

Bulletin

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Renters, Rent Inflation and Renter Stress

Nalini Agarwal, Robert Gao and Megan Garner^[*]



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Abstract

Around one-third of all Australian households rent. Renter households tend to be younger, have lower incomes and less wealth than owner-occupiers. Renter households are also more likely than mortgagors to experience financial stress, although the incidence of financial stress among renter households has declined over the past decade. The rental market is tight and rents have increased more strongly of late, compared with the modest increases in average rents over the 2010s. For some renters, strong growth in incomes will have helped limit the deterioration in housing affordability, although there will be others who will struggle to afford the rent increases. This suggests that affordability will have worsened for some renters, and, in combination with other rising cost-of-living pressures, this is likely to be contributing to financial stress.

Introduction

Around one-third of all households rent their home, either in the private market or in public housing (Graph 1). Access to appropriate and affordable rental accommodation is an important issue for these households and the economy more broadly, as it has implications for patterns of consumption and savings and, most importantly, renters' overall wellbeing (Productivity Commission 2014). This article examines the demographic and financial characteristics of renter households and recent trends in the rental market, focusing on the

implications of the tight rental market for rental affordability and what this means for renter households.

Australia's growing rental market

The share of households that rent has risen over the past few decades, mainly in the eastern states. This reflects a rise in the proportion of private renters as home ownership rates have declined. The share of households in public housing has also declined, as growth in public housing stock has not kept pace with growth in the total number of households.

Rent assistance to private tenants has also become a more common way of providing housing assistance to lower income households.

Renting has always been more common among younger households; around half of all heads of renter households are between 25 and 44 years of age (Graph 2). However, the share of older households renting has risen over time, and single older women are the fastest growing group in public housing. Renters also tend to move home more often than owner-occupiers, regardless of their age or income level (Ellis 2017). This insecurity of tenure partly reflects that the majority of private renters are on short-term leases.

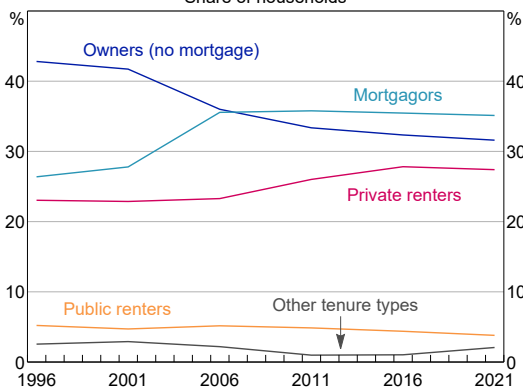
The income and wealth of the average renter

The average and median incomes of renter households are generally lower than owner-occupiers across age groups (Graph 3). However, the share of private renters who are in the top half of the income distribution has risen over time as the share of private renters in higher paid jobs, such as professional services, has increased. This shift has coincided with an increase in the average age of first home buyers and a decline in the home ownership rate among younger households.

There are also large differences in incomes between renters in public housing and private renters. Those in public housing are overwhelmingly concentrated in the lower end of the income distribution; nearly two-thirds of these households' gross income (including rent assistance) is sourced from government pensions and allowances, on average.

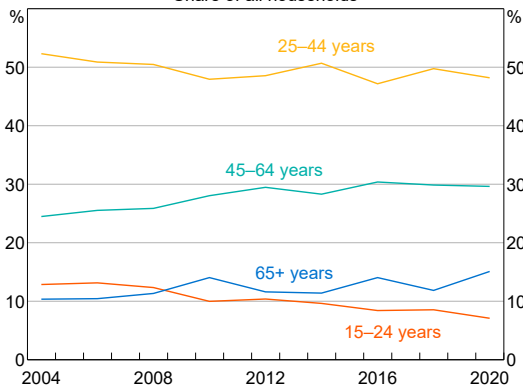
Renters, especially those on lower incomes, tend to spend a larger proportion of their incomes on basic living expenses and have less spare cash flow (i.e. income available to spend on discretionary consumption or save), relative to those who have a mortgage. Renters also tend to have lower savings buffers. In combination, these factors can make renters more vulnerable to increases in the cost of living and make it more difficult for these households to accumulate wealth over time, compared with owner-occupiers.

Graph 1
Housing Tenure Type*
Share of households



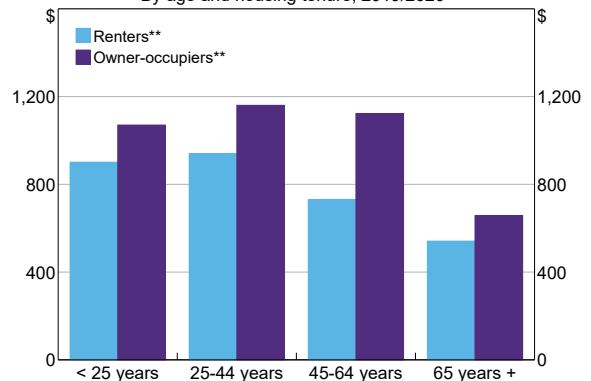
* Mortgagors include dwellings being purchased under a shared equity scheme; other tenure types include dwellings being occupied rent-free, under a life tenure scheme and other.
Sources: ABS; RBA

Graph 2
Renter Households by Age*
Share of all households



* Age is in reference to the household head.
Sources: ABS; RBA

Graph 3
Median Weekly Disposable Income
By age and housing tenure, 2019/2020*



* Equivalised household disposable income. Age is in reference to the household head.
** Renters include renters in the private market, social or public housing. Owner-occupiers with or without mortgages.
Sources: ABS; RBA

Renter households are concentrated in the lower end of the net wealth distribution (i.e. wealth after subtracting debt and not including wealth held in superannuation accounts) (Graph 4). Nearly 90 per cent of all households in the lowest wealth quintile were renters in 2019/20. This in part reflects that renters tend to be younger than other types of households and so have had less opportunity to accumulate savings over time. However, renters also tend to have lower wealth compared with owner-occupier households even after controlling for age and income.

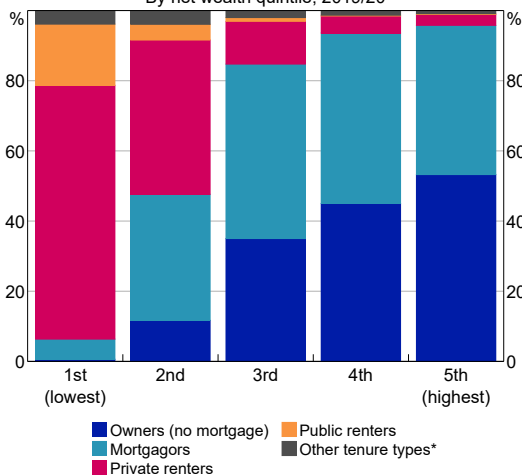
The dollar gap between renters' wealth and that of owner-occupiers has increased over the past two decades (Graph 5). Rising housing prices have increased the net wealth of owner-occupier households, which is concentrated in housing. The wealth of renter households is concentrated in other types of assets – such as savings deposits, where returns have been lower. Nevertheless, the rate of growth in net wealth has been broadly the same across households with different housing tenures, in part reflecting the shift in the population of renters to include older and higher income households over time.

The current tight rental market

Rental vacancy rates have declined across Australia over the past few years, after increasing early in the pandemic, especially in Sydney and Melbourne

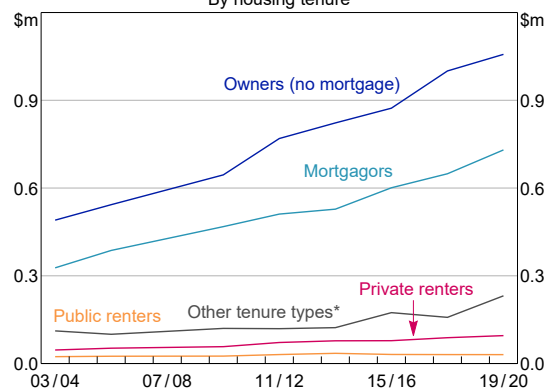
(Graph 6). At the same time, rent inflation (as measured in the Consumer Price Index (CPI), the most comprehensive measure of price changes for the stock of all rentals) has picked up over the past year (a more detailed discussion of rents is below). Advertised rents, which provide a signal of rent increases when a property is rented out to new tenants, have grown more strongly than the entire stock of rents and finding a suitable rental property has become more difficult. A number of demand- and supply-side factors have contributed to the current tightness in the domestic rental market, with strong growth in rents expected over coming years.

Graph 4
Distribution of Housing Tenure
By net wealth quintile, 2019/20



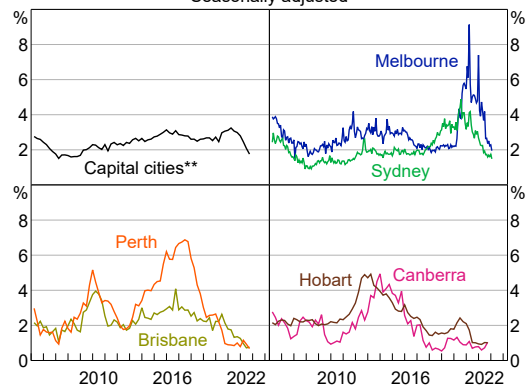
* Includes shared equity schemes, life tenure schemes and other.
Sources: ABS; RBA

Graph 5
Median Net Wealth
By housing tenure



* Includes shared equity schemes, life tenure schemes and other.
Sources: ABS; RBA

Graph 6
Rental Vacancy Rates*
Seasonally adjusted



* Data is monthly for Sydney and Melbourne, and quarterly for all other series.
** Excluding Adelaide from March 2015.
Sources: RBA; REIA; REINSW; REIV

Strong demand

During the COVID-19 pandemic, lockdowns and health concerns meant that people desired more space and to live with fewer people (Ellis 2022). This shift in living preferences contributed to average household size declining to its lowest level in at least a quarter of a century (Graph 7) (Agarwal, Bishop and Day 2023). The decline in average household size since the start of 2020 – around 1 per cent – is estimated to have contributed to around 120,000 additional households being formed and, as a result, additional demand in the rental market. Average household size has remained low in the face of the recent tightness in the rental market and rising rents. Solid growth in incomes (and, for some, increased working from home) has underpinned demand for space.

The pandemic also shifted relative demand towards smaller capital cities and regional areas. People from these areas did not move to the larger, locked-down cities at the usual rate, and greater opportunities to work remotely made living in smaller population centres feasible for more households (Ellis 2022). While advertised rents (for new rental leases) have risen across Australia, the increases were stronger in regional areas than in most capital cities through 2020 and 2021 (Graph 8). Regional vacancy rates have risen a little and capital city vacancy rates have declined since the start of 2022, which suggests that relative demand may have shifted back

towards capital cities, particularly Sydney and Melbourne.

The reopening of the international border in early 2022 also contributed to declines in vacancy rates, particularly in Sydney and Melbourne. Net overseas migration is expected to increase significantly over the coming year or so, supporting a pick-up in population growth. Around 240,000 people are expected on net to migrate to Australia over this time, equivalent to demand for an additional 96,000 properties.

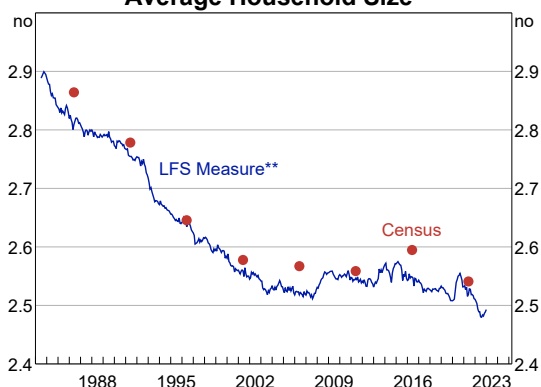
Slowing supply

Growth in the stock of total dwellings has slowed in recent years, reflecting a slowdown in apartment construction after strong growth in the mid-2010s (Graph 9). This is important for rental supply, as about half of the total stock of apartments are rented out. Further, the number of newly listed rental properties available for rent declined sharply following the onset of the pandemic and has generally remained at low levels, both in regional and metropolitan areas. Participants in the Bank’s liaison program have observed that poor availability of housing in a number of regional areas has contributed to challenges in attracting and retaining labour.

Shortfalls of public housing for those most in need have also become more acute, with the number of ‘greatest need’ households on public housing waitlists almost doubling since 2016. While the stock of public housing has grown by 3 per cent

Graph 7

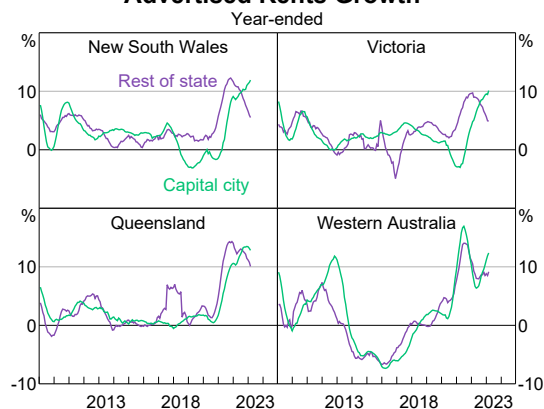
Average Household Size*



* Average number of persons usually resident in an occupied private dwelling; excludes visitors and persons in non-private dwellings (e.g. hotels and hospitals).
 ** Estimated using Labour Force Survey microdata; seasonally adjusted.
 Sources: ABS; RBA

Graph 8

Advertised Rents Growth*



* Hedonic; seasonally adjusted.
 Sources: CoreLogic; RBA

over the past decade, the total number of households in Australia and the total dwelling stock have increased by around 20 per cent over that same period. While many of the households on waitlists will be receiving rental assistance for a private rental, shorter leases mean that this alternative offers less security of tenure than public housing.

Looking ahead, growth in the supply of new rentals available to the market is expected to be subdued over the next few years. Although the return of international immigration and rising rental yields provides an incentive to supply new dwellings, information from liaison with property developers suggests that higher interest rates and construction costs, combined with declining housing prices and apartment presales, are headwinds to growth in the supply of new dwellings. The decline in the demand for new dwellings is expected to weigh on overall dwelling investment over the next few years. As a result, vacancy rates are likely to remain at low levels.

Rising rents

The average rate of increase in rents over the past decade has been relatively weak (Table 1; Graph 10). Rent inflation across the capital cities has increased at an average rate of 1 per cent per year since 2012, as measured by the ABS CPI. This is the most comprehensive measure of rent price growth available, as it tracks the prices of the stock of all rentals (in capital cities). Growth in CPI rents across

most Australian capital cities has been subdued over the past decade as a whole, with the exception of Hobart, and rents have declined in Perth and Darwin over the same period. CPI rents have generally grown at a slower pace than overall CPI, wages and household disposable income.

More recently, CPI rent inflation has picked up and leading indicators point to further increases. Advertised rents measure the prices of dwellings that are available for new tenants to rent, and so provide some indication of the future path of CPI rents, as well as capturing the experience of households seeking a new rental home. But advertised rents are a partial measure of overall rent prices, as only a small share of all rental accommodation is advertised for rent at any given point in time. In addition, changes in advertised rents do not capture changes in rent prices due to other factors, such as new leases that are agreed to at a rate that is different from the advertised rate, or the renegotiation of existing leases. For example, during the initial stages of the pandemic, a sizeable proportion of renters with existing leases were able to negotiate discounts on their rents, which resulted in a large gap between growth in advertised rents and CPI rent inflation (Evans, Rosewall and Wong 2020).

Over the past decade, rent-to-income ratios – a commonly used measure of rental affordability – have been broadly unchanged for private renters in the upper quintiles of the income distribution (Graph 11). Rent-to-income ratios for those in lower

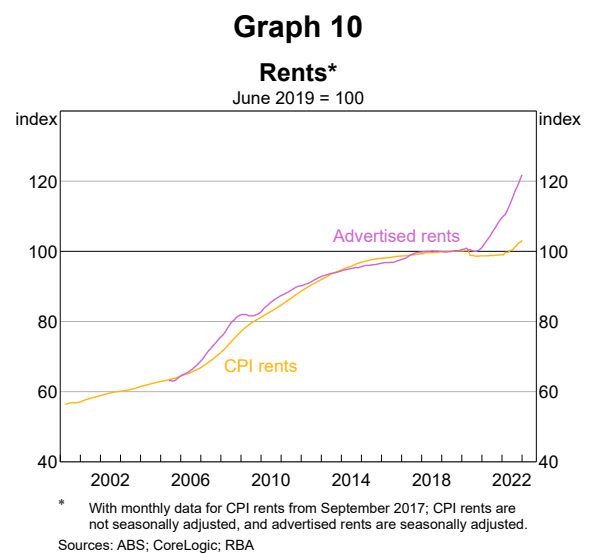
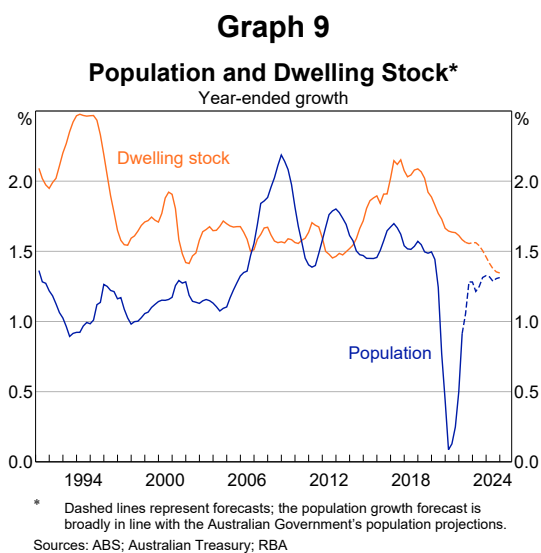


Table 1: Rents Growth
Average annualised percentage growth to December 2022

	2-year growth	5-year growth	10-year growth
CPI rents			
Capital cities	2.1	0.7	1.1
Sydney	0.7	-0.2	1.3
Melbourne	0.5	0.7	1.3
Brisbane	4.5	1.8	1.4
Adelaide	3.7	2.1	1.7
Perth	7.9	1.4	-0.4
Darwin	7.9	0.1	-0.6
Canberra	4.5	3.2	1.5
Hobart	5.1	4.8	3.4
Advertised rents			
Capital cities	9.6	4.0	2.7
Regional	10.3	6.0	3.6
Wages and income			
Wages	2.7	2.2	2.3
Disposable income	3.2	4.9	4.3
CPI	4.7	2.8	2.4

Sources: ABS; CoreLogic; RBA

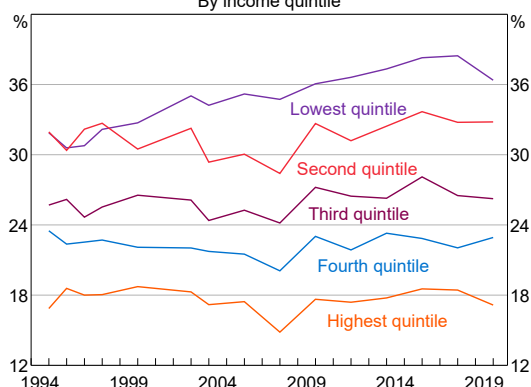
income quintiles have trended up over this period, though they have been broadly unchanged after adjusting for rent assistance. Lower income households spent 28 per cent of their disposable income on rent in the 2019/20 financial year, after accounting for rent assistance, compared with 22 per cent for higher income households (Graph 12).

Since the start of 2022, the strong growth in advertised rents has started to be reflected in higher rents for all leases, as measured by the CPI. The increase in CPI rents of 4 per cent over 2022 was the strongest in 10 years. CPI rent growth is expected to pick up further in the year ahead, though the timing and extent of this remains uncertain.

For some renters, housing affordability is likely to have worsened since the start of 2022, but it is difficult to measure to what extent. Relatively timely information suggests that growth in employment income and income support was strong for renters over the year to mid-2022 (Graph 13).^[1] These sources of renters’ income, in aggregate, increased

at around the same pace as advertised rents over that period, and outpaced the growth in CPI rents. This provides some evidence that the increase in housing costs has been broadly offset by strong income growth, thereby limiting the deterioration in housing affordability for at least some renters. This is consistent with the very strong labour market

Graph 11
Rent-to-income Ratios*
By income quintile

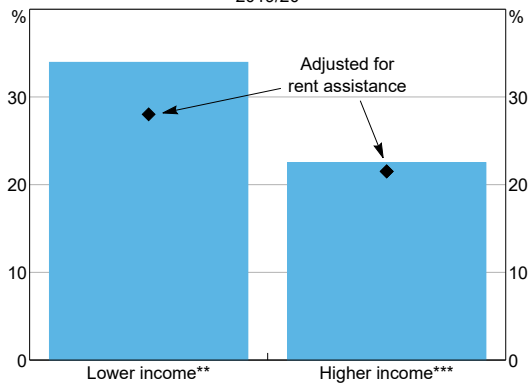


* Average rent as a proportion of household disposable income; equivalised disposable income quintiles for renters only; households with nil or negative disposable income, in the first and second income percentiles, or with a rent-to-income ratio above 100 per cent are excluded from the sample.

Sources: ABS; RBA

over the past year as well as the strong growth in social assistance benefits during the pandemic. Part of this income growth may also reflect lifecycle factors, especially if young renters experience strong income growth as they move up the job ladder, or compositional changes, such as renters moving to higher paying jobs. On the other hand, this obscures differences in outcomes across individuals, worsening rental affordability for some renters (in particular, people on new leases) and that advertised and CPI rents continued to increase for the remainder of 2022.

Graph 12
Rent-to-income Ratios*
2019/20



* Average rent as a proportion of household disposable income; equivalised disposable income quintiles for renters only; households with nil or negative disposable income, in the first and second income percentiles, or with a rent-to-income ratio above 100 per cent are excluded from the sample.

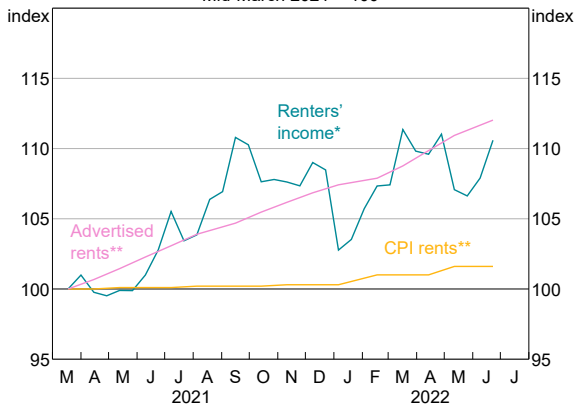
** Lower income households defined as those between the 3rd and 40th percentiles.

*** Higher income households defined as those between the 41st and 100th percentiles.

Sources: ABS; RBA

Graph 13

Rent and Income
Mid-March 2021 = 100



* Fortnightly data; Single Touch Payroll employment income and Department of Social Services support income data for renters at the time of the 2021 Census.

** Monthly data; advertised rents is seasonally adjusted.

Sources: ABS; ATO; DSS; MADIP; RBA

Recent trends in renter financial stress

The share of renter households experiencing one or more financial difficulties has declined over the past couple of decades (Graph 14). While some of this decline reflects the increased share of higher income households in the renter population, even controlling for renter households' place in the income distribution, financial stress has become less common over time.

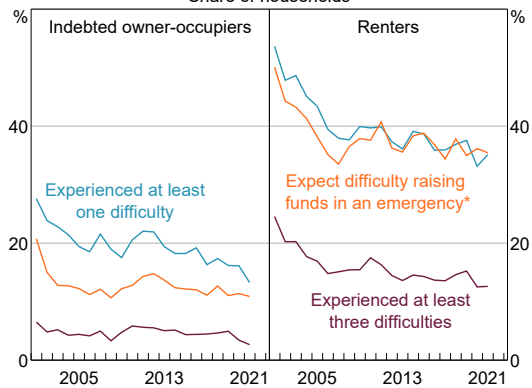
Despite this, renter households are still more likely to experience financial stress than mortgagors. Indeed, timely information suggests that financial stress for some renters has picked up over the past year. National Debt Helpline website traffic where rent is cited as a concern has increased since mid-2021, with rent consistently being one of the two most reported concerns. Further, community service providers participating in the Bank's liaison program report that demand for financial assistance and counselling has also increased, primarily for renters.

The recent challenge of higher living costs

Consumer price inflation has risen considerably over the past year, with broad-based increases in the prices of most goods and services. To the extent that renters are more likely to be lower income households compared with owner-occupiers, they are also less likely to be able to substitute towards less expensive goods and services. Furthermore, while the effect of price rises on lower income

Graph 14

Incidence of Financial Stress
Share of households



* \$2,000 from 2001–2008; \$3,000 from 2009–2019; \$4,000 from 2020 onwards.

Sources: HILDA Survey Release 21.0; RBA

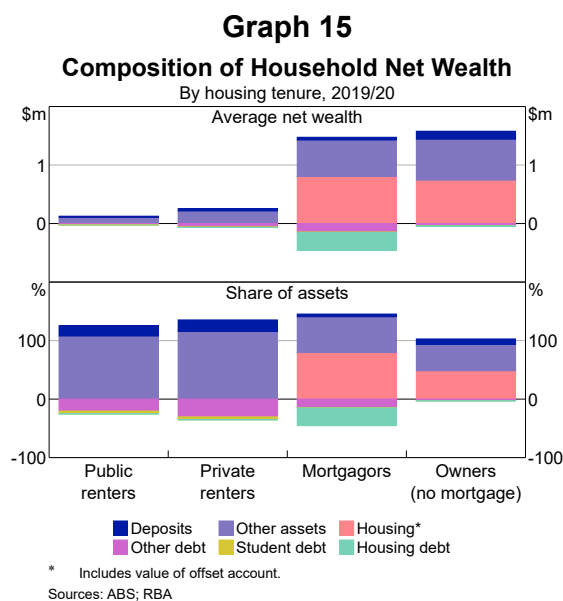
renters is mitigated by the indexation of social assistance payments to inflation twice per year, this indexation operates with a lag.

The direct effect of rising interest rates on household net wealth is less important for renter households, as renters hold less interest-sensitive debt in absolute terms and as a share of total assets when compared with mortgagors (Graph 15). However, the indirect effects of rising interest rates on household cash flows are likely to be greater for renters than for owner-occupier households. This is because renters tend to have lower incomes compared with owner-occupiers. Lower-income workers tend to be more exposed to the economic cycle, in the sense that they are more likely to be affected by changes in unemployment and adjustments in hours worked and/or wages than higher-income workers (Stone 2016).

Conclusion

Renter households account for a meaningful share of all Australian households. The demographic and financial characteristics of these households tend to be different to owner-occupier households – renters are younger, move more often, and have lower incomes and lower wealth. These characteristics can make renter households more

vulnerable to rising rents and broader cost-of-living pressures. Over the past decade, rents have grown modestly and this growth has been outpaced by growth in wages and household disposable income in the economy. Even so, the tightness in the rental market and the strong growth in rents that has occurred since the onset of the COVID-19 pandemic will have contributed to a deterioration in rental affordability and an increase in financial stress for some renter households. ↗



Endnotes

[*] The authors are from Economic Analysis Department. The authors are grateful for the assistance provided by others in Economic Group and Financial Stability Department, in particular Maia Alfonzetti, James Bishop, Tomas Cokis, Jonathan Hambur and Declan Twohig. This research uses microdata from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, ABS, and microdata accessed via the Multi-Agency Data Integration Project (MADIP).

[1] This analysis uses anonymised Census, Single Touch Payroll income data and Department of Social Services Support income data to track the incomes of those who were renting at the time of the 2021 Census. Other sources of income, such as investment income, are not included in this analysis. New renters do not contribute to this measure of nominal income growth. By contrast, individuals who stop renting after the Census date continue contributing to this measure. The data was accessed via MADIP.

References

Agarwal N, J Bishop and I Day (2023), 'A New Measure of Average Household Size', *RBA Bulletin*, March.

Ellis L (2017), 'Opening Remarks to Plenary Panel at the Australasian Housing Researchers Conference', Australasian Housing Researchers Conference, Melbourne, 16 February.

Ellis L (2022), 'Housing in the Endemic Phase', Keynote Speech to the UDIA 2022 National Congress, Sydney, 25 May.

Evans R, T Rosewall and A Wong (2020), 'The Rental Market and COVID-19', *RBA Bulletin*, September.

Productivity Commission (2014), 'Geographic Labour Mobility', Research Report, April.

Stone T (2016), 'The Sensitivity of Personal Income to GDP Growth', RBA *Bulletin*, December.

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Fixed-rate Housing Loans: Monetary Policy Transmission and Financial Stability Risks

Gian-Piero Lovicu, Jin Lim, Anthea Faferko, Amelia Gao, Anirudh Suthakar and Declan Twohig^[*]



Photo: Andrew Merry – Getty Images

Abstract

Fixed-rate borrowing increased significantly during the COVID-19 pandemic, which has delayed the effect of the higher cash rate on borrowers' cash flows. A key issue for the economic outlook, and by implication financial stability, relates to the ability of borrowers with fixed-rate loans to adjust to substantially higher borrowing costs when their fixed-rate mortgages expire. Borrowers with fixed-rate loans have had a considerable period to adjust their finances to prepare for the increase in their mortgage payments and many appear to have similar savings to borrowers on variable rates. However, on some metrics fixed-rate loans have higher risk characteristics than variable-rate loans. With many fixed-rate mortgages expiring in the period ahead, the Reserve Bank will continue to closely monitor the implications for household consumption and financial stability.

Introduction

During the COVID-19 pandemic, the value of fixed-rate housing loans increased substantially, peaking at almost 40 per cent of outstanding housing credit in early 2022, or roughly twice their usual share from prior to 2020 (Graph 1).^[1] Many borrowers also fixed

their interest rates for longer periods than is typically the case. Lenders lowered their advertised fixed rates below variable rates to compete for borrowers (Graph 2). Strong competition on fixed-rate loans was made possible, at least in part, by lenders' ability to obtain low-cost term funding via

the Reserve Bank’s monetary policy response to the pandemic, which included the introduction of the Term Funding Facility, the three-year yield target and forward guidance (RBA 2022a). Competing vigorously on fixed-rate loans also enabled lenders to attract new borrowers without reducing their reference rates for variable-rate loans (which would have lowered rates for their existing variable-rate customers). New fixed-rate lending slowed sharply from late 2021 as new fixed rates rose relative to variable rates, along with market yields around the period when the yield target ended. By mid-2022, new fixed-rate lending had declined to around 5 per cent of total new lending.

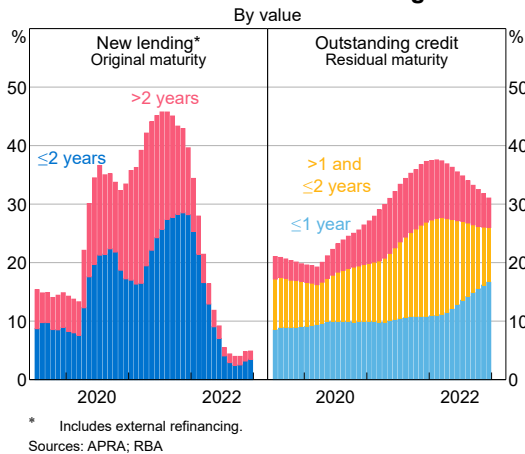
Most borrowers in Australia who fix their mortgage interest rate do so for three years or less. This means

that the fixed-rate term on most loans taken out during the pandemic has expired recently or will do so over the coming two years. One-quarter of fixed-rate loans outstanding in early 2022 have now expired; most have rolled on to a variable interest rate, rather than re-fixing at a higher rate. Another 40 per cent of fixed-rate loans outstanding in early 2022 will expire by the end of 2023 and a further 20 per cent by the end of 2024. This equates to 590,000 loan facilities in 2022, 880,000 in 2023 and 450,000 in 2024.^[2] The profile of expiring fixed-rate loans is similar across the states and territories and between capital cities and regional areas.

The analysis in this article draws largely on the Bank’s Securitisation dataset, which covers around one-third of outstanding housing credit (Fernandes and Jones 2018), liaison with major banks and survey data on household balance sheets.^[3]

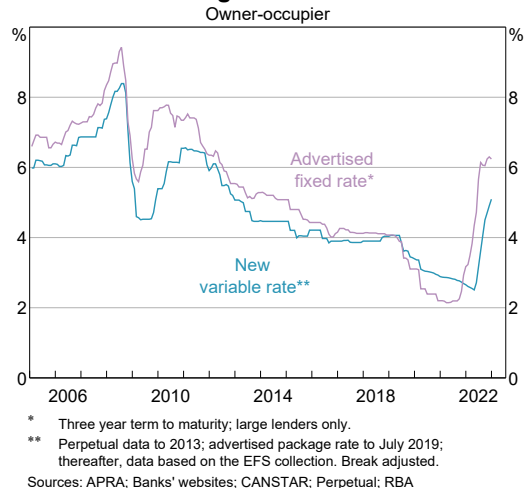
Graph 1

Fixed-rate Share of Total Housing Loans



Graph 2

Housing Interest Rates



Borrowers with expiring fixed-rate loans face large increases in their repayments

Scheduled loan payments will increase for borrowers when their fixed-rate terms expire, based on current interest rates and assuming the cash rate changes in line with the path inferred from financial market pricing as at 1 March 2023 (the ‘market path’). To date, borrowers have rolled off onto a rate similar to that faced by existing variable-rate borrowers (Graph 3). Many borrowers are likely to have subsequently reduced the initial variable rate they rolled off to by negotiating with their existing lender or refinancing with another lender, especially those of higher credit quality (RBA 2023b; Carse, Faferko and Fitzpatrick 2023).

How much the scheduled payment on an expiring fixed-rate loan increases depends on the loan’s current fixed rate, the timing of the expiry of that rate and the loan’s new interest rate (Graph 4). Scheduled loan repayments on some of the fixed-rate loans that expired in 2022 increased by up to 50 per cent at expiry, although around two-thirds of loans experienced an increase of 30 per cent or less (Graph 4, top panel, area under orange line).^[4] Most of these borrowers’ repayments have increased further since they switched to variable-rate loans, as they have for all borrowers with a variable-rate loan (Graph 4, top panel, blue line). The one-off increase

in scheduled payments when the fixed rates on these loans expire is large because fixed rates were very low when most were taken out.

Loans that are yet to roll off their fixed rate will face a larger initial increase in scheduled repayments than those that rolled over during 2022 because the cash rate increased over that year and the market path implies further increases until late 2023. Around 90 per cent of these loans will see their scheduled payments increase by 30 per cent or more (Graph 4, bottom panel, area under orange line) and most will experience the total increase upon the expiry of the fixed rate (bottom panel, orange and blue lines similar). Though these increases are large for many of the loans yet to roll off their fixed rate, they are similar in size to the total increases in scheduled payments for variable-rate loans since the first increase in the cash rate in May 2022.

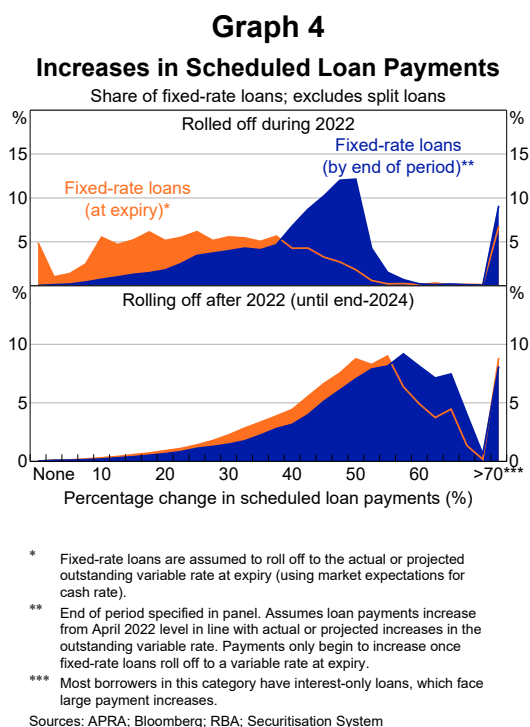
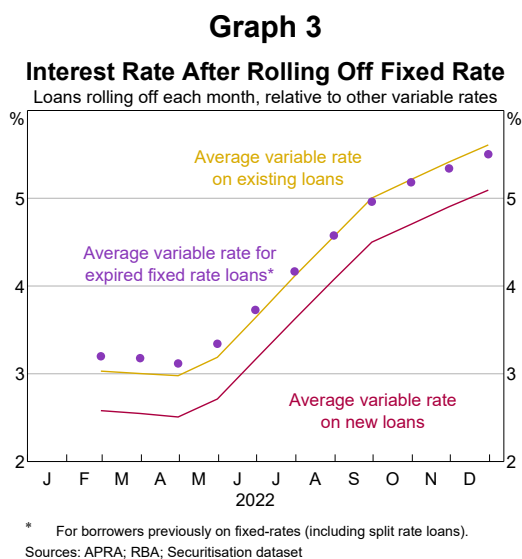
Borrowers with fixed-rate loans have benefited from a prolonged period of low interest rates, and will have had more time than borrowers with variable-rate loans to prepare for higher rates – including by accumulating savings. By having a fixed rate, around 60 per cent of fully fixed-rate loans (outstanding in December 2022) will have avoided higher loan payments equivalent to more than three months of their new required repayment after their fixed rate expires (Graph 5). Constructing this estimate compared the scheduled payment at the loan’s fixed rate with the scheduled payment the loan

would have had each month if it had a variable rate. Loans that have a fixed rate for longer will benefit most.

It is not possible to observe how much of the cash flow associated with experiencing lower loan payments that borrowers on fixed-rate mortgages have *actually* saved (or will save). As discussed later, borrowers have broadly similar levels of liquid savings – regardless of the type of interest rate on their loan – and have increased these over the past few years. While many borrowers on fixed rates may have saved or be saving in preparation for higher loan payments, some may have used the period of low fixed borrowing costs to consume more than they would have otherwise.

Fixed-rate loans delay the transmission of a higher cash rate to mortgage payments

In 2022, scheduled loan payments in aggregate increased a little slower than in the past because of the higher share of fixed-rate credit and because borrowers fixed their rates for longer than is typically the case. A higher cash rate is still transmitting quickly to most loans, though, because the majority have a variable rate, many have already rolled off their earlier fixed rates and many more will do so in the coming months.



The Reserve Bank raised the cash rate by 3 percentage points in 2022 to 3.1 per cent; over the same period, the average outstanding mortgage rate (for all loans) increased by almost 2 percentage points to 4.7 per cent. If all fixed-rate loans instead paid the variable rate on new loans, the average outstanding mortgage rate would be 70 basis points (bps) higher than it was in December 2022. This gap will slowly shrink as more fixed-rate loans expire and will be around 25 bps at the end of 2023 and close to zero by the end of 2024.

The Reserve Bank monitors the effect of interest rates on scheduled housing loan payments because they directly affect household disposable income; this cash flow channel is an important mechanism for transmitting monetary policy (La Cava, Hughson and Kaplan 2016). Borrowers can service their loans when their required loan payments increase by saving less, drawing on existing savings and wealth, or reducing consumption. If available to them, some borrowers may also choose to increase their income – for example, by changing jobs or working more hours. The higher share of fixed-rate loans (compared with past interest rate cycles) delays the cash flow channel in aggregate because some households will not face higher interest rates for a period. But this will also depend on how fixed-rate

borrowers prepare their finances ahead of their fixed rate expiring. For example, if they save a lot more in anticipation of the increase in required loan payments in the future, they may not need to reduce their consumption (further) when their loan payments actually do increase.

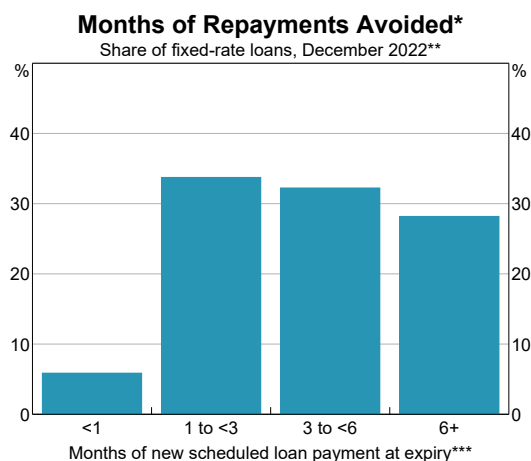
Fixed-rate loans have riskier characteristics than variable-rate loans ...

The large and discrete increase that borrowers with fixed-rate loans have faced or will soon face in their mortgage payments is one of the factors expected to contribute to slower household consumption in the period ahead. It could ultimately increase the potential for financial stability risks if many borrowers default on their loans (leading to losses for lenders) (Bergmann 2020) or reduce their consumption to the extent that unemployment increases significantly and other borrowers facing unemployment in turn struggle to service their debts.

In general, financial stability risks are more likely to eventuate if there are large numbers of borrowers with risky characteristics, including high levels of debt relative to income and assets, low income levels and low spare income after meeting loan payments and other essential expenses (RBA 2022b). On some of these metrics, borrowers with fixed-rate loans are more risky than those with variable-rate loans (who have seen large increases in their loan payments already and who to date have shown little evidence of increased financial stress). Nevertheless, while fixed-rate loans tend to be newer and to a degree are expected to have more debt outstanding relative to income (since borrowers have not yet had time to pay down their loan) the differences are not large.

Some borrowers could fall behind on their scheduled loan payments if they cannot adjust to higher loan payments. One rough metric for assessing whether a borrower might encounter difficulty servicing their loan is if they spend more than 30 per cent of their income on scheduled loan payments. In practice, however, other factors such as the borrower's income level and savings are also important. In April 2022, most borrowers with fixed-rate loans spent between 5 and 25 per cent of their

Graph 5



* Calculated each month using the difference between loan's current scheduled payment at its fixed rate and the payment they would face at the outstanding variable rate each month from May 2022 until expiry. Changes in the outstanding variable rate are assumed to take two months to pass through to scheduled payments.

** Excludes split loans and a small number of loans that are worse off on their fixed rate.

*** New scheduled payment calculated using outstanding variable rate projected at expiry (assuming full pass through of changes in the cash rate under the market path).

Sources: APRA; RBA; Securitisation System

income making mortgage payments before they rolled off; only around 10 per cent of borrowers on fixed rates spent more than 30 per cent (Graph 6). But after rolling off, roughly 25 per cent would need to spend more than 30 per cent of their income on loan payments – a slightly larger share than borrowers with variable-rate loans. Much of the increase comes from borrowers in the bottom half of the income distribution, who are more likely to have less spare cash flow and so may reduce their consumption and/or encounter difficulty servicing their debt as they roll off.^[5] This is a key group to monitor as fixed-rate loans roll off over the period ahead, especially if this group also has low savings buffers.

