

Bulletin

MARCH 2022



RESERVE BANK OF AUSTRALIA

Contents

1. The Evolution of Interbank Settlement in Australia	1
2. Exploring the 'Confidence Gap'	12
3. Tracking Consumption During the COVID-19 Pandemic	24
4. COVID-19 Health Risks and Labour Supply	37
5. The Significant Shift in Australia's Balance of Payments	47
6. Are First Home Buyer Loans More Risky?	55
7. Developments in Banks' Funding Costs and Lending Rates	64
8. Australian Money Markets Through the COVID-19 Pandemic	74
9. Australian Securities Markets Through the COVID-19 Pandemic	83
Copyright And Disclaimer Notices	95

The *Bulletin* is published under the direction of the Bulletin Editorial Committee: Luci Ellis (Chair), Lynne Cockerell, Darren Flood, Amanda Martz, Carl Schwartz, Penelope Smith and Paula Drew (Secretary).

The *Bulletin* is published quarterly in March, June, September and December and is available at www.rba.gov.au. The next *Bulletin* is due for release on 16 June 2022.

The graphs in this publication were generated using Mathematica.

ISSN 1837–7211 (Online)

© Reserve Bank of Australia 2022

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

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

Source: Reserve Bank of Australia 2022 OR Source: RBA 2022

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

The Evolution of Interbank Settlement in Australia

Kasia Kopec and Chirag Rao^[*]



Photo: Prasit photo – Getty Images

Abstract

Electronic payments are ubiquitous in modern economies and result in financial obligations between different financial institutions. These interbank obligations need to be settled in a way that is safe and efficient to promote the stability of the Australian financial system. In Australia, interbank settlement is performed in the Reserve Bank Information and Transfer System (RITS), which is owned and operated by the Reserve Bank. Since the introduction of real-time gross settlement services in 1998, the functionality of RITS has continued to evolve in line with payment innovations and the increasing importance that electronic payment systems play in supporting economic activity in Australia. This article considers key moments in this evolution as well as potential future developments.

Introduction

Interbank settlement resolves the financial obligations created between institutions when consumers, businesses and the government make payments in the economy. Each day, around \$200 billion worth of these payment obligations are processed. In Australia, interbank settlement is performed in the Reserve Bank Information and Transfer System (RITS) through the simultaneous debiting and crediting of Exchange Settlement Accounts (ESAs) that banks and other eligible financial institutions hold with the Reserve Bank. As

the funds used to settle the obligations are issued by the Reserve Bank (central bank money), it provides a risk-free method of settlement with finality.^[1]

The introduction of real-time gross settlement (RTGS) in 1998 was a key milestone in the evolution of Australia's payments settlements infrastructure (Gallagher, Gauntlett and Sunner 2010). Prior to this, settlement of non-cash payments was completed on a net basis in 'batches', including for large-value payments. This meant that processes to tally up what was owed were undertaken at the end of the

day, with settlement of the resulting obligations carried out in a batch at 9:00 am the next morning. This often resulted in banks accumulating large obligations to each other – and if, for any reason, these obligations could not be met at settlement, institutions might have faced liquidity and solvency risks. RTGS introduced the irrevocable line-by-line settlement of wholesale (large-value) and other time-critical payments in real time, thereby reducing the build-up of settlement risk in the payments system.

Although RTGS meant that wholesale payments were now settled in a timely and effective way, most low-value transactions (generally related to retail payments) continued to be settled on a deferred ‘net’ basis. The associated settlement risk was considered acceptable because of the relatively lower exposures involved, which were reduced further through netting. Netting allows obligations arising from numerous payments to be combined and offset across several banks, using Exchange Settlement (ES) balances more efficiently than line-by-line settlement. Settlement arrangements for low-value payments have also changed considerably over time to support an evolving payments landscape. Key additions include same-day settlement for direct entry payments (such as direct debits, ‘pay anyone’ transactions and bulk payments like salaries and bills), enhanced batch arrangements for card payments and new

functionality enabling electronic property settlement.

Further, in 2018, the Fast Settlement Service (FSS) was introduced as an additional service of RITS to support the 24/7 operation of the New Payments Platform (NPP), expanding the use of real-time settlement functionality to low-value retail payments.

This article reviews key changes to interbank settlement in RITS since 1998, covering both RTGS and net settlement methods, and considers some potential future developments.^[2]

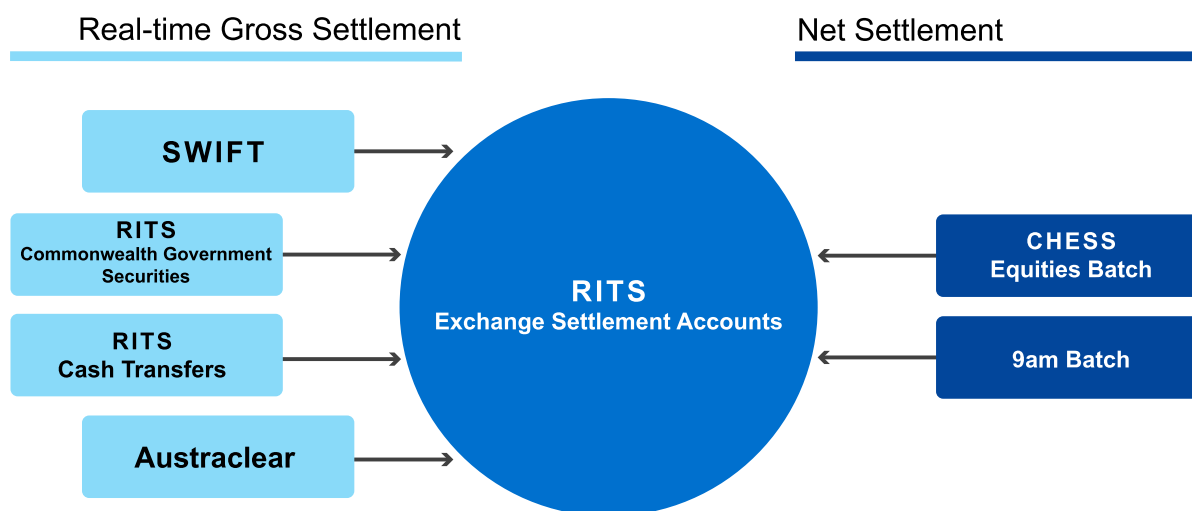
The evolution of RITS functionality

The introduction of RITS

When RTGS was introduced in 1998, the RITS environment was designed around the then prevailing needs of Australia’s payments system, which were less complex than they are today. At that time, four core transaction types could be settled on an RTGS basis, two of which originated from external ‘feeder systems’ (Figure 1).

