Bulletin

JUNE 2023

RESERVE BANK OF AUSTRALIA

Bulletin

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Climate Change and Financial Risk

Samuel Kurian, Geordie Reid and Maxwell Sutton[*]

Photo: sarote pruksachat – Getty Images

Abstract

Climate change, and the actions taken in response to it, introduces both risks and opportunities for financial institutions. The Reserve Bank continues to monitor the build-up of climate-related financial stability risks, including how these risks are priced and who ultimately bears the physical and transition risks arising from climate change. Globally and in Australia, most analysis has found limited direct effects of climate risks on the financial system as a whole. Those that do arise fall unevenly, with the largest risks concentrated in specific geographic regions and sectors. Much of the analysis to date has been exploratory in nature and analytical frameworks continue to develop. This reflects, in part, the complexity of bringing together elements of climate science, economics, finance and regulation. Commonly identified areas for improvement relate to data availability and coverage, consistent disclosure requirements, and the design of scenarios used to assess climate-related risks to financial stability. Ongoing engagement and coordination between the public and private sectors, domestically and internationally, will be required to effectively monitor and ultimately manage the physical and transition risks arising from climate change.

Introduction

Australia's climate has warmed by nearly 1.5°C since national records began in 1910, according to the Bureau of Meteorology's latest 'State of the Climate' report (BoM 2022). Average sea surface temperatures have increased by over 1°C since 1900, and rainfall patterns have changed significantly in many regions. In the coming decades, Australia is expected to see ongoing changes to its weather and climate, including decreased winter rainfall in southern and eastern agricultural regions, more periods of extreme heat, longer fire seasons and fewer but higher intensity tropical cyclones (BoM 2022).

These changes, and the actions taken in response, introduce opportunities (e.g. in the development of green technologies) but also risks for Australia's economy and financial system (Summerhayes 2017; Debelle 2019). Economic and financial risks arising from climate change are typically divided into two types:

- **Physical risks** refer to the potential damage and losses from the increasing severity and frequency of climate-related events. These can be acute (as in the case of a destructive tropical cyclone) or chronic (such as rising sea levels and temperatures).
- **Transition risks** result from the actions taken to reduce greenhouse gas emissions, mitigate climate change and adjust to a lower emissions economy. This encompasses changes in government policies, technology, and investor and consumer preferences, which have the potential to result in substantial and, in some cases, unexpected changes to the functioning of the economy and financial system. Transition risks can arise domestically or internationally, transmitted through trade flows or financial markets.

These climate risks will affect financial institutions via a number of channels.[1] Physical risks from increased variability and extremity of climatic conditions will reduce the value of certain assets and income streams. This could result in increased claims on insurers, unexpected credit losses for banks and write-downs to the value of financial investments. Policy and technological changes that address climate change will moderate these physical risks; however, they may increase the transition risks associated with the move to a lower emissions global economy. Sudden or unexpected changes in regulations, technology or consumer preferences, or uncertainty about prospective policy settings, could quickly lower the value of assets or businesses in emissions-intensive industries, some of which may become economically unviable or 'stranded'.

This article provides an update on international and domestic research into the financial risks of climate change from a financial stability perspective, including some recent modelling undertaken by the Reserve Bank. To date, much of this work has been exploratory in nature. Key aims have been to understand the data and capabilities needed to better evaluate climate risks and to build capacity in this area within regulatory and financial institutions, with the ultimate goal of more effectively managing these risks.

International developments in climate scenario analysis

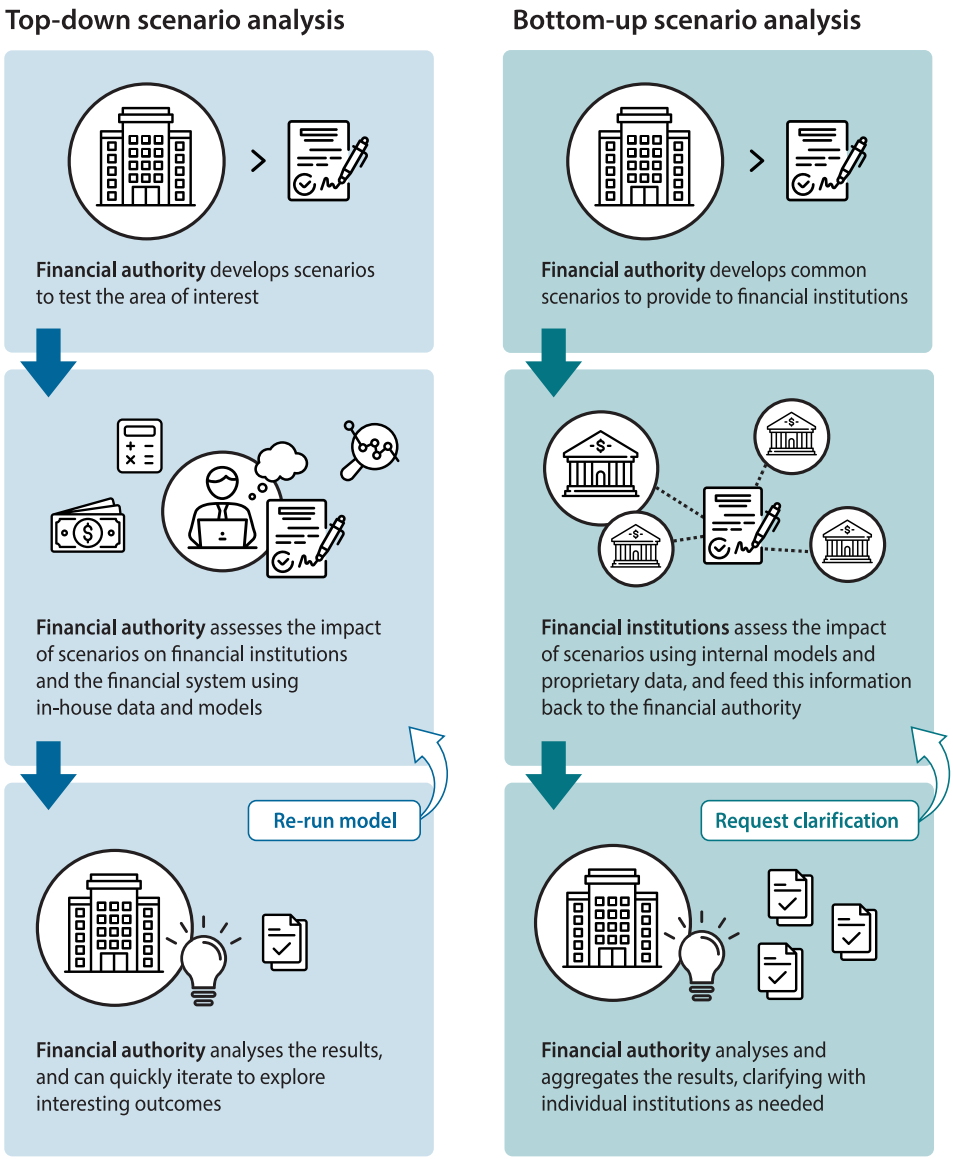
Integrating measures of climate risk into monitoring and regulatory frameworks is a recent development for financial authorities. It is complicated by significant uncertainty about the impact of a warming climate on global weather patterns, how government policy will respond, how these actions will transmit to economic and financial sectors, and how individual institutions are exposed to these risks. Traditional risk-analysis methods, which rely on historical data, are less useful given the unprecedented and wide-ranging nature of climate risks.

To fill this gap, scenario analysis has emerged as a key tool for evaluating climate risks. Scenario analysis deals with uncertainty by assessing future outcomes based on a plausible set of assumptions; scenarios are best understood as 'what if' narratives rather than as a set of forecasts. While it is unlikely that any specific scenario will eventuate, investigating possible outcomes under a wide range of assumptions helps to draw out the key factors that may drive future developments and to assess the potential implications. The Network for Greening the Financial System (NGFS) – a group of central banks and supervisors created to design and share best practice for climate risk management in the financial sector – has developed a set of climate scenarios designed to be a common reference point for understanding how climate change, climate policy and technological trends could evolve in the future (NGFS 2022).[2]

There are two main approaches to scenario analysis, although hybrid methods are also possible:

- **Top-down** approaches are model-based exercises that apply a consistent set of decision

Figure 1: Top-Down and Bottom-Up Scenario Analysis



rules to all institutions and are generally run in-house by authorities, allowing for quick iterations to explore interesting results.

- **Bottom-up** exercises involve authorities providing common scenarios to financial institutions that then assess the implications for themselves and their counterparties using internal models and processes. The results are submitted back to the relevant authority to be collated and analysed, and individual institutions are asked for clarification if required. Bottom-up exercises tend to contain richer and more realistic detail than top-down approaches, but they are significantly more resource intensive and take much longer to complete.

Over the past two years, more than 50 climate scenario analysis exercises have been completed or are currently underway by NGFS members using top-down, bottom-up and hybrid approaches. The majority of these exercises have focused on credit risk or market risk, using metrics such as the probability of default or loss-given-default for credit exposures (FSB and NGFS 2022). These exercises have covered a range of objectives in addition to providing an initial assessment of the magnitude of climate risks (Graph 1). Common themes included: identifying data needs for climate risk analysis; building capabilities within financial authorities (like the Reserve Bank); and facilitating dialogue with industry about climate-related vulnerabilities.

In general, these exercises have not found severe macroeconomic and financial impacts at a system-wide level, although in some cases adverse impacts were found for individual sectors or institutions (FSB and NGFS 2022). However, many jurisdictions felt that the measures of exposure and vulnerability were likely understated, noting that the initial modelling did not account for second-round effects or potential climate non-linearities. Offsetting this, in general the scenarios did not factor in adaptation measures taken by financial and non-financial firms that might mitigate the risks. Another finding from these exercises related to the material differences in estimated climate-risk exposures between countries, industries and institutions. While this result may be partly due to the different methods employed, it also highlights the underlying diversity of climate risks. For Australia, this implies a need to look beyond aggregate results and develop a deeper understanding of the regions and sectors where risks are most concentrated.

Climate change risks to Australian banks

Previous Reserve Bank work

Bellrose, Norman and Royters (2021) provided a preliminary assessment of climate change risks to Australian banks. The work examined banks' exposures to physical climate risks associated with bank mortgages and transition risks from bank business lending. Residential mortgages account for approximately two-thirds of major Australian banks' loan portfolios, with housing collateral backing the loans. If current property values do not fully reflect the long-term risks of climate change, banks will be more exposed to the risk of credit losses in the case of borrower default. The research found that overall losses for the financial system due to climate-related declines in property value are likely to be manageable, and only a small share of housing in regions most exposed to extreme weather would experience price falls that could worsen credit losses to banks.

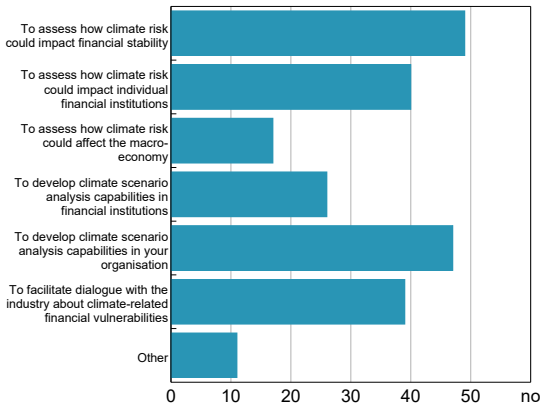
To examine the impact of transition risks on business lending, the authors constructed a measure of emissions intensity by sub-industry.[3] Using this as a proxy for exposure to transition risk, they then measured banks' credit exposures to each of these sub-industries. They found that bank lending to industries with a high level of emissions is typically small, while banks' largest exposures are to industries with relatively low emissions intensity. As a result, banks' lending portfolios were found to be less emissions intensive than the Australian economy as a whole, indicating banks are not carrying outsized exposures to transition risks.

A number of limitations were noted in this analysis, such as the assumptions that banks' balance sheet structures do not change over time and that all firms within a sub-industry have the same emissions intensity. However, it provided a preliminary examination of potential climate risks facing Australian banks and identified areas where more information is needed, such as data on the location of business assets. As the authors noted, a range of approaches will need to be used to better capture the different facets of climate change and their potential impact on the financial system.

Graph 1

Main Purpose of Climate Scenario Analysis Exercises*

Number of observations



* Reproduced from Graph 2 in 'Climate Scenario Analysis by Jurisdictions: Initial Findings and Lessons' (FSB and NGFS 2022).

Sources: FSB and NGFS; RBA

Climate Vulnerability Assessment

The Australian Prudential Regulation Authority (APRA), on behalf of the Council of Financial Regulators, recently published the results of a Climate Vulnerability Assessment (CVA) undertaken with Australia's five largest banks during 2021–2022. The CVA was a bottom-up scenario analysis designed to provide insights into the potential financial risks to banks, the financial system and the

economy posed by both physical and transition climate risks. It also aimed to improve banks' climate risk management capabilities and to understand how banks may adjust their business models in response to climate change (APRA 2022).

The exercise drew on two global scenarios developed by the NGFS, tailored with additional Australia-specific economic and physical risk data:

- The **Current Policies** scenario explored a future where global emissions remain broadly similar to current levels to 2050 before growing slowly to 2100, resulting in higher physical risks for the economy. Many physical risks become more severe in the second half of the century under this scenario.
- The **Delayed Transition** scenario explored a future with the same global emissions trajectory to 2030 as the Current Policies scenario. Global policy action on climate change in 2030 leads to a rapid reduction in global emissions from 2030 onwards, introducing transition risks as climate policies take effect.

The scenarios were chosen to gain insights into the potential impacts on banks under markedly different assumptions and climate outcomes.

Overall, the CVA results reported by the participating banks indicated that the climate risks considered in both scenarios would increase losses on bank lending in the medium-to-long term but were unlikely to cause severe stress to banks. Higher mortgage lending losses were reported in regions that were exposed to more severe and prolonged physical risks, and these losses were marginally higher under the Current Policies scenario. For business lending, several sectors – including mining, manufacturing, transport and wholesale trade – showed higher losses due to transition risks, especially under the Delayed Transition scenario. Lending losses were concentrated in specific regions and industries that represent only a small proportion of banks' overall lending exposures. These conditions, however, could present a risk to less-diversified banks that have greater concentrations of their exposures in these regions and sectors. The participating banks indicated they would adjust their risk appetite and lending approaches in response to growing climate risks.

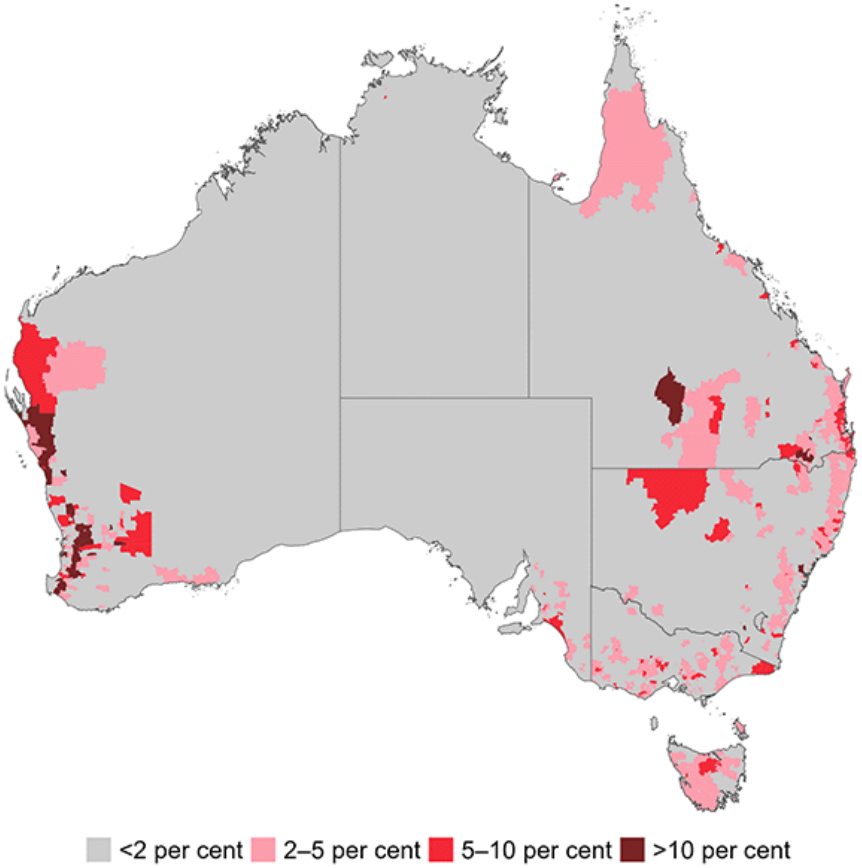
There were several limitations to the CVA exercise, including issues with climate-related data quality and accessibility and the extended time horizon of the scenarios (beyond typical business and capital planning cycles). There were significant differences in the scale of the impacts reported across the banks for their portfolios. The largest driver of these differences was considered to be variations in the ability of banks to capture climate change impacts in their internal models, rather than reflecting the uneven impact of climate change on banks' differing balance-sheet structures.

Climate scenario analysis using the Bank's macrofinancial model

As a complement to the CVA, the Reserve Bank also undertook a climate scenario analysis exercise. This was a top-down exercise, using the Bank's existing stress-testing framework to assess how climate risks might impact the banking sector. However, it is important to note that this analysis was undertaken largely to establish and refine analytical techniques; it was not intended to be a formal and fully fledged stress test. It focused primarily on possible financial risks, rather than being a broader assessment of different climate policies. As with the CVA, it looked at the banking system; other important parts of the financial system, such as insurers and asset managers, will be considered in future work.

The exercise was conducted using the Bank's macrofinancial stress-testing model described by Garvin *et al* (2022). At a high level, the model involves estimating how adverse macroeconomic conditions affect bank capital ratios using a set of common assumptions and balance sheet decision rules.[4] The exercise used the Current Policies and Delayed Transition macroeconomic climate change scenarios from the CVA (as discussed above), along with a baseline scenario of steady growth, no macroeconomic shocks and no change in climate risks.[5] The CVA scenarios, in particular the Delayed Transition scenario, were devised with a focus on key regions for exploratory analysis. As such, they contain known limitations and this exercise was

Figure 2: Housing Price Effects of Physical Risk*



* Estimated effect of increased climate hazard risk on housing values in 2050, by postcode, relative to current climate hazard risk.

Sources: ABS; RBA; XDI-Climate Valuation

undertaken primarily with a view to testing analytical methods.

To better capture the physical climate risks to residential housing, we overlaid the housing price falls in the CVA scenarios with climate hazard data provided by XDI Climate Valuation and Munich Re.[6] These hazard data measure the expected increase in insurance costs due to climate-related damage – for example, more frequent flooding or more damaging cyclones – and were translated into housing price falls using the user cost method as described in Fox and Tulip (2014) and Bellrose *et al* (2021).[7] This was calculated at the postcode level of geographical disaggregation for the XDI Climate Valuation hazards and the SA3 statistical area level for the MunichRe hazards. Figure 2 shows the estimated housing price impacts in 2050 due to increased physical climate risk using data from XDI Climate Valuation, noting that the equivalent Munich Re data provides very similar results. These estimates suggest that around 7.5 per cent of properties are situated in postcodes that could see property price effects of 5 per cent or more, relative to the case where there is no change in climate risks from current levels.[8]

Graph 2 shows the effect of the climate scenarios on banks' CET1 ratios relative to the baseline scenario for the case of the XDI Climate Valuation hazard overlay. The MunichRe hazards show an almost identical pattern. In the Current Policies scenario there is a small fall in the aggregate CET1 ratio, but banks do not experience significant deteriorations in capital. While we might expect minimal effects in the near term under this scenario, the lack of impact on bank capital in later periods raises questions about how well physical climate shocks have been captured. The Delayed Transition scenario shows a pronounced, albeit small, fall in

capital as the peak climate transition shock occurs around 2030–2031. The results appear to be driven by the aggregate macro-economic conditions in the scenario, rather than region or sector-specific risk overlays. In neither case, however, do banks experience severe stress.[9]

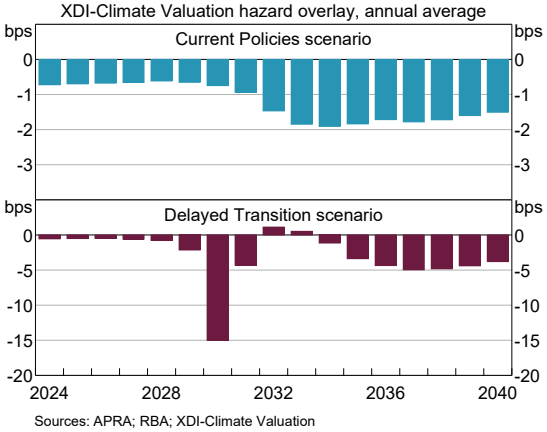
There are some important caveats to these results. Within the scenarios, physical risks to businesses are not captured due to a lack of data on the locations of business assets. In addition, the model contains an implicit assumption of full insurance; in other words, it assumes dwellings are not destroyed or can be rebuilt (and without frictions in the process). As a result, the Current Policies scenario in particular may underestimate the impact of physical risks on banks' CET1 ratios. The availability and extent of insurance is an important factor to consider in future work as it involves the transfer of risk – if a dwelling becomes effectively uninsurable, the risks from physical damage are transferred to the homeowner and to banks if the asset is collateral for a loan. Finally, only credit risk is captured using this framework. A fuller analysis would consider other metrics like liquidity risk and market risk, as well as hard to quantify factors such as legal or reputational risk.

In general, models such as the Bank's macrofinancial stress-testing model require significant amounts of macroeconomic stress, typically associated with severe but plausible recessions, to generate material deteriorations in bank capital. The climate scenarios used in this exercise did not contain the amount of stress that would generate significant losses in traditional macrofinancial stress testing.[10] This should not be read as saying that climate change could not cause significant losses, but rather that the development of climate scenarios is an ongoing process and future iterations may better capture the extent of second-round effects, better account for interactions between climate shocks and wider macroeconomic downturns, and contain higher frequency data to avoid smoothing over periods of financial stress. Climate shocks are also expected to have localised effects that could have larger impacts on smaller regional lenders; however, these were not examined in this analysis, and may require a different analytical approach such as regionally disaggregated models or local case studies.

Graph 2

CET1 Ratio Deviation From Baseline

XDI-Climate Valuation hazard overlay, annual average



Sources: APRA; RBA; XDI-Climate Valuation

The results described here were broadly in line with those found in the CVA and the earlier results reported by Bellrose *et al* (2021). However, it is important to note that the work to date has been largely exploratory in nature as researchers develop and improve analytical techniques and fill data gaps for capturing climate risks. A number of limitations and areas for development have been repeatedly noted, including the availability of appropriate data, the need to adapt bank risk models for longer time horizons and the omission of second-round (or 'spillover') effects.

Climate change risks for non-banks

To date, most analysis of climate-related financial risks has focused on the banking system. However, understanding the impacts of climate change on other participants in the financial system – including insurers and asset managers – is important for assessing financial system risks.[11] In 2022, the NGFS's international survey found that only around one-third of initial climate scenario analysis exercises included the insurance sector, with far fewer including other non-bank institutions (FSB and NGFS 2022).

Insurers are exposed to climate change as underwriters of insurance products. More frequent or more severe weather events are expected to increase claims on damaged property and other assets. Given this increased risk, insurers are likely to increase premiums to cover their expected claims. Australian insurers also partly rely on reinsurance

contracts to meet payouts for large events; as these events become more frequent, reinsurers may raise prices or reduce the cover they offer, which would affect the price and availability of domestic insurance. However, insurers' ongoing exposure to physical climate risks is limited because the majority of general insurance contracts in Australia are written year to year (ICA 2022). This means that insurers can pass on increased costs to their customers or withdraw coverage from high-risk regions to adapt to changing climate risks.

As insurance costs rise and availability declines or becomes less certain, some households and businesses may choose to reduce their coverage, resulting in higher rates of non-insurance and under-insurance. These parties will bear more of the costs in the case of a severe climate event and these costs may be passed on to lenders in the case of loan defaults where affected assets are used as collateral (Kearns 2022).[12] This reflects a tension between annually renewed insurance contracts and long-term bank loans and has implications for who bears the risks from climate change and how these risks are managed.

In response to challenges related to the affordability and availability of insurance, governments in Australia and overseas have generally aimed to either reduce the costs of natural disasters or to expand insurance availability. The cost of natural disasters may be reduced through mitigation measures (such as retrofitting homes for cyclone resilience) and managed retreat, which involves moving vulnerable people and assets away from high-risk areas. Managed retreat can include land buy-backs, relocations or land swaps as in the case of Grantham, Queensland following severe flooding in 2011 and more recently in northern New South Wales following flooding in 2022 (Moore 2020; Cross and Herbert 2023). In response to concerns about the diminishing availability of insurance, some governments abroad have created government-run insurers and government-backed reinsurance pools, and have provided direct subsidies or rebates (ACCC 2020). In 2021, a cyclone reinsurance pool was introduced by the Australian Government (Treasury 2021).[13] International examples include the FloodRe scheme in the United Kingdom and the National Flood Insurance Program in the United States. To help manage financial risks for government-sponsored schemes and encourage adaptation, some schemes include lower premiums for mitigation measures and exclude properties built in high-risk areas after the scheme was introduced (ACCC 2020).

Insurers are also exposed to climate risks through the large asset portfolios they hold to cover expected claims, which are vulnerable to significant falls in value. The risks to this part of their operations are similar to those facing other asset managers such as superannuation funds, although Australian insurers typically have asset allocations skewed towards lower risk assets. Physical climate risks can cause the value of property and infrastructure assets to fall, whether through direct damage or reduced productivity. Transition risks may affect the valuation of firms, especially in emissions-intensive sectors, both through decreased profitability (if, say, an emissions price is introduced and emissions-related business costs increase) and through changes in investor preferences. A severe stress scenario could see the asset management sector amplify a negative shock through fire sales of assets, increasing systemic risk and leading to a 'green swan' event (Bolton *et al* 2020; OECD 2021).[14] In a less severe illustration of the scale of potential losses, the Bank of England's 2021 Climate Biennial Exploratory Scenario modelled insurers' asset values falling between 8 per cent and 15 per cent across three different scenarios (Bank of England 2021).

Next steps for climate risk analysis

As noted above, the majority of analytical work to date, in Australia and internationally, has found limited impacts from climate risks for financial stability at a system level. However, these exercises have largely been designed to build capacity, develop frameworks and identify issues and constraints with existing risk-analysis methods. These exercises have yielded a common set of recommendations to enable more rigorous assessment of climate risks: filling data gaps; introducing common reporting and disclosure standards; and developing more comprehensive climate scenarios.

Filling data gaps

Climate change is a global phenomenon and impacts multiple sectors, markets and jurisdictions. However, the effects of climate change may vary substantially between geographic locations and economic environments. To accurately capture financial institutions' potential exposures to climate risks, institutions and regulators will require new and detailed data.[15] For example, assessing firm-level climate exposures will require granular data on firm-level emissions, transition plans and the location of assets. Consistent analysis across industries and countries will require comparable data – for example, emissions will need to be measured in the same way. In some cases, analysis will require data not previously collected by regulators, such as information on insurance coverage. Financial institutions themselves are likely to want these data for their own risk-management purposes, while regulators need to combine the various data sources to accurately capture potential exposures of financial firms and the risk across the system. The task of gathering and managing appropriate access to these data will be made easier by consistent reporting.

Introducing reporting standards

Part of the solution to filling data gaps is to introduce a common framework for reporting climate risks. Climate risk disclosures should be consistent and comparable between firms, industries and countries to allow for the global nature of climate shocks and financial linkages. The Taskforce on Climate-related Financial Disclosures (TCFD) has prepared a set of recommendations for best practice, aimed at creating a global standard (TCFD 2017). Domestically, current guidelines from the Australian Securities and Investments Commission encourage listed companies to use the TCFD recommendations as the primary framework for voluntary climate change-related disclosures (ASIC 2021). The Australian Treasury is consulting on a climate risk reporting framework that outlines standardised, internationally aligned requirements for disclosure of climate-related financial risks by large businesses and financial institutions while minimising the regulatory burden (Treasury 2022). This framework will be based on TCFD principles, with the flexibility to adapt to changes in global best practice.

Improving scenario analysis

Scenario analysis has emerged as a leading approach for assessing climate risks to the financial system. However, robust scenario analysis requires appropriate scenarios tailored for different jurisdictions. It is becoming widely recognised that climate impacts can differ substantially between regions and industries, and even within industries – for example, between firms using energy-efficient best practice and those relying on older technology. There are numerous uncertainties in mapping the impact of climate change to financial stability, from understanding how weather patterns will change in a warming climate, to the adaptation measures taken by governments and others and the effects this will have on economies and financial markets, through to the impact on individual financial institutions and financial stability.

There are several approaches available to better understand the range of possible outcomes. These include examining results over different time horizons, looking at distributions of outcomes rather than just the central tendency, and using a wider range of models. This will require a multi-faceted approach combining elements of climate science, economics, finance and regulation. Finally, having access to sufficiently detailed data and disclosures will support the preparation of more comprehensive and detailed scenarios, allowing regulators and financial institutions to better assess the implications of how climate change will affect systemic risk.

Conclusion

Climate change introduces new sources of risk that financial authorities and institutions need to monitor and manage. In Australia and around the world, quantitative analysis undertaken to date has found relatively minor impacts on financial stability at a system level, although several analyses have noted uneven impacts across geographic areas and industries. However, these exercises have encountered limitations and have largely been

aimed at building capacity and identifying knowledge and information gaps. Improved data availability, aided by comprehensive and consistent climate risk disclosures, will help the development of climate scenario analysis and other modelling and monitoring techniques. Coordination across the public and private sector, along with continued engagement with global best practice, is critical to the effective monitoring and ultimately management of climate risk in the Australian economy and financial system.

Endnotes

[*] The authors undertook this work while in Financial Stability Department. They would like to thank Michelle Lewis, Anna Park, Andrea Brischetto, Brad Jones and colleagues at APRA for their contributions. They would also like to thank XDI-Climate Valuation and MunichRe for supplying data used in this work.

[1] Financial regulators typically view climate risks in terms of their effects on the traditional categories of credit risk, market risk, liquidity risk and operational risk (BCBS 2021). For example, a fall in the value of collateral due to climate change increases credit risk, while write-downs to the value of financial assets is a type of market risk. Reputational and litigation risks are sometimes separated from operational risk as discrete categories.

[2] The NGFS was created in 2017 by a group of eight central banks and supervisors, and now contains over 120 members. The Bank has been a member of the NGFS since 2018 and contributes to multiple work streams.

[3] This accounted for direct greenhouse gas emissions from operations and production, and indirect emissions from inputs and the upstream supply chain.

[4] The core of the stress-testing model involves mapping a scenario for GDP, the unemployment rate and property prices to three key variables: bank profits; the amount of profits retained as capital; and the change in banks' risk-weighted assets in response to the macroeconomic conditions. These three variables can then be used to estimate how banks' capital ratios change quarter to quarter in the model.

[5] The baseline scenario was also provided by APRA but did not form part of the CVA exercise.

[6] The hazard data provided by XDI-Climate Valuation covered coastal flooding, riverine flooding, surface water flooding, extreme wind and forest fire. Other hazards provided, which may damage structures without a severe event, were freeze-thaw cycles and soil subsidence. MunichRe provided data on riverine flooding and tropical cyclones.

[7] Intuitively, this can be thought of as a decrease in the capital value of a property as higher future insurance costs increase the cost of servicing the property.

[8] This is not to say that property prices fall by 5 per cent, as both scenarios anticipate property prices to rise over time. Rather, it indicates that, due to increased physical climate risks, the level of property prices is 5 per cent lower than it would have been in the hypothetical case where there is no change in physical climate risks from current levels out to 2050.

[9] The peak fall in banks' capital ratios modelled in this exercise was 15 basis points on an annual average basis. By comparison, modelling of a severe downside scenario during the COVID-19 pandemic resulted in banks' CET1 ratios falling almost 200 basis points (Garvin *et al* 2022).

[10] Previous research has found evidence supporting the 'double trigger' hypothesis that mortgage defaults require both negative equity and a reduction in borrowers' ability to repay their mortgage (Bergmann 2020). In the current exercise, neither condition reached levels seen in previous stress events.

[11] In its recent Supervisory Priorities publication, APRA indicated that it is considering a climate vulnerability assessment for the insurance sector in 2023 (APRA 2023).

[12] This also raises distributional and affordability issues. An Actuaries Institute report found that the households that are already struggling to pay home insurance premiums will be most affected by the impacts of climate change on home insurance premiums (Actuaries Institute 2022).