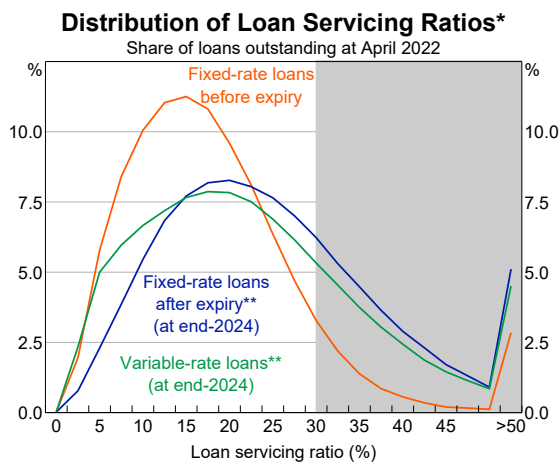
Fixed-rate borrowers are more likely to have larger loans relative to their incomes (LTI ratio > 6) or high loan-to-valuation ratios (LVR > 80) than borrowers on variable rates (Graph 7). This is especially so for some fixed-rate loans with low mortgage prepayments. These loans are more risky on average, but in part this reflects their tendency to be newer and so borrowers have had less time to accumulate equity or liquidity buffers. Borrowers with fixed-rate loans are also more likely to be first home buyers, although first home buyers on fixed rates tend to have more mortgage prepayments than other loans with otherwise similar characteristics.

... but many have built savings buffers to help mitigate risks

One way borrowers can adjust to higher loan payments is by using their savings. Comprehensive data are available on offset and redraw balances of owner-occupier variable-rate loans, which form a large part of these borrowers’ savings (La Cava and Wang 2021). However, assessing the savings buffers of borrowers with fixed-rate loans is more difficult because many hold more of their savings outside of their mortgage.

Most fixed-rate loan products do not have an offset facility and typically restrict mortgage prepayments. Nevertheless, some avenues exist for fixed-rate borrowers to save via their mortgages especially if they have a split loan. While there are no comprehensive data on the savings held by fully fixed-rate borrowers in non-mortgage forms, private survey data suggest that fixed-rate borrowers have similar levels of total liquid assets to borrowers with variable-rate or split loans. This is particularly true among borrowers with lower incomes, who might otherwise be regarded as potentially more vulnerable. In addition, liaison with some banks has indicated that borrowers on fixed rates in general have as many (and in some cases more) savings than other borrowers, in part because they have so far avoided higher loan payments.

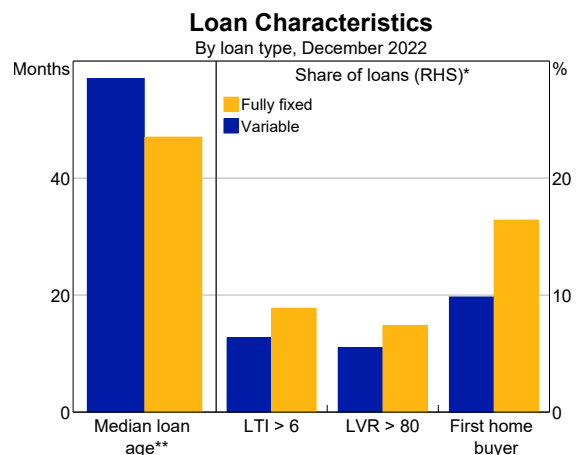
Graph 6



* Loan-servicing ratio is minimum scheduled payment after roll-off divided by an estimate of income at expiry. Excludes fixed-rate loans expiring after the end of 2024.
 ** Assumes loan rate increases according to increases in the cash rate since April 2022 (including any future increases implied by the market path until end-2024). Fixed-rate loans assumed to roll off to average outstanding variable rate (actual or projected) at their expiry date and then their rate changes in line with variable-rate loans.

Sources: APRA; Bloomberg; RBA; Securitisation System

Graph 7



* Loan-to-income (LTI) ratio is loan scheduled balance divided by an estimate of current income. LVR is scheduled loan balance divided by an estimate of current value of the property. Property valuation at origination adjusted using house price changes at SA3 level.

** Excludes externally refinanced loans.

Sources: ABS; CoreLogic; RBA; Securitisation System

Some borrowers on fixed-rates have large mortgage prepayments, especially those with split loans

Some fixed-rate borrowers have a 'split' loan with a fixed- and variable-rate component. A borrower may elect to split their loan into a fixed-rate facility and a variable-rate facility, with an offset and/or a redraw feature available to make prepayments on the variable-rate portion of their loan. Information from major banks suggests that over half of their owner-occupier customers on fixed rates have a split loan and that the majority of their loan balance has a fixed rate.

Borrowers with a split loan tend to exhibit similar savings behaviour in their mortgages to those with variable-rate loans, and most have substantial savings buffers that can help them meet higher repayments. Around three-quarters of owner-occupiers with split loans could cover their minimum payment for more than three months if they were to immediately roll off to a variable rate (and 60 per cent could cover their payments for more than a year) (Graph 8).

For loans that have a fully fixed rate, most lenders allow the borrower to make limited prepayments, which they can redraw but only when their fixed-rate term expires. Among the largest 10 lenders, the median prepayment allowance is \$10,000 per year of the fixed term.^[6] Additionally, borrowers who switched from an existing variable-rate loan to a fixed rate may have made additional payments prior to fixing their interest rate – for example, analysis of a sample of loans rolling onto fixed rates suggests that around half of borrowers had made mortgage prepayments of more than three months just prior to fixing their interest rate. Further, around 15 per cent of fully fixed-rate loans in the Securitisation database have an offset facility with a positive balance from one of the relatively few lenders offering this feature.

Consistent with the limited options available to them to save via their mortgage, only one-third of fully fixed owner-occupiers have excess payments to cover their minimum scheduled payment for three or more months if they were to immediately roll off to the average new variable rate (compared

to two-thirds of variable-rate and split loan borrowers) (Graph 8).^[7]

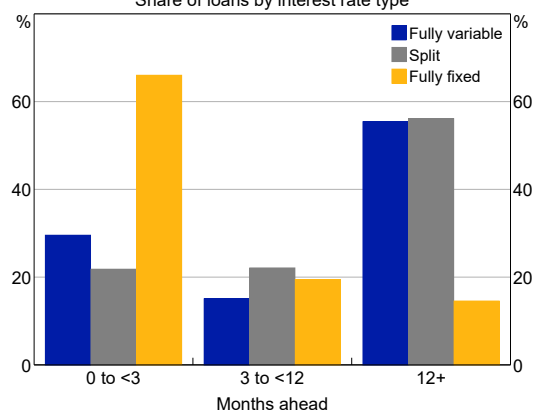
It is important to note that this does not necessarily suggest that fully fixed-rate borrowers are at higher risk of facing repayment difficulties or reducing their spending. Given they are restricted from saving via mortgage prepayments, many fully fixed-rate borrowers are likely to hold their savings buffers in other (non-mortgage) forms.

Survey data suggest borrowers have similar savings buffers, regardless of interest rate type

Private survey data suggest that many borrowers with fully fixed-rate loans hold substantial non-mortgage savings (Graph 9). These data are based on a smaller sample than the Securitisation data, but provide a more complete comparison between the savings of borrowers on fixed rates and variable rates (non-mortgage savings are not visible in the Securitisation data). The additional savings are held in (non-offset) bank deposits and other liquid assets (such as managed funds and shares) but exclude funds available for redraw from a loan account. These additional savings show borrowers on fixed rates have meaningful savings buffers that are comparable to variable-rate and split loan borrowers. Borrowers on lower incomes have similar savings regardless of the type of interest rate on their loan.

Graph 8

Household Mortgage Prepayment Buffers*
Share of loans by interest rate type



* Number of months that prepayments (offset and redraw balances) could cover a loan's minimum scheduled payment. For variable-rate loans this is calculated using the loan's current variable interest rate, for fully fixed and split loans this is calculated using the average new variable rate.

** Owner-occupier loans in December 2022.

Sources: APRA; RBA; Securitisation System

There are still some borrowers (regardless of the type of interest rate) with low savings buffers that are vulnerable to higher loan payments, especially those with lower incomes. But, based on these data, borrowers on fixed rates appear at least as prepared as other borrowers for the coming increase in their loan payments.

One-fifth of fixed-rate loans increased mortgage prepayment by six months or more after roll-off

Once a loan’s fixed-rate term has expired, if it has rolled off to a variable rate most lenders will allow the borrower to make unlimited payments into an offset or redraw facility linked to the loan (they may also be able to redraw any extra payments made before or during the fixed-rate term). At this point, the borrower has an incentive to convert at least some liquid savings they hold elsewhere (e.g. in a deposit account) into mortgage prepayments since they will most likely receive a higher return (and a tax benefit) from doing so.^[8] Observing loans after their fixed-rate term expires can therefore provide insights into the non-mortgage savings buffers these borrowers held while they were on a fixed rate.

A material share of borrowers make large transfers into their mortgage after their fixed rate expires. Around one-fifth of fully fixed-rate loans rolling off between February and October 2022 increased

mortgage prepayments by more than six months of their new required payment within a few months of rolling off to a variable rate. The share of fixed-rate loans that made large prepayments was twice as high compared with variable-rate loans over the same period (Graph 10). A little under half of these loans did not have meaningful mortgage prepayments prior to rolling off, which suggests that these borrowers held substantial non-mortgage savings to transfer into their loan after their fixed rate expired.

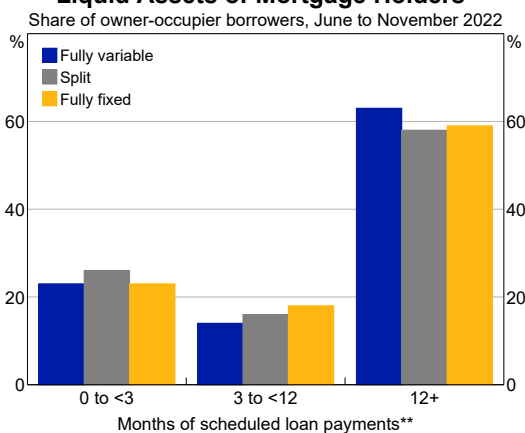
However, two to three months after roll-off, the distribution of buffers among recently rolled off loans remains lower than for variable-rate loans; only around half covered the new scheduled payment for three or more months (compared with around two-thirds of variable-rate and split loans). This suggests that some fixed-rate borrowers are either choosing to hold their savings outside their mortgage or, for some reason, this particular cohort have fewer savings than all variable-rate borrowers.

Conclusion

Borrowers with fixed-rate loans have faced or will face large, discrete increases in their loan payments when their fixed-rate terms expire. Loans that are yet to roll off will face the largest increases, although these borrowers have also benefited the most from avoiding higher loan payments to date and have

Graph 9

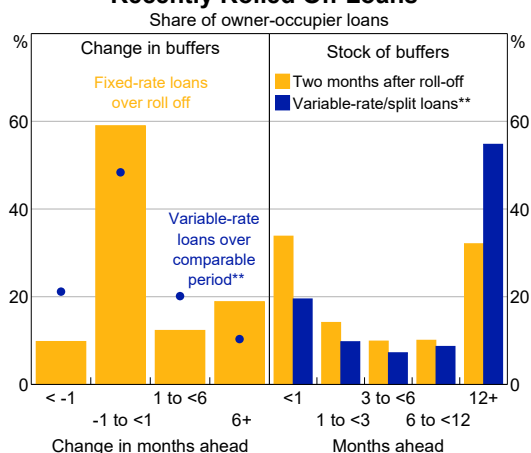
Liquid Assets of Mortgage Holders*



* Liquid assets include balances held in deposit accounts (including offset accounts), shares and holdings in managed funds. Excludes balances available for redraw from the loan.
 ** Monthly scheduled payment calculated using credit foncier model assuming all borrowers face the outstanding variable rate as at December 2022.
 Sources: DBM Atlas; RBA

Graph 10

Recently Rolled Off Loans*



* Change in buffers within two to three months of rolling of fixed term to variable rate; includes loans that rolled off between February and October 2022; all buffers expressed relative to the loan’s variable rate in December 2022.
 ** Buffers as at December 2022.
 Sources: RBA; Securitisation System

had more time to prepare for the rise in mortgage payments. Although higher mortgage payments will strain the finances of some borrowers, most are facing higher interest rates from a position of strength, with very low rates of mortgage arrears, a very low unemployment rate and a high rate of participation in the labour market.

The historically high share of fixed-rate lending during the pandemic means that a rising cash rate will take slightly longer than usual to pass through to mortgage payments for all borrowers. However, aggregate mortgage payments have still increased substantially because the majority of households have variable-rate loans and most fixed-rate mortgages are fixed for relatively short periods of time (RBA 2023b).

Aside from encountering a large step up in their loan payments, borrowers on fixed rates tend to have newer loans and, on some measures, more risky loan characteristics than borrowers on variable rates. While the differences are not large in aggregate, more vulnerable borrowers (such as those with lower incomes, more leverage and first home buyers) are more exposed to large increases

in interest rates and typically have fewer margins of adjustment to their financial situation. They should, therefore, be monitored carefully for signs of emerging stress.

Borrowers' savings buffers can help them to adjust to higher loan payments. Many borrowers on fixed rates have built savings buffers to help them adjust to higher loan servicing obligations. In particular, many borrowers on fixed rates have split loans with sizeable prepayment buffers, and one-third of fully fixed-rate borrowers have also accumulated savings in their mortgages. Many borrowers with fully fixed-rate loans are likely to hold substantial non-mortgage savings: a material share of loans make large transfers in to their mortgage after their fixed rate expires and private survey data shows borrowers have a similar distribution of savings, regardless of the type of interest rate on their loan. The Bank will continue to monitor the expiry of fixed-rate loans closely in the period ahead, especially given its importance for the consumption outlook and, by implication, financial stability. ❖

Endnotes

- [*] The authors are from Financial Stability and Domestic Markets departments.
- [1] While such a high share of fixed-rate housing credit is unusual in an Australian context, fixed-rate housing loans are much more common in some other economies, such as New Zealand, Canada, the United Kingdom and the United States. In New Zealand, the most popular fixed-rate term is two years for mortgages; for Canada and the United Kingdom, it is five years (RBA 2023a).
- [2] The number of facilities is not equivalent to the number of households with fixed-rate loans. For example, a household may have multiple loan facilities (potentially across different lenders) or borrowers from different households may be responsible for the same loan facility.
- [3] The share of new loans in the Securitisation data is lower than in the total stock of outstanding housing credit; this stems from a delay between origination and securitisation. Fixed-rate loans are less likely to be securitised so are underrepresented in the Securitisation data. The share of outstanding fixed-rate credit in the Securitisation data is around 27 per cent, compared with 30 per cent for all housing credit as at December 2022.
- [4] See RBA (2022c), RBA (2022d) and Bullock (2022) for scenarios for increases in scheduled loan payments using some different assumptions.
- [5] This refers to the income distribution of mortgage holders (which make up roughly one-third of households). Mortgage holders tend to, on average, have higher incomes than other households.
- [6] Based on fixed-rate loans advertised in December 2022. This allowance is over seven months of prepayments for a \$500,000, 30-year loan at the average new variable rate in December 2022.
- [7] Investors are excluded from this analysis because they tend to hold their savings buffers outside their investment property.
- [8] The mortgage interest saved due to balances held in an offset facility is not taxable; interest earned from savings held in a deposit account is taxed at the marginal income tax rate.

References

- Bergmann M (2020), 'The Determinants of Mortgage Defaults in Australia – Evidence for the Double-trigger Hypothesis', RBA Research Discussion Paper No 2020-03.
- Bullock M (2022), 'How Are Households Placed for Interest Rate Increases?', Speech to the ESA (QLD) Business Lunch, Brisbane, 19 July.
- Carse V, A Faferko and R Fitzpatrick (2023), 'Developments in Banks' Funding Costs and Lending Rates', RBA *Bulletin*, March.
- Fernandes K and D Jones (2018), 'The Reserve Bank's Securitisation Dataset', RBA *Bulletin*, December.
- La Cava G and L Wang (2021), 'The Rise in Household Liquidity', RBA Research Discussion Paper No 2021-10.
- La Cava G, H Hughson and G Kaplan (2016), 'The Household Cash Flow Channel of Monetary Policy', RBA Research Discussion Paper No 2016-12.
- RBA (2022a), 'Review of the Yield Target'.
- RBA (2022b), 'Box B: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows', *Financial Stability Review*, October.
- RBA (2022c), 'Household and Business Finances in Australia', *Financial Stability Review*, October.
- RBA (2022d), 'Household and Business Finances in Australia', *Financial Stability Review*, April.
- RBA (2023a), 'Box A: Mortgage Interest Payments in Advanced Economies - One Channel of Monetary Policy', *Statement of Monetary Policy*, February.
- RBA (2023b), 'Domestic Financial Conditions', *Statement of Monetary Policy*, February.

A New Measure of Average Household Size

Nalini Agarwal, James Bishop and Iris Day^[*]



Photo: Aleksandar Nakic – Getty Images

Abstract

This article introduces a new, timely measure of average household size (AHS) – a key determinant of underlying demand for housing – using the data from the ABS monthly Labour Force Survey. The average number of people living in each household has declined from around 2.9 in the mid-1980s to around 2.5 since the early 2000s. More recently, the AHS declined to historical lows of a little below 2.5 people per household. This was driven by changes in Sydney and Melbourne during the pandemic, which were more exposed to health restrictions, lockdowns and changes in migration flows from overseas.

Introduction

Average household size (AHS) – the average number of adults and children living in a home – is a key determinant of underlying demand for housing. For example, a decline in AHS means more households are being formed and there is therefore greater demand for housing for a given level of population growth. Changes in AHS can be driven by structural factors, such as shifts in demographics and household preferences for how much space people want; changes in AHS can also occur in response to cyclical conditions, such as changes in housing prices and rents (Kohler and van der

Merwe 2015). During the COVID-19 pandemic, changes in AHS were an important margin of adjustment for the housing market (Ellis 2022).

Existing AHS measures are published infrequently and with a long lag, which does not allow for a timely assessment of the interaction between changes in AHS and housing market conditions. This article introduces a timelier measure of AHS – developed by the authors – that can be calculated for different groups in the Australian population, including by geographic area and household characteristics.

Table 1: Measures of Average Household Size

	LFS Measure	Census	SIH	HILDA
Frequency	Monthly	Every 5 years	Every 2 years	Annual
Publication lag (approx.)	6 weeks	11 months	2 years	1 year
Sample size (approx.)	26,000 households	All responding households	15,000 households	9,500 households

Sources: ABS; Melbourne Institute; RBA

A new measure of AHS using Labour Force Survey data

Background

Research on household size and household formation in Australia has tended to use data from the Census of Population and Housing, which is conducted by the Australian Bureau of Statistics (ABS) every five years. While the Census is an invaluable source of data on longer run trends in household formation, it is not suitable for monitoring recent and higher frequency changes in household formation such as those that occurred since the onset of the pandemic. Other sources of household-level data – including, the Survey of Income and Housing (SIH) and the Household, Income and Labour Dynamics in Australia (HILDA) survey – are also not available frequently and timely enough for real-time monitoring of household formation.

Recently, the Bank has started constructing and monitoring a new series on AHS (Graph 1). This new measure uses the data underlying the ABS’s monthly Labour Force Survey (LFS). While the LFS was not specifically designed to measure AHS, it aligns closely with and addresses many of the shortcomings of the existing measures.^[1] Hereafter, the new measure constructed by the authors is referred to as the ‘LFS Measure’.

The LFS Measure is timely: it is available on a monthly basis and can be updated six weeks after the end of the period that each survey references (e.g. if the survey is conducted in the first half of March, estimates for March are generally available by the fourth week of April). As a result, the LFS provides the most up-to-date estimate of AHS, with

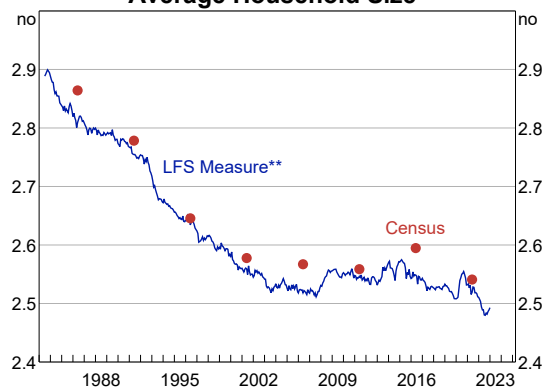
the latest data suggesting that the AHS remained around historically low levels at 2.49 people per household in January 2023. The LFS Measure also has the advantage of being based on a large nationally representative sample, with monthly data underpinning the measure available back to July 1983. The long history allows us to adjust for regular seasonal patterns and to understand trends and cycles over time. Table 1 summarises the timeliness of the various measures of AHS. Appendix A provides details on the various measures and their differences.

Methodology

The LFS Measure is simple to construct. As part of the LFS, the ABS collects information on the characteristics of each household, including the number of adults and children who usually live in the dwelling. These questions have been asked every month since mid-1983. Both the LFS and Census estimates of AHS in Graph 1 count the

Graph 1

Average Household Size*



* Average number of persons usually resident in an occupied private dwelling; excludes visitors and persons in non-private dwellings (e.g. hotels and hospitals).

** Estimated using Labour Force Survey microdata; seasonally adjusted. Sources: ABS; RBA

number of persons who are usually resident in the same private dwelling and exclude visitors and people who usually live in non-private dwellings (such as nursing homes, hotels and boarding schools).

The LFS Measure is calculated by the authors using the following methodology:

1. The number of residents in each household is counted by summing the number of adults and children within each occupied private dwelling for each month of the survey. Visitors to the household are excluded from this count.
2. The average number of people in each household across Australia is calculated for each month. In order to ensure this is broadly representative of the whole population, our average is weighted by the probability of the adults appearing in the LFS.
3. The series is seasonally adjusted to minimise the effects of any variations arounds holidays, the university calendar or other seasonal events, although the seasonal effects are small.^[2]

The series can be revised over time if the ABS make changes to the population measures the LFS data are aligned to.

An example of the code is provided in Appendix B, and graph data are available on request.

Recent developments in household size

At the onset of the pandemic

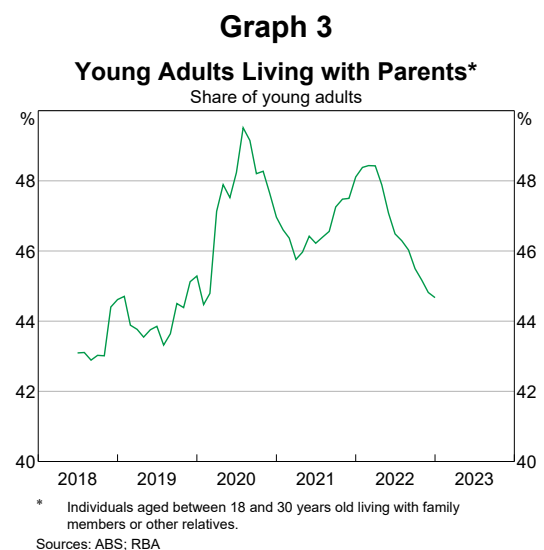
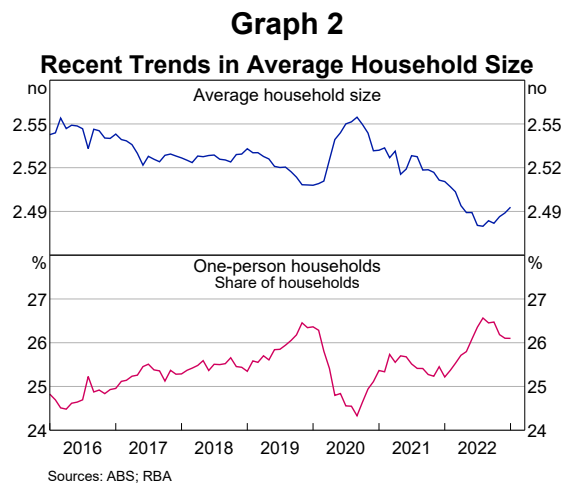
The LFS Measure shows that AHS picked up noticeably at the beginning of the COVID-19 pandemic (Graph 2, top panel). Household sizes grew, on average, by around 2 per cent between February and September 2020, during which time a large share of the population was under lockdown.

The spike in AHS reflected compositional changes in households (Ellis 2022). The share of households with one person fell by 2 percentage points, while the share of households with three or four people increased by a similar amount (Graph 2, bottom panel). In part, these shifts likely reflected a large number of young adults moving home with their families, with the share of those aged 18–30 years

old living with their parents rising by 5 percentage points to a historical high (Graph 3). These trends were likely driven by efforts to lower housing expenses at a time of labour market weakness and economic uncertainty, the shift to online learning and work, as well as a desire to live with others amid social distancing outside households.

From late 2020

The increase in AHS at the onset of the pandemic abruptly reversed in late 2020, with AHS declining over the following two years from 2.55 individuals per household to a historical low of 2.48 individuals by August 2022. This trend could reflect an increase in the demand for space, as people spent more time at home, both due to pandemic-related health restrictions and the increased ability for some to work from home.^[3] Population growth was also



much lower than expected during the pandemic, due to lower net overseas migration and the closure of international borders. This contributed to a period of high rental vacancy rates and lower advertised rents, particularly in Sydney and Melbourne, in 2020. Greater affordability, combined with changed preferences and strong income growth, likely encouraged individuals to form smaller households with more space per person over 2021 and 2022.

The decline in AHS contributed to a sizeable increase in demand for the number of homes in Australia, which helped offset the relatively slow growth in the population during the pandemic (Graph 4).^[4] A rough calculation suggests that across the Australian population of more than 25 million people, a decline in AHS of the magnitude observed between early 2020 and September 2022 (around 1 per cent, without any change in population growth) would alone imply an increase of around 120,000 households.

The outlook for AHS is uncertain. AHS has increased slightly since the end of 2022, possibly in response to tightness in many rental markets, particularly regional areas (see discussion below). But many structural factors that have contributed to the formation of smaller households over recent decades – such as an aging population, falling fertility and marriage rates, and higher household incomes – are still relevant today. Furthermore, it is not clear whether the preference for additional space will endure.

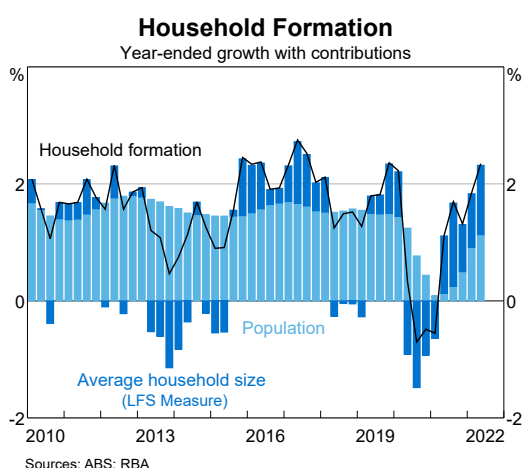
Trends by location

AHS varies considerably by location. Capital cities, on average, have larger households than regional Australia, likely reflecting higher housing costs (Graph 5). It may also reflect compositional factors. New households, such as those created by permanent arrivals from overseas, tend to be larger and more likely to settle in capital cities than regional areas due to the proximity to employment and education opportunities.

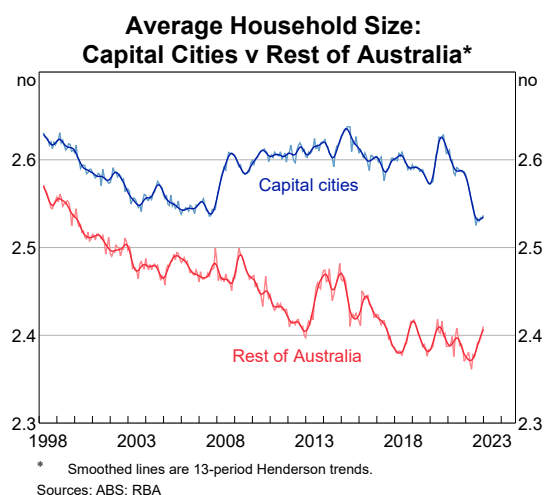
The up-down cycle in AHS since the onset of the pandemic has largely been driven by developments in capital cities, in particular Sydney and Melbourne (Graph 6). These cities experienced a sharp increase in the AHS at the start of the pandemic. They had longer and more stringent lockdowns compared with other parts of Australia, which may have led to a greater shift and persistence in preferences for additional space. Both cities were also more exposed to changes in overseas migration associated with the international border closure than other parts of the country. In part reflecting the decline in arrivals, Sydney and Melbourne experienced weaker rental markets at the onset of the pandemic relative to other capital cities and regional areas, with large increases in rental vacancy rates and declines in advertised rents by mid-2020 (Graph 7).

AHS in Sydney and Melbourne declined over 2022 and has remained around historical low levels, alongside a considerable tightening in rental

Graph 4



Graph 5



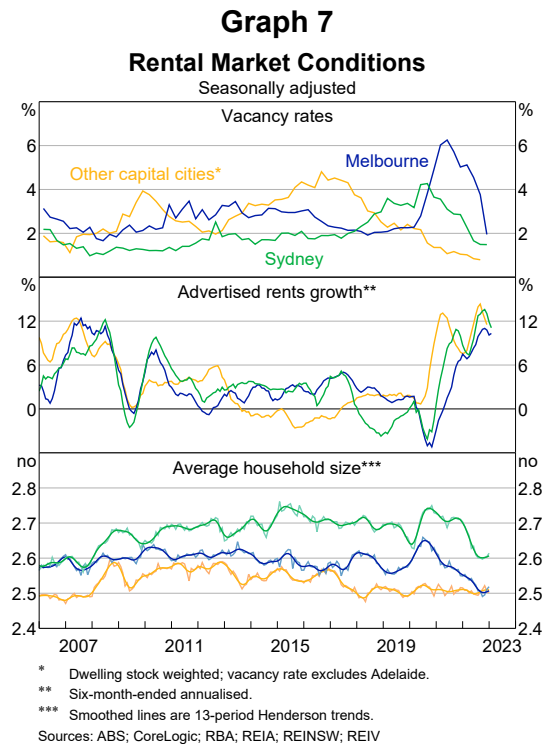
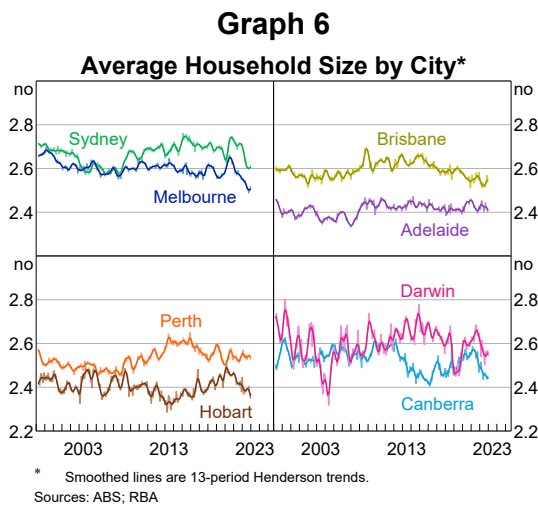
market conditions in both cities (Agarwal, Gao and Garner 2023). By contrast, there are some signs of AHS increasing or stabilising in some other capital cities, such as Brisbane, and regional areas, where rental markets have been tight for a longer period of time.

Conclusion

The new LFS Measure of AHS has the advantage of being timely, frequent and based on a large representative survey. Given the detailed demographic and employment-related information available in the LFS microdata, there are many other subgroups for which we could calculate AHS. This article has focused on changes in AHS following the onset of the pandemic and examined developments in living arrangements and in different parts

of Australia. However, the LFS Measure can also be used to examine how AHS has changed across different types of households, including by industry and occupation of employment.

Other researchers can make use of the data and code developed as part of this article.^[5] The Bank will continue to closely monitor developments in AHS using this new measure, as well as assessing its role as an indicator of underlying housing demand.



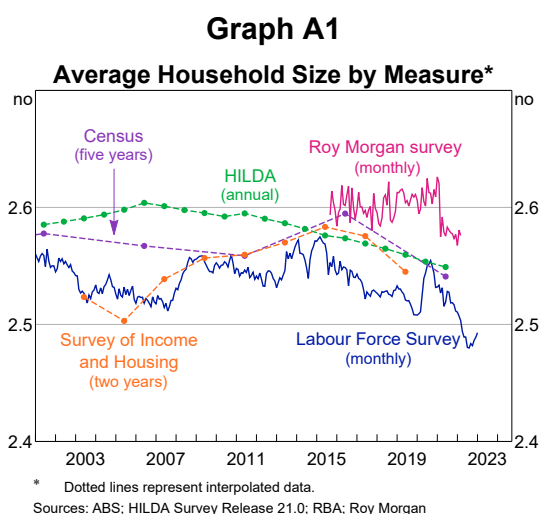
Appendix A: Various measures of AHS

The LFS Measure of AHS aligns with other measures (Graph A1). AHS steadily declined from around 2.9 people per household in the mid-1980s to be close to 2.6 people by the late 1990s, consistent with Census data. AHS was relatively flat from the early 2000s until the mid-2010s, before continuing on a downward trend over the 2020s, which is evident in all other AHS measures.

The consistent results reflects that these measures are conceptually similar, although there are a few differences in scope and coverage. All estimates of

AHS measure the number of persons who are usually resident in the same private dwelling. Most people who usually live in the household but were temporarily absent during Census night or the survey (e.g. for work, school, other purposes or because they were temporarily overseas) are treated as being part of the household. These measures also exclude visitors to the household. Furthermore, visitor-only households and people usually living in non-private dwellings (such as nursing homes, hotels, boarding schools and hospitals) are excluded from the average.

There are also small level differences between the LFS estimate of AHS and others that likely relate to variation in scope and coverage of each source of data. For example, the SIH and the LFS both exclude households in very remote geographical areas or with members of the Australian defence force, while these households are included in the Census. However, this has only a small impact on the aggregate data, as households in very remote areas constitute a small portion of the population and households with defence personnel have mostly similar household sizes.



Appendix B: Sample code for Stata

A list of variable names and definitions can be found at ABS (2023).

```
*****
* Set up and cleaning
*****
* Use LLFS microdata. The date has been recoded to a monthly variable.
`hhid`, `id`, `weight` `date` are the variable names for household id,
individual id, representative weight and date.
use lffsdata.dta
keep if date >= tm(1983m7)

* Recode missing values for number of children aged 14 years or younger
(nkid14h)
replace nkid14h =. if nkid14h <0 & nkid14h !=.

* Drop all visitors and non-private dwellings
drop if urstatus!=1

*****
* Generate the national LFS Measure of AHS
*****
* Count the number of usual adult residents in the household. This
excludes visitor from the count and assigns this figure to each person in
the household.
bysort hhid date: egen ahs = count(id)

* Add the number of resident children to this figure, providing the total
number of persons who are usually resident in the same private dwelling.
replace ahs = ahs + nkid14h

* Create a household-level weight, based on the average probability of
each adult appearing in the LFS.
collapse (mean) ahs weight, by(hhid date)

* Calculate the average number of people in each household across
Australia for each month.
collapse (mean) ahs [weight = weight], by(date)
```

Endnotes

- [*] The authors are from Economic Analysis Department. They would like to thank staff from the Australian Bureau of Statistics for making the LFS microdata available, and in particular Scott Marley for his assistance.
- [1] This data comes from the Longitudinal Labour Force Survey (LLFS). For further details on the data, including on how to apply for access, see ABS (2023). Previously, in the 1990s, the Labour Force Survey was used to adjust estimates of household size based on Census data. See ABS (1999).
- [2] The US Census Bureau's X13-ARIMA-SEATS methodology is applied to seasonally adjust the series.
- [3] Before the pandemic, households with at least one full-time teleworker lived in larger homes than those that did not (Stanton and Tiwari 2021).
- [4] These pandemic trends are consistent with experience in the United States, where greater household formation increased demand for rental properties (Waller 2022).
- [5] Full data and coding is available on request: contact rbainfo@rba.gov.au.

References

- ABS (Australian Bureau of Statistics) (1999), '3228.0 - Demographic Estimates and Projections: Concepts, Sources and Methods, 1999', August.
- ABS (2023), 'Microdata: Longitudinal Labour Force, Australia'.
- Agarwal N, R Gao and M Garner (2023), 'Renters, Rent Inflation and Renter Stress', *RBA Bulletin*, March.
- Ellis L (2022), 'Housing in the Endemic Phase', Keynote Speech to the UDIA 2022 National Congress, Sydney, 25 May.
- Kohler M and M van der Merwe (2015), 'Long-run Trends in Housing Price Growth', *RBA Bulletin*, September, pp 21–30.
- Saunders T and P Tulip (2019), 'A Model of the Australian Housing Market', RBA Research Discussion Paper No 2019-01.
- Stanton CT and P Tiwari (2021), 'Housing Consumption and the Cost of Remote Work', NBER Working Paper Series No 28483.
- Waller CJ (2022), 'The Red Hot Housing Market: The Role of Policy and Implications for Housing Affordability', Recent Fiscal and Monetary Policy: Implications for U.S. and Israeli Real Estate Markets Conference, Webcast, 24 March.

HILDA Disclaimer

Non-bank Lending in Australia and the Implications for Financial Stability

Callum Hudson, Samuel Kurian and Michelle Lewis^[*]



Photo: YinYang – Getty Images

Abstract

Non-bank lenders help to finance some forms of economic activity that might otherwise go unfinanced by traditional banks. However, as the global financial crisis demonstrated, non-bank lending activities have the potential to undermine financial stability, in part because they are less constrained by regulation. Risks to financial stability can include the amplification of credit and asset price cycles, increased competition for borrowers that prompts banks to weaken their own lending standards, and the potential of stress spilling over into the prudentially regulated financial system. Unlike in some other economies, non-bank lending accounts for a small share of total credit in the Australian economy and banks have relatively limited exposure to non-bank lenders. Non-bank lending therefore poses little systemic risk to financial stability in Australia at present. However, it has grown strongly in recent years, particularly for housing. Regulators and policymakers therefore need to continue monitoring developments in this space. This article provides a primer on non-bank lending in Australia, focusing on lending for housing and the potential risks to financial stability.

Introduction

Lending by non-banks can play an important role in financing some forms of economic activity that might not otherwise be financed by the traditional banking system, without putting customer deposits at risk. However, as much of the lending activity of

non-banks occurs outside of the prudential regulatory perimeter, policymakers and regulators need to monitor developments in the sector for risks posed to financial stability.^[1] As events leading up to and during the global financial crisis (GFC) showed, such risks can include:

- the potential for non-bank lending to be more concentrated, riskier and more pro-cyclical than bank lending as a result of lighter regulation, which can amplify credit and asset price cycles
- competition from non-banks that might encourage banks to weaken their lending standards in order to protect or grow market share
- linkages between non-banks and banks that could result in stress in the non-bank sector spreading to banks.

As non-bank lenders operate with fewer regulatory constraints than banks, market discipline acts as a key mechanism that helps to limit how far non-bank lenders can ease lending standards and how far along the risk spectrum they can operate. This is particularly the case for non-bank lenders that securitise loans, especially for housing, as visibility of these lenders' activities has improved with increased reporting requirements following the GFC (DeBelle 2012; Aylmer 2016); by contrast, other segments of non-bank lending remain more opaque. Regardless of these improvements, non-bank lending can still lead to a build-up of systemic risk because non-banks' business models tend to involve liquidity and maturity mismatches and the use of leverage.

Internationally, non-banks are viewed as a key vulnerability in the global financial system. For example, during the GFC, the early stages of the COVID-19 pandemic and the periods of asset price volatility in 2022, the non-bank sector amplified financial market stress. Some of these events resulted in central banks and/or governments, including in Australia, intervening to restore orderly functioning of financial markets – the disruptions in the UK pension fund sector in late 2022 being the most recent example. Given the inherent vulnerabilities and the growing size of the global non-bank sector, international bodies – such as the Financial Stability Board (FSB), the Bank for International Settlements and national regulators – are working to improve their visibility and understanding of non-banks so as to increase the resilience of the sector (Carstens 2021; FSB 2022).

The small size of Australia's non-bank sector, and in some respects its different structure, mitigates some of the vulnerabilities posed by non-banks internationally – but these vulnerabilities are still present. Australian superannuation funds, although not a focus of this article because their investment focus is more on equities and they do not lend much outside of holding bonds, provide a helpful example of differences in structure. Compared with the UK pension sector, Australian superannuation funds are mostly defined contribution rather than defined benefit, have larger cash holdings and have more limited use of leverage. This leaves Australian superannuation funds well placed to manage liquidity shocks, as was demonstrated in the early stages of the pandemic (RBA 2021).^[2] In order to examine the role of non-bank lending in Australia and its implications for financial stability, this article focuses on credit intermediation by non-banks that are not regulated by the Australian Prudential Regulation Authority (APRA).

A variety of non-bank lenders operate in Australia, accounting for around 5 per cent of the financial system

Non-bank lenders account for a small share of the financial system in Australia, at around 5 per cent of total financial system assets (Graph 1). Non-bank lending is undertaken by registered financial corporations (RFCs) and some types of managed investment funds, including hedge funds. RFCs utilise a business structure that is similar to banks, in that they obtain short-term debt funding and extend longer term credit to households and businesses. RFCs predominantly provide credit for residential housing and automobiles (autos), although lending to businesses and commercial property developers also features in their portfolios. The business model of managed investment funds differs to banks and RFCs; they are mostly delegated asset managers that act as pass-through vehicles for other investors, such as superannuation funds.

RFCs account for about half of non-bank lenders' assets in Australia. RFCs can be split into two broad groups – securitisers and non-securitisers. Securitisers originate loans and then package these loans into asset-backed securities (ABS). Residential

mortgage and auto lending account for the largest share of the non-bank securitisation market. By contrast, non-securitisers retain loans on their balance sheets. These lenders focus mostly on non-housing credit, such as lending for construction, non-auto personal finance and some business loans.

Managed investment funds, including hedge funds, account for the other half of non-bank lenders' assets. Managed funds' debt instruments as a share of the financial system has declined since 2016, as funds switched more of their portfolios to equities (and equity-like exposure) in search of higher returns in a low-interest rate environment. The size of the Australian-domiciled hedge fund sector cannot be deduced from existing data sources.

There are limited data covering non-bank credit intermediation more broadly, particularly outside of housing lending. In part, this is because non-bank lenders have less extensive reporting requirements than prudentially regulated banks.

Non-bank corporations that extend credit and have debt assets greater than \$50 million are required to register with APRA to be an RFC and to regularly report data on their financial position and lending activity. APRA's data provide good coverage of lending for housing and some business activities, but less so for other types, such as commercial

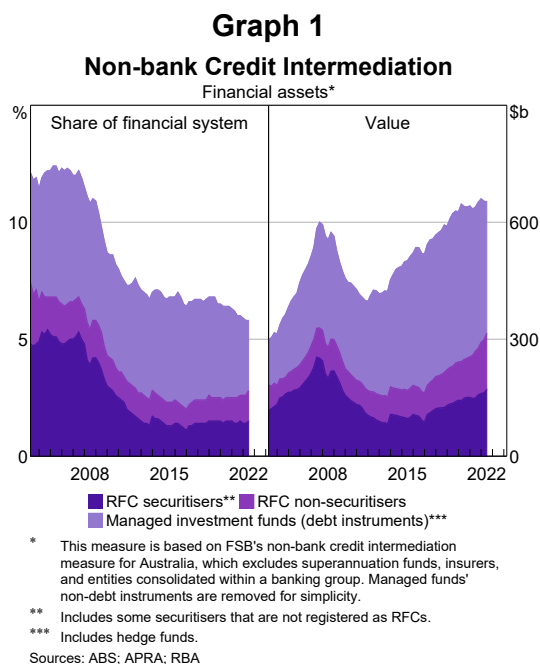
property, where some lenders operate as trusts, rather than corporations, and thus are not required to register as an RFC. Data gaps also exist because entities must self-identify to report with APRA. To help supplement available data and to understand market developments, the Reserve Bank uses liaison with businesses, banks and non-bank lenders (Dwyer, McLoughlin and Walker 2022).^[3] Work is underway to increase the visibility of other non-bank activities. Most of this article focuses on RFCs.