SWIFT payments were submitted to RITS via the High Value Clearing System and included customer payments, foreign exchange settlements, correspondent banking flows and the Australian dollar leg of cross-border payments.^[3] The Austraclear feeder system facilitated the secure exchange of cash and debt market securities in

Figure 1: Interbank Settlement in 1998



Australia, including private sector and state government debt securities and other money market instruments.^[4] Cash transfers could be entered directly into RITS by members and were primarily used for transacting in the overnight interbank cash market or in contingency scenarios. These three wholesale transaction types are still in use today. Prior to their migration to the Austraclear system, Commonwealth Government Securities were the fourth transaction type and were directly entered and settled in RITS.

In addition to wholesale transactions, retail payments were settled on a net basis in a single deferred '9am Batch'. This included retail card payments, non-government direct entry, BPAY, ATMs, Medicare refund transactions and cheques. Equities transactions processed through the ASX Limited's Clearing House Electronic Subregister System (CHES) were also settled separately on a net basis around midday each business day.

The first decade

In the decade following the introduction of RTGS, functionality in RITS remained broadly unchanged, consistent with the settlement needs of domestic payment systems and the ongoing prominence of cash and cheque use. One notable development over this period was the introduction of Continuous Linked Settlement (CLS) in 2002, which facilitates settlement of bought and sold currencies in foreign exchange transactions. CLS connects participating national RTGS systems during a common 'funding and settlement period' when it settles foreign exchange transactions across multi-currency accounts that participants hold with CLS Bank International. This change required RITS operating hours to be extended to overlap with those of CLS members, enabling participating banks to settle foreign currency obligations in a way that greatly reduces foreign exchange settlement risk (RBA 2015).^[5] In the same year, Austraclear became the central electronic depository and settlement system for Commonwealth Government Securities, meaning that securities settlement and depository functionality in RITS could be decommissioned.

The second decade

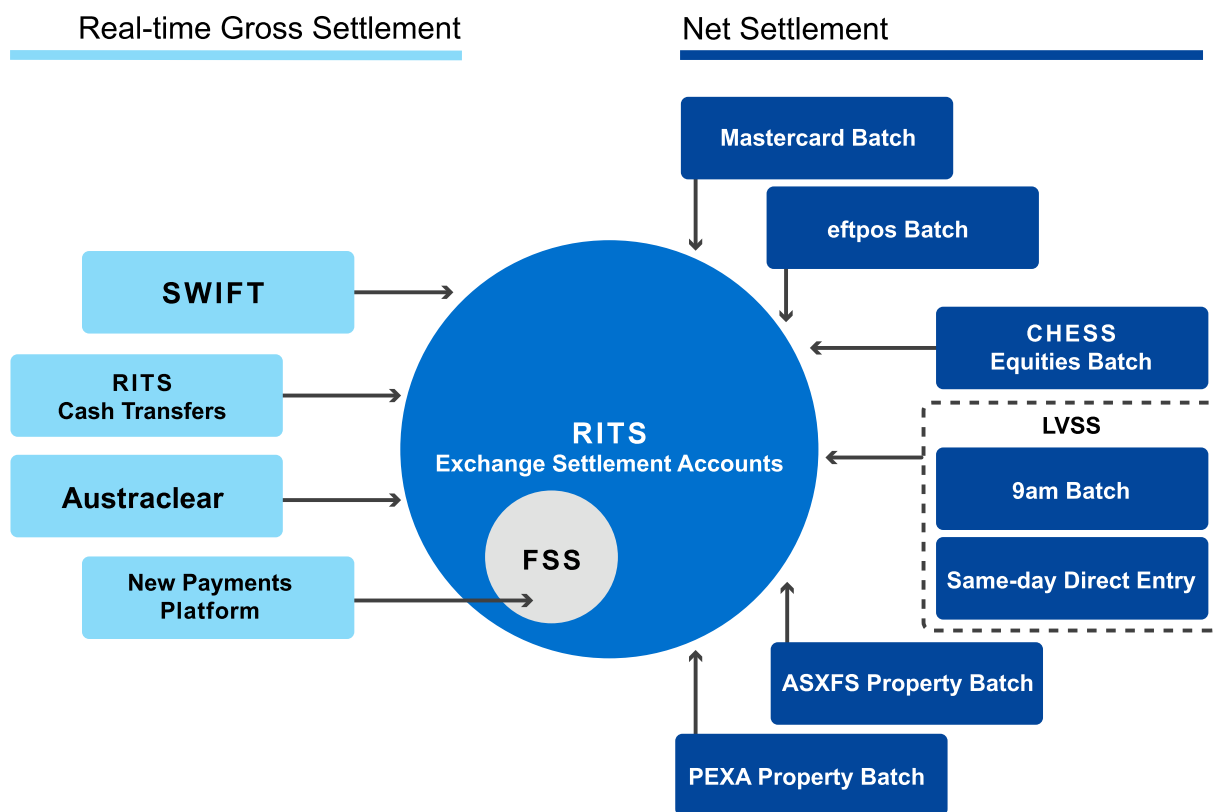
In the second decade after RTGS was introduced, there were significant changes to RITS to support increasing innovation in electronic payment methods.^[6] These changes involved creating new settlement arrangements in RITS, which moved value previously settled in the 9am Batch to separate batches or the FSS (Figure 2). The key changes were:

- In 2013, the RITS Low Value Settlement Service (LVSS) replaced previous arrangements for the 9am Batch and introduced five intra-day batches to enable the same-day settlement of direct entry payments. This made it possible for bulk payments (such as payroll and dividends) and pay-anyone transactions to be made and received on the same day, although the same-day availability of funds to customers tends to vary between financial institutions. Related changes included the further extension of RITS operating hours and new liquidity arrangements to accommodate the settlement of these obligations later in the day.
- In 2018, the FSS was introduced as an additional service of RITS for the settlement of payments originating from the NPP. The FSS has enabled the 24/7 settlement of many lower-value retail payments on an RTGS basis, which were traditionally settled as direct entry payments on a deferred net basis.