[13] This covers property damage caused by cyclones and cyclone-related flood damage, with the goal of improving accessibility and affordability of insurance for households and small businesses in cyclone-prone areas. The pool is backed by a government guarantee and is designed to decrease premiums in cyclone-prone regions. One desired outcome is a reduction in under-insurance and non-insurance in affected regions.

[14] A 'green swan' refers to a potentially extremely disruptive financial event, triggered by a climate shock, which could lead to a systemic financial crisis. See Bolton *et al* (2020) for more detail.

[15] See FSB (2021) for a full discussion about data needs for monitoring and assessing climate-related risks to financial stability.

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New Insights into the Rental Market

Fred Hanmer and Michelle Marquardt[*]

Photo: Daria Nipot – Getty Images

Abstract

This article draws out new insights into the private Australian rental market using a new large administrative dataset of rental properties, which is an input to the Consumer Price Index (CPI). CPI rent inflation has picked up recently. Since 2021, rents have increased across inner-city and regional areas throughout all the states. Rent increases have also become more common and larger on average – particularly for the 2–3 per cent of properties each month that have a change in tenants. This is in contrast with the experience during the COVID-19 pandemic where rents fell in many suburbs close to central business districts but increased in regional areas, driven by a preference shift among many households for more space and net population flows.

Introduction

Access to appropriate and affordable rental accommodation is important for the wellbeing of renter households. According to the 2021 Census, close to 30 per cent of all households rent their home in the private rental market – a share that has risen over the past few decades. The 2019/20 Survey of Income and Housing (SIH) showed that renters tend to have lower incomes and spend a larger share of their disposable income on housing costs compared with owner-occupier households (both outright owners and those with a mortgage). The median private renter spends around 26 per cent of their weekly income on rent. Furthermore, rents (both public and private) currently make up around 6 per cent of the CPI basket, making it the second largest expenditure class.[1] Understanding the rental market is important for policymakers as it has implications for patterns of consumption and savings by households, as well as inflation.

The rental market has tightened since late 2021, with vacancy rates declining over this period (Graph 1). During the COVID-19 pandemic, lockdowns and health concerns prompted many Australians to desire more space and to live with

fewer people (Ellis 2022). The associated decline in average household size is estimated to have contributed to around 120,000 additional households being formed, with some of this demand materialising in the rental market (Agarwal, Gao and Garner 2023). More recently, the return of international migration – and, in particular, the return of international students – has added to demand for rental properties in the major cities. Advertised rents have grown strongly and finding a suitable rental property has become more difficult as vacancy rates have declined.

Rents, as measured in the CPI, have also picked up of late but to a lesser extent than advertised rents, increasing by around 5 per cent over the year to February 2023 (Graph 2). Advertised rents measure the asking price for currently vacant properties; CPI rents measure price changes for the stock of all rentals.[2]

The new rents dataset

As outlined in a recent ABS information paper, from July 2022 the ABS has incorporated a new data source to measure the rents series in the quarterly CPI and monthly CPI indicator (ABS 2022a).

The new dataset is comprised of information about rental properties as entered by property managers.[3] The dataset begins in July 2018, is updated monthly and currently includes approximately 600,000 rental properties across both regional and capital city areas. In total, this represents 32 per cent of the national 2021 Census rental dwelling stock.

The dataset contains several variables of interest, including: weekly rent; property characteristics, such as type (apartment, townhouse or house), street name and postcode, and number of bedrooms; lease start and end dates; and a unique property ID.

The dataset only includes private rental properties. As such, the results shown throughout the rest of the article reflect outcomes for the private rental market and exclude rental assistance. By contrast, the measure of rents in the CPI includes prices for both the public and private rental market and accounts for rental assistance in the private rental market.[4]

Rental market characteristics

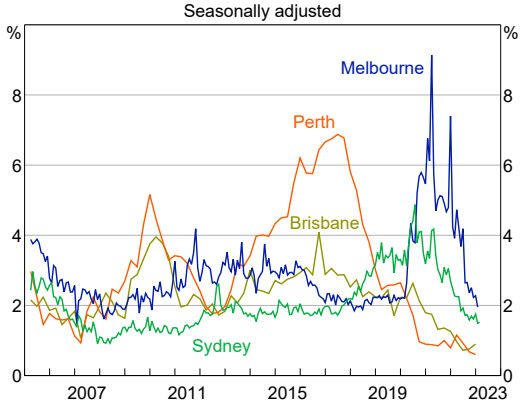
Median rents began increasing in all states in 2021 and have continued to increase over the past year. In February 2023, the median weekly rent amount was highest in the ACT at $560 per week and lowest in South Australia at $380 per week (Graph 3).

Around 90 per cent of lease agreements are for 12 months or less, with the bulk of these being 12-month leases (Graph 4). The share of six-month leases has declined since early 2021 in favour of 12-month leases. These figures reflect the share of currently valid leases and therefore understate the typical length of tenancy because renters may enter

Graph 1

Rental Vacancy Rates*

Seasonally adjusted



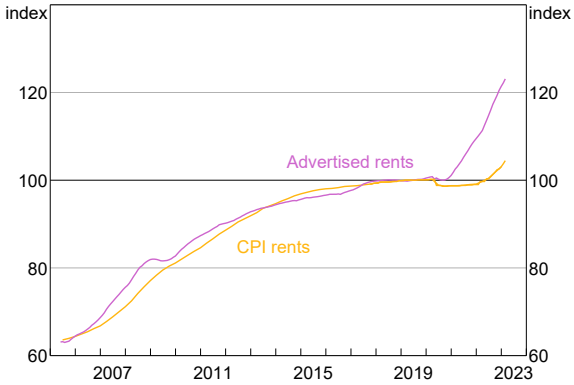
* Data is monthly for Sydney and Melbourne and quarterly for all other series.

Sources: REIA; REINSW; REIV

Graph 2

Rents*

June 2019 = 100



* With monthly data for CPI rents from September 2017; CPI rents are not seasonally adjusted, and advertised rents are seasonally adjusted.

Sources: ABS; CoreLogic

into a new lease agreement or a rolling month-to-month arrangement after their lease expires.

Around 2–3 per cent of properties each month have a change in tenant (Graph 5). This turnover is similar across the states and has been broadly stable over the past four years or so. Quantifying the proportion of properties that have a change in tenant is useful as it helps to explain the large divergence between advertised rents and CPI rents. As discussed above, advertised rents have grown strongly of late; however, as they represent only a small proportion of the rental market, this has had a limited impact on the measure of rents included in the CPI.

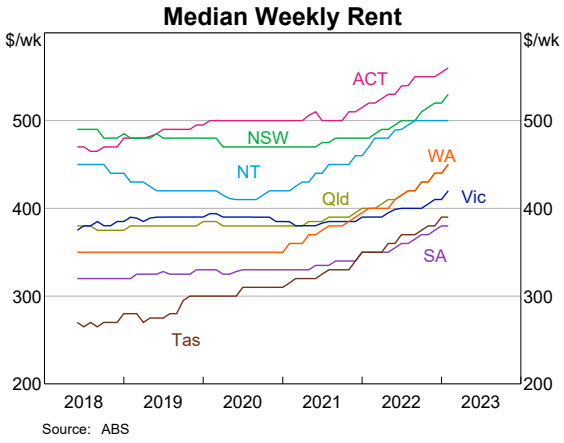
Regional versus capital city rents

Rental properties in regional areas make up over one-quarter of all rental properties, and 10 per cent of all households rent their home in a regional area. The new dataset covers regional areas as well as capital cities, providing a rich source of information about rent inflation geographically since 2018. This allows for an exploration of rent price measurement for both finer levels of geographical detail and a broader geographical scope than the CPI, which covers only the eight capital cities.

Developments in population flows, vacancy rates and changes in households' preferences over the past three years have been important drivers of rents. Early in the COVID-19 pandemic, demand for rental properties in inner-city markets declined as international students returned home, international migration slowed and some young adults moved back in with their parents. As well as overseas migration coming to an effective halt, people from parts of Australia that were not in lockdown at the time, including regional areas and smaller capital cities, tended not to move to cities that were in lockdown (Ellis 2022). The decline in international visitors and domestic business travel also encouraged some landlords to offer their short-term holiday rental accommodation on the long-term market, increasing the available rental stock (Evans, Rosewall and Wong 2020). Similarly, lockdowns prompted people to desire more space than densely populated inner-city areas could provide (Agarwal, Bishop and Day 2023).

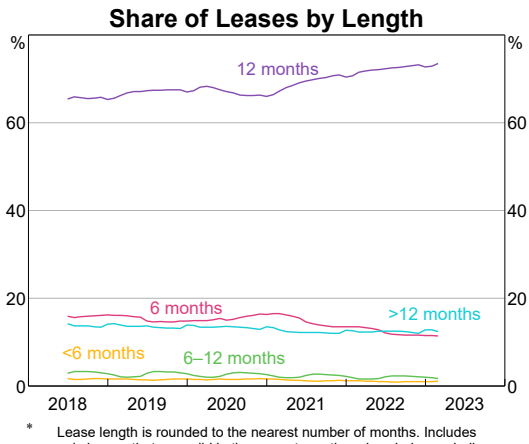
As a result, rent inflation diverged during the pandemic across capital cities compared with regional areas. In general, rents increased the most

Graph 3



Source: ABS

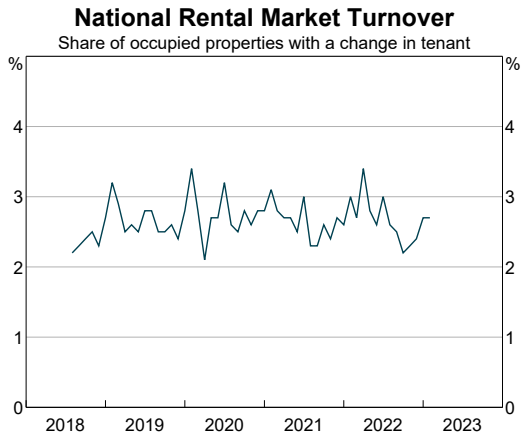
Graph 4



* Lease length is rounded to the nearest number of months. Includes only leases that are valid in the current month and excludes periodic leases with no end date (e.g. rolling month-to-month).

Source: ABS

Graph 5



Source: ABS

in regional areas that are furthest away from a capital city, supported by net population inflows and low vacancy rates (Graph 6).

By contrast, rents decreased in some capital cities over the pandemic period, in part reflecting elevated supply of rental properties and weak demand because of travel restrictions and lower population growth. State governments also introduced mechanisms to enable tenants who became unemployed or lost income due to COVID-19 to negotiate rent reductions. Rent declines were largest in inner-city Sydney and Melbourne where renegotiations were most prevalent and where international travel restrictions led to the most pronounced increase in available rental properties (Evans, Rosewall and Wong 2020). More recently, rent inflation in capital cities and regional areas has picked up; both increased by around 6 per cent over the year to February 2023 (Graph 7). This is above the 4.8 per cent rent inflation published in the monthly CPI indicator for this period as the CPI also includes public rental dwellings and rental assistance properties.

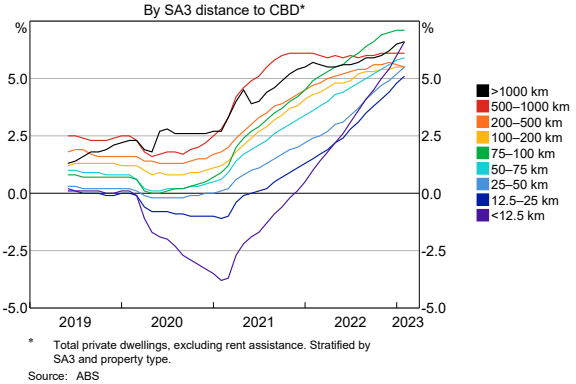
Rents in many inner-city areas remain below pre-pandemic levels

Although rents for properties that are close to a central business district (CBD) (less than 12.5 km) began to increase in 2021, rents for many inner-city suburbs in Melbourne and Sydney are still below pre-pandemic levels. In fact, 20 per cent of the 2021 Census capital city rental dwelling stock have rents below pre-pandemic levels, while 20 per cent have experienced rent increases of at least 10 per cent since March 2020 (Graph 8; Graph 9; Table 1; Table 2). Rent prices fell further and were slower to start increasing in Sydney and Melbourne compared with the other capital cities over 2020 and 2021. This was driven by the factors mentioned above, including a higher prevalence of rent reductions, higher vacancy rates and larger declines in net internal and overseas migration. Nonetheless, the rental market has tightened significantly in inner-city areas over the past year, particularly for new tenancies that have experienced large rent increases.

Graph 6

Year-ended Rent Inflation

By SA3 distance to CBD*

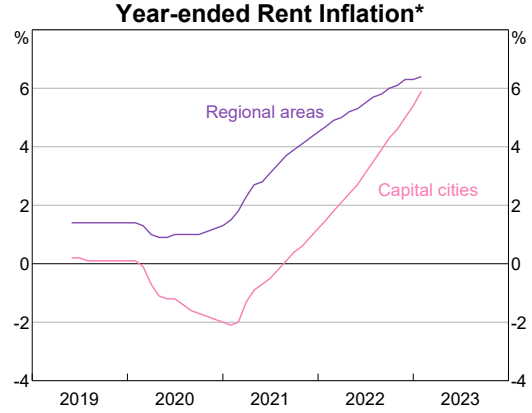


* Total private dwellings, excluding rent assistance. Stratified by SA3 and property type.

Source: ABS

Graph 7

Year-ended Rent Inflation*



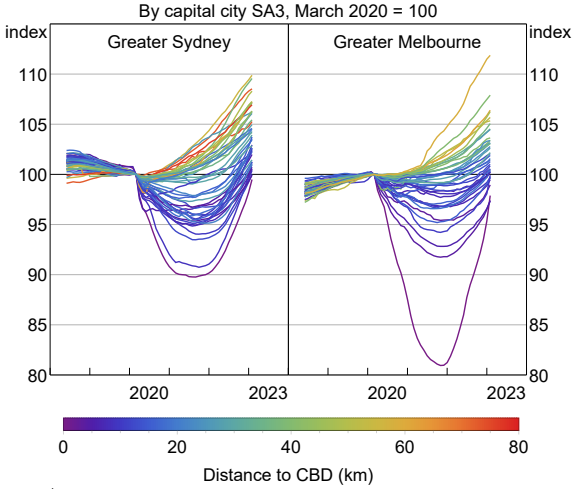
* Total private dwellings, excluding rent assistance. Stratified by SA3 and property type.

Source: ABS

Graph 8

Rent Price Indices*

By capital city SA3, March 2020 = 100



* Total private dwellings, excluding rent assistance. Stratified by SA3 and property type.

Source: ABS

Table 1: Rent Prices Below Pre-pandemic Levels[(a)]

	Expenditure share of rental dwelling stock with rent prices below pre-pandemic levels Per cent			
SA3 distance to CBD	Sydney	Melbourne	All other capital cities	Total 8 capital cities
<12.5 km	49	62	0	36
12.5–25 km	10	17	0	9
>25 km	0	0	0	0

(a) To calculate these proportions, price indexes were created using rents for each SA3 by property type (e.g. houses, apartments and townhouses). Then, the proportion of rent expenditure for each SA3 by property type that index represented of total expenditure for the particular radius around the CBD was calculated. These proportions were then aggregated for those indexes below March 2020 levels in February 2023, to give the overall expenditure share of the rental dwelling stock with rent prices below pre-pandemic levels.

Table 2: Rent Prices At Least 10 Per Cent Above Pre-pandemic Levels

	Expenditure share of rental dwelling stock with rent prices at least 10 per cent above pre-pandemic levels Per cent			
SA3 distance to CBD	Sydney	Melbourne	All other capital cities	Total 8 capital cities
<12.5 km	0	0	45	15
12.5–25 km	0	0	71	24
>25 km	2	6	87	26

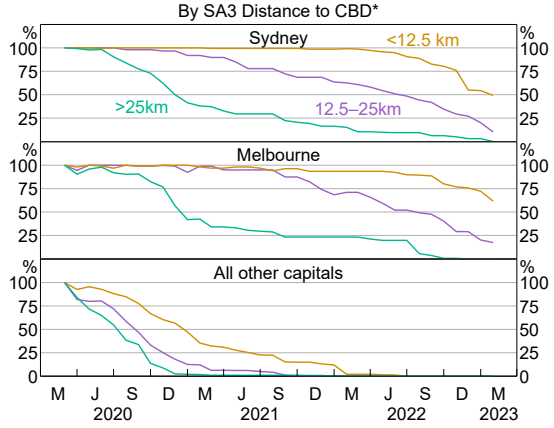
A closer look at the distribution of rent changes

Rent increases have become larger and more common over the past year for most properties in capital cities. This is the case regardless of whether properties have a new tenant or not, although increases have been more pronounced for properties with a new tenant. Over the past year, rents have increased for almost three-quarters of properties, up from around one-quarter every year pre-pandemic. Rental prices for properties with new tenants are more likely to change than for properties with existing tenants. Over mid-to-late 2020, new tenants tended to pay rental prices lower than or equal to what was being paid for a given rental property the year prior (Graph 10). However, since mid-2021, the majority of new tenants have been paying higher rent than was charged for the same property the year prior. This share increased to as high as 94 per cent in February 2023, compared with 71 per cent for properties with existing tenants (Graph 11).

Graph 9

Share of Rents at or Below Pre-Pandemic Levels

By SA3 Distance to CBD*



* Total private dwellings, excluding rent assistance. Stratified by SA3 and property type.

Source: ABS

The distribution of rent changes has shifted, with larger rent increases becoming more common for all properties regardless of whether tenants are new or existing. However, rent increases for properties with a new tenant have tended to be larger, on average, than for properties with existing tenants. In February 2023, over 60 per cent of properties with new tenants had rent amounts more than 10 per cent higher than 12 months earlier (Graph 12); this compares with only one-quarter of properties with existing tenants having rent increases of more than 10 per cent (Graph 13).

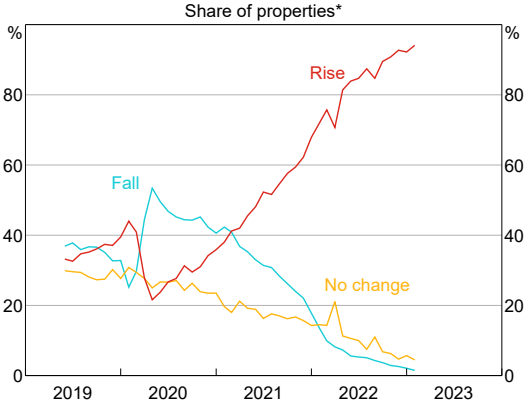
Rents have increased at a faster pace for more expensive rental properties than for less expensive properties over the past year. Properties in the 90th percentile for weekly rent – that is, those properties with weekly rent amounts greater than or equal to 90 per cent of all properties – have experienced rent increases of 10 per cent on average over the year to February 2023 (Graph 14). By contrast, properties in the 10th percentile – or those properties with weekly rent amounts less than or equal to 90 per cent of all properties – have increased by 7 per cent on average.

While an increase in rents puts pressure on household budgets across the economy, lower income households typically have the most constrained budgets as they spend a greater proportion of their income on essential items and have lower financial buffers. For example, all else equal, a 7 per cent increase in rent for renters in the 10th percentile of the income distribution would reduce the amount of income available for other

Graph 10

Year-ended Rent Changes – New Tenants

Share of properties*



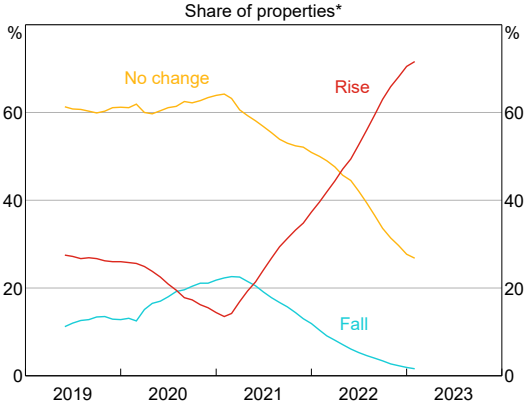
* Expenditure weighted. Private rentals only excluding rent assistance.

Source: ABS

Graph 11

Year-ended Rent Changes – Existing Tenants

Share of properties*



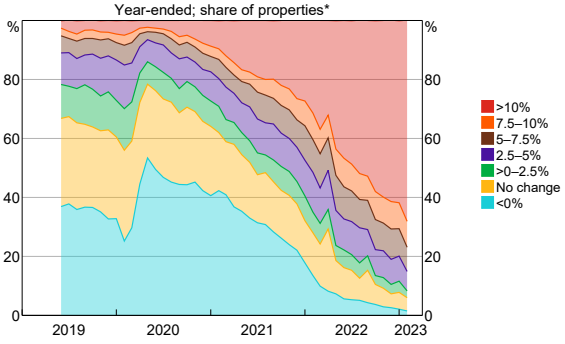
* Expenditure weighted. Private rentals only excluding rent assistance.

Source: ABS

Graph 12

Rent Changes of Different Sizes – New Tenants

Year-ended; share of properties*



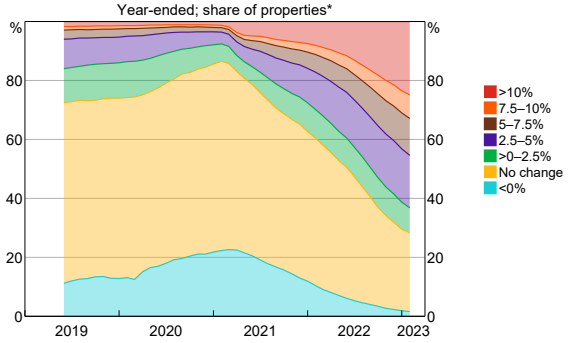
* Expenditure weighted. Includes private rentals only. It should be noted the distribution presented in this graph uses different methodology and sampling to the CPI.

Source: ABS

Graph 13

Rent Changes of Different Sizes – Existing Tenants

Year-ended; share of properties*



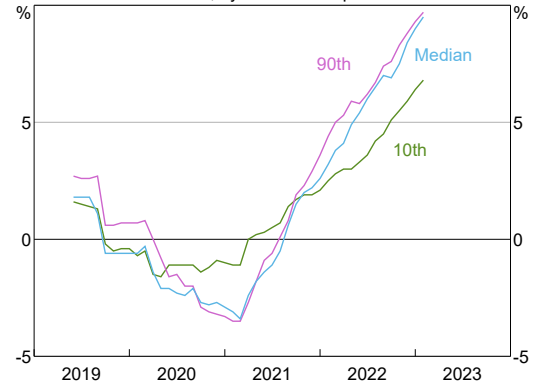
* Expenditure weighted. Includes private rentals only. It should be noted the distribution presented in this graph uses different methodology and sampling to the CPI.

Source: ABS

Graph 14

Average Rent Changes

Year-ended; by rent amount percentile*



* Ranks properties each month by the weekly rent amount percentile and then calculates expenditure weighted average price change.

Source: ABS

uses more than a 10 per cent increase in rent would for renters in the 90th percentile of the income distribution.

Measuring rents paid by new tenants

The rents paid by new tenants provide a leading indication of price developments in the total stock of rental properties. Previously, the best available indicator of rents paid by new tenants was advertised rents; however, this may not be the most useful measure because the actual rent agreed to by a landlord and a new tenant may be different from the advertised amount. To overcome this concern, an index of actual prices paid by new tenants can be estimated using the subset of properties in the dataset each month that have a new tenant.[5]

Actual rents paid by new tenants increased by 14 per cent over the year to February 2023, which is 9 percentage points higher than the increase in the monthly CPI indicator rent index (which measures all rents, not just those paid by new tenants). Since the onset of the pandemic in 2020, rents paid by new tenants have increased by 24 per cent and the CoreLogic advertised rent series has increased by 22 per cent (Graph 15). The index declined further than the CoreLogic advertised rent series earlier in the pandemic due to the actual rent agreed to between landlords and tenants tending to be lower than the advertised amount. More recently, rents paid by new tenants have increased above the CoreLogic advertised rent series because the actual rent agreed between landlords and tenants has been higher on average than the advertised amount.

Rents for apartments with new tenants have been more volatile than for houses and townhouses over the past couple of years, in line with the developments in the rental market discussed above (Graph 16). Rents for apartments with new tenants fell sharply during the pandemic and remained below pre-pandemic levels until early 2022, while rent inflation for houses and townhouses with new tenants has generally been positive since the onset of the pandemic. Rent inflation for apartments with new tenants was 24 per cent over the year to February 2023, whereas the overall index increased by 14 per cent. By contrast, rent inflation for houses and townhouses with new tenants was around 10 per cent over the year to February 2023.

If vacancy rates remain low, then stronger-than-normal increases in advertised rents are likely to persist. This will impact the CPI both directly, given that these properties are included in the calculations, and indirectly as increases in market rents influence landlords' price-setting behaviour in the rest of the rental market.

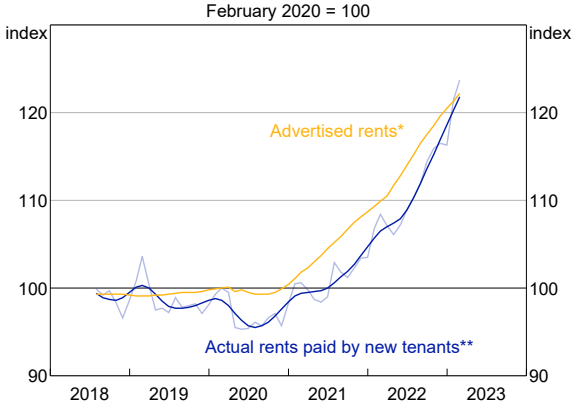
Conclusion

The rental market has tightened considerably since 2021. Rent inflation has picked up and is broadly based across new and existing tenants, property types and the states. Rent increases have also

Graph 15

Measures of Rent Prices for New Tenants

February 2020 = 100

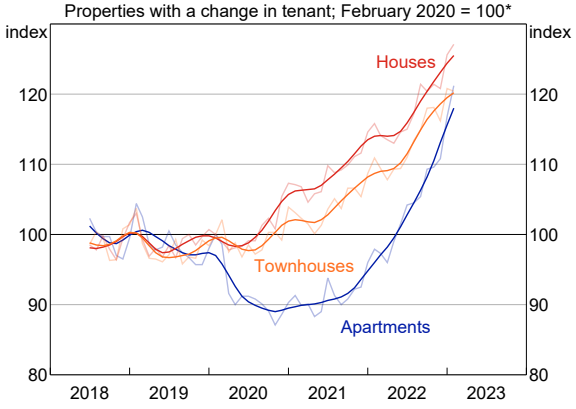


* Listed asking rents for vacant rental properties.
** Properties with a change in tenant. Darker line is 13-month Henderson trend.
Sources: ABS; CoreLogic

Graph 16

Rent Prices for New Tenants

Properties with a change in tenant; February 2020 = 100*



* Darker line is 13-month Henderson trend.
Source: ABS

become more common, and larger on average. Properties with a change of tenant have experienced larger rent increases than existing tenancies, and so have been more closely aligned to changes in advertised rents. The new dataset on rental prices discussed here has enhanced the measurement of rents in the CPI and afforded new insights into the private rental market.

Endnotes

[*] Fred Hanmer, the lead author of this article, is an economist in the RBA's Economic Analysis Department; this work was completed while on secondment at the ABS. Michelle Marquardt is the Program Manager, Prices Branch at the ABS. We would like to thank, in particular, Jan de Haan (ABS) for significant methodological contributions. For their excellent assistance, ideas and input into the project, we would like to thank our colleagues from the ABS – Sarah Askew, Jessica Chew, Neel Tikaram, Michael Webster and Isabel Zheng – and from the RBA – James Bishop, Sue Black, Ashwin Clarke and Tom Williams.

[1] See ABS (2022b) for more detail.

[2] CPI rents also incorporate price information on rental assistance and government-provided rental properties, which advertised rents exclude.

[3] All Australian rental property data are supplied to the ABS by MRI Real Estate Software.

[4] Rent assistance makes up a small share of the total private rent index.

[5] The index simply takes the average price of rental properties with new tenancies in each period and compares it with the average price in the base period. The index is stratified by property type, number of bedrooms and capital city and is aggregated using 2021 Census expenditure data. Tasmania is excluded from the estimation due to small sample size. The index is volatile and subject to compositional change in the sample – this is because it is not possible to have matched samples month-on-month as rental properties do not turn over every month. Trend lines are plotted to give an indication of the momentum in the index.

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Consumer Payment Behaviour in Australia

Thuong Nguyen and Benjamin Watson[*]

Photo: AsiaVision – Getty Images

Abstract

The results of the Reserve Bank's 2022 Consumer Payments Survey show that consumers continue to shift from using cash to electronic payment methods – a trend that was accelerated by the COVID-19 pandemic and consumers' preference towards using debit and credit cards and making payments online. Consumers are also increasingly using more convenient payment methods, particularly contactless card payments, by tapping their card or phone. Cards are now used for most in-person payments, even for small transactions that used to be made mostly with cash.

Introduction

The Reserve Bank conducted its sixth Consumer Payments Survey (CPS) in October to early December 2022. This article considers the results of the survey, with a particular focus on electronic payment methods. Livermore and Mulqueeney (2023) summarise the results on cash usage, including the drivers of declining cash use and the accessibility of cash services for Australians.

Survey methodology

Participants recorded every transaction they made for seven days in a payments diary and provided extra information on their payment preferences and attitudes in a post-survey questionnaire. The CPS provides unique insights into Australian consumers' payments behaviour and their changing preferences via both qualitative questions and quantitative analysis of the payments diaries. For the 2022 CPS, around 1,000 people completed the survey and recorded around 13,000 transactions.

Table 1: Consumer Payment Methods[a]

Share of number of payments, per cent

	2007	2010	2013	2016	2019	2022
Cash	69	62	47	37	27	13
Cards	26	31	43	52	63	76
– Debit cards	15	22	24	30	44	51
– Credit and charge cards	11	9	19	22	19	26
BPAY	2	3	3	2	2	2
Internet/phone banking[b]	–	2	2	1	3	3
PayPal	–	1	3	3	2	2
Cheque	1	1	0.4	0.2	0.2	0.1
Other[c]	1	1	2	4	2	2

(a) Excludes payments over $9,999, transfers (payments to family and friends), transport cards and automatic payments. Totals may not sum to 100 due to rounding.

(b) Payments made using banks' internet or telephone facilities; does not include other payments made using the internet.

(c) 'Other' methods include prepaid, gift and welfare cards, bank cheques, money orders, BNPL and Cabcharge.

Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

The seven-day payments diary captured detailed information on every transaction that a consumer made in a week. The information included:

- *the payment method* – for example, debit card, credit card, cash or bank transfer
- *the payment location* – whether in-person or online
- *the execution of the payment method* – for example, by inserting a card into the terminal, or tapping a physical card or mobile device
- *the payment purpose* – for example, supermarket, household bills, leisure or transport.

The sample was collected to ensure it was representative of the Australian population across a range of demographics, including respondent age, sex, geographical location and household income.

Results overview

The results show that Australians continue to change the way they make payments, with the longer run shift to electronic payment methods accelerated by the COVID-19 pandemic. Australians are using cash less frequently; only around 13 per cent of payments were made using cash in 2022, which is half the share reported in 2019 (Table 1). Card payments made up the bulk of consumer payments, with debit cards accounting for half of all payments and credit cards another quarter. Other payment methods such as 'buy now, pay later' (BNPL) services made up only a small share of consumer payments. Cheque usage declined further in the 2022 CPS.

Cash usage

Australians continue to shift away from using cash for day-to-day transactions. Since the CPS was first conducted in 2007, the share of payments made using cash has declined in every subsequent survey – cash made up around 70 per cent of payments in 2007 and only 13 per cent in 2022. The pandemic accelerated the shift away from cash as consumers complied with social distancing requirements by making more payments remotely and because of hygiene concerns with handling cash. Cash has historically been used more frequently for low-value in-person purchases; however, card payments have now overtaken cash usage even for these small purchases.

Card payments

The 2022 CPS showed a further shift to electronic payments by Australians. This trend has been driven in recent years by the development of more convenient and seamless payment technology as

well as changes in consumer payment behaviour brought on by the COVID-19 pandemic. Card payments now offer convenient contactless payments that speed up transactions; they have reduced the need for consumers to top up cash, have wide merchant acceptance facilitated by new payment providers, and have allowed for innovation in the payments space (such as storing cards in mobile wallets). As a result, three-quarters of payments were made with cards in 2022 – an increase of 13 percentage points from 2019 and three times the share in 2007 (Graph 1). The increase in card usage mirrors the decline in cash usage.