Non-bank lending for housing has grown rapidly

In Australia, as elsewhere, non-bank lenders tend to focus on borrowers and market segments that have been underserved by banks. They also compete with banks for borrowers based on loan turn-around times and the level of service provided. Most lending is for housing, but over recent years non-banks have increasingly moved into financing vehicles, lending to self-managed super funds (SMSF), and lending for residential and commercial construction as banks exit these sectors or where access to finance through banks can be more challenging.

The interest rates on loans offered by non-banks are typically higher than those offered by banks, which is consistent with non-banks lending to riskier borrowers on average. Between 2019 and 2021, non-bank housing lending rates were about 60 basis points above those offered by the major banks (Graph 2). However, the spread increased to around 100 basis points in 2022, consistent with a larger increase in funding costs in the securitisation market compared with banks' funding costs (which include low-rate deposits) and competition from banks for high-quality borrowers (Carse, Faferko and Fitzpatrick 2023). For business lending, the spread between non-bank and bank lending rates is larger than for housing on average; however, this is primarily because non-banks are lending to businesses in different sectors, with greater risk profiles.

Non-bank lending in Australia has grown rapidly since 2015, driven mostly by mortgage lending where growth has averaged almost 15 per cent on a six-month annualised basis – more than twice the



rate recorded by banks (Graph 3). Despite this growth, the share of non-bank credit remains small at a little under 5 per cent, which is about half its share before the GFC. While the small size of the non-bank lending market attenuates the systemic risks to financial stability in Australia, strong credit growth in the sector could lead to financial stability risks if it induced a broad-based weakening in lending standards.

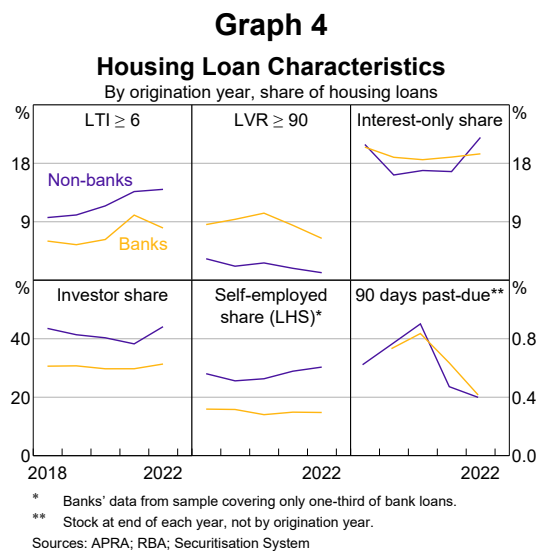
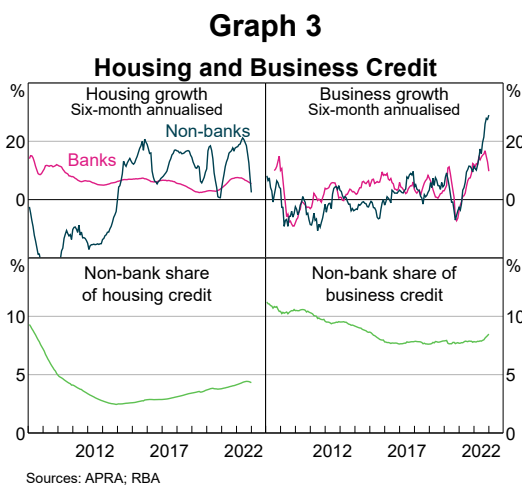
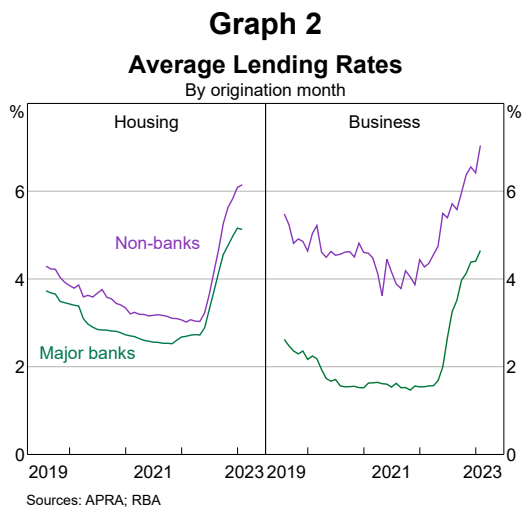
Non-bank lending is riskier than bank lending, on average ...

The Reserve Bank’s Securitisation Dataset provides detailed data on mortgages underlying Australian residential mortgage-backed securities (RMBS).^[4] The Reserve Bank uses these data, along with APRA data and liaison, to monitor developments in the mortgage market and the quality of lending.

Non-bank lending is riskier than bank lending on average, as a greater share of non-banks’ lending is to borrowers who are self-employed or employed in industries more sensitive to economic conditions, and who have low levels of documentation. Despite this, non-bank mortgages have performed well over recent years and loss rates have been at low levels (Moody’s 2022).

Non-banks’ lending standards do not appear to have weakened materially alongside the rapid credit growth seen between 2020 and mid-2022 (Graph 4). The share of new non-bank housing lending with high loan-to-valuation ratios (LVRs) has declined and is currently below that observed at banks. Loan arrears are at historically low levels, in part because, like banks, non-bank lenders proactively managed loan deferrals during the pandemic and because unemployment has been low.^[5] At the same time, non-banks’ high loan-to-income (LTI) lending has increased slightly, while it has decreased for banks. The increase in high-LTI lending is consistent with the rise in housing prices over recent years; however, it might also reflect some shift of higher LTI borrowers to non-banks following the increase in APRA’s serviceability buffer in October 2021 (discussed further below).

Outside of housing, there are less data available to monitor lending standards. However, liaison indicates that non-bank standards for non-housing lending are generally looser than at banks, particularly after banks tightened some lending standards. For example, non-banks require lower



rates of pre-sales for construction and typically have more appetite to lend at higher LVRs for construction loans.

... but is influenced by bank lending standards and macroprudential policies

During periods when aspects of bank lending have posed risks to the stability of the financial system, APRA has implemented macroprudential policies. Given that banks and non-bank lenders compete in some market segments, particularly for housing loans, a concern is that such policies may lead to risky lending shifting from banks to non-banks, which are subject to lighter regulation. International research has found some evidence of this occurring.^[6] It is important to note, however, that if non-bank lending in Australia were to pose a risk to financial stability, APRA could avail its reserve powers to regulate the sector.^[7]

The effects of APRA’s macroprudential policies on broader credit trends in recent years are discussed below. The full impact of APRA’s 2021 macroprudential policy changes on non-bank lending will take time to ascertain.^[8] However, using the Reserve Bank’s Securitisation Dataset, we find evidence that non-banks’ housing loan quality did not deteriorate overall – and in some aspects improved – following the implementation of APRA’s 2017 macroprudential policies.

APRA’s 2021 increase in the loan serviceability buffer

In October 2021, APRA increased the minimum residential mortgage serviceability buffer from 2.5 per cent to 3 per cent.^[9] This has the effect of reducing maximum loan sizes, which decreases the amount of credit extended to borrowers who seek a loan close to their maximum borrowing capacity. If such a policy were to cause a spillover to non-bank lending, we would expect non-banks’ share of high-LTI lending to increase as these constrained borrowers shift to non-banks to restore their previous borrowing capacity.

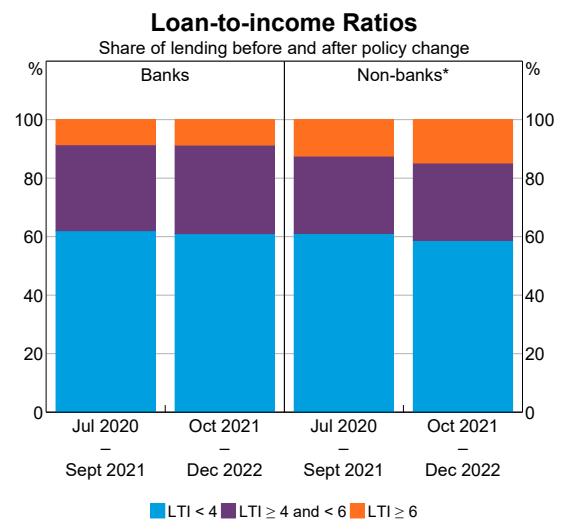
Early evidence suggests that the share of high-LTI lending by non-banks increased somewhat following the change to the serviceability buffer (Graph 5). However, this result should be treated

with caution. It will take time to fully assess the impact of the increase in the serviceability buffer on non-banks because there is a lag between when a loan is originated and when it is securitised (typically six months to a year). Liaison with non-bank lenders suggests that some adopted the increased serviceability buffer, while others opted to use their internal serviceability criteria to assess borrowers.

APRA’s 2017–2018 limits on interest-only lending

In 2017, APRA imposed limits on interest-only (IO) mortgages and some additional scrutiny on high-LVR lending, in addition to earlier restrictions on lending to investors that were introduced in 2014.^[10] Following this, interest rates on both bank and non-bank IO mortgages increased, although the initial increase at non-banks was smaller (Graph 6). In addition, the share of IO housing loans declined in both sectors reflecting a decrease in the share of new lending that was IO, although the reduction in the share of IO lending was smaller for non-banks. The share of IO lending continued to decline following the removal of the macroprudential requirement at the end of 2018. At this time, APRA proposed changes to bank capital requirements, whereby banks would hold more capital for riskier loans (APRA 2018). APRA finalised an updated version of this proposed capital

Graph 5



* Outstanding mortgages in the securitisation system as at December 2022.
Sources: APRA; RBA; Securitisation System

framework in 2021, which was implemented in 2023 (APRA 2021).^[11]

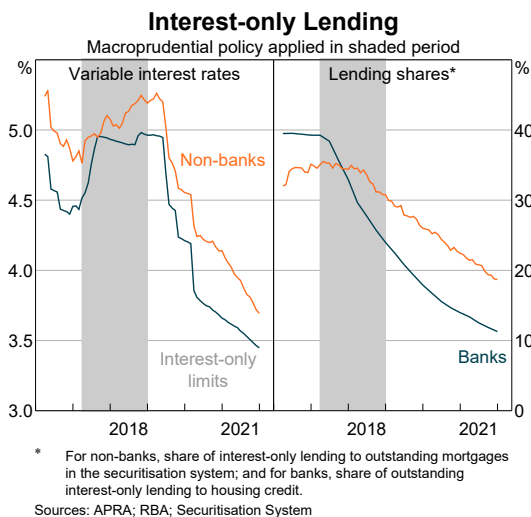
During this period, non-banks reduced the share of their IO lending that was originated with a high LTI, which was mostly attributable to investor borrowing (Graph 7). They also reduced their share of lending originated with high LVRs, with the largest decline attributable to principal-and-interest (P&I) loans (Graph 8). The regression analysis presented in Appendix A suggests that lending standards for non-banks did not deteriorate overall while the macroprudential measures were in place.

Non-bank lenders rely on market-based finance or private investors for funding

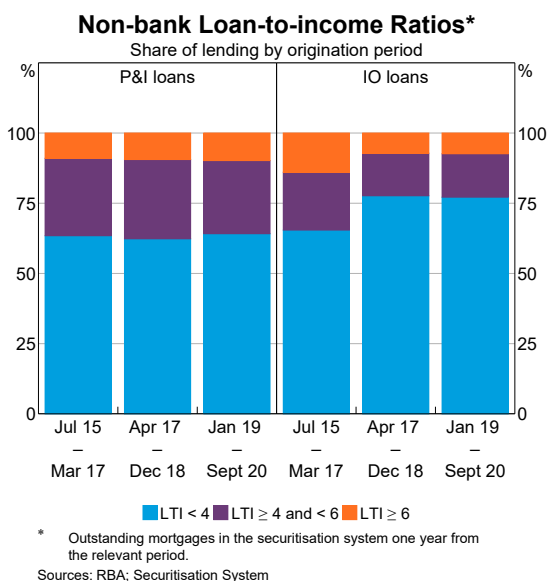
The funding structure of non-bank lenders varies based on the adopted business model (Graph 9). Securitisers’ funding comes mostly through warehouse facilities during the loan origination phase, and then from the securitisation market once loans are packaged and sold to investors. Warehouse facilities act like a line of credit and are collateralised by the securitisers’ originated loans. Securitisers have little equity as most loans are sold to investors and only a small share of loans are retained on the securitiser’s balance sheet.

Non-banks’ warehouse facilities are mostly provided by banks, including Australian banks. As such, these warehouse and other funding facilities are one of the direct channels through which problems in the non-bank sector can flow through to banks. However, Australian banks’ exposure to non-banks via these facilities is small at around 1 per cent of banks’ assets (Graph 10). Furthermore, banks impose lending standards for loans originated through their warehouse facilities, such as limits on LVRs. Banks are incentivised to do this by APRA’s capital requirements; in 2018, APRA increased the required capital banks must hold against loans in warehouse facilities to be similar to that required if the bank directly held the loan. This helps to limit the scope for deterioration in lending standards and deviations from APRA’s prudential requirements.

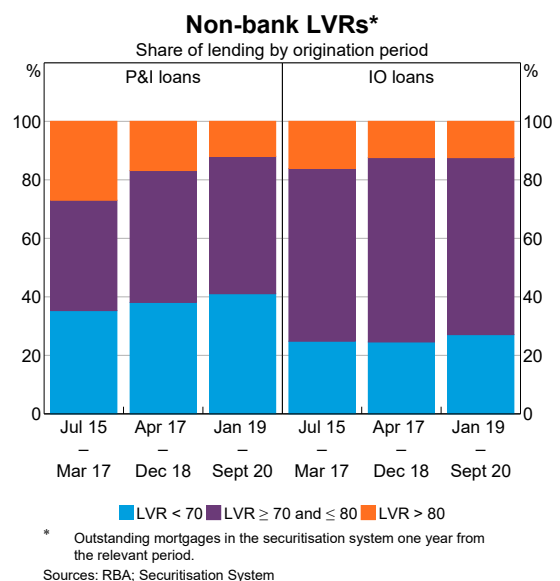
Graph 6



Graph 7



Graph 8



Further market discipline is imposed by virtue of rating agencies and investors closely scrutinising the quality of loans underlying a securitisation; longer term RMBS investors typically expect ‘prime’ loans to broadly conform to APRA standards.

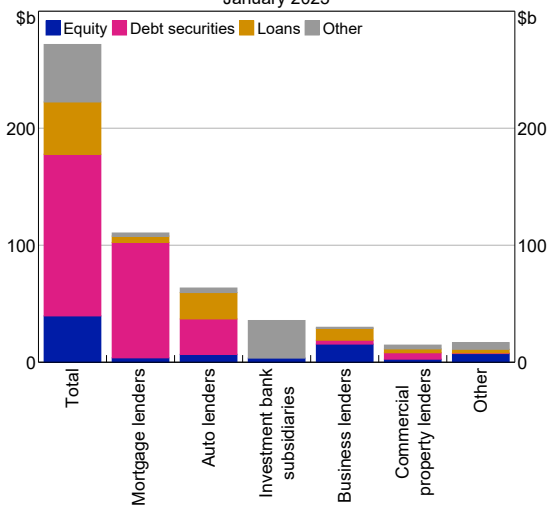
Non-bank RMBS and other ABS issuance has significantly increased over recent years (Graph 11; Graph 12). Non-banks now account for the majority of issuance, most of which is higher quality ‘prime’ loans. Issuance has been supported by demand from both domestic and international investors; as noted above, the preferences of these investors play a key role in determining how far along the credit risk spectrum non-bank lenders operate.

The securitisation market is a further channel by which stress among non-bank lenders could potentially be transmitted to banks. While Australian banks’ direct exposure through holdings of non-bank RMBS and other ABS is low, banks – particularly smaller banks – use the securitisation market to diversify their funding. This market is vulnerable to disruptions during periods of stress in financial markets, such as during the GFC and the pandemic. To support small lenders during these periods, the Australian Government implemented programs that helped restore confidence among investors and return orderly functioning.^[12]

Non-securitisers fund themselves mostly through loans and equity (primarily from specialist lenders, which are typically funded by investor equity, and

Graph 9

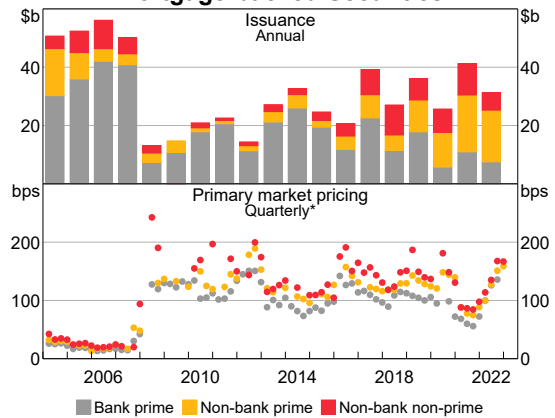
Non-bank Funding Sources*



* Excludes managed investment funds.
Sources: APRA; RBA

Graph 11

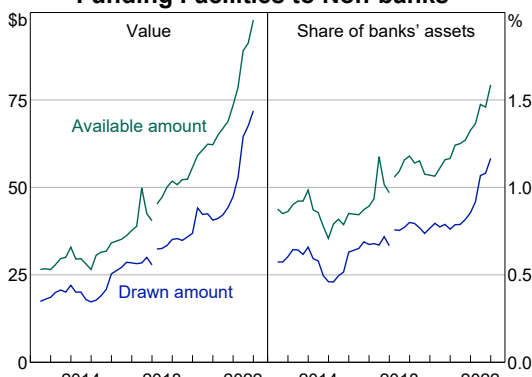
Australian Residential Mortgage-backed Securities



* Face-value weighted monthly average of the primary market spread to bank bill swap rate for AAA rated notes.
Sources: Bloomberg; KangaNews; RBA

Graph 10

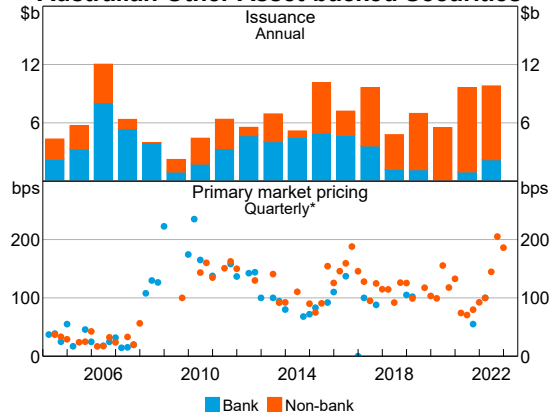
Bank Liquidity, Warehouse and Funding Facilities to Non-banks*



* Series break end-2017.
Sources: APRA; RBA

Graph 12

Australian Other Asset-backed Securities



* Face-value weighted monthly average of the primary market spread to bank bill swap rate for AAA rated notes.
Sources: Bloomberg; KangaNews; RBA

high net worth individuals and family offices). The higher level of equity is consistent with the greater risk associated with the nature of lending by non-securitisers, such as for property development and personal spending. The reduced connection to banks and the greater use of equity funding helps to limit the risks to the wider financial system from non-securitisers' financing activities.

Non-bank lenders' capital levels vary widely

Financial institutions require capital to absorb losses that arise from their lending and investment activities. For non-bank lenders, the level of capital held varies greatly by business model (Graph 13). As a whole, non-banks' equity as a share of assets is around 10 per cent. This is higher than the equity held by banks (which averages at 5 per cent), reflecting in part the higher risk involved in some non-bank financing.

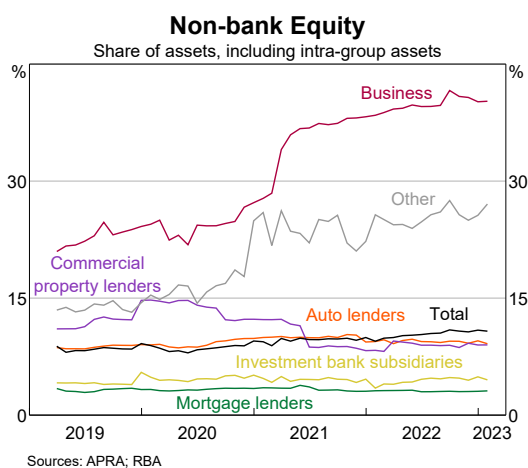
Non-bank securitisers (such as auto and mortgage lenders) tend to hold lower levels of capital than non-securitisers (such as commercial property lenders and some business lenders), which reflects the fact that most loans do not remain on their balance sheet. Securitisers retain a portion of their warehouse and securitisation deals to have 'skin-in-the-game'. This typically includes some of the most junior tranche; the amount held depends on the riskiness of the lending and the preferences of investors. The practice of the securitiser retaining a portion of the deal was introduced following the GFC as a way to align the securitiser's incentives

with those of the investor. While there is no formal requirement in Australia for securitisers to hold a portion of their deals, it is required in international jurisdictions such as the euro area and the United States, which acts as an incentive for Australian securitisers to do likewise.

Securitisation structures contain a number of loss-absorbing features that must be exhausted before a securitiser's capital is required to absorb losses. Protections include (in typical order): the value of the underlying collateral above the loan amount; lenders mortgage insurance if the security is backed by mortgages; and the excess spread on the security (i.e. the spread above what is required for the security's interest and management payments) (Arsov, Kim and Stacey 2015). Only where these sources are exhausted will a defaulted loan cause a loss to the securitiser.

Non-securitising lenders, including commercial property and some business lenders, have a wide range of capital levels. Non-bank business lenders are largely funded by equity or via specialist funds that understand the risks associated with financing activity in the sector. Capital levels for commercial property lenders are above those of securitisers because loans often remain on their balance sheets. With the pullback of bank lending for property developments, non-banks are financing more senior tranches of developments, which are less likely to incur losses. Historically, banks that funded senior tranches of developments would carry out due diligence on the project. Less involvement in development deals by banks means that non-banks and other investors are increasingly becoming responsible for carrying out due diligence on borrowers.

Graph 13



Managed investment funds mostly lend to governments and banks

Managed investment funds, including hedge funds, provide credit mostly through investments in listed and unlisted fixed-income securities. As noted above, data on their funding base, lending activities and capital levels is limited. This makes it difficult to ascertain their interconnections, liquidity mismatches and use of 'hidden leverage' through derivatives. However, the overall size of this sector

as a share of Australia's financial system is estimated to be small – much smaller than in some international jurisdictions, such as the euro area and the United States, where non-bank activity is a key source of vulnerability for the financial system (FSB 2022). In Australia, credit provided by managed investment funds was \$240 billion in 2022, which is less than 3 per cent of total credit (Graph 14). Of the credit provided, most is funding for banks and Australian, state and territory governments, which have minimal default risk and good liquidity in normal market conditions. As of 2022, only \$14 billion of exposure was related to the debt of non-financial businesses.

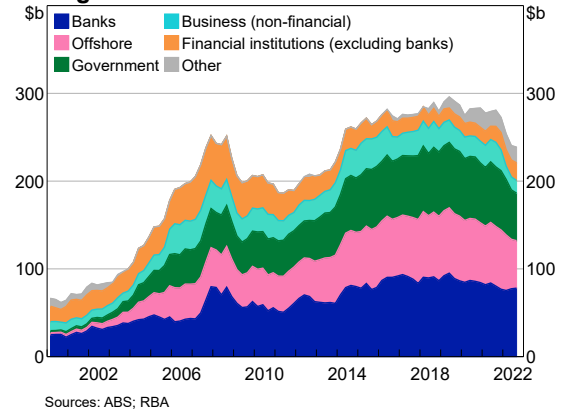
Conclusion

Non-bank lending accounts for a relatively small proportion of overall credit in Australia, and non-bank lending standards for mortgages do not appear to have materially deteriorated over recent years despite the imposition of tighter macroprudential policies for banks. There are also more constraints on how far non-bank lenders can move along the risk spectrum, compared with the period before the GFC. Together, these factors suggest that the risks posed by the non-bank

lending sector to financial stability in Australia are low. Nevertheless, the rapid growth in housing lending by non-banks, and data limitations over the full scope of non-bank financing activity, call for ongoing vigilance by regulators and policymakers. Further, as has been recognised by international and domestic policy authorities, the closure of data gaps relating to non-bank lending remains an important priority to ensure that the associated risks to financial stability are well understood. ✖

Graph 14

Managed Investment Funds' Debt Investments



Appendix A: Regression analysis of the impact of the 2017–2018 macroprudential policy on non-bank lending

A more formal way to evaluate how lending standards evolved when APRA introduced its macroprudential policies in 2017 is by running regressions that compare LTI ratios and LVRs of loans originated during the macroprudential policy period and non-policy periods. The following regression results use a sample of loans from the Securitisation Dataset with loans originated before, during and after the macroprudential policy was in place. For loan (i) originated in quarter (t) by non-bank institution (j), the regression specification is given by:

$$(1) \quad LTI_{ij} = \alpha_j + \beta_1 I(\text{MacroPru})_t + \beta_2 [I(\text{MacroPru})_t \times I(\text{IO})_i] + \text{LoanControls}_i \phi + \text{MacroControls}_t \theta + \epsilon_{ij}$$

$$(2) \quad LVR_{ij} = \alpha_j + \beta_1 I(\text{MacroPru})_t + \beta_2 [I(\text{MacroPru})_t \times I(\text{IO})_i] + \text{LoanControls}_i \phi + \text{MacroControls}_t \theta + \epsilon_{ij}$$

Where:

- α_j is a set of non-bank financial institution fixed effects
- $I(\text{MacroPru})_t$ is an indicator variable for the quarters where the macroprudential policy was in effect
- $I(\text{IO})_i$ is an indicator variable for loans that are interest-only or not
- LoanControls_i are a set of loan-level controls including whether the loan is to an investor or not, whether a loan is interest-only or not, whether the loan is to a first home buyer or not, the interest rate charged on the loan, and the type of property purchased such as a house or apartment
- MacroControls_t is a set of macro-controls including quarterly GDP growth, the change in the cash rate over the quarter, and the growth in dwelling prices over the quarter.

Table A.1: Effects of 2017 Macroprudential Policy on Non-Bank Lending

Regression coefficients, standard errors in parentheses

Regression	LTI	LVR
$I(\text{MacroPru})_t$	0.018 (0.021)	-0.193 (0.152)
$I(\text{MacroPru})_t \times I(\text{IO})_i$	-0.312*** (0.038)	0.837*** (0.273)
Controls	Yes	Yes
Sample size	100,340	100,340

(a) ***, ** and * denote statistical significance at the 1, 5 and 10 per cent levels, respectively.

Sources: ABS; Corelogic; RBA; Securitisation System

The estimated marginal effect from the macroprudential policy on IO loans is the sum of the coefficients on the macroprudential indicator variable β_1 and the interaction between the macroprudential indicator and the IO indicator variables β_2 . These coefficients indicate that IO loans originated during the macroprudential policy tended to have lower LTI ratios, but slightly higher LVRs compared to non-policy periods. However, the marginal effects are economically small for the estimated increase in LVRs, with the coefficients suggesting an additional borrowing of around \$6,400 on a property valued at \$1,000,000. Overall, the evidence suggests there was no material deterioration in lending standards for non-banks and therefore no spillover of risks during the macroprudential policy period.

Endnotes

- [*] The authors are from Financial Stability Department.
- [1] For a comprehensive discussion of non-bank activity, see Adrian and Jones (2018).
- [2] The resilience of Australian superannuation funds will be further strengthened by APRA's enhanced requirements for investment stress tests, liquidity management (including liquidity stress tests) and asset valuations (APRA 2022).
- [3] For further detail on data limitations for non-bank activity, particularly for property development, see Gishkariany, Norman and Rosewall (2017); RBA (2019).
- [4] For a discussion of the dataset and coverage of the RMBS market, see Fernandes and Jones (2018).
- [5] Liaison with non-banks during the pandemic indicated that most non-banks offered payment deferrals to borrowers in need. However, unlike some banks that offered blanket deferrals, non-banks had stricter criteria and assessed each referral request on a case-by-case basis.
- [6] For example, Claessens *et al* (2021) found in a sample of 24 countries (including Australia) that a tightening of macroprudential policy can lead to an increase in non-bank activities and a reduction in bank assets.
- [7] Part IIB of the *Banking Act 1959* gives APRA the power to extend macroprudential policy to non-bank lenders where the provision of non-bank finance is materially contributing to instability in the financial system.
- [8] APRA (2023) assessed that the combination of rising interest rates and the higher serviceability buffer coincided with a decline in high debt-to-income lending over 2022.
- [9] In other words, banks are now required to assess a borrowers' capacity to service a mortgage at an interest rate that is at least 3 percentage points above the product loan rate compared with the 2.5 percentage points that was commonly applied by banks at the time of this policy announcement.
- [10] APRA expected banks to limit new IO lending to 30 per cent of total new residential mortgage lending and within that place strict limits on IO lending taking place at LVRs above 80 per cent. In addition, banks were expected to manage lending to investors to remain within the previously announced investor limits. Finally, banks needed to ensure serviceability metrics were appropriate for the given conditions and limit loans to high-risk segments of the portfolio. See APRA (2017). Garvin, Alex and Rosé (2021) analysed the effects of APRA's 2014 and 2017 policies on the banking system and found that banks increased advertised rates by around 10–30 basis points and that lending growth in targeted mortgages declined by around 20–40 percentage points within a year of the policy announcements.
- [11] The new capital framework is more risk sensitive, whereby riskier lending (e.g. investor and IO loans) is subject to higher risk weights under the new framework.
- [12] For further discussion, see Johnson, Lane and McClure (2022); Kearns (2022).

References

- Adrian T and B Jones (2018), 'Shadow Banking and Market-based Finance', IMF Departmental Paper No 2018/013.
- APRA (Australian Prudential Regulation Authority) (2017), 'APRA Announces Further Measures to Reinforce Sound Residential Mortgage Lending Practices', Media Release, 31 March.
- APRA (2018), 'Revisions to the Capital Framework for Authorised Deposit-taking Institutions', Discussion Paper.
- APRA (2021), 'An Unquestionably Strong Framework for Bank Capital', Information Paper, 21 November.
- APRA (2022), 'Prudential Standard SPS530 Investment Governance in Superannuation', 17 November.
- APRA (2023), 'Update on APRA's Macroprudential Policy Settings', Information Paper, 27 February.
- Arsov I, IS Kim and K Stacey (2015), 'Structural Features of Australian Residential Mortgage-backed Securities', *RBA Bulletin*, June, pp 43–58.
- Aylmer C (2016), 'Towards a More Transparent Securitisation Market', Speech to the Australian Securitisation Conference, Sydney, 22 November.
- Carse V, A Faferko and R Fitzpatrick (2023), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.
- Carstens A (2021), 'Non-bank Financial Sector: Systemic Regulation Needed', *BIS Quarterly Review*, December.

Claessens S, G Cornelli, L Gambacorta, F Manaresi and Y Shiina (2021), 'Do Macroprudential Policies Affect Non-bank Financial Intermediation?', BIS Working Paper No 927.

Debelle G (2012), 'Enhancing Information on Securitisation', Address to Australian Securitisation Forum, Sydney, 22 October.

Dwyer J, K McLoughlin and A Walker (2022), 'The Reserve Bank's Liaison Program Turns 21', RBA *Bulletin*, September.

Fernandes K and D Jones (2018), 'The Reserve Banks' Securitisation Dataset', RBA *Bulletin*, December.

FSB (Financial Stability Board) (2022), 'Global Monitoring Report on Non-Bank Financial Intermediation 2022', 20 December.

Garvin N, K Alex and C Rosé (2021), 'Macroprudential Limits on Mortgage Products: The Australian Experience', RBA Research Discussion Paper No 2021-07.

Gishkariany M, D Norman and T Rosewall (2017), 'Shadow Bank Lending to the Residential Property Market', RBA *Bulletin*, September, pp 45–52.

Johnson C, K Lane and N McClure (2022), 'Australian Securities Markets through the COVID-19 Pandemic', RBA *Bulletin*, March.

Kearns J (2022), 'Securitisation: Past, Present and Future', Speech to the Australian Securitisation Convergence, Sydney, 30 November.

Moody's (2022), 'Moody's – Australian Non-bank Lenders' Improved Loan Quality Tempers Risks of Rising Inflation and Interest Rates', Research Announcement, 20 July.

RBA (Reserve Bank of Australia) (2021), 'Box C: What Did 2020 Reveal About Liquidity Challenges Facing Superannuation Funds?', *Financial Stability Review*, April.

The Cash-use Cycle in Australia

Rochelle Guttman, Tanya Livermore and Zhan Zhang^[*]



Photo: Traceydee Photography – Getty Images

Abstract

The use of cash for day-to-day transactions has been declining for many years and this has implications for all aspects of the cash system. This article illustrates the interrelationships between consumers' use of cash for transactions, access to cash services and merchants' acceptance of cash as a payment mechanism through a 'cash-use cycle'. Recent data suggest that the cash-use cycle in Australia is functioning adequately at present. However, the ongoing adequacy of cash access is vulnerable to further withdrawal of access points; this issue warrants regular monitoring.

Introduction

For consumers to use cash successfully, they must first obtain it and then have businesses accept it for transactions. However, the use of cash for day-to-day transactions has been in trend decline in Australia since the mid-2000s. This has implications for all aspects of the cash system, including the infrastructure that underpins cash distribution and access and the willingness of businesses to accept cash for payments. This article illustrates the interrelationships between consumers' use of cash, access to cash and merchants' acceptance of cash through a 'cash-use cycle'.

The demand for cash is driven by consumer payment preferences, the relative ease and accessibility of alternative payment methods, such as debit and credit cards, and the ability to access and use cash. The demand for cash is also driven by precautionary and store-of-wealth purposes; however, this aspect of demand is less pertinent to the cash-use cycle, because hoarded banknotes change hands less frequently. The supply of cash for consumers is driven by factors such as the accessibility of a cash access point (like an ATM or bank branch) or the receiving of cash from others (such as an income payment or gift). The supply of cash to consumers is facilitated by the logistics of moving cash from cash-in-transit (CIT) companies'

depots to bank branches, ATMs and retailers ('retail cash distribution'). This in turn is underpinned by the wholesale banknote distribution system, which involves the bulk movement of cash from the Reserve Bank of Australia (the Bank) – the sole issuer of banknotes – to CIT cash depots around the country, on behalf of the four major banks.^[1]

The Bank, as part of its 2022/23 Corporate Plan and in the conclusions to the 2022 Review of Banknote Distribution Arrangements, has committed to working to support the ongoing provision of cash services in Australia, including by monitoring the ability of consumers to access and pay with cash. This article contributes to this goal by drawing together the latest data on the retail part of the cash system in terms of cash use, access and acceptance, to assess the state of the cash-use cycle in Australia.^[2]

The article first presents the cash-use cycle as a stylised framework, followed by an assessment of the latest data on the use of cash by consumers, their access to cash and merchants' acceptance of cash in Australia. Overall, it concludes that Australia's cash-use cycle is functioning adequately, although the decline in the use of cash has led to vulnerabilities, in that further withdrawal of access points could make cash access – and so usage – difficult for some parts of the community.

The cash-use cycle

A stylised framework, that we term the 'cash-use cycle', can be used to illustrate the interdependencies between consumers' use of cash, access to cash and merchants' acceptance of cash (Figure 1), based on the following definitions:

- **Cash use** – the prevalence of consumers using physical cash to pay for retail transactions.
- **Cash access** – the ease in obtaining cash through various sources, including ATMs, bank branches, Bank@Post outlets (which offer cash services at Australia Post outlets to the customers of over 80 authorised deposit-taking institutions (ADIs)) or as cash-out from retailers.
- **Cash acceptance** – whether a merchant will accept cash as a means of payment in their store.

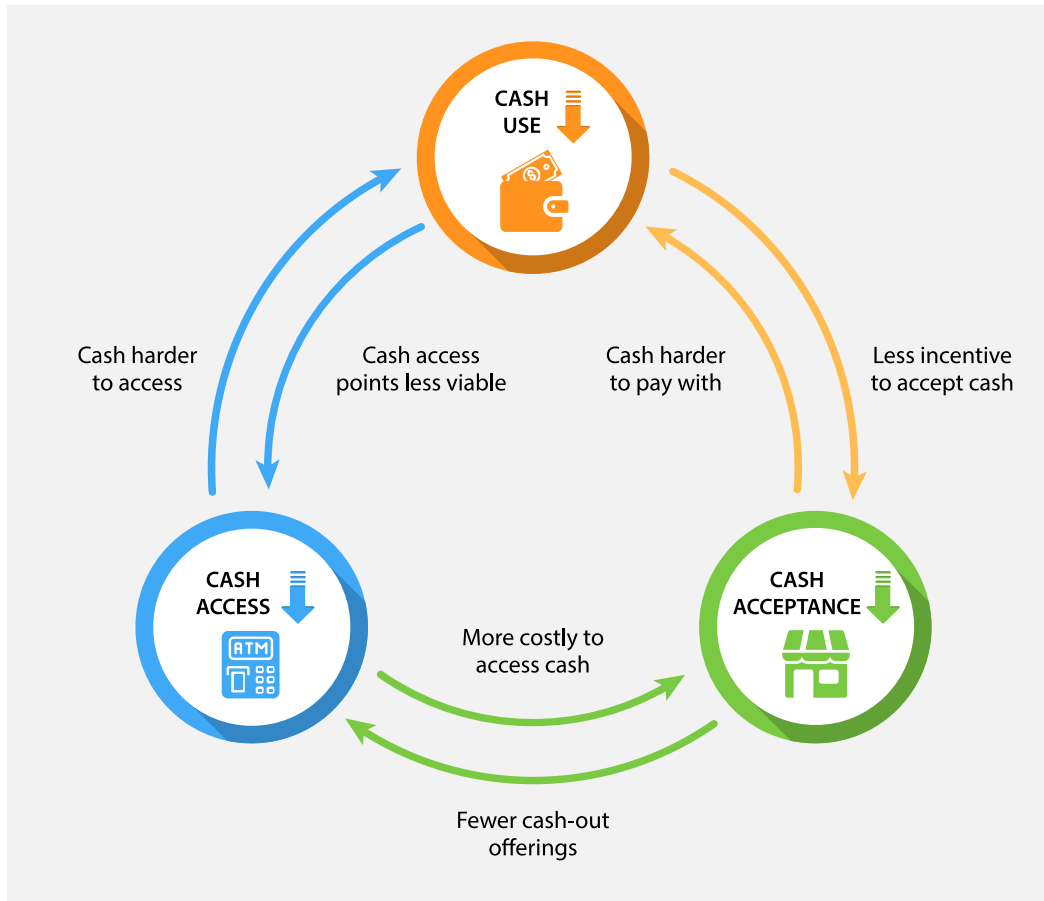
While the framework shows the three aspects are interdependent, other factors can also trigger a shift in the cycle – such as consumer preferences away from paying with cash or merchant preferences around accepting cash.

The cash-use cycle demonstrates how the decline in cash use can be self-reinforcing, where a marked decline in one aspect could lead to downward pressure on the others. For example, consider a shift in consumers' preferences away from using cash (cash use falls), in favour of other payment methods. This could make it uneconomic for ADIs and ATM providers to offer cash services in some regions. The geographic coverage of cash access points would then decline, and so cash access would fall. This in turn affects the ease and cost at which businesses can meet their cash needs (such as obtaining cash floats or depositing the day's takings), resulting in fewer merchants accepting cash for payments (cash acceptance falls). A decline in merchant acceptance of cash makes it harder for consumers to pay with cash, further reinforcing a decline in cash use (cash use falls).

Similarly, a decline in cash use (cash use falls) may reduce the incentive for businesses to accept cash for payments (cash acceptance falls) or provide cash-out services (cash access falls), particularly as the average cost of cash handling rises with lower cash volumes. This highlights network effects where consumers value methods of payments that are widely accepted, and merchants value methods of payments that are widely used. Furthermore, if accessing cash becomes harder or more expensive, it can reduce consumers' ability or preferences to continue paying with cash.

The cash-use cycle points to how a decline in cash use *can* affect the whole cash system, but it does not necessarily mean that cash access and acceptance *will* decline. For instance, there may be several ATMs servicing a particular location, so the removal of an unprofitable or underutilised machine will have little impact on cash accessibility. Furthermore, merchants may still accept cash payments if the benefits outweigh the costs of doing so.^[3] As such, cash access and acceptance may be fairly stable, even in the face of declining cash use. Nonetheless, a tipping point could

Figure 1: The Cash-use Cycle



conceivably be reached where providing or accepting cash becomes economically unviable for the private sector. While we do not believe that point has been reached in Australia, the Bank is monitoring the situation and will continue to do so going forward.

Cash use

The use of cash for day-to-day payments has declined for many years, with consumers increasingly preferring to make their payments electronically. The Bank's Consumer Payments Survey (CPS) showed that the share of total retail payments made in cash fell from 69 per cent in 2007 to 27 per cent in 2019 (Caddy, Delaney and Fisher 2020). Based on payment diaries, this survey provides the richest source of data on payment trends, but it is only run every three years; the results from the 2022 survey will be published later this year. To understand trends in transactional cash demand on a more frequent basis, we can examine a number of different data sources.

Lower demand for cash for transactional use is evident from the decline in cash withdrawals from ATMs. The use of ATMs has been declining since 2008, with the number and value of ATM withdrawals falling by about 60 per cent and 40 per cent, respectively (Graph 1). This decline was previously occurring at a steady pace, but cash withdrawals fell dramatically during the COVID-19 pandemic and have only partially recovered. Cash withdrawn using debit card cash-outs and cash advances has followed a similar pattern to ATM withdrawals over the past decade, while cash withdrawn over-the-counter from ADI branches has recovered faster.

Another indicator of cash spending in the economy is the value of cash that is lodged by CIT companies at their cash depots (CIT companies transport cash from retailers and ADIs to their depots). Both the number and value of banknote lodgements at major cash depots are around 50 per cent lower than at their peaks, and remain well below pre-pandemic levels.

These longer term trends partly reflect the shift to online shopping. The share of retail sales conducted online increased sharply during the pandemic-related lockdowns, and remains higher than it was prior to the pandemic. Online sales have been steady at around 11 per cent of total retail sales over 2022, which is a marked rise compared with around 7 per cent at the end of 2019. This, along with the other indicators of cash system activity, suggests that the changes in shopping habits and payment behaviour induced by the pandemic have endured.