While net obligations settled via the LVSS are calculated in RITS, obligations settled through externally administered batches are calculated outside of RITS by an approved third party. There have been several external batches added to RITS over the past decade:

- In 2014, a separate, externally administered batch for Mastercard payments was introduced, which moved settlement of these obligations out of the 9am Batch. This replaced the previous arrangement where a commercial bank acted as the settlement agent for Mastercard transactions. The newly introduced Mastercard batch also provided more timely settlement than the previous arrangements, bringing

Figure 2: Interbank Settlement in 2022



forward the transfer of funds between participating institutions by one day.

- Also in 2014, new RITS functionality enabled the safe and prompt electronic settlement of multi-party property transactions by linking the cash settlement and title transfer processes (De Freitas and Fitzgerald 2021). Payments related to a property transaction, such as a sale or refinancing, are now mostly settled on a net basis in near real-time. Property Exchange Australia Ltd (PEXA) was the first batch administrator for property settlement to commence operations in RITS.
- In 2017, as part of eftpos Payments Australia Ltd’s move to centralised processing of eftpos card payment obligations, a new externally administered batch was introduced, moving settlement of these obligations out of the 9am Batch.
- In 2019, ASX Financial Settlements Pty Ltd (ASXFS), on behalf of network operator Sympli Australia Pty Ltd, became operational as the

second external property settlement batch administrator.

RITS membership has expanded

Broad-based access to settlements infrastructure like RITS promotes competition and innovation in payments services. RITS membership expanded from 54 ESA holders in 1999 to 101 in 2021 reflecting a range of factors including new foreign banks entering the Australian market and an increase in the number of domestic entities classified as banks (Graph 1).^[7] ESA applicants must meet certain eligibility criteria, which have been updated to cater to the modern and more diverse payments industry.^[8] In recent years, a range of non-bank entities – including money remitters, card acquirers and third-party payment providers – have expressed increased interest to operate an ESA.

Agency arrangements were introduced in 2003 to reduce the operational demands for smaller financial institutions of settling their own RTGS payments, allowing these members to settle payment obligations through ‘agent’ members (i.e.

other financial institutions or service providers) (RBA 2021b). While the total number of ESA holders has grown steadily since 1999, many of these use agents to settle their payments such that the number of ESA holders settling payments directly ('active' members) has increased at a slower pace, from 54 to 62, over the same period. Reflecting the trend to broader participation in settlement, the share of total value settled by the four major banks in RITS decreased from around 62 per cent in 1999 to 49 per cent in 2021.

RTGS settlements reflect economic and financial activity

Since the introduction of RTGS in 1998, around 90 per cent of interbank value settled per day has been completed in real-time. In 2021, RITS settled an average \$176 billion of RTGS payments each day (excluding FSS) (Graph 2). The average daily volume of RTGS settlements increased fairly steadily prior to the COVID-19 pandemic, by around 6 per cent on average each year from 1999 until 2019. The main driver of volume growth was an increase in lower-value SWIFT payments, the majority of which are between customers of financial institutions, including the Australian dollar leg of cross-border payments. Lower-value SWIFT payments have increased five-fold over the last two decades. In 1999, SWIFT payments with a value below

\$100,000 accounted for 43 per cent of RTGS volume and increased to around 70 per cent in 2019.

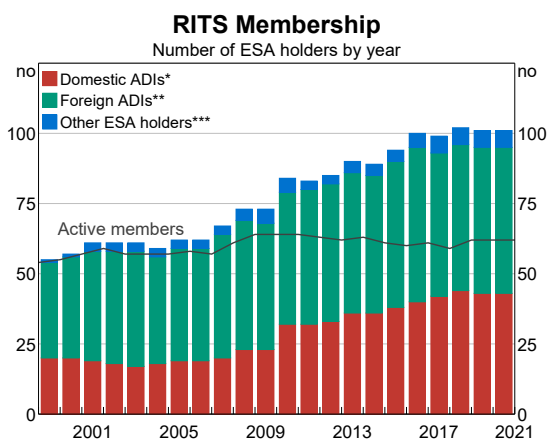
Value settled by RTGS shows a similar pattern, having increased by an average of 4 per cent each year between 1999 and 2019. Over these years the composition of transactions changed. Austraclear transactions increased as a share of value from around 19 per cent in 1999 to 33 per cent of total RTGS value in 2019, in part due to the integration of Commonwealth Government Securities in 2002. The SWIFT share of value decreased from 68 per cent to 60 per cent of total RTGS value, while still growing in absolute value terms. Although customer-to-customer payments make up the bulk of SWIFT volumes, it is payments made between financial institutions that contribute most to SWIFT values.

These patterns changed in 2020, however, with the onset of the COVID-19 pandemic. The pandemic is only the second time there has been a notable slowdown in RTGS value growth over 23 years of operation in Australia, with the first triggered by the global financial crisis. The change in settlement activity since the pandemic is explained in Appendix A.

Most RTGS payments now settle earlier in the day

Since 1998, there has been a strong peak in volume and value of RTGS settlements occurring after

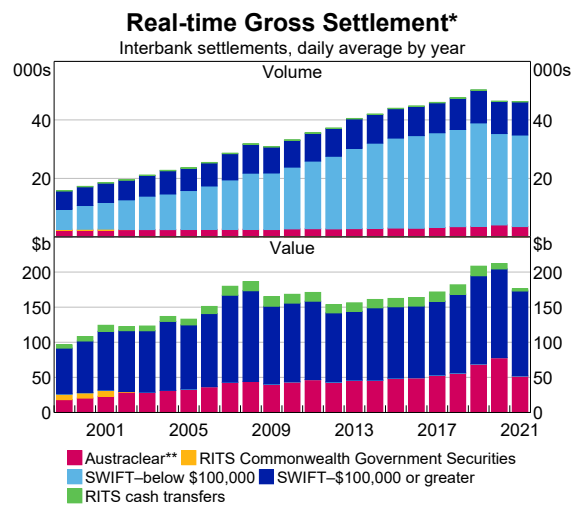
Graph 1



* Includes the Reserve Bank and domestic authorised deposit-taking institutions (ADIs).
** Includes branches and subsidiaries of foreign banks.
*** Includes central counterparties, securities settlement facilities and non-ADI payment service providers.