The increase in card usage since 2007 has involved both debit and credit cards. Since the CPS was first conducted in 2007, consumers have continuously increased their usage of debit cards; the share of payments made with debit cards is now around half of all payments – more than three times higher than in 2007. The increase over the past 15 years has been driven by the introduction of debit cards that provide much of the same payment functionality as credit cards, such as the ability to make contactless and online payments and to store them in mobile wallets (see below). By contrast, the increase in credit card usage since 2007 has been more moderate, rising 14 percentage points to be around one-quarter of all payments. The stronger uptake of debit cards partly reflects consumers preferring to use their own funds from a bank account, rather than borrowed funds from a credit card. In addition, the perceived attractiveness of credit card reward schemes has fallen in recent years and higher surcharges for using credit cards at some merchants may be driving consumers to use debit cards instead.[1]

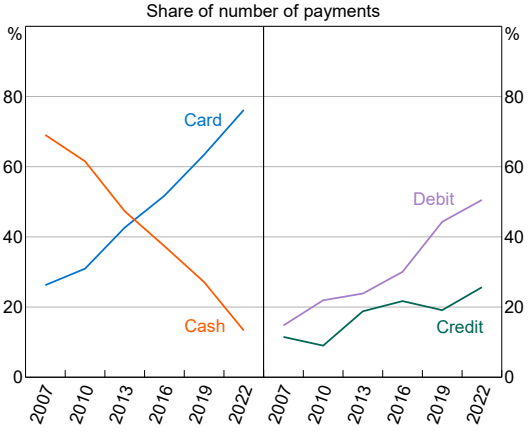
Cards are the dominant payment method for Australians of all age groups. Younger people use cards most intensively, with consumers aged 18–29 years using cards for around 85 per cent of their payments (Graph 2, left panel). Consumers aged 65 and above have historically been high cash users; however, they now use cards for nearly two-thirds of their payments. Compared with 2019, the share of transactions made using cards rose most strongly for those 40 years and older, with little change for those under 40, narrowing the difference between younger and older people. The increase in the use of cards for older consumers was strongest for low-value transactions; for those under 40, the share of low-value payments made using cards had already reached a high level in 2019.

The rise in the share of card payments between 2019 and 2022 was seen across all income groups (Graph 2, right panel). The rise in card usage was strongest in the middle-income groups (i.e. the second and third income quartiles). Higher income households have the greatest propensity to use cards, with cards accounting for 82 per cent of their

Graph 1

Cash and Card Payments

Share of number of payments

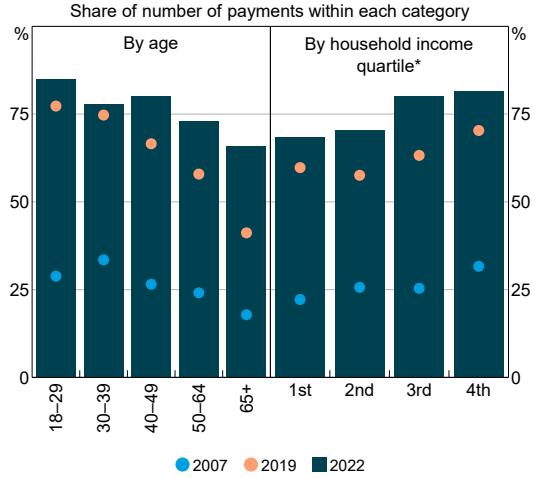


Source: RBA calculations, based on Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 2

Card Payments

Share of number of payments within each category



* Because of the overlap between age and income groups, the figures for income quartiles are adjusted for respondents' age.

Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

payments, compared with 69 per cent for those in the lowest income quartile.

Lower income households use debit cards and cash more frequently than higher income households (Graph 3, left panel). Consumers in the lowest income quartile made 55 per cent of their transactions with debit cards, compared with 45 per cent for those in the highest income quartile. However, in value terms, middle-income households use debit cards for a slightly larger share of their spending than other income groups (Graph 3, right panel).

Conversely, higher income households use credit cards more intensively than other households (Graph 3). Consumers in the highest income quartile use credit cards for around one-third of their payments, which is three times the share for lowest income households. This may reflect higher income households being more likely to meet the lending standards for a credit card, as well as debit cards and cash being used as budgeting tools for lower income households.

The 2022 CPS shows that cards are the dominant payment method at almost all types of business (Graph 4, top panel). Cards account for more than 80 per cent of payments at supermarkets, food retailers, transport, and petrol and service stations. The high share of card payments at supermarkets may reflect the convenience of using a card at these businesses – for instance, supermarkets were among the first businesses to introduce contactless card terminals in Australia, and more recently have introduced self-service checkouts that do not accept cash. Also, many supermarkets do not surcharge card payments, making this payment method a more attractive choice than at businesses that directly recoup the cost of card payments. Card payments are used least for household bills, with consumers tending to use lower cost methods such as bank transfers and BPAY for these payments.

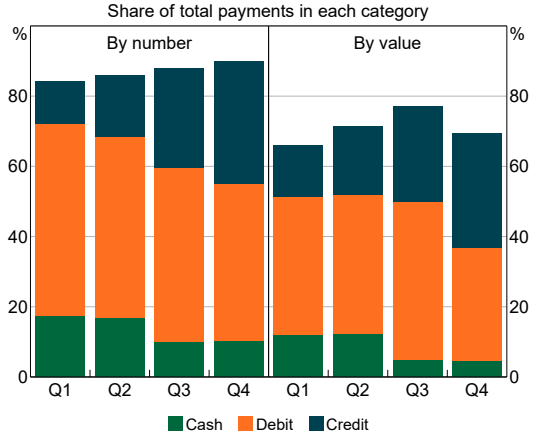
Since 2019, the increase in card use has been broadly based across types of business. There has been a significant shift away from cash at small food retailers, such as cafés, pubs and takeaway food outlets, with the share of payments made by card increasing by 18 percentage points (Graph 4, bottom panel). In addition to consumer preference to use cards, this trend could reflect wider card acceptance, enabled by plans offered by new payments providers catering to smaller merchants, as well as more convenient technology such as simpler point-of-sale terminals and portable payment terminals that connect to mobile phones. The decrease in the share of payments made using cards in the holiday category reflects increased use of other non-cash methods such as bank transfers, which can be used to avoid card surcharges.

Australian consumers are increasingly using cards for transactions of all sizes, from low-value transactions of less than $10 to larger transactions

Graph 3

Debit, Credit Card and Cash Payments by Income

Share of total payments in each category



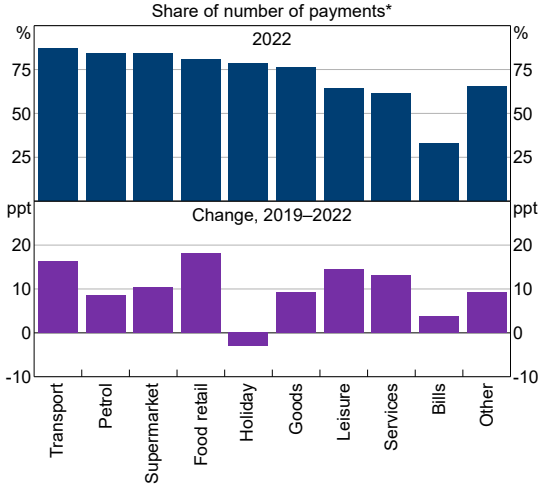
* Because of the overlap between age and income groups, the figures for income quartiles are adjusted for respondents' age.

Source: RBA calculations, based on data from Roy Morgan Research.

Graph 4

Card Payments by Sector

Share of number of payments*



* Excludes transport cards.

Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

over $100 (Graph 5). Around 80 per cent of payments over $10 are made using cards. Historically, low-value payments of $10 or less were made mostly in cash; however, in 2022 more than 70 per cent of these payments were made using cards – up from around 50 per cent in 2019. The widespread acceptance of card payments, adoption of contactless functionality and changes in payment preferences in response to the COVID-19 pandemic have supported the sharp increase in the use of cards for low-value transactions over the past decade (Bullock 2020).

The use of contactless card payments, such as tapping a card or waving a mobile device at the payment terminal, increased further in 2022. Contactless card payments are used near universally by Australian consumers, making up 95 per cent of in-person card transactions in 2022, up from around 85 per cent in 2019 (Graph 6). By contrast, when the CPS was first conducted in 2007, almost all in-person card transactions were made by inserting the card into a terminal and providing a signature or personal identification number (PIN) for verification. The increase in contactless payments since 2019 was driven by a significant increase in the usage of mobile devices such as phones, watches and rings, to account for 30 per cent of all in-person card payments. Tapping a physical card, rather than a mobile device, is still the most common way of making an in-person card payment, despite its decline since 2019 as consumers switch to mobile payments.

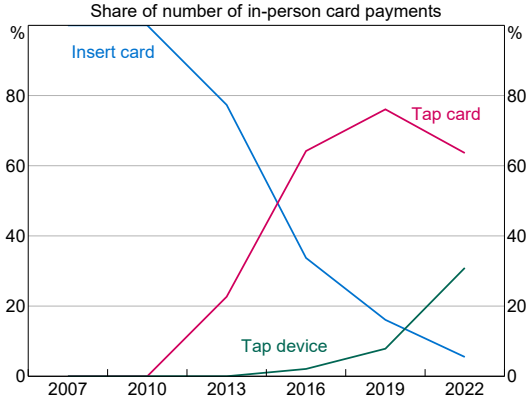
In the 2022 CPS, more than one-third of consumers used a mobile device to make a contactless payment in the diary week – an increase of 25 percentage points from 2019. Adoption of payment-enabled mobile devices has increased substantially across all age groups over the past three years, particularly for younger consumers (Graph 7). Mobile payments were used by nearly two-thirds of Australians aged between 18 and 29 in 2022, up from less than 20 per cent in 2019. For consumers aged 65 and over, only 9 per cent made a mobile payment during the diary week – however, this was triple the share in 2019.

Mobile payments are facilitated by mobile wallets – that is, applications on mobile devices, like smartphones, that store card details. As well as in-person payments, mobile wallets can be used to

Graph 6

Card Payments by Channel

Share of number of in-person card payments

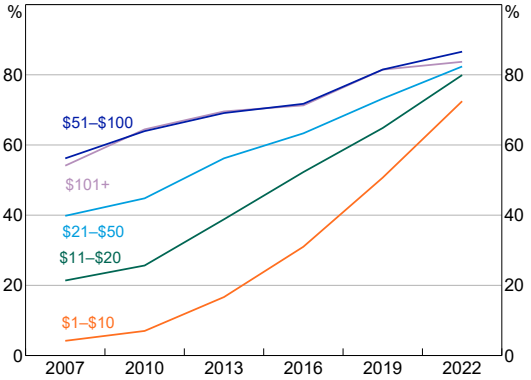


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 5

Card Payments by Size

Share of number of total payments in each category

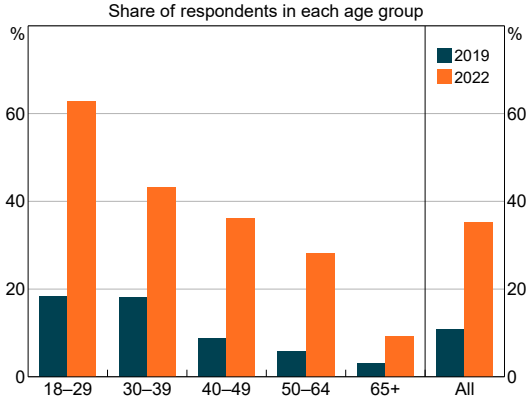


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 7

Use of Mobile Devices for Card Payments*

Share of respondents in each age group



* Used at least once in the diary week of the Consumer Payments Survey.

Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

Table 2: Online Payments

Share of number of consumer payments, per cent

	2007	2010	2013	2016	2019	2022
BPAY/internet banking	2	4	5	4	4	5
Credit cards	1	1	3	3	2	4
Debit cards	0.3	1	2	3	4	6
Other[(a)]	0.4	1	3	4	2	3
Total	4	7	13	14	12	18
Mobile/app as a share of online payments[(b)]	–	–	6	20	40	37

(a) 'Other' methods include Paypal, prepaid, gift and welfare cards and BNPL services.

(b) 'Mobile phone' was recorded as a separate category of online payments only in 2013 and 2016, while in 2019 this was recorded as 'App'.

Sources: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

make online payments. In the 2022 CPS, respondents were asked if they stored each of their payment cards in a mobile wallet, such as Apple Wallet, Google Wallet, Samsung Wallet or Alipay etc. Around half of respondents stated they had a card stored in a mobile wallet in 2022, with mobile wallet usage higher among younger people (Graph 8, top panel). Mobile wallets have become more popular for consumers of all age groups since 2019 (Graph 8, bottom panel). Having a single card stored in a mobile wallet is more common than having multiple cards stored.

Online payments

Online payments made up a higher share of retail payments in 2022 than in 2019, with consumers shifting away from in-person transactions. When measured by the number of transactions, the share of payments made online was 18 per cent – up from 12 per cent in 2019 and just 4 per cent in 2007. This reflects the long-term rise in e-commerce, spurred on more recently by lockdowns and social distancing during the pandemic.

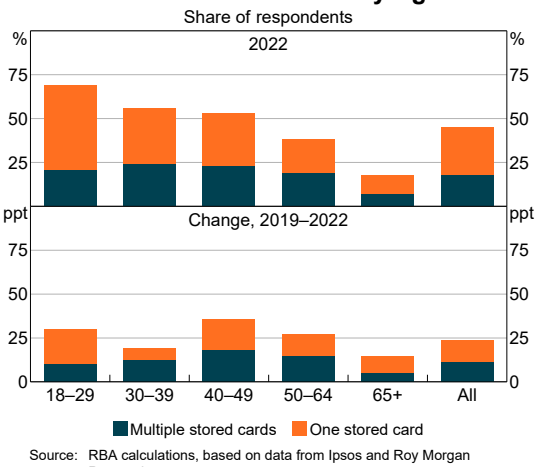
Around two-thirds of respondents made at least one online payment in 2022, up from around 55 per cent in 2019 and more than double the share of people surveyed in 2007. Some goods or services are more difficult or more expensive to purchase online – including petrol, supermarket items and food retail – and so only a small share of these purchases are made online (Graph 9). For other types of services – such as leisure, bills and holidays – a high share of purchases are made online. More than half of leisure purchases – such as music, movies and sports tickets – were made online in 2022.

Consumers are increasingly using their debit cards to make online payments, in addition to BPAY and bank transfers, which have historically accounted for the largest share of online payments (Table 2). In 2022, the share of online payments made using mobile apps was little changed from 2019 at just under 40 per cent, with the remainder initiated through other means such as web browsers (e.g. Chrome or Safari).

The figures in Table 2 refer to online payments where participants initiated and made the payment during the diary week. The CPS also collects

Graph 8

Use of Mobile Wallets by Age



Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

information on participants' automatic payment arrangements, such as household bills (e.g. rent or electricity) paid by direct debit, and recurring 'pay anyone' transactions via online banking. These arrangements are set up ahead of the payment occurring and are recorded separately in a post-diary questionnaire (participants review their bank statements when recording information on these payments). The share of payments made automatically during the week of the CPS has been steadily increasing over recent years, to 12 per cent of the total number of transactions (Graph 10, left panel). By value, nearly one-third of weekly spending was made automatically in 2022 (Graph 10, right panel). The growth in automatic payments reflects the changing way people pay their bills as well as the increasing use of subscription services, such as video streaming and meal services. Two-thirds of all household bill payments in 2022 were made automatically, which is around triple the share in 2013. This shift towards automatic payments for certain transactions is another way in which payments are becoming more convenient for consumers.

Other payment methods

In recent years, several other ways to make payments – besides cash, cards or cheques – have emerged in Australia. Some of these newer ways to pay use the same 'payment rails' as existing payment methods, but they are faster, more convenient or more secure.

The CPS gathered respondents' knowledge and usage of a number of these other ways to make payments (Graph 11). PayPal and BNPL had near universal consumer awareness, while Beem (previously called 'Beem It') and Alipay/WeChat Pay had little awareness or usage in Australia. Many people were aware of cryptocurrencies, but only a very small share had used them to make a payment in the past year.

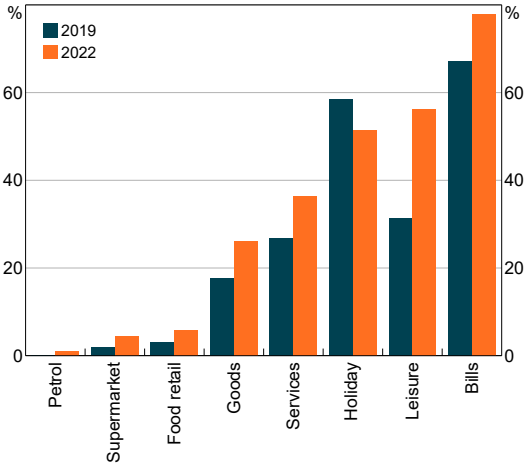
QR codes

The 2022 CPS asked respondents for the first time about their awareness of using quick-response (QR) codes for making payments. Some merchants now

Graph 9

Online Payments

Share of number of payments made online

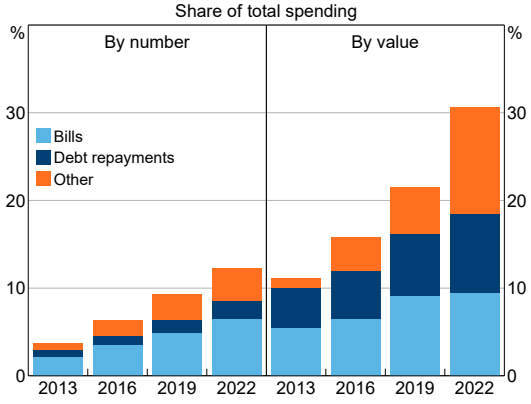


Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

Graph 10

Automatic Payments

Share of total spending

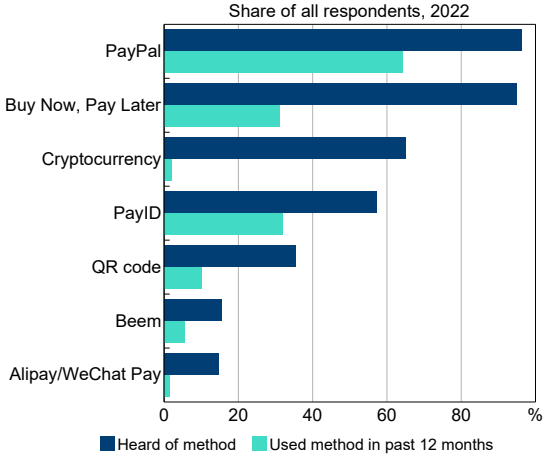


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 11

Alternative Payment Methods

Share of all respondents, 2022



Source: RBA calculations, based on data from Ipsos.

offer QR codes that direct consumers to a mobile wallet, typically funded by the consumer's debit or credit card, to complete a payment at the terminal. About one-third of respondents had heard of this payment method and around 10 per cent reported using it to make a payment in Australia in the past year. In some other countries, merchants are providing QR codes that allow their customers to pay by transferring funds directly from their bank account through fast payment systems. Adoption of this payment method in Australia could provide consumers with a low-cost alternative to card payments.

PayID

PayID is a way of using a mobile number, email address or Australian Business Number to address an account-to-account bank transfer, with the funds available to the recipient almost instantly. In 2022, around half of Australians had heard of PayID and 30 per cent had used it in the past year. PayID is more convenient than using the traditional Bank-State-Branch (BSB) and account number, which require consumers to correctly key in 15 digits. Another benefit of PayID is that the payer receives confirmation of the name of the person or business being paid, reducing the risk of fraud. PayID was introduced in 2018 as part of the New Payments Platform (NPP). Consumer uptake of PayID has been slower than initially expected, and currently not all Australian bank accounts are connected to make or receive a payment using PayID (Connolly 2022). The Payments System Board continues to encourage financial institutions to roll out PayIDs for all bank accounts, which will be necessary to achieve their full potential. In the diary, payments using PayID made up around 10 per cent of bank transfers, with the remainder addressed using BSB and account numbers (Graph 12). Consumers under the age of 50 had the highest share of bank transfers addressed using PayID.

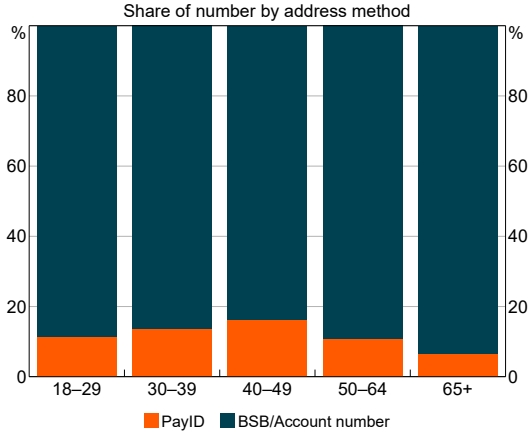
Buy now, pay later

BNPL services allow customers to purchase goods on credit and make interest-free instalment repayments. While offering benefits for consumers, BNPL services are typically an expensive way for merchants to accept payments, costing on average around 4 per cent of the value of the transaction, compared with 0.5–1.5 per cent for traditional card payments. Almost one-third of Australians had used a BNPL service in the past year, up around 8 percentage points from 2019. Usage was highest among younger Australians: over 40 per cent of 18–39 year olds had used a BNPL service in the past year, compared with only 10 per cent for those aged 65 and over (Graph 13). However, usage increased across all age groups from 2019. While a large share of Australians had used BNPL in the past year, BNPL payments made up just 0.7 per cent of the number of payments in 2022 up from 0.5 per cent in 2019.

Graph 12

Bank Transfers*

Share of number by address method



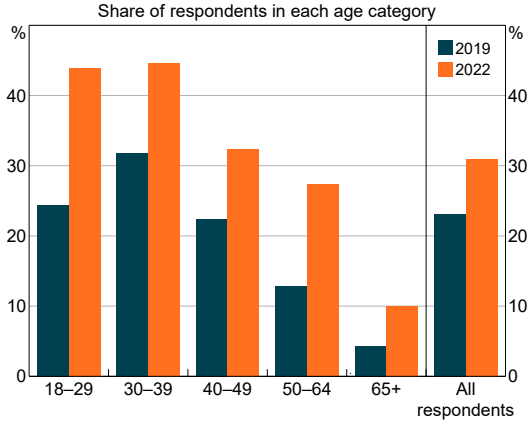
* Excludes transfers to family and friends, and transfers within own accounts.

Source: RBA calculations, based on data from Ipsos.

Graph 13

BNPL Use by Age*

Share of respondents in each age category



* Used a Buy Now, Pay Later services in the past 12 months.

Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

For the first time, the 2022 CPS also collected data on the number of BNPL accounts consumers had with different BNPL providers. On average, Australians had 0.7 BNPL accounts per person, with people aged 18–39 having nearly one account on average (Graph 14, left panel). Those aged 65 and over were the least likely to hold a BNPL account. Of those consumers with a BNPL account, BNPL users held two accounts on average (Graph 14, right panel). Consumers with access to multiple accounts may encourage competition in the BNPL market, as providers compete to entice consumers to use their service. However, BNPL firms typically do not allow merchants to pass on the high cost of accepting their service directly to BNPL users through a surcharge. So, the benefits of competition in the BNPL market may accrue to BNPL users, subsidised by non-users as merchants recoup the cost by raising the price of goods and services generally.

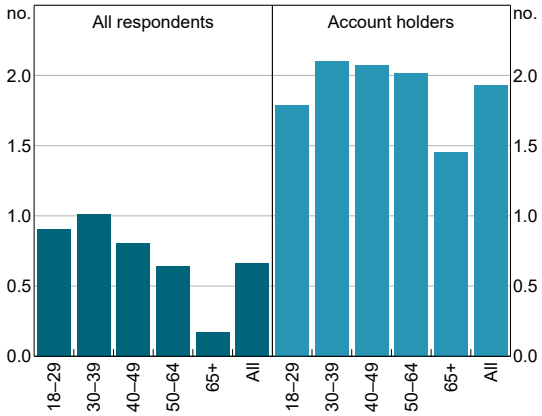
Conclusion

The 2022 CPS showed a further increase in the use of electronic payment methods, with consumers further reducing their use of cash. This partly reflects both a continuation of existing trends and changes induced by the pandemic. Australians mostly use cards to make payments, even for smaller transactions that used to be made with cash, with debit cards alone accounting for half of all payments. At the same time, consumers are continuing to embrace a range of more convenient ways to pay, such as contactless payments using mobile phones and automatic payments, although such methods often use the existing payments infrastructure (such as the card networks).

Graph 14

Average Number of BNPL Accounts Held

By age group



Source: RBA calculations, based on data from Ipsos.

Endnotes

[*] The authors are from Payments Policy Department. The authors are grateful for the assistance provided by others in Payments Policy Department and Note Issue Department, in particular Troy Gill, Tanya Livermore and Jack Mulqueeney.

[1] A surcharge is a fee merchants charge consumers for accepting a particular payment method.

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Cash Use and Attitudes in Australia

Jack Mulqueeney and Tanya Livermore[*]

Photo: Vicki Smith – Getty Images

Abstract

The 2022 Consumer Payments Survey reveals that the ongoing decline in cash use in Australia has accelerated since the COVID-19 pandemic. The share of in-person transactions made with cash halved, from 32 per cent to 16 per cent, over the three years to 2022. The decline in cash use was particularly pronounced for smaller payments; cash is now used less than electronic methods for all transaction sizes. The demographic groups that traditionally used cash more frequently for payments – such as the elderly, those on lower incomes and those in regional areas – saw the largest declines in cash use. Privacy and security concerns with electronic payment methods continued to be the main reason for needing cash, while barriers to using electronic payment methods have become less important since 2019.

Introduction

The Reserve Bank undertook its sixth triennial Consumer Payments Survey (CPS) in November 2022. Survey participants recorded details about every transaction they made over a week; they also completed a questionnaire on payment preferences, cash holdings and perceptions of cash access. Around 1,000 individuals completed the survey, recording about 13,000 transactions, around 9,000 of which were made in person.[1]

This article summarises the results of the CPS as they relate to cash use in Australia, focusing on in-person payments where consumers tend to have the option to use cash.[2] Nguyen and Watson (2023) provide an overview of the CPS results focused on non-cash payments, including use of online payments and newer payment methods.

Cash payments

The CPS suggests that, over the three years to 2022, Australians halved their share of cash payments by number, from 32 per cent to 16 per cent of in-person transactions (Graph 1). In value terms, the cash share of in-person payments declined more

modestly, from 19 per cent in 2019 to 13 per cent in 2022. If one considers all payments, including online payments, cash payments made up 13 per cent by number and around 8 per cent by value in 2022. The decline in cash use between 2019 and 2022 partly reflects the impact of the COVID-19 pandemic on people's payment behaviour, which accelerated the decline that had been underway since at least the first CPS in 2007.

While cash was used less across payments of all sizes, the decline was particularly pronounced for smaller sized payments (Graph 2). Indeed, the share of payments under $10 made with cash nearly halved over the three years to 2022, from around one in every two payments to around one in four payments – the largest decline in this category since the CPS began in 2007. Cash use for higher value transactions also continued to decline, although at a slower pace, with around one in 10 in-person payments over $50 being made with cash. Consistent with these declines, cash is now used less than electronic payment methods for all transaction values (Graph 3). Consumers have tended to switch to using cards for low-value payments because of the convenience of contactless cards and 'tap-and-go' device payments (Nguyen and Watson 2023).

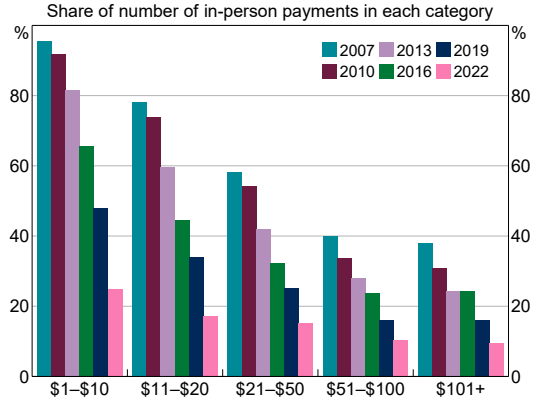
The decline in Australians' use of cash was evident in almost all areas of household expenditure over the three years to 2022, consistent with pre-pandemic trends (Graph 4). The share of transport payments (e.g. parking, public transport and taxis) that were made with cash declined the most, followed by leisure purchases (e.g. music, sports and gambling) and bills. Several factors contributed to these recent declines, including the increased popularity of contactless card payments, the rise of ride-share services, and that most public transport services no longer accept cash. In 2022, cash continued to be used most intensively for leisure and services purchases (e.g. plumbing, hairdressing and baby-sitting) and least intensively for transport.

The sharp decline in the cash share of transactions reflects that most Australians now use cash infrequently. Indeed, 72 per cent of Australians were classed as 'low cash users' in 2022, using cash for 20 per cent or less of their in-person transactions, compared with 50 per cent in 2019 (Graph 5). By contrast, 'high cash users', who use cash for

Graph 2

Cash Payments by Size

Share of number of in-person payments in each category

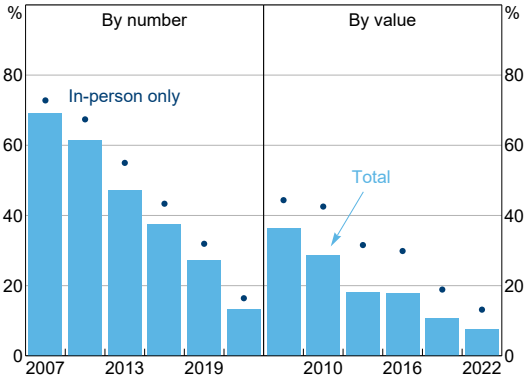


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 1

Cash Payments

Share of payments

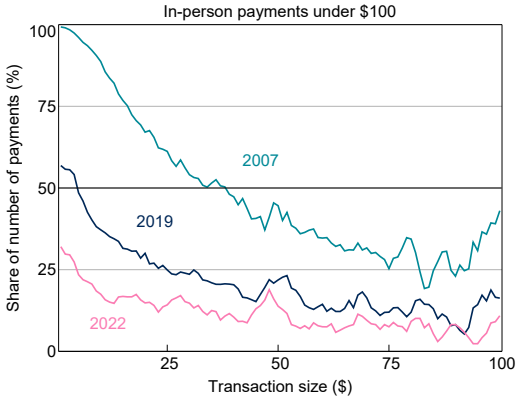


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 3

Cash Payments by Transaction Size

In-person payments under $100



* $5-centred moving average; for example, the $6 share is an average of the payment method share at $4, $5, $6, $7 and $8.

Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

80 per cent or more of their in-person transactions, now represent only about 7 per cent of Australians – a number that halved between 2019 and 2022. Also, just over half of respondents did not use cash at all during the 2022 survey week, compared with around one-third in 2019. One in 20 participants used cash for all in-person transactions in the 2022 survey, compared with one in 10 in 2019.

Demographics of cash use

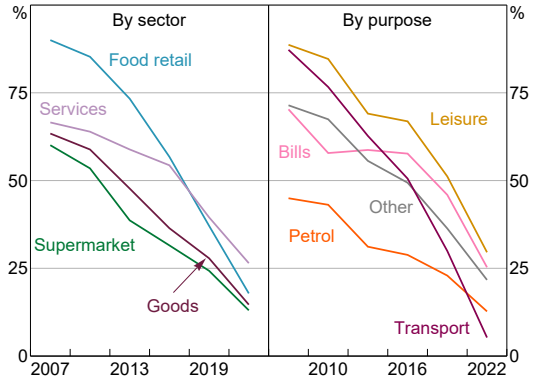
The decline in cash use in the 2022 survey was broadly based across demographic groups. Groups that have traditionally had the highest cash users tended to see the largest declines in cash use over this period (Graph 6). In particular, the oldest age bracket – those aged 65 and above – experienced the largest percentage point decline in the share of high cash users. Similarly, the share of high cash users in regional and remote areas decreased by more than in major cities, such that there is now little difference between these locations – in 2022, a little under 10 per cent of people in both major cities and regional or remote areas were high cash users. The lowest household income quartiles recorded the largest decline in the share of high cash users. As a result, cash use is now more similar across age, location and household income than at any time since the CPS began in 2007.

However, differences remain across some demographic groups, particularly by age and income. By age, older survey participants were the highest cash users, with 18 per cent of respondents aged 65 and above classified as high cash users (Graph 7). By contrast, only 3 per cent of those under the age of 50 were high cash users – in fact, around 82 per cent were low cash users. By income, lower household income continued to be associated with more intensive cash usage – for example, 17 per cent of people in the first household income quartile were high cash users, compared with only 2 per cent in the fourth household income quartile.