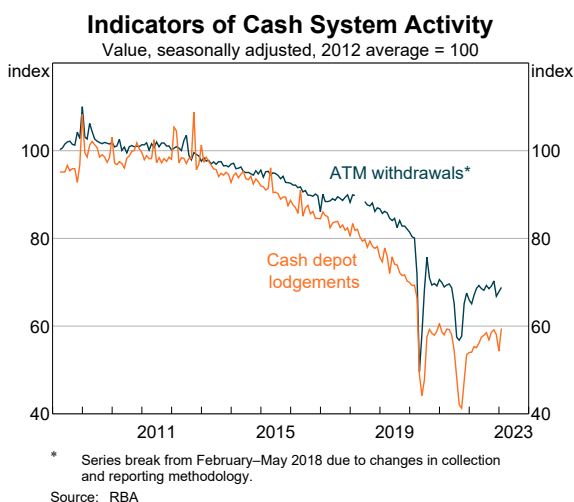
An alternative source of data is from an annual survey commissioned by the Bank – the Online Banknotes Survey (OBS) – which asks individuals about their cash use behaviour. The survey shows that, in 2022, cash was used by 25 per cent of respondents in their most recent in-person transaction, which is similar to the previous two years (Graph 2). While not directly comparable, this is lower than the 32 per cent of in-person payments made in cash in 2019 as found in the CPS (Delaney, McClure and Finlay 2020). Debit and credit cards remain the most popular payment method, although electronic options – such as tapping with smartphones – are becoming more prevalent. The survey points to a permanent shift in payment behaviour for a significant proportion of the population; 39 per cent of respondents said they have been using cash less often since the pandemic began, while only 16 per cent said they use it more often. Furthermore, only 9 per cent of respondents considered themselves high cash users, compared

to 68 per cent that said they are low cash users. Those on lower incomes were more likely to have used cash for their most recent transaction and consider themselves a high cash user. Respondents generally preferred to use cash for lower value transactions.

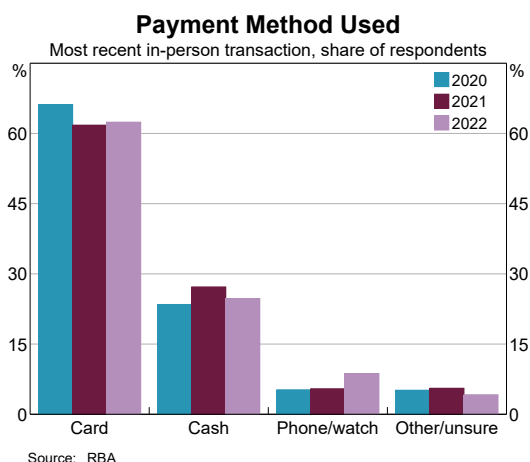
Finally, the denominational mix of banknotes that are in circulation can provide insight into cash use trends. In recent years, growth in low denomination banknotes (\$5, \$10 and \$20 banknotes) has been slow, outside of the periods where the Next Generation Banknote series for each denomination was first issued (Graph 3). These denominations – particularly the \$5 and \$10 denominations – are typically used for in-person transactions and for merchants to provide change, so subdued demand for these banknotes aligns with reduced use of cash for consumer spending. This trend has remained even after the end of pandemic-related lockdowns.

By contrast, the trend rate of growth in high denomination banknotes on issue (\$50 and \$100 banknotes) has remained strong over the past decade, with a particularly large spike during the pandemic. Strong growth in high denomination banknotes reflects the increased desire in the community to hold banknotes as a precaution or store of wealth, as well as macroeconomic factors (Flannigan and Staib 2017). However, when banknotes are hoarded they change hands less frequently, which means the strong growth in demand for these banknotes has less bearing on the cash-use cycle.

Graph 1



Graph 2



Cash access

Cash access is the ability or ease with which people can withdraw or deposit cash. In Australia, cash can be accessed through a variety of methods; however, according to the OBS, withdrawals from ATMs are the most common method of accessing cash (Graph 4). Over-the-counter services – at ADI branches and Bank@Post outlets – are also a common method for withdrawing and depositing cash, particularly for larger values of cash. Outside of these options, individuals can receive cash at the point of sale (e.g. eftpos cash-outs) or by receiving payments or gifts in cash (e.g. wages, payments for goods or services provided or transfers from friends), although these are not examined here.

The number and availability of these cash access points, therefore, are important to consider when

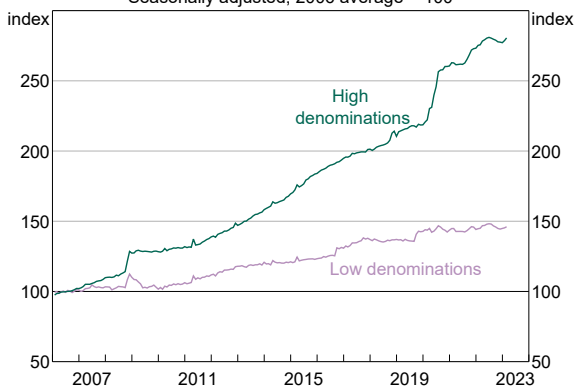
assessing the ease with which Australians can deposit or withdraw cash. In recent years, a substantial number of cash access points have been removed from locations around Australia. Since 2016, when ATM numbers peaked, around 8,000 ATMs (or 25 per cent) have been closed (Graph 5). Most of these closures have been ATMs owned by ADIs, whereas independently owned ATMs have gained an increasingly large share of the ATM market. Independent deployers are more likely to charge a fee for the use of their machines, compared with ADI-owned ATMs, which can be a barrier to cash access.

ADI branch numbers have also been in trend decline. The total number of ADI branches is now 30 per cent lower than in 2017, when comparable data are available. The majority of these closures have been in major cities (60 per cent) or in inner regional parts of Australia (20 per cent). However, given the relative lack of alternative branches, as well as the larger geographic area of regional Australia, the impact of these closures may be more pronounced for non-metropolitan communities. Against this background, the Australian Government established a Regional Banking Taskforce to investigate the impact of these closures on regional areas, which included in its recommendations: a review of the Australian Banking Association’s Branch Closure Protocol; actions to better communicate and alleviate the negative impact on regional communities; and a review of the relevant

Graph 3

Value of Banknotes in Circulation

Seasonally adjusted, 2006 average = 100

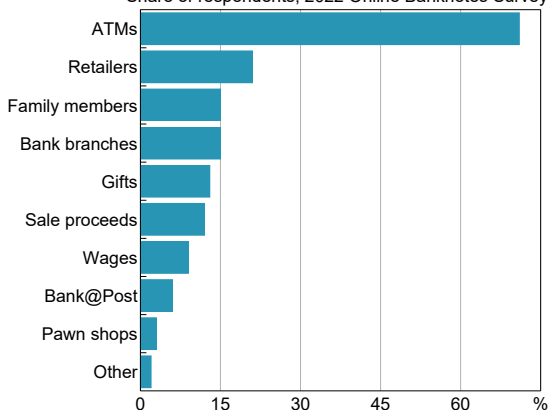


Source: RBA

Graph 4

How Consumers Access Cash

Share of respondents, 2022 Online Banknotes Survey*



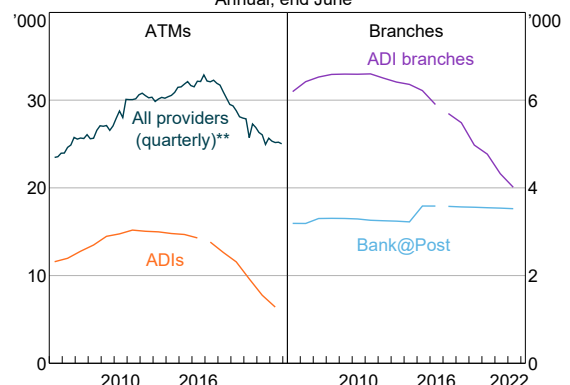
* Multiple responses were allowed, so bars do not sum to 100 per cent.

Source: RBA

Graph 5

Cash Access Points

Annual, end June*



* Series break in annual data in June 2017 due to APRA data collection change.

** The decrease in the number of active ATMs in June 2020 was largely due to temporary COVID-19-related venue closures.

Sources: APRA; AusPayNet; RBA

Table 1: Cash Access Points and Distance to Cash Services^(a)

	June 2022		Change from June 2020 ^(b)	
	Number	Distance in kilometres ^(c) 95 per cent	Number	Distance in kilometres ^(c) 95 per cent
ADI deposit	8,469	5.6	-886	0.1
– ADI branches	4,944	10.7	-864	0.8
– Bank@Post outlets	3,525	5.8	-22	0.1
All withdrawal types ^(d)	24,356	4.5	-1,403	0.2
– ADI withdrawal	14,881	5.4	-4,095	0.5
– ADI ATMs	6,412	11.1	-3,209	1.8
– All ATMs	15,887	6.7	-517	0.2

(a) Distances are measured as the shortest distance between two points (i.e. as the crow flies).

(b) The change in distance captures population changes – that is, the distances are calculated using population data at different points in time.

(c) Distance within which 95 per cent of Australia's usual resident population lives.

(d) Includes ADI ATMs, ADI branches, Bank@Post and independent ATMs.

Sources: ABS; APRA; Australian Banking Association; Banktech; ggmap; Google; Linfox Armaguard; Next Payments; Prosegur; RBA

data produced by the Australian Prudential Regulation Authority (APRA), which this article uses to examine cash access (Treasury 2022).

Distance to cash services

Despite the decline in the number of cash access points, the removal of *some* access points may not substantially affect people's ability to access cash if these points are located sufficiently close to one another. To better incorporate the locality of access points and the population that live around them in our assessment of changes to cash access, we estimated the distance that people have to travel to reach their nearest cash access point. We examined the locations of all ADI access points (ADI-owned ATMs, branches and Bank@Post outlets) using data from APRA and some independently operated ATM deployers as at June 2022. The data cover around half of the independently owned ATMs and so our analysis likely underestimates access to cash.^[4]

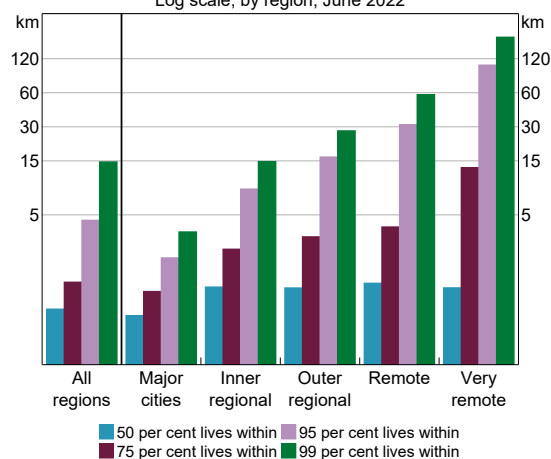
Overall, distance to cash services has been little changed in recent years, despite the significant number of cash access point closures. As of June 2022, 95 per cent of the population lived within 5.6 km of a cash deposit point and 4.5 km of a cash withdrawal point (Table 1). It reflects the strong geographic coverage of Bank@Post outlets, which are limiting any increase in overall distances. The closures of ADI branches and ADI-owned ATMs,

however, have increased the distances to these particular services; this is especially the case for more remote communities (Graph 6). Since 2020, the median distances to ADI branches and ADI ATMs in remote locations have increased by 3.4 km (12 per cent) and 6.5 km (18 per cent), respectively; in very remote areas, the increases are 7.6 km and 19 km (although these regions already had very high distances to cash access points to begin with).

Graph 6

Distance to Cash Withdrawal

Log scale, by region, June 2022



Sources: ABS; APRA; Australian Banking Association; Banktech; ggmap; Google; Linfox Armaguard; Next Payments; Prosegur; RBA

Vulnerabilities in cash access

Although the overall change in the distance most people need to travel to access cash has not changed substantially, the vulnerability to further removal of cash access points is increasing. This can be seen by examining the average distance to the next closest cash access point. Increasing vulnerability is particularly evident in cash deposit services, where the additional distance to the next closest access point has increased considerably over the past couple of years (Graph 7); robustness of withdrawal services has worsened only slightly over this time, although ADI-owned access points – which are important in providing fee-free access – have relatively greater vulnerability. Much of the deteriorating robustness in the cash access network has been concentrated among people who are already far from access points, suggesting some non-metropolitan communities are increasingly at risk of a further significant increase in distance to the nearest cash access point.

The increases in distances reflect that vulnerabilities in the system are concentrated in particular service types. For ADI branches (including other ADI face-to-face outlets), we estimate 190 of the 864 net closures (22 per cent) since June 2020 did *not have an alternative branch* within a 1 km radius. By contrast, only 51 (6 per cent) of these withdrawn branches lacked any alternative access point (i.e. an ATM, Bank@Post or alternative bank branch) within a 1 km radius. This highlights the compositional

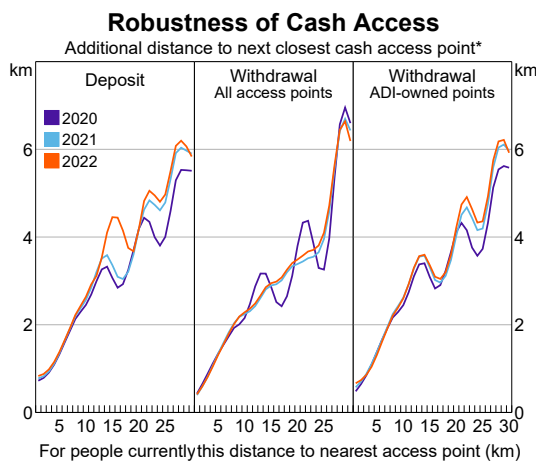
shifts in cash access, where consumers may have to switch to alternate service types in order to withdraw or deposit cash, if they are unable to travel the extra distance.

This can be an issue for consumers because the type of cash access point – ADI branches, ATMs and Bank@Post – is not always fully substitutable in the services it offers. For example, independently operated ATMs often carry fees, which can be a financial barrier for some. Some ATMs may also be inaccessible at certain hours – for example, if they are inside a shopping centre, hotel or other venues. There are also some limitations to the Bank@Post service, as outlined by the Regional Banking Taskforce, including that not all ADIs are able to be accessed, there are different withdrawal and deposit limits, and the Bank@Post service may not be sufficiently well-known by some communities (Treasury 2022). As such, while access to Bank@Post outlets remains strong, it may be insufficient for some consumers. These considerations are consistent with survey data, which find consumers hold different perceptions about the convenience, safety, fees and location of different sources of cash (Graph 8).

Cash acceptance

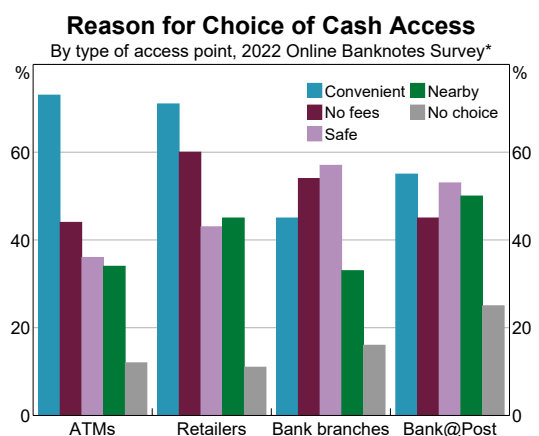
Cash acceptance refers to how merchants communicate their intentions to their customers about whether they accept cash payments or not. In most countries, including Australia, cash is legal tender (cash generally needs to be accepted to

Graph 7



* Population weighted; smoothed.
Sources: ABS; APRA; Australian Banking Association; Banktech; ggmap; Google; Linfox Armaguard; Next Payments; Prosegur; RBA

Graph 8



* Multiple responses were allowed, so bars do not sum to 100 per cent.
Source: RBA

Table 2: Surveys of Cash Acceptance in Australia

	Frequency	Range	Most recent survey	Sample	Sample size	Acceptance question
RFI Global	Biannual	2016–2022	April 2022	Card-accepting offline businesses	~800	Do you accept cash for payments?
Phone	Ad hoc	2020–2022	June 2022	Offline businesses	~350	Do you accept cash for payments?
OBS	Biennial	2019–2021	November 2022	Representative sample of individuals	~1,000	Did you come across a business that did not accept cash in the past month?

Sources: RBA; RFI Global

settle debts), but there is no legal requirement for merchants to accept cash for retail payments (RBA 2022b). It is the decision of the merchant as to whether they accept or encourage payments in cash. At one end of the spectrum, merchants may accept only cash for payments, displaying ‘cash-only’ signage. Alternatively, merchants may refuse to accept cash for payment. Some merchants may accept cash, but verbally discourage its use or display ‘we prefer card’ signage.

To help understand trends in merchant cash acceptance, we drew on three different surveys, providing both a business perspective and a consumer perspective (Table 2):

1. A biannual survey of businesses, undertaken by global business intelligence provider, RFI Global (RFI) and including additional questions commissioned by an industry working group run through AusPayNet. The survey includes around 1,000 card-accepting merchants; the sub-sample of merchants that have an offline presence (around 800 businesses) is most relevant to assessing merchant cash acceptance.
2. The Bank conducts a phone survey of around 350 businesses on an ad-hoc basis to assess merchants’ acceptance of cash.^[5]
3. The OBS, described above, captures responses from around 1,000 consumers on their experiences of businesses accepting cash.

Trends in cash acceptance

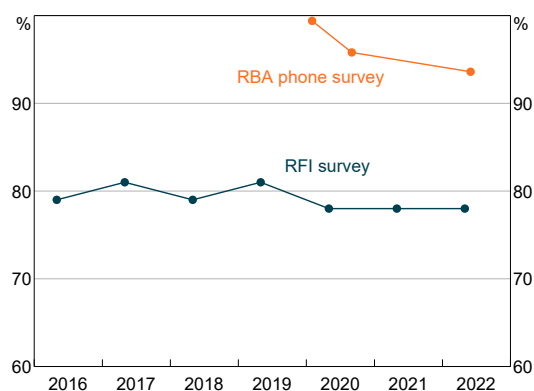
The two business surveys differ in their estimates of the rate of merchants’ cash acceptance. The RFI data suggest that cash is accepted by 78 per cent of

card-accepting merchants with a physical presence (Graph 9). This sample excludes cash-only firms and therefore underestimates the rate of cash acceptance. The RBA phone survey, which includes cash and/or card-accepting merchants with a physical presence, suggests that 94 per cent of businesses surveyed reported accepting cash for payments. The two surveys also imply slightly different trends in merchants’ cash acceptance. RFI data suggest that cash acceptance has been little changed since 2016. By comparison, the phone survey suggests a decline in the share of merchants accepting cash from 99 per cent just prior to the pandemic, to 94 per cent in June 2022.

From the consumer perspective, the OBS suggests that cash acceptance declined somewhat after the onset of the pandemic, but has partly rebounded since (Graph 10). One-third of respondents noticed a vendor did not accept cash in 2022, compared with around half of respondents in 2020. Note that

Graph 9

Merchant Cash Acceptance



* Offline businesses.

** Card-accepting offline businesses.

Sources: RBA; RFI Global

the difference between the consumer and business survey estimates can be reconciled in that more than one consumer may have experienced cash non-acceptance at the same store (or large company with multiple stores). Overall, the indicators suggest that cash acceptance may be a little lower than prior to the pandemic, but nonetheless remains at a high level.

Plans to dissuade cash usage

The RFI survey provides a forward-looking indicator of merchant cash acceptance. The data suggest that half of merchants that accepted cash in April 2022 planned on actively discouraging cash payments or displaying signage to that effect at some point in the future. Those merchants that plan to move away from accepting cash were more likely to have higher turnover and be in metropolitan areas.

The pandemic appears to have influenced some merchants’ plans to dissuade cash use. Merchants that have or plan to dissuade cash use point to hygiene concerns around cash handling during the pandemic as the most prominent reason (Graph 11). Preferences of consumers to not use cash is the second most cited reason, followed by the risk of theft and mishandling, cash handling costs, and difficulty for businesses in accessing cash.

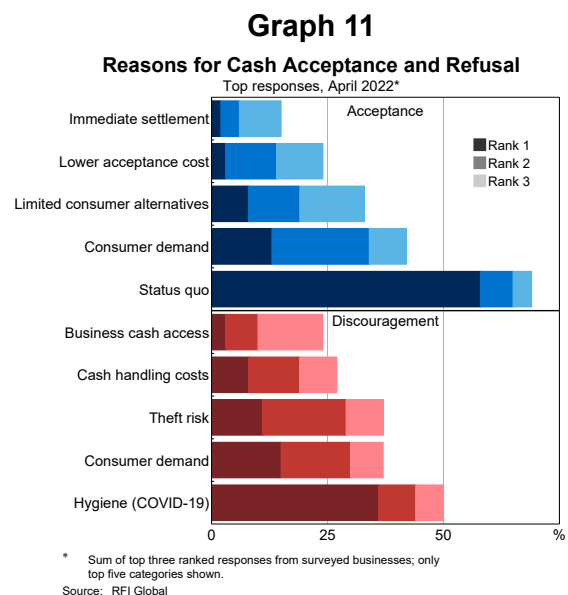
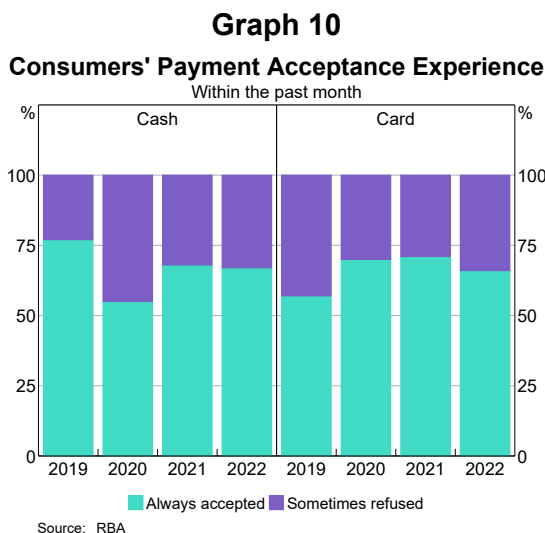
Amongst merchants that do not have plans to dissuade cash usage, most indicate that there is no reason to change the status quo. They also cite consumer preference to pay with cash and a lack of

alternative methods of payment for some customers. Other prominent reasons included lower costs of accepting cash than other payment methods and the immediacy of cash payments.

Conclusion

The use of cash for day-to-day payments has declined for many years, with the COVID-19 pandemic accelerating this trend. Indicators of cash system activity suggest that the change in payment behaviour induced by the pandemic has endured. Despite declining cash use, its flow-on effects to cash access and cash acceptance have been less evident. Regarding the public’s ability to access cash, the distance to cash services has been little changed in recent years, with Bank@Post outlets supporting ease of access. The acceptance of cash for payments by merchants remains at a high level, although it is a little lower than prior to the pandemic. As such, we assess that the cash-use cycle in Australia is functioning adequately.

Nevertheless, the data point to some vulnerabilities in the cash system. Some communities, particularly in non-metropolitan areas, are increasingly susceptible to a decline in cash access if there were to be further removal of cash access points. Furthermore, a substantial share of merchants indicated plans to discourage cash payments at some point in the future. The Bank will continue to monitor these trends. ↴



Endnotes

- [*] The authors are from Note Issue Department. Thanks to Zan Fairweather who contributed to early work on merchant cash acceptance, and to Jay Narayanan, Jack Mulqueeney and Varsha Patel for assisting with data collection.
- [1] Cash and banknotes are used interchangeably in this article. Although coins are also part of cash, the Royal Australian Mint is responsible for issuing Australia's circulating coinage.
- [2] Wholesale cash distribution was the main topic of the Review and is not covered here (RBA 2022a).
- [3] Specifically, if the marginal cost of accepting a cash payment from an additional customer exceeds the marginal benefit of making that sale, then a business may decide to stop accepting cash.
- [4] The data and the methodology used here are discussed in further detail in Caddy and Zhang (2021).
- [5] Businesses were randomly selected from the universe of all registered and active Australian businesses according to the Australian Business Register in May 2022. Businesses that did not have a physical storefront or did not sell goods and services of a retail nature were excluded from the sample.

References

- Caddy J, L Delaney and C Fisher (2020), 'Consumer Payment Behaviour in Australia: Evidence from the 2019 Consumer Payments Survey', RBA Research Discussion Paper No 2020-06.
- Caddy J and Z Zhang (2021), 'How Far Do Australians Need to Travel to Access Cash?', RBA *Bulletin*, June.
- Delaney L, N McClure and R Finlay (2020), 'Cash Use in Australia: Results from the 2019 Consumer Payments Survey', RBA *Bulletin*, June.
- Flannigan G and A Staib (2017), 'The Growing Demand for Cash', RBA *Bulletin*, September, pp 63–74.
- RBA (Reserve Bank of Australia) (2022a), 'Review of Banknote Distribution Arrangements: Conclusions Paper', August.
- RBA (2022b), 'Legal Tender', RBA Banknotes site.
- Treasury (2022), 'Regional Banking Taskforce Final Report', September.

Can Wage-setting Mechanisms Affect Labour Market Reallocation and Productivity?

Jonathan Hambur^[*]



Photo: Ivan Bajic – Getty Images

Abstract

Productivity growth has slowed in Australia and overseas in recent decades, with negative implications for wages and incomes. In Australia, at least part of this slowdown reflects the fact that more productive firms have grown and attracted workers more slowly than in the past. This article considers whether the increased use of industry-wide wage agreements could help to explain this slowdown. It finds that in sectors with greater use of industry-wide agreements, the relationship between firm-level wages and productivity tends to be weaker. This weaker relationship between productivity and wages seems to feed through to firm growth, with more productive firms seemingly less likely to attract staff and grow. While many factors can affect the choice of wage-setting mechanism, these results suggest that aggregate productivity growth and living standards could be stronger when firms are incentivised and able to compete for workers.

Introduction

Productivity measures how much the economy can produce for a given set of inputs (such as labour, capital and land). Over the long term, productivity growth is the key driver of living standards, as it allows economies to produce and consume more

for the same amount of inputs – that is, working smarter rather than harder.

Productivity growth can come from two sources:

1. individual firms becoming more productive by making better use of their inputs

2. more efficient firms growing and attracting labour (and other inputs) at the expense of less efficient firms, often referred to as ‘productivity-enhancing reallocation’.

Over recent decades, the pace at which workers tend to move from less to more productive firms in an industry has slowed.^[1] This has contributed to slower national productivity growth, and therefore slower growth in national wages and incomes (Andrews and Hansell 2021). It has also meant lower wages for individual workers, as more productive and efficient firms tend to pay higher wages (Card *et al* 2018). Given the very real implications for both individuals and the economy, it is important to understand why productive firms appear to be growing and attracting workers more slowly in recent decades.

How do more productive firms tend to grow? In some cases they will hire people who are not currently employed. But in many cases they will have to attract, or poach, staff away from other firms by offering them more attractive employment, particularly higher wages (Bilal *et al* 2022). As such, institutional or regulatory factors that affect the wages that firms offer could also influence the amount of reallocation that occurs.

This could, for example, occur through changes in wage-setting mechanisms, which determine at what level workers and firms bargain and set wages. In recent decades, Australia has had three main wage-setting mechanisms:

- *individual arrangements* – set between a worker and a firm
- *enterprise bargaining agreements (EBA)* – set across all workers in a firm
- *industry awards (IA)* – set across all workers in a role/industry.

For the first two mechanisms, worker wages for the same job can differ across firms. For industry awards, all workers doing the same role will receive the same wage.

In theory, shifts in the prevalence of these wage-setting mechanisms over time could affect the rate of labour reallocation. For example, overseas research has shown that the relationship between

firm productivity and wages is weaker where centralised wage-setting mechanisms are used (Guertzgen 2009; OECD 2019; Garnero, Rycx and Terraz 2020). If firms become more likely to offer the same centralised IA wage, there could be less poaching of staff from low to high productivity firms. This might occur if the higher costs incurred in entering non-IA agreements started to outweigh the benefits they provided in terms of flexibility and the ability to attract workers and grow.

That said, it is also possible for increased use of centralised wage-setting mechanisms to cause more labour to flow towards more productive firms. For example, if IA wages, which act as a minimum wage, were too high for low productivity firms to operate profitably, this could cause low productivity firms to shed workers, who might then move to more productive firms (Dustmann *et al* 2022).

This article examines whether the relationship between productivity and employment growth, and between productivity and wages, differ when different wage-setting mechanisms are used. Such research could potentially shed light on the causes of the slowdown in aggregate productivity growth, and provide more general insights into how wage-setting mechanisms interact with firm- and worker-level outcomes.

Changes in wage-setting mechanisms over time

For wage-setting mechanisms to have contributed to slower reallocation and productivity growth, the prevalence of these mechanisms likely needs to have changed. To consider this, Graph 1 shows the share of workers using IA over time for a number of sectors. While the use of IA declined over the mid-2000s, from around 2010 their use increased. The increase was fairly broadly based across most industries, but experience did differ across industries. For example, the share of workers on IA was broadly flat in the professional services sector, but increased substantially in retail and in accommodation and hospitality. We can exploit these differing outcomes across sectors by looking at whether reallocation slowed more where IA use increased by more.

A look at the link between productivity and growth, and wage-setting mechanisms

To consider the relationships between employment growth and productivity, and between wages and productivity, I used de-identified firm- and worker-level data from the ABS Business Longitudinal Analysis Data Environment (BLADE). This database contains employment and tax data for almost all Australian firms; however, I chose to focus on the non-financial market sector, and so finance, education, public administration and health sector data were excluded from this analysis.^[2]

For firms, I constructed measures of employment, wages and labour productivity using taxation data (for more details, see Appendix A). I also drew on the ABS Employee Earning and Hours (EEH) survey microdata, which contains information on workers' wages, as well as the wage-setting mechanism under which they are set. I used these to construct worker-, firm- and industry-level measures of the share of workers using different wage-setting mechanisms.

Labour flows to productive firms more slowly when industry award usage goes up

As noted above, the relationship between firm employment growth and productivity could in theory be either stronger or weaker where IA use is more prevalent. This is likely to depend on many different factors, including the level of the IA wage, the share of low and high productivity firms in the

economy and the competitiveness of the labour market.

To consider which of these assertions is correct, I regressed firm-level (j) employment growth ($Growth_{j,t+1}$) on firm productivity ($Prod_{j,t}$), with productivity expressed as the (log) deviation from the industry average. As such, I compared outcomes for high and low productivity firms in the same industry, and abstracted away from the fact that, for example, mining firms may tend to be more productive than retailers.

More precisely, I ran the following regression:

$$Growth_{j,t+1} = \alpha_0 + \beta * Prod_{j,t} + \gamma * Prod_{j,t} * Awardshare_{m,t} + \theta X_{i,t} + \epsilon_{i,t+1}$$

$Award\ share_{m,t}$ captures the share of workers in the industry (m) (I used ANZSIC divisions, e.g. mining, retail trade) on IA. I removed the division-level average to focus on changes within industries, rather than differences across industries. This allowed me to abstract from structural differences across industries. For example, IA are heavily used in the retail trade division, which tends to have structurally high labour turnover. I sought to abstract from these structural differences across sectors, which could reflect various other factors, so as to focus on changes that occur alongside changes in IA use. I used either the ABS's published shares or shares constructed from the EEH microdata, as this allowed me to capture different sample periods.

The regression contained a number of additional controls ($X'_{i,t}$) to try to capture other factors that might affect firm employment growth, including firm size and age, sales growth over the previous year, and dummies for each industry in each year to account for industry performance or other structural changes in the industry. I also included an interaction between productivity and state-level unemployment, to account for the fact that the relationship between growth and productivity could be stronger or weaker when the labour market is tight. As such, the regression focuses on 'structural' changes in IA usage, rather than changes driven by labour market strength.^[3]

The coefficient of interest is γ . As discussed above, we generally expect more productive firms to grow more quickly, meaning $\beta > 0$. But if the relationship

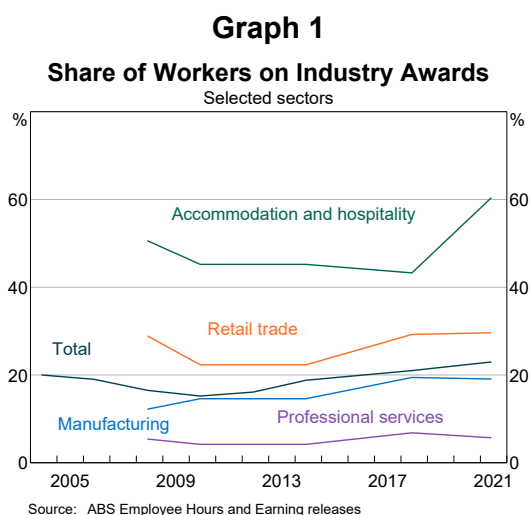


Table 1: Reallocation Regressions^(a)

	Published share – demeaned (1)	Published share – demeaned (2008 data removed) (2)	Constructed shares – demeaned (3)
Productivity β	0.032***	0.031***	0.031***
(t-stat)	(14.67)	(14.74)	(15.31)
Productivity \times Award share γ	-0.026	-0.050**	-0.047**
(t-stat)	(-1.41)	(-2.58)	(-2.62)
Observations	755,094	588,491	597,211
R-squared	0.065	0.062	0.068

(a) All regressions include controls for firm demographics (size, age and past sales growth), industry*year FE, and state-level unemployment*productivity (cyclicality of reallocation). *, * and *** show significance at the 10, 5 and 1 per cent level, respectively. Errors clustered at division level (1-digit ANZSIC). Column 1 includes 2008, 2010, 2014 and 2018. Column 2 includes 2010, 2014 and 2018. Column 3 includes 2012, 2014, 2018. Top and bottom percentile of productivity distribution trimmed.

Source: RBA

between employment growth and productivity is weaker in industries with a higher share of workers on IA, then $\gamma < 0$.

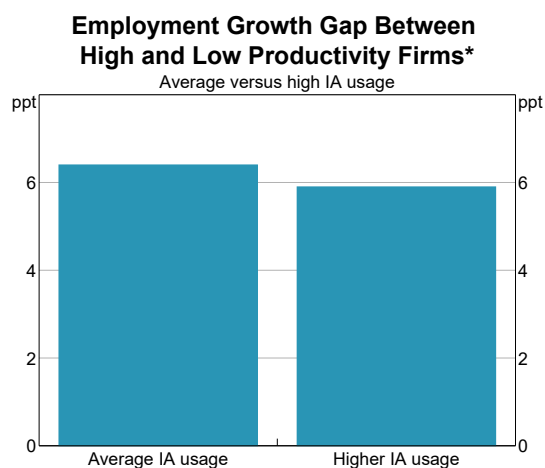
Table 1 shows the results. As expected, more productive firms tend to grow more quickly, as evidenced by the positive coefficient on productivity ($\beta > 0$). However, when more workers are on IA, the relationship between employment growth and productivity tends to weaken, with workers flowing towards more productive firms more slowly ($\gamma < 0$). While the weakening is (statistically) insignificant using the published shares over the full sample (column 1), it is significant if 2008 is removed from the sample (column 2). This brings the sample period more in line with the IA shares constructed from the microdata (column 3), where the relationship is again significant. This suggests that the 2008–2010 period may be unusual, potentially reflecting the disruptions of the global financial crisis, or the unusually sharp fall in IA shares in many industries over this period.

The coefficients are difficult to interpret directly. As such, a simple scenario based on these results can be derived to illustrate their economic importance, using the implied average employment growth rates for high and low productivity firms and considering how the gap between them would differ for industries with differing IA use. For an industry with average IA use, annual employment growth for high productivity firms is 6.4 percentage points higher than for low productivity firms.

Assuming the IA share rose by 5 percentage points, around the average increase from 2010–2018, the gap in employment growth between high and low productivity firms falls to 5.9 percentage points – a ½ percentage point decline (Graph 2). Previous research has shown that this shift is large enough to influence aggregate productivity growth to some extent, particularly if it is sustained over a number of years (e.g. Hambur 2021).^[4]

Firm/worker wages are less related to productivity when industry award usage goes up

The above results show that higher use of IA tends to be associated with slower flows of workers to productive firms. But to provide more evidence, I

Graph 2

* High/low productivity firm is one standard deviation above/below the industry mean. Increase in IA usage for higher scenario is 5 percentage points.

Source: RBA

Table 2: Firm Rent-sharing Regressions^(a)

	Base (1)	Firm fixed effects (2)
Productivity β	0.091***	0.088***
(t-stat)	(31.76)	(18.78)
Productivity \times Industry award share γ	-0.039***	-0.031***
(t-stat)	(-7.5)	(-3.73)
Controls		
Firm FE	N	Y
Observations	59,413	59,100
R-squared	0.367	0.617

(a) All regressions include controls for wage-setting mechanism, firm demographics (age and size), and industry and state by year, to account for prevailing economic conditions. *, * and *** show significance at the 10, 5 and 1 per cent level, respectively. Regressions cover 2002–2018. Industry award workers relationship expressed relative to average of individual award or EBA.

Source: RBA

also tested whether high productivity firms appear less willing or able to offer differentiated, higher wages when IA usage is more prevalent. In this case, we would expect to see a weaker relationship between wages and firm-level productivity when IA usage rises.

I ran some simple regressions of wages on firm productivity, allowing the relationship to differ based on the wage-setting mechanisms. I did so by regressing both average wages in the firm (j) and individual worker's (i) wages on the firm's productivity, while accounting for other firm- or worker-specific factors that can influence wages ($X_{i,j,t}$) (e.g. worker age or occupation, firm industry and the strength of the economy).

More precisely, I ran the following the regression:

$$\log(\text{wage}_{ijt}) = \alpha + \beta \log(LP_{jt}) + \gamma \log(LP_{jt}) * \text{IndustryAward}_{i,t} + \delta X_{i,j,t} + \epsilon_{ijt}$$

First, I ran these regressions at a firm level, comparing firms' wages (from tax data) to their productivity, and considered whether this relationship differed for firms with differing shares of workers on IA (based on EEH microdata). In this sense, I compared firms that tend to use IA intensively versus those that do not.^[5]

Table 2 shows the results. Wages tend to be higher at more productive firms ($\beta > 0$). But the relationship between worker wages and firm productivity is weaker when firms use IA ($\gamma < 0$). Based on the coefficients, the relationship between productivity and wages would be one-third smaller

for a firm that has all workers on IA, compared with one with all workers on other agreements. This is the case even if firm fixed effects are included, which account for structural firm-specific factors that could drive both wages and the choice of wage-setting mechanism, such as the firm's business model.

Finally, as a further robustness test, I ran worker-level regressions taking information from the EEH Survey on the worker's (ordinary time) wage rate and their wage-setting mechanism. These data provide a one-time snapshot of outcomes for a number of workers in each firm, allowing for comparison of outcomes between firms, or between workers within a firm, but not for a given firm across time.

Table 3 shows the results. Wages tend to be higher at more productive firms ($\beta > 0$). But the relationship between worker wages and firm productivity is again weaker for workers on IA ($\gamma < 0$). This finding is robust, even when I allowed the relationship between wages and productivity to differ between occupations (column 2). The evidence was weaker when I included firm fixed effects, and so effectively compared workers on different wage-setting mechanisms within the same firm (columns 3 and 4). However, wage-setting mechanisms tend to be the same for most workers in a given firm, so it's not surprising that it's hard to find differences within firms.

Table 3: Worker Rent-sharing Regressions(a)

	Base (1)	Allow occupation specific rent-sharing (2)	Firm effects (3)	Firm effects and allow occupation specific rent-sharing (4)
Productivity β	0.034***	–	0.016**	–
(t-stat)	(10.60)		(2.25)	
Productivity \times Industry Award γ	–0.028***	–0.018***	–0.011*	–0.010
(t-stat)	(–5.10)	(–3.16)	(–1.94)	(–1.40)
Controls				
4-digit ANZSCO \times productivity	N	Y	N	Y
Firm FE	N	N	Y	Y
Observations	47,586	47,586	47,325	47,325
R-squared	0.670	0.678	0.786	0.789

(a) All regressions include controls for worker demographics (quadratic in age, and gender), and wage-setting mechanism, and division, state and 4-digit occupation by year, to account for prevailing economic conditions. *, * and *** show significance at the 10, 5 and 1 per cent level, respectively. Errors clustered at firm level. Regressions cover 2012, 2014, 2018. Industry award workers relationship expressed relative to individual award. EBA interaction not shown. For columns 2 and 4, overall response captured in occupation*productivity controls.

Source: RBA

Overall, the results suggest that where IA use is more prevalent, the relationship between firm-level productivity and wages is weaker. This is unsurprising as these wage rates are set at a national rather than a firm level. This provides further evidence that increased IA use could be associated with less wage differentiation and poaching, and therefore less flow of labour to more productive firms.

Discussion and conclusions

Slower productivity growth has significant negative implications for wages, incomes and living standards. As such, it is crucial to understand why more productive firms have been growing and attracting labour more slowly than in the past. The above results point to one potential factor: the increased use of IA, where all firms offer the same wages no matter how productive they are, is associated with slower flows of labour to productive firms. However, the results do not provide much evidence on *why* the use of IA has increased, which is crucial in thinking about policy as it is these ultimate causes that will determine whether the trend continues and whether they need to be addressed.

One potential explanation is that some form of ‘frictions’ have prevented firms from using other mechanisms and offering differentiated wages. For example, the costs and complexities in entering into EBA could have become more significant, relative to the benefits.^[6] Alternatively, firms and workers may increasingly be taking IA as a ‘signal’ of the appropriate wage level. For example, US studies have found that, where there is a benchmark wage for an occupation, firms are more likely to offer similar wages (Cullen, Li and Perez-Truglia 2022).

Another potential explanation is that firms’ bargaining power may have increased, allowing more of them to lower wages down to the IA level. So it could be that the increases in firms’ market power have led to increased IA usage and therefore slower reallocation to high productivity firms. In fact, a key argument for minimum wages, such as IA, is that they can mitigate the effects of firms’ bargaining power, particularly in concentrated markets (Azar *et al* 2021).^[7]

Recent work suggests that firm bargaining power rose as rates of firm creation declined over the 2010s, as this meant less competition for workers and fewer new employment opportunities for

workers to leverage in negotiations (Hambur 2023). While there is no evidence linking this to increased use of IA, it does similarly speak to the importance of promoting dynamic and competitive markets where firms compete for workers.

Overall, these results provide further evidence that at least part of the slowdown in productivity growth reflects frictions or other issues that make the economy less dynamic, such that firms have less of

an imperative to compete with each other for workers or sales. Increased use of industry minimum wage arrangements is one mechanism through which this has affected economic outcomes, but it is not the only one. Understanding and addressing these issues is important, given slower productivity growth has real implications for wages, incomes and people's welfare. ✎

Appendix A

I measured productivity as the ratio of value-added to full-time equivalent employees (FTE), where FTE is provided in BLADE based on ABS calculations. 'Value-added' was measured as income less expenses other than labour, depreciation and some other fixed expenses. Value-added was deflated using division-level deflators.

For growth in labour, I measured growth in FTE. Rather than using a standard growth rate, I used the bounded growth rate that is common in the literature:

$$Growth_{j, t+1} = \frac{L_{ijt+1} - L_{j, t}}{0.5*(L_{j, t+1} + L_{j, t})}$$

The advantage of this approach is that it is bounded by -2 and 2 , and is an approximation of the log change. While this measure can also accommodate firm entry and exit (2 and -2 respectively), I focused only on existing and continuing firms (the intensive margin of productivity growth).

As noted, for some of the analysis I constructed firm- or division-level industry award wage worker shares. For these shares, I used unweighted counts of workers on industry awards, and on other wage-setting mechanisms. Ideally, I would have used a weighting scheme similar to that used by the ABS in the EEH survey, but weights are not provided in the microdata. Nevertheless, the internally constructed and published division-level metrics appear similar for the overlapping periods and give similar results.