Source: RBA

Graph 2



* Excludes FSS transactions.
** Excludes intraday and open repos.

Source: RBA

Table 1: Growth in Net Settlement Batches

	Batch commenced operation ^(a) Year	Growth in average settlement value per financial year ^(b) Per cent	Share of net settlement value in 2021 Per cent
9am Batch	1998	-1	8
CHESS (equities)	1998	8	6
Intraday direct entry	2013	7	53
Mastercard	2014	20	7
Property settlement ^(c)	2014	105	24
eftpos	2017	-1	2

(a) Stated from the start of RTGS in RITS in 1998.

(b) Growth is measured from the first full year of settlements for all batches excluding the 9am and CHESS batches, where growth is measured from 1999.

(c) Includes both PEXA and ASXFS property batches.

Source: RBA

9:15 am (Graph 3).^[9] The bulk of this peak comprises SWIFT payments that are sent into RITS overnight and through the early morning, and are queued to become eligible for settlement at this time. This morning peak has continued to grow over the last two decades, from settling around 16 per cent of daily RTGS volume in 1999 to 41 per cent in 2021. In general, this earlier settlement of payments is beneficial in reducing liquidity risks that can arise late in the settlement day and assists in redistributing liquidity between banks.

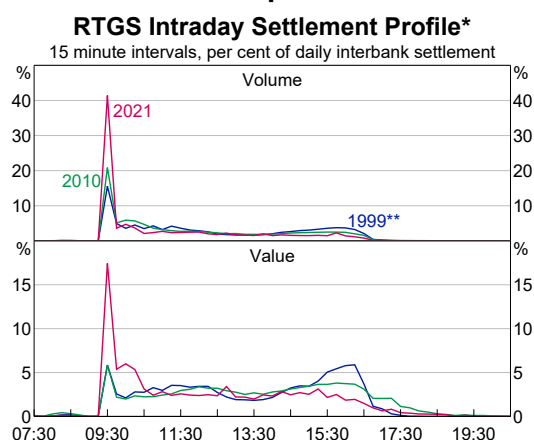
In the early years of RTGS settlement, there was also a peak in value settled in the late afternoon around 4:00 pm, when banks are typically engaged in end-of-day settlement activities. However, over the last two decades, as settlement of RTGS payments has shifted to earlier in the day, this late-afternoon peak has flattened to the point where it has mostly disappeared.

Net settlement activity reflects innovation in electronic payments

Lower value payments continue to be settled in RITS on a net basis (where not settled in FSS). These batches collate a large number of payments but only account for around 10 per cent of settlement value in RITS due to their generally lower value and the effects of netting, averaging around \$19 billion per day in 2021. The value of most of the individual

net settlement batches have grown strongly since commencing operation (Table 1).

The creation of five intraday direct-entry settlements comprising non-government bulk payments and pay-anyone transfers, as well as new external batches for Mastercard and eftpos payments, had a significant impact on net settlement values (Graph 4). Up until 2013, the value of the 9am Batch had grown steadily in line with the adoption of electronic payments, to reach around \$4 billion per day. Over 2013 and 2014, as payments moved out of the 9am Batch to the new individual batches, the average daily value declined to around

Graph 3

* Excludes transactions settled through the FSS.

** 1999 was prior to the extension of RITS operating hours. Includes intraday repos.

Source: RBA

\$1.2 billion. While these new batches provided advantages such as more timely settlement for some transaction types, the relocation of settlements to separate batches has reduced the benefits of netting, resulting in the less efficient use of ES balances (Fraser and Gatty 2014). For example, in 2014, after the disaggregation of the 9am Batch, the combined net settlement value of the 9am and the new batches increased to a daily average of \$7.4 billion.

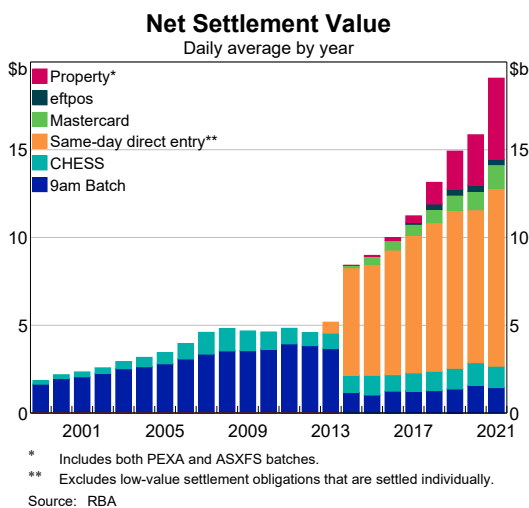
Since its introduction, property settlement in RITS has grown strongly to become the largest of the external batches, comprising settlements of around \$4.6 billion per day. Unlike other externally administered batches, which are typically settled in RITS once per day, property batches are settled throughout each business day with each batch commonly representing a single property transaction. Growth in electronic property settlement has been driven in part by state and territory government mandates for electronic conveyancing, encouraging the shift from paper-based settlement using cheques. As cheques are typically used for large transactions such as property settlements, the uptake in electronic conveyancing has contributed to the decline in the use of cheques (Graph 5).

