdings declined significantly from late 2020 as the banks sold AGS to the Reserve Bank during the bond purchase program (Graph 4). Holdings of semis by CLF banks declined only slightly over 2021 – consistent with the Reserve Bank Bond Purchase Program (BPP) being more

Graph 3**HQLA Securities Outstanding***

Market value



* Dash lines are projections from issuing authorities' latest borrowing program updates.

Sources: ABS; AOFM; RBA; State and territory treasury corporations; Treasury.

heavily weighted to AGS than semis. CLF banks' holdings of semis increased over 2022. Overall, CLF banks were able to meet their LCR requirements holding less HQLA securities than the Reserve Bank judged could be reasonably held over 2021 and 2022. In part, this reflected improvements in liquidity conditions for banks associated with the Reserve Bank's policy measures (discussed below). From 1 January 2023, CLF banks have continued to increase their holdings of HQLA securities, largely driven by acquiring more semis. While the share of total outstanding HQLA securities held by CLF banks has returned to around the pre-pandemic level, the share of semis held is considerably higher.

The increase in system liquidity and improved liquidity conditions for banks

The reduction in the size of the CLF was facilitated by improvements in funding and liquidity conditions for banks, where CLF banks were comfortably exceeding their LCR requirements. The policy measures implemented by the Reserve Bank during the pandemic contributed to a significant increase in liquidity in the banking system (Dowling and Prinant 2021). Surplus ES balances that banks hold at the Reserve Bank, which are a form of HQLA, increased by more than \$400 billion between March 2020 and the peak in early 2023, due to the monetary policy measures introduced to support the Australian economy (Graph 5).

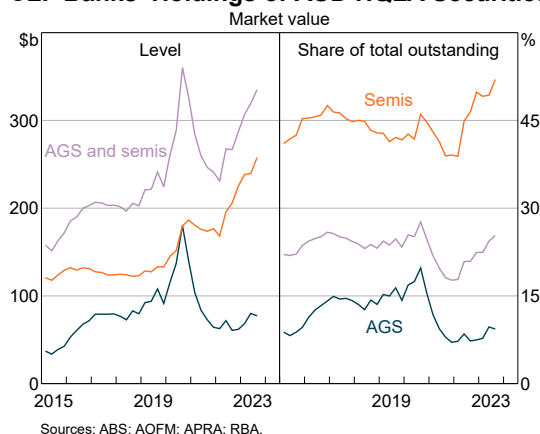
The Reserve Bank's purchases of government bonds as part of the BPP, to aid market functioning and to support the yield target on the three-year Australian

Government bond, contributed around two-thirds of the increase in ES balances. Some of these bonds were purchased directly from CLF banks, as reflected in the decline in their holdings of AGS and semis. When the Reserve Bank buys bonds from a bank, it pays for the bonds by crediting that bank's Exchange Settlement Account (ESA). In this transaction, one type of HQLA is swapped for another, and the level of HQLA held by the bank stays the same. However, when the Reserve Bank buys bonds from a non-bank investor, it pays for the bonds by crediting ES balances to the investor's bank, which creates HQLA for this bank and a deposit for the non-bank investor. Importantly, those ES balances created in this way stay within the banking system, even if their location might vary over time.^[4] The effect on the LCR of the increase in HQLA for this bank is offset, in some part, by an increase in the bank's liquidity needs due to an increase in NCOs arising from the increase in deposits.

Funding provided by the Reserve Bank under the TFF contributed to around one-third of the rise in ES balances. However, in contrast with the purchases of government bonds, the funding provided by the TFF generally increased the level of HQLA held by banks without a corresponding reduction in HQLA securities held by them (as most of the securities pledged as TFF collateral were self-securitised assets) (Black, Jackman and Schwartz 2021). The rise in surplus ES balances, all else being equal, implies less need for the CLF. However, it is important to note that the level of ES balances will depend on (and change with) monetary policy developments. Surplus ES balances declined by around \$120 billion to the end of September 2023, largely driven by the maturity of the first tranche of the TFF, with the remaining balance to mature by mid-2024.

While the stock of available HQLA increased significantly from early 2020, the liquidity needs of banks also increased due to a sharp rise in bank deposits. This increase in bank deposits (in particular, strong growth in at-call deposits) was associated with an increase in NCOs, which in turn increased the amount of HQLA that CLF banks were required to hold under the LCR (Graph 6). However, the increase in available HQLA was larger than the

Graph 4
CLF Banks' Holdings of AUD HQLA Securities



increase in NCOs. Consequently, the size of the CLF was able to be gradually reduced so that it was no longer in use at the beginning of 2023. During the same period, banks’ aggregate LCR remained well above the minimum regulatory requirement of 100 per cent.

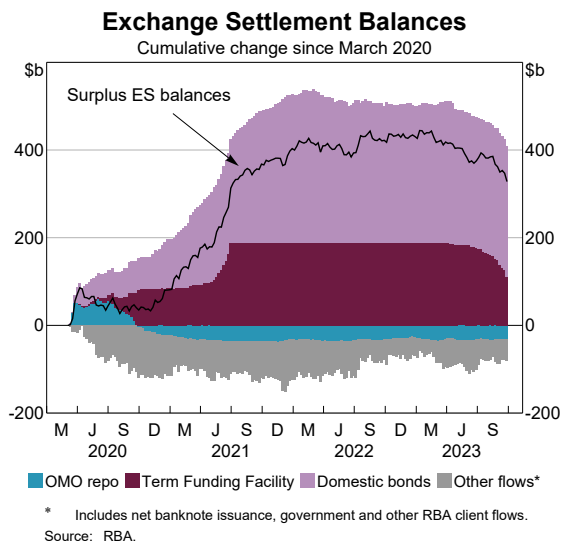
Gradual reduction of the CLF

The aggregate CLF amount was equal to the projected LCR requirements of the CLF banks less the Reserve Bank’s assessment of the banks’ reasonable holdings of HQLA. From 2015–2019, APRA reduced the aggregate size of the CLF from \$274 billion in 2015 to \$243 billion in 2019 as projected liquidity requirements over this period increased by less than the volume of HQLA

securities the banks could reasonably hold (Graph 7).