Graph 4

Cash Payments

As a share of in-person payments

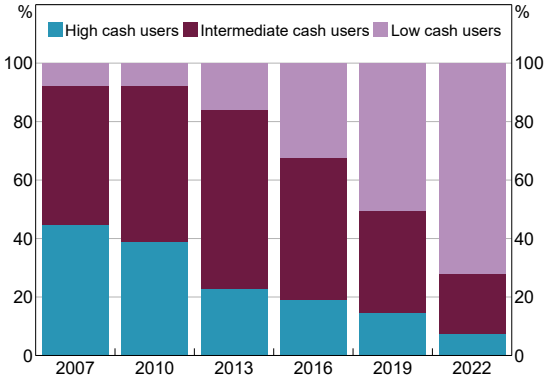


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 5

Cash Use Intensity

Share of respondents in each group



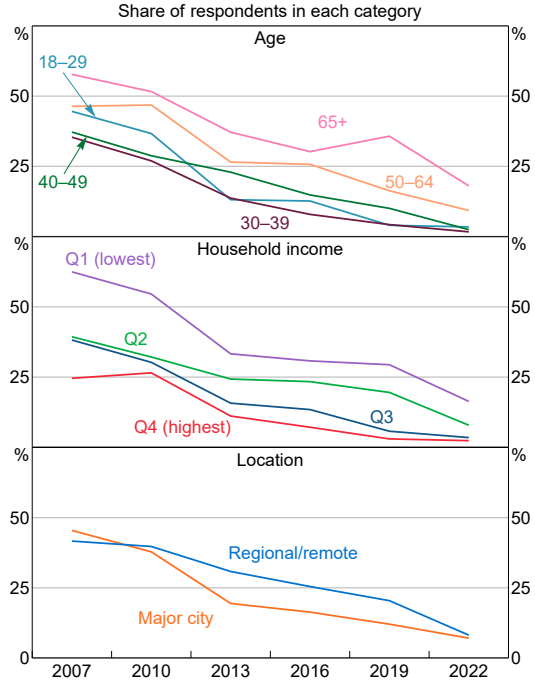
* Frequency based on share of in-person payments in cash (low: ≤ 20 per cent, high: ≥ 80 per cent).

Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 6

High Cash Users*

Share of respondents in each category



* High cash users are those who use cash for at least 80 per cent of their in-person transactions.

Source: ABS; RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Attitudes towards cash

Consistent with previous surveys, the 2022 CPS indicated that some Australians would be negatively affected if cash was difficult to access or if shops stopped accepting it as a payment method. Overall, just over one-quarter of respondents – regardless of how intensively they used cash – reported that they would experience a 'major inconvenience' or 'genuine hardship' if cash was hard to access or use (Graph 8). Notably, this number is unchanged since the 2019 survey. Around 60 per cent of high cash users indicated they would experience a major inconvenience or genuine hardship if cash was no longer available or usable – this group made up about 4.5 per cent of the adult Australian population in 2022, which is about half its share in 2019. This suggests that cash remains essential in the lives of some Australians, albeit a shrinking proportion.

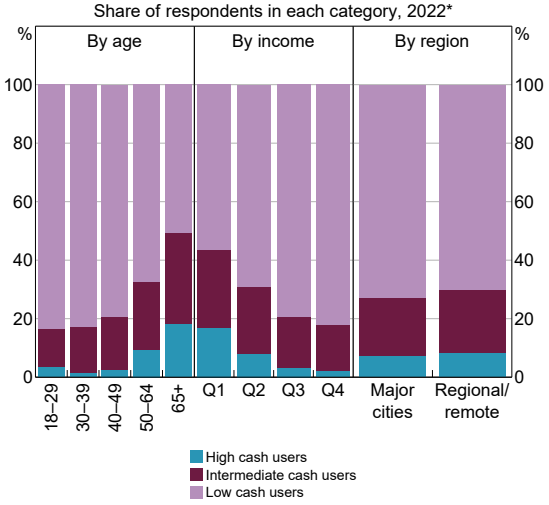
To understand the reasons why cash is important to some people, those participants who indicated that they would experience a 'major inconvenience' or 'genuine hardship' if cash were hard to access or use were asked why they needed to use cash rather than other payment methods. Privacy and security concerns was cited as the top reason, followed by some merchants only accepting cash and using cash for budgeting purposes (Graph 9). There was a notable increase in the share of respondents citing privacy and security concerns as their most important reason for using cash in the 2022 survey, perhaps reflecting high-profile cyber incidents in the past few years. Reasons associated with barriers to using alternative payment methods (i.e. poor internet access, some merchants only accepting cash, or having no other way to pay) have decreased in relative importance since the 2019 survey. Indeed, having no other way to pay was the least cited reason to need to use cash in 2022, a notable shift from 2019.

One factor that may have assisted people to use payment methods other than cash or to view cash as less important is the increase in internet access

Graph 7

Cash User Groups

Share of respondents in each category, 2022*



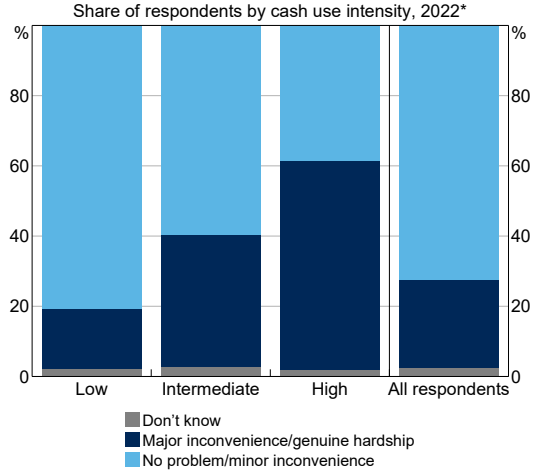
* Frequency based on share of in-person payments in cash (low: ≤ 20 per cent, high: ≥ 80 per cent).

Source: ABS; RBA calculations, based on data from Ipsos.

Graph 8

Effects of No Cash

Share of respondents by cash use intensity, 2022*



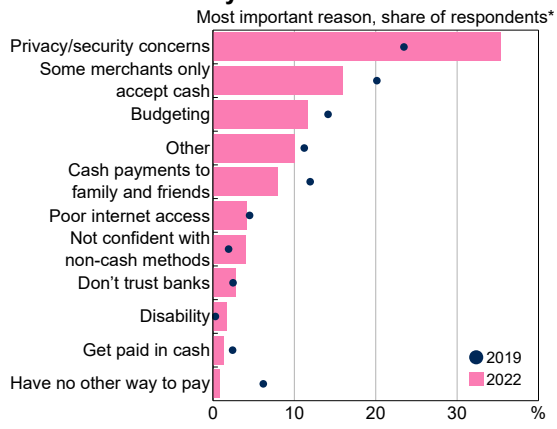
* Frequency based on share of in-person payments in cash (low: ≤ 20 per cent, high: ≥ 80 per cent).

Source: RBA calculations, based on data from Ipsos.

Graph 9

Why Do You Need to Use Cash?

Most important reason, share of respondents*



* Of the 211 (in 2022) and 277 (in 2019) respondents who indicated it would be difficult if shops stopped accepting cash or they could no longer withdraw cash.

Source: RBA calculations based on data from Ipsos and Roy Morgan Research.

on mobile phones. Although the CPS indicates that a lower share of high cash users had access to an internet-compatible mobile phone than other consumers, ownership of such devices has nearly doubled since 2019, narrowing the gap markedly (Graph 10). This, coupled with barriers to other payment methods being a relatively less important reason for needing cash, suggests that access to (and presumably comfort with) technology may be less of a barrier to using digital payments for groups that were traditionally reliant on cash.

Accessing cash

Convenience

The CPS includes questions about consumers' perceptions of access to cash services. This complements other data sources on the number, type and distance to cash access points (Guttmann, Livermore and Zhang 2023). The 2022 CPS suggests that almost all people use cash withdrawal services, and that access to these services is generally convenient (Graph 11). By comparison, fewer people use cash deposit services than withdrawal services, and people generally find accessing deposit services less convenient. There was little change in these shares between the 2019 and 2022 surveys.

Focusing only on high cash users who *use* withdrawal and deposit services, about 80 per cent indicated that their access to cash withdrawal services was convenient; however, this was a decline from about 95 per cent in 2019. By contrast, perceived convenience of cash deposit services was little changed from 2019, with about 75 per cent of high cash users rating it as convenient.

Cash top-ups

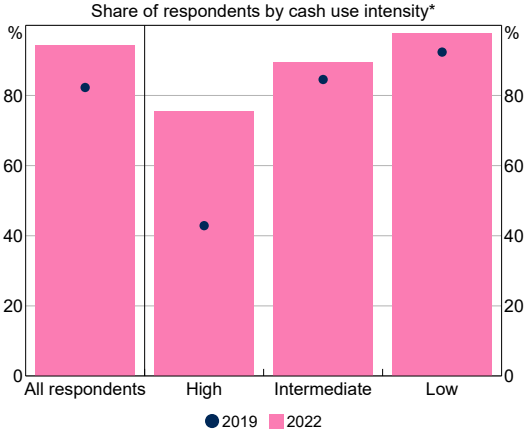
Consistent with the decline in the use of cash for transactions, the share of respondents making cash top-ups (i.e. receiving or withdrawing cash) during the survey week decreased compared with previous surveys: 29 per cent of respondents in the 2022 survey made at least one top-up, compared with 48 per cent in 2019 and 86 per cent in 2007. Similarly, the average number of top-ups halved – from around three top-ups per month in 2019 to around two per month in 2022. On the other hand, the median value of cash top-ups returned to $100 in 2022, from $80 in 2019, to be the same as reported in most surveys since 2007. Together, these results suggest that as consumers use cash less, they are choosing to withdraw around the same amount of cash as in the past – just less frequently. That said, the real value of cash top-ups has clearly fallen since 2007 given that inflation has occurred over that time.

Consistent with previous CPS findings, data on respondents' transactions during the survey week suggested that these top-ups tended to occur either via ATMs or via other non-bank sources (e.g. wages, transfers from friends etc), rather than at a

Graph 10

Has Mobile Internet Access

Share of respondents by cash use intensity*



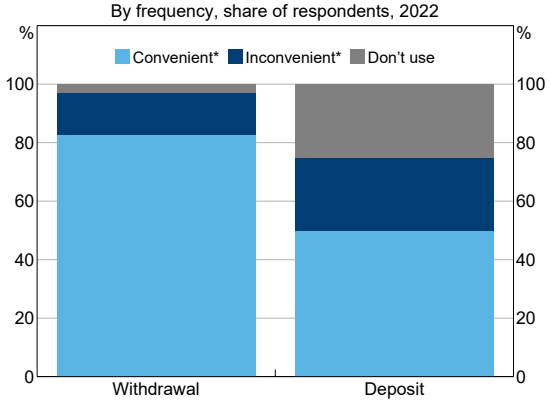
* Frequency based on share of in-person payments in cash (low: ≤ 20 per cent, high: ≥ 80 per cent).

Source: RBA calculations, based on data from Ipsos and Roy Morgan Research.

Graph 11

Access to Cash Services

By frequency, share of respondents, 2022



* Share of respondents who answer very (in)convenient or (in)convenient.

Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

bank branch or via cash out at the point-of-sale. Like with top-ups overall, the CPS indicates that the number of ATM withdrawals per person halved between 2019 and 2022 to be about eight per year (roughly one withdrawal every six weeks).

In the 2022 CPS, respondents were asked to reflect on where they *usually,* and where they *most prefer* to, access their cash even if they did not do so during the survey week. (The declining frequency of cash top-ups has reduced the CPS's visibility of the access points that respondents use and so these questions were asked to address this gap.) Across all cash-user groups, people usually access cash from ATMs or cash out at the point-of-sale; these were also cited as the two most preferred ways to access cash (Graph 12). By cash use intensity, high cash users were more likely to state that they *usually*, and *most prefer* to, access cash at a bank branch or Bank@Post, compared with low cash users.

The preference of high cash users for access points with a person-to-person element may be related to a decline in their perceived convenience of cash withdrawal services. Access to bank branches has declined in recent years (Guttmann *et al* 2023). While most high cash users still perceive withdrawal services to be convenient, this highlights that these users may be vulnerable to deteriorations in their cash access. With the falling number of high cash users over the past three years, it may also be that this group increasingly represents those for whom access points with a person-to-person element are particularly important or whose cash needs are only met by bank branches (i.e. no withdrawal limits).

Cash holdings

Survey participants were asked to record the number and value of banknotes held in their wallets. There was a sizeable increase in the share of people who had no cash in their wallet, up from 23 per cent in 2019 to 29 per cent in 2022 (Graph 13). The share of respondents holding more than $100 in their wallet did not change over this period.

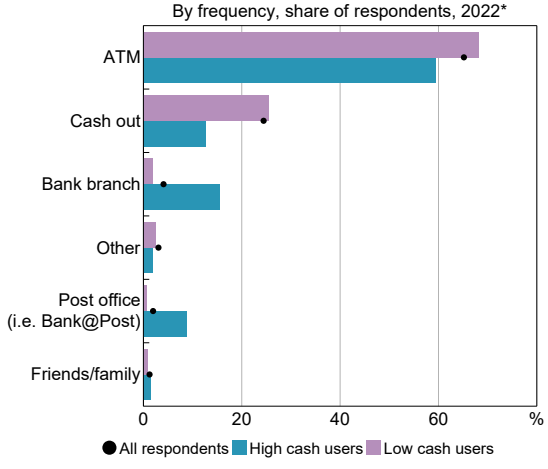
Higher denomination banknotes constituted a larger share of wallet holdings compared with previous years (Graph 14). Even though cash use is declining, most people held some amount of cash in their wallet in 2022; however, this was more likely to be a $50 banknote than in previous years, possibly reflecting precautionary motives, inflation or the prominence of ATMs for accessing cash (which typically dispense $50 or $20 banknotes). The low-denomination ($5 and $10) banknotes were less prevalent in people's wallets in 2022 compared with previous years, consistent with lower transactional cash use and weak demand for these denominations since the start of the COVID-19 pandemic (Guttmann *et al* 2023).

Around 40 per cent of respondents indicated that they typically held cash somewhere other than their wallet in 2022 (unchanged since 2019). Most

Graph 12

Most Preferred Cash Access Point

By frequency, share of respondents, 2022*



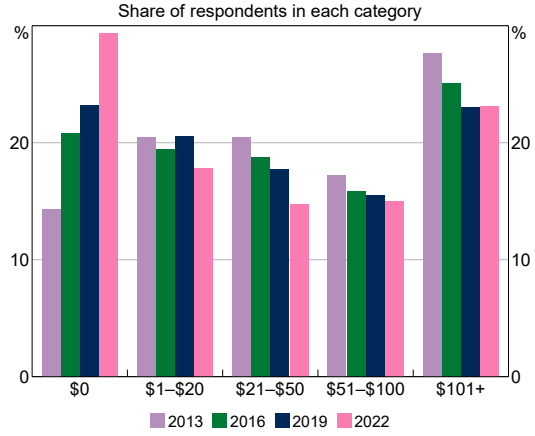
* Frequency based on share of in-person payments in cash (low: ≤ 20 per cent, high: ≥ 80 per cent).

Source: RBA calculations, based on data from Ipsos.

Graph 13

Wallet Cash Holdings

Share of respondents in each category



Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

respondents held between $101 and $1,000, and few reported more than $1,000 (Graph 15). This is nonetheless likely to be an underestimate, as people who hold a large amount of cash may not be willing to disclose this in a survey or may not be captured by the sample (Finlay, Staib and Wakefield 2018).

The CPS suggests that many consumers perceive cash to be important as a back-up payment method. Of the people who held cash in their wallet in 2022, the most important reason for doing so – other than for day-to-day purchases – was for emergency transactions (20 per cent of respondents), followed by concerns about payments system reliability (Graph 16). Emergency transactions was also cited as the most important reason for holding cash outside the wallet, followed by giving cash gifts.

Conclusion

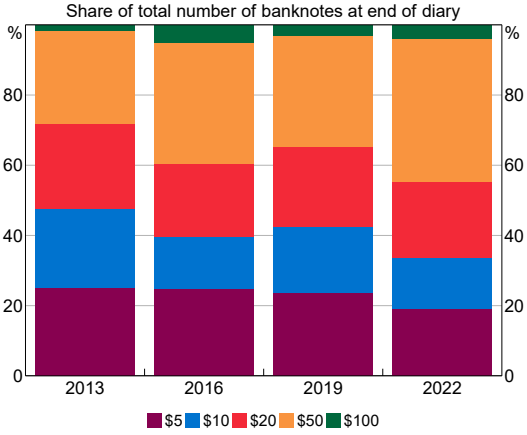
The 2022 CPS suggests that the decline in cash use accelerated in recent years. Australian consumers halved their share of cash payments by number over the three years to 2022, and cash is now used less than electronic methods for all transaction sizes. The decline in cash use has been broadly based; while attributes such as being older and having a lower household income remain associated with more intensive cash use, the 2022 CPS suggests that cash use is now more similar across demographics than at any time since the CPS began in 2007. In particular, cash use has converged for people living in major cities compared with those living in regional or remote locations. Consistent with the decline in the use of cash for transactions, the share of respondents making cash top-ups has also decreased.

These results are a continuation of the long-run decline in cash use observed since the first CPS in 2007, which likely reflects interrelated structural factors. One factor is that consumer preferences have shifted over this time towards electronic payment methods as new technologies have made these more convenient. Another factor is that the number of cash access points has declined considerably in recent years, although the distance

Graph 14

Banknotes in Wallet

Share of total number of banknotes at end of diary

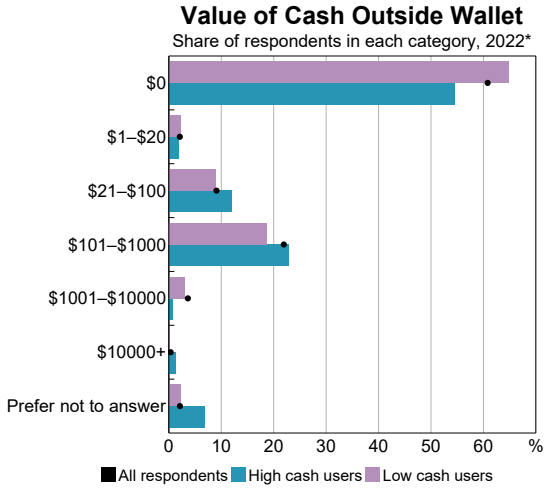


Source: RBA calculations, based on data from Colmar Brunton, Ipsos and Roy Morgan Research.

Graph 15

Value of Cash Outside Wallet

Share of respondents in each category, 2022*



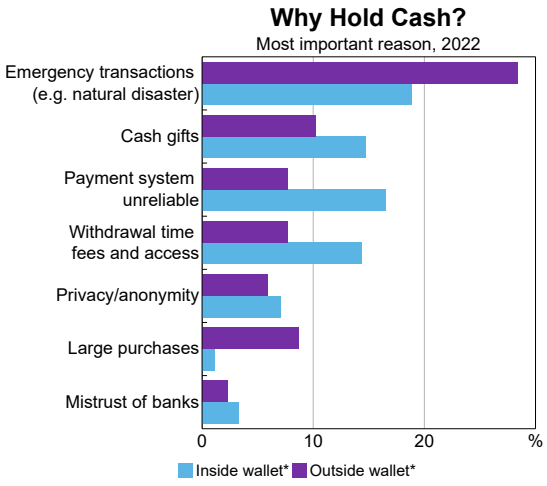
* Frequency based on share of in-person payments in cash (low: ≤ 20 per cent, high: ≥ 80 per cent).

Source: RBA calculations, based on data from Ipsos.

Graph 16

Why Hold Cash?

Most important reason, 2022



* Share of respondents who hold cash inside and/or outside their wallet.

Source: RBA calculations, based on data from Ipsos.

to the nearest cash access point has remained relatively unchanged. The 2022 CPS raises important questions about how these factors might continue to affect the long-run decline in cash use, and how policy should respond.

Of particular importance is the implications of these long-run declines for the cash distribution system. The Reserve Bank's 'Review of Banknote Distribution Arrangements: Conclusions Paper' confirmed that the declining volumes of banknotes being transported and processed has put financial pressure on private participants and contributed to significant excess capacity within the cash distribution network (RBA 2022). Despite declining cash use, its flow-on effects to cash access and cash acceptance have been modest to date (Guttmann *et al* 2023). That said, there are vulnerabilities to cash access in some communities, particularly in non-metropolitan areas, and a substantial share of merchants have 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. The authors are appreciative of the assistance provided by others in Note Issue Department and Payments Policy Department, in particular Troy Gill, Ben Watson and Thuong Nguyen.

[1] For further details on the CPS methodology, see Nguyen and Watson (2023).

[2] Cash might not be an option for some in-person transactions, such as if the merchant does not accept it as payment. However, merchant acceptance of cash remains high, and so considering in-person transactions represents a good proxy of when cash is an option (Guttmann, Livermore and Zhang 2023).

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Finlay R, A Staib and M Wakefield (2018), 'Where's the Money? An Investigation into the Whereabouts and Uses of Australian Banknotes', RBA Research Discussion Paper No 2018-12.

Guttmann R, T Livermore and Z Zhang (2023), 'The Cash-use Cycle in Australia ', *RBA Bulletin*, March.

Nguyen T and B Watson (2023), 'Consumer Payment Behaviour in Australia', *RBA Bulletin,* June.

RBA (Reserve Bank of Australia) (2022), 'Review of Banknote Distribution Arrangements: Conclusions Paper', August.

Estimating the Relative Contributions of Supply and Demand Drivers to Inflation in Australia

Ben Beckers, Jonathan Hambur and Tom Williams[*]

Photo: miniseries – Getty Images

Abstract

Inflation has increased substantially since mid-2021. Understanding the relative contributions of supply and demand factors is important for determining the appropriate monetary policy response; a central bank may at least partly 'look through' the price effects of a supply shock if it is expected to be short lived and inflation expectations remain anchored. This article attempts to disentangle and explore the contributions of supply and demand factors to the recent inflationary episode, using three approaches. Similar to the experience of other advanced economies, our estimates suggest that supply-side factors have been the biggest driver of recent inflation outcomes in Australia. These supply-side factors have been persistent, with their contribution to inflation growing over 2022, leading to an extended period of inflation being above target and concerns that inflation expectations could become de-anchored. That said, demand has also played an important role.

Introduction

Inflation in Australia has picked up sharply since the second half of 2021, peaking at around 8 per cent at the end of 2022. Inflation has increased by significantly more than the Reserve Bank and other forecasters expected in mid-2021, similar to the experience overseas (RBA 2022a). The increase in inflation reflected a combination of both supply factors that reduced the global and domestic economy's capacity to produce as many goods and services at previous prices, and demand factors that increased the amount of goods and services

businesses and households wanted to buy. Supply-side factors included: disruptions resulting from the COVID-19 pandemic, which strained the ability of firms globally to produce and deliver goods; Russia's invasion of Ukraine, which led to sharp increases in the prices of energy and other commodities; and flooding on the east coast of Australia in the first half of 2022, which interrupted domestic supply chains (Graph 1) (RBA 2021).

Demand-side factors have also contributed to strong inflation outcomes. These included: the initial shift in demand from services towards goods due to pandemic-related restrictions on activity and a hesitancy among the population to participate in some social activities (Graph 2); the rapid economic recovery following the faster-than-expected development of effective vaccines; and the significant fiscal and monetary policy support provided during the pandemic.

It is important to try to disentangle the supply and demand contributions to the recent inflationary episode, as doing so can help inform the appropriate monetary policy response. However, separating the relative contributions of supply and demand is not straightforward. For example, the shift in demand towards goods and disruptions to global supply chains likely combined to push up prices for imported goods like consumer durables.

This article explores three approaches to gauge the relative importance of supply and demand factors in contributing to the current high levels of inflation, ranging from a data-driven approach to a structural model approach. Overall, these approaches suggest that supply factors have accounted for at least half of inflation in Australia over the past year or so.

Estimates of supply-side and demand-side contributions to inflation

To disentangle the supply- and demand-side contributions to inflation, we first need to make some simplifying assumptions about how the economy works. By imposing more assumptions about the 'structure' of the economy, we can generally get a more precise assessment of the contributions of supply and demand. But this comes at a cost: making more assumptions increases the risk that the results are, at least in part, driven by the particular set of assumptions that have been made.

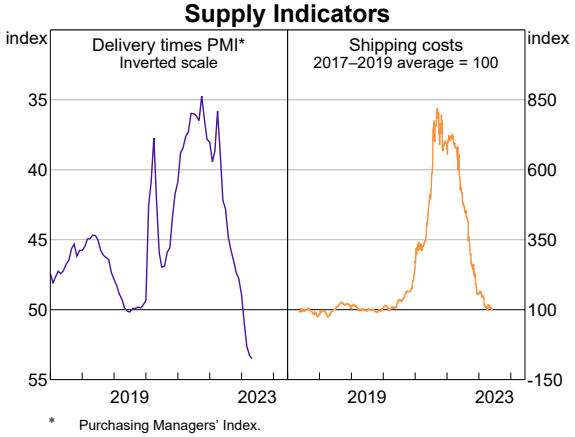
To mitigate this, we consider three different approaches to estimating the supply and demand contributions to inflation. Each approach places increasingly more structure, and so more assumptions, on the economy, starting with very little and ending with a full economic model of the Australian macroeconomy. The benefit of using three different approaches is that it allows us to check the robustness of the overall conclusions to the different assumptions used.

Approach 1: Changes in prices and quantities of each CPI expenditure group

The first approach, proposed by Shapiro (2022), places very little structure on the economy. It rests

Graph 1

Supply Indicators



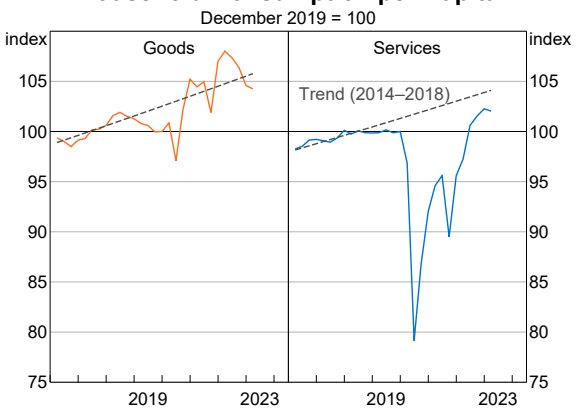
* Purchasing Managers' Index.

Sources: RBA; Refinitiv; S&P Global.

Graph 2

Household Consumption per Capita

December 2019 = 100



Sources: ABS; RBA.

on the simple and uncontroversial assumption that when demand for a good increases, the quantity consumed of this good will increase but so will its price. By contrast, when the ability of firms to supply a good decreases (or their costs of production increase), the quantity consumed falls but its price rises. This simple framework can be used to assign price movements in groups of similar items from the Consumer Price Index (CPI) in each quarter as being either supply or demand driven, as follows:

- **Demand-driven price movement**: The quantity consumed and the price move in the *same* direction.

  For example, if both the price and quantity of clothing rise over the CPI quarter, the higher prices for clothing are assessed as being driven by higher demand.

- **Supply-driven price movement**: The quantity consumed and the price move in the *opposite* direction.

  For example, if the price of clothing rises and the quantity sold falls over the CPI quarter, the higher prices for clothing are assessed as being driven by lower supply.

With each group-level price change labelled as either demand or supply driven, headline CPI inflation can then be decomposed into demand- and supply-driven contributions based on the weight of each group in the CPI basket.

To identify the demand and supply drivers of inflation since mid-2021, it is important to abstract from some longer term trends in prices and quantities, such as the fact that prices and quantities tend to grow over time as the economy expands. Returning to the earlier example, if clothing prices and quantities tend to increase over time, it might look like most changes are driven by demand – but this simply reflects longer term growth in the economy, rather than current supply and demand conditions. To this end, our analysis focused on *unexpected* changes in prices or quantities in any given quarter by estimating a vector autoregressive (VAR) model for each CPI expenditure group, which allowed us to abstract from these longer term trends. See Appendix A for further details of the VAR model.

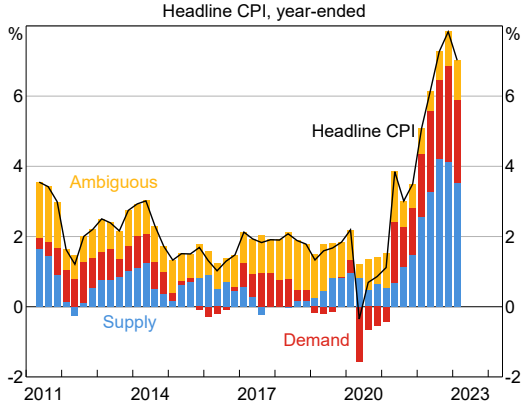
Moreover, rather than assigning all price changes to being supply or demand driven, we followed Shapiro (2022) and only classified changes if both the unexpected price and quantity change were sufficiently large. Otherwise, the price change was labelled 'ambiguous'. This reflected inherent uncertainty in the estimates. The choice of the threshold was arbitrary, and a larger threshold would have labelled more quarterly price changes as ambiguous. Further caveats of the approach are discussed in Appendix A.

Results

This approach suggests that supply-side factors have been responsible for around half of headline CPI inflation over the year to the March quarter of 2023, similar to results found for other advanced economies using this approach (Gonçalves and Koester 2022; Chen and Tombe 2023) (Graph 3). The contribution of supply-side factors to inflation peaked at around 4¼ percentage points over the year, and contributed 3½ percentage points over the year to March 2023. Demand-side factors were also found to be important, responsible for around one-third of inflation over the past year, equivalent to around 2½ percentage points of year-ended inflation. Around 1 percentage point of headline CPI inflation could not be classified by this approach.

Graph 3

Decomposition of Inflation – Approach 1*



* Based on the methodology of Shapiro (2022); 'ambiguous' indicates the contribution from components where the unexpected change in prices or quantities is within the 25 per cent prediction interval and the contribution from unmodelled components due to data limitations.

Sources: ABS; RBA.

Approach 2: Deviations from predictions of standard inflation models

The second approach compares actual inflation outcomes with what can be explained by the Bank's inflation models. These models generally best capture demand-driven inflation and so the unexplained part of inflation provides an indication of what might be due to supply factors (RBA 2022a). More specifically, we can compare actual outcomes with what the Bank's Phillips curve inflation model would have predicted if it had information on the actual outcomes for unemployment, inflation expectations and import prices (see Appendix B). This puts slightly more structure around how supply and demand affect the economy and inflation. In particular, it assumes that demand factors affect inflation by influencing unemployment, import prices and inflation expectations. All other changes in inflation are assumed to reflect supply factors.[1]

One limitation of this approach is that the Phillips curve model includes changes in the prices of imported goods and therefore the model will capture some supply-driven inflation coming from overseas. However, over recent decades consumer prices in Australia have not been very sensitive to changes in the prices of imported goods. As a result, the model attributes very little of the recent increase in inflation to import prices. Another reason to be cautious in interpreting these results is that they are sensitive to the assumption about the non-accelerating inflation rate of unemployment (NAIRU), as this determines how much spare capacity there is in the economy for a given unemployment rate. For example, a higher NAIRU assumption would imply less spare capacity in the economy and therefore higher demand-driven inflation in this framework (and vice versa for a lower NAIRU assumption). The NAIRU is unobservable and estimates of it are always subject to a high degree of uncertainty; the pandemic has further complicated efforts to construct these estimates. For this analysis, we assumed that the NAIRU is around 4.5 per cent, which is broadly in line with model estimates of the NAIRU prior to the onset of the pandemic (Ellis 2019).

Results

According to this approach, around one-half to two-thirds of inflation over the year to the March quarter of 2023 cannot be explained by the models – this is therefore our estimate of supply-driven inflation (Graph 4). The contribution of supply factors to inflation increased sharply over 2022. In the absence of supply factors, this approach suggests that inflation would have been 3.1 per cent over the year to the March quarter of 2023.[2]

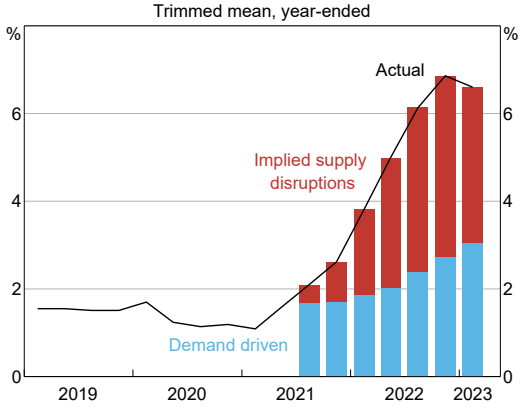
Approach 3: A structural model of the Australian economy

The third approach uses a macroeconomic model of the Australian economy to identify the role of supply-side and demand-side factors in economic outcomes. This approach places a large amount of structure around how supply and demand shocks affect inflation. In particular, this type of model has a set of equations predicting outcomes for each variable in the economy, based on all the other variables in the model. It also specifies shocks that move the variables away from their 'steady-state values' – that is, the values they would return to if no unusual fluctuations or shocks were occurring. These shocks are passed through to the rest of the model economy based on the relationships between all the variables. The model interprets all deviations from the steady-state values as ultimately stemming from some shocks. So, by fitting the model to the data, we can determine what shocks are most likely to explain the observed economic

Graph 4

Decomposition of Inflation – Approach 2

Trimmed mean, year-ended



Sources: ABS; RBA.

outcomes. This allows the model to precisely attribute outcomes to supply- and demand-side shocks; however, the downside is that the attribution may be model specific – any changes to the model could lead to different attributions.