Settlement liquidity changes with economic events and funding requirements

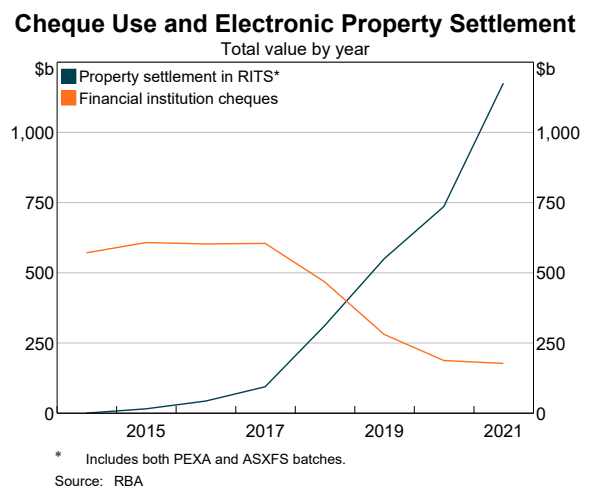
The amount of liquidity available for settlement purposes ('settlement liquidity') is the total funds held in members' ESAs overnight plus intraday liquidity sourced through repurchase agreements (repos) from the Reserve Bank. ES balances must remain positive at all times as members need to hold sufficient ES balances to settle their payment obligations. As with other RITS functionality, the provision of liquidity has evolved as the use of payments and system funding needs have changed, particularly with the trend towards settlement of electronic payments after hours. Liquidity levels can also be influenced by monetary policy settings and, more generally, by payments made to and from the Reserve Bank. Average settlement liquidity across the day has increased from around \$7 billion in the early 2000s to \$300 billion in 2021, following systemic changes involving the different components (Graph 6):

- In the late 1990s/early 2000s, settlement liquidity was mostly provided through intraday repos. Settlement liquidity grew broadly in line with settlement activity, averaging \$9 billion in 2006.
- At the onset of the global financial crisis in mid-2007, the increased use of intraday repos, and to a smaller extent larger precautionary ES balances held by members, resulted in settlement liquidity nearly doubling between

Graph 4



Graph 5



2006 and 2009, while RTGS settlement values only increased by around 10 per cent (RBA 2008). Settlement liquidity subsequently remained steady at around \$17 billion until 2013.

- In late 2013, ‘open repos’ were introduced to support the after-hours settlement of direct entry obligations when other sources of liquidity were unavailable, and largely replaced intraday repo use (Fraser and Gatty 2014). Settlement liquidity averaged \$28 billion by 2016.
- Since early 2020, the Reserve Bank’s policy measures to support the Australian economy through the COVID-19 pandemic have injected substantial liquidity into the financial system, meaning RITS members now hold large ES balances (Debelle 2021). Settlement liquidity averaged \$300 billion over 2021.
- From September 2021, RITS members settling after-hours FSS and direct entry obligations were allowed more flexibility in how they fund these payments, with open repo use no longer mandatory. Soon after, the majority of open repo positions were unwound; however, because of the large ES balances held, settlement liquidity has remained high, averaging over \$400 billion in January 2022 (Dowling 2021).

Changes in liquidity levels can have an impact on how quickly transactions are settled in RITS (time

spent waiting on the queue) and, consequently, on how quickly funds become available to members. If liquidity is low relative to the value of transactions being settled, then queue times are typically higher as payments wait for sufficient funds to settle. Over the history of RTGS, the amount of liquidity has generally risen relative to the value of settlements, contributing to lower queue times (Graph 7). For example, before open repos commenced in 2013, the ratio of settlement liquidity to value settled (the liquidity ratio) was around 7 per cent, while average queue times were around three minutes. Between 2014 and prior to the COVID-19 pandemic, the liquidity ratio was around 17 per cent and queue times were closer to one minute. As of 2021, average queue times were around 10 seconds.

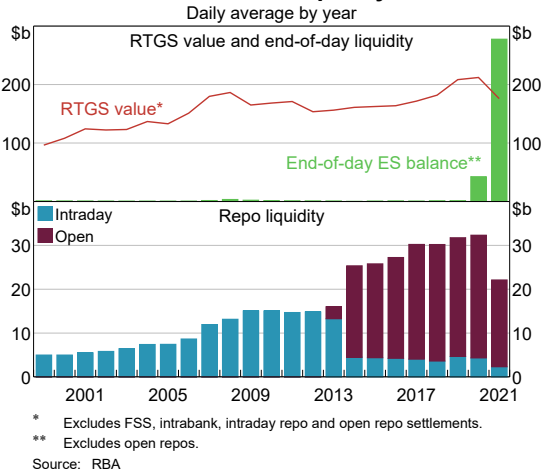
With increased liquidity there is less need for liquidity-saving mechanisms in RITS, one of which automatically offsets outstanding payments between two members. This mechanism (Auto-Offset) allows payments to be made using less funds as payment obligations are netted off against each other prior to settlement. Before the introduction of open repos in 2013, up to 30 per cent of value each day was settled this way, reducing to around 8 per cent after open repos and to around 1 per cent more recently (Graph 7).

The ongoing modernisation of RITS

The payments industry is undergoing rapid change as consumers and businesses demand faster, more

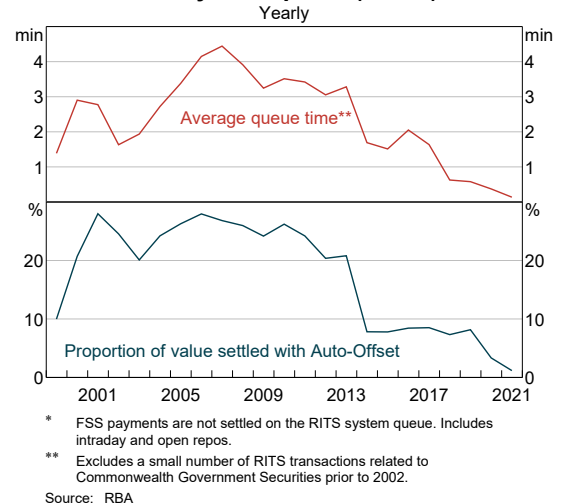
Graph 6

Settlement Liquidity



Graph 7

RITS system queue (RTGS)*



accessible and innovative payment methods. The Reserve Bank plays an important role in supporting this innovation by advancing RITS functionality in line with these changes. Some current and emerging areas of work for RITS include:

- *Maintaining a high level of security and resiliency in RITS as systemically important payments infrastructure.* For example, development of a third-site data bunker was recently completed, further minimising the risk of data loss in the event of a disruption to existing Reserve Bank systems. New security standards were also released in December 2021 to set additional requirements on RITS members for the effective management of RITS-related cyber risks.
- *Modernising RITS systems.* This will include expanding the support of payment messaging in RITS by adopting ISO 20022 – a modern and open messaging standard that encourages payments innovation through richer data and better interoperability with other payment systems in Australia and globally (Major and Mangano 2020).
- *Monitoring global developments to inform potential enhancements to RITS.* Current exploratory work includes participating with other central banks in initiatives led by the Bank for International Settlements Innovation Hub to explore the potential use of central bank digital currencies, and investigating the potential linkage of national fast payment systems. These have the overarching goal of facilitating faster, more transparent and cost-efficient cross-border payments.