Given the changes in HQLA and NCOs from 2020, APRA allowed CLF banks to apply for interim adjustments to CLF allowances to help them manage their LCR (APRA 2021b). Accordingly, the aggregate CLF amount was further reduced from \$223 billion in January 2020 to \$33 billion in December 2022. This reduction was made in a measured and staggered way to minimise the risk of any financial market disruptions associated with reduced demand by banks for assets previously used to collateralise CLF allowances, particularly in light of the uncertain economic environment, and the conditions facing banks, including the amount of HQLA they needed. The CLF was no longer in use at the beginning of 2023.

Graph 5



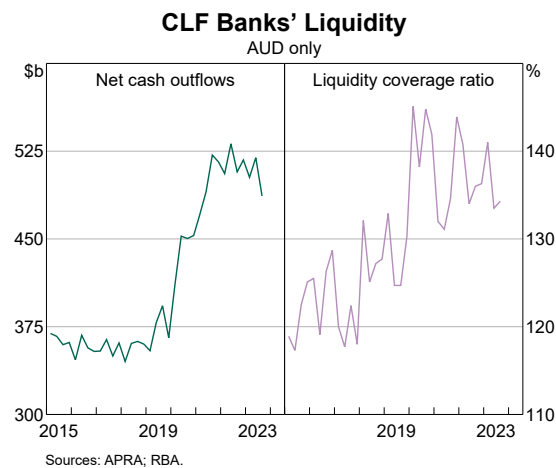
Drawing on the CLF

During the time that the CLF was in use, no bank needed to draw on the CLF for the purposes of managing liquidity in a period of financial stress. However, some banks did draw on the CLF over this time, since any use of the Reserve Bank’s standing facilities by a CLF bank was considered to be a drawing on their CLF.^[5]

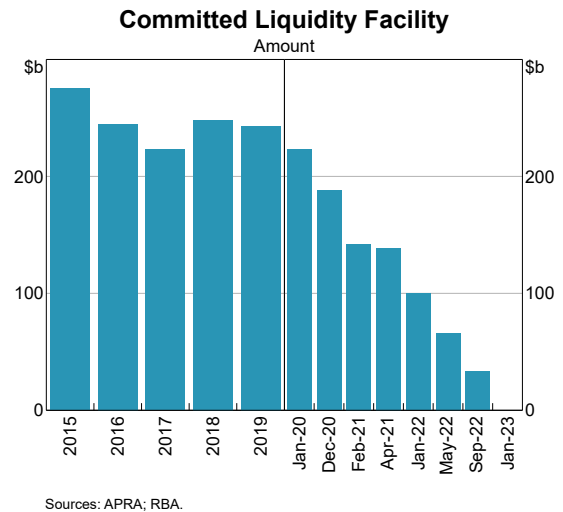
The CLF fee

From 2015–2022, banks paid a monthly fee to the Reserve Bank for their CLF allotment. This fee was charged on the entire committed amount,

Graph 6



Graph 7



regardless of whether or not a bank drew down on the CLF.^[6] The Reserve Bank set the level of the CLF fee such that banks faced similar financial incentives to meet their liquidity requirements through the CLF or by holding HQLA securities (if there were enough available).

A starting point for assessing the appropriate CLF fee was to compare the yields on the CLF collateral and the HQLA securities held by the CLF banks. This difference included the compensation required by banks to account for the higher credit risk associated with holding CLF collateral rather than HQLA securities, but it was only the additional liquidity risk associated with holding CLF collateral that should be reflected in the CLF fee. In practice, adjusting the spread between CLF collateral and HQLA securities to remove the credit risk component was not straightforward. Consequently, there was uncertainty about the exact level of the fee that would make banks indifferent to holding more HQLA or applying for a larger CLF amount. If the CLF fee was set too high, this could have triggered a disruptive shift away from using the facility and distort the markets that use HQLA. This also could have had implications for the implementation of monetary policy, since the market that underpins the cash rate involves the trading of ES balances, which are also HQLA.

During the first five years of the CLF, the CLF banks (in aggregate) consistently overestimated their liquidity requirements. This resulted in the CLF banks being granted larger CLF amounts, which they used to hold larger buffers above the minimum required LCR of 100 per cent. The CLF banks also held fewer HQLA securities than the Reserve Bank had judged could be reasonably held without impairing the market for HQLA securities. Taken together, these two observations suggested that the CLF fee from 2015–2019 of 15 basis points per annum was too low. Indeed, following a review in 2019, the CLF fee was increased to 17 basis points per annum on 1 January 2020 and 20 basis points per annum on 1 January 2021, which remained in place to the end of 2022. This two-step increase was considered appropriate to amend the incentives

around liquidity management options, without generating unwarranted distortions in the markets that use HQLA. It was implemented in two steps to ensure a smooth transition by minimising the effect on market functioning (Bergmann *et al* 2019; Kent 2019).