Endnotes

[*] The author is from Economic Research Department.

[1] More productive firms tend to remain so over time. The persistence of firm productivity has been broadly unchanged over the past two decades.

[2] These sectors were excluded due to the large role played by government, which makes it complicated to assess outcomes. The finance division was excluded given conceptual difficulties in measuring output and productivity in this sector. Non-employing firms were also excluded, given they have undefined (log) labour inputs, productivity and wages.

[3] Interacting productivity with division-level measures of performance as an alternative does not change the results.

[4] To put this in context, Hambur (2021) showed that measures of competition (i.e. average firm markups) in the Australian economy declined from 2005–2017. This was

associated with a similar (though slightly larger) decline in the gap between employment outcomes for high and low productivity firms and had a sizeable effect on labour productivity growth.

[5] I focused on the firm-level share, not the division-level share as in the reallocation regression. Reallocation is likely to depend both on a firm and its competitors' wage-setting mechanisms, as this will determine the degree of wage differentiation. But an individual's wages will depend on the firm's wage-setting choice. I used the average share to allow for extrapolation to non-survey years in a consistent manner for firms that appear in the EEH survey once and firms that appear multiple times.

[6] For some discussion of this, see Productivity Commission (2022).

[7] Similarly, by putting a floor on wages, IA can decrease the gap in earnings for men and women in the same job (Sobeck 2022).

References

- Andrews D and D Hansell (2021), 'Productivity-enhancing Labour Reallocation in Australia', *Economic Record*, 97(317), pp 157–169.
- Azar J, Huet-Vaughn, Emiliano, I Marinescu, B Taska and T von Wachter (2019), 'Minimum Wage Employment Effects and Labor Market Concentration', NBER Working Paper No 26101.
- Bilal A, N Engborn, S Mongey and GL Violante (2022), 'Firm and Worker Dynamics in a Frictional Labor Market', *Econometrica*, 90(4), pp 1425–1462.
- Card D, AR Cardoso, J Heining and P Kline (2018), 'Firms and Labor Market Inequality: Evidence and Some Theory', *Journal of Labor Economics*, 36(S1), pp 13–70.
- Cullen ZB, S Li and R Perez-Truglia (2022), 'What's My Employee Worth? The Effects of Salary Benchmarking', NBER Working Paper No 30570.
- Dustmann C, A Lindner, U Schonberg, M Umkehrer and P vom Berge (2021), 'Reallocation Effects of the Minimum Wage', *The Quarterly Journal of Economics*, 137(1), pp 267–328.
- Garnero A, F Rycx and I Terraz (2020), 'Productivity and Wage Effects of Firm-Level Collective Agreements: Evidence from Belgian Linked Panel Data', *British Journal of Industrial Relations*, 58(4), pp 936–972.
- Guertzgen N (2009), 'Rent-sharing and Collective Bargaining Coverage: Evidence from Linked Employer–Employee Data', *The Scandinavian Journal of Economics*, 111(2), pp 323–349.
- Hambur J (2021), 'Product Market Competition and its Implications for the Australian Economy', Treasury Working Paper No 2021-03.
- Hambur J (2023), 'Did Labour Market Concentration Lower Wages Growth Pre-COVID?', RBA Research Discussion Paper No 2023-02.
- OECD (2019), 'Negotiating Our Way Up: Collective Bargaining in a Changing World of Work', November.
- Productivity Commission (2022), '5-year Productivity Inquiry: A More Productive Labour Market', Interim Report No 6, October.
- Sobeck K (2022), 'Greedy Jobs, Labour Market Institutions, and the Gender Pay Gap', Tax and Transfer Policy Institute Working Paper No 15/2022.
- BLADE Disclaimer Notice

Bank Fees in Australia

Laura Nunn^[*]



Photo: ljubaphoto – Getty Images

Abstract

This article updates previous Reserve Bank research on bank fees charged to Australian households, businesses and government. Over the year to June 2022, total fees charged by banks through their domestic operations were little changed from the previous reporting period. Strong growth in business credit added to fee income in the year, while overall fee income from households declined amid heightened lending competition in the housing market. Lending growth continued to outpace growth in fee earnings, and total fee income as a share of banks' incomes decreased slightly.

Introduction

This article updates previous research on bank fees and covers the year to June 2022.^[1] Since 1997, the Reserve Bank has collected information on the fees charged by banks to households and businesses through their Australian operations. The year to June 2022 was the second year these data were collected through the Economic and Financial Statistics (EFS) collection, which has improved the detail and consistency of reported data.^[2] This year's data captured 40 lenders, which account for around 88 per cent of total credit outstanding.

The context for the results for this period includes the rapid recovery in activity following the end of

the COVID-19 lockdowns in 2021, strong growth in credit and the increase in the cash rate of 75 basis points over May and June 2022 (RBA 2022b).

Interest rates on deposits and on loans to households and businesses increased over the reporting period as financial institutions responded to actual and anticipated increases in the cash rate (Graph 1).

Total fees charged

Total fees charged by banks through their domestic operations were little changed in the year to June 2022, after declining over the previous five years (Graph 2; Table 1). Fee income as a share of assets and deposits edged lower, as lending and deposit

Table 1: Bank Fees^(a)

	Households		Institutions		Total	
	Levels (\$ million) ^(b)	Growth (per cent) ^(c)	Levels (\$ million) ^(b)	Growth (per cent) ^(c)	Levels (\$ million) ^(b)	Growth (per cent) ^(c)
2019	3,963	-5.6	8,305	2.1	12,269	-0.5
2020	3,559	-10.2	7,881	-5.1	11,439	-6.8
2021	3,301	-11.1	11,130	-3.2	14,431	-5.1
2022	3,213	-2.7	11,261	1.2	14,474	0.3

(a) Financial year.

(b) There is a series break between 2020 and 2021 for all series.

(c) Growth rates for the year to the end of June 2021 have been break adjusted to account for series breaks and rounded.

Sources: APRA; RBA

growth outpaced growth in fee earnings. Total fee earnings decreased slightly as a share of banks' total income to comprise less than 10 per cent of reporting banks' income, compared with around 50 per cent from interest income on lending.^[3]

Underlying the stability in aggregate fee income, there was an ongoing reduction in fees charged to households; this was offset by a modest increase in the larger component of fee income – fees charged to institutions (businesses and government). Reporting institutions again earned the bulk of their fee income on charges to medium and large business customers; fees charged to these customers comprise around 65 per cent of total banks' fee income (Graph 3).

Fees charged to households

Fees charged to households decreased by around 3 per cent in the year to June 2022 as fee income from housing loans fell, driven by strong competition (Graph 4; Table 2). The decline occurred despite strong growth in housing lending. Fees charged on credit cards increased and fees on personal loans declined modestly, broadly reflecting shifts in spending patterns corresponding to the impact of the recovery from the COVID-19 pandemic. Most of the fees charged to households were from fees on housing loans and credit cards

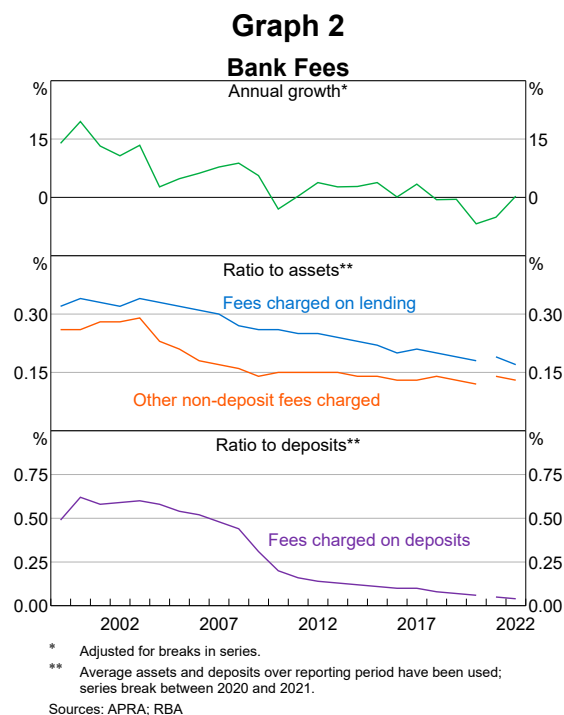
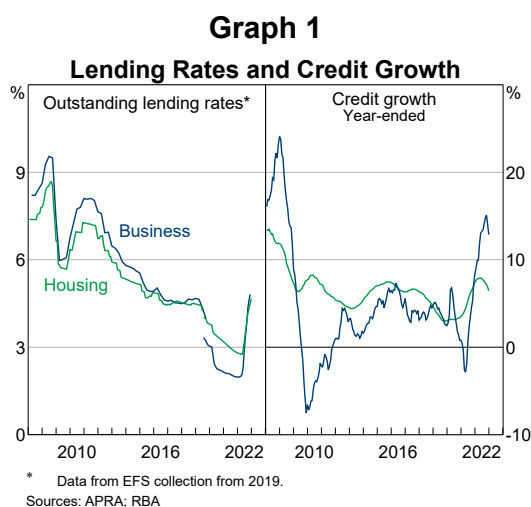


Table 2: Fees Charged to Households^(a)

	2020	2021 ^(b)	2022	
	(\$ million)	(\$ million)	(\$ million)	(per cent)
Loans	2,898	2,668	2,567	-4
– Housing	1,188	1,279	1,123	-12
– Personal	313	337	329	-2
– Credit cards	1,397	1,051	1,115	6
Deposits	616	590	606	3
Other	44	44	40	-9
Total	3,559	3,301	3,213	-3

(a) Financial year.

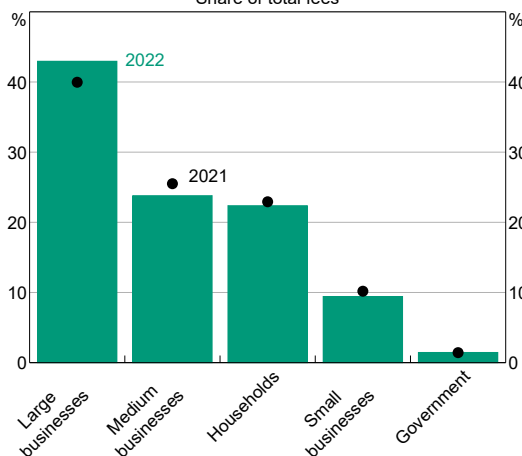
(b) There is a series break between 2020 and 2021 for all series.

Sources: APRA; RBA

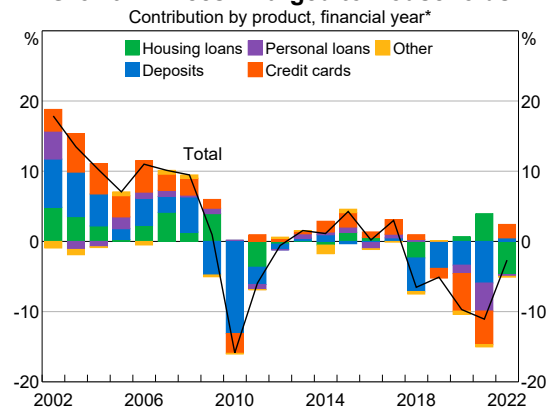
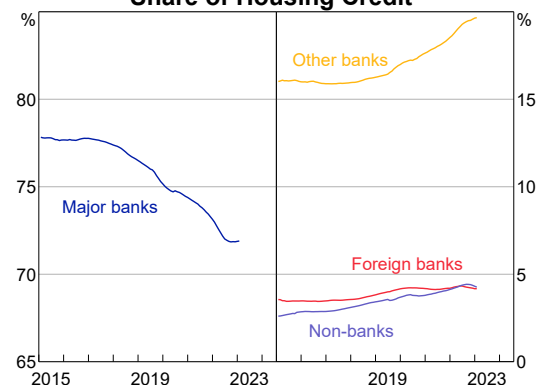
(each with a 35 per cent share), followed by deposits (19 per cent).

Fee income from households has fallen since 2018. Much of this fall reflects banks reducing or removing fees on certain products. In previous years, fees were removed partly in response to the 2018 Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry (Banking Royal Commission). Competitive behaviour may also have played a role in the decline in fees charged to households, as banks competed for market share (Graph 5). In the year to June 2022, fees charged to households continued to decline, mainly owing to heightened competition for housing loans. Some banks also

continued to simplify their fee policies, as has been the trend in recent years.

Graph 3**Bank Fees by Customer**
Share of total fees

Sources: APRA; RBA

Graph 4**Growth in Fees Charged to Households*** Adjusted for breaks in series.
Sources: APRA; RBA**Graph 5****Share of Housing Credit**** Seasonally and break adjusted.
Sources: APRA; RBA

Fees charged on housing loans decreased sharply in the year to June 2022, as strong competition in the mortgage market reduced fee earnings. In particular, a number of banks sought to compete for new customers by offering cashback deals – where a lender offers an incentive (often cash-in-hand) to new customers – for refinancing their home loan (RBA 2021).^[4] As at June 2022, at least 27 lenders were offering cashback home loan deals to customers, ranging from \$1,000 to \$10,000 provided as cash or through waived or reduced Lender’s Mortgage Insurance premiums (Ritchie 2022). These offers were widely taken up, with housing loan commitments for external refinancing reaching historical highs (Graph 6). A decline in housing loan break fees – fees charged when a customer terminates a contract early – further reduced fee income (Graph 9). This reflects the increase in fixed interest rates since early 2022; higher advertised fixed rates reduce the incentive for consumers to break their existing fixed-rate housing loan as there is unlikely to be a lower fixed rate on offer. The high volume of new lending in the year partly mitigated the fall in fee earnings from housing loans. Borrowers who take out a new housing loan generally pay an application or establishment fee for the new loan and, for some fixed-rate borrowers, a fee to lock in a fixed interest rate over the time it takes to process the loan application.

Fees charged on personal loans – which include fees associated with fixed-term loans, margin loans to households and home-equity loans where the predominant purpose is unknown – continued to fall in the year to June 2022. The fall in fee income from personal loans was in line with the trend decrease in personal credit to mid-2022 (Graph 7).

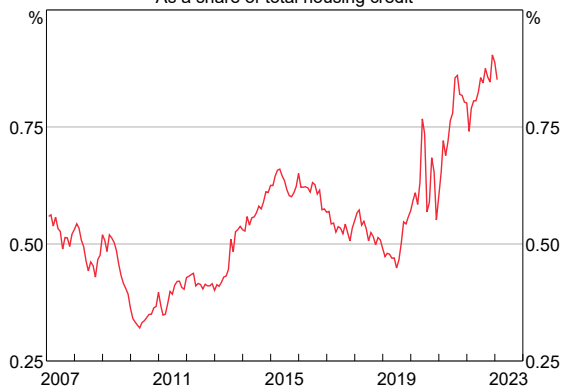
Fees charged on credit cards (which make up around one-third of fees collected from households) increased over the reporting period, after declining sharply in recent years. Banks saw an increase in fee income from credit card fees on international transactions, consistent with international borders reopening and a recovery in Australian card spending overseas (Graph 8). The increase in fee income from credit cards occurred despite a steady decrease in the number of credit card facilities, which fell by around 1 per cent over the year to June 2022. The average account servicing fee paid by households increased slightly, to around \$83 per credit card account.

Fees charged on household deposits increased in the year to June 2022. Higher fee income from term deposit accounts drove much of the increase in deposit fees, in line with the strong growth in term deposits since early 2022 (Carse, Faferko and Fitzpatrick 2023). Fees charged on transaction deposit accounts also increased slightly over the reporting period. An increase in exception fees charged – pre-determined charges that are

Graph 6

Housing Loan Commitments for External Refinancing*

As a share of total housing credit

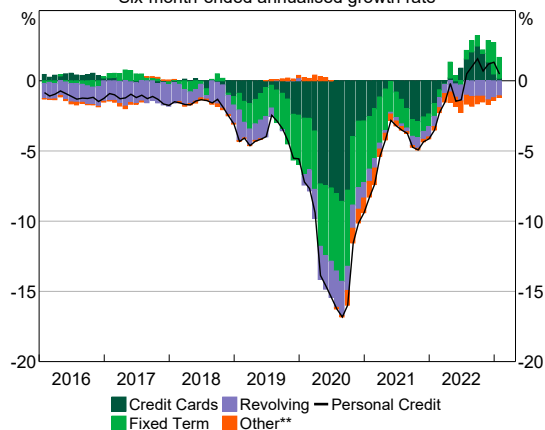


* Seasonally and break adjusted.
Sources: ABS; RBA

Graph 7

Contribution to Personal Credit Growth*

Six-month-ended annualised growth rate

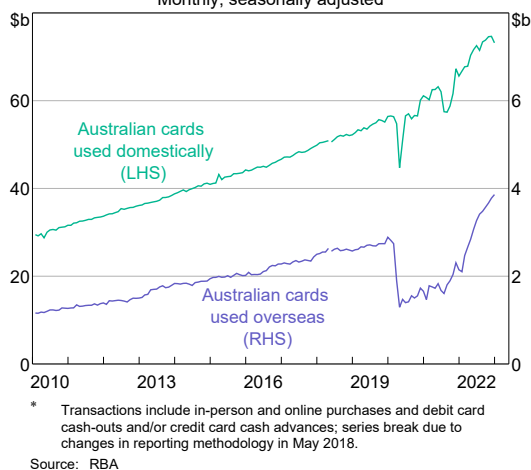


* Seasonally and break adjusted.
** Other includes leasing and unclassified securitised loans.
Sources: APRA; RBA

imposed in the event of a breach of contract – across all household deposit accounts contributed to the higher fee income (Graph 9). This was a reversal of a trend decrease in exception fees on deposit accounts over recent years and was partly driven by an increase in late payment and overdraft fees. As interest rates increase there is also greater incentive for customers to break their term deposit before it matures, which typically incurs a fee. Despite the increase in household deposit exception fees, these fees remained well below levels prior to the Banking Royal Commission, which recommended changes to the Banking Code to remove overdraft and dishonour fees on basic accounts (Australian Banking Association 2020).

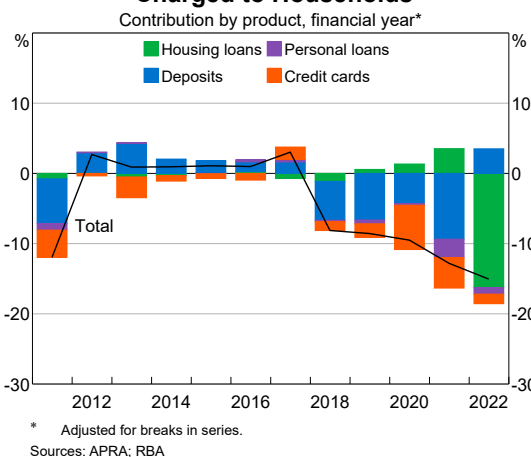
Graph 8

Australian Card Usage
Monthly, seasonally adjusted



Graph 9

Growth in Exception and Break Fees Charged to Households
Contribution by product, financial year*



Fees charged to businesses and government

Total fees charged to institutional customers increased in the year to June 2022, as strong growth in lending to medium and large businesses contributed to higher fee earnings (Graph 10; Table 3). The increase occurred despite a decline in fee income from merchant services – fees charged to businesses and governments for providing payment processing services – reflecting the incompleteness of the recovery in international tourists visiting Australia and a shift in merchant services towards the non-bank sector. Fee income from lending to institutions provides a substantial component of bank earnings as fees on business loans are typically higher than housing loans, consistent with the complex structure and larger average size of business loans.

Fees charged on loans to institutions (which account for around 45 per cent of fees from institutions) increased by 5 per cent over the reporting period, consistent with strong growth in business credit. Lending to businesses grew by more than 13 per cent in the year to June 2022, its fastest pace in more than a decade (Graph 1) (RBA 2022a). Over the year, this growth was most pronounced for lending to medium and large businesses, and to the property services and finance industries. Lending growth was also notable for complex loan products, such as syndicated loans. Syndicated lending – where funds are jointly provided by two or more lenders – grew by more

Graph 10

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

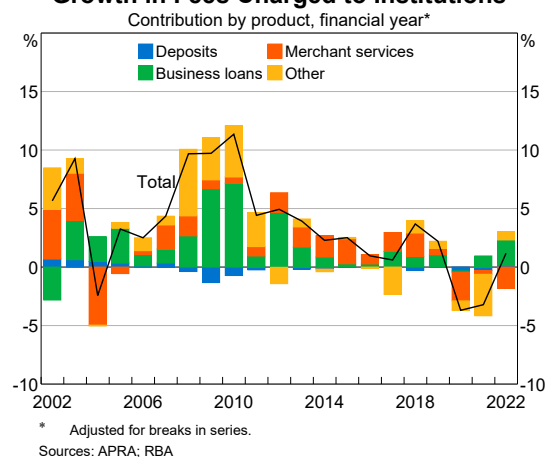


Table 3: Fees Charged to Institutions^(a)

	2020	2021 ^(b)	2022	
	(\$ million)	(\$ million)	(\$ million)	(per cent)
Loans	3,321	4,866	5,109	5
– of which: corporate credit cards	N/A	93	94	0
– of which: exception and break fees ^(c)	51	105	45	–60
Merchant service fees	2,909	2,985	2,782	–7
Deposit accounts	532	537	552	3
– of which: exception and break fees ^(c)	53	42	40	–5
Other ^(d)	1,117	2,742	2,819	3
Total	7,881	11,130	11,261	1
– of which: exception and break fees ^(c)	104	147	85	–42

(a) Financial year.

(b) There is a series break between 2020 and 2021 for all series.

(c) Excludes fees charged to governments from 2021.

(d) Includes bills of exchange.

Sources: APRA; RBA

Table 4: Fees Charged to Institutions^(a)

By institution size; share of fees charged

	2020	2021 ^(b)	2022
	(per cent)	(per cent)	(per cent)
Small businesses	51	13	12
Medium businesses	–	33	32
Large businesses	49	52	54
Government	–	2	2

(a) Financial year.

(b) There is a series break between 2020 and 2021 for all series.

Sources: APRA; RBA

than 18 per cent in the year to June 2022 for reporting institutions, compared with around 5 per cent average annual growth over the past decade.^[5] Borrowers that take out a new business loan generally pay an application or establishment fee, and these fees can be larger for complex or bespoke loans. However, growth in business lending outpaced growth in fee income, and fee income from business loans as a share of banks' business credit fell over the reporting period.

Merchant service fees fell by 7 per cent over the year to June 2022 (Graph 11). These are often a mix of fixed fees (such as for card payment terminals) and transaction fees for each card payment, and make up around one-quarter of fees charged to institutions. Fees for merchant services have fallen

in recent years, as COVID-19 lockdowns and border closures led to fewer transactions being processed. While the value of card spending increased over the year alongside the increase in economic activity, the closure of Australia's international border over the first half of the reporting period and the slow recovery in international arrivals weighed on merchant service fees. The average fee charged per dollar transacted with credit and debit cards declined because higher fees are typically levied on international transactions than on equivalent domestic transactions.

Structural changes also contributed to lower merchant service fee income over the reporting period. An ongoing shift from credit to debit cards has weighed on fees, as credit cards typically attract

a higher fee per transaction than debit cards; debit cards accounted for over 58 per cent of total card transactions in the reporting period (Gill, Holland and Wiley 2022). Additionally, ANZ's joint venture with Worldline resulted in a reduction in reported bank fee income, as a greater share of merchant service fees is now distributed to a non-bank entity (ANZ 2022) and therefore is no longer included in the EFS collection. Available data suggest that, even abstracting from this shift in market structure, merchant service fees would have decreased – but by a smaller amount.

Fees charged to institutions on deposit accounts (which account for around 5 per cent of fees from institutions) increased slightly, following a 6 per cent fall in the previous reporting period. Most fees charged on institutional deposit accounts are collected from small businesses, although the share collected from large businesses increased in the year to June 2022 (Graph 12). The increase in fees charged on business deposit accounts largely reflects an increase in account servicing fees for large businesses, and in transaction fees for all business sizes. In particular, some banks noted higher fee income from fund transfer services, including international transfer services. Additionally, following a pause in 2021 as banks opted not to implement certain charges during the pandemic, there was an increase in certain account and dishonour fees. This increase also reflected in

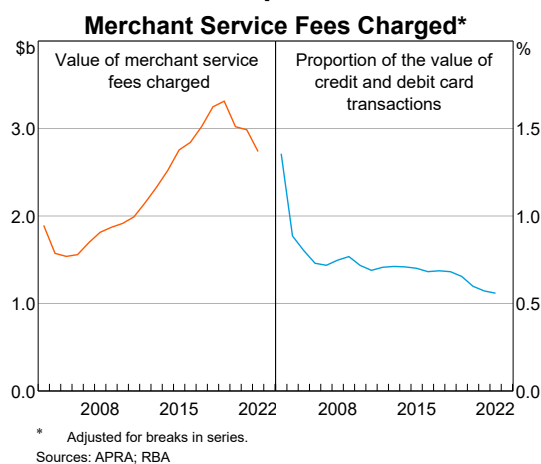
part an uptick in the instances of accounts being overdrawn.

Other fees charged to institutions increased by 3 per cent over the reporting period. The reporting of 'other fees charged' was revised as part of the EFS collection, and now includes a range of fees that were previously recorded as interest income for the purposes of the RBA Bank Fee Survey (Sparks and Fitzpatrick 2022). This series was supported by an increase in advisory and financial services fees, but was weighed down by lower fees on commercial bills, international transaction services and merger and acquisition services.

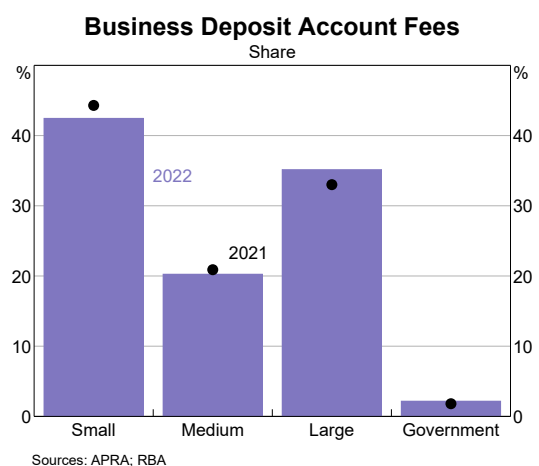
Conclusion

Total fees charged by banks through their domestic operations were roughly steady in the year to June 2022, after declining for the previous five years. Fees charged to households decreased over the year, as elevated competition in the mortgage market reduced fee earnings from housing loans. By contrast, fees charged to institutional customers increased, with very strong growth in business credit increasing fee income from business loans. Lending and deposit growth continued to outpace growth in fee earnings, and total fee income as a share of banks' incomes also decreased slightly. ✖

Graph 11



Graph 12



Endnotes

- [*] The author is from Domestic Markets Department.
- [1] For the 2021/22 financial year, see Sparks and Fitzpatrick (2022).
- [2] These data are published in the Reserve Bank's Statistical Table C9 and are subject to revisions. All bank fees series are affected by a series break between 2020 and 2021, which has resulted in a notable increase in the reported levels of fees charged to institutions. For more information, see Sparks and Fitzpatrick (2022).
- [3] Total income earned in accordance with Australian Accounting Standards and Australian Reporting Standard ARS 730.0, reported quarterly.
- [4] As part of the EFS collection, banks report fee income from housing loans net of cashback offers (Sparks and Fitzpatrick 2022).
- [5] A syndicated loan is a loan where the funds are jointly provided by two or more lenders (RBA 2005). Though there is a single loan agreement, each participant to a syndicated loan maintains a separate claim on the portion of the loan that it has provided. Through a syndicated loan, large businesses can access larger loan sizes than are typically available through a single lender.

References

- ANZ (2022), 'ANZ Commences Joint Venture with Worldline', Media Release, 1 April.
- Australian Banking Association (2020), 'Royal Commission Changes to Banking Code Go Live Tomorrow', News Release, 29 February.
- Carse V, A Faferko and R Fitzpatrick (2023), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.
- Gill T, C Holland and G Wiley (2022), 'The Cost of Card Payments for Merchants', *RBA Bulletin*, September.
- RBA (Reserve Bank of Australia) (2005), 'Syndicated Lending', *RBA Bulletin*, September.
- RBA (2021), *Statement of Monetary Policy*, November.
- RBA (2022a), 'Financial Aggregates June 2022', 29 July.
- RBA (2022b), *Statement of Monetary Policy*, August.
- Ritchie A (2022), '27 Home Loan Cashback Deals Up for Grabs in June', RateCity News Release, 8 June.
- Sparks K and R Fitzpatrick (2022), 'Bank Fees in Australia', *RBA Bulletin*, June.

Developments in Banks' Funding Costs and Lending Rates

Vincent Carse, Anthea Faferko and Rachael Fitzpatrick^[*]



Photo: MicroStockHub – Getty Images

Abstract

Banks' funding costs rose over 2022, driven by increases in the cash rate and in expectations for the future path of the cash rate. In turn, lending rates have increased considerably for the first time in over a decade. The increases in the average rate charged on all outstanding loans was limited by the large share of fixed-rate housing loans and ongoing competition in housing lending. This article updates previous research published by the Reserve Bank on developments in banks' funding costs and lending rates.

Introduction

Banks fund themselves via a range of sources, including deposits, wholesale debt and equity. The cost of banks' funding is a key determinant of the rates they offer on loans to households and businesses (RBA 2023a).^[1] The Reserve Bank's monetary policy affects banks' funding costs – and, in turn, lending rates – primarily through its influence on a range of interest rates in the economy. Indeed, this is an important channel through which monetary policy is transmitted (RBA 2023c; Brassil, Cheshire and Muscatello 2018). This article updates previous analysis,^[2] focusing on

developments in the major banks' funding costs and lending rates over 2022.

Funding costs and lending rates increased substantially over 2022

During 2022, the Reserve Bank withdrew some of the extraordinary monetary policy support put in place during the COVID-19 pandemic (RBA 2023b). The Bank raised the cash rate target by 300 basis points, to 3.1 per cent by the end of the year – one of the largest and most rapid increases in the cash rate on record. The cash rate is a key determinant of banks' funding costs through its influence on the broader interest rate structure in the Australian

financial system. Much of banks' wholesale debt and deposit funding is linked to bank bill swap (BBSW) rates either directly or via banks' hedging practices.^[3] These rates are heavily influenced by the cash rate (and expectations about the path of the cash rate) and so rose substantially over 2022 (Graph 1).

Tighter monetary policy drove up costs across banks' funding base over 2022, though the overall increase in major banks' non-equity funding costs was smaller than the increase in the cash rate by the end of the year (Graph 2) (discussed further below). Lending rates also increased considerably for the first time in over a decade, as banks passed on higher funding costs to borrowers. The increase in outstanding lending rates was limited over 2022 by the large share of fixed-rate housing credit that was taken out around historically low interest rates during the pandemic, and ongoing price competition to attract and retain housing borrowers.

Composition of bank funding

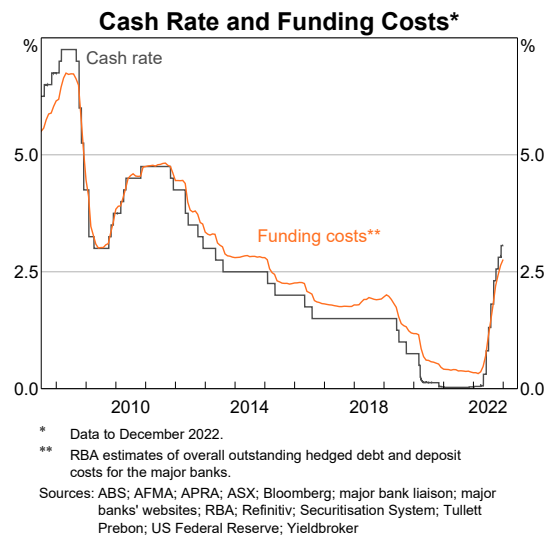
Banks obtain funding from retail deposits, wholesale deposits, wholesale debt (including securitisation) and equity. In recent years, banks also sourced low-cost funding from the Reserve Bank's Term Funding Facility (TFF), which was introduced at the outset of the pandemic as part of a monetary policy package to support the Australian economy at that time (Black, Jackman and Schwartz 2021). The

composition of the major banks' funding in terms of these broad categories was little changed over 2022 (Graph 3).^[4]

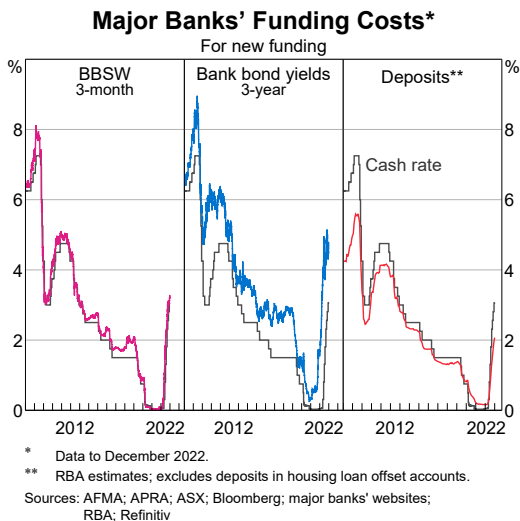
Deposits are the largest source of bank funding

In aggregate, deposits account for around two-thirds of major banks' non-equity funding. This share has been relatively stable over the past two years, following a large increase in both the stock and share of deposit funding after the onset of the pandemic in 2020. The increase in deposits during the pandemic reflected a number of factors, including the effect of increased lending by the banking sector, government bond purchases by the Reserve Bank and the decline in the stock of banks'

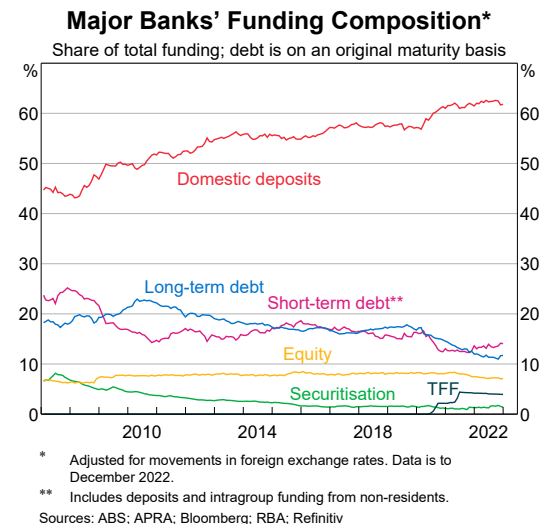
Graph 2



Graph 1



Graph 3



outstanding wholesale debt (RBA 2020). More lending creates deposits as the funds made available to a borrower find their way into a deposit somewhere in the banking system, either as a deposit in the borrower's account or in another account when the borrower uses those funds to make a purchase (Kent 2018). Net redemptions of bank debt and purchases of government bonds by the Reserve Bank may increase deposit growth when asset holdings of non-bank investors are replaced with deposits, but these factors were not material drivers of deposit growth over 2022.

The stock of major banks' deposits increased further over 2022, with the stock of term deposits held by households and businesses rising notably (Graph 4). At-call balances ended the year little changed, with an early increase later unwound as some depositors switched from at-call deposits to term deposits as the spread between interest rates on these products widened (discussed further below). Nonetheless, term deposits remain a slightly smaller share of major banks' deposit base compared with the period shortly before the pandemic. The composition of aggregate deposits by depositor type was little changed.

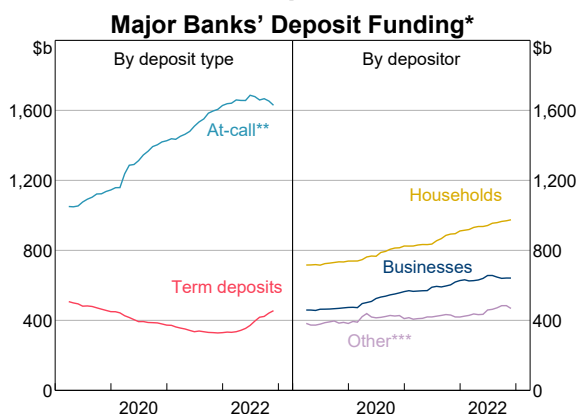
Major banks' wholesale debt issuance picked up

Major banks' issuance of wholesale debt increased considerably over 2022, but the total share of funding sourced from wholesale debt markets was little changed. In the case of long-term debt, the

value of issuance was the highest since 2017 (Graph 5), with increased activity both onshore and offshore. In an environment of higher yields and increased volatility over 2022, banks shifted more of their issuance to shorter tenors compared with 2021 (e.g. three year and five year, instead of seven year) and issued more secured debt such as covered bonds, which have a lower risk profile. After accounting for maturing debt, the stock of outstanding long-term debt grew at a similar pace to other funding sources. This compares with subdued bank bond issuance and an overall decline in wholesale debt funding during the pandemic, when the major banks were able to access alternative term funding via the TFF at very low rates (Johnson 2022).

Stronger issuance over 2022 partly reflected the fact that the TFF closed to new drawdowns in June 2021. Banks also started preparing for TFF repayments coming due over 2023 and 2024 (Graph 6). In addition, the Committed Liquidity Facility allowances were reduced to zero over 2022 and some debt issuance was to fund the purchase of government securities to continue satisfying High Quality Liquid Asset (HQLA) requirements (APRA 2023). The Reserve Bank's assessment is that the funding task related to the refinancing of the TFF is sizeable but manageable; public statements made by some banks have supported this assessment (Black, Jackman and Schwartz 2021; NAB 2021; ANZ 2022). Banks' decisions about how to repay TFF drawings will

Graph 4



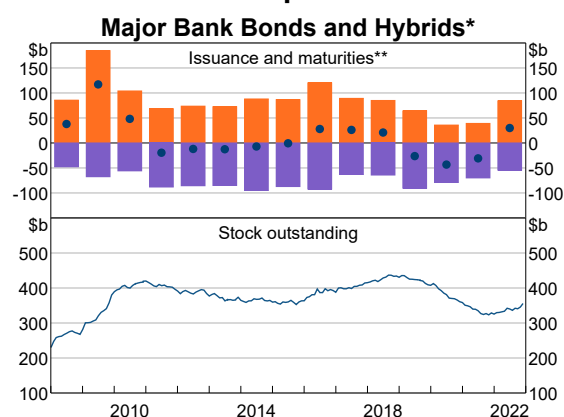
* Data to December 2022.

** Includes deposits in housing loan offset accounts and non-interest bearing deposits.

*** Includes deposits from the government and financial institutions, including superannuation funds.

Sources: APRA; RBA

Graph 5



* Data to December 2022.

** Dots represent net annual issuance.

Sources: Bloomberg; Private Placement Monitor; RBA

depend on a number of factors, such as their asset growth and the price and availability of the full range of funding sources, including deposits.

The major banks' equity share of total funding was little changed

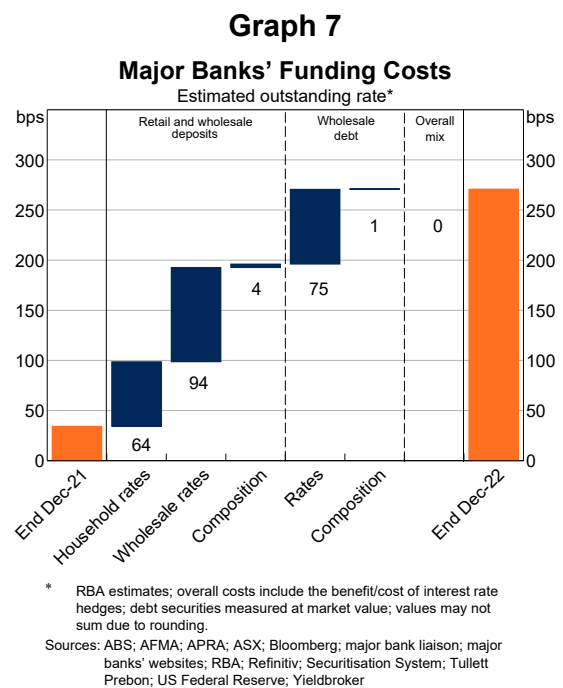
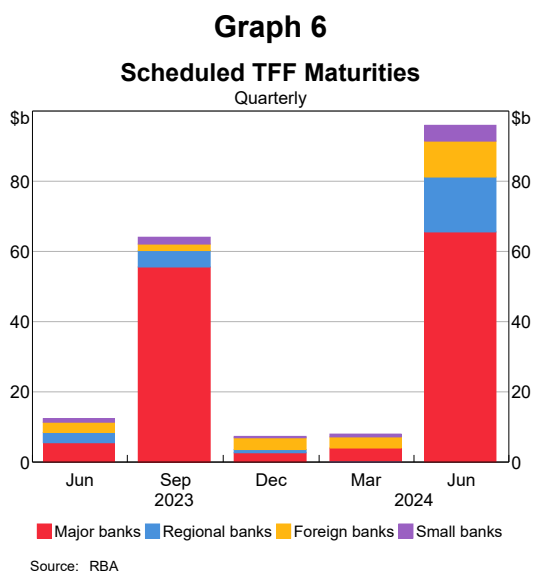
The amount of banks' equity funding (or 'equity capital') rose over 2022 in line with an expansion in banks' balance sheets, leaving the equity share of funding little changed. The major banks maintained capital buffers well above their regulatory requirements over the year, despite several of the banks returning some capital to shareholders through share buybacks and dividends. Overall, banks were well positioned to meet APRA's 'unquestionably strong' capital framework that came into effect in January 2023 (RBA 2022).

Major banks' cost of funding

As noted above, the major banks' funding costs rose sharply over 2022, driven by a tightening in monetary policy (Graph 1; Graph 2). The overall rise in their outstanding non-equity funding costs was smaller than the increase in the cash rate (Graph 7). The factors contributing to this gap included limited pass-through of increases in interest rates in other markets to some of the rates paid on the banks' deposit base (particularly household and at-call products) and lags in the effect of higher BBSW rates on wholesale funding costs. Most of the impact of a change in BBSW rates flows through to

wholesale funding costs in three to six months, with the time frame varying according to the maturity profiles of banks' short-term debt, wholesale deposits and interest rate hedging instruments.

The estimated level of major bank funding costs also includes adjustments to account for how banks may hedge their interest rate risk. The estimates presented here assume that to the extent fixed-rate funding liabilities are not naturally hedged by offsetting fixed-rate assets, interest rate swaps are used to transform fixed-rate payments into floating-rate payments (Berkelmans and Duong 2014). It is possible that major banks have hedged differently to the simple adjustment made in these estimates. This may have caused funding costs to increase by more than presented here due to the rise in floating rates over 2022. For example, banks may have chosen to swap fixed-rate funding drawn from the TFF (rather than relying on a fixed-rate asset, such as lending, as a natural hedge). In this instance, the effective cost of TFF funding will have increased alongside the increase in floating rates, rather than remaining at the low rate on TFF drawings.^[5] Similarly, major banks' effective earnings from their fixed-rate loan book may have increased with the rise in floating interest rates if fixed-rate lending was hedged using interest rate swaps.