Conclusion

RITS continues to underpin Australia's payments ecosystem and support the evolution and uptake of electronic payments in Australia. Key changes since the introduction of RTGS include same-day direct entry settlement, new external batches, property settlement functionality and extended settlement hours. The addition of the FSS to support the NPP has made 24/7 settlement available for a wider range of payments. RITS has also continued to operate reliably, including through periods of

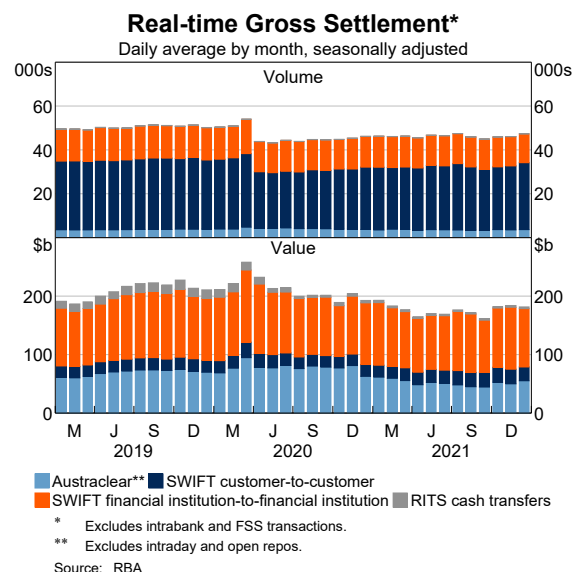
economic stress such as the global financial crisis and the COVID-19 pandemic. In doing so, it has supported safe and efficient settlement of payments between Australian consumers, businesses and government agencies. In coming years, the Reserve Bank will continue to uplift settlement services in line with the changing needs of the payments industry.

Appendix A: The impact of the COVID-19 pandemic on settlement activity

In the early stage of the pandemic in March 2020, RTGS activity in RITS spiked, reflecting a sharp increase in market volatility (Graph 8). Daily interbank settlement value reached a historical peak of around \$360 billion on 18 March 2020, which was about 73 per cent higher than the daily average value settled during 2019. After the initial spike, settlement activity fell and remained subdued, with declines in Austraclear and RITS payments accounting for around 85 per cent of the \$32 billion decline in daily average RTGS value between 2019 and 2021. In volume terms, daily average transactions fell 8 per cent over this period, mainly driven by a lower number of SWIFT customer-to-customer payments.

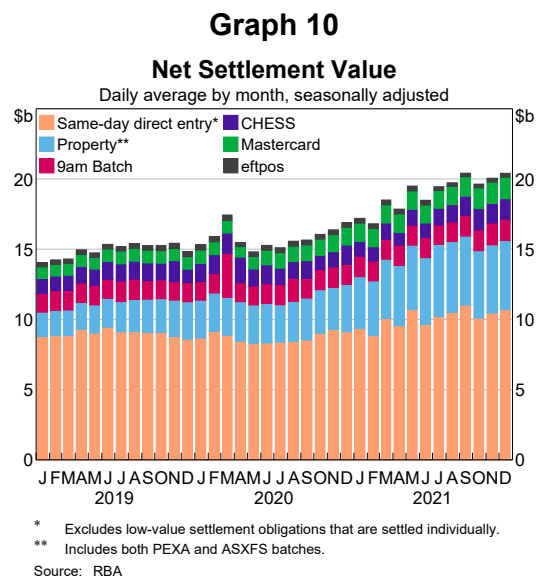
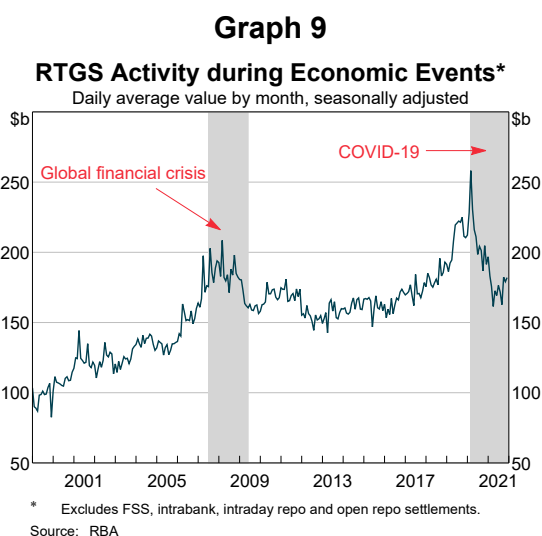
A brief comparison of RTGS settlement activity around the global financial crisis and the COVID-19 pandemic highlights the key difference between these two economic events (Graph 9). While the

Graph 8



financial crisis was triggered by systemic failures within the global financial system, COVID-19 is a public health emergency, which has also deeply impacted various aspects of the global economy. Settlement values initially increased at the onset of both events, reflecting volatility in financial markets and uncertainty among consumers. In line with global economic and market conditions, the period of heightened settlement activity was more drawn out during the financial crisis, lasting from mid-2007 to early 2009. In comparison, the COVID-19 pandemic resulted in a spike in activity, immediately followed by a sharp fall. In the period after the global financial crisis, wholesale settlement patterns were relatively stable at a lower level for a number of years before picking up again. With COVID-19, settlement values have largely remained subdued since early 2020, though look to have picked up in recent months.