Conclusion

The Reserve Bank provided the CLF from 2015–2022 as part of Australia’s implementation of the Basel III liquidity standard. The CLF met its objectives by improving the banking system’s resilience to potential liquidity stress during a period where the stock of HQLA alone was insufficient for banks to meet the LCR requirement. In 2019, a review by the Reserve Bank led to some modest and gradual adjustments to arrangements around the CLF, in a way that reduced the need of the CLF banks to make use of the CLF, while also increasing their cost of doing so. Since early 2020, the increased issuance of AGS and semis, combined with a large increase in system liquidity and associated improvements in funding and liquidity conditions for banks, led to a managed reduction in the size of the CLF needed for banks to meet the LCR requirement. Its use was fully phased out in January 2023. Overall, these changes helped to ensure that banks continued to have suitable options to manage their liquidity risk appropriately.

Banks have managed the transition away from the CLF smoothly and their aggregate LCR remains well above minimum regulatory requirements. With the effects of pandemic-era stimulus still very much reflected in the stock of AGS and semis, and with further change ahead in the Reserve Bank balance sheet, the environment for banks’ liquidity management will continue to evolve. On current projections, the stock of HQLA securities is projected to increase further over coming years, while the volume of ES balances will decline by around \$100 billion by mid-2024 with the maturity of the TFF. Consequently, the banks, APRA and the Reserve Bank will continue to closely review developments in markets for HQLA. ✎

Endnotes

- [*] The authors are from Domestic Markets Department.
- [1] Debt securities of the Export Finance and Insurance Corporation and Housing Australia (previously National Housing Finance and Investment Corporation) are also considered HQLA for the purposes of the LCR requirement in Australia (APRA 2021a).
- [2] The data used to estimate turnover in Graph 1 only include trades settled between counterparties that use separate Austraclear accounts, and so do not represent all trades in these securities. Transactions of Australian dollar securities may be settled through clearing systems other than Austraclear, such as Euroclear or Clearstream. These missing transactions tend to add a downward bias to our turnover estimates.
- [3] The legal documentation for the CLF is published on the Reserve Bank’s website: see RBA (2019a); RBA (2019b).
- [4] ES balances created through the Reserve Bank’s government bond purchases will eventually decline as the bonds mature, with the exact timing and amount depending on how the bond maturities are financed.
- [5] In particular, some banks maintain ‘open repos’ (repurchase agreements contracted without a maturity date) with the Reserve Bank to support the smooth functioning of the payments system. The funds obtained via these open repos are held in a bank’s ESA for use in meeting its payment obligations after normal banking hours. These open repos account for most of the CLF use over this period. The remaining CLF use was for small transactions used to test a bank’s systems and access.
- [6] In the event of a drawing on the CLF, in addition to the set fee, interest would be charged on the amount drawn.

References

- APRA (Australian Prudential Regulation Authority) (2021a), ‘Liquidity – Frequently Asked Questions’, Prudential Practice Guide APG 210 – Liquidity and Reporting Standard ARS 210.0 Liquidity, 9 December.
- APRA (2021b), ‘Committed Liquidity Facility Update’, Letter to Locally Incorporated LCR ADIs, 10 September.
- Bergmann M, E Connolly and J Muscatello (2019), ‘The Committed Liquidity Facility’, RBA *Bulletin*, September.
- Black S, B Jackman and C Schwartz (2021), ‘An Assessment of the Term Funding Facility’, RBA *Bulletin*, September.
- Dowling S and S Printant (2021), ‘Monetary Policy, Liquidity, and the Central Bank Balance Sheet’, RBA *Bulletin*, June.
- Kent C (2019), ‘The Committed Liquidity Facility’, Address to Bloomberg, 23 July.
- RBA (Reserve Bank of Australia) (2019a), ‘CLF Operational Notes’, 7 July.
- RBA (2019b), ‘Committed Liquidity Facility Terms and Conditions’, 7 October.

Recent Developments in the Semi-government Bond Market

Sam Batchelor and Maddie Roberts^[*]



Photo: da-kuk – Getty Images

Abstract

The market for Australian state and territory government bonds is often referred to as the market for 'semis'. Semi-government bonds are a key source of government funding and they form an important share of high-quality liquid assets in the Australian financial system. The COVID-19 pandemic, and state and territory government policies implemented in response, increased the size of the semi-government bond market significantly. During this period, there have also been compositional changes in the types of issuance and investors of semis. This article explores recent trends in the issuance, ownership and pricing of semi-government bonds.

Introduction

The market for Australian state and territory government long-term debt, commonly referred to as the semi-government bond (semis) market, plays an important role in the Australian financial system. Semis are issued by state and territory treasury corporations to fund their respective governments and other eligible public entities, including to cover budget deficits and infrastructure investment. Banks hold semis as an asset to meet their liquidity needs. In particular, semis qualify as high-quality liquid assets (HQLA) under Australia's prudential liquidity standards so they can be used to help banks meet their regulatory liquidity requirements. The size and

structure of the semis market has changed considerably over recent years following fiscal and monetary policy responses to the COVID-19 pandemic. This article explores trends in the semis market with respect to issuance values, ownership and pricing, and briefly covers the outlook for supply of semis over the coming years.