One such model is the Reserve Bank's Dynamic Stochastic General Equilibrium (DSGE) model.[3] This is a large model of the Australian economy with several sectors, such as housing, mining, goods and services.

The DSGE has many different shocks, which we can group into three baskets:

- *Demand shocks:* Shocks that influence demand for goods in a sector, or in aggregate. These include surprise moves in monetary policy, or shocks to the willingness of households and firms to consume or invest.
- *Supply shocks:* Shocks that push up prices while lowering output. These include changes in productivity and increases in domestic firms' markups (and so profit margins) or input costs. The latter will partly capture higher imported input costs.
- *Foreign shocks:* Any supply and demand shocks occurring overseas.

Results

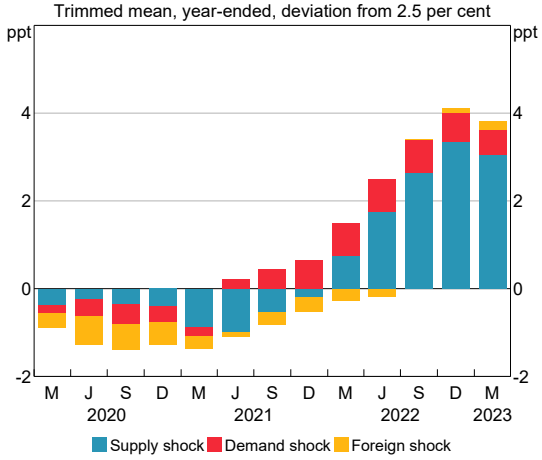
According to the DSGE model, supply-side shocks accounted for around three-quarters of the deviation of underlying inflation from its assumed steady-state level of 2½ per cent over the year ending March 2023 (Graph 5). The share has been broadly stable over time, though the contribution to the level of inflation has increased substantially. In the absence of supply-side shocks, the model implies that underlying inflation would have been around 3 percentage points lower in December 2022, or slightly below 3½ per cent. As such, inflation would still have been above the Bank's target range of 2–3 per cent.

The DSGE model can also be used to explore which sectors have contributed the most to supply-side inflation (Graph 6). The model suggests that supply shocks in the tradables goods sectors (both imports and domestically produced tradables) and the housing sector account for a large share of the pick-up in inflation to date. The former is likely to reflect high prices for imported goods, as well as increased energy prices. The latter is likely to reflect a combination of higher prices for imported construction goods and supply constraints in the construction sector (RBA 2022b). More recently, the non-traded sector has begun adding to inflationary pressure, consistent with a broadening of inflationary pressures to the services sector (RBA 2023).

Graph 5

Decomposition of Inflation – Approach 3*

Trimmed mean, year-ended, deviation from 2.5 per cent



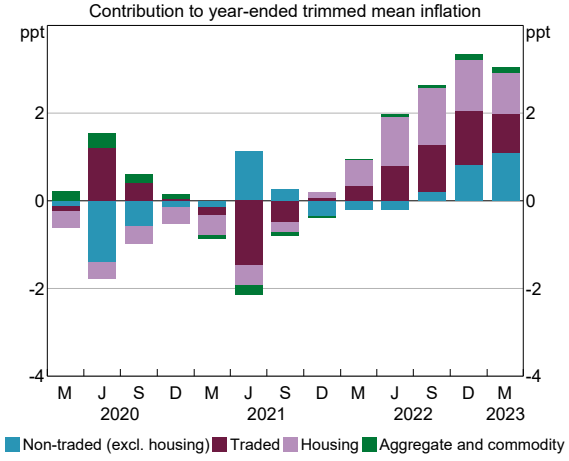
* Demand includes monetary policy, investment and consumption shocks. Foreign includes foreign demand and cost shocks. Supply includes markup, technology and labour supply shocks. Supply will capture some overseas cost shocks.

Source: RBA.

Graph 6

Decomposition of Supply Shock*

Contribution to year-ended trimmed mean inflation



* Supply shocks include markup, technology and labour supply shocks.

Source: RBA.

Table 1: Contribution of Supply-side Factors to Inflation

	Supply contribution Percentage points	Inflation without supply contribution Per cent
Approach 1[(a)]	3.5	3.5
Approach 2[(b)]	3.5	3.1
Approach 3[(c)]	3.1	3.5

(a) Headline CPI inflation. March 2023.

(b) Underlying CPI inflation. March 2023.

(c) Underlying CPI inflation. Supply contribution is contribution to deviation from 2.5 per cent inflation, rather than total inflation. March 2023.

Source: RBA.

Conclusion

The three approaches explored above suggest that supply factors have accounted for at least half of inflation in Australia over the past year or so (Table 1). Each of these methods has its limitations and so other possible approaches could yield different results. However, the fact that three very different methodologies tell a similar story give us confidence in this high-level conclusion.

While a central bank may 'look through' the price effects of a supply shock if it is expected to be short lived, in the recent episode supply shocks have resulted in an extended period of inflation being well above the inflation target in many advanced economies (RBA 2022a). In this environment, there have been concerns globally that inflation expectations could become de-anchored if inflation is not returned to target in a reasonable period of time (Adrian 2022). The contribution of supply factors to inflation outcomes in Australia continued to grow throughout 2022. Demand has also been an important driver of recent inflation outcomes; measures of capacity utilisation have been very high and labour market spare capacity has been at multi-decade lows. Taken at face value, these results suggest that inflation would still have been above the Reserve Bank's target range even if the contribution of supply factors was excluded in the estimates above.

Appendix A: Approach 1 – The vector autoregressive (VAR) model

A VAR model can be used to describe the dynamic relationship between two or more (economic) variables. Here we use VARs to model the relationship between the (log) price *p* of a group of goods and services in the CPI and the (log) quantity *q* of that group of goods and services (measured by volumes from Household Final Consumption Expenditure (HFCE) in the national accounts). This dynamic relationship can be represented as follows:

$$p_{i,\,t} = c_{1i} + d_{1i}t + a_{11i}p_{i,\,t-1} + a_{12i}q_{i,\,t-1} + u_{1i,\,t}$$

$$q_{i,\,t} = c_{2i} + d_{2i}t + a_{21i}p_{i,\,t-1} + a_{22i}q_{i,\,t-1} + u_{2i,\,t}$$

Where *i* is a group, *t* is the time period (here quarter), *u* is the one-quarter ahead forecast error, *c* is a constant, and *d* and *a* are parameters that capture the effect of deterministic (time) trends and past prices and quantities on current prices and quantities. The model above is written with one lag of past prices and quantities, but further lags can be included.

Following this approach, we estimated 15 two-variable VARs – one for each HFCE expenditure category for which a mapping exists with a group of CPI items. These 15 groups account for 90–97 per cent of the consumption basket underlying the CPI over the sample. The VARs were estimated over rolling windows of 12 years to allow for changes in the model parameters. For each iteration of rolling-window estimates, we used the Hannan-Quinn information criterion to determine the optimal number of lags in past prices and quantities up to a maximum of 12 lags.

We then used the estimated VARs to obtain the expected price level and quantity for each group based on the estimated constant, time trend, and dynamics in both prices and quantities. If realised prices and quantities deviated in the same direction from their expected values and to a sufficiently large extent (e.g. both price and quantity were *above* their 25 per cent prediction intervals), we labelled the group as 'demand driven' in that quarter. If realised prices and quantities deviated in *opposite* directions from their expected values and to a sufficiently large extent (e.g. the price was *above* the 25 per cent prediction interval but the quantity was *below* the 25 per cent prediction interval), we labelled the group as 'supply driven' in that quarter. If either price or quantity were within their 25 per cent prediction intervals, the group was labelled as 'ambiguous'.

After assigning labels to each category, headline CPI inflation was then decomposed using the most recent expenditure weights. That is, the contribution of supply shocks to headline CPI inflation was taken as the sum of all component-level inflation rates that were classified as supply driven, multiplied by their weight in the CPI basket. The contribution of demand shocks was obtained similarly.

In addition to the arbitrariness in the choice of the threshold in labelling a share of shocks as 'ambiguous', there are further shortcomings to this approach that are important to note:

- The approach assumes that all of the price change for a particular expenditure group stems from either a shift in demand or a shift in supply, rather than allowing for both supply and demand to have an effect in a given period. In any given quarter, each expenditure group is likely to experience changes to both demand and supply, but the approach can, at best, only identify which force dominates *on net*.
- Our primary objective was to identify *new* shocks to supply and demand that occurred during and after the COVID-19 pandemic. As such, we sought to abstract from longer run structural changes to the supply and demand balance for individual expenditure groups. Prices for communications equipment, for instance, have generally fallen over the past decades as supply increased alongside increased global production and trade. Similarly, some price changes during and after the pandemic may be the delayed response to shocks occurring before 2020. We abstracted from such trends and past shocks by including expenditure group-specific deterministic trends and lags of price and quantity changes. However, this implies that demand or

supply shocks happening early during the pandemic were not captured in our estimates of demand and supply shocks in 2021 and 2022.

- The approach cannot identify the fundamental demand or supply shocks to the same extent as the DSGE model. That is, it cannot determine whether changes to demand were due to changes to monetary or fiscal policy or the willingness of households to consume, or whether changes to supply were due to changes in productivity, markup or input cost shocks.
- Shocks hitting only one sector may spill over to other sectors and be captured as shocks to these sectors. For instance, shutdowns of restaurants during the pandemic would represent a supply shock to the hospitality sector. As a result of this shock, however, demand for groceries increased as households shifted to cooking at home. While this would be labelled as a demand shock to the food and drink CPI expenditure group, the fundamental shock was a supply shock to the travel services, hotels and dining expenditure group.
- Similarly, overseas demand shocks (e.g. for furniture, home exercise equipment or electronics during the pandemic) could raise (global) prices but reduce supply available to Australia. While the underlying shock may have been an increase in global demand, the model would classify this as a supply shock to Australia.
- The demand or supply shock to each expenditure group is defined based on the *unexpected* price (and quantity) change alone. However, the *entire* price change (the expected and the unexpected parts) are then labelled as demand or supply driven even though the expected part of a price change is due to deterministic factors, long-run trends and past demand or supply shocks *not identified* by this model. In practice, it can even be the case that the unexpected parts of an expenditure group's price and quantity changes are both negative (indicating a negative demand shock) – but, as long as the entire price change is positive, the approach would incorrectly label this category to exert upwards pressure on total inflation due to a *positive* demand shock.

Appendix B: Approach 2 – Phillips curve model specification

The Phillips curve model estimates a relationship between inflation, inflation expectations, a measure of labour market spare capacity and import prices. The following variables are included in the model, which estimates quarterly inflation:[4]

- Inflation in the previous quarter (π_{t-1}), which can be interpreted as representing the component of inflation expectations that is backward looking.
- Inflation expectations ($\frac{trend\ expectations_t}{4}$), because theory suggests that inflation expectations play a role in price-setting behaviour.
- The 'unemployment gap' ($\frac{u_{t-2} - u^*_{t-2}}{u_{t-2}}$) – that is, the difference between the unemployment rate and an estimated measure of the NAIRU (a measure of spare capacity in the economy).
- Changes in the prices of imported goods ($\frac{\%\ \Delta^{ye}\ (consumerIPI_{t-1})}{4}$), recognising Australia's relatively open economy. Australian consumers and businesses use imported goods and imported goods compete with many domestically produced goods.

Table B1: Philips Curve Model

Estimated June 1993 – December 2019

	Estimate[(a)]	Standard error
Intercept	−0.104	(0.130)
π_{t-1}	0.207*	(0.093)
$\frac{trend\ expectations_t}{4}$ (b)	0.963***	(0.221)
$\frac{u_{t-2} - u^*_{t-2}}{u_{t-2}}$ (b)	−0.691***	(0.116)
$\frac{\%\ \Delta^{ye}\ (consumerIPI_{t-1})}{4}$	0.010	(0.010)
Adjusted R2	0.48	

(a) Statistical significance marked as * = 0.05, ** = 0.01, *** = 0.001.

(b) The standard errors on these variables are incorrect due to the generated regressors problem.

Source: RBA.

To generate an estimate of what inflation would have been in the absence of supply factors, we forecasted ahead with the Philips curve model from September 2021 (the beginning of the pick-up in inflation in Australia). Actual outcomes were used for the independent variables, such as import prices and the unemployment rate. Inflation in the previous quarter was determined by the model, not actual CPI outcomes (which capture the impact of supply factors). Supply-driven inflation was calculated as the difference between actual inflation outcomes and the model predictions.

Endnotes

[*] The authors are from Economic Group.

[1] This approach assumes that supply shocks do not affect unemployment or inflation expectations. If supply shocks do affect these variables, which in turn influence inflation, this indirect influence will be treated as demand-driven inflation not supply-driven inflation.

[2] Most of the inflation predicted by the Philips curve model can be explained by inflation expectations, which remained anchored around the midpoint of the Bank's target range. Unemployment below the NAIRU has pushed inflation outside the Bank's target range, according to the model.

[3] For further details on the DSGE model, see Gibbs, Hambur and Nodari (2018).

[4] For more details, see Cassidy *et al* (2019).

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Leverage, Liquidity and Non-bank Financial Institutions: Key Lessons from Recent Market Events

Rhea Choudhary, Suchita Mathur and Peter Wallis[*]

Photo: CHUNYIP WONG – Getty Images

Abstract

Non-bank financial institutions (NBFIs) can pose risks to financial stability due to their size, complexity and global interconnectedness. Vulnerabilities present in some NBFIs include high levels of leverage, liquidity mismatches and weaknesses in risk management practices. This article discusses how these vulnerabilities have been exposed in multiple episodes overseas since early 2020, resulting in dysfunction in some financial markets and losses for some NBFI counterparties. While Australian markets and institutions were largely unaffected by these episodes, regulators in Australia and overseas remain vigilant to the potential future risks posed by the sector.

Introduction

The term 'non-bank financial institution' (NBFI) refers to a group of entities that includes insurance companies, broker-dealers, investment funds and commodity trading houses. At its broadest, it can be defined as any financial institution that is not a central bank, bank or public financial institution (such as government mortgage corporations).[1] NBFIs complement or provide competition to the traditional banking sector by providing services that are often highly specialised and/or not suited to banks. They offer financial services using alternative funding sources to deposits and are subject to less stringent regulatory requirements compared with banks. These services include:

- *Credit intermediation:* Non-bank lenders extend credit directly to households and businesses, funded by non-deposit sources such as warehouse financing, loan securitisation or wholesale funding markets.[2] Non-banks' borrower profiles are often skewed towards riskier households and small to medium-sized

firms that may have limited access to funding via the traditional banking sector.

- *Institutional investment:* Investment funds (such as pension funds or money market funds), private equity firms, family offices and insurers invest in a wide range of assets, in some cases using leverage to finance their activity or increase potential returns.
- *Market-making and prime brokerage*: Broker-dealers act as intermediaries between market participants to facilitate trades. Prime brokers offer a range of services to hedge funds, family offices and other institutional investors, including securities lending, margin lending, cash management and trade execution.
- *Central clearing*: Central counterparties (CCPs) simplify market structure by acting as an intermediary between participants and ensuring smooth market functioning.

The international NBFI sector is large and highly interconnected with both the global banking system and parts of the real economy. NBFIs are estimated to hold close to 50 per cent of global financial system assets – a share that has increased by around 7 percentage points since the global financial crisis (GFC) (Graph 1). NBFIs' credit intermediation in certain jurisdictions is significant (e.g., non-bank lending accounted for approximately 65 per cent of new mortgage credit in the United States in 2021). They are also large institutional investors in sovereign and corporate debt markets.

While the size of Australia's NBFI sector is comparable with other advanced economies, it is largely comprised of superannuation funds that are prudentially regulated (Graph 1). Features that characterise the Australian superannuation sector – such as limited use of leverage, preference for longer dated assets, stable funding sources and higher holdings of cash and deposits – make it less vulnerable to risks associated with other non-bank entities that are more highly leveraged or have runnable liabilities (such as hedge funds, discussed below). Outside of superannuation funds, the NBFI sector in Australia largely consists of insurers and managed funds investing on behalf of superannuation funds. Credit intermediation from non-banks accounts for a small share of total credit in the Australian economy (Hudson, Kurian and Lewis 2023).

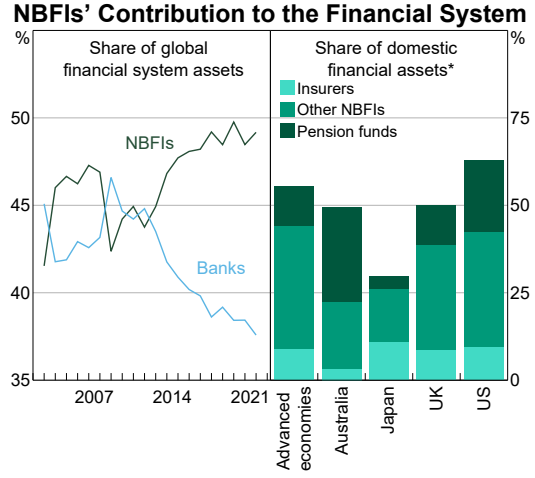
Assessing and addressing risks associated with NBFIs has been a key priority for global bodies as well as national regulators for the past decade. Events during the GFC highlighted a range of vulnerabilities, including a build-up of leverage, maturity mismatches between institutions' assets and liabilities, strong interlinkages with the traditional banking system and a general lack of transparency (Manalo, McLoughlin and Schwartz 2015). International work to monitor these vulnerabilities and strengthen oversight of the NBFI sector has been coordinated by the Financial Stability Board (FSB) in conjunction with other standard-setting bodies. This work has had two parts:

- **monitoring** trends and developments in the NBFI sector to better identify the build-up of systemic risks (FSB 2022)
- **policy recommendations** to strengthen the oversight and regulation of NBFIs, in conjunction with other international organisations (FSB 2023).[3]

The policy response is ongoing. Furthermore, recent episodes of market stress involving NBFIs have highlighted an increase in vulnerabilities, as global reforms to enhance the resilience of the banking system have pushed certain activities and risks

Graph 1

NBFIs' Contribution to the Financial System



* Other NBFIs comprise of financial auxiliaries and other financial intermediaries. Data are as of end-2021.

Sources: FSB; RBA.

outside of the regulated sector (IMF 2023). The growing size and interconnectedness of the NBFI sector has also created a greater risk for market dislocation and stress to spread across the financial system. This article discusses the common themes from recent stress events involving NBFIs across a range of sectors and markets and considers policy implications for regulatory authorities in Australia and overseas.

Recent market stress events

March 2020: A 'dash for cash'

Uncertainty arising from the rapid global spread of a new coronavirus and the economic effects of lockdowns and other government policy responses peaked in early 2020, triggering large declines in riskier asset prices and widespread asset sales, including very large outflows from investment funds. Demand for cash increased sharply due to risk aversion and as investment funds and other entities sought to reduce leverage, meet margin calls and meet redemptions. While investment funds were generally able to meet the redemption pressures without large disruptions, leverage and liquidity mismatches in some funds amplified market stress. For example, certain highly leveraged hedge funds contributed to dysfunction in the US Treasury market as large price fluctuations led to forced unwinding of positions to meet margin calls (Schrimpf, Shin and Sushko 2020). This included funds that were engaged in 'basis' trades that aimed to profit from small price deviations between economically similar bond exposures (such as between cash bonds and futures).

The forced selling from these funds added to widespread selling pressures in the US Treasury market by a range of entities, which overwhelmed the capacity of dealers to intermediate trades. This combination of large asset sales and constraints on dealer intermediation was self-reinforcing and resulted in severe market dysfunction.[4] Yields on 10-year Treasuries moved by 65 basis points over nine days in March 2020 (Graph 2). Market participants faced large variation margin (mark-to-market) calls, adding to selling pressures in the US Treasury market. Initial margin requirements also increased by over 70 per cent from the onset of the strains to their peak (Cunliffe 2022).[5] Similar dynamics and yield movements were also present in other government bond markets, including in Australia (Finlay, Siebold and Xiang 2020).

March 2021: Archegos collapse

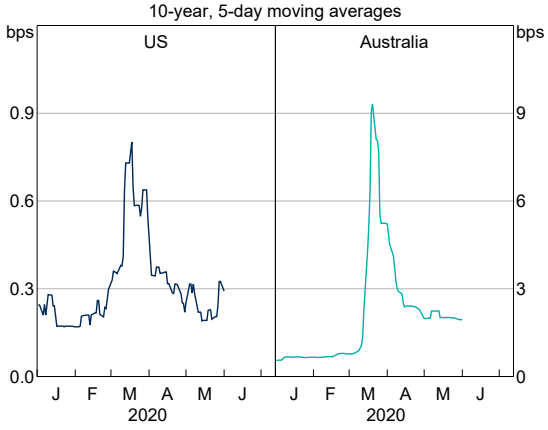
Archegos was a US-based family office that held highly leveraged long positions in a range of US and Chinese technology stocks. These positions were built up using equity derivatives such as total return swaps, in which Archegos paid a fixed fee and received a return based on price movements in an underlying stock. Archegos obtained derivatives exposure from a group of prime brokers that included several global systemically important banks (G-SIBs). These prime brokers hedged their positions by purchasing the underlying securities. Archegos used derivatives across multiple prime brokers to accumulate very large positions in individual stocks without disclosing the extent of its position to its brokers, other market participants and regulators. This included gaining effective control of more than 50 per cent of the freely trading shares in ViacomCBS, according to investigations by the US Department of Justice (discussed below).

In March 2021, a decline in ViacomCBS' equity price triggered margin calls on Archegos' leveraged positions, which the fund was unable to pay. This left Archegos' prime brokers holding long unhedged positions in the underlying stocks, which

Graph 2

Government Bond Bid-ask Spreads

10-year, 5-day moving averages



Sources: Bloomberg; RBA.

they sold to unwind their positions. The fire sale resulted in significant price declines for the stocks involved, and prime brokers that were slower to unwind their positions faced large losses as a result (Graph 3). Credit Suisse (a G-SIB) reported US$5.5 billion in losses associated with the incident. This was one of multiple incidents that damaged the bank's reputation (RBA 2023a). Nomura reported losses of US$2.8 billion associated with the incident, while Morgan Stanley reported losses of around US$1 billion and UBS reported losses of around US$770 million.

Archegos' failure highlighted the extent to which leverage can accumulate while remaining 'hidden' from regulators and market participants. In the case of Archegos, the fund allegedly engaged in deliberately fraudulent conduct to conceal details of its positions from its prime brokers; the head of Archegos and three other senior members of the fund were charged with fraud offences by the US Department of Justice in April 2022. The build-up of concentrated leveraged exposures was also enabled by the fund's status as a family office, which meant it was subject to minimal regulatory disclosure requirements, as well as deficiencies in banks' counterparty credit risk management.

March and September 2022: Liquidity stress in commodities markets

Russia's invasion of Ukraine triggered large increases in commodity prices and significant financial market volatility, which in turn led to higher margin requirements. Participants with short positions, such as commodity producers hedging natural exposures, faced large variation margin calls. While most firms were able to meet these calls through existing facilities (such as bank credit lines), the liquidity stress posed systemic risks in some cases.

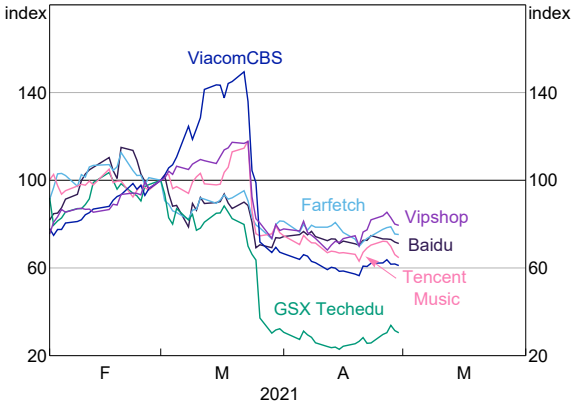
- In March 2022, the nickel futures market on the London Metal Exchange (LME) was suspended following a period of market dysfunction, initially triggered by liquidity stress at nickel producer Tsingshan. When nickel prices increased, Tsingshan was unable to meet margin calls associated with a very large short futures position. Tsingshan's brokers and bank counterparties sought to reduce their exposures by purchasing offsetting futures contracts, putting further upwards pressure on prices. This resulted in further margin calls for other participants with short positions, which also attempted to reduce or unwind their exposure. This created a dysfunctional price-margin cycle that saw the price of LME nickel rise by more than 250 per cent over 24 hours (Graph 4). In response, the LME retroactively cancelled trades entered into on 8 March, which helped to limit the extent of margin calls that brokers were facing. It also suspended trade between 8–15 March, and trading in LME nickel futures remained disorderly for several days following the resumption of trade.
- In September 2022, authorities in continental Europe and the United Kingdom announced liquidity support to energy companies, after a surge in gas prices led to large margin calls for companies hedging natural exposures with futures contracts. These liquidity facilities aimed to prevent the potential default of otherwise solvent energy producers, which would have been disruptive for both physical energy markets and the financial system. Some countries have since closed these facilities following a decline in gas prices.

In each of these events, many of the entities that faced liquidity stress were using futures contracts to hedge natural exposures. Nevertheless, there was a risk of widespread defaults if entities were unable to meet margin calls. For example, during the period

Graph 3

Selected Stocks held by Archegos

Equity prices, 1 March 2021 = 100



Source: Bloomberg.

of dysfunction in the LME nickel market, LME Clear suffered the largest initial margin breach in its history. If there had been widespread participant defaults, CCPs may have been exposed to large price moves and unable to absorb losses, which would have had significant implications for participants and financial stability.

September 2022: UK gilt market stress

In September 2022, UK long-term government bond yields rose sharply following the UK Government's announcement of a large debt-financed fiscal stimulus package. The large increase in yields resulted in liquidity stress in some defined benefit pension funds engaged in 'liability driven investment' (LDI).[6]

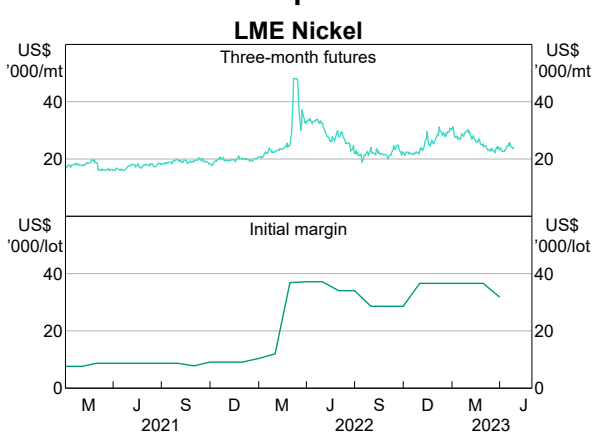
UK LDI pension funds purchase government bonds and interest rate derivatives to match their liabilities. Some LDI funds also use leverage, generated through the purchase of derivatives, to further grow the value of their assets to meet future liabilities. However, this increases their exposures to changes in asset prices, thereby increasing the potential size of margin they may need to provide to counterparties in the event the derivative prices move against their position.

The sharp increase in UK yields had two effects on LDI pension funds. It reduced the future value of liabilities as the discount rate rose. However, the large yield movements also resulted in sizeable variation margin calls on derivatives purchased to match the liabilities. Funds that did not hold enough cash sold assets including government bonds to meet the calls.

The sale of government bonds and interest rate derivatives in the market when the price of these assets was already falling created a feedback loop. The fall in price in 30-year gilts over a four-day period was over 65 per cent – more than twice as large as the moves during March 2020 and three times larger than any recent historical move (Graph 5) (Bank of England 2023). The disorderly conditions prompted the Bank of England (BoE) to purchase government bonds with the aim of restoring market functioning. The purchases occurred amidst the BoE's monetary policy tightening cycle and required them to defer their government bond sale program.

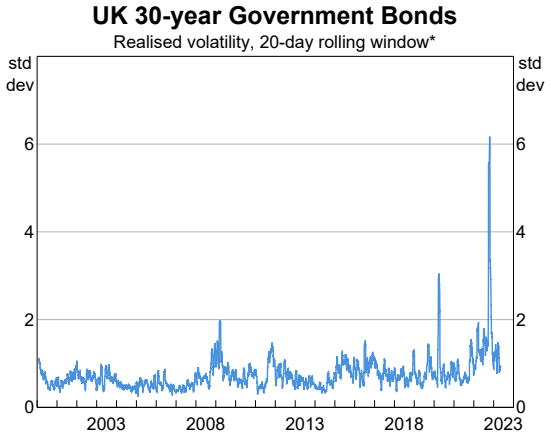
Events in the UK gilt market highlighted the financial stability implications from investment strategies that involve high amounts of leverage that may be inadequately managed. In times of stress, entities with insufficient liquidity to hold their leveraged positions may be forced to liquidate their holdings to minimise their losses. This can exacerbate market volatility. The BoE has since made recommendations to improve LDI funds' ability to withstand 'severe but plausible' stresses in the gilt market and meet margin calls without engaging in asset sales.

Graph 4



Sources: LME; Refinitiv.

Graph 5



* Realised volatility has been calculated on daily changes in the UK 30-year benchmark bond index.

Sources: RBA; Refinitiv.

Key features of recent market stress events

Although the events discussed above occurred across a range of countries, sectors and markets, they were underpinned by common vulnerabilities. These vulnerabilities included high levels of 'hidden' leverage, liquidity mismatches between entities' assets and liabilities in stressed conditions, and deficiencies in risk management processes that left entities poorly prepared to manage market volatility.

Hidden leverage

Financial markets can become destabilised by a build-up of leverage, particularly where this occurs outside of the view of regulators. For example, some NBFIs employ leveraged trades on non-centrally cleared markets, which are subject to less oversight and where risk management practices may be less rigorous. Entities can also be structured and use financial instruments in ways that obscure their activity from regulatory view, as seen with Archegos.

Reforms following the GFC have intended to reduce hidden leverage, such as by recommending greater central clearing of derivatives contracts. However, centralised exchanges may also be vulnerable to the effects of hidden leverage, as regulatory oversight of these risks can be hampered by confidentiality issues that restrict data sharing with relevant supervisors (IMF 2023). While there are regulatory requirements on CCPs to manage the risks posed by participants and their clients, CCPs themselves may also have limited visibility of leverage and concentration risks if entity positions are spread across multiple brokers, as occurred in the LME nickel market event and in the case of Archegos, which had positions both on and off central exchanges.

Liquidity mismatches

The balance sheet structure of NBFIs can leave them vulnerable to liquidity mismatches that can pose financial stability risks, especially when combined with highly leveraged trading strategies. In periods of stress, outsized leveraged positions that need to be marked-to-market may generate liquidity stress. Entities with illiquid assets and short-term liabilities may also find it difficult to liquidate assets to meet obligations associated with their leveraged positions, a risk that materialised for many open-ended funds during March 2020.

Asset fire sales from entities facing liquidity pressure can cause dysfunction in asset markets. Liquidity stress can also transmit to other participants if entities are unable to acquire sufficient liquidity to post margin.

Deficiencies in risk management practices

A common feature across the recent episodes of market dysfunction was NBFIs' inability to meet unexpected and large increases in margin calls as their existing liquidity buffers were inadequate and other assets were too illiquid to meet their obligations.

In many instances, such as in the LME nickel and UK gilt markets episodes, the price movements were favourable to their underlying or natural position – for example, a higher nickel price increased Tsingshan's future profits as a nickel producer. However, the speed and magnitude of price moves generated immediate liquidity needs from margin calls that could not be met without accessing external sources of funding (which can be slow or difficult to acquire, especially in times of broader stress) or liquidating their existing positions (which can amplify market volatility).

These deficiencies were exacerbated by the limited transparency and oversight of entities' risk management practices. This was particularly evident in the cases of Archegos and Tsingshan, which were able to build up positions across multiple brokers and across on-exchange and over-the-counter markets. Limited visibility over the nature and extent of these exposures can impact CCPs' risk management to ensure ongoing market functioning.