While RTGS settlements in RITS declined noticeably with the onset of the pandemic, net settlement activity levelled out briefly and then quickly resumed growing (Graph 10). Although the value of net settlements can fluctuate for a number of reasons, some changes in spending habits related to the pandemic can be observed from the data. For example, as non-urgent elective surgeries were suspended in Australia in early 2020, there was a significant reduction in the value of Medicare refund payments settled in RITS. Similarly, as public health measures restricted movement, settlements related to cash withdrawals from ATMs declined temporarily around April 2020. Other net settlement activity such as direct entry payments decreased slightly in value in early 2020, but soon recovered to pre-pandemic levels and continued to broadly trend upward despite subsequent lockdowns and pandemic restrictions. ↘



Endnotes

- [*] The authors are from Payments Settlements Department. The authors would like to thank Emilie Fitzgerald, John Bagnall, Kylie Stewart and Sean Dowling for their helpful comments and suggestions.
- [1] RITS is an approved RTGS system under the *Payment Systems and Netting Act 1998*. Payments settled in RITS cannot later be unwound. See RBA (2021a) for further details.
- [2] Excluding details of the FSS that have been discussed in previous Bulletin articles. See FSS articles Rush and Louw (2018), Fitzgerald and Rush (2020).
- [3] Society for Worldwide Interbank Financial Telecommunication (SWIFT) is a co-operative organisation that operates a network for the exchange of payment and other financial messages between financial institutions.
- [4] The Austraclear feeder system is operated by Austraclear Limited, a wholly owned subsidiary of ASX Limited.
- [5] Foreign exchange settlement risk is the risk that one party to a foreign exchange transaction will pay the currency it sold but will not receive the currency it bought. See BIS (1996).

- [6] See also 'The Reserve Bank's Strategic Review of Innovation in the Payment System' in RBA (2012).
- [7] This excludes a number of RITS members that do not hold an ESA but belong to RITS for the purpose of being an eligible counterparty of the Reserve Bank in its domestic market operations or being a Batch Administrator. At present, five members administer external batch arrangements. Until 2018, banks were required to hold an ESA whether or not they used an agent to settle their RTGS transactions (RBA 2018).
- [8] Members are required to settle payment obligations using their own ESA if their aggregate high-value payments exceed 0.25 per cent of the total value of RTGS payments settled in RITS. See RBA (undated).
- [9] RITS opens at 7:30 am each weekday, although the majority of RTGS transactions are settled between 9:15 am and 4:30 pm. See 'Box B: The RTGS Operating Day' in Gallagher, Gauntlett and Sunner (2010).

References

- BIS (Bank for International Settlements) (1996), 'Settlement Risk in Foreign Exchange Transactions', Report prepared by the Committee on Payment and Settlement Systems of the Central Banks of the Group of Ten Countries, March.
- Debelle G (2021), 'Monetary Policy During COVID', Shann Memorial Lecture, Online, 6 May.
- De Freitas G and E Fitzgerald (2021), 'Property Settlement in RITS', *RBA Bulletin*, March.
- Dowling S (2021), 'Recent Changes to the Reserve Bank's Liquidity Operations', *RBA Bulletin*, December.
- Fraser S and A Gatty (2014), 'The Introduction of Same-day Settlement of Direct Entry Obligations in Australia', *RBA Bulletin*, June, pp 55–64.
- Fitzgerald E and A Rush (2020), 'Two Years of Fast Payments in Australia', *RBA Bulletin*, March.
- Gallagher P, J Gauntlett and D Sunner (2010), 'Real-time Gross Settlement in Australia', *RBA Bulletin*, September, pp 61–70.
- Major T and J Mangano (2020), 'Modernising Payments Messaging: The ISO 20022 Standard', *RBA Bulletin*, September.
- Reserve Bank of Australia (RBA) (2008), 'The Balance Sheet and Operations in Financial Markets', *Annual Report*, August.
- RBA (2012), 'Strategic Review of Innovation in the Payments System: Conclusions', June, pp 25–27.
- RBA (2015), 'Continuous Linked Settlement: RITS Session Times and Operational Arrangements', July.
- RBA (2018), 'Payments System Issues: Exchange Settlement Account Policy', Media Release No 2018-06, 20 March.
- RBA (2021a), 'An Assessment of the Reserve Bank Information and Transfer System', May, p 4.
- RBA (2021b), 'Exchange Settlement Accounts for ESA Holders Eligible to use an RTGS Agent', August.
- RBA (undated), 'Exchange Settlement Account Policy'.
- Rush A and R Louw (2018), 'The New Payments Platform and Fast Settlement Service', *RBA Bulletin*, September.

Exploring the 'Confidence Gap'

Joyce Tan^[*]

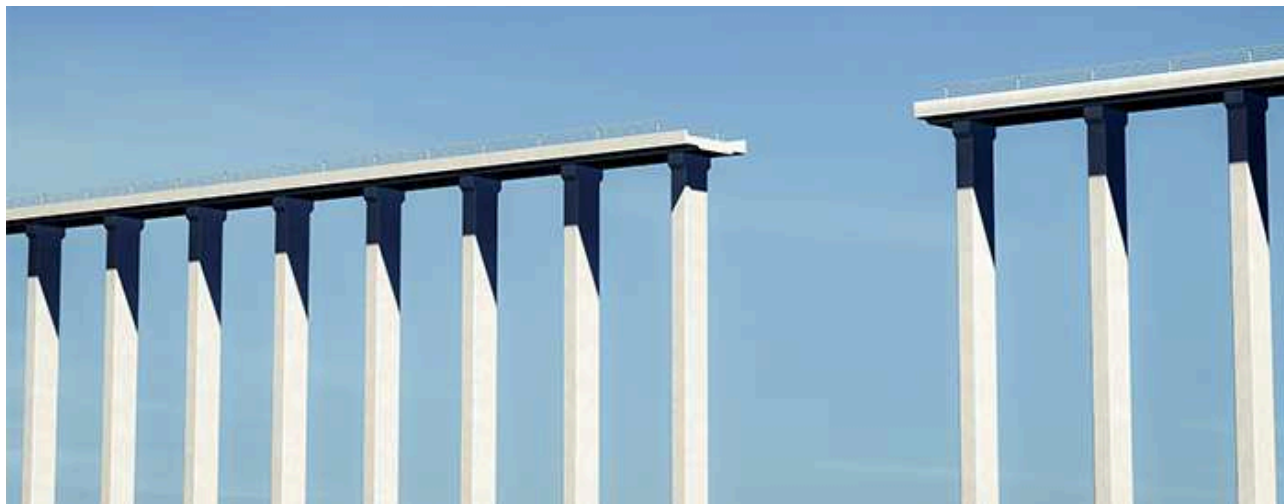


Photo: artpartner-images – Getty Images

Abstract

Previous Reserve Bank research has shown that female students and students from less advantaged backgrounds are more likely to report having a poor understanding of economics and lower confidence in their economics proficiency than other students. This is consistent with their falling participation in the subject. Using data from a survey administered by the Bank, this article investigates whether these negative perceptions are in line with students' observed proficiency or whether there is a 'confidence gap'. It finds that females continue to report having poorer understanding and less confidence even after accounting for their observed proficiency, indicating a confidence gap. By contrast, students' self-perceptions by socio-economic status look to be in line with variations in their observed proficiency. These findings have implications for the design of interventions to encourage greater participation by these students and support increased diversity amongst the economics student body.