Trends in issuance

Issuance

The semis market has grown considerably over the past decade. The stock of semis outstanding has increased by over \$350 billion since 2010 to a

record \$550 billion in 2023 (Graph 1). Semis outstanding grew moderately from 2013 to 2019, reflecting relatively low state and territory government funding needs. The policy responses to the pandemic led to considerable growth in the semis market, similar to the experience during the global financial crisis (Lancaster and Dowling 2011).

Annual net issuance of semis was close to zero in the years prior to the pandemic, increasing to over \$50 billion since 2020 (Graph 2). Semis outstanding increased particularly rapidly during the pandemic, with \$130 billion in net issuance between March 2020 and December 2021. State and territory government funding needs rose alongside increased spending and a decline in revenue associated with a slowdown in economic activity. Semis issuance has remained elevated since then as there has been only a gradual reduction in state and territory government budget deficits, mainly reflecting ongoing infrastructure spending.

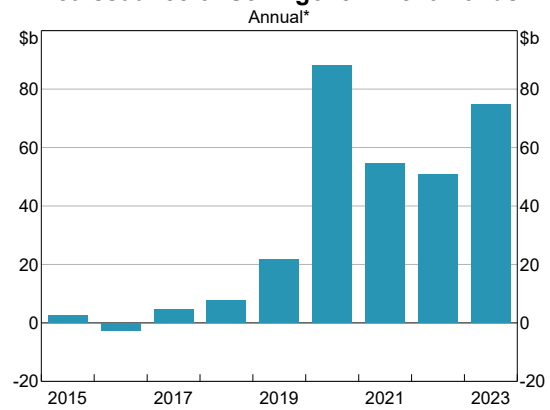
Trends in semis issuance are driven by the largest issuers – Victoria, New South Wales and Queensland. Issuance by these three states collectively account for over 75 per cent of the stock of semis outstanding (Graph 3). Historically, Queensland was the largest semis issuer, accounting for around one-third of semis outstanding, reflecting strong investment in state infrastructure assets (Lancaster and Dowling 2011). Since 2020, however, Victoria and New South Wales have become the largest issuers in the market. Growth in total semis outstanding during the

pandemic was primarily driven by the requirements of Victoria and New South Wales, where relatively weaker economic activity reduced revenues, and governments responded with larger stimulus programs. By contrast, Queensland and Western Australia’s share of semis outstanding fell during the pandemic. Issuance from the remaining state and territory issuers has remained steady at around 10 per cent of semis outstanding over the past decade.

Despite the recent increase in semis issuance, the semis market remains smaller than the market for Australian Government debt. The stock of semis outstanding is around 60 per cent of the stock of Australian Government Securities (AGS) outstanding (Graph 4). AGS outstanding increased rapidly during the pandemic, exceeding net semis issuance by

Graph 2

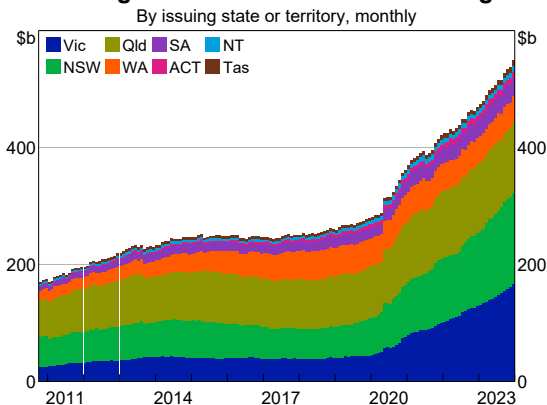
Net Issuance of Semi-government Bonds



* 2023 data as at 30 November 2023.
Sources: RBA; State and territory treasury corporations.

Graph 1

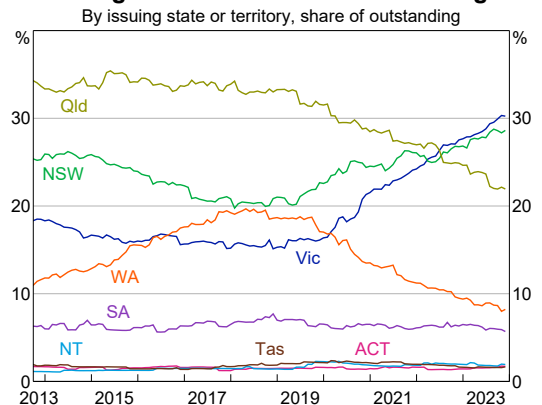
Semi-government Bonds Outstanding*



* Data as at 30 November 2023.
Sources: RBA; State and territory treasury corporations.

Graph 3

Semi-government Bonds Outstanding*



* Data as at 30 November 2023.
Sources: RBA; State and territory treasury corporations.

over \$90 billion in the 2020/21 financial year. However, net issuance of AGS has subsequently declined, in contrast with semis net issuance that remains near record highs. Lower AGS issuance reflects stronger-than-expected revenues and lower spending requirements in the near term, which resulted in a budget surplus in 2022/23 (Treasury 2023).

Characteristics of issuance

Semis are typically issued in the domestic market, at long-term tenors and with fixed coupon rates. Almost all semis are issued domestically, with offshore issuance accounting for less than 2 per cent of semis outstanding.^[1] Treasury corporations also prefer to issue fixed-rate semis with a term to maturity of over five years to match state and territory funding requirements, including for infrastructure projects, and to manage refinancing risk (Graph 5). Despite these preferences, state and territory treasury corporations have diversified the type of bonds issued since 2020 in response to investor preferences, as seen in increased floating rate and sustainable issuance.