In aggregate, deposit rates rose but by less than the cash rate

The divergence between overall deposit costs and the cash rate was underpinned by limited pass-through to transaction and at-call savings accounts (Graph 8). At-call deposits accounted for around 80 per cent of major banks' deposit base on average in 2022. Average rates on new term deposits increased by more than the cash rate, in line with the larger movements in BBSW and longer term swap rates, which are the key benchmarks used to price these products. Compared with earlier periods of monetary policy tightening, total deposits comprised a larger share of major banks' funding in 2022, amplifying the effect of changes in deposit rates on major banks' total funding costs.

By depositor type, banks have increased rates on wholesale deposits by more than on household deposits (Graph 9). This different treatment is likely, in part, to reflect wholesale depositors having a wider range of market-based alternatives in which to place cash. For households, increases in at-call deposit rates have been larger for savings products that require depositors to adhere to certain conditions to earn interest (e.g. the balance must increase in the month) than for online savings products without conditions. Some of the largest increases in advertised deposit rates have been offered by non-major banks.

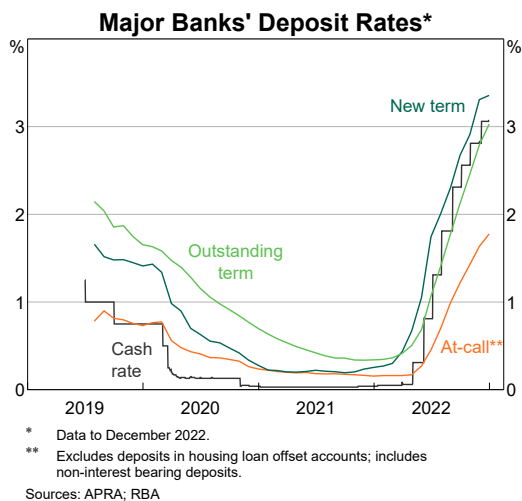
The cost of new wholesale funding rose alongside benchmark rates

The cost of issuing short-term and long-term wholesale debt rose over 2022, following the increase in benchmark market rates. Domestic yields on major banks' three-year bonds ended the year around 5 per cent – the highest level since 2012 (Graph 10). Bank bond yields also increased by more than the increase in comparable swap rates (which are reference rates for the pricing of fixed-income securities). This difference reflected stronger demand for bank funding and a broader increase in risk premia. The spread to the swap rate ended the year a little above its three-year average over the period preceding the pandemic. A wider spread suggests it became more costly for banks to swap fixed-rate liabilities into floating-rate liabilities. The cost of swapping foreign currency debt back into Australian dollars also rose from the historical lows seen during the pandemic. If yields and spreads remain around these levels, then as maturing debt is rolled over, the cost of banks' outstanding debt will also increase a little further, putting upwards pressure on funding costs.

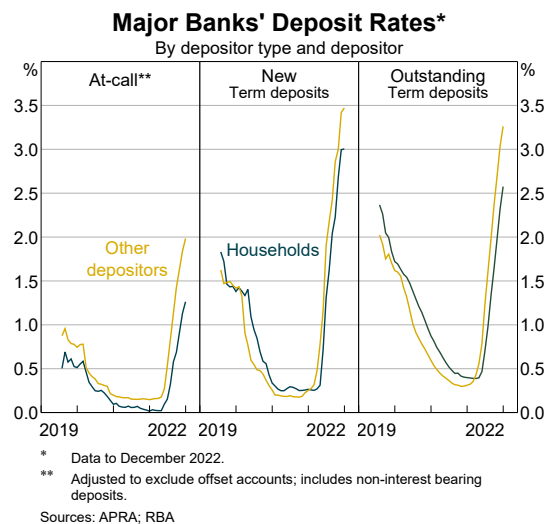
Lending rates

Major banks responded to higher funding costs and increases to the cash rate by increasing lending rates. From April to December, compared with a rise in the cash rate target of 300 basis points, the average outstanding housing lending rate

Graph 8



Graph 9

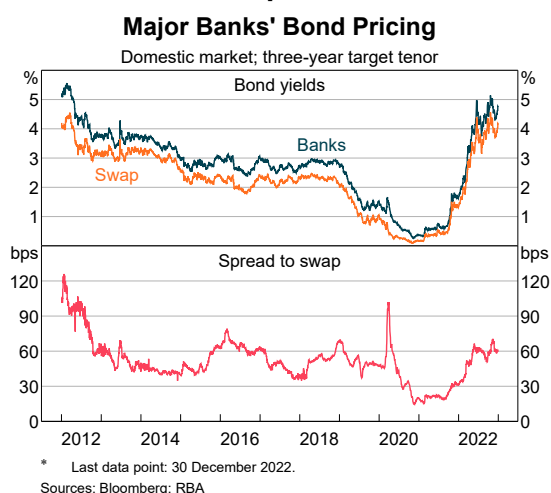


increased by around 190 basis points and the average outstanding business rate increased by just over 260 basis points. The average new lending rates for housing and business purposes rose by a little more than the average rates charged to existing borrowers, but by less than the cash rate. The average rate charged on outstanding personal debt also increased slightly.

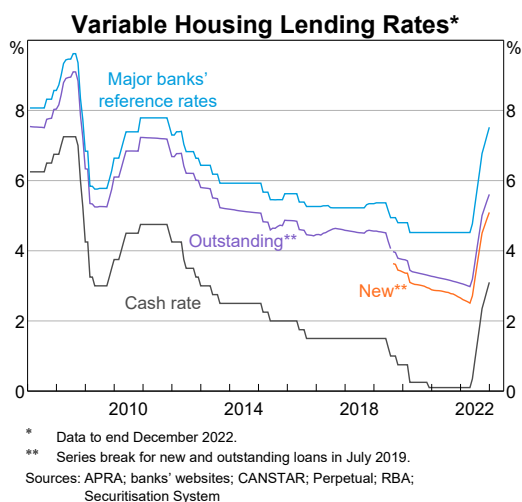
Housing lending rates

The increase in the average rate charged to existing housing borrowers was mainly driven by increases in variable rates. Over 2022, the average outstanding variable rate returned to levels not seen since 2013, the last time the cash rate was above 3 per cent (Graph 11).

Graph 10



Graph 11



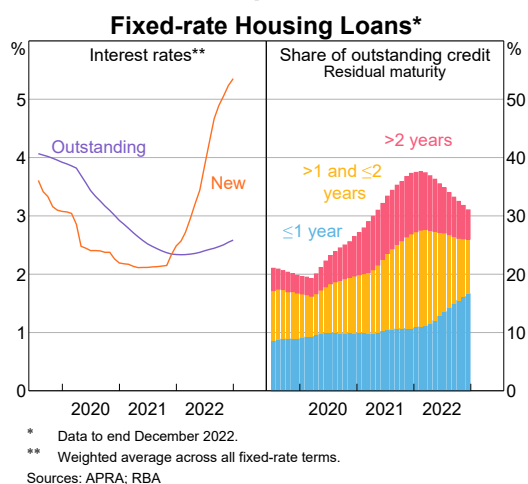
Although lenders passed on cash rate increases in full to variable reference rates, very few borrowers pay rates as high as these. Instead, borrowers are offered, or negotiate, a discount relative to these reference rates (RBA 2019). During 2022, banks competed strongly for new and externally refinancing borrowers, particularly those of higher credit quality, in addition to adjusting discounts to retain existing borrowers. Liaison suggests that around 30 per cent of variable-rate borrowers have renegotiated a lower rate on their housing loan with their existing lender since May. Many borrowers have also refinanced with a new lender, with major banks extending cashback offers to customers of around two to four thousand dollars.

The large share of fixed-rate lending taken out during the pandemic also weighed on pass-through to the average rate charged to all housing borrowers (Graph 12). While around one-quarter of fixed-rate loans outstanding in early 2022 rolled to a new (and in most cases higher) interest rate over the year, the remainder were unaffected by the rise in lending rates. As these borrowers' fixed-rate periods expire in the period ahead, the total average outstanding housing rate is likely to increase further (Lovicu *et al* 2023).

Business lending rates

Interest rates on variable-rate loans to businesses of all sizes have increased alongside the cash rate and three-month BBSW (which is the benchmark for most loans to medium- and large-sized businesses)

Graph 12



(Graph 13).^[6] Loans to medium and large businesses account for just under 90 per cent of total business credit and the majority are on a variable rate.^[7] Reflecting the dominance of variable-rate lending, the average outstanding rate on business loans has moved considerably more than the average outstanding housing rate.

Implied lending spread

A bank's implied lending spread is the difference between the average lending rate it charges to borrowers and its overall funding cost. We estimate that the implied lending spread for the major banks narrowed further over 2022 (Graph 14).

Underpinning this, the aggregate lending rate increased by around 30 basis points less than funding costs. Key factors weighing on the aggregate lending rate included the high share of fixed-rate housing loans that did not reprice, and the effect of ongoing competition in housing lending on interest rates for new and outstanding variable-rate loans.

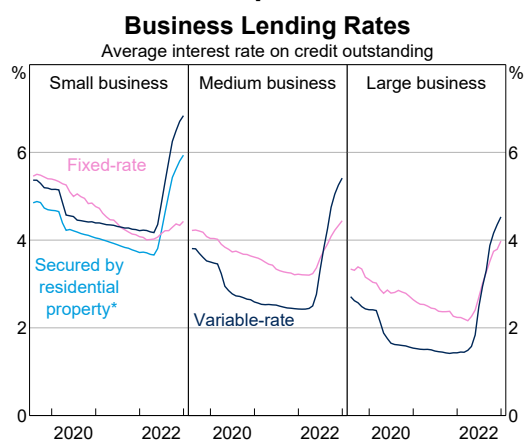
The lending spread shown above differs from reported measures of bank profitability like net interest margin (NIM). Reported NIMs for the major

banks generally started to increase during 2022. Among the differences between these measures, the lending spread excludes the effects of non-loan interest-earning assets, such as cash and other HQLA, which are captured in banks' NIMs. Yields on some of these assets have risen – for instance, the rate paid on Exchange Settlement balances held at the Reserve Bank increased from zero to 3 per cent over 2022. The lending spread estimate also likely only partially accounts for hedging practices, whereas reported NIMs will fully reflect hedging cash flows.

Conclusion

The effects of tighter monetary policy over 2022 have driven a substantial increase in banks' funding costs. In turn, banks have started charging higher interest rates on loans to households and businesses over this period. As such, the cost of borrowing for many households and businesses has increased considerably for the first time in over a decade, leading to a significant tightening in financial conditions for these borrowers. ✖

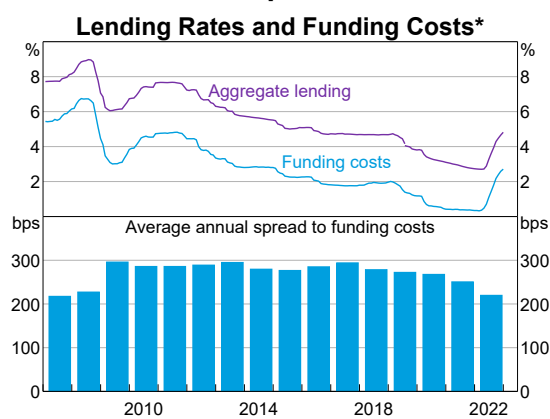
Graph 13



* Small business loans secured by residential property can have fixed or variable interest rate terms and are included in the fixed-rate and variable-rate lines.

Sources: APRA; RBA

Graph 14



* Major banks; data from the EFS collection from July 2019.

Sources: ABS; AFMA; APRA; ASX; Bloomberg; CANSTAR; major bank liaison; major banks' websites; RBA; Refinitiv; Securitisation System; Tullett Prebon; US Federal Reserve; Yieldbroker

Endnotes

[*] The authors are from Domestic Markets Department. The authors are grateful for the assistance provided by others in the department, in particular David Wakeling.

[1] Banks also take into account the risks inherent in lending, such as the credit risk associated with loans and the

liquidity risk involved in funding long-term assets with short-term liabilities. Banks' growth strategies, competition in the financial sector and their desired return to equity holders also affect their lending rates.

[2] See Fitzpatrick, Shaw and Suthakar (2022).

- [3] For a more detailed discussion on how BBSW rates influence banks' funding costs, see Black and Titkov (2019). For an update on the banking sector's hedging of foreign currency liabilities, see Atkin and Harris (2023).
- [4] All measures in this article (unless otherwise noted) use banks' 'domestic books' as the basis of measurement, rather than their global balance sheet (APRA 2017).
- [5] One implication of banks opting to swap fixed-rate TFF drawings into floating rate exposures is that, as banks begin to replace TFF funding, the overall increase in funding costs might be smaller than would be estimated by the Reserve Bank's methodology as hedging will have already brought forward much of the cost increase.
- [6] Variable-rate loans to business include loans on variable and floating interest rates.
- [7] Generally, businesses with a turnover greater than or equal to \$50 million are classified as large businesses in banks' reporting. For businesses with turnover of less than \$50 million, the business is generally classified as medium when the reporting institution has an exposure of more than \$1 million.

References

- ANZ (Australia and New Zealand Banking Group Ltd) (2022), '2022 Full Year Results', Investor Discussion Pack, 27 October.
- APRA (Australian Prudential Regulation Authority) (2017), 'Reporting Standard ARS 701.0', ABS/RBA Definitions for the EFS Collection, August.
- APRA (2023), 'Aggregate Committed Liquidity Facility – January 2023', Letters, Notes and Advice, 9 January.
- Atkin T and J Harris (2023), 'Foreign Currency Exposure and Hedging in Australia', *RBA Bulletin*, March.
- Berkelmans L and A Duong (2014), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March, pp 69–76.
- Black S and D Titkov (2019), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.
- Black S, B Jackman and C Schwartz (2021), 'An Assessment of the Term Funding Facility', *RBA Bulletin*, September.
- Brassil A, J Cheshire and J Muscatello (2018), 'The Transmission of Monetary Policy through Banks' Balance Sheets', in *Central Bank Frameworks: Evolution or Revolution?*, Proceedings of a Conference, Reserve Bank of Australia, Sydney, pp 73–122.
- Fitzpatrick R, C Shaw and A Suthakar (2022), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.
- Johnson C (2022), 'Trends in Australian Banks' Bond Issuance', *RBA Bulletin*, September.
- Kent C (2018), 'Money – Born of Credit?', Remarks at the Reserve Bank's Topical Talks Event for Educators, Sydney, 19 September.
- Lovicu G-P, J Lim, A Faferko, A Gao, A Suthakar and D Twohig (2023), 'Fixed-rate Housing Loans: Monetary Policy Transmission and Financial Stability Risks', *RBA Bulletin*, March.
- NAB (National Australia Bank Ltd) (2021), 'Full Year Results 2021', Investor Presentation, 9 November.
- RBA (Reserve Bank of Australia) (2019), 'Box D: The Distribution of Variable Housing Interest Rates', *Statement of Monetary Policy*, November.
- RBA (2020), 'Box D: Recent Growth in the Money Supply and Deposits', *Statement on Monetary Policy*, August.
- RBA (2022), 'The Australian Financial System', *Financial Stability Review*, October.
- RBA (2023a), 'Banks' Funding Costs and Lending Rates', Explainer.
- RBA (2023b), 'Supporting the Economy and Financial System in Response to COVID-19', 9 January.
- RBA (2023c), 'The Transmission of Monetary Policy', Explainer.

Developments in Foreign Exchange and Over-the-counter Derivatives Markets

Cameron Armour and Jack Beardsley^[*]



Photo: da-kuk – Getty Images

Abstract

This article discusses the key results from the 2022 Triennial Central Bank Survey of Foreign Exchange and Over-the-counter Derivatives Markets. Global activity in foreign exchange (FX) markets increased over the three years to April 2022, driven by increased turnover of FX swaps with short maturities and trading between dealers. The volume of FX trading activity in the Australian market also grew, although this was largely driven by increased trading between related parties. The Australian dollar was the sixth most traded currency globally, down from fifth in 2019. Turnover of over-the-counter (OTC) interest rate derivatives declined globally, reflecting the transition away from the London interbank offered rate (Libor); however, activity increased in the Australian OTC interest rate derivative market, reflecting an increase in turnover of interest rate swaps. For Australian banks, the value of OTC derivatives increased sharply, driven by interest rate and commodity derivatives.

Introduction

Every three years, the Bank for International Settlements (BIS) collects information about the size and structure of global foreign exchange (FX) and over-the-counter (OTC) derivatives markets from 52 jurisdictions. This article discusses the key results from the 2022 Triennial Central Bank Survey of FX and OTC Markets, with a focus on Australia.^[1] It

analyses trends in FX turnover – including by jurisdiction, counterparty, instrument, execution method, settlement method and currency – as well as activity in single-currency interest rate derivatives and developments in OTC derivatives markets.

FX turnover

The survey was undertaken in April 2022, which was a period of elevated volatility in FX markets due to a backdrop of shifting expectations for inflation and central banks’ policy rates, as well as the Russian invasion of Ukraine. Global FX turnover increased to US\$7.5 trillion per day on average in April 2022, up 14 per cent from the previous survey in April 2019 (Graph 1).^[2]

Two key factors drove the increase in global turnover:

1. *Higher turnover of FX swaps with short-dated maturities that are rolled over more frequently.* Increased activity in these shorter dated FX swaps may have reflected market participants’ aversion to taking on risks over longer tenors amid increased uncertainty and volatility.
2. *Increased trading between dealers, which tends to rise with volatility* (Drehmann and Sushko 2022). The share of turnover related to customers, such as large corporations and other financial institutions – which is more likely to be associated with trade and investment – declined.

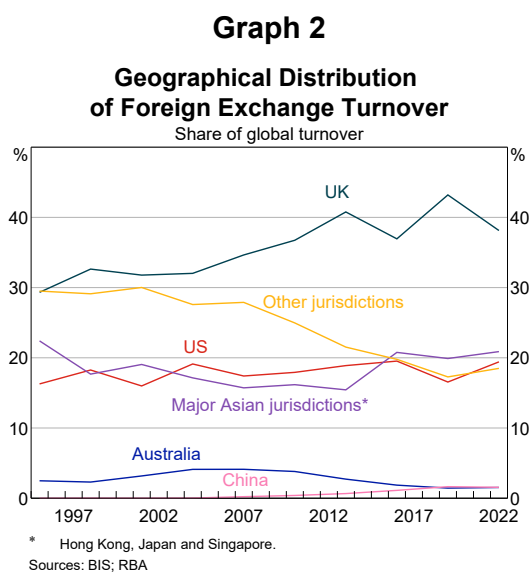
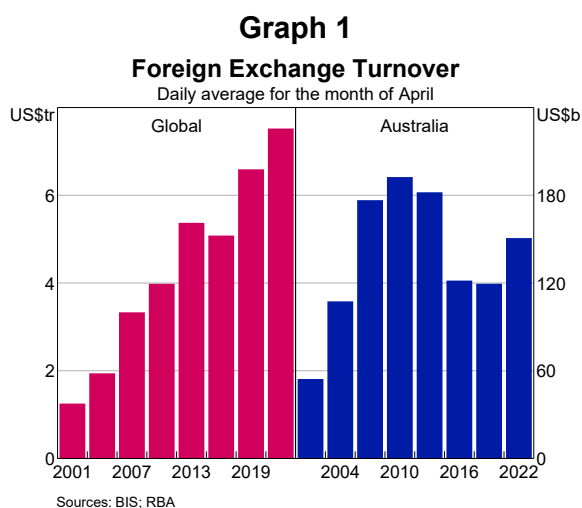
Turnover in the Australian FX market increased by 26 per cent over the three years to April 2022, reaching a daily average of US\$150 billion. Similar to global turnover, much of the growth was driven by short-dated FX swaps. However, unlike the global results, turnover in Australia was primarily driven by related party trades. Related party trades occur within the same institution or among affiliated

firms, and tend to be driven by reporting requirements or the centralisation of risk management practices within a company. As a result, these trades do not necessarily reflect the same underlying behaviour as when participants ‘go to the market’, and the increase in related party activity may not have contributed much to price discovery or market functioning.

Turnover by jurisdiction

The vast bulk of turnover in the global FX market is concentrated within a small number of financial centres. The largest of these is the United Kingdom, which accounts for almost 40 per cent of global turnover, followed by the United States, which reported strong growth in turnover over this period, and then financial centres in Asia, including Singapore, Hong Kong and Japan (Graph 2; Appendix A, Table A1).

China is now the 10th largest FX market globally, having increased its share of total turnover over the past two decades alongside the increasing internationalisation of the Chinese renminbi as well as further efforts over the past three years to open up domestic financial markets to foreign participants. Australia was the 11th largest FX market globally in 2022, down from 10th in 2019, having been surpassed by Canada.



Turnover by counterparty

The BIS survey records three broad categories of market participants that transact in the FX market:

- *reporting dealers* – large commercial and investment banks that facilitate activity in the FX market by trading for their own account or to meet demand from customers
- *other financial institutions* – such as banks, superannuation and investment funds
- *non-financial institutions* – such as large corporations.

Reporting dealers can trade among themselves – in what is referred to as the *interdealer market* – as well as with other financial and non-financial institutions.

The growth in global turnover between 2010 and 2022 was driven almost entirely by trading between dealers, reversing the long-term trend of a declining share of activity in the interdealer market (Graph 3; Appendix A, Table A2). This may partly reflect the period of elevated volatility in which the survey was conducted. During such periods, it can be more difficult for dealers to internally manage imbalances arising from customer trades, and so they may be more willing to trade in the interdealer market to manage these risks.

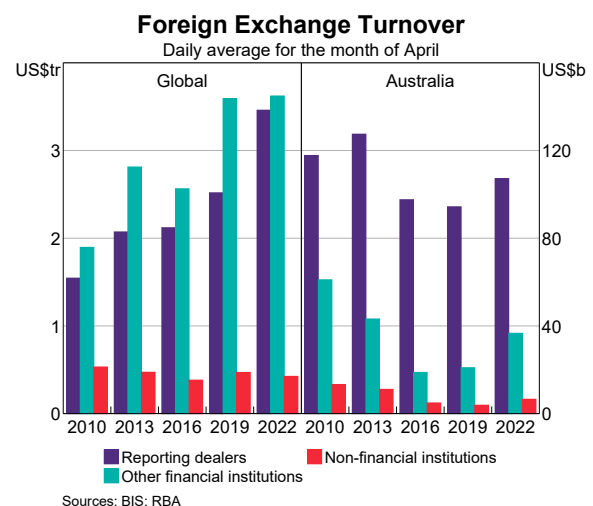
While the interdealer market segment accounted for around 45 per cent of turnover in the global FX market in April 2022, this was a decline from around 60 per cent in the late 1990s. The longer term decline was linked to the rise of some risk management practices, including trade internalisation – a process where reporting dealers offset trade orders internally from one customer against trades from another customer without going to the interdealer market. This allows them to manage risk internally rather than trading with other dealers, which can also lower costs.

Meanwhile, turnover with non-financial institutions decreased in the three years to 2022, and trading with other financial institutions was little changed from the previous survey. This reflected a decline in trading with hedge funds and proprietary trading firms (PTFs) that was offset by increased turnover with institutional investors and official sector financial institutions.^[3]

The structure of the FX market in Australia differs noticeably from the global picture. Trading between reporting dealers represents a larger share of the Australian FX market than globally, while the share of other financial institutions is much smaller. One reason for the much lower share of other financial institutions is the greater concentration of the banking sector, which means there is less activity between dealers and ‘non-reporting’ banks. It also reflects the fact that there are fewer hedge funds and proprietary trading firms that are active in Australia compared with some other markets.

Similar to the global results, trading between dealers in Australia increased over the three years to 2022. However, there was a significant increase in related party trades, which accounted for more than 40 per cent of total turnover in the Australian market (Graph 4). Globally, related party trades account for around one-fifth of total turnover. Although some related party transactions reflect genuine funding requirements – such as the use of swaps to fund an offshore branch – others are driven by reporting requirements, or to centralise and consolidate risk management within a parent entity. The increase in the share of related party turnover in Australia was greater than the global increase, and the share of turnover that was ‘non-market facing’ was also higher in Australia.^[4] Given these trades reflect different underlying behaviour by participants compared with ‘going to the market’ for customer-related trades, it is not clear that increased turnover with related parties in the

Graph 3



Australian market has contributed to price discovery or added much to market functioning.

Turnover with ‘other’ financial institutions also increased over the three years to April 2022. Other financial institutions include superannuation funds, which have seen offshore funds under management more than triple over the last 10 years. While activities related to the hedging of these offshore assets are likely to have increased Australian turnover, some large fund managers also conduct activities from offshore jurisdictions that would be captured in global turnover.

Turnover by instrument

Globally, turnover increased across all types of FX instruments over the three years to April 2022, primarily driven by FX swaps (Graph 5). Turnover in FX swaps and outright forwards grew at a faster pace than spot transactions, continuing a longer run trend towards the use of derivatives. Indeed, FX derivatives now account for more than 70 per cent of global turnover, while spot transactions account for slightly less than 30 per cent.

Turnover in FX swaps increased by around 20 per cent over this period, with the increase entirely driven by trading of shorter dated swaps. Reflecting this, FX swaps with a tenor of less than seven days now make up around 70 per cent of all swap turnover, of which close to half have an overnight maturity. Increased use of shorter dated derivatives is likely to have mechanically increased

total turnover, assuming contracts are rolled over more frequently.

In the Australian market, turnover of short-dated FX swaps was also the main driver of growth in total turnover, while turnover in swaps with a maturity of more than seven days was little changed. This is despite the fact that Australian funds have increased the share of foreign assets in their portfolios, and the value of hedged foreign assets has increased markedly. While longer dated FX swaps can be used to hedge exchange rate risk on these type of assets, some Australian funds undertake these swaps in markets outside of Australia.

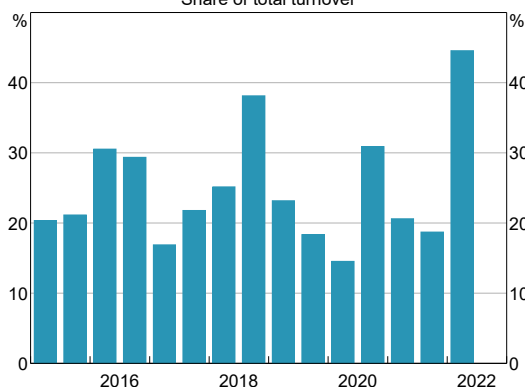
Cross-currency swaps differ from FX swaps as they involve swapping interest payment streams (that are often variable) in addition to the exchange of principal. Turnover of these instruments in the Australian market decreased in the three years to April 2022. Large Australian banks typically raise about three-quarters of their bond funding offshore and often use cross-currency swaps to hedge the FX risk associated with this borrowing (Johnson 2022).

Turnover by execution method and settlement

Market participants can execute FX trades directly with dealers or they can be intermediated by a third party. The 2022 survey showed a move towards direct forms of trading, both in Australia and globally, and away from anonymous venues, which

Graph 4

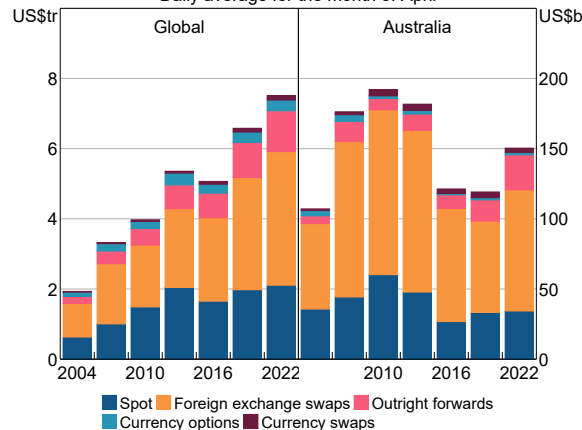
Related Party FX Turnover in Australia*
Share of total turnover



* Sourced from data collected by the RBA as part of its semi-annual FX turnover survey.
Source: RBA

Graph 5

Foreign Exchange Turnover
Daily average for the month of April



Sources: BIS; RBA

include primary venues such as Refinitiv and EBS (Graph 6). On these types of anonymous platforms, counterparties do not know who they are executing a trade with and they are more akin to an exchange; this differs from direct methods of execution, where information remains private. The shift away from indirect methods of execution that use multilateral platforms to make prices available to all participants implies that transparency of the global FX market may have decreased. In Australia, the increase in direct execution may also partly reflect growth in related party turnover.

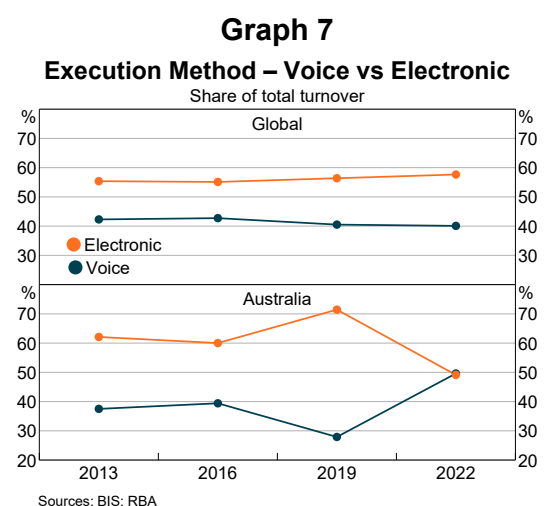
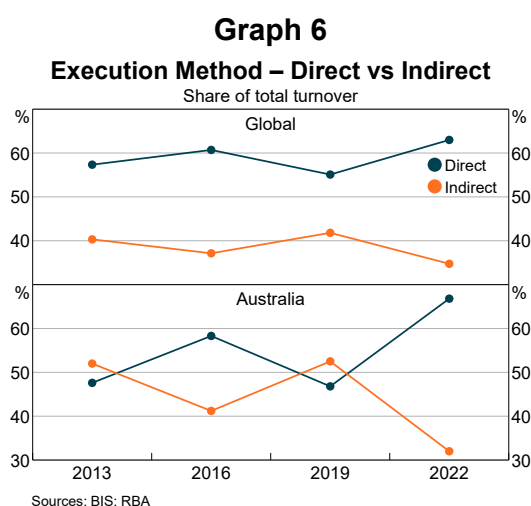
Trades can also be executed electronically or by voice. Globally, the share of turnover executed electronically has trended upwards over recent decades as technological innovations have facilitated a broader range of trading strategies and the composition of market participants has become more diverse. The 2022 survey showed that 58 per cent of trades were executed electronically, which was a slightly higher share than in 2019 (Graph 7).

By contrast, the share of electronic turnover in Australia decreased over this period and in April 2022 was lower than it was around a decade ago. This decrease can be linked to the elevated turnover of FX swaps in the Australian market. Trading of FX swaps relies more heavily on voice intermediation than some other instrument types, in part because they can involve particularly large notional amounts and are contracted with bespoke settlement dates. Around 85 per cent of the number of trades in Australia are executed

electronically. However, the value of turnover is split evenly between electronic and voice execution. This means that the value of any given voice trade is likely to be higher than an electronic trade.

The 2022 Triennial Survey introduced a greater breakdown of FX settlement data. Market participants can mitigate settlement risk (the risk that a party pays its obligation but does not receive its payment in return) by offsetting their payment obligations bilaterally, or by settling via payment-versus-payment (PvP) arrangements or via the same clearer. In short, in a PvP mechanism the final payment of one currency only occurs if the final payment of the other currency takes place. Settlement via the same clearer is termed 'on-us', and involves both payment legs settling across the books of a single institution.

The global results showed that pre-settlement netting reduced settlement risk for around one-fifth of deliverable turnover. In addition, half of the global deliverable turnover settled via PvP arrangements or via the same clearer, leaving around 30 per cent of all turnover at risk on any given day. The sizeable share of global turnover settled without risk mitigation can be explained by the fact that PvP settlement is not an option for some currencies and/or counterparties, and is limited to certain time zones. Additionally, some market participants may choose not to adopt PvP if they believe the cost of doing so outweighs the benefits (Glowka and Nilsson 2022).



In the Australian market, the level of turnover subject to settlement risk was low compared with the global results. Settlement risk was mitigated on around 85 per cent of deliverable turnover in Australia through pre-settlement netting or via other risk mitigation mechanisms. The main driver of this relatively high level of mitigation was a high level of turnover settled via the same clearer.

Turnover by currency

Global FX turnover continues to be heavily concentrated in just a few major currencies (Appendix A, Table A3). The US dollar remained the most traded currency in the world, being on one side of almost 90 per cent of all FX transactions globally and in Australia. The US dollar's dominant role in global FX markets is due to a number of factors, including: its use in international trade and global payments; its role as a reserve currency; and its use as a vehicle currency for FX transactions, whereby non-US dollar currency pairs are often exchanged via the US dollar (Maronoti 2022). The euro and Japanese yen recorded similar shares of turnover compared with the previous survey.

Turnover of the Chinese renminbi increased at a faster pace than the currencies of major advanced economies, to be the fifth most traded currency in 2022. Turnover increased by 85 per cent to more than US\$500 billion per day between 2019 and 2022. The main driver of the increase was greater trading of the currency outside of mainland China, including in some of the major financial centres; the share of global renminbi turnover that occurred within China actually declined (Graph 8) (Caballero *et al* 2022).

The Australian dollar was the sixth most traded currency globally, down from fifth in the previous survey, and the AUD/USD was the sixth most traded currency pair. Most of the turnover in the Australian dollar occurs in the major financial centres, with around 90 per cent of its turnover occurring outside of Australia.

Given the strong trade links between Australia and China, some market participants have viewed buying the Australian dollar as a way to gain exposure to developments in China. Indeed,

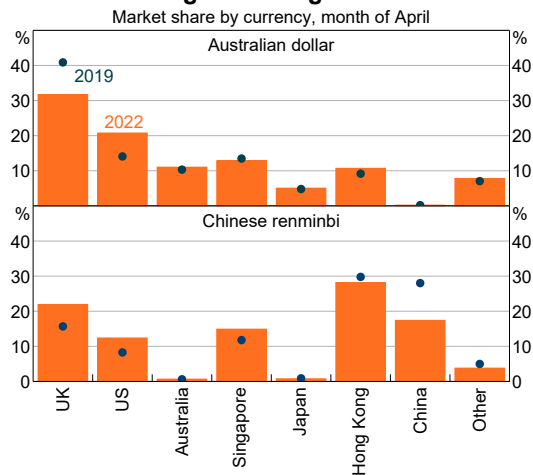
movements in the renminbi and the Australian dollar have been positively correlated over a number of years (Adams *et al* 2021). However, trading in the renminbi has increased strongly over recent years, surpassing the share of turnover in Australian dollars in the 2022 survey. This may suggest that market participants are increasingly gaining exposure to developments in China directly by trading in the renminbi rather than indirectly through the Australian dollar.

Single-currency interest rate derivatives turnover

Global turnover in single-currency OTC interest rate derivatives declined by around 20 per cent to US\$5.2 trillion per day, reflecting the transition away from London interbank offered rate (Libor) to 'nearly risk free rates' (Graph 9) (Huang and Todorov 2022). Libor publication ceased for several key currencies at the end of 2021, leading to a significant decline in turnover of forward rate agreements (FRAs), which reference forward-looking rates such as Libor. By currency, the largest decline in turnover was for interest rate derivatives denominated in US dollars, with the Libor transition having a substantial impact on US dollar denominated FRAs. Overnight risk-free rates (RFR) have begun replacing Libor as key interest rate benchmarks in major currencies, which has increased trading in swaps that reference these RFRs.

Graph 8

Geographical Distribution of Foreign Exchange Turnover



Sources: BIS; RBA

In contrast to the global results, turnover in the Australian market grew by 16 per cent over the three years to April 2022, driven entirely by turnover of interest rate swaps. Interest rate swaps now account for almost all of the OTC interest rate derivative turnover in Australia, while the share of turnover in FRAs and options has declined to almost zero.^[5]

The change in the composition of single-currency interest rate derivative instruments in Australia has also affected the share of turnover by currency. Previously, the US dollar was the second most common currency of denomination after the Australian dollar for interest rate derivatives in the Australian market. The shift away from US dollar denominated FRAs has pushed the turnover of US dollar denominated instruments down by around two-thirds, and there is now more turnover of New Zealand dollar denominated instruments than US dollar denominated instruments in the Australian market.

The size of OTC derivatives markets

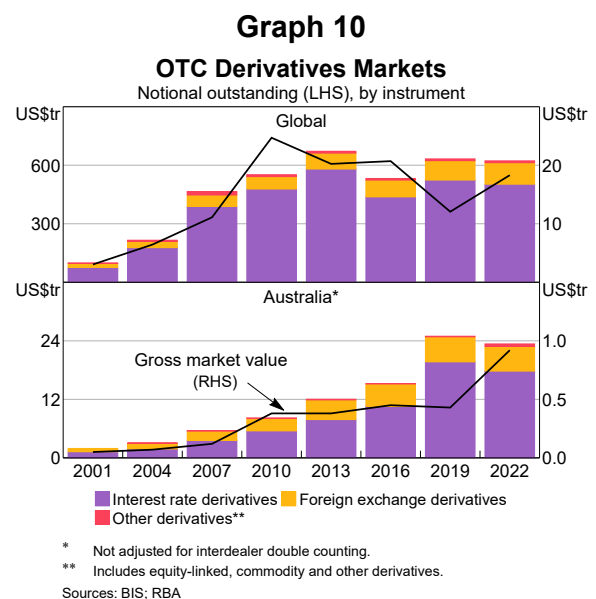
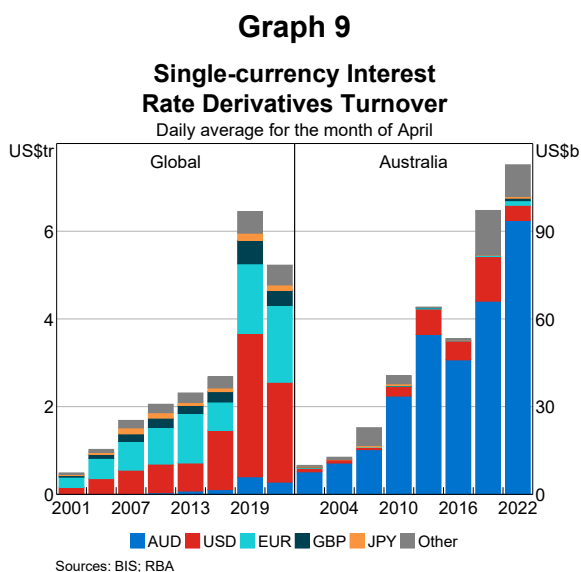
In addition to measuring turnover, the Triennial Survey provides data on the aggregate outstanding position of contracts in OTC derivatives markets as at the end of June 2022. It provides three measures of market size: notional amounts outstanding; gross market values; and gross credit exposures.

Notional amounts outstanding reflect the principal amount used to calculate payments made on

derivatives contracts. Over the survey period, the notional size of the global OTC derivatives market decreased slightly (Graph 10). In Australia, the notional amount outstanding decreased by around 6 per cent, largely driven by a decline in the notional amounts of interest rate swaps. In both domestic and international markets, the decline partly reflected a reduction in the notional amount outstanding of forward rate agreements, which fell following the phasing out of Libor benchmark interest rates (BIS 2022b). Despite this decline, the Australian OTC derivatives market remains around twice as large as it was a decade ago.

Gross market value measures the aggregated replacement values of outstanding contracts, evaluated at the market price – that is, it represents the gross costs counterparties would face if all their open contracts were replaced on the day of the survey. This measure is sensitive to changes in the market value of the underlying reference variable (e.g. interest rates or exchange rates) between the contract’s inception and the survey reporting date. Therefore, as a measure of market size, gross market value reflects both the quantity of derivatives outstanding and fluctuations in market prices.

Over recent years, the global gross market value of derivatives has increased, both in Australia and internationally, driven by the values of interest rate derivatives. Higher-than-expected inflation and the associated policy response from central banks led to



sharp increases in the interest rates on the assets underlying these contracts, above what was expected at their inception, which in turn increased the gross market value of these derivatives (BIS 2022b). The increase in Australian values was more pronounced than for global values. As a result, the Australian share reached 5 per cent of global derivatives' gross market values – the highest level since at least 2001.

While notional amounts outstanding and gross market values are important indicators of the size of OTC derivatives markets, both measures include the value of economically offsetting positions (such as contracts covered by bilateral netting arrangements). As a result, these metrics do not necessarily reflect the true level of risk in these markets. Gross credit exposures can better capture levels of market or counterparty credit risk by netting the value of these offsetting positions from gross market values. Globally, and for Australian reporting dealers, gross credit exposure rose in absolute terms but declined as a share of gross market value over the past three years (Graph 11).

The composition of outstanding OTC derivatives contracts has changed only a little since the previous survey. Both domestically and internationally, single-currency interest rate derivatives account for the majority of outstanding contracts. However, their relative share of the OTC derivatives market has declined. By notional value,

single-currency interest rate derivatives accounted for 76 per cent of all outstanding Australian OTC derivatives contracts in 2022, compared with 79 per cent in 2019. By tenor, around half of outstanding derivatives in Australia have one year or less remaining until maturity. While this is a decrease in the share of derivatives with shorter tenors since 2019, it brings the tenor composition of the Australian market more in line with global peers.

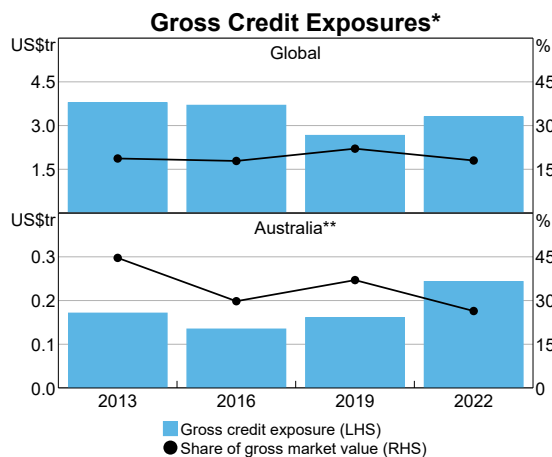
Single-currency interest rate OTC derivatives

The notional value of single-currency interest rate derivatives declined over the past three years (Graph 12). Globally, notional values have fallen by around 5 per cent since 2019, while Australian reporting dealers recorded a 10 per cent decline. The decline in notional amounts outstanding in Australia was largely driven by a fall in Australian dollar denominated contracts. These contracts now account for 60 per cent of outstanding Australian interest rate derivatives, down from 66 per cent in 2019. By comparison, the notional value of US dollar denominated contracts grew over the past three years, overtaking the New Zealand dollar as the second most common currency denomination for interest rate derivatives in Australia.

In contrast to the notional value of interest rate derivatives, the market value of these contracts, both globally and in Australia, experienced a broad-based increase across most major currency denominations as interest rates rose globally in 2022.

The cessation of Libor for most major currencies at the end of 2021 had a material impact on both the amount outstanding and the currency composition of forward rate agreements (BIS 2022b). Globally, and mirroring developments in turnover, US dollar denominated forward rate agreements as a share of notional amounts outstanding almost halved, while their share dropped to near zero for Australian reporting dealers (Graph 13). Currencies less affected by the change, such as the euro, saw their share increase.^[6] In contrast to forward rate agreements, the share of interest rate swaps denominated in US dollars increased both globally and in the Australian market. Forward rate

Graph 11



* Gross credit exposure is defined as the sum of positive and negative replacement costs of OTC contracts outstanding after taking into account legally enforceable bilateral netting arrangements.