Policy implications

Recent market stress events have highlighted the increasing importance of the NBFI sector in financial markets. These events have also raised a number of issues for policymakers.

Procyclical margining

In many cases, market stress emerged from leveraged participants with losing positions and limited liquidity to meet margin calls. This was met by either selling other assets to fund margin, leading to stress contagion, or winding down positions, which can exacerbate price movements and generate a re-enforcing feedback loop.

The expanded use of margin was a significant global policy initiative resulting from the GFC. The exchange of margin is designed to mitigate risks between financial market participants. It provides an early warning signal of a participant under liquidity stress and reduces the credit risk exposures between participants, thereby reducing the potential for contagion in the event of a participant default.

An anticipated consequence of the greater use of margin is that participants must be prepared to meet the liquidity demands from changes in margin requirements. Some of the events indicate that not all participants are adequately prepared. This may be a consequence of the lack of transparency of margin models or their excessive procyclicality.

Procyclicality in margining has been a focus of authorities in recent years, with international guidance encouraging CCPs to maintain higher initial margin requirements 'through the cycle' to limit the need for destabilising changes in times of stress (RBA 2020b). In 2022 the global standard-setting bodies for market infrastructures, banking and securities markets issued the 'Review of Margining Practices' (BCBS-CPMI and IOSCO 2022). The Review details how these bodies plan to set baseline expectations for margin procyclicality, and the role of clearing participants' practices when passing on CCP margin calls to clients in dampening or exacerbating procyclical margins.

Central bank intervention

In response to the recent instances of severe market disruption, central banks have provided policy support to restore orderly market functioning, including via liquidity provision to NBFIs and asset purchases (FSB 2020; RBA 2020a).

While central banks may be available to support financial markets and participants when tail-risk events occur, there remains a question on the level of market dysfunction regulators should be willing to accept to minimise moral hazard and encourage self-insurance by market participants, particularly from NBFI entities that often fall outside of the purview of regulators. As NBFI participation grows in key markets (such as US Treasury securities), policymakers are considering the effects that structural changes in financial markets and its participants may have on the prevalence of episodes of market dysfunction and the impacts of frequent intervention. Alongside this, there remains uncertainty over the optimal type of intervention (i.e. the relative merits of standing versus more ad-hoc facilities), and whether non-bank entities should have access to central bank liquidity facilities (and if so, under what circumstances) (Schrimpf, Shin and Sushko 2020; Breckenfelder and Hoerova 2023; IMF 2023).

Could these issues arise in Australia?

The scope for financial stability risks stemming from NBFIs operating in Australia is limited by the differences in the composition and structural features of the sector compared with other jurisdictions; Australia's NBFI sector is largely comprised of superannuation funds, and credit intermediation from non-banks is limited.

However, stress arising in overseas financial markets can transmit to Australia, as Australian banks and NBFIs are active in global financial markets. To date, market stress from events overseas has had minimal effects on Australian markets and institutions.

Australian superannuation funds

One channel through which international stress events could transmit domestically is through the superannuation sector, due to its size and significant international financial market participation. Superannuation funds constitute the largest share of the Australian NBFI sector, with assets under management equivalent to around 140 per cent of domestic GDP in 2022. While Australian funds' use of leverage is limited, around 35 per cent of their funds are invested offshore and

survey data indicate that around 40 per cent of these offshore investments are hedged (RBA 2023b). As a result, stress in international markets that increases foreign exchange volatility could trigger large margin calls for superannuation funds.

In addition, domestic superannuation funds could face liquidity risks from unanticipated member withdrawals and/or switching to safe assets, which can be large during periods of high market uncertainty. This risk crystallised in March 2020, when Australian superannuation funds faced a combination of liquidity pressures from: investors switching away from more risky and thus less liquid investment options; increased margin calls from foreign currency hedges; and the Australian Government's early release of superannuation scheme that created unanticipated liquidity needs. However, the superannuation industry managed these extreme circumstances without causing disruptions to underlying asset markets (RBA 2021).

The disruptions that affected UK pension funds in 2022 did not directly affect Australian superannuation funds other than through increased volatility in foreign exchange and government bond markets. More broadly, there are key differences between the UK pension fund industry and the Australian superannuation industry that make such an event unlikely to occur in Australia (RBA 2023b). For example, in comparison with UK pension funds that are mostly defined benefit, Australian superannuation funds are mostly defined contribution, where investment risk is borne by members rather than the fund. This reduces the need to hedge long-run interest rate risk, which is typically done using interest rate swaps and results in embedded leverage. Australian superannuation funds also make less use of derivatives overall (21 per cent of assets compared with 62 per cent in the United Kingdom) and have larger cash holdings that can be used to meet margin calls (12 per cent of assets versus 2 per cent in the United Kingdom).

Domestic and international CCPs

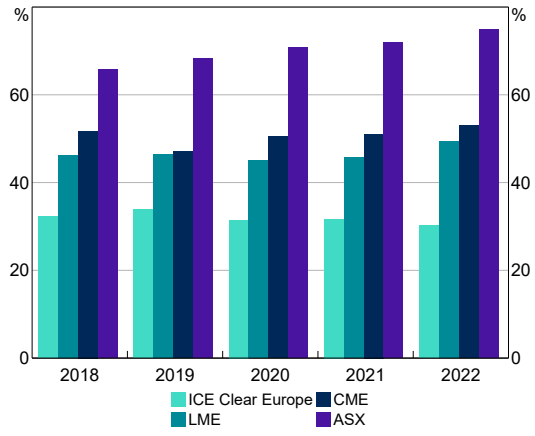
CCPs are classified as systemically important institutions in many jurisdictions, including Australia. As such, a stress event that threatens the solvency of the CCP would be a significant risk to broader financial stability (Debelle 2018). Similar to their international counterparts, domestic CCPs (such as the ASX) have margining methodologies that may respond procyclically in times of market stress. In addition, the ASX has concentrated participant exposures in certain markets (Graph 6). In tail-risk scenarios where shocks cause these participants to withdraw from market-making, this decline in market depth could materially affect price volatility and reduce the efficacy of the ASX's initial margin calculations (and thus its ability to absorb losses). If a large participant faces liquidity stress that leaves it unable to meet margin calls, the ASX may also find it difficult to close out these positions, especially if the participant's default affects the health of other participants in the market.

Domestic financial markets could also experience spillovers from stress events in international CCPs, as some of these CCPs operate in Australia and clear Australian securities. International stress tests, such as in Europe, have revealed that some CCPs have a shortfall of collateral to manage the extent of their concentrated participants' exposures (ESMA 2022). Stress that affects the ongoing viability of international CCPs has the potential to affect domestic market functioning, although contagion from international CCPs has not occurred in past stress episodes.

Graph 6

Central Counterparties*

Open position concentration, counterparty level**



* ASX, ICE Clear Europe and CME clear a range of interest rate, commodity and fixed income derivatives. LME is a commodities exchange.

** For clearing services with 25 or more members, the average percentage of open positions held by the largest 10 clearing members (item 18.2.2 from CPMI-IOSCO disclosures). For ASX, this is for 10 or more members (disclosure item 18.2.1).

*** Open position concentration for CME refers to their Base products category.

Sources: ASX; CME; ICE; LME.

Conclusion

NBFIs are an increasingly important part of the global financial system, providing a broad range of financial services that are not well suited to the traditional banking sector. However, recent episodes of market stress have highlighted the complexity of the sector and how NBFI-driven stress can be a source of instability for the broader financial system. Prevailing market volatility and liquidity stress during these events were exacerbated by a rapid, disorderly unwinding of positions by certain NBFIs, underpinned by common vulnerabilities such as highly leveraged investment strategies, liquidity mismatches and weaknesses in risk management practices. These events have reignited ongoing discussions among policymakers on strengthening NBFIs' and market resilience to such shocks, and the role of central bank intervention in response to NBFI-driven stress. The NBFI sector and financial markets in Australia have proven to be largely resilient to international market stress to date, due to structural and compositional differences that mitigate the vulnerabilities identified internationally. Nevertheless, regulators both internationally and in Australia remain attentive to risks and developments in the NBFI sector to ensure financial system stability.

Endnotes

[*] The authors are from Financial Stability and Domestic Markets departments. This article draws on work completed by Julie Guo. The authors are grateful for feedback provided by Jon Cheshire, Mustafa Yuksel, Jordan Brell, Claude Lopez, Michelle Lewis, Eden Hatzvi, Andrea Brischetto and Brad Jones.

[1] The Financial Stability Board (FSB) defines the NBFI sector as all financial institutions that are not central banks, banks or public financial institutions. The FSB also defines NBFIs in a narrower sense such as to exclude insurers and pension funds, as they are prudentially regulated and employ different leverage and trading strategies. This article relies on this definition to focus largely on investment funds, family offices, CCPs and other financial intermediaries. The term 'bank' is defined by the FSB to include other deposit-taking institutions such as credit unions. The NBFI sector was previously referred to as the 'shadow banking' sector, defined as credit intermediation involving entities and activities (fully or partially) outside the regular banking system. The term NBFI captures a broader range of entities performing a more diverse range of services.

[2] Warehouse facilities act like a line of credit and are collateralised by the securitisers' originated loans (Hudson, Kurian and Lewis 2023).

[3] These included policies that aimed to: mitigate spillovers between banks and the NBFI sector; reduce the susceptibility of money market funds (MMFs) to runs; align incentives associated with securitisation; dampen financial stability risks and procyclical incentives associated with securities financing transactions; and mitigate systemic risks posed by other non-bank entities and activities. The FSB is monitoring implementation of these recommendations into members' regulatory frameworks (see FSB 2023).

[4] These constraints on dealer intermediation include ensuring that banks have sufficient stock of high-quality liquid assets and disincentivising over-reliance on short-term funding that can be more volatile during market stress. Such reforms were instituted as part of post-GFC reforms to minimise instances of oversupply and underpricing of liquidity that encouraged excessive risk-taking. However, as seen in March 2020, they may be less able or willing to warehouse or absorb risk. This may lead price volatility to persist for longer (Debelle 2015).

[5] Variation margin is typically collected at least daily from participants to cover daily market movements, preventing the build-up of exposures. Initial and additional margin is used to cover potential future exposures that a CCP would take on in the event of a participant default (e.g. price movements between the last variation margin payment and the time that a defaulting participant's portfolio can be closed out). For additional background on CCP margin frameworks, see Carter and Cole (2017).

[6] An LDI strategy involves purchasing assets to match liabilities. The process of liability matching is dynamic because the value of future liabilities is dependent on the level of interest rates – that is, the present value of future liabilities increases if interest rates fall.

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Syndicated Lending

Qiang Liu[*]

Photo: Morsa Images – Getty Images

Abstract

Syndicated lending involves a group of lenders providing a single loan to one borrower. This article considers the purposes and workings of syndicated loans in the Australian market, and the advantages of this type of lending for both lenders and borrowers. It finds that syndicated loans are a significant source of funding for large Australian businesses and for borrowers with large financing needs, especially as such loans are often more accessible and flexible than public debt markets. For lenders, syndication allows them to diversify their exposures, as well as to monitor loans and negotiate covenants efficiently.

Introduction

A syndicated loan is extended by a group of lenders to a single borrower. The borrower typically organises this by agreeing to terms with a small group of banks, called mandated lead arrangers. In most cases, the mandated lead arrangers seek other lenders to join the syndicated loan as participating lenders.[1]

Syndicated lending in Australia has expanded since the mid-1990s, along with overall business debt. The flow of new loan commitments for syndicated loans (including refinancing) increased from about $10 billion in 1995 to about $140 billion in 2022, and annual commitments have made up around 10 per cent of the stock of total business debt for the period since the global financial crisis (GFC).[2] In 2022, non-financial businesses in Australia borrowed about seven times as much through syndicated loans as they issued in corporate bonds (Graph 1).[3] By contrast, globally, the US dollar syndicated loan market and the US dollar corporate bond market are similar in size (Lee, Liu and Viktors 2017).

This article uses a sample from Refinitiv of 4,000 loans to Australian borrowers since 1984 to summarise the features of syndicated lending and consider why firms engage in this market.[4]

Purpose of syndicated loans

Firms use syndicated loans for a variety of purposes that can be grouped into three categories:

- **project finance** – including long-term infrastructure or industrial projects that require significant capital investment, such as projects for transport, mining operations or renewable energy, as well as public-private partnerships to build hospitals, schools and other public infrastructure
- **mergers and acquisitions (M&A)**
- **general purposes** – including loans for working capital, operating expenses and capital expenditures.

The refinancing of existing loans accounts for a significant share of syndicated loan commitments, particularly when the loan is for general purposes or project finance (Graph 2). A borrower may choose to refinance debt to access more funds, extend the maturity of a loan, consolidate multiple debts or negotiate more favourable terms. Since refinancing replaces existing debt, commitments for refinancing only add to total debt outstanding to the extent refinancing involves an increase in the size of the loan. Commitments excluding refinancing provide a better indicator of new lending activity (Graph 3).

Most of the growth in new syndicated loan commitments since 2010 has been in lending for general purposes. Commitments for project finance have been around the same level over this period, while much of the variation in overall commitments has reflected commitments for M&A (Graph 4). This variation is consistent with research that shows debt funding in Australia is positively correlated with M&A (Connolly and Jackman 2017). The large volume of M&A in the period leading up to the GFC and around 2021 involved high levels of syndicated loan commitments. Commitments for M&A also picked up around 2016; however, this reflected a few particularly large loans for M&A rather than a material pick-up in total M&A.

Advantages for borrowers

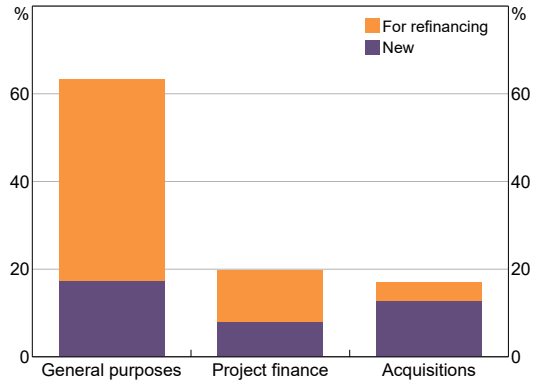
Large loan size

Syndicated loans allow borrowers to raise a large amount of funds with medium- or long-term maturities. The average facility in a syndicated loan is about $300 million – a similar size to what firms can obtain by issuing a corporate bond. A single syndicated loan may comprise multiple facilities

Graph 2

Share of Syndicated Loan Commitments

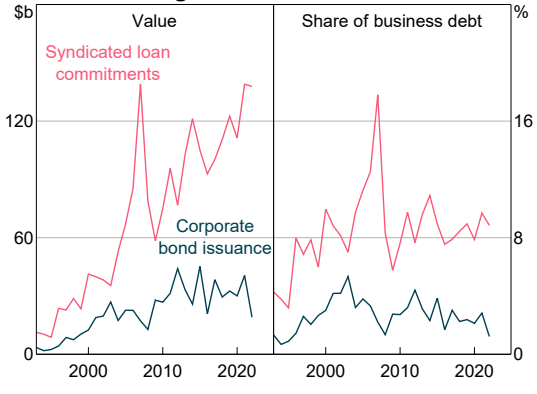
2010–2022



Sources: RBA; Refinitiv.

Graph 1

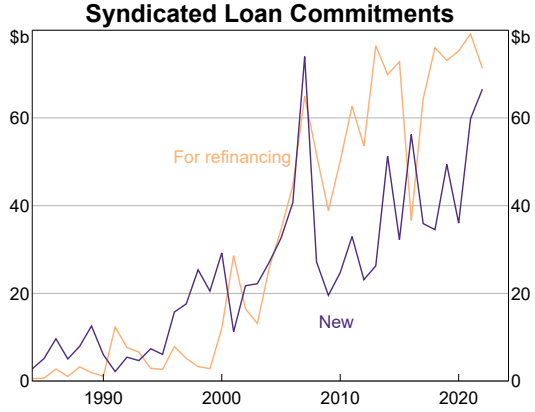
New Lending to Non-financial Borrowers



Sources: APRA; Bloomberg; RBA; Refinitiv.

Graph 3

Syndicated Loan Commitments



Sources: RBA; Refinitiv.

with different features, such as whether the loan is fixed term or is a revolving line of credit (see below). By contrast, a bilateral loan provided by a single lender to a borrower is much smaller on average (Graph 5). Large syndicated loans over $1 billion have accounted for about 30 per cent of the value of syndicated loan commitments since mid-2019 (Graph 6).

The size distribution of corporate bond issuance was similar to that of syndicated lending over this period, with the exception of a few very large loan facilities in excess of $2.5 billion. There were no corporate bond issues of similar size by Australian borrowers between July 2019 and December 2022.

Syndicated loans typically have a shorter term than corporate bonds, which may reflect the timeframes of the underlying activities being financed (Graph 7). Some syndicated loans are for bridging purposes (with terms less than one year); loans for M&A tend to have shorter terms than loans for project finance.

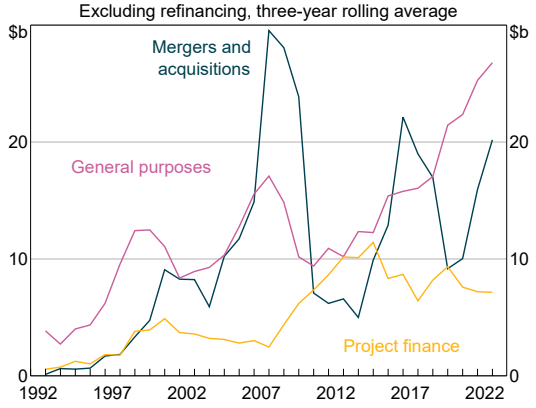
More accessible than the corporate bond market

Since 2010, about 1,200 Australian firms have contracted syndicated loans, while about 300 firms have issued corporate bonds. Smaller firms may be deterred by the substantial fixed costs associated with issuing bonds, such as the cost to disclose information or obtain a credit rating (Pattani and Vera 2011). Firms without an investment-grade credit rating typically find it more costly and difficult to access funding through corporate bonds than syndicated loans; only about 8 per cent of

Graph 4

New Syndicated Loan Commitments

Excluding refinancing, three-year rolling average

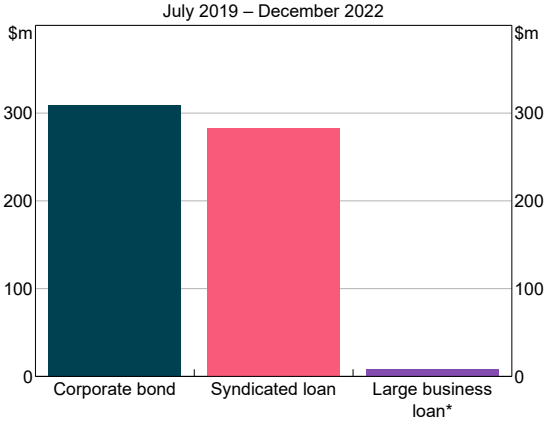


Sources: RBA; Refinitiv.

Graph 5

Average New Facility or Issue Size

July 2019 – December 2022



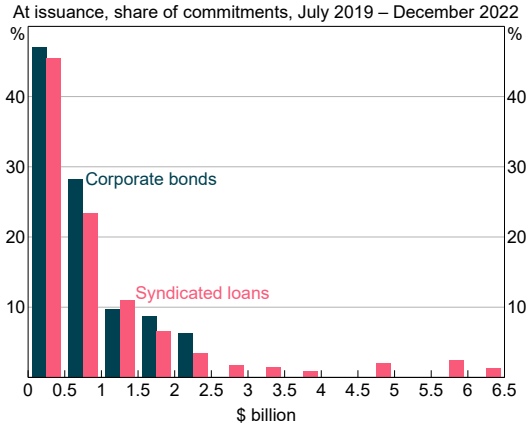
* Includes syndicated loans reported by banks to APRA; each bank reports their portion of a syndicated loan separately.

Sources: APRA; RBA; Refinitiv.

Graph 6

Distribution of Facility/Issue Size

At issuance, share of commitments, July 2019 – December 2022

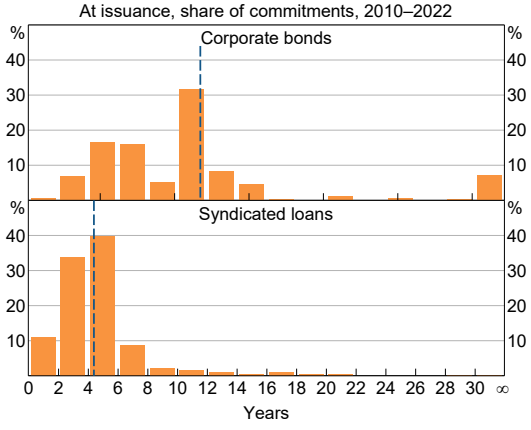


Sources: RBA; Refinitiv.

Graph 7

Distribution of Term to Maturity

At issuance, share of commitments, 2010–2022



* Dashed line shows weighted-average term.

Sources: RBA; Refinitiv.

Australian borrowers in the syndicated loan market have at least one recorded credit rating, compared with about half of corporate bond issuers.

Flexible loan terms

About 60 per cent of syndicated loans comprise multiple facilities to suit the different financing needs of a given borrower – for example, a borrower may include a revolving credit facility to meet working capital requirements as well as a fixed-term loan facility to fund a long-term investment. Allowing for multiple facilities improves access to credit by allowing for different contractual terms across facilities but under the umbrella of a single syndicated loan. Facilities can have different collateral, maturity date, interest rate, or claim priority in the event of insolvency. Larger loans tend to have more facilities (Graph 8). Having more facilities in a loan, however, can increase transaction costs, such as legal or regulatory costs (Cumming *et al* 2020).

Advantages for lenders

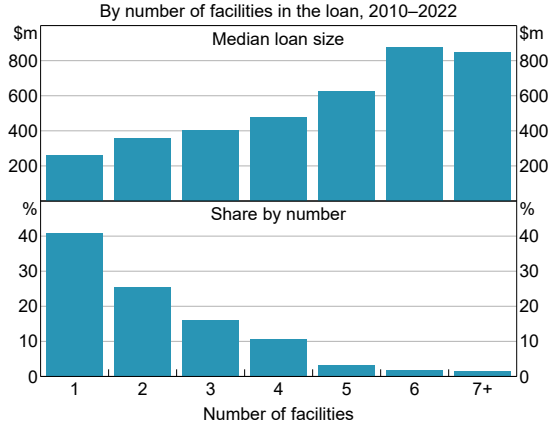
Diversification

Syndication allows lenders to share the credit risk of a large loan and avoid excessive exposure to a single borrower or industry. Banks are subject to regulatory requirements such as limits on how much they can lend to any one borrower, which encourages them to share exposure to a large borrower with other lenders via a syndicated loan (Simons 1993; Gadanecz 2004). Syndication also allows arranging banks to serve more borrowers and maintain relationships with customers to whom they could provide loans or other services in the future.

Graph 8

Loan Size and Number of Facilities

By number of facilities in the loan, 2010–2022



Sources: RBA; Refinitiv.

Access to foreign markets

Alongside the major Australian banks, foreign banks are the main participants in the Australian syndicated lending market.[5] Foreign lenders that lack expertise in the Australian market can gain exposure to Australian borrowers by participating in syndicated loans (RBA 2005). Participating lenders rely on the credit information and loan documentation supplied by the arrangers.

Over the past 30 years, about 90 per cent of syndicated loans to Australian businesses have involved at least one foreign bank. During that period, foreign banks have accounted for about one-half to three-quarters of the value of annual syndicated loan commitments. Not all of these foreign banks have operations in Australia; the foreign banks that do have such operations (and so report to the Australian Prudential Regulation Authority) have accounted for only about 30 per cent of total loan commitments to large businesses since June 2019 (the period for which the data are available).

Asian banks have increased their syndicated lending activity in Australia in the last two decades, while lending by European banks has decreased since its peak in 2007 (Graph 9). Following the GFC, European banks pulled back from syndicated and cross-border lending more generally (Howcroft, Kara and Marques-Ibanez 2014; BIS 2018).

Efficient monitoring and renegotiation

Banks can monitor borrowers more efficiently than can the holders of corporate bonds (Diamond 1984). Monitoring is important for identifying risks to the borrower's ability to repay the loan. The arrangers of a syndicated loan undertake most of the due diligence when the loan is originated, as well as most of the monitoring effort over the life of the loan (Dennis and Mullineaux 2000). Arrangers have an incentive to monitor more actively when they hold a larger share of the loan and when

borrowers are riskier or more opaque. This is particularly relevant when the borrowers are private firms, for which there is often limited public information available (Gustafson, Ivanov and Meisenzahl 2021).

Syndicated loans typically include covenants, which protect the lenders' interests by restricting what borrowers can do. When a borrower fails to meet a covenant, a technical default occurs, and the lenders have the right to require the borrower to immediately repay the outstanding loan in full. This is the most extreme response and generally will cause the borrower to become insolvent. Lenders might otherwise renegotiate the terms of the agreement to waive a violation of a covenant in exchange for: a fee or an increase in the interest rate; additional collateral; or tighter loan terms. With syndicated loans, it is feasible and relatively straightforward to renegotiate loan conditions given the modest number of bank lenders involved in any one deal. By contrast, it is extremely difficult to change the covenants of corporate bonds because they are typically held by many different investors (Bradley and Roberts 2015).

Loan pricing

Syndicated loans are typically issued with a variable interest rate, paying a spread against a reference interest rate such as the bank bill swap rate (BBSW). The spread reflects the credit risk of the borrower and whether the loan is secured by collateral, as well as the type of loan and its term. Data on pricing are incomplete because syndicated loans are confidential, and pricing is often not disclosed. Only 40 per cent of loan facilities by value (25 per cent by number) publicly report pricing information.

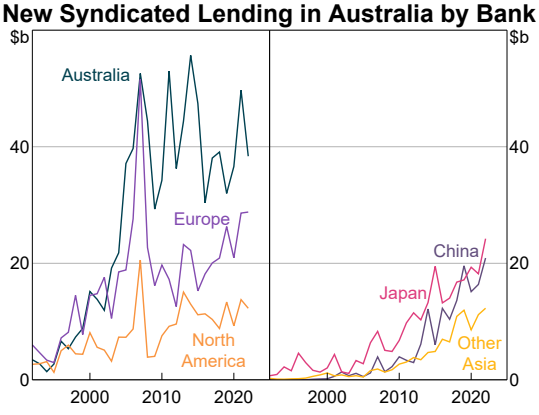
Based on the available data, larger loans tend to have narrow spreads, perhaps because larger loans are typically issued to larger borrowers that are generally less risky (Graph 10) (European Commission 2019). Loans for M&A typically price at a wider spread than loans for other purposes, likely reflecting the greater risk associated with corporate restructuring; these deals often involve a significant increase in leverage and may be more complex than other types of corporate investment.

BBSW is the most common reference rate for syndicated loans to Australian borrowers, based on available data (Graph 11). Since 2010, about two-thirds of total commitments (and over 90 per cent of Australian dollar commitments) referenced BBSW. Between 2010 and 2021, US dollar loans largely referenced the London Inter-Bank Offered Rate (LIBOR), which had long been the primary reference rate for syndicated loans in the United States. However, given limitations of the LIBOR benchmark, regulators globally determined that market participants should cease creating new contracts that reference LIBOR by the end of 2021 and switch to alternative reference rates (RBA 2021). Since 2022, US dollar loans have generally referenced the Secured Overnight Financing Rate (SOFR).

Average spreads on syndicated loans were around 170–180 basis points above the relevant reference

Graph 9

New Syndicated Lending in Australia by Bank

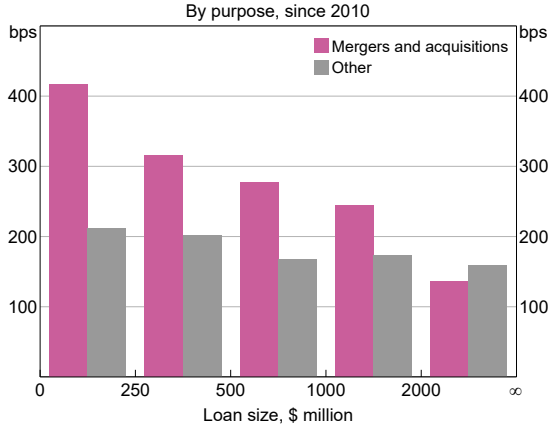


Sources: RBA; Refinitiv.

Graph 10

BBSW Spreads on Syndicated Loans

By purpose, since 2010



Sources: RBA; Refinitiv.

rate in 2022 (Graph 12). Interest rate spreads have increased for both Australian and US dollar denominated loans since the GFC, reflecting several factors including increased capital requirements, bank funding costs and a repricing of risks since the crisis.

Interest rates on syndicated loans are about the same or higher than the interest rates on variable-rate loans to large businesses more broadly, or on corporate bonds that receive a BBB rating (BBB+, BBB or BBB-) – the lowest rating above the threshold to still be considered 'investment grade'. BBB-rated corporate bonds were around 150–210 basis points above the Australia dollar swap rate in 2022 depending on the tenor of the bond. New large-business variable-rate loans were around 120 basis points above the three-month BBSW (the standard benchmark used to price loans to large businesses).

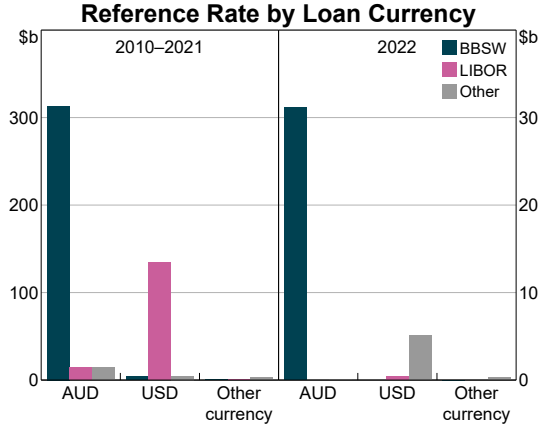
This comparison does not account for loan and borrower characteristics that may affect risk – for example, riskier private firms may prefer syndicated loans over corporate bonds, and syndicated loans tend to have longer terms to maturity than bilateral loans. However, syndicated loans are not less expensive than bilateral loans, after accounting for loan and borrower characteristics (Cortés, Tribó and Adamuz 2020). Spreads on different syndicated loans also tend to be quite dispersed; in particular, riskier loans mostly for M&A can have spreads much higher than average.

Conclusion

Syndicated loans are a significant source of funding for larger Australian businesses, particularly for large projects and M&A. The market is useful for borrowers requiring larger loans, flexible contractual terms or access to funds in the absence of having obtained a credit rating. Lenders benefit through diversification, efficient monitoring and access to foreign markets.

Graph 11

Reference Rate by Loan Currency

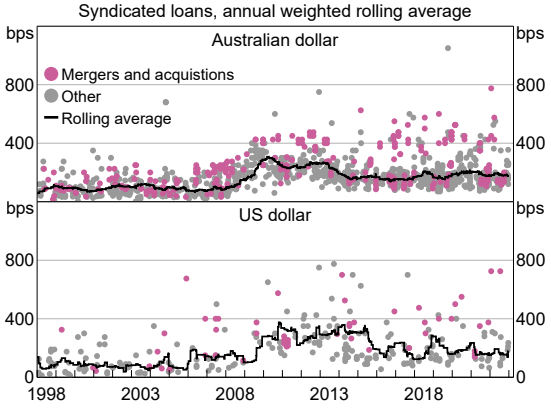


Sources: RBA; Refinitiv.

Graph 12

Spread to Reference Rate

Syndicated loans, annual weighted rolling average



Sources: RBA; Refinitiv.

Endnotes

[*] The author completed this work in Domestic Markets Department. The author would like to thank Laura Nunn for further work on the data and code. Christian Maruthiah, Nick Eagles, Joel Bank and Andre Chinnery contributed to the data on lender region. This article draws on analysis of the Australian corporate bond market by Nina McClure.

[1] About 35 per cent of loans by value to Australian borrowers are club deals, which are deals for which the lead arrangers commit to provide the full loan to the borrower without further syndication. Club deals are on average about 80 per cent of the size of loans that are further syndicated. For more information on how syndicated loans are arranged, see RBA (2005); European Commission (2019); Pitchbook (2023).

[2] Loan commitments are used throughout this article due to lack of data availability of credit data.

[3] For more information on the Australian corporate bond market, see Lim *et al* (2021).

[4] The sample excludes borrowers in financial industries identified as Standard Industry Classification (SIC)

60 through 64. This exclusion filters out credit institutions, security and commodity brokers, and insurers. These borrowers accounted for about 10 per cent of syndicated loans. However, venture capital firms and units investing on their own account are included in the sample.