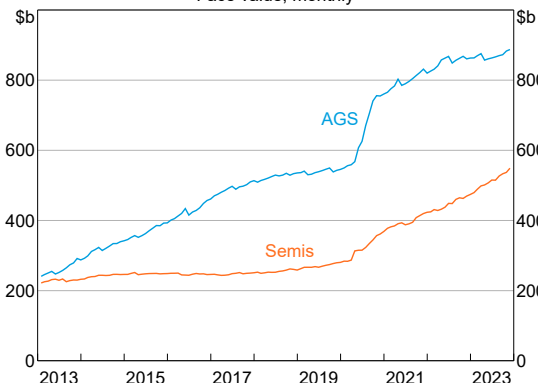
Floating-rate issuance has increased since 2020 but it remains a relatively small proportion of semis outstanding (Graph 6). Unlike fixed coupon securities, the interest rate paid on floating-rate semis varies according to movements in an underlying benchmark interest rate. The most common benchmark in the semis market is the

three-month bank bill swap rate (BBSW), although South Australia uses the cash rate. The volume-weighted average time to maturity at issuance of floating-rate semis is six years, compared with over 12 years for fixed-rate issuance.

A recent development in Australian fixed-income markets is the growth of sustainable issuance (Armour, Hunt and Lwin 2023). There is no universal definition of sustainable bonds. Broadly speaking, sustainable bonds are issued to fund projects that promote environmental or social objectives. Issuance of sustainable semis has grown rapidly since the first sustainable bond was issued in 2016, although they still represent a small share of the semis market (Graph 7). The four largest state treasury corporations have issued around \$30 billion across 12 sustainable bond lines to date. The largest sustainable semis issuer is Queensland,

Graph 4

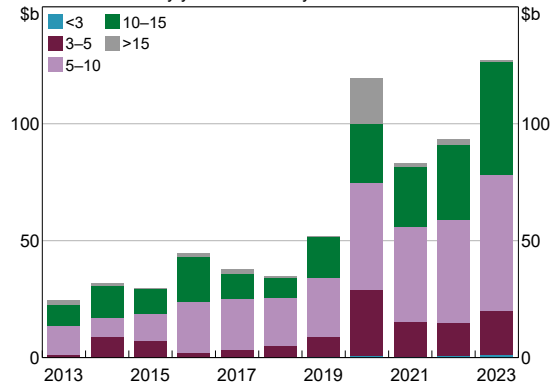
Australian Government Debt Outstanding*
Face value, monthly



* Excludes short-term debt. Data as at 30 November 2023. Sources: AOFM; RBA; State and territory treasury corporations.

Graph 5

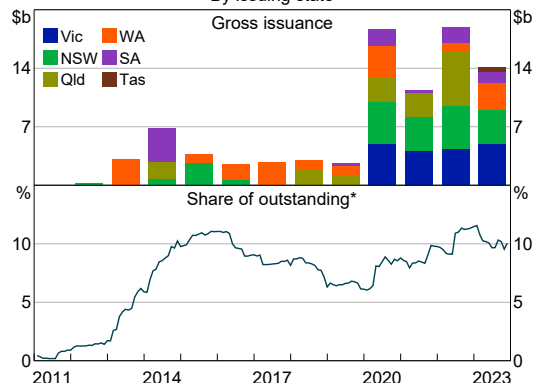
Gross Issuance of Semi-government Bonds
By years to maturity at issuance



Source: Bloomberg.

Graph 6

Semi-government Floating-rate Bonds
By issuing state



* Data as at 30 November 2023. Sources: Bloomberg; RBA; State and territory treasury corporations.

which has issued \$11 billion, followed by New South Wales (\$10 billion), Victoria (\$8 billion) and Western Australia (\$2 billion). State treasury corporations issued a record \$10 billion in sustainable bonds in 2023, with market participants expecting continued issuance in the coming years. However, because the funding raised from sustainable bonds must be earmarked for specific sustainable projects, the size of the sustainable semis market is constrained by the pipeline of suitable projects.

Trends in ownership

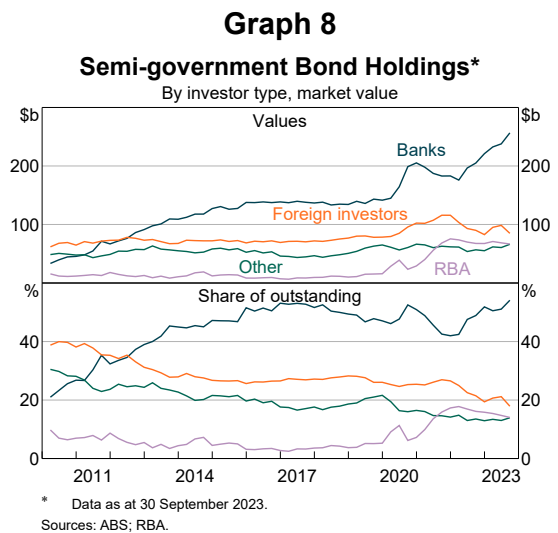
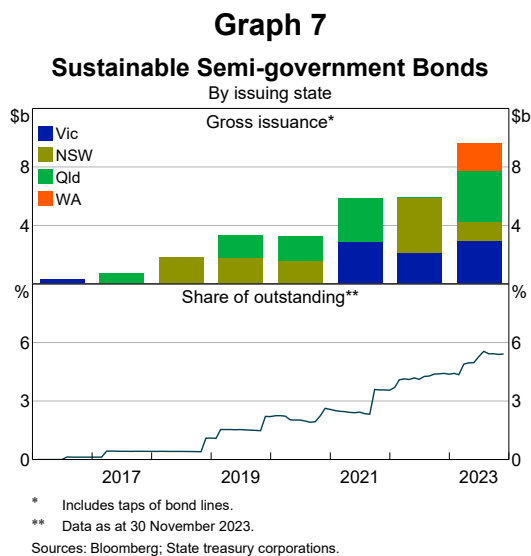
Banks