** Not adjusted for interdealer double counting.

Sources: BIS; RBA

agreements denominated in currencies affected by the end of Libor are likely being replaced by interest rate swaps compatible with the reference rates replacing Libor (BIS 2022a).^[7]

Since they were separately identified for global reporting dealers in the 2016 Survey, central counterparties (CCPs) have been the most common counterparty for transactions of single-currency interest rate derivatives (Graph 14). Globally, the use of CCPs has remained relatively stable at around 79 per cent of the notional value of interest rate derivatives. In Australia, growth in the use of CCPs has continued, with trades settled through CCPs now accounting for 85 per cent of the notional value of interest rate derivatives. By contrast, the proportion of contracts with other reporting dealers

fell to 4 per cent, down from 7 per cent in 2019. The continued growth in the use of CCPs is consistent with the fall of gross credit exposures as a share of gross market value, as CCPs often offer trade compression services that reduce the amount of offsetting trades (RBA 2016).

FX OTC derivatives

While the notional amounts of global FX derivatives continued to increase over the past three years, notional amounts in Australia declined slightly (Graph 15). Somewhat in contrast, the gross market value of FX derivatives increased sharply from 2019 levels in both global and Australian markets, coinciding with a period of elevated volatility in FX markets. This increase was driven by contracts with a leg denominated in US dollars, which continues to be the most important currency for FX derivatives.^[8]

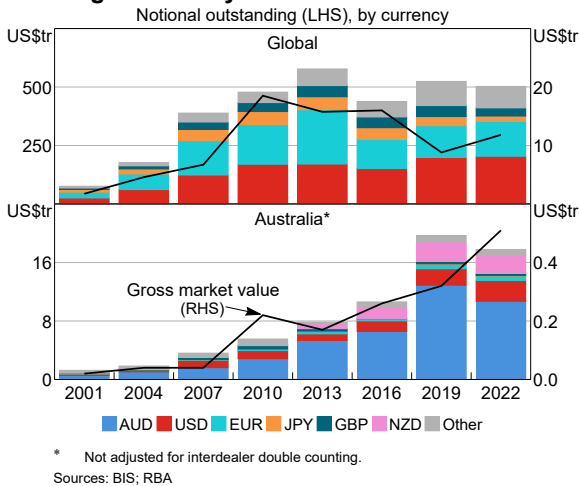
Outright forwards and swaps continue to account for the majority of outstanding FX derivative instruments, both globally and in Australia (Graph 16, green bar). The notional amount of forwards and swaps continued to increase in the global market, but decreased slightly in Australia for the first time since at least 2001.

Credit default swaps

The notional amount of credit default swaps (CDS) outstanding increased both globally and in Australia over the past three years. Globally, this is the first

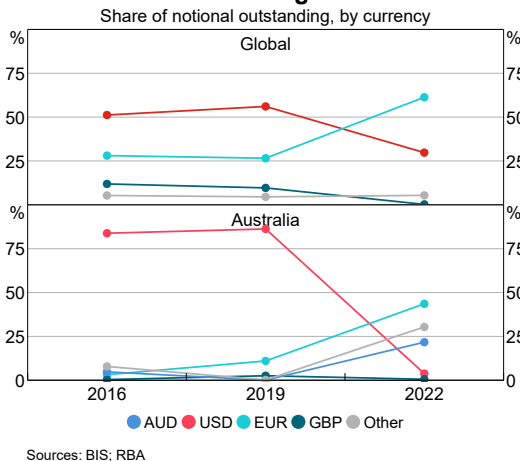
Graph 12

Single-currency Interest Rate Derivatives



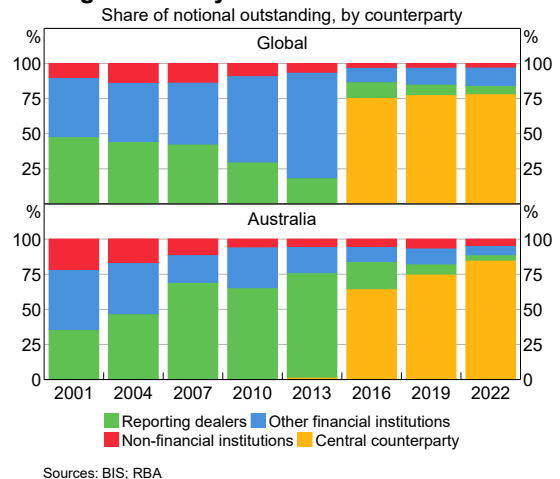
Graph 13

Forward Rate Agreements



Graph 14

Single-currency Interest Rate Derivatives



time that notional values of CDS increased since 2007, following a long-term decline in CDS contracts outstanding (Graph 17). As in the previous survey, the majority of outstanding CDS contracts were multi-name (i.e. referencing multiple entities) rather than single-name instruments for both Australian and international reporting dealers. The tenor composition of outstanding CDS for Australian reporting dealers lengthened significantly in the past three years. The share of CDS maturing in one year or less fell to 3 per cent from 33 per cent in 2019, while the proportion of outstanding contracts maturing in one to five years increased from 54 per cent to 77 per cent.

The share of notional amounts outstanding held between reporting dealers halved over the last three years, from 40 per cent to 20 per cent. At the same time, the share of notional amounts outstanding held with CCPs increased by a similar amount during the period, to be around 40 per cent of notional amounts outstanding. The use of CCPs is most prevalent for outstanding CDS maturing in one to five years.

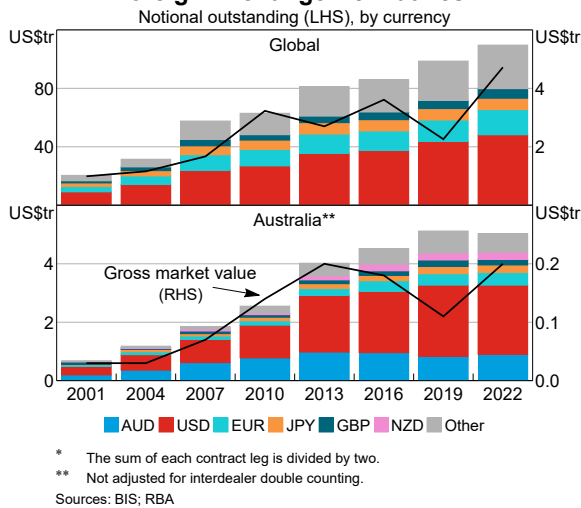
Commodity derivatives

The notional value of outstanding commodity derivatives has increased for both international and domestic reporting dealers. The growth in commodity derivatives was mainly driven by an increase in the volume of contracts related to commodities other than precious metals. The strong increase in domestic outstanding values lifted Australia’s share of global commodity derivatives by notional amount to its highest level in the past decade.

Globally, gross market values of commodity derivatives traded OTC increased significantly over the past three years, from US\$198 billion to US\$920 billion – an increase of over 350 per cent – driven almost entirely by movements in contracts related to commodities other than precious metals. Similarly, in Australia, the gross market value of these ‘other commodities’ increased sharply since 2019. While the survey does not provide a more detailed breakdown of these ‘other commodities’, the BIS noted that the increase coincides with rising food and energy prices (BIS 2022b).

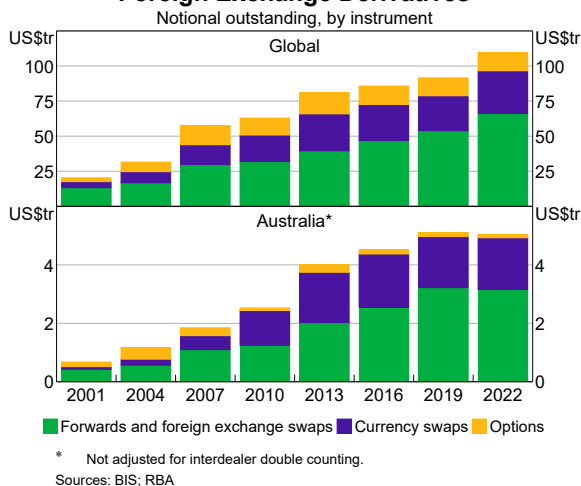
Graph 15

Foreign Exchange Derivatives*



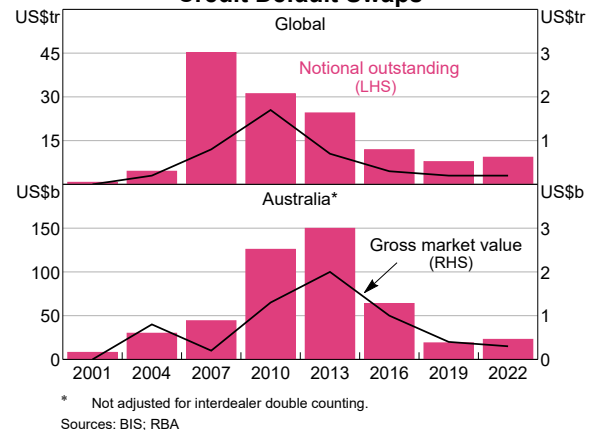
Graph 16

Foreign Exchange Derivatives



Graph 17

Credit Default Swaps



Conclusion

Turnover in global FX markets increased over the three years to April 2022, driven by increased turnover of FX swaps with short-dated maturities and turnover between reporting dealers. Turnover in the Australian FX market also grew, although much of this was associated with an increase in related party trades. The Australian dollar was the sixth most traded currency, down from fifth in April 2019, and the Australian FX market was the 11th largest in the world. Globally, there was a large decrease in the turnover of OTC interest rate derivatives associated with the transition from LIBOR to RFRs.

The size of global OTC derivatives markets, as measured by notional amounts outstanding, decreased slightly over the three years to June 2022. By contrast, the gross market value of OTC contracts increased substantially, driven by increases in the value of interest rate derivatives as interest rates rose globally. Developments in the Australian market mostly followed these international patterns, although increases in the notional amount and market value of commodity derivatives was more pronounced in the Australian market. ↘

Appendix A

Table A1: Global Foreign Exchange Turnover by Jurisdiction^(a)

	Daily average	Change over	Share of total turnover	
	April 2022 US\$ billion	2019–2022 Per cent	April 2019 Per cent	April 2022 Per cent
Total^(b)	9,843	19	n/a	n/a
United Kingdom	3,755	5	43	38
United States	1,912	40	17	19
Singapore	929	45	8	9
Hong Kong	694	10	8	7
Japan	433	15	5	4
Switzerland	350	32	3	4
France	214	28	2	2
Germany	184	48	2	2
Canada	172	58	1	2
China	153	12	2	2
Australia	150	26	1	2
Other jurisdictions	897	17	9	9

(a) Jurisdiction subtotals are not adjusted for cross-border double counting; subtotals may not sum to total due to double counting.

(b) Numbers in this table are reported on a 'net-gross' basis. As a result, the total differs to the global figures reported above on a 'net-net' basis.

Sources: BIS; RBA

Table A2: Foreign Exchange Turnover by Counterparty^(a)

April 2022

	Global		Australia	
	Daily average, April 2022 US\$ billion	Change over 2019–2022 Per cent	Daily average, April 2022 US\$ billion	Change over 2019–2022 Per cent
Reporting dealers	3,460	37	107	14
Other financial institutions	3,622	1	37	75
– Non-reporting banks	1,618	0	14	128
– Institutional investors	846	9	19	76
– Hedge funds, proprietary trading firms	514	–13	1	237
– Official sector financial institutions	99	11	1	–7
– Other/undistributed	544	4	1	–52
Non-financial institutions	425	–10	7	0

(a) All amounts represent transactions between reporting dealers and each counterparty.

Sources: BIS; RBA

Table A3: Foreign Exchange Turnover by Currency^(a)

	Global		Australia	
	Daily average US\$ billion	Share of total Per cent	Daily average US\$ billion	Share of total Per cent
Total	7,506	n/a	150	n/a
Currency^(b)				
USD	6,639	88	139	92
EUR	2,292	31	27	18
JPY	1,253	17	17	12
GBP	968	13	10	7
RMB ^(c)	526	7	4	3
AUD	479	6	70	47
Other currencies	2,854	38	33	22
Currency pair				
USD/EUR	1,705	23	21	14
USD/JPY	1,013	14	15	10
USD/GBP	714	10	8	5
USD/RMB	494	7	4	3
USD/CAD	410	5	4	3
USD/AUD	381	5	62	41
Other currency pairs	2,789	37	36	24

(a) Subtotals may not sum to total due to rounding.

(b) The sum of currency subtotals is divided by two as each transaction involves two currencies.

(c) Includes onshore (CNY) and offshore (CNH) renminbi turnover.

Sources: BIS; RBA

Endnotes

- [*] The authors are from Financial Markets Group and would like to thank Jessie Cameron, Tim Atkin and Jason Griffin for their significant contribution to this work.
- [1] Global highlights from the Triennial Survey are discussed by McGuire, Schrimpf and Tarashev (2022).
- [2] Unless otherwise stated, global turnover figures are adjusted for interdealer double counting at both the local and global level (i.e. 'net-net' basis). Country subtotals are adjusted for interdealer double counting at the local level only (i.e. 'net-gross' basis).
- [3] PTFs are firms that invest, hedge or speculate for their own account and often employ high-frequency trading strategies (BIS 2018).
- [4] The 2022 survey was the first time the BIS looked to measure 'non-market facing' trades. These trades are defined as back-to-back trades and compression trades. Back-to-back trades are deals that automatically follow trades with customers to shift risk across sales desks, and compression trades occur when dealers optimise their portfolios by replacing existing contracts with new ones to reduce notional amounts while keeping net exposures unchanged.
- [5] Interest rate swaps represented over 99 per cent of interest rate derivative turnover in Australia in April 2022, up from 86 per cent in 2019. Overnight indexed swaps are the most common type of interest rate swap in the Australian market.
- [6] While euro Libor has been discontinued, there are no plans to discontinue Euribor. Most euro denominated contracts reference Euribor (BIS 2022b).
- [7] Libor rates are forward looking in that they reflect expectations of banks' future borrowing costs. RFRs reflect the evolution of actual overnight rates and so are backwards looking. This difference has limited the benefits of using FRAs to hedge fixing risk on interest rate swaps. For further information, see Huang and Todorov (2022).
- [8] FX contracts are reported on a single-currency basis. This means that the notional amount outstanding (and the market value) of any contract will be reported twice according to the two currency legs, and the amounts reported for each currency will add up to 200 per cent of total. Total amounts are therefore divided by two when presenting the results.

References

- Adams N, D Jacobs, S Kenny, S Russell and M Sutton (2021), 'China's Evolving Financial System and Its Global Importance', *RBA Bulletin*, September.
- BIS (2018), 'Monitoring of Fast-paced Electronic Markets', September.
- BIS (2022a), 'OTC Derivatives Statistics at End-December 2021', 12 May.
- BIS (2022b), 'OTC Derivatives Statistics at End-June 2022', 30 November.
- Caballero J, A Maurin, P Wooldridge and D Xia (2022), 'The Internationalisation of EME Currency Trading', *BIS Quarterly Review*, December.
- Drehmann M and V Sushko (2022), 'The Global Foreign Exchange Market in a Higher Volatility Environment', *BIS Quarterly Review*, December.
- Glowka M and T Nilsson (2022), 'FX Settlement Risk: An Unsettled Issue', *BIS Quarterly Review*, December.
- Huang W and K Todorov (2022), 'The Post-Libor World: A Global View from the BIS Derivatives Statistics', *BIS Quarterly Review*, December.
- Johnson C (2022), 'Trends in Australian Banks' Bond Issuance', *RBA Bulletin*, September.
- Maronoti B (2022), 'Revisiting the International Role of the US Dollar', *BIS Quarterly Review*, December.
- McGuire P, A Schrimpf and N Tarashev (2022), 'OTC Foreign Exchange and Interest Rate Derivatives Markets through the Prism of the Triennial Survey', *BIS Quarterly Review*, December.
- RBA (Reserve Bank of Australia) (2016), 'Box D: Trade Compression', *Financial Stability Report*, April.

Foreign Currency Exposure and Hedging in Australia

Tim Atkin and Jacob Harris^[*]



Photo: Busakorn Pongparnit – Getty Images

Abstract

The 2022 Survey of Foreign Currency Exposure confirms that Australian entities' financial positions, in aggregate, are well protected against a depreciation of the Australian dollar. The composition of Australia's foreign currency denominated assets and liabilities means that, overall, Australian entities have a net foreign currency asset position. This has increased over a number of years, largely reflecting an increase in the value of foreign currency equity assets associated with superannuation funds. Meanwhile, the banking sector accounts for a large share of Australia's foreign currency liabilities because of their offshore funding activities. However, the bulk of the banking sector's foreign currency debt liabilities have been hedged. After hedging, the sector has a net foreign currency asset position and no significant currency mismatches, both of which reduce the risks associated with a large depreciation of the Australian dollar.

Introduction

Australia benefits from strong trade and financial linkages with the rest of the world, as well as a flexible exchange rate.^[1] Against this background, many Australian businesses have foreign currency denominated assets, liabilities and cash flows. Such exposures facilitate trade but may also be vulnerable to movements in the exchange rate if they are not well managed. For example, a sharp

depreciation of the exchange rate would increase the Australian dollar value of unhedged foreign currency liabilities or contractual payments, which could have broader implications for macroeconomic and financial stability. It is therefore important to understand the size and distribution of foreign currency exposures as well as the ways that businesses manage exchange rate risks.

Given the importance of hedging activities for managing exchange rate risks, the Reserve Bank initiated and provides funding for the Australian Bureau of Statistics (ABS) Survey of Foreign Currency Exposure (SFCE). The SFCE measures Australian businesses' foreign currency exposures and the extent to which they are hedged. The first survey was conducted in 2001, with subsequent surveys conducted every four years.^[2] This article sets out the key results of the 2022 survey. It examines the effect of hedging activities across different sectors in the economy and highlights the extent to which businesses have managed risks associated with exchange rate movements.

The SFCE captures two key ways that businesses hedge against exchange rate movements. First, there is the use of derivatives – financial instruments that insure against movements in the exchange rate. Second, there are 'natural' hedges. Natural hedges occur when foreign currency exposures are offset by positions or cash flows in the same foreign currency. For example, a resources firm that receives US dollars for the commodities it produces can use these cash flows to pay costs charged in US dollars.

Australia's net foreign liability position translates to a net foreign currency asset position

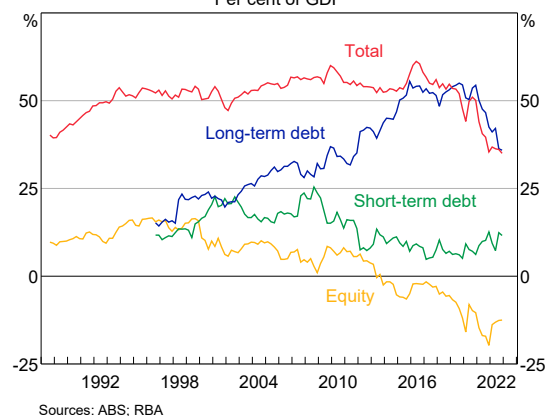
Australia has a net foreign liability position with the rest of the world because, for much of its history, investment opportunities in Australia have been greater than the domestic pool of savings available to fund that investment. Australia's net foreign liability position averaged around 50 per cent of GDP over the past couple of decades; however, this has declined over recent years to be around 35 per cent of GDP alongside the significant shift to a current account surplus (Graph 1). The key factors behind this shift were the decline in foreign direct investment following the end of the mining boom as well as an increase in purchases of foreign equities by Australian superannuation and investment funds (Adams and Atkin 2022).

One key feature of Australia's net foreign liability position is that Australia's foreign liabilities are largely denominated in Australian dollars, while

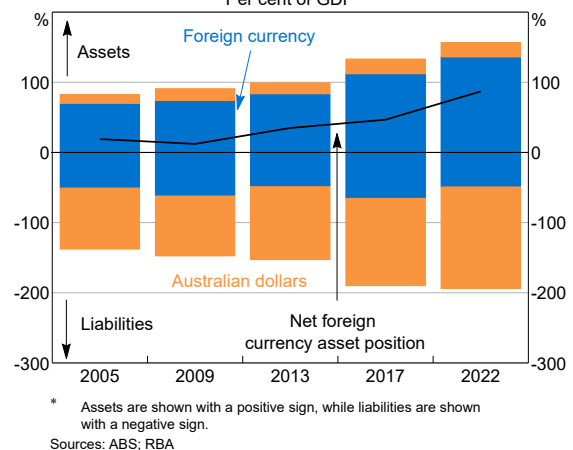
Australia's foreign assets are largely denominated in foreign currency terms (Graph 2).^[3] As a result, Australia has a net foreign currency *asset* position with the rest of the world. This means that a significant depreciation of the Australian dollar actually increases the Australian dollar value of foreign assets relative to foreign liabilities. In other words, the net foreign liability position declines when there is a depreciation of the Australian dollar. This is true even before hedging of exchange rate risk is taken into account.

Australia's net foreign currency asset position was equivalent to a touch above 85 per cent of GDP as at 31 March 2022 (ABS 2022b). Around three-quarters of Australia's foreign liabilities were denominated in Australian dollars, compared with around 15 per cent of Australia's foreign assets.

Graph 1
Net Foreign Liability Position
Per cent of GDP



Graph 2
Currency Composition of Australia's External Position*
Per cent of GDP



Between 2017 and 2022, foreign currency assets increased as a share of GDP, largely reflecting an increase in the value of foreign equity assets. This was associated with the accumulation of foreign equities by Australian funds over this period as well as valuation effects associated with these investments, such as increases in the prices of foreign equities and the depreciation of the Australian dollar. Meanwhile, foreign currency liabilities declined as a share of GDP, largely reflecting activities in the banking and non-financial sectors.

What share of foreign currency exposures are hedged?

The share of foreign currency exposures hedged by Australian entities (the hedge ratio) has been little changed since the previous survey at around 35 per cent. This can be broken down into a hedge ratio of around 55 per cent for foreign currency liabilities and slightly less than 30 per cent for foreign currency assets.

By identifying the unhedged component of Australia’s foreign currency exposures, the net foreign currency asset position can be translated into a net *effective* foreign currency asset position.^[4] Hedging via derivatives resulted in a net *effective* foreign currency asset position equivalent to around 75 per cent of GDP as at the end of March 2022, up from around 50 per cent of GDP at the previous survey (Graph 3).

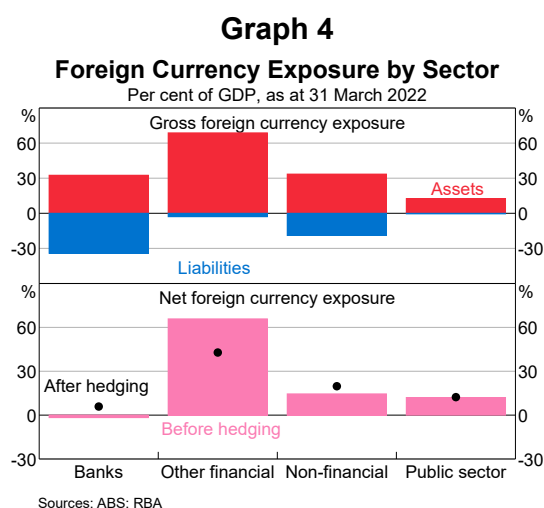
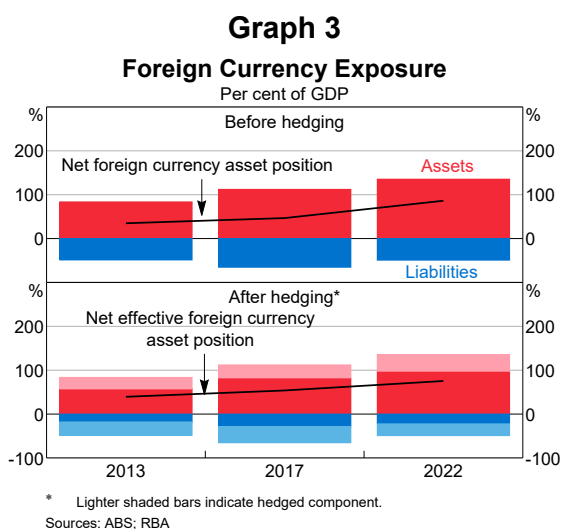
Hedging policies and practices

Aversion to risk and exposure minimisation were cited in the ABS survey as common reasons for hedging, and that hedging policies and practices have been little changed over recent years. The ABS reported that the appetite for risk was low among respondents, particularly within the banking sector. Some respondents reported that foreign exchange exposure was managed at the enterprise or Australian subsidiary level, and in some instances hedging strategies were also employed on a security-by-security basis. However, larger organisations tended to apply a broader approach whereby securities were collectively hedged to manage risk. The ABS also noted that, in most cases, there is limited warehousing of foreign exchange risk – that is, taking on foreign currency exposure and leaving it unhedged for a period.

Most sectors of the Australian economy had a net foreign currency asset position as at 31 March 2022 – even before accounting for hedging activities (Graph 4; Appendix A, Table A1). The banking sector was the main exception. The following sections analyse foreign currency exposures and hedging activities across different sectors of the economy.

Banks

Given the significant role of the banking sector in Australia’s financial system, it is important to understand how the sector’s foreign currency exposures are hedged.^[5] Australian banks account for around 60 per cent of Australia’s foreign currency liabilities, reflecting their use of offshore markets to



fund both domestic and international operations. Access to these markets enables banks to diversify their funding sources, access deeper and more liquid markets, and borrow for longer terms than are generally available in the domestic market (Bellrose and Norman 2019). Offshore funding is typically denominated in foreign currency, which requires hedging to manage the associated risks.

In 2022, slightly less than 15 per cent of bank funding was sourced from offshore wholesale debt markets, with the vast bulk of this debt denominated in foreign currency. Since the previous survey in 2017, the value of foreign currency denominated liabilities related to the banking sector has decreased, resulting in a narrowing in the sector's net foreign currency liability position before hedging (Graph 5, top panel).^[6] This partly reflects a decline in the share of funding sourced from offshore wholesale debt markets by banks over this period because they were able to access low-cost funding domestically, including through the Reserve Bank's Term Funding Facility.

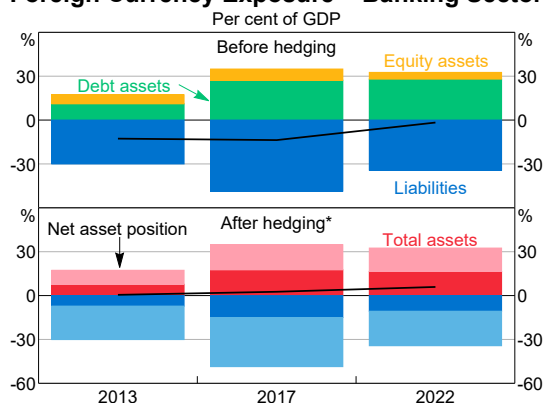
The 2022 SFCE confirmed that the banking sector had a small net effective foreign currency asset position after accounting for hedging via derivatives. Around 70 per cent of foreign currency liabilities were hedged with derivatives in the banking sector, compared with around 50 per cent of foreign currency assets. Given total foreign currency assets and liabilities are around the same size before hedging, this means that the sector's net

foreign currency liability position has been fully hedged, in net terms, against the risk of an exchange rate depreciation.

Debt security liabilities – banks issuing bonds offshore – are the main source of foreign currency exposure for the sector, accounting for slightly more than half of the sector's foreign currency liabilities. Similar to the previous survey, the 2022 SFCE showed that around 90 per cent of these liabilities were hedged using derivatives. A breakdown by maturity shows that around 95 per cent of banks' longer term debt securities (those with a residual maturity greater than one year) were hedged with derivatives against foreign currency risk, while around 80 per cent of securities with a residual maturity of less than one year were hedged with derivatives (Graph 6).

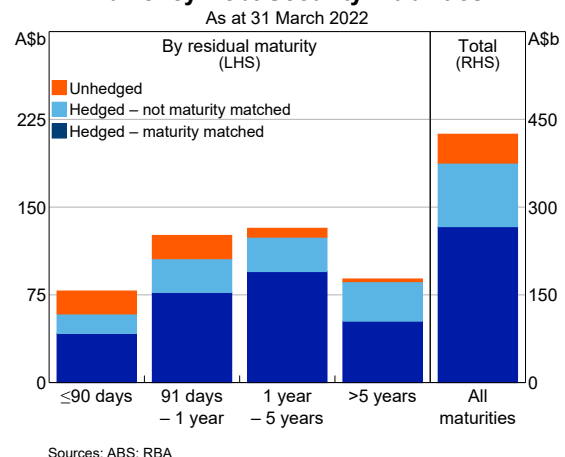
The SFCE also indicated that a majority of the derivatives used to hedge against foreign currency risk were matched to the maturities of the underlying debt securities. (Maturity matched hedging of liabilities mitigates the exposure to foreign currency risk for the duration of the underlying security, which reduces rollover risk – that is, the risk that a derivative will expire and a loss will be incurred when replacing it, or that a derivative will not be able to be replaced during periods of stress in financial markets.) The share of foreign currency debt security liabilities that are both hedged and maturity matched declined from around 85 per cent at the time of the previous

Graph 5
Foreign Currency Exposure – Banking Sector



* Lighter shaded bars indicate hedged component.
Sources: ABS; RBA

Graph 6
Banks' Hedging of Foreign Currency Debt Security Liabilities



Sources: ABS; RBA

survey to slightly below 65 per cent in the 2022 survey. However, the ABS suggested there was not a significant shift in behaviour or an emerging trend to decrease maturity matching across the banking sector.

The SFCE showed that of those liabilities in the banking sector that were not hedged with derivatives, over two-thirds had a natural hedge in place – that is, there was a matching asset in the same foreign currency. Also, the vast majority of unhedged foreign currency liabilities were denominated in US dollars; however, this was offset by a large amount of US dollar denominated assets, such as loans made to non-residents. As a result, after both derivative and natural hedging were taken into account, there were only very small net foreign currency exposures by currency and for the sector as a whole (Graph 7).

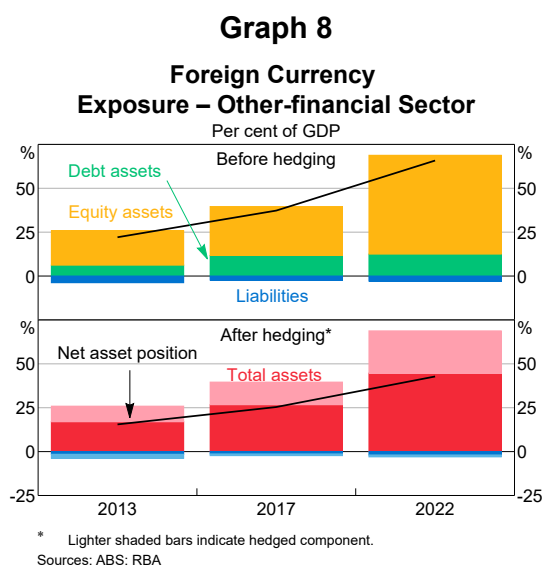
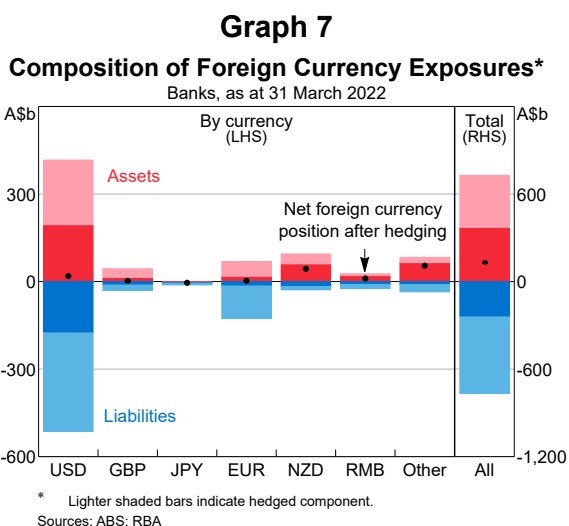
Other financial corporations

Other financial corporations include non-bank financial corporations such as superannuation funds, fund managers and insurance corporations.^[7] This sector had the largest net foreign currency asset position, largely reflecting holdings of foreign equity assets, particularly by Australia’s superannuation funds, as well as fixed-income assets such as government and corporate bonds (Graph 8). Indeed, foreign equities represented nearly half of Australian superannuation funds’ total equity holdings, and foreign fixed-income assets represented around

45 per cent of their total fixed-income investments as at 31 March 2022 (APRA 2022b).

Since the previous survey, foreign currency assets in this sector have increased significantly, owing to an increase in the value of foreign equity assets. This reflects valuation effects as well as the accumulation of foreign equity assets, largely by Australia’s superannuation funds that have increased the share of foreign equities in their investment portfolios. Superannuation funds have also increased their holdings of international fixed-income and infrastructure investments since the previous survey. At the end of March 2022, other financial corporations had a net foreign currency asset position equivalent to around 65 per cent of GDP before hedging.

These non-bank financial corporations used derivatives to hedge just over one-third of their foreign currency assets. After accounting for hedging via derivatives, the net effective foreign currency asset position of other financial corporations decreased to be equivalent to almost 45 per cent of GDP. The further internationalisation of investment portfolios in this sector has increased the focus on managing foreign exchange-related risks (NAB 2021). While the SFCE does not provide a breakdown of hedging by type of foreign currency asset, data from the Australian Prudential Regulation Authority show that superannuation funds hedge around 70 per cent of their international debt and unlisted infrastructure investments, but only around 25 per cent of their international equity investments



(APRA 2022b). Periods of increased risk aversion in global markets are typically associated with declines in foreign equity prices and a depreciation of the Australian dollar (Jacobs 2019). To the extent that these developments coincide, losses on the value of unhedged foreign equity assets are somewhat mitigated because a depreciation of the exchange rate increases the value of these assets in Australian dollar terms, all else being equal.

Risks to the broader financial system from large asset price movements associated with superannuation funds' assets, including from the growing portfolio of hedged and unhedged foreign assets, are not substantial because of the predominance of defined contribution schemes in Australia's superannuation sector.^[8] However, superannuation funds are still exposed to liquidity risks associated with margin calls on derivatives used to hedge foreign exchange risks. For example, when the Australian dollar depreciates, the value of these derivatives declines, and superannuation funds are required to make a payment to their counterparties to mitigate risks arising from mark-to-market losses. However, liquidity risks associated with hedging foreign currency assets are at least partly mitigated by the depreciation of the Australian dollar also lifting the Australian dollar value of these underlying assets (RBA 2021). This supports a fund's ability to sell foreign assets to meet margin calls associated with hedging contracts.

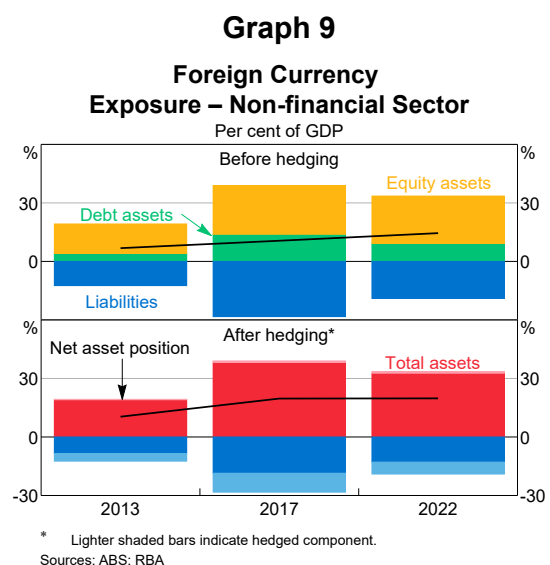
Non-financial corporations

Non-financial corporations had a net foreign currency asset position equivalent to 15 per cent of GDP at the end of March 2022 (Graph 9).^[9] The net position consisted of a sizable amount of foreign currency assets, over two-thirds of which were foreign equity assets.^[10] However, the sector also had a notable amount of foreign currency liabilities, of which around 85 per cent were either longer term debt securities or loans. After hedging, the non-financial sector had a net foreign currency asset position equivalent to 20 per cent of GDP at the end of March 2022, which is similar in size to the previous survey.

The degree of hedging via derivatives in the non-financial sector has generally been less than in the financial sectors. The 2022 SFCE showed that derivatives were used to hedge only around one-third of their foreign currency liabilities, compared with more than two-thirds in the banking sector, and that only a negligible amount of their foreign currency assets were hedged.

This difference is related to the composition of the sectors' assets and liabilities. The foreign currency equity assets of the sector include the foreign operations of multinational corporations, which are partly matched by foreign currency borrowing in the form of loans and debt securities. In addition, for some non-financial corporations a large share of their revenue is denominated in foreign currency, particularly US dollars – given this is the currency through which they conduct much of their trade – so foreign currency borrowing is matched to these trade payments and revenue streams. For example, a large share of Australia's resource exports are invoiced in US dollars (ABS 2021). Given this, mining companies generally borrow in US dollars so that US dollar payment obligations on their outstanding debt are matched to their US dollar trade receipts.

In addition to the exchange rate risk associated with an entity's balance sheet, exchange rate movements can also affect foreign currency trade payments and receipts. With more than 80 per cent of Australia's exports invoiced in US dollars, it is important to understand the extent to which these



cash flows are exposed to exchange rate risk. Non-financial corporations represent almost all of Australia’s foreign currency trade receipts and payments.^[11] At the end of March 2022, non-financial corporations used derivatives to hedge around one-third of their expected foreign currency trade payments and around 4 per cent of their trade receipts (Graph 10). These shares approximately match the hedge ratios for assets and liabilities on the balance sheets of non-financial corporations.

Public sector

The public sector’s foreign currency assets and liabilities are relatively small (Appendix A, Table A2). Before hedging, the general government sector – which includes federal, state and local governments – had a net foreign currency asset position equivalent to 9 per cent of GDP. This is up from around 6 per cent of GDP in the previous survey and was mainly driven by an increase in foreign currency assets. Foreign currency equity assets account for around three-quarters of the general government’s total foreign currency assets, with the Australian Government’s Future Fund holding a sizable share of the general government sector’s foreign currency assets. The Future Fund had a net foreign currency asset position, after hedging, of around \$80 billion at the end of the 2022 financial year (Future Fund 2022).

The Reserve Bank had a net foreign currency asset position equivalent to 3 per cent of GDP as at 31 March 2022. This exposure reflects the Reserve

Bank’s holdings of foreign exchange reserves. These are in the form of debt instruments issued by sovereign and supranational entities and foreign currency deposits at other official institutions, such as foreign central banks. The Reserve Bank does not seek to fully eliminate or hedge the foreign exchange exposure associated with these holdings of official reserve assets (RBA 2022).

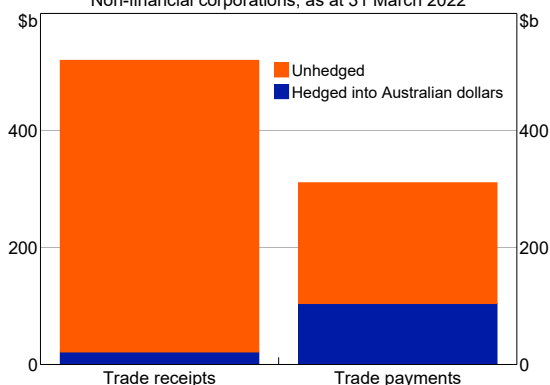
Derivative holdings

As well as providing information about foreign currency exposures and hedging, the SFCE also contained detailed information on Australian entities’ derivative holdings as at the end of March 2022. These are recorded on a notional basis – that is, the total value of the exposure the derivative is covering. Some of these derivatives are used to hedge foreign currency exposures, which have been the focus of much of this article, but the survey also captures derivatives used to gain exposure to particular foreign exchange markets. The survey indicated that Australian entities were positioned such that they had a net long foreign currency position or equivalently a net short Australian dollar position with non-residents on derivative holdings (Graph 11). This means that in net terms Australian residents would profit from a depreciation of the Australian dollar.

By instrument type, swaps (including foreign exchange swaps and cross-currency basis swaps) and foreign exchange forwards continued to

Graph 10

Expected Trade Receipts and Payments in Foreign Currency
Non-financial corporations, as at 31 March 2022

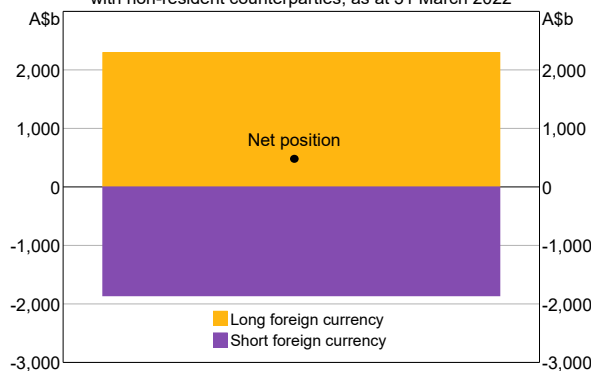


Sources: ABS; RBA

Graph 11

Foreign Currency Derivative Positions*

Notional amount held by residents with non-resident counterparties, as at 31 March 2022



* Derivatives involving the Australian dollar.
Sources: ABS; RBA

account for the vast bulk of the total notional value of foreign exchange derivatives, while futures and options accounted for most of the remaining share. By sector, derivative holdings remain concentrated in the banking sector, which accounted for around 70 per cent of the total value of foreign exchange derivatives involving the Australian dollar and more than 90 per cent of the value of derivatives not involving the Australian dollar as at March 2022.

Summary

Australia has a net foreign liability position, reflecting funds flowing from the rest of the world to Australia over a long period of time because of its high levels of domestic investment relative to savings. There are potential risks associated with foreign liabilities, including exchange rate risk, but these can be managed with various hedging strategies. Australia's foreign liabilities are largely denominated in Australian dollars, and foreign assets are largely denominated in foreign currency, which means that the net liability position translates to a net foreign currency asset position, even before

hedging activities are taken into account. As a result, a depreciation of the Australian dollar actually results in a decline in the value of Australia's net foreign liability position.