[5] Although the dataset does not indicate institution type, a review of the top 20 lenders in each year shows that lenders in the Australian market are largely banks, rather than non-bank lenders. Smaller Australian banks tend not to participate in syndicated lending.

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Recent Developments in the Cash Market

Laurence Bristow and Calebe de Roure[*]

Photo: alexsl – Getty Images

Abstract

Following the implementation of unconventional monetary policy measures during the COVID-19 pandemic, liquidity in the banking system rose significantly. This led to a fall in cash market activity and a decline in the cash rate to below the cash rate target. Despite the high level of liquidity – as measured by Exchange Settlement (ES) balances – some banks have continued to borrow in the cash market. Over the past year or so, this borrowing has picked up somewhat and the cash rate has risen modestly to be slightly closer to the target, largely owing to an increase in the concentration of ES balances. As the Reserve Bank's unconventional policy measures unwind and ES balances decline, activity in the cash market is likely to increase further. The extent of any future pick-up in activity, and the level of the cash rate relative to the target, will be influenced by the distribution of ES balances across banks.

Introduction

Banks borrow and lend Exchange Settlement (ES) balances on an overnight, unsecured basis in the cash market. Banks hold ES balances in their accounts at the Reserve Bank and use them to settle payment obligations with other banks. Banks may also hold ES balances for other reasons, such as for precautionary liquidity. Banks with insufficient ES balances to meet their needs can source additional funds by borrowing in the cash market (Hing, Kelly and Olivan 2016).

The cash rate is the weighted average interest rate on transactions in the cash market. It plays a central role in the transmission of monetary policy – in particular, it is the Reserve Bank's operational target for monetary policy and the primary anchor for other interest rates in the economy. The cash rate is also an important financial benchmark; it is used as

the reference rate for Australian dollar overnight indexed swaps and the ASX's interbank cash rate futures contract.

Since the onset of COVID-19, activity and pricing in the cash market have changed in response to the substantial increase in ES balances brought about by the Reserve Bank's pandemic-era policy measures. Prior to 2020, the Reserve Bank managed the supply of ES balances to closely match demand at the cash rate target. Banks frequently needed to borrow from each other in the cash market because the aggregate level of ES balances was intentionally kept relatively low. Since then, the supply of ES balances has increased substantially, such that most banks hold ES balances in excess of their needs. Hence, the demand to borrow in the cash market has declined (Graph 1). As expected, the excess supply of ES balances pushed the cash rate below target and towards the interest rate paid on banks' deposits held at the Reserve Bank – known as the 'ES rate'. The ES rate acts as a floor for the cash rate because banks can earn this interest rate by holding their ES balances on deposit at the Reserve Bank rather than lending them in the interbank market (Debelle 2021).

Since late 2021, demand to borrow in the cash market has picked up a little and the cash rate has increased relative to the ES rate, despite the supply of ES balances remaining around its historical peak (Graph 1).

This article first explores some reasons for these developments, including changes in the structure of the cash market and how ES balances are distributed across banks. It then discusses how activity in the cash market may evolve when the Reserve Bank's pandemic-era policy measures unwind and ES balances decline.

Changes in cash market activity

Since the pandemic, the volume of transactions in the cash market has been largely determined by the supply of ES balances and how these balances are distributed across banks. Increases in the supply of ES balances generally lead to lower cash market activity, as a greater number of banks will have enough ES balances to meet their demand and so will have no need to borrow from other banks. However, if a given level of ES balances is more concentrated among a few banks, cash market activity will tend to increase because it is more likely that the remaining banks will have insufficient ES balances to meet their needs.

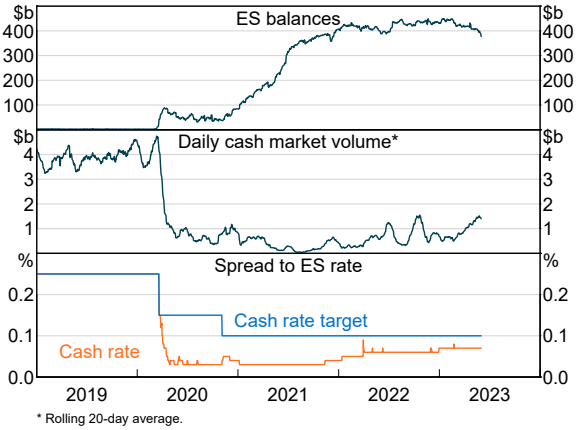
Over the past three years, ES balances have risen substantially. In early 2020, in the weeks following the outbreak of COVID-19, the Reserve Bank significantly increased the amount of ES balances that it lent through its open market operations in response to a sharp increase in banks' demand for liquidity (Dowling and Printant 2021). From 2020 until early 2022, ES balances rose further as a result of the Term Funding Facility (TFF) and the Reserve Bank's bond purchases. In contrast to the initial increase early in the pandemic, these additional ES balances were well in excess of banks' day-to-day needs and resulted in an abundance of liquidity in the banking system. Following the end of the bond purchase program in early 2022, the level of ES balances has remained around historical highs.

As a result of the substantial increase in ES balances, most banks had enough to meet their payment needs. Consequently, demand to borrow ES balances decreased, and the number and value of transactions in the cash market declined noticeably.

Since 2020, the level of ES balances has risen and they have become increasingly concentrated among certain banks – with the share of ES balances held by large Australian banks rising to

Graph 1

ES Balances and the Cash Market



* Rolling 20-day average.
Source: RBA.

more than 80 per cent (Graph 2). This is evidenced by a rise in the Gini Coefficient over this period (Graph 3). Changes in the distribution of ES balances across banks tend to follow net payment flows as banks use ES balances to settle their payment obligations with one another. Banks with a large share of deposits have received most of the additional ES balances injected by the Reserve Bank as their customers received payments and left them on deposit. This particularly applies to large Australian banks because they hold over 80 per cent of all deposits in Australia. Conversely, foreign banks hold only a small share of deposits in Australia; while they held the majority of ES balances before the pandemic, their share of ES balances has declined over time (Graph 2). Although ES balance shares have converged toward banks' deposit shares, significant short-term variation is possible as banks can acquire or shed ES balances through other means, such as issuing wholesale debt or transacting in foreign exchange markets.

The concentration of ES balances among large Australian banks may also reflect the fact that these banks face a higher opportunity cost on lending ES balances than other banks, owing to the major bank levy. The five largest banks in Australia – Commonwealth Bank, ANZ, Westpac, National Australia Bank and Macquarie – are subject to this levy. The major bank levy is an annualised charge of 6 basis points on selected liabilities of the banks less their holdings of ES balances (Treasury 2017). If these banks lend out their ES balances, it increases the size of the levy payable. Therefore, these banks need to receive a return equal to the ES rate plus 6 basis points to have the incentive to lend their ES balances, compared with a return of the ES rate for all other banks.

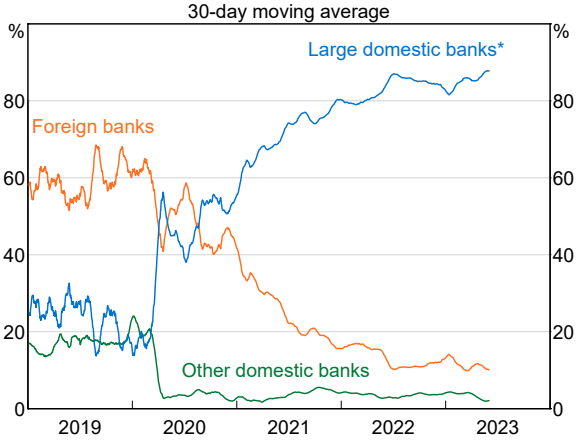
The recent pick-up in activity reflects an increase in the concentration of ES balances and has occurred despite the aggregate supply of ES balances remaining close to its historical peak. Some foreign banks' ES balances have declined to the point that they have increased the size and frequency of their borrowing in the cash market, to ensure they have sufficient ES balances to meet their daily needs (Graph 4). This growing demand to borrow in the cash market has been met increasingly by large Australian banks, which hold the bulk of ES balances (Graph 5). As such, large Australian banks have become increasingly important lenders in the cash market and the interest rates they lend at have played a greater role in the calculation of the cash rate.

The cash rate is a significant financial benchmark in Australia, and the increase in activity in the cash market over the past year has supported more regular setting of it on the basis of market transactions. In order to ensure the calculation of the cash rate is robust, it is only based on market transactions if there is sufficient cash market activity.[1] If there is insufficient cash market activity, the Reserve Bank (as the benchmark administrator

Graph 2

Share of ES Balances

30-day moving average



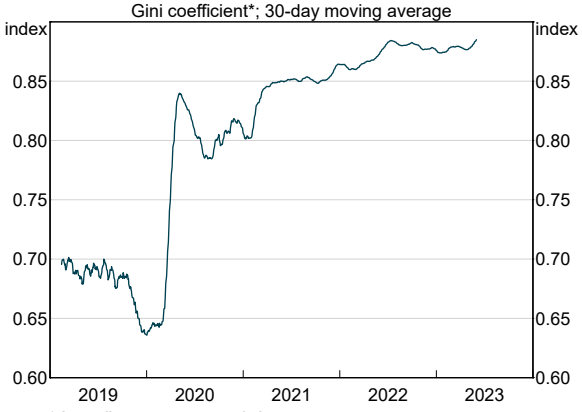
* Includes CBA, NAB, Westpac, ANZ and Macquarie.

Source: RBA.

Graph 3

Concentration of ES Balances

Gini coefficient*; 30-day moving average



* Gini coefficient takes value zero if ES balances are evenly distributed across all banks and value one if one bank holds all ES balances.

Source: RBA.

of the cash rate) uses a range of information to determine the level of the cash rate that reflects market conditions – a process known as 'expert judgement'.[2] Expert judgement was first used in May 2020 following the increase in system liquidity discussed above; it picked up in frequency in 2021 – when it was required on around 95 per cent of days – as the supply of ES balances continued to rise (Graph 6). Since mid-2022, with activity in the cash market having picked up, expert judgement has only been required for around one in every three days.

Changes in cash market pricing

Together with the fall in cash market activity since the onset of the pandemic, there have been significant changes in the pricing of transactions in the cash market.

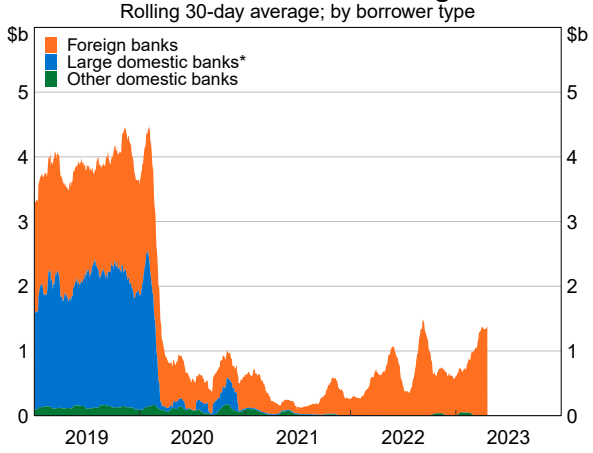
The most obvious effect of these changes has been a decline in the cash rate to below the cash rate target. As discussed above, before COVID-19 the Reserve Bank tightly managed the supply of ES balances to closely match the demand from banks at the cash rate target. Indeed, almost all transactions were made at the cash rate target (Graph 7). However, since the pandemic, the significant rise in ES balances and the resulting fall in demand to borrow in the cash market have led to the cash rate declining below the target but remaining above the ES rate. This was an expected outcome of the Reserve Bank's policy measures and is consistent with the experience of other countries with comparable policy settings.

Alongside the decline in the cash rate to below the target, there has been more variation in interest rates on individual transactions in the cash market. Since the start of the pandemic, 12 per cent of transactions in the cash market have been at interest rates that differed from the cash rate, which again is the weighted average across all transactions when there are sufficient transactions (Graph 8). By contrast, in the year before the pandemic, only one cash market transaction had a different interest rate to the cash rate. As discussed further below, this increase in price dispersion reflects differing risk

Graph 4

Cash Market Borrowing

Rolling 30-day average; by borrower type

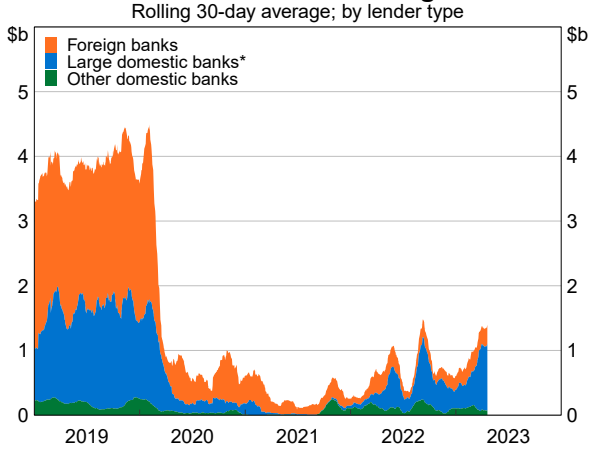


* Includes CBA, NAB, ANZ, Westpac and Macquarie.
Source: RBA.

Graph 5

Cash Market Lending

Rolling 30-day average; by lender type

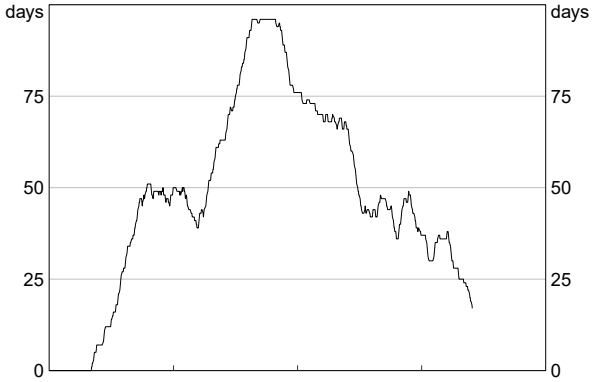


* Includes CBA, NAB, ANZ, Westpac and Macquarie.
Source: RBA.

Graph 6

Expert Judgement Used

In the last 100 days



Source: RBA.

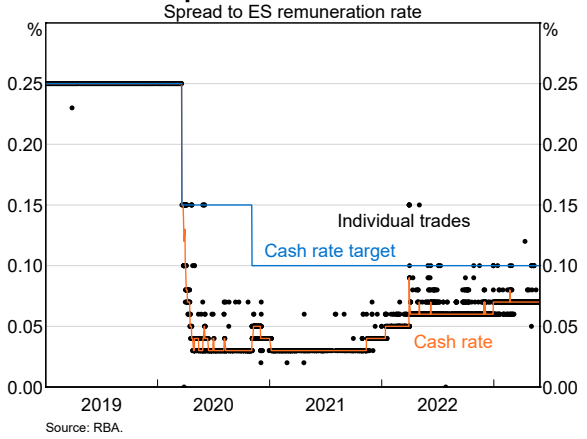
premia and opportunity costs between banks. Accordingly, compared with the pre-pandemic era, the cash rate now clearly reflects changes in market conditions as it is affected by the demand for ES balances and banks' willingness to lend them.

One common reason for differences in rates across cash market transactions is the variation in business relationships between the participating banks. Banks generally lend at lower interest rates to other banks with which they transact frequently. Moreover, borrowers tend to first source ES balances from lenders that offer the lowest interest rates – only relying on lenders that offer higher interest rates for additional volume. Thus, certain lending and borrowing banks transact frequently at higher volume and lower prices than other lender-borrower relationships.

Graph 7

Price Dispersion in the Cash Market

Spread to ES remuneration rate

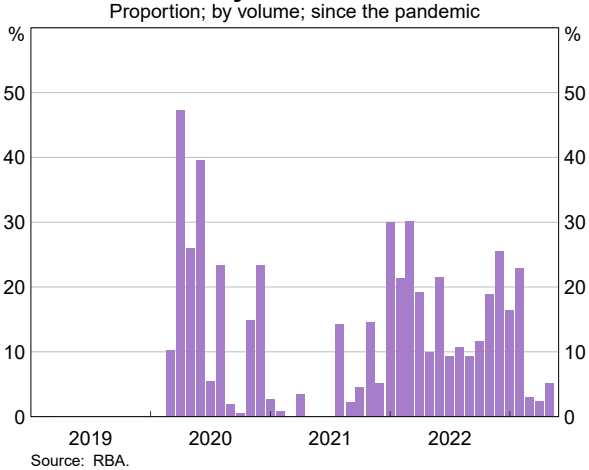


Source: RBA.

Graph 8

Trades Away from the Cash Rate

Proportion; by volume; since the pandemic



Source: RBA.

As mentioned above, the major bank levy creates different incentives to lend in the cash market for some banks. The five largest banks in Australia, which are subject to the major bank levy, face an opportunity cost of lending their ES balances at the ES rate plus 6 basis points. By contrast, other banks not subject to the levy face an opportunity cost on lending ES balances equal to the ES rate and can therefore profitably lend in the cash market at lower rates than banks subject to the major bank levy.

These different opportunity costs help to explain some of the variation in the cash rate since ES balances became abundant. For most of 2020 and 2021, most lenders in the cash market were not subject to the major bank levy, and the cash rate traded at the ES rate plus 3 basis points. This reflected the return that the lending banks could earn if they retained these ES balances, plus a small spread that incorporated a credit premium and the operational costs of transacting in the cash market (Debelle 2021). Since then, as the share of lending by banks subject to the levy has risen, the cash rate has also increased relative to the ES rate, reflecting these banks' opportunity cost of lending ES balances (the ES rate plus 6 basis points) plus, at times, a small spread.[3] Many smaller lenders have tended to act as price-takers through this period, raising the interest rate they charge in line with the increases in the cash rate relative to the ES rate.

Outlook for the cash market

Over the coming years, the level of ES balances will decline as funding provided to banks under the TFF unwinds and the Reserve Bank's holdings of government bonds mature (Graph 9). Nonetheless, the supply of ES balances will remain higher than pre-pandemic levels for a number of years; activity in the cash market is likely to increase from current levels but remain lower than it was before the pandemic for some time.

The future distribution of ES balances among banks will have an important influence on cash market activity and the level of the cash rate; however, it is uncertain how this will evolve. A greater concentration of ES balances among some banks would likely lead to other banks needing to borrow more in the cash market. Therefore, if ES balances

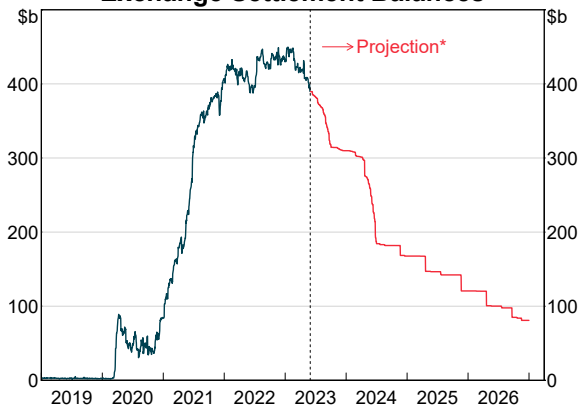
remain concentrated among the large Australian banks that are subject to the major bank levy, it is likely that demand to borrow in the cash market will continue to increase. If these banks continue to be the main cash market lenders, the opportunity cost they face (the ES rate plus 6 basis points) will continue to form an effective floor for the cash rate. If, on the other hand, ES balances become more evenly distributed among banks, cash market activity may not increase, even as the level of ES balances declines. In this case, it is more likely that the ES rate would form the effective floor for the cash rate.

The future demand for ES balances will also determine banks' need to borrow in the cash market and their appetite to lend. Prior to the pandemic, banks typically held only enough ES balances to meet their payment obligations during the day. Consequently, at close of business, when most payments activity ceased, banks had no need for their surplus ES balances and were generally willing to lend them in full.[4] However, according to the Reserve Bank's liaison program and the experience of other countries, it is unlikely that banks' demand for ES balances will revert to such low levels in the future. Under the Australian Prudential Regulation Authority's liquidity standards, ES balances qualify as high-quality liquid assets (HQLA) and so can be used to meet the Liquidity Coverage Ratio (LCR). It is possible that some banks may continue to demand ES balances to meet the LCR, rather than holding HQLA securities (principally bonds issued by the borrowing authorities of the Australian, state and territory governments). As such, banks may no longer be willing to lend all their ES balances to the same extent. Under this scenario, the demand to borrow in the cash market would pick up while the supply of ES balances remains very high compared with the pre-pandemic era.

Finally, the way the Reserve Bank implements monetary policy in the future will play an important role in determining activity in the cash market. As discussed above, activity in the cash market was much higher before the pandemic when the Reserve Bank set aggregate ES balances at a relatively low level. By contrast, if the Reserve Bank chooses to implement monetary policy by maintaining an abundance of ES balances (even if this is still much lower than current levels) then cash market activity will typically be much lower than pre-pandemic levels.

Graph 9

Exchange Settlement Balances



* ES balances in excess of banks' minimum requirements and late payments minus maturing Term Funding Facility loans and government bond holdings.

Source: RBA.

Endnotes

[*] The authors are from Domestic Markets Department.

[1] For the cash rate to be determined entirely from cash market transactions on a given date, all of the following criteria must be met: the total value of transactions is over $500 million; the number of transactions is at least three; and the number of different cash market participants is at least four (RBA 2022).

[2] There are three ways that the Reserve Bank may use expert judgment. The Reserve Bank may determine the cash rate to be: (1) the last published cash rate; or (2) the cash rate target, should a new target be announced by the Reserve Bank Board; or (3) another rate that is judged to better reflect the interest rate relevant to unsecured overnight funds for cash market participants.

[3] Prior to the pandemic, the presence of the major bank levy was immaterial in banks' decisions to lend in the cash market. At that time, cash was lent at the cash rate target, which was the ES rate plus 25 basis points, well above the effective return that banks subject to the levy would receive on their holdings of ES balances. In other words, all banks could profitably lend at the cash rate, regardless of whether they were subject to the major bank levy or not.

[4] Some banks with after-hours payments activity are required to hold ES balances to meet these expected payments. Banks could lend any surplus ES balances in excess of these requirements. For more details, see Dowling and Printant (2021).

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Economic Developments in the South Pacific

Kelsey Wilkins[*]

Photo: GenDeschenes – Getty Images

Abstract

Australia has long played a significant role in the regional economy of the South Pacific. This article provides an overview of economic developments in the region, with a focus on recent shocks and medium-term growth challenges. The region's heavy reliance on external demand meant that South Pacific economies were severely impacted by the COVID-19 pandemic and other concurrent challenges. Expansionary economic policies implemented by governments and central banks, alongside international aid and lending, supported the region through the acute phase of the pandemic. While a recovery is underway, the South Pacific will continue to face challenges to its medium-term growth and development, particularly via high debt levels and climate change.

Introduction

Australia plays an important role in the South Pacific as the largest trading partner of many countries in the region, as well as a major aid donor and development partner. The Reserve Bank of Australia has a longstanding relationship with many countries in the South Pacific; it provides central banking-related technical assistance and participates in the annual South Pacific Central Bank Governors Meeting (SPGM). The Reserve Bank also raises awareness of issues facing the Pacific in its contributions to international groups and initiatives.

This article examines recent economic developments in South Pacific economies, with a focus on the SPGM member countries of Fiji, Papua New Guinea (PNG), Samoa, Solomon Islands, Timor-Leste, Tonga and Vanuatu.[1] These countries have faced a series of challenges in recent years, including the COVID-19 pandemic and several natural disasters. Aided by supportive economic policies over this

Table 1: Snapshot of the South Pacific

Select population and geographic indicators

	Population[a]	GDP per capita[a]	Population using the internet[b]	Urban land area 5 metres or less above sea level[c]	Agricultural land[d]
	Number	Current $, PPP	Per cent	Per cent of total land area	Per cent of total land area
Fiji	924,610	11,381	69	8.3	17
Papua New Guinea	9,949,437	4,040	11	3.8	3
Samoa	218,764	6,080	34	2.1	18
Solomon Islands	707,851	2,649	12	7.3	4
Timor-Leste	1,320,942	5,529	29	1.6	23
Tonga	106,017	6,749	41	17.5	49
Vanuatu	319,137	3,057	26	4.2	15

(a) Data as at 2021.

(b) Observations for Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu as at 2017; Fiji as at 2018; Timor-Leste as at 2020.

(c) Data as at 2015.

(d) Data as at 2020.

Source: World Bank.

period, a recovery in the region is underway, albeit at an uneven pace. Ongoing challenges, such as government debt sustainability and threats posed by climate change, are expected to place further pressure on achieving strong and sustainable economic growth for many South Pacific countries.

Economic landscape of the South Pacific

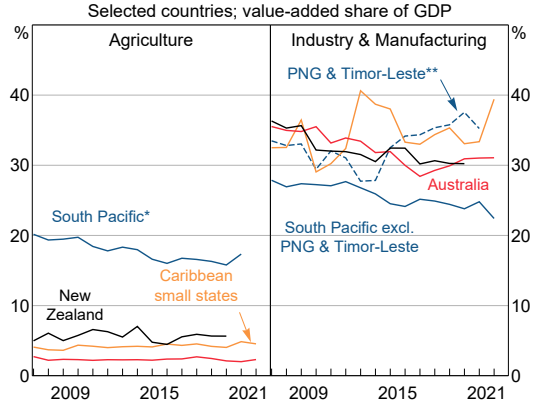
Countries in the South Pacific differ greatly in economic structure, income and population (Table 1). Nonetheless, many have a number of similar characteristics – most are comprised of low-lying, geographically dispersed islands (which can make infrastructure development expensive and challenging), have extensive subsistence agriculture and have high amounts of informal labour. The region is also affected by the departure of skilled workers to higher income economies (ILO 2017; Packard *et al* 2012; Bright and Abbott 2021). Reflecting these factors, manufacturing and industry are not a large share of the economy for most countries in the South Pacific (Graph 1).

Trade in the South Pacific is regionally concentrated. Most South Pacific countries rely heavily on their largest trading partners, which are Australia, New Zealand, China, South Korea and Japan. Broadly speaking, economies in the South Pacific can be grouped into either commodity-exporters or tourism-dependent economies. The former includes Papua New Guinea, Solomon Islands and Timor-Leste, while the latter captures Fiji, Vanuatu, Samoa and, to a lesser extent, Tonga. Major commodity exports from the region are oil, gas, gold, timber and copper, while tourism services are worth between 20 per cent and 40 per cent of GDP for tourism-dependent economies (IMF 2020).[2]

Graph 1

Economic Composition

Selected countries; value-added share of GDP



* Fiji, PNG, Solomon Islands, Samoa, Tonga, Timor-Leste, Vanuatu; PPP-weighted.

** PNG and Timor-Leste excluded due to high share of industry & manufacturing associated with commodity exports.

Sources: IMF; RBA; World Bank.

Remittances are an important source of income for many of the non-commodity-exporting South Pacific islands (Boulton and Winton 2018). Remittance transfers from nationals working overseas (predominately in the United States, Australia and New Zealand) range from 15 per cent to 40 per cent of GDP for these countries, compared with around 3 per cent for other small and low-income states (IMF 2020; World Bank 2023).

Foreign aid is another significant financial resource to the region (Graph 2). Leading up to the pandemic, the South Pacific received around 4.5 per cent of GDP per year in aid from bilateral and multilateral donors – the largest bilateral donor being Australia.

Economic impact of the pandemic

The South Pacific's heavy reliance on external demand meant that the region was severely impacted by the COVID-19 pandemic. Tourism-dependent countries were particularly hard hit by travel restrictions (Graph 3; Graph 4). Fiji was one of the worst affected countries as tourism accounts for around 40 per cent of its GDP; approximately one-third of Fiji's formal workforce lost hours or employment altogether in the immediate aftermath of widespread travel restrictions (Sayed-Khaiyum 2020; Fiji Ministry of Economy 2022). A high degree of informal employment in sectors reliant on tourism in the South Pacific (such as crafts, food and local market stalls) amplified the negative effects of the abrupt cessation of tourism (ILO 2021; Bright and Abbott 2021).

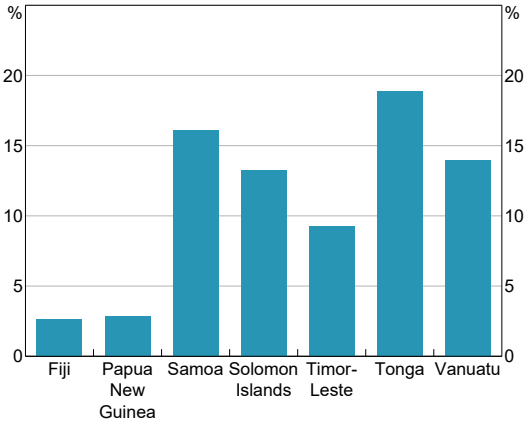
The effects of the pandemic on commodity-exporting countries were more mixed. Some countries, such as Papua New Guinea, were negatively affected by numerous lockdowns that closed several mines and prevented fly-in-fly-out workers from entering the country. Papua New Guinea and Timor-Leste were also adversely affected by lower oil and gas prices, which hurt export receipts (Graph 5). Conversely, the price of timber increased throughout 2020, which helped to support the Solomon Islands economy despite falls in export volumes.

Given the large degree of subsistence agriculture across the South Pacific, those informally employed in these sectors appear to have fared relatively better than those in formal employment (Bright and Abbott 2021). This was mostly due to subsistence

Graph 2

Official Development Assistance

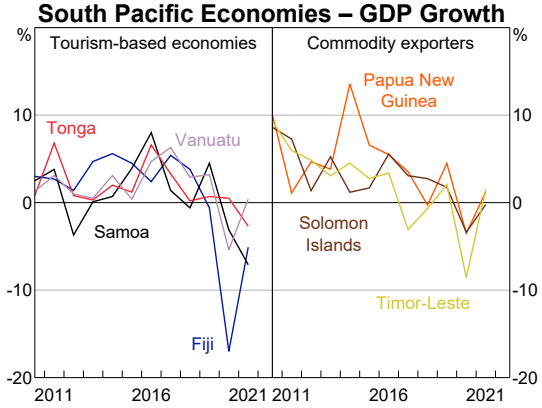
Net receipts as a per cent of GNI; 2017–2019 average



Sources: OECD; RBA.

Graph 3

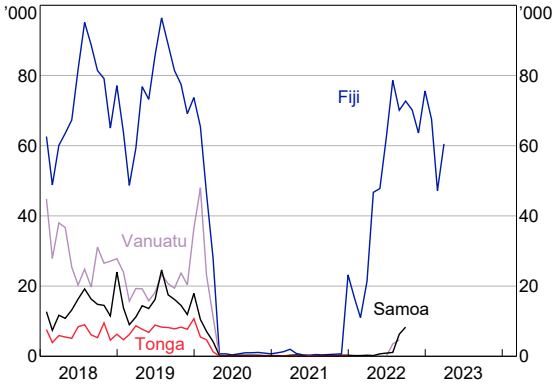
South Pacific Economies – GDP Growth



Source: IMF.

Graph 4

International Visitor Arrivals



Sources: National Statistics Office of Vanuatu; Reserve Bank of Fiji; Samoa Bureau of Statistics; Tonga Statistics Department.

Table 2: Natural Disasters and Health Events[(a)]

2019–2022

Event	Countries affected	Year
Earthquake	Papua New Guinea	2019, 2022
Volcanic activity	Papua New Guinea Vanuatu Tonga	2019 2021 2022
Tropical cyclone	Fiji Solomon Islands Tonga Vanuatu Timor-Leste	2019, 2020, 2021, 2022 2020 2020 2020 2021
Flood	Papua New Guinea Timor-Leste	2019, 2020 2020
Landslide	Papua New Guinea	2019, 2020
Health	Fiji Samoa Tonga Timor-Leste	2019 2019 2019 2022

(a) Health events included a measles outbreak in Fiji, Samoa and Tonga and a dengue outbreak in Timor-Leste.

Source: EM-DAT database.

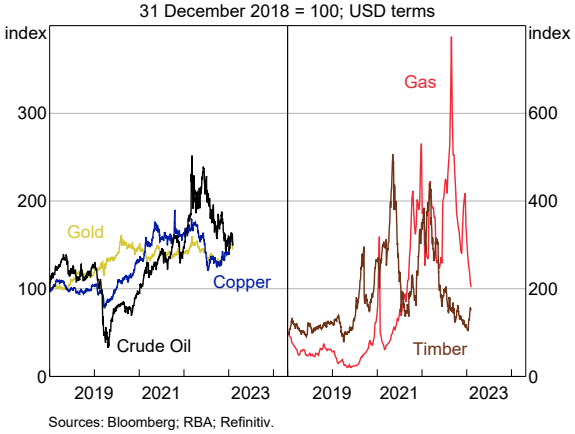
agriculture being relatively protected from external shocks and government-imposed lockdowns. Indeed, there is some evidence that disruptions to supply chains and other food imports to the South Pacific supported a shift towards more traditional foods and increased local agricultural production during the pandemic (Iese *et al* 2021).