Ownership of semis by domestic banks increased in the lead up to the introduction of the liquidity coverage ratio (LCR) in 2015 (RBA and APRA 2010). Since then, Australian banks have been the largest investor by some margin, holding around 40–50 per cent of semis outstanding (Graph 8). Banks subject to the LCR (LCR banks), which account for a large portion of the banking system, are required to hold HQLA sufficient to cover their estimated net cash outflows during a 30-day period of stress.^[2] Semis and AGS are the main Australian dollar securities classified by the Australian Prudential Regulation Authority as HQLA for LCR purposes, though Exchange Settlement (ES) balances at the Reserve Bank are also HQLA.^[3]

LCR banks typically prefer to hold semis over AGS to meet their HQLA requirements because they trade

at higher yields and so offer higher returns than AGS. When they purchase debt securities such as semis, banks take on interest rate risk. Australian banks typically hedge the interest rate risk associated with fixed-rate securities to match their floating-rate liabilities such as bank bills or deposit funding. Also, some semis are floating rate whereas AGS are all fixed rate.^[4] Banks find floating-rate semis particularly attractive as they do not require separate hedging for interest rate risk,^[5] which is reflected in the high allocation of floating-rate issuance to banks. The recent increase in floating-rate issuance partly reflects semis issuers diversifying their issuance plans in response to investor preferences, including those of banks.

LCR banks' preference for semis is reflected in their high holdings of these securities relative to AGS (Graph 9). LCR banks have held more semis than AGS since the introduction of the LCR. Between 2015 and 2020, semis comprised around two-thirds of LCR banks' Australian government securities holdings for LCR purposes. Consistent with these preferences, banks sold significantly less semis than AGS during the operation of the Reserve Bank's Bond Purchase Program (BPP) from late 2020 to early 2022. In part, this reflects the BPP being more heavily weighted to AGS than semis. More recently, LCR banks have continued to increase their holdings of HQLA securities, largely driven by acquiring more semis. This partly reflects the Committed Liquidity Facility being reduced to zero and maturity of the Term Funding Facility, both of



which have increased banks' demand for HQLA securities (Rustia, Schwartz and Stenner 2024).

Foreign investors

Foreign investors' holdings of semis has declined from around 40 per cent of the market in 2010 to around 20 per cent, alongside a decline in offshore issuance and an increase in the outstanding stock of semis. Nonetheless, foreign investors remain an important source of demand for semis, particularly certain types of issuance, such as sustainable bond lines. Strong demand for sustainable semis is likely to reflect an increasing number of investors that are climate conscious or have portfolio mandates with responsible investing requirements. Foreign investors hold a much lower share of the semis market compared with their share of the AGS market (currently around 50 per cent of AGS outstanding). This could reflect foreign investors' risk and liquidity preferences. For example, the semis market is smaller and less liquid than the AGS market (discussed below).

Reserve Bank of Australia

Before the pandemic, the Reserve Bank held a relatively small portfolio of semis for its liquidity operations. Outright semis holdings typically fluctuated between \$2 billion and \$5 billion in the decade prior to 2020 and were generally less than 3 per cent of semis outstanding. The Bank's bond purchases during the pandemic increased its outright holdings of semis; the Bank purchased around \$11 billion of semis to support market

functioning and \$57 billion under the BPP (Finlay, Xiang and Titkov 2022). These purchases resulted in the Bank's outright semis holdings peaking in early February 2022 at around \$68 billion, or 16 per cent of outstanding semis; currently, the Bank holds around \$65 billion of semis, or about 12 per cent of the market outstanding. These holdings have maturities out to 2033.

Pricing and liquidity

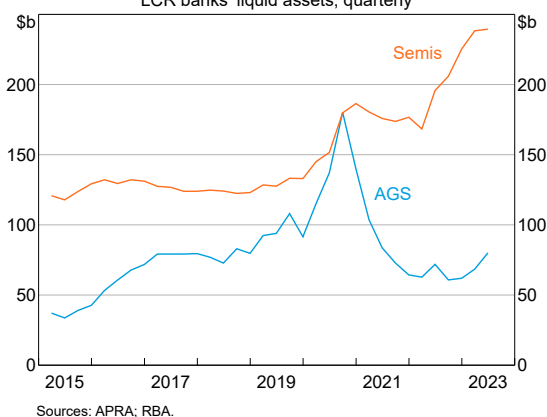
Bond pricing is often expressed in terms of the difference, or 'spread', between a bond's yield and a benchmark rate of comparable maturity. Bond spreads reflect perceptions of credit and liquidity risk for which investors seek compensation. Semis are generally considered very low credit risk due to government guarantees from respective state and territory governments, with all governments rated AA or above, reflecting strong fiscal positions. In comparison, AGS are guaranteed by the Australian Government and are therefore considered to have minimal credit risk (Finlay and Chambers 2008).