Hedging activities also reduce the exchange rate risk that comes from borrowing offshore. The banking sector was the only sector that had a net foreign currency liability position before hedging. Banks' debt security liabilities account for more than half of the sector's total foreign currency liabilities, but the vast bulk of these exposures are hedged. In addition, the majority of the derivatives used to hedge exchange rate risk are matched to the maturities of the underlying debt securities. After hedging, the sector had a small net effective foreign currency asset position. Moreover, there are no significant currency mismatches either for the banking sector or for the country as a whole. The 2022 SFCE confirms that the Australian economy overall is well protected from vulnerabilities associated with a depreciation of the exchange rate, despite its net foreign liability position. ✎

Appendix A

Table A1: Private Sector Foreign Currency Exposure

As at 31 March 2022

	Banks		Other financial corporations		Non-financial corporations	
	Before hedging	After hedging	Before hedging	After hedging	Before hedging	After hedging
A\$ billion						
Assets	726	369	1,534	997	748	729
Liabilities	764	238	65	42	424	288
Net balance sheet exposure	-38	131	1,469	956	324	441
Per cent of GDP						
Assets	33	17	69	45	34	33
Liabilities	34	11	3	2	19	13
Net balance sheet exposure	-2	6	66	43	15	20

Sources: ABS; RBA

Table A2: Public Sector Foreign Currency Exposure

As at 31 March 2022

	General government		Reserve Bank of Australia	
	Before hedging	After hedging	Before hedging	After hedging
A\$ billion				
Assets	217	217	62	62
Liabilities	7	1	4	4
Net balance sheet exposure	210	216	58	58
Per cent of GDP				
Assets	10	10	3	3
Liabilities	0	0	0	0
Net balance sheet exposure	9	10	3	3

Sources: ABS; RBA

Endnotes

- [*] The authors are from International Department, and would like to thank the ABS for the preparation and distribution of the SFCE on which this article draws heavily.
- [1] For a broader discussion of the benefits of a floating exchange rate in promoting macroeconomic stability in small open economies, see Stevens (2013); Schembri (2019).
- [2] For the primary source of information and available data, see ABS (2022a). The results of the previous survey are discussed in Berger-Thomson and Chapman (2017). There was a five-year gap between the 2022 survey and the previous survey, reflecting a delay to the survey being conducted because of the COVID-19 pandemic.
- [3] Australia's foreign equity liabilities are recorded by the ABS as Australian dollar denominated liabilities, as the entity is domiciled in Australia and its valuation (market or book) is in Australian dollars.
- [4] The net *effective* foreign currency asset position is estimated by taking the net position of unhedged foreign currency assets and liabilities.
- [5] APRA's regulation of the Australian banking system covers activities that give rise to foreign exchange risks. APRA's prudential standards require that banks operating in foreign exchange markets have appropriate risk measurement systems in place, and that they hold capital against foreign exchange risks. For more information, see APRA (2022a).
- [6] For a discussion of developments in Australian banks' offshore funding over recent years, see Bellrose and Norman (2019); Fitzpatrick, Shaw and Suthakar (2022); Johnson (2022); Carse, Faferko and Fitzpatrick (2023).
- [7] A rough calculation using different data sources suggests superannuation funds account for somewhere around half of the sector's foreign currency assets.
- [8] Under a defined contribution structure, superannuation funds are liable to pay members' accumulated balances (rather than guaranteeing fixed payments), which means investment losses are passed on to members. This also means that movements in the funds' assets and liabilities are more closely linked than those that have a defined benefit structure.
- [9] The SFCE reports the foreign currency exposures and hedging of 'other resident sectors'. However, financial accounts data (ABS 2022c) suggest that non-financial corporations account for most of these sectors' exposures and hedging.
- [10] The bulk of these assets reflect direct equity holdings of non-financial corporations, which consist of foreign operations and subsidiaries.
- [11] Only foreign currency denominated trade receipts and payments expected over the next four years are included in the survey; those denominated in Australian dollars are not included. Around one-third of Australia's imports are denominated in Australian dollars, as opposed to only 10 per cent of Australia's exports (ABS 2021).

References

- ABS (Australian Bureau of Statistics) (2021), 'Export and Import Invoice Currencies, 2020–21', 4 November. Available at <<https://www.abs.gov.au/articles/export-and-import-invoice-currencies-2020-21>>.
- ABS (2022a), 'Foreign Currency Exposure, Australia', 5308.0, 31 October. Available at <<https://www.abs.gov.au/statistics/economy/international-trade/foreign-currency-exposure-australia/latest-release>>.
- ABS (2022b), 'Balance of Payments and International Investment Position, Australia', 5302.0, 6 December. Available at <<https://www.abs.gov.au/statistics/economy/international-trade/balance-payments-and-international-investment-position-australia/latest-release>>.
- ABS (2022c), 'Australian National Accounts: Finance and Wealth', 5232.0, 29 September. Available at <<https://www.abs.gov.au/statistics/economy/national-accounts/australian-national-accounts-finance-and-wealth/jun-2022>>.
- Adams N and T Atkin (2022), 'The Significant Shift in Australia's Balance of Payments', *RBA Bulletin*, March.
- APRA (Australian Prudential Regulation Authority) (2022a), 'Banking (Prudential Standard) Determination No. 9 of 2022', Prudential Standard APS 116 Capital Adequacy: Market Risk, 1 December.
- APRA (2022b), 'Quarterly Superannuation Performance Statistics', June.
- Bellrose K and D Norman (2019), 'The Nature of Australian Banks' Offshore Funding', *RBA Bulletin*, December.
- Berger-Thomson L and B Chapman (2017), 'Foreign Currency Exposure and Hedging in Australia', *RBA Bulletin*, December, pp 67–75.
- Carse V, A Faferko and R Fitzpatrick (2023), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.
- Fitzpatrick R, C Shaw and A Suthakar (2022), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.
- Future Fund (2022), 'Future Fund Annual Report 2021–22'.
- Jacobs D (2019), 'How Do Global Financial Conditions Affect Australia?', *RBA Bulletin*, December.
- Johnson C (2022), 'Trends in Australian Banks' Bond Issuance', *RBA Bulletin*, September.
- NAB (2021), '2021 Biennial NAB Superannuation FX Hedging Survey', November.
- RBA (Reserve Bank of Australia) (2021), 'Box C: What Did 2020 Reveal About Liquidity Challenges Facing Superannuation Funds?', *Financial Stability Review*, April.
- RBA (2022), 'Reserve Bank of Australia Annual Report 2022'.
- Schembri L (2019), 'Flexible Exchange Rates, Commodity Prices and Price Stability', Speech at the Economics Society of Northern Alberta, Edmonton, 17 June.
- Stevens G (2013), 'The Australian Dollar: Thirty Years of Floating', Speech to the Australian Business Economists' Annual Dinner, Sydney, 21 November.

Reassessing the Costs and Benefits of Centrally Clearing the Australian Bond Market

Jon Cheshire and Joanne Embry^[*]



Photo: aire images – Getty Images

Abstract

This article considers the costs and benefits of centrally clearing the Australian bond market, in light of developments in the market since the Reserve Bank's last review in 2015. On balance, our analysis suggests that changes to the size and structure of the Australian bond market have strengthened the case for central clearing. These changes include substantial growth in the size of the market, increased participation of non-resident investors and increased complexity resulting from the growing number of bilateral clearing arrangements. Central clearing would simplify the market structure and could yield other benefits, especially in times of stress. For example, our estimates suggest multilateral netting has the potential to lower settlement obligations by \$60 billion per day. This is more than can be achieved with bilateral netting. Further, market resilience and liquidity conditions might also be improved by multilateral netting as interbank participants' balance sheet constraints are reduced. The key challenge for a potential central counterparty would be to develop a sufficiently wide network of products and participants to achieve overall benefits. Some participants face a lower incentive to join and in their absence the potential benefits from central clearing would be reduced.

Introduction

Since the global financial crisis (GFC), central clearing has come into sharper focus by policy-

makers around the world. The principal reason for this is that, under the right conditions, it is possible for central clearing to increase the efficiency and

stability of financial markets. Indeed, the increased use of central clearing in the over-the-counter (OTC) interest-rate-derivative markets over the past decade or so has generally been seen as having increased resilience in these markets (FSB 2018a; FSB 2018b; ISDA 2021; IAWG 2022).

There is a current debate, particularly in the United States, over whether there would be benefits from expanding the use of central clearing in bond markets. However, central clearing may not be appropriate for all markets and is also not a cure-all for market functioning and financial stability issues that might arise in the course of their operation. Nonetheless, the Financial Stability Board has suggested there would be merit in exploring the increased use of central clearing in bond and repurchase agreement (repo) markets, and has recommended that authorities evaluate the costs and benefits of introducing central counterparties (CCPs) into their interdealer repo markets where they do not exist (FSB 2013; FSB 2022).

In 2015, after public consultation, the Reserve Bank concluded that, at that time, there was no financial stability case to actively promote the introduction of a CCP in the Australian bond market (RBA 2015a). Against this background, the article begins with a discussion of the changes in the Australian bond market over the past seven years. This is followed by consideration of some of the potential costs and benefits of central clearing and an overview of the scope of products and level of participation that would affect its viability.^[1]

Current market structure versus central clearing

After a financial market securities trade is executed, it is confirmed, cleared and then settled. Trade confirmation involves the two counterparties confirming the details of the transaction with each other. The process of clearing involves the calculation of participants' obligations to make payments or deliver securities in order to establish final positions for settlement. Settlement occurs after clearing and involves the exchange of funds for securities.

Clearing in the Australian bond and repo markets currently occurs bilaterally and reflects the complex web of transactions among participants that are yet to be settled (Figure 1). Central clearing involves placing a single counterparty as an intermediary for each transaction. The CCP becomes the buyer to every seller and the seller to every buyer (Figure 2). The result is a simpler hub and spoke network of transactions that are yet to be settled, but one that is dependent on the CCP.

Review of changes since 2015

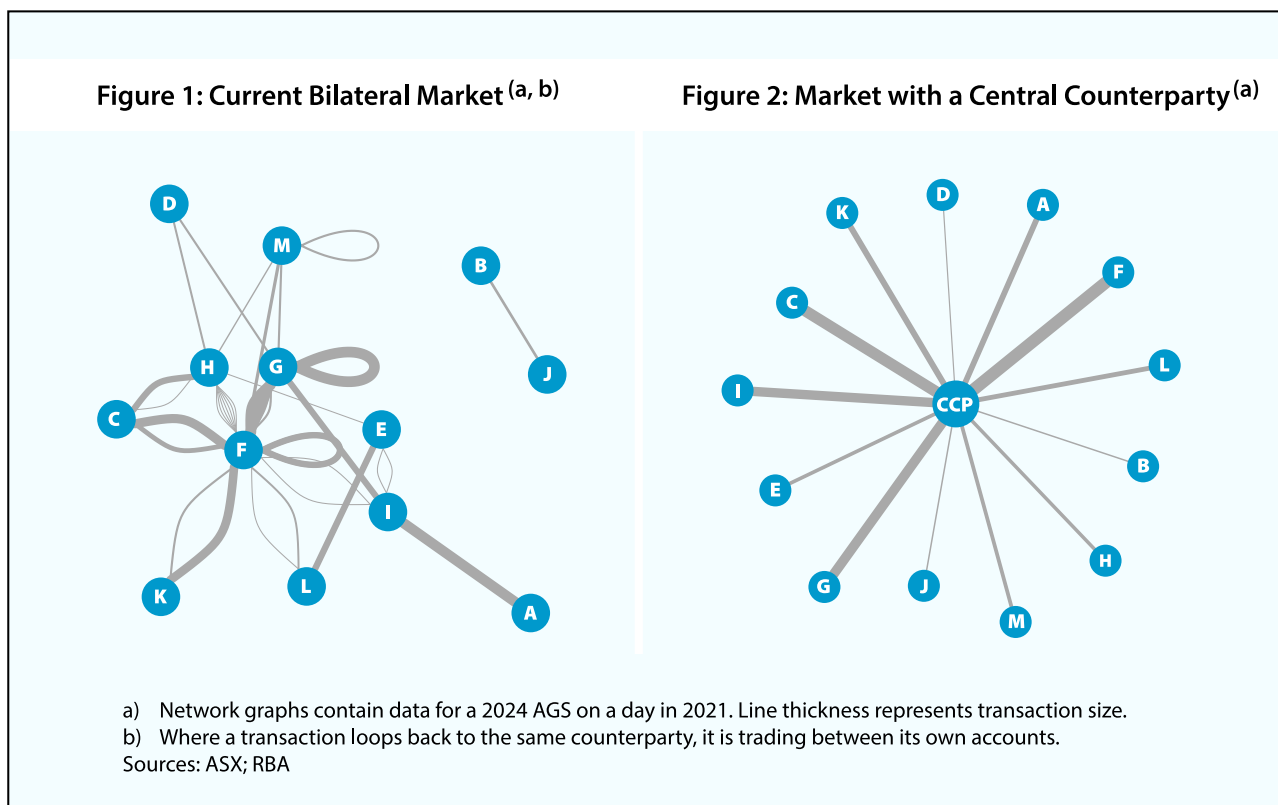
The 'dash for cash' in the US Treasuries market in early 2020 re-energised discussion over whether greater use of central clearing would improve the functioning of that market.^[2] It is estimated that virtually all interdealer transactions in US Treasuries prior to the mid-2000s were centrally cleared. However, the entry of new participants since that time that do not centrally clear has accompanied a decline in its use, such that three-quarters of the current market is not centrally cleared (Chaboud *et al* 2022).

It is generally agreed that centrally clearing bond market trades can provide a number of benefits, including enhanced efficiency, transparency and market stability (ISDA 2022). Because of these benefits, some, including a G30 Working Group on Treasury Market Liquidity, have called for a mandate to encourage greater central clearing of US Treasuries; in September 2022, the US Securities and Exchange Commission (SEC) proposed a similar mandate (G30 2022; SEC 2022; McCormick and Schulhofer-Wohl 2022).

The Australian bond market has become larger and more important

Significant growth in outstanding issuance in the Australian bond market prompts the question as to whether the bilateral clearing arrangements that served the bond market while it was considerably smaller remains appropriate today. Growth in the Australian bond market over the past decade or so has been particularly prominent in the case of Australian Government Securities (AGS), where outstanding issuance increased from around 10 per cent of GDP prior to the GFC to around

Figures 1 and 2



55 per cent in 2022. The larger volume of outstanding issuance has supported a greater level of activity in the Australian bond market. One example of this can be seen in the market for repos, which grew from a stock of around \$170 billion in 2015 to around \$300 billion in 2022.

As the bond market has grown, it has also come to play a more important role in the management of risks in the broader financial sector. Banks now make greater use of the bond market compared with a few years ago, holding over three times more AGS (as high quality liquid assets (HQLAs)) to meet their prudential liquidity requirements. Debt securities are also used by many participants in financial markets to meet margin and collateral requirements, which have increased in recent years.

It also worth noting that between 2001 and 2004, ASX operated the Bond and Repo Clearing service. It is estimated that, by June 2004, around 40 per cent of Australian bond transactions were cleared through the service (RBA 2015b); however, in July that year, the service was suspended due to the combination of the relatively small size of the market and a number of key market participants not using the service.

Against this backdrop, the growth in the Australian bond market over recent years is one consideration pointing to a strengthened case for centrally clearing the Australian bond market.

The Australian bond market has become more international

Growth in the size of the Australian bond market has attracted a greater range of participants. This expansion increases the complexity associated with the bilateral network of counterparties that must clear and settle their transactions. A particularly strong trend has been the increased involvement of non-residents, which currently hold over \$350 billion of AGS on issue, up from around \$200 billion in 2015 (Baker, Miller and Rankin 2021). Non-residents have also become much more heavily involved in the repo market, doubling their share of the stock of transactions outstanding since 2015 to around 50 per cent (Graph 1).

Non-resident investors typically access the Australian bond market through a different range of intermediaries compared with those used by residents. One example of this is the use of international central security depositories (ICSDs) to

hold and settle debt securities transactions. The ICSDs help to facilitate access to the Australian securities markets for international investors. They do this by linking to the domestic facility, Austraclear, where most Australian debt securities are held. However, the use of these intermediaries results in a more complex network of bond market participants (discussed further below).

The Reserve Bank’s participation is no longer critical to the viability of a CCP

The outright and repo markets for bonds are very important for the implementation of monetary policy. From 2020 to early 2022, the Reserve Bank increased its ownership of bonds in order to further ease monetary policy conditions. Over the same period, the Reserve Bank’s repo transactions declined and no longer represent a large share of the repo market. Overall, as the private market has grown, the Reserve Bank’s participation is no longer as critical to a CCP’s viability as was previously the case. While it is possible that the Reserve Bank’s operations in the bond market change in the future, it should be noted that central banks internationally are typically not participants in bond and repo market CCPs for their own currencies and do not use the CCP for monetary policy implementation.

Additionally, the experience internationally and in other domestic financial markets has shown that centrally cleared and non-centrally cleared markets can successfully coexist – an example in Australia is

the centrally cleared and non-centrally cleared markets for interest rate swaps.

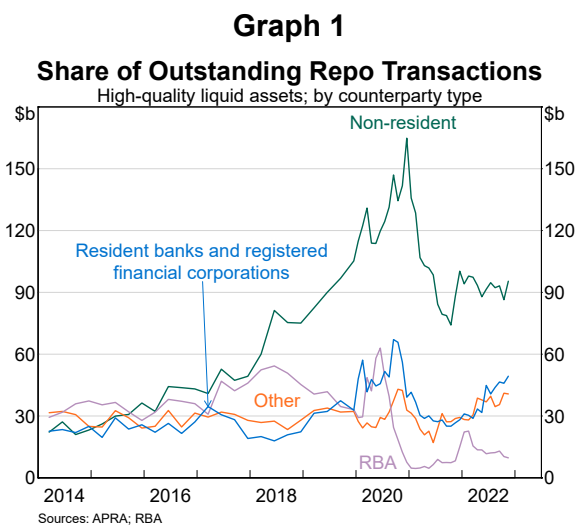
Market participant support for, and experience with, CCPs has increased

In liaison with the Reserve Bank, a number of dealers have expressed an appetite for reviewing the case for centrally clearing the Australian bond market. Among these firms, there is general support for a bond market CCP, reflecting the growth in the size of the market and number of participants, and the increased complexity resulting from the growing number of bilateral clearing arrangements.

The Reserve Bank’s liaison has also indicated that the benefits of a CCP, relative to its costs, are better understood by Australian market participants than in the past, including: operational efficiencies; standardisation of processes and contractual arrangements; and increased netting that would bring about capital savings and lessen balance sheet constraints. Firms have noted that growth in the bond market has outpaced the market capacity to warehouse bonds (where an entity stores bonds on its balance sheet for a period of time) and that central clearing could help to alleviate this constraint.

The greater understanding of the costs and benefits of a CCP among Australian market participants is due in part to the increased use of CCPs for other products and in overseas bond markets.^[3] Many international jurisdictions now have CCPs for bond market transactions, including Canada, Japan, Europe, the United Kingdom and the United States (New York Fed 2019).^[4]

It has also been noted in liaison that there is currently very little buy-side participation in the Australian repo market and that overseas repo CCP access models have resulted in increased participation from buy-side firms. Buy-side firms – such as hedge funds, mutual funds and pension funds – typically buy securities for money management purposes or as an investment. Further, under certain conditions there could be wider benefits for market functioning and resilience (see discussion below).



Costs of central clearing

Should there be central clearing in the Australian bond market, market participants would face both set-up costs in joining a CCP, along with other financial costs, including the following:

- **Fees to the CCP** are paid by participants in return for the CCP's service.
- **Default fund contributions** are paid by CCP participants to cover losses incurred in excess of initial margin (financial resources paid to cover potential future changes in the value of a participants' position) when closing out a defaulting participant's positions. Outright bond and repo transactions are relatively low risk and as such the default fund at a bond market CCP is likely to be small, particularly in comparison with a CCP clearing equities.
- **Variation margin** covers changes in the value of a participant's positions resulting from changes in market prices. It prevents the build-up of current exposures. In the bilateral market, it is only used for some repo market transactions. As such, the cost to participants joining a CCP is likely to be similar for some but increase for others.
- **Initial margin** covers a CCP's potential future exposures on a participant's positions in the event the participant defaults. Some participants already pay an equivalent to initial margin in the bilateral repo market in the form of a haircut on the value of the collateral. As such, there may only be a change in this cost for some participants (Carter and Cole 2017).

However, the costs of joining a bond market CCP are expected to be relatively small when compared with other markets due to the low-risk nature of the products.

Potential benefits of central clearing

One of the main benefits of CCPs is that they enable firms to net their exposures with all other counterparties.^[5] This is referred to as multilateral netting and is described in Figures 1 and 2 above. It can create firm- and system-wide benefits, which are outlined below.

Improved operational efficiency

In a centrally cleared bond market, multilateral netting can increase operational efficiencies for participants. This is possible because the number and value of transactions that each counterparty must process and settle may be lower than in a bilaterally cleared market that has no netting.

These benefits can be illustrated by comparing transactions that would be settled under bilateral and centrally cleared arrangements. Taking a single AGS bond on one day in 2021, there were 64 outright transactions among 20 counterparties (Table 1). In this particular security on this one day, two counterparties conducted multiple transactions (Y and Z), while several counterparties, including W and X, only had one transaction.

In a bilateral market with no netting, all 64 transactions would have to be settled individually. If the market were centrally cleared, each counterparty would settle only one transaction – the net of their purchases and sales. The number of transactions Y and Z must settle is significantly reduced. As W and X only had one transaction each and therefore no possible offsetting transactions, they do not receive operational benefits from central clearing for this security on this day. Two participants had perfectly offsetting transactions – same value of purchases and sales – of this security on this day and would have had no net settlement obligation.

System-wide liquidity benefits from multilateral netting

These firm-level netting benefits, aggregated across all participants and securities, leads to a reduction in the amount of cash and securities required in the market to effect settlement, which can reduce the size of positions held on firms' balance sheets.

In a bilaterally cleared market with no netting or payment sequencing, each counterparty would need to fund its gross settlement obligations, which is the sum of all purchases and sales in each security. In a centrally cleared market, a counterparty only needs to fund its net settlement obligation because its purchases and sales in the same security, on the same day, have been netted.

Table 1: Reduced Trades Improve Operational Efficiency^(a)

Counterparty	Bilateral market Count of settlements	Centrally cleared market Count of settlements	Bilateral market Value (\$billion)	Centrally cleared market Value (\$billion)
W	1	1	0.09	0.09
X	1	1	0.02	0.02
Y	26	1	0.82	0.29
Z	15	1	0.82	0.16
Aggregate market	64	18	2.58	1.30

(a) AGS data on a selected day in 2021. Only selected counterparties shown.

Sources: ASX; RBA

A comparison of gross and net settlement obligations for debt securities settled in Austraclear (the Australian securities settlement facility) over a 12-month period to late November 2021 indicates net settlement obligations would have been around 60 per cent lower. This amounts to a reduction of around \$60 billion per day, on average, in the amount of cash and securities that participants would need to make available for settlement if all debt securities transactions in Austraclear were centrally cleared (Graph 2).^[6]

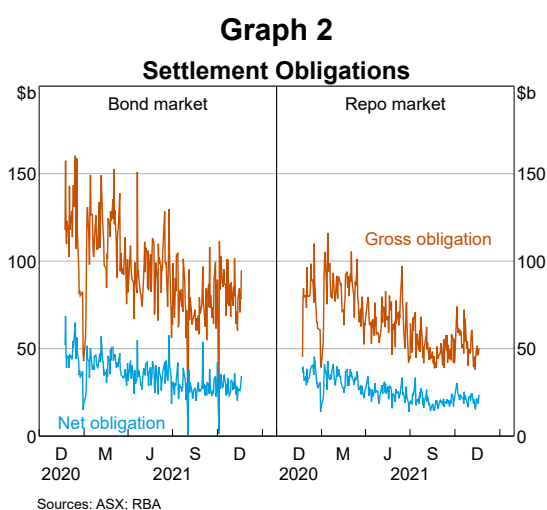
The liquidity netting benefits in the Australian bond market are calculated with an assumption that there is no sequencing of trades or netting present in the bilateral market. However, it is known that these arrangements do exist in the market. Therefore, the liquidity netting benefits calculated may overstate the benefits of moving from a bilateral to a centrally cleared market structure in Australia. However, the bilateral netting benefits of

interbank participants are approximately half of the possible multilateral netting benefits from central clearing (see discussion below). Further, the estimate of potential netting benefits is calculated using only Australian dollar denominated debt securities settled in Austraclear. There is also a material share of Australian dollar denominated debt securities settled outside Austraclear that could also be centrally cleared by a bond market CCP.^[7]

Netting benefits increase with trading volume

Netting benefits are greatest on days when there is a high volume of transactions that need to be settled, as there are typically more opportunities for offsetting transactions. In a bilateral market in which participants must fund and settle each transaction, operational and financial risk management balance sheet constraints are more likely to be binding on high-volume days. This is because there are more transactions occurring on these high-volume days and as such there is more financial and operational risk to protect against, which results in increased use of participants' balance sheets. As the trading volume increases, so too do the average netting benefits. The maximum potential netting benefit increases to over \$80 billion on days in the 90th percentile of trading volume (Graph 3).

High-volume days tend to be correlated with higher volatility in markets. While causation between activity and volatility can occur in either direction, increased balance sheet capacity to warehouse and facilitate transactions among interbank participants is likely to dampen volatility.^[8]



System-wide operational benefits and reduced settlement failures

The greater the number of transactions that must be settled in a bilateral market, the greater the number of dependencies – that is, one counterparty requires delivery of a bond from another counterparty in order to deliver it to a third counterparty. These dependencies are referred to as settlement chains or circles in securities markets. A settlement chain entails a chain of securities transactions among three or more counterparties involving the purchase and sale of a single security on a single date. A settlement circle is an extension of a settlement chain where the same security is due to pass between several participants on the same day without a clear start or end point.

In a bilateral market with no netting, settlements of transactions in a chain or circle would typically need to occur in a sequence such that all parties must have and deliver the securities. If one of the counterparties is unable to fulfil its obligation, this has the potential to result in a settlement failure of other transactions further through the chain or circle.

As the Australian bond and repo markets have grown and become more international, the complexity of the clearing and settlement processes for these securities has increased. Settlement chains or circles in the Australian bond market occur frequently.

A settlement failure occurs when a counterparty to a transaction fails to deliver all or part of the cash or

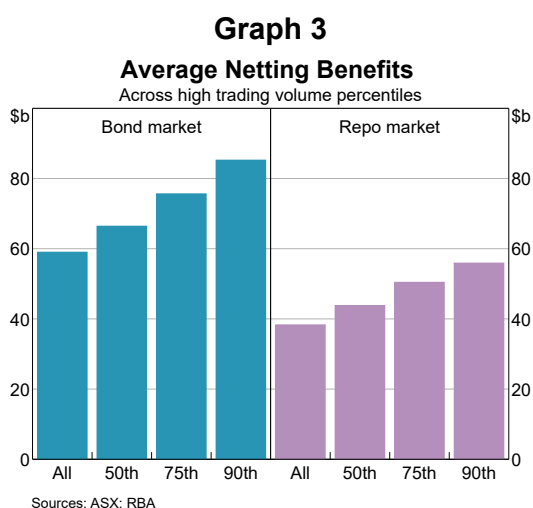
security they have contracted. The maximum exposure to settlement fails can be reduced through central clearing. In the above example, if one of the counterparties (Y) with the largest bilateral settlement exposures in this security on this day were to default, it would result in an exposure of \$0.82 billion. Under central clearing, this could be reduced to \$0.29 billion (Table 1).

Settlement failures are not common in the Australian bond market because counterparties instead facilitate settlement by borrowing securities in the market or from the Reserve Bank (Aziz and Jackman 2022). While providing a useful backstop mechanism, this step adds complexity to the facilitating of bond and repo market transactions. A central clearing facility would net obligations across counterparties prior to settlement, reducing the frequency and amount of securities that counterparties on aggregate would need to borrow. Central clearing could further reduce the already low number of failures, as well as the potential for a single transaction failure to have a systemic impact, and could improve market efficiency.

Lower credit risk exposures and capital requirements

For participants in a CCP that are banks, the reduction in operational, credit and liquidity risks leads to lower capital requirements than if the transactions were not centrally cleared. The reduction in credit risk is a result of the removal of a firm’s direct exposures to multiple counterparties, replaced with a single net exposure to the CCP. As credit risk is reduced, it frees up space on firms’ balance sheets, which makes it less likely that capital and other constraints limit the capacity of participants to transact in the markets.

However, market participants have noted that reduced credit risk is not seen as a significant benefit of central clearing in bond and repo markets. This is because the credit risk exposures for bond and repo market transactions is not high. Bond market transactions typically settle two days after a transaction occurs, while repo transactions, by definition, are well collateralised. It is estimated that there will be a capital benefit from central clearing compared with bilateral clearing, but the



benefit is expected to reduce once Basel III regulations are implemented in 2023.

Potential benefits to market resilience

Reforms to the OTC derivatives markets, including increased central clearing, in the wake of the GFC have been widely acknowledged to have made the financial system more resilient. Increased central clearing has standardised risk management, including: the use of margin to manage risk and coordinated default management; a more complete and less complex/segmented hub and spoke network of participants; and reduced exposures and potential for contagion through multilateral netting. It is worth noting that central clearing reduces contagion in the event of participant defaults; however, as the market is more concentrated around the CCP in this model, should the CCP itself default there could be major flow-on effects.

In assessing whether a market is suitable for central clearing, it is likely that the resilience benefits are larger for products that are widely traded and give rise to large exposures when not centrally cleared. Growth in the size of the Australian bond and repo markets naturally increases the potential benefits to centrally clearing these markets. The increased internationalisation of these markets through the greater participation of non-residents and the greater use of ICSDs has also contributed to a more complex network of bilateral relationships that could benefit from moving to a simplified hub and spoke model.

Evidence from the OTC derivatives markets suggests that moving towards central clearing can increase the liquidity of a market (Slive, Witmer and Woodman 2012; BlackRock 2018). It is also possible that centrally clearing the Australian bond market would increase market liquidity, particularly in AGS.

Case study: Lehman Brothers default in Japan

In Japan, the default of Lehman Brothers in 2008 led to greater use of central clearing in the Japanese Government bond (JGB) market. Prior to the Lehman Brothers default, there was modest participation in the JGB market CCP. Banks were already netting transactions bilaterally and did not realise large additional netting benefits or

efficiencies from joining the CCP. However, the benefits of central clearing beyond netting and efficient settlement were apparent to participants.

At the time of default, Lehman Brothers had a large value of trades yet to settle in the JGB bilateral market. As a consequence of Lehman Brothers' failure to settle these transactions, there were chains of settlement failures that took weeks to resolve.

This disruption was greater and took longer to resolve in the bilateral JGB market than in the centrally cleared JGB market where Lehman Brothers was a participant (Sato 2014; Bank of Japan 2009). Participants of a CCP are required to provide financial resources, including initial margin, proportional to their risk exposure. The CCP can draw upon these resources to cover any exposure or losses in the event of a default. Should a default occur, the netting provided by a CCP would have likely already decreased the overall exposure compared with the default occurring in the bilateral market. In the centrally cleared market, all losses incurred during the Lehman Brothers default were fully covered by its initial margin (IMF 2012).

Further, when Lehman Brothers failed to fulfil its obligations, participants in the CCP did not experience the flow-on effects to other trades that the bilateral market did, as the CCP took on those obligations. Surviving participants are better protected against replacement cost risk, which is the potential loss incurred from market movements should a participant need to close and re-establish its position because the original counterparty defaulted. The CCP was able to meet the obligations it assumed from Lehman Brothers to all non-defaulting participants.

After the Lehman Brothers default, there was a move by participants towards the cleared market. In comparison with the bilateral market, a CCP offers the additional benefit of coordinated default management processes. A CCP has predefined rules and procedures that participants agree to prior to joining the CCP that can contribute to more orderly market conditions in the event of a participant default, as it did during the Lehman Brothers default.^[9]

What affects the viability of a CCP?

A challenge that CCPs face is to incentivise a set of counterparties to join the CCP that will yield sufficient benefits from the central clearing market structure. The potential benefits are influenced by the network that the CCP can construct, including both the scope of products and participants. For example, the potential liquidity netting benefits noted above can only be achieved if all participants join a CCP.

While some countries have been able to develop successful bond market CCPs without mandates, others have encountered difficulty. As noted above, a reduced level of participation in the US debt securities CCP has led the SEC to propose mandated central clearing for all US Treasuries purchases and sales between a clearing member and registered broker-dealers, government securities brokers, dealers or hedge funds so that greater benefits can be realised (SEC 2022). Mandates were also used in developing central clearing in OTC swaps.

Participants face different incentives to join CCPs

The netting benefits from joining a CCP fall unevenly across participants. This may result in a lower incentive for some participants to join, even though there are potentially large system-wide benefits. Possibly reflecting these considerations, participation in bond market CCPs has been variable in jurisdictions where they exist.^[10]

Participants with the most offsetting trades will have the greatest netting benefits. In the analysis of Australian bond market (outright and repo) settlements in Austraclear, the top 20 participants are all interbank participants and would receive 98 per cent of the potential netting benefits (Table 2). Participants with fewer offsetting trades receive much smaller benefits. However, for the larger participants to realise the full netting benefits, participants with smaller potential benefits must also join the CCP.

Table 2: Cumulative Share of Netting Benefits

Participant	Cumulative share Per cent
Top 3 participants	40
Top 5 participants	58
Top 10 participants	83
Top 15 participants	93
Top 20 participants	98
All 101 participants	100

Sources: ASX; RBA

There are different trade-offs between the costs and benefits to less active trading participants or those with directional portfolios. While these participants would receive small to no netting benefits, joining a bond market CCP would expand the pool of counterparties smaller participants could easily transact with to include all other participants in the CCP, and reduce frictions such as bilateral agreements. In this way, central clearing can facilitate all-to-all trading, which tends to result in improved market liquidity. In a bilateral market, smaller participants would face insurmountable costs in setting up the legal agreements and operational arrangements required to transact with every other market participant. Participation in a CCP could increase the network for smaller participants, reducing the segmentation among market participants, and would likely increase competition for transactions, improve pricing and add depth to the market. Some overseas bond market CCPs have developed sponsored access models that cater for participants with lower levels of activity.^[11]

Netting across products and settlement facilities increases the benefits

The benefits of using a CCP are also dependent on the number of products that are eligible to clear. If a CCP were to operate for only the Australian dollar repo market that is settled within Austraclear (and not for the outright bond market), the overall netting benefit would drop to around \$40 billion per day on average. Allowing for cross-netting the settlement obligations of outright bond and repo

transactions increases the aggregate benefit in nominal terms by \$20 billion per day (Graph 3).

A CCP in the Australian bond market would also yield greater benefits if it netted transactions that took place in the ICSDs as well as Austraclear.

Netting benefits are impacted by the market structure

It is likely that not all of the activity in the bond and repo markets would be cleared through a CCP should one be set up. A more likely outcome is for a bond market CCP to realise only part of the maximum potential netting benefits. The following scenarios highlight the importance for any CCP to acquire participation from active counterparties, particularly those in the interbank market, in securities where there is a high level of activity (Graph 4):

- **Maximum benefit:** A bond market CCP clears all products and all potential counterparties join the CCP.
- **Interbank market:** Around 80 per cent of the maximum benefit is realised if 22 interbank market participants clear all of their outright and repo transactions.
- **AGS only:** Around 80 per cent of the maximum benefit is realised if only outright and repo transactions in AGS are centrally cleared.
- **Combined:** Around 70 per cent of the maximum benefit is realised if all outright and repo AGS transactions are centrally cleared by the 22 interbank participants that account for 90 per cent of activity.
- **Excluding a large participant:** The benefits of a bond market CCP are highly dependent on large participants joining. If a single large participant did not join the CCP, the aggregate netting benefit of using one would drop dramatically.

Bilateral netting benefits are lower than multilateral netting

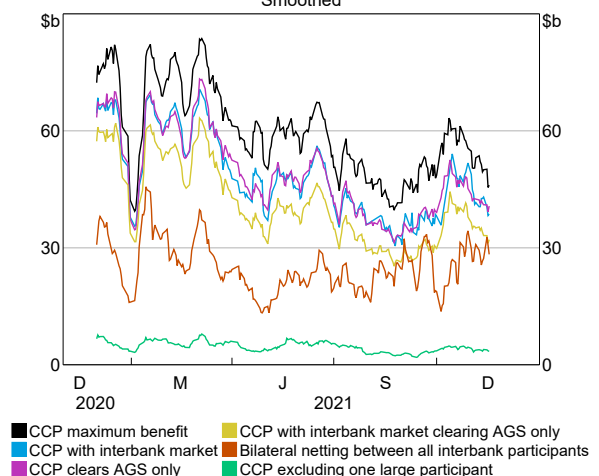
Some market participants have suggested that much of the benefit of multilateral netting from a CCP can also be achieved through bilateral netting. Our comparison of the bilateral and multilateral

netting benefits for 22 interbank participants indicates that around half of the netting benefits of a CCP could be realised through bilateral netting (Graph 4). For these to be realised, the 22 interbank participants would need to have bilateral netting arrangements with every other counterparty. Depending on the participant, this may be more or less costly than joining a CCP. A limitation of bilateral netting is that it is less likely to reduce issues arising from settlement chains or circles.

Next steps

The introduction of a CCP in the Australian bond market would entail costs and benefits. Overall, the public policy case for central clearing in the Australian bond and repo markets is stronger than in 2015 when the Reserve Bank last considered the case. However, the Reserve Bank intends to engage further with market participants on this topic to ensure that a wide range of perspectives are considered. One area that will be discussed is whether a potential Australian bond market CCP provider should be located in Australia, which has previously been the Reserve Bank’s view (RBA 2015a). Other areas of focus will be the incentives faced by different types of participants for joining a CCP and the interaction of financial stability issues and business case considerations as they relate to potential operators, market participants and the broader financial markets industry. ✎

Graph 4
Netting Benefits Under Different Scenarios
 Smoothed



Sources: ASX; RBA

Endnotes

- [*] The authors are from Payments Policy Department and would like to thank Bradley Jones, Ellis Connolly, Adam Cagliarini and Richard Finlay for feedback and Mia Pahljina for contributing analysis.
- [1] This article does not address all of the requirements for introducing a CCP outlined in World Bank (2022).
- [2] See, for example, Brainard (2021); FIA PTG (2021); DTCC (2021); Chaffee and Schulhofer-Wohl (2021); Brookings (2021).
- [3] In the context of a CCP, a participant is a direct member of the CCP and not a client of a participant.
- [4] In Europe and the United Kingdom, LCH's RepoClear services clear euro and sterling denominated repo trades; in the United States, FICC operates the Government Securities Division that centrally clears US Treasuries.
- [5] For a general discussion of the costs and benefits of CCPs, see RBA (2015b).
- [6] The liquidity netting benefits have been calculated using a similar methodology to Fleming and Keane (2021). See also Ziqing Chen *et al* (2022).
- [7] Both Clearstream Banking and Euroclear Bank settle Australian dollar denominated securities; some banks may also provide settlement within their own books.
- [8] For a discussion on the effect of dealer business models on liquidity in fixed income markets, see Cheshire (2016).
- [9] For example, the default rules in place at RepoClear (2022) (bond clearing service in the United Kingdom and Europe) and the Government Securities Division of FICC (2022) (US bond clearing service).
- [10] For example, in the United States, in 2017 only 13 per cent of Treasury transactions were centrally cleared.
- [11] See, for example, RepoClear (2023); FICC (2023). For a discussion of sponsored clearing, see BIS (2021).

References

- Aziz A and B Jackman (2022), 'The RBA and AOFM Securities Lending Facilities', *RBA Bulletin*, December.
- Baker N, M Miller and E Rankin (2021), 'Government Bond Markets in Advanced Economies During the Pandemic', *RBA Bulletin*, September.
- Bank of Japan (2009), 'Payment and Settlement Systems Report 2009'.
- BIS (Bank for International Settlements) (2021), 'A Discussion Paper on Client Clearing: Access and Portability', November.
- BlackRock (2018), 'An End-investor Perspective on Central Clearing: Looking Back to Look Forward', Viewpoint, September.
- Brainard L (2021), 'Some Preliminary Financial Stability Lessons from the COVID-19 Shock', Speech at the 2021 Annual Washington Conference, Institute of International Bankers, Webcast, 1 March.
- Brookings (2021), 'Task Force on Financial Stability', June.
- Carter L and D Cole (2017), 'Central Counterparty Margin Frameworks', *RBA Bulletin*, December, pp 85–94.
- Chaboud A, E Correia Golay, C Cox, M Fleming, Y Huh, F Kean, K Lee, K Schwarz, C Vega and C Windover (2022), 'All-to-All Trading in the US Treasury Market', New York Fed Staff Report No 1036.
- Chaffee M and S Schulhofer-Wohl (2021), 'Is a Treasury Clearing Mandate the Path to Increased Central Clearing?', Chicago Fed Insights, 23 June.
- Cheshire J (2016), 'Liquidity in Fixed Income Markets', *RBA Bulletin*, June, pp 49–58.
- DTCC (2021), 'More Clearing, Less Risk: Increasing Centrally Cleared Activity in the U.S. Treasury Cash Market', White Paper, May.
- FIA PTG (2021), 'Clearing a Path to a More Resilient Treasury Market', July.
- FICC (Fixed Income Clearing Corporation) (2022), 'Government Securities Division Rulebook', December.
- FICC (2023), 'Sponsored Service'.

- Fleming M and F Keane (2021), 'The Netting Efficiencies of Market Wide Central Clearing', New York Fed Staff Report No 964.
- FSB (Financial Stability Board) (2013), 'Strengthening Oversight and Regulation of Shadow Banking: Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos', 29 August.
- FSB (2018a), 'Incentives to Centrally Clear Over-the-counter (OTC) Derivatives', 19 November.
- FSB (2018b), 'OTC Derivatives Market Reforms Thirteenth: Progress Report on Implementation', 19 November.
- FSB (2022), 'Liquidity in Core Government Bond Markets', 20 October.
- G30 (2022), 'US Treasury Markets: Steps Toward Increased Resilience', Status Update, June.
- IAWG (2022), 'Enhancing the Resilience of the U.S. Treasury Market: 2022 Staff Progress Report', 10 November.
- IMF (International Monetary Fund) (2012), 'Japan: Oversight and Supervision of Financial Market Infrastructures', IMF Country Report No 12/229.
- ISDA (2021), 'Evolution of OTC Derivatives Markets Since the Financial Crisis', Research Note, January.
- ISDA (2022), 'US Treasury Clearing Survey Results', 10 August.
- McCormick M and S Schulhofer-Wohl (2022), 'Expanded Central Clearing Would Increase Treasury Market Resilience', Federal Reserve Bank of Dallas, 23 December.
- New York Fed (2019), 'White Paper on Clearing and Settlement in the Secondary Market for US Treasury Securities', November.
- RBA (Reserve Bank of Australia) (2015a), 'Central Clearing of Repos in Australia: Conclusions', October.
- RBA (2015b), 'Central Clearing of Repos in Australia: A Consultation Paper', March.
- RepoClear (2022), 'LCH Limited Default Rules', September.
- RepoClear (2023), 'Sponsored Clearing'.
- Sato T (2014), 'Maximizing the Potential of Japanese Government Bonds as Global Financial Assets – Recent Initiatives to Improve the Market Infrastructure for JGB Settlement', Speech at the International Bankers Association of Japan, Tokyo, 27 February.
- SEC (US Securities and Exchange Commission) (2022), 'SEC Proposes Rules to Facilitate Additional Central Clearing for the U.S. Treasury Market', Press Release No 2022-162, 14 September.
- Slive J, J Witmer and E Woodman (2012), 'Liquidity and Central Clearing: Evidence from the CDS Market', Bank of Canada Working Paper No 2012-38.
- World Bank (2022), 'How to Analyse the Costs and Benefits of Introducing a Central Counterparty', February.
- Ziqing Chen J, J Chen, S Ghosh, M Pandey and A Walton (2022), 'Potential Netting Benefits from Expanded Central Clearing in Canada's Fixed-income Market', Bank of Canada Staff Analytical Note No 2022-8.

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