At the onset of the pandemic, it was expected that remittances to the South Pacific would fall dramatically due to job losses and repatriation of foreign workers (IMF 2020; Howes and Surandiran 2020). However, remittances proved to be resilient throughout the pandemic, partly due to programs like the Pacific Australia Labour Mobility Scheme, which continued to provide employment for Pacific Islanders in Australia during the pandemic (DFAT 2022; IMF 2021b).

Graph 5

Commodity Prices

31 December 2018 = 100; USD terms



Sources: Bloomberg; RBA; Refinitiv.

Both prior to and during the pandemic, South Pacific countries were affected by other health problems, natural disasters and social unrest (Table 2). Tropical Cyclones Harold and Yasa caused extensive damage to Fiji, Vanuatu and Tonga in 2020, while measles outbreaks in Samoa, Tonga and Fiji led to public health crises in 2019. Civil unrest in the Solomon Islands in November 2021 caused widespread destruction in the capital, Honiara; Papua New Guinea's northern region suffered substantial damage from a large earthquake in 2022. Coupled with the challenges presented by the pandemic, these adverse events complicated policy responses and reduced the capacity for fiscal policy to support recovery and development in the South Pacific.

Economic policy responses

Like many countries, governments and central banks in the South Pacific responded to the pandemic and other disasters by implementing highly expansionary economic policies. Given the

prolonged and evolving nature of the pandemic, many governments implemented a sequence of fiscal support packages. Common features of these packages included cash transfers or temporary unemployment relief, subsidies, tax and tariff reductions, permitted drawdowns of retirement savings and national provident funds, loan moratoriums and debt guarantees (Asian Development Bank 2020; IMF 2021b; Bright and Abbott 2021). The Government of Fiji provided much more fiscal support than other South Pacific countries, in part reflecting the fact that Fiji was one of the most adversely affected by the pandemic due to its exposure to tourism; much of this support was in the form of tax and tariff reductions and spending on public health. Timor-Leste also provided substantial fiscal support, with a large portion of this designed to extend beyond the acute phase of the pandemic to address pre-existing economic vulnerabilities that were amplified by COVID-19, predominantly related to human capital development (Government of Timor-Leste 2020; Timor-Leste Ministry of Finance 2021). Concessional and non-concessional loans from the International Monetary Fund (IMF), other multilateral development banks (MDBs) and bilateral lenders supported government expenditure in many countries across the region.

Central banks in the South Pacific eased monetary policy settings markedly, in many cases from already accommodative settings.[3] Most additional policy stimulus was provided through policy rate or reserve requirement reductions and, in some cases, government bond purchases. The Bank of Papua New Guinea executed the largest bond purchase program, purchasing approximately US$218 million in government bonds. Some central banks also reactivated or established new financing facilities, such as Vanuatu's Import Substitution and Export Finance Facility and Disaster Reconstruction Credit Facility, the Solomon Islands' Export Finance Facility and new repo facility, and Fiji's targeted support facilities for small-and-medium enterprises. Financial regulators temporarily adjusted prudential treatments to allow banks to provide moratoriums and deferred payments on commercial loans.

Research from the Asian Development Bank shows that the value of the combined support from governments and central banks was substantial (Table 3). These are broad estimates that capture both actual spending and lending by governments and central banks, and attempt to include the value of indirect financial measures such as loan guarantees. A narrower measure of policy stimulus from the Australian National University considers only *additional* government spending, and this suggests that the value of support ranged from 1 per cent to 8 per cent of GDP (Howes and Surandiran 2021).[4] The collective fiscal and monetary policy responses largely forestalled the possibility of any significant financial instability in the region. Substantial support was also provided through foreign aid – including the provision of vaccines, as well as direct financial support from donors.

Economic recovery

Several years after the onset of the pandemic, an uneven recovery is taking place across the South Pacific (Table 4). Most crises-era support policies have or are being wound back. Nonetheless, the IMF expects that some countries may require ongoing fiscal support to avoid long-lasting economic damage, and others will need to carefully monitor financial stability following the cessation of loan moratoriums (IMF 2022b). Tourism is resuming following staggered border reopenings across the South Pacific, albeit at an uneven pace. Higher commodity prices resulting from the war in Ukraine have benefitted Papua New Guinea's export sector and government revenues; however, higher food and energy prices are adding to inflationary pressures across the region.

Growth is expected to moderate across the region in coming years, with IMF forecasts indicating a return to pre-pandemic levels of GDP by around 2025 for most countries. High inflation and high travel costs are expected to weigh on growth in the near term, and the outlook is further clouded by slowing global demand and the risks of a global recession. In addition, there are other localised challenges to the South Pacific's medium-term growth and recovery, as discussed below.

Table 3: COVID-19-related Policy Support[a]

	Domestic policy support		Foreign aid[b]	
	US$ millions	Per cent of GDP	US$ millions	Per cent of GDP
Fiji	2,496	58.7	557	13.1
Papua New Guinea	1,644	6.86	778	3.2
Samoa	59	7.28	110	13.7
Solomon Islands	38	2.43	114	7.4
Timor-Leste	254	16.1	12	0.8
Tonga	26	5.17	106	21.0
Vanuatu	50	5.98	27	3.2
Australia[c]	383,428	31.32	–	–
New Zealand[c]	21,666	11.12	–	–

(a) January 2020 to November 2021; based on estimates from the Asian Development Bank that capture monetary and fiscal policy. Only Australia, New Zealand and Timor-Leste capture estimates of the value of loan guarantees or forbearance.

(b) Estimates of foreign aid include grants and loans specifically provided for COVID-19; some aid packages included unspecified combined aid for natural disasters. Excludes central bank swap lines (only applicable for Australia and New Zealand).

(c) The bulk of domestic policy support in Australia and New Zealand was health spending and income support for individuals and businesses.

Sources: Asian Development Bank; Felipe and Fullwiler (2021); RBA.

Table 4: Economic Outlook

South Pacific countries; IMF forecasts

	GDP growth Per cent			Inflation Per cent		
	2023	2024	2025	2023	2024	2025
Fiji	7.5	3.9	3.7	2.5	2.5	2.6
Papua New Guinea	3.7	4.4	3.1	5.4	4.9	4.6
Samoa	5.0	3.6	3.4	10.0	5.0	4.0
Solomon Islands	2.5	2.4	3.0	4.8	3.7	3.3
Timor-Leste	2.2	3.1	3.1	4.0	2.5	2.0
Tonga	2.5	2.8	2.6	9.7	4.8	2.9
Vanuatu	3.5	3.6	3.9	3.5	3.0	3.1

Source: IMF.

Medium-term challenges to economic growth

In addition to global economic headwinds, South Pacific countries face several specific challenges to economic growth and development. These include longstanding issues relating to capacity development, economic diversification and ensuring countries remain connected to the international financial system (see Davies (2023)). In the near-to-medium term, high levels of government debt and threats from climate change pose increasingly pressing challenges.

Government debt

For some countries in the South Pacific, high government debt and efforts to ensure debt sustainability have been a persistent challenge. Low GDP growth has historically created challenges for debt management and serviceability, and the opacity of total debt levels (including quasi-fiscal liabilities and other off-balance sheet items) pose additional risks that may not be captured in debt sustainability assessments (IMF 2022a).

Prior to the COVID-19 pandemic, government debt in most South Pacific countries had been rising and averaged around 35 per cent of GDP in 2019

(though with significant variation across countries). Less developed domestic financial markets and limited access to international markets means most of the South Pacific's debt is financed by loans from international financial institutions (such as the IMF and the Asian Development Bank) and bilateral lenders (predominantly Australia, China, Japan and New Zealand) (Roger 2022; Sirimaneetham 2022; IMF 2021a).[5]

The pandemic saw a marked increase in government debt as tax revenue fell but spending increased via substantial fiscal support packages (Graph 6). This was most acute in tourism-dependent economies where fiscal revenues fell significantly (IMF 2022b); that said, the aggregate fiscal position of commodity exporters also deteriorated due to lower commodity prices. The majority of the debt needed to fund expenditure in this period was sourced from external official lenders, particularly MDBs, on concessional terms (Roger 2022; IMF 2022a). A few countries, including Samoa and the Solomon Islands, were able to supplement revenue via dividends from state-owned enterprises and provident funds (IMF 2021b).

While the South Pacific is not unique in experiencing significant increases in government debt in recent years, several countries in the region are considered at high risk of debt distress and have limited capacity to absorb further shocks to the economy. Additional external shocks – to which the South Pacific is particularly vulnerable – coupled with limited institutional capacity to manage or mitigate shocks would likely see a further increase in debt levels while at the same time reducing growth. In the context of already-reduced fiscal capacity, potentially greater debt serviceability burdens will make it challenging for countries to invest in critical infrastructure and other development needs (IMF 2021c). To this end, many countries are now embarking on fiscal and debt consolidation management plans to attempt to return government debt to a sustainable level.

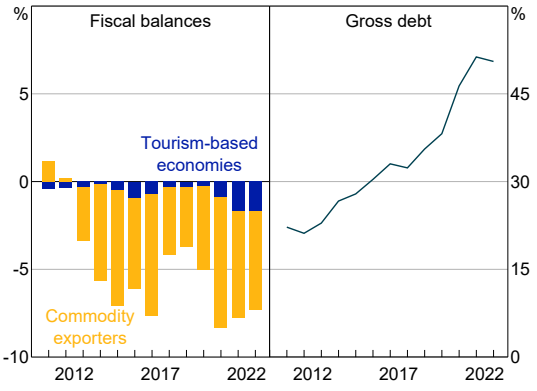
Climate change

Climate change poses a significant threat to countries in the South Pacific. Given their make up of relatively low-lying dispersed islands and less developed economies, they are at much greater risk than countries with greater geographic variability and resourcing to combat climate change (Graph 7). The biggest risks from climate change to the South Pacific region are increases in the frequency and severity of natural disasters, and rising sea levels. The past 100 years have seen sea levels rise approximately 17 centimetres, and by 2100 it is expected that sea levels could rise further by up to 200 centimetres, with average annual temperatures rising by 1.4–3.7°C (Fouad *et al* 2021). This will increase stress on water and agricultural systems and poses severe risks to economic development and stability via the destruction of infrastructure, loss of life and loss of potential growth.

Graph 6

South Pacific Government Finances

Per cent of GDP*



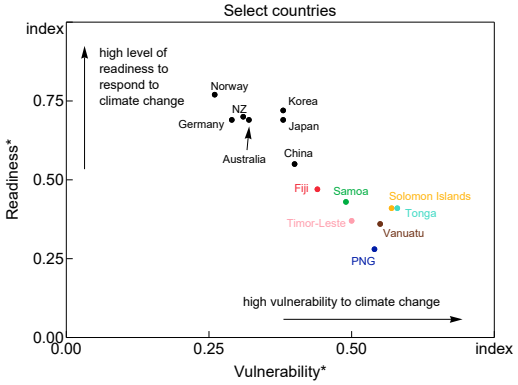
* Weighted by size of South Pacific economy.

Sources: IMF; RBA.

Graph 7

Climate Vulnerabilities and Readiness to Respond

Select countries



* These metrics measure the vulnerabilitiy of countries based on exposure, sensitivity and adapative capacity, and readiness to take action based on economic, governance and social factors.

Sources: Chen et al (2022); Notre Dame Global Adaptation Index (ND-GAIN).

The South Pacific therefore has greater needs when it comes to climate change mitigation and adaptation, but less human and financial capital to meet those needs. Reflecting their small carbon footprints, the majority of climate-related financing in the South Pacific is focused on adaptation rather than mitigation (Fouad *et al* 2021). However, the Pacific more broadly has some of the highest costs in the world for infrastructure adaptation (Tiedemann *et al* 2021) – it is estimated that Pacific countries will need between 6½ per cent and 9 per cent of GDP per year to finance climate-resilient infrastructure, which is more than double the average for Asia Pacific economies and far outstrips the amount of climate adaptation funding currently available to most Pacific islands (IMF 2021a; Fouad *et al* 2021).

South Pacific countries face challenges in meeting eligibility requirements for climate finance targeted at low- and medium-income economies, such as grants and concessional loans. It is anticipated that grant-based access to financing is critical for these countries to meet their adaptation needs given limited fiscal capacity (Fouad *et al* 2021).[6] Criteria determining eligibility for loans often centre on metrics like credit ratings, completion of debt consolidation management programs or institutional reforms, and sometimes include additional references to other social criteria (such as those relating to gender equity or social inclusion). For climate adaptation projects where initial eligibility is not a challenge, oftentimes the return on investment or impact of the project can be assessed as too low, or there are simply capacity challenges in designing and implementing complex projects (Fouad *et al* 2021).[7]

Nevertheless, some South Pacific countries have been able to access some of the funding available and have made progress towards climate adaptation. For example, Samoa has commenced work on urban flood management systems to address growing risks of riverine flooding and Timor-Leste recently improved the climate-resilience of a major transport corridor (UNDP Climate Change Adaptation 2018; UNDP Climate Change Adaptation 2019). Some countries, such as Fiji, are also seeking to build new financial infrastructure to facilitate private investment in funding climate adaptation projects alongside government and donor funding.[8] These projects have largely been co-led with MDBs and international bodies such as the United Nations Development Programme; such technical expertise and assistance will remain critical to overcoming a lack of capacity in the region as it seeks to increase access to adequate climate financing.

Conclusion

Economies in the South Pacific have been quite resilient in the face of a series of severe adverse events over the past few years. Expansionary government and central bank policies, alongside substantial international assistance, supported much of the region through the acute phase of the pandemic and other disasters. Economies are recovering, albeit unevenly, particularly as the region continues to be hit by natural disasters. While local conditions and idiosyncratic issues will play a large role in countries' ongoing development, the South Pacific region will also face challenges arising from high debt levels and climate change. Addressing these will be made more difficult by longstanding issues relating to capacity and skilled labour development and, as discussed in Davies (2023), sustaining connections to the international financial system. The Reserve Bank of Australia will continue to seek to understand economic issues facing the South Pacific and provide central banking-related technical assistance to the region.

Endnotes

[*] The author is from International Department.

[1] Australia's and New Zealand's central banks are the other SPGM members.

[2] In commodity-exporting countries, main commodity exports account for roughly 60 per cent (gas, gold and copper in PNG), 70 per cent (timber in Solomon Islands) and 90 per cent (oil in Timor-Leste) of total merchandise exports.

[3] Central banks in the South Pacific operate a range of monetary policy implementation frameworks, including through the use of interest rates, managed or fixed exchange rates, reserve requirements and administrative controls. Monetary policy transmission mechanisms in the South Pacific can be weak due to institutional factors and underdeveloped financial markets, which limit policy pass-through (Dunn *et al* 2011).

[4] Additional government spending excludes other planned spending redirected for COVID-19, as well as private sector or non-government official institution support.

[5] Fiji is an exception to this, with around 70 per cent of government debt issued and held domestically (IMF 2021d).

[6] Grant-based funding does not need to be repaid, unlike concessional loans that carry (and add to existing) debt burdens.

[7] Finance and grant providers often have criteria to ensure that a project has a significant positive impact. This can be measured in various ways, including expected lives saved, expected emissions reductions or anticipated loss mitigation of physical environment.

[8] See Fiji Climate Change Portal (2022) for examples of initiatives.

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Correspondent Banking in the South Pacific

Michael Davies[*]

Photo: Henryk Sadura – Getty Images

Abstract

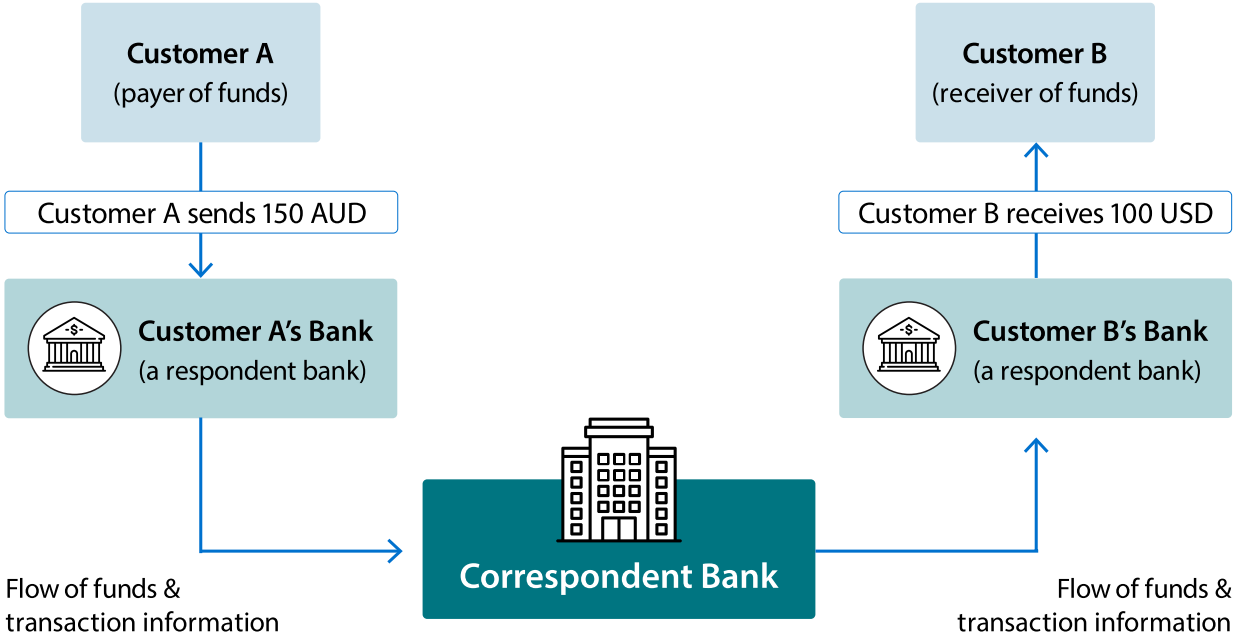
Worldwide, many financial institutions make use of correspondent banking services to connect to the global financial system. This article examines the withdrawal of global financial institutions from the provision of correspondent banking services to the South Pacific and the implications for countries in the region. The available evidence suggests that South Pacific nations, like many small island economies globally, have seen a larger-than-average decline in the provision of these services. The decrease in the availability of correspondent banking services appears to be most pronounced for smaller local banks and in the major global currencies. While the available evidence suggests that South Pacific countries have been able to manage this decline thus far, the remaining correspondent banking services are becoming increasingly stretched and further withdrawal may cause financial sector disruption.

Introduction

Correspondent banking involves a financial institution (the 'correspondent') providing a deposit account and related payment services to another financial institution (the 'respondent') for the purposes of currency exchange, the execution of third-party payments, trade finance and cross-border money transfers. The correspondent bank executes payments on behalf of the respondent bank and its customers (Figure 1).

Correspondent banks are important for all countries, but they can be particularly vital in smaller open economies. These economies often rely heavily on foreign currency inflows, such as remittances to households, official development assistance and tourism receipts. Their local banks are often relatively small or do not have offices abroad to

Figure 1: Simple Cross-border Payment Using a Correspondent Bank



Note: This is a simple cross-border transaction. Sometimes cross-border payments need to go through multiple correspondent banks or domestic payments infrastructure in either the origination or destination country.

offer cross-border payment services themselves. In these situations, international banks offer account services – 'correspondent banking services' – to local banks (Boulton and Winton 2018).

This article examines recent trends in the provision of correspondent banking services in the South Pacific and the impact on countries in the region. At a global level, international banks have historically provided correspondent banking services to a large number of banks; however, over the past decade, the number of correspondent banking relationships has shrunk significantly. The available evidence suggests that smaller countries have been most affected by this reduction, at least in part because the risk/return profile for correspondent banks servicing these countries is often not as attractive as it is in larger or more developed economies.

The article concludes by outlining some of the work being undertaken by the central banks and government agencies of countries in the South Pacific to support correspondent banking in the region.

Importance of correspondent banking in the South Pacific

It is important for all countries to have robust links to the global financial system to facilitate efficient cross-border payments services. However, these links are particularly fragile for small, open countries like those in the South Pacific. This article focuses on the South Pacific Central Bank Governors Meeting (SPGM) member countries of Fiji, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga and Vanuatu, which are subsequently referred to as 'SPGM member countries' – noting that the two member countries of Australia and New Zealand are excluded from this reference unless specified. The high degree of economic openness, reliance on remittances, tourism and the inflow of official development assistance that characterises many SPGM member countries underscores the importance of retaining correspondent banking services (Wilkins 2023).

Table 1: Changes in Correspondent Banking Relationships in SPGM Member Countries (excluding Australia and New Zealand)

Percentage change over 2011–2022

	CBRs	Annual transaction volume	Annual transaction value
Fiji	–66	43	61
Papua New Guinea	–56	126	–26
Samoa	–52	39	278
Solomon Islands	–57	30	641
Timor-Leste	–78	74	149
Tonga	–49	28	–33
Vanuatu	–65	38	14

Sources: National Bank of Belgium; SWIFT BI Watch.

Trends in correspondent banking networks

The number of correspondent banking relationships (CBRs) is shrinking globally. Available data show that the number of CBRs declined by about 30 per cent between 2011 and 2022 and by 4 per cent in 2022 alone (BIS 2023). This is despite the total volume and value of transactions processed through these networks increasing by 61 per cent and 37 per cent, respectively, over the 12 years to 2022. International research suggests that the decline in CBRs globally reflects a range of interrelated factors, including:[1]

- International banks are looking to simplify and streamline their operations, which puts pressure on geographically dispersed business services such as correspondent banking.
- Banks are increasingly focused on regulatory, reputational and financial risks from anti-money laundering (AML) and combating the financing of terrorism (CFT) compliance, which is in part due to the sizeable penalties levied by regulators in a range of countries.
- Compliance costs have increased for correspondent banks as they enhance their systems and processes to identify and verify their customers (respondent banks as well as other customers).
- Banks now have a greater focus on risk/return for the provision of correspondent banking services, with these businesses often seen as lower return and hence less attractive. In smaller countries, there are also often fewer opportunities for correspondent banks to sell other services to support the costs associated with providing correspondent banking services. There is a renewed focus by banks on ensuring that individual correspondent banking relationships generate sufficient revenue or profit.
- There are actual or perceived shortcomings in the AML/CFT, sanctions, tax and broader regulatory arrangements in some countries, which disincentivise the provision of correspondent banking services.

The South Pacific has been one of the more heavily affected regions, with the number of active correspondents[2] decreasing by about 60 per cent between 2011 and 2022 – a decline almost twice as severe as that seen globally (Graph 1). Moreover, the number of remaining active correspondents in some South Pacific countries is quite low.

Large declines in the number of CBRs have occurred in all SPGM member countries, despite most having rising transaction volumes and values (Table 1). The available evidence suggests that the pressures are most acute for US dollar (USD) and euro (EUR) denominated services, with services denominated in Australian dollars (AUD) and other currencies less affected.

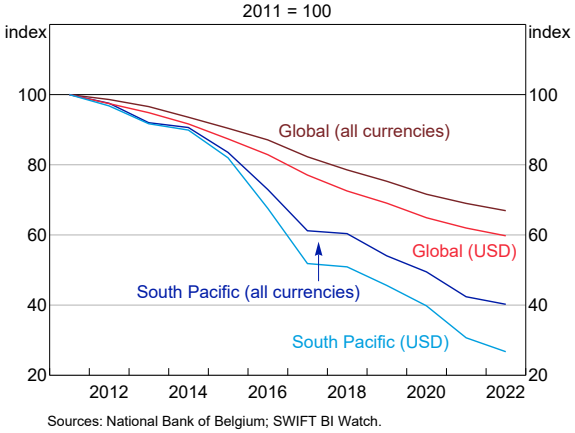
The larger-than-average decline in CBRs in the South Pacific is consistent with international research, which suggests that, globally, the countries that have been most affected by the reduction in the provision of CBRs are: smaller countries (which often have smaller transaction volumes and hence less revenue for correspondent banks); countries that are perceived as having higher risks around AML/CFT compliance, international sanctions, corruption or tax havens/ offshore centres; and countries that have transaction flows that are viewed by banks as inherently riskier, such as wire transfers, cheque clearing, remittances and trade finance.[3]

Industry reports suggest that in SPGM member countries, local banks (i.e. banks headquartered and operating in a single country) have been more heavily affected by the loss of CBRs than regional banks (i.e. banks headquartered in a SPGM member country with operations in multiple countries) and international banks operating in those countries. Many of the international banks operating in the Pacific are headquartered in France or Australia, reflecting these countries' close ties to the region.

The presence of foreign-owned banks in the South Pacific has both advantages and disadvantages for these countries. One disadvantage is that the larger size of the international banks together with the small size of the Pacific countries, heightens these countries' vulnerability to adverse operational decisions by international banks about the countries and market segments in which they operate. On the other hand, these foreign-owned banks are better able to maintain their correspondent bank accounts as they typically have larger scale, more developed AML/CFT systems and processes, the capacity to offer other business or reciprocal correspondent bank accounts to other international banks, and the ability to provide CBRs in major currencies via their parent bank or other banking subsidiaries.

Graph 1

Number of Active Correspondents



Sources: National Bank of Belgium; SWIFT BI Watch.

The available evidence from IMF Article IV reports suggests that the extent of pressures on CBRs varies across the SPGM member countries. The information below focuses mainly on AML and other regulatory risks, but the broader factors affecting trends in correspondent banking relationships globally described above are also relevant in the Pacific:

- **Fiji** does not appear to be facing significant pressure on its CBRs. This is partly because most banks operating in Fiji are large foreign banks, and the banking sector has strict licensing, prudential and regulatory requirements (IMF 2021b).
- **Papua New Guinea** authorities are working to minimise risks of possible future disruptions to correspondent banking services by strengthening their AML/CFT framework and broader regulatory arrangements; they are also taking regulatory action against a local bank to demonstrate the importance of compliance with AML/CFT rules (IMF 2022b).
- **Samoa** continues to experience pressures on the CBRs of its domestic banks, with factors including low profitability, weaknesses around AML/CFT supervision, and reputational risks from Samoa's offshore sector weighing on the provision of these services (IMF 2023a). Samoan authorities are working to address these issues.
- **Solomon Islands** has experienced relatively muted pressure on its CBRs so far, in part because most commercial banks are subsidiaries of foreign banks (IMF 2023c). Authorities are working to strengthen the country's AML/CFT framework and compliance arrangements, and to address other correspondent banking relationship pressures.

- **Timor-Leste** does not appear to be facing any CBR pressures at present (IMF 2022c).
- **Tonga** has experienced some CBR pressures, with two small banks recently losing their USD accounts (IMF 2022a). Tonga has several initiatives in progress to reinforce its AML/CFT framework and supervision of financial institutions.
- **Vanuatu** continues to experience some pressure on CBRs, with domestic banks most affected (IMF 2023b). Factors that are weighing on the provision of CBRs are concerns around the economic citizenship program, AML/CFT framework, offshore financial centre dealings and tax transparency.[4] Vanuatu is working with international agencies to strengthen its AML/CFT arrangements.

Risks of reduced CBRs in the region

To date, SPGM member countries have been able to ensure that their banks maintain enough CBRs to retain their access to global cross-border payments services. However, anecdotal evidence suggests that the CBRs in the region are now costlier than they were previously and may come with additional restrictions on the types of customers or transactions that can be processed through them. Moreover, over time, as fewer international banks are willing to maintain their breadth and depth of correspondent banking services, it may become increasingly difficult for banks in smaller countries to maintain their CBRs.

This raises several potential risks for SPGM member countries, including:

- *Increased cost of cross-border payments* – Reduced availability of correspondent banking services may make cross-border payments slower and more expensive for households, firms and governments by: increasing transaction costs as banks pass on the costs of their more expensive correspondent banking arrangements to customers; lengthening payment chains as transfers are routed via third countries; and incurring more foreign exchange costs as the transfers move via intermediary currencies. This may have negative implications for important economic activities such as tourism, trade and foreign direct investment.
- *Increased cost of remittances* – Within the context of broader cross-border payments, more costly remittances is a key issue. Remittance flows into SPGM member countries have been holding up fairly well over recent years, despite the derisking pressures on banks and money remitters; remittance flows have grown, the cost of sending remittances has slowly declined, and there are several active money remitters servicing each country corridor. However, the cost of sending remittances to the Pacific remains relatively high by global standards and will not be assisted by further consolidation of correspondent banking services.
- *Greater use of informal payment channels* – The continuing decline in correspondent banking services may see customers resort to unregulated and potentially less safe 'shadow payments'. Examples of this include: the use of informal Hawala payment networks; transporting cash between jurisdictions; or paying with crypto currencies.[5] There have been anecdotal reports of money transfer organisations transferring funds to the Pacific in cash (Fonseka 2022; Alwazir *et al* 2017).
- *Increased financial frailties* – Over the medium-to-long term, reduced availability of correspondent banking services increases the operating costs for respondent banks by raising the cost, processing time and/or scrutiny of these relationships. This could have implications for the cost of doing business, or on the scope of financial services these banks provide. There may also be market structure and competition implications, as smaller, local banks appear to be more affected by the withdrawal of correspondent banking accounts than larger regional banks.

Efforts to maintain CBRs in the South Pacific

Banks' decisions around whether to offer correspondent banking services are ultimately

commercial ones that are mainly based on the balance of risk and return. Nonetheless, SPGM member countries (including Australia and New Zealand) and international organisations are undertaking a range of initiatives to support the provision of CBRs, including by: enhancing respondent banks' capacity to manage risks; increasing correspondent banks' appetite to manage risks associated with CBRs; and strengthening national regulatory frameworks and supporting their implementation.

Some of the initiatives that are being led by SPGM member countries are set out below:

- *Regional and national eKYC projects* – Given the importance of remittances for the region, the SPGM member central banks have been investigating the implementation of a regional electronic 'Know Your Customer' Facility (eKYC) since 2020. The intention of the eKYC Facility was to support the provision of correspondent banking services and remittances to the region via improvements to customer due diligence processes and AML/CFT compliance (RBA 2020). In June 2022, the central banks decided to prioritise developing individual countries' strategies for delivering their own eKYC capability over a regional facility (RBA 2022). Several countries in the region are currently working on or considering projects to develop national identity databases or eKYC facilities or both. The Reserve Bank has been providing support where requested.
- *Improvement of regulatory frameworks* – Several SPGM member countries have been working to strengthen their regulatory frameworks with support from international partners such as the International Monetary Fund.
- *AUSTRAC technical assistance* – The Australian Transaction Reports and Analysis Centre (AUSTRAC) is providing a range of technical assistance and training programs to help Pacific countries improve their financial intelligence and AML/CFT compliance arrangements (AUSTRAC 2021; AUSTRAC 2022). One key part of this support has been partnering with South Pacific financial intelligence units to implement the Australian-developed TAIPAN financial intelligence analytical system across the region. AUSTRAC's technical assistance is part of a broader effort by the Australian Government to support South Pacific countries.

Conclusion

The decline in the provision of correspondent banking services in SPGM member countries over the past decade has been significant – and larger than the average decline seen globally. Some banks in the region are finding it difficult and increasingly costly to maintain a sufficient network of correspondent banking relationships to make all their international payments in a cost-effective way.

While the available data suggest that SPGM member countries have thus far managed this decline, with their banks able to continue to process cross-border flows for themselves and their customers, further decreases in the availability of correspondent banking services would raise the risk of more serious financial sector disruption.

Various initiatives by SPGM member countries and multinational organisations seem to be somewhat supportive of maintaining effective cross-border payment arrangements. However, it is a difficult issue for the region to solve on its own, as the provision of correspondent banking services is a commercial matter for the relevant international banks and correspondent banking networks are consolidating globally.

Australia is aware of the challenges that some South Pacific countries are facing in maintaining their correspondent bank accounts and, as a member of SPGM, will continue to support member countries in their endeavours to secure and maintain these services.

Endnotes

[*] The author is from Business Services Group.

[1] See Erbenova *et al* (2016); Rice *et al* (2020); US Department of the Treasury (2023).

[2] The count of active correspondents measures, corridor by corridor, the number of banks that have sent or received messages. As a result, correspondents present in more than one corridor are counted several times.

[3] See Rice *et al* (2020); World Bank (2015); US Department of the Treasury (2023).

[4] Samoa, as well as Fiji and Vanuatu, were listed on the EU list of non-cooperative jurisdictions for tax purposes as at February 2023 (EU 2023).

[5] Hawala is a traditional money transfer system originating in Southeast Asia. It is an informal channel for transferring funds from one location to another through service providers known as hawaladars. While hawala transactions are mostly initiated by emigrant workers living in a developed country, the hawala system can also be used to send funds from a developing country. The hawala system is largely unregulated and is based on trust and relationships (El-Qorchi 2002).

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