Semis market liquidity has improved since 2010, alongside strong growth in the size of the market. One measure of the improved liquidity has been an increase in the number of individual semis bond lines with more than \$5 billion outstanding. Larger bond lines tend to have higher turnover (Armour, Berkemans and Bristow 2023). Semis have also become more readily available and traded in the Australian repo market (Bergmann, Connolly and Muscatello 2019). Nonetheless, the semis bond lines are not as large as AGS and the overall market is not as large as the AGS market: the semis market is around 60 per cent of the size of the AGS market (Graph 4); and semis are traded less frequently than AGS (i.e. they have lower turnover) in the secondary market and the Australian repo market (Bergmann, Connolly and Muscatello 2019; Armour, Berkemans and Bristow 2023). This has contributed to semis pricing at a positive spread to AGS (Graph 10).

The Reserve Bank's response to the pandemic

The COVID-19 pandemic resulted in semis spreads to AGS increasing as liquidity conditions deteriorated in March 2020. For example, the five-year semis spread to AGS increased by around

Graph 9
Australian Government Securities Holdings
LCR banks' liquid assets, quarterly



20 basis points and bid-offer spreads in the outright market widened by over 30 basis points for some issuers. A widening in semis spreads to AGS is common during periods of market stress as investors seek to increase their holdings of AGS, which are more liquid and perceived by investors to have lower risk. Similarly, liquidity declined as the market became increasingly one-sided, with investors trying to liquidate their holdings alongside a large increase in issuance (Finlay, Seibold and Xiang 2020).

The Bank announced that it would buy AGS and semis in March 2020 with the aim of improving market functioning. These purchases reduced the imbalance of supply and demand and resulted in higher levels of activity and lower transactions costs. One indicator of this is bid-offer spreads, which returned to be close to pre-pandemic levels within a few months (Finlay, Seibold and Xiang 2020). Similarly, the BPP announced in November 2020 involved the purchase of semis and AGS to ease financial conditions by lowering longer term interest rates. The BPP announcement lowered semis spreads to AGS by around 5–10 basis points and led to semis trading at their tightest spread to AGS in at least 15 years (Finlay, Xiang and Titkov 2022). Since the end of the BPP, semi spreads have risen to be back around pre-pandemic levels alongside strong semis issuance.

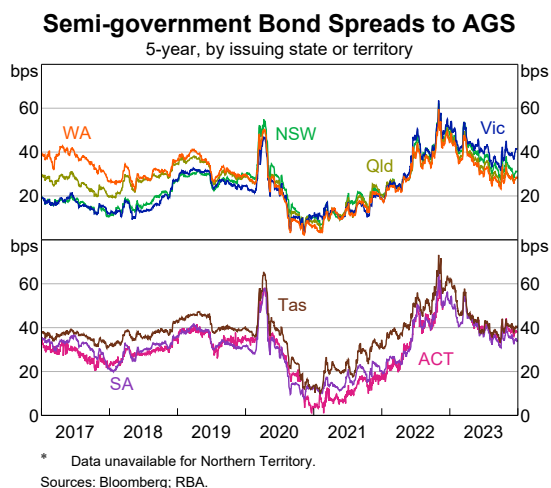
Variation across issuers

The liquidity and pricing of semis varies by issuer, typically reflecting differences in supply. The bonds of smaller issuers with fewer semis outstanding are generally less liquid. This can be seen when comparing the three smallest issuers that each have around \$10 billion outstanding (Northern Territory, Tasmania and Australian Capital Territory) with the three largest issuers that each have over \$100 billion outstanding (Victoria, New South Wales and Queensland). Semis issued by these smaller issuers often trade with wider bid-ask spreads and have lower turnover ratios (Graph 11). To compensate investors for this liquidity risk, semis issued by these issuers typically trade at wider spreads to AGS (Graph 10). Large issuance, by the semis sector or individual states and territories, may also lead to wider spreads as compensation for potential higher credit risk and to attract additional buyers. For example, larger borrowing programs since the pandemic in New South Wales and Victoria relative to Western Australia have been associated with NSW and Victorian semis trading at higher yields than WA semis (Graph 10).

Outlook for semis

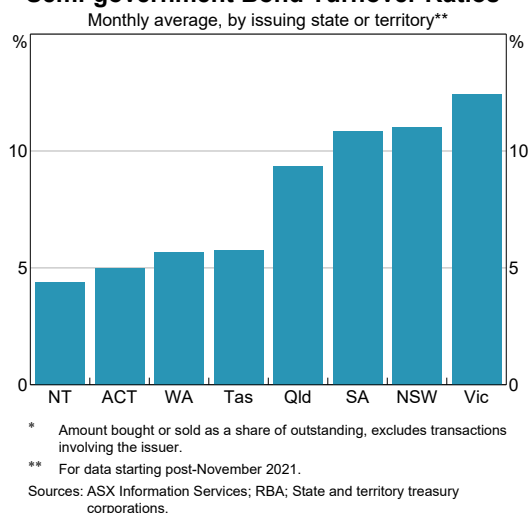
Issuance of semis in coming years is expected to remain sizeable by historical standards (Graph 12). The latest forecasts from the state and territory treasury corporations suggest over \$50 billion in net semis issuance for the 2023/24 financial year. New