Introduction

The diversity amongst students studying high school economics in Australia has fallen significantly over the past few decades (Dwyer 2017; Livermore and Major 2020). In particular, the share of female students and those from lower socio-economic backgrounds has been trending downwards sharply. Consistent with this, students from these groups tend to have less favourable perceptions of economics – that is, they are less likely to report having a good understanding of economics, less

likely to feel confident in their ability to study the subject and more likely to perceive greater risks with doing so because they do not know what it is about or where it will lead (Livermore and Major 2020, 2021).

Self-perceptions tend to influence students' decisions to undertake further study in a particular field (Perez-Felkner, Nix and Thomas 2017; Parker *et al* 2012). It is therefore useful to investigate whether differences in students' *self-perceived* proficiency in economics by sex and socio-economic status are in

line with differences in their *observed* proficiency or whether there is a 'confidence gap'. In other words, do female students or those from less advantaged backgrounds tend to underestimate their own proficiency? Identifying confidence gaps amongst these groups can inform the design of interventions aimed at increasing participation in economics and encouraging a more diverse group of students to pursue further study or a career in this field. Greater diversity has been shown to improve the performance of teams, decision-makers and businesses more generally (Woolley *et al* 2010; Hoogendoorn, Oosterbeek and van Praag 2013). This influence on performance is important given those with economics backgrounds often go on to work in roles where their decisions affect many people. Furthermore, as those who study economics shape the discipline and are involved in setting public policies, there are wider social benefits when they are more representative of society (Dwyer 2018; Bayer and Wilcox 2017).

What we already know about confidence gaps

Much of the literature on confidence gaps has focused on the differences between genders in non-economics fields and their implications. Females typically rate their ability more negatively than males in an array of disciplines, including science, technology, engineering and mathematics (STEM), even after accounting for their actual ability (Anaya, Stafford and Zamarro 2021). This can adversely affect enrolments in these disciplines (Kanny, Sax and Riggers-Piehl 2014).

There is also evidence that the confidence gap persists beyond schooling years. Sarsons and Xu (2015) found that female economists at top US universities continue to be less confident than their male counterparts even after controlling for their educational background and achievements in academia. However, relatively few studies examine confidence gaps between those from higher and lower socio-economic backgrounds; those that do typically find that socio-economic status is positively correlated with a student's confidence in their ability (Filippin and Paccagnella 2012; Seyedi-Andi *et al* 2019).

Similarly, studies on the *drivers* of confidence gaps have primarily focused on gender-related differences rather than socio-economic status. Research into the gender confidence gap generally attributes it to both intrinsic factors (reflecting inherent gender differences) and environmental factors. Intrinsic factors include the tendency for females to update their beliefs about their ability more conservatively than males after receiving positive feedback, resulting in lower confidence overall (Mobius *et al* 2011). External factors include societal stereotypes about gender differences in 'innate' ability (with males perceived to be naturally better at STEM subjects) (Xie, Fang and Shauman 2015; Heyder, Steinmayr and Kessels 2019). Karaarslan and Sungur (2011) posited that students from higher socio-economic backgrounds may report greater confidence in their abilities because they are more likely to have access to intellectually stimulating home environments (e.g. access to more books) than those who are less well-off; however, they did not account for the role of students' actual ability in their analysis.

Surveying economic proficiency

To understand how students' self-perceived proficiency varies after accounting for their observed proficiency, this research drew on information from a survey administered by the Reserve Bank of Australia (RBA) in 2021. The survey was initially conducted as part of a randomised control trial to assess the effectiveness of the RBA's school talks program (where RBA economists discuss and answer questions on monetary policy and current economic conditions) (Rickards 2021).^[1] The dataset comprises the survey responses from almost 2,000 Year 11 and 12 economics students at 75 schools across Australia. Each student's response to the survey was augmented with data from the Australian Curriculum, Assessment and Reporting Authority (ACARA) on the characteristics of the student's school, and information on each teacher's sex.^[2] The variables in the dataset can be broadly grouped into three categories:

- *Student-, teacher- and school-level characteristics* – including the student's self-reported sex and

year level, the teacher's sex and the school's type and socio-economic profile.^[3]

- *Students' self-perceived proficiency* – students were asked to rate their understanding of economics and confidence in the subject on a scale of 1 to 5 (lowest to highest rating). Specifically, students rated their 'understanding of monetary policy', 'understanding of current economic conditions' and 'confidence in understanding and completing their economics subject'.
- *Students' observed proficiency* – students received a score (expressed as a percentage) based on their performance on a series of knowledge-based multiple choice questions. These questions – listed in Appendix A – tested their understanding of economic concepts, including the transmission of monetary policy, inflation and unemployment. This score was used as a proxy for their economic proficiency at the current point in time.

There are two main caveats with using these survey data:

1. The surveyed schools are a subset of those schools that offer economics and were confined to those that have participated in the RBA's school talks program. The surveyed population was slightly more skewed towards students from higher socio-economic backgrounds. While school talks are offered to all schools, participation in both the talks and the survey tended to be greater amongst more advantaged schools, potentially because these schools are better resourced and so are more able to participate (particularly in online activities). The surveyed students were more likely to come from independent schools and single-sex schools than the overall Year 11 and 12 economics cohort, and all attended schools in metropolitan areas.^[4]
2. Measurement of students' self-assessed and current economic proficiency was based only on their responses to questions on macroeconomic topics, such as monetary policy and unemployment. While this is likely to be a reasonable indicator of their economic