Graph 10



Graph 11

Semi-government Bond Turnover Ratios*

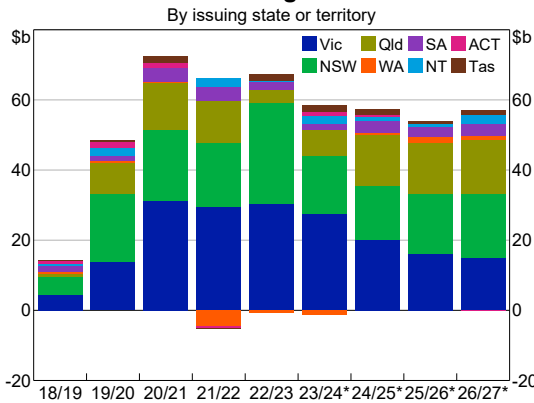


South Wales, Victoria and Queensland are likely to account for over 80 per cent of total issuance, in line with recent years. Large infrastructure pipelines are expected to keep net semis issuance high in the coming years. State and territory governments are collectively budgeting over \$350 billion in infrastructure investment until 2026/27, and accordingly most governments are projecting to run budget deficits out until the end of 2026/27.^[6] That said, state and territory borrowing requirements could decline, for example, if infrastructure investment is delayed or revised, or revenues are stronger than expected.

The state and territories' borrowing task is also large when compared with that of the Australian Government (Graph 13). There have only been a few occasions when the states and territories issued more than the Australian Government. However, net issuance of semis exceeded AGS issuance last financial year by roughly \$70 billion and on the outlooks provided by the relevant issuing authorities is expected to remain above AGS issuance over the next few years. Although issuance of semis will exceed that of AGS in the near term, on these projections the market will remain smaller than the AGS market. ✕

Graph 12

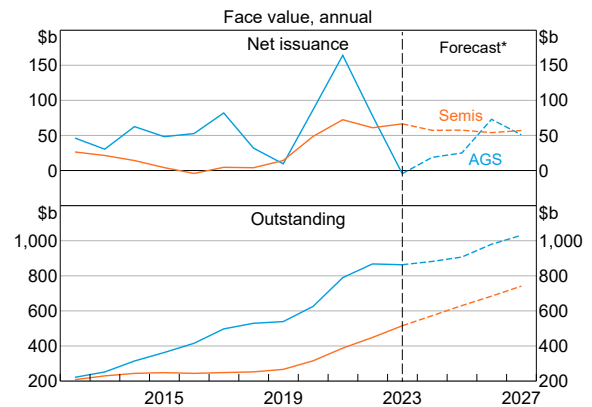
Net Issuance of Semi-government Bonds*



* From latest borrowing program updates.
Sources: RBA; State and territory treasury corporations.

Graph 13

Australian Government Debt*



* From issuing authorities' latest borrowing program updates. Excludes short-term debt.
Sources: AOFM; RBA; State and territory treasury corporations.

Endnotes

- [*] The authors are from Domestic Markets Department.
- [1] Offshore issuance has declined over the past decade. Tax changes in 2008 made offshore issuance less favourable to foreign investors. See Lancaster and Dowling (2011).
- [2] See RBA (2015).
- [3] Debt securities of the Export Finance and Insurance Corporation and Housing Australia (previously National Housing Finance and Investment Corporation) are also considered HQLA for the purposes of the LCR requirement in Australia (APRA 2021).

- [4] The cash flows of Treasury Indexed Bonds vary with inflation, but the interest rate is fixed. For more information, see AOFM (undated).
- [5] Floating-rate bonds do not have much interest rate risk because the bondholder is compensated through an increase (decrease) in coupon income as short-term rates rise (fall). Conversely, the coupon rate on fixed-rate bonds is fixed and does not change in response to market rates, resulting in the overall value of the bond changing to reflect this.
- [6] From 2023–24 state and territory budgets.

References

Armour C, D Hunt and J Lwin (2023), 'Green and Sustainable Finance in Australia', *RBA Bulletin*, September.

Armour C, L Berkelmans and L Bristow (2023), 'Measuring Government Bond Turnover in Australia Using Austraclear Data', *RBA Bulletin*, September.

AOFM (Australian Office of Financial Management) (undated), 'Treasury Indexed Bonds'. Available at <<https://www.aofm.gov.au/securities/treasury-indexed-bonds>>.

APRA (Australian Prudential Regulation Authority) (2021), 'Liquidity – Frequently Asked Questions', Prudential Practice Guide APG 210 – Liquidity and Reporting Standard ARS 210.0 Liquidity, 9 December.

Bergmann M, E Connolly and J Muscatello (2019), 'The Committed Liquidity Facility', *RBA Bulletin*, September.

Finlay R and M Chambers (2008), 'A Term Structure Decomposition of the Australian Yield Curve', RBA Research Discussion Paper No 2008-09.

Finlay R, C Seibold and M Xiang (2020), 'Government Bond Market Functioning and COVID-19', *RBA Bulletin*, September.

Finlay R, D Titkov and M Xiang (2022), 'The Yield and Market Function Effects of the Reserve Bank of Australia's Bond Purchases', RBA Research Discussion Paper No 2022-02.

Lancaster D and S Dowling (2011), 'The Australian Semi-government Bond Market', *RBA Bulletin*, September.

RBA (Reserve Bank of Australia) (2015), 'Box A: The Basel III Liquidity Reforms in Australia', *Financial Stability Review*, March.

RBA and APRA (Australian Prudential Regulation Authority) (2010), 'Australian Implementation of Global Liquidity Standards', Joint Media Release 2010-31, 17 December.

Rustia F, C Schwartz and N Stenner (2024), 'The Committed Liquidity Facility: 2015 to 2022', *RBA Bulletin*, January.

Treasury (2023), 'Final Budget Outcome 2022–23', 22 September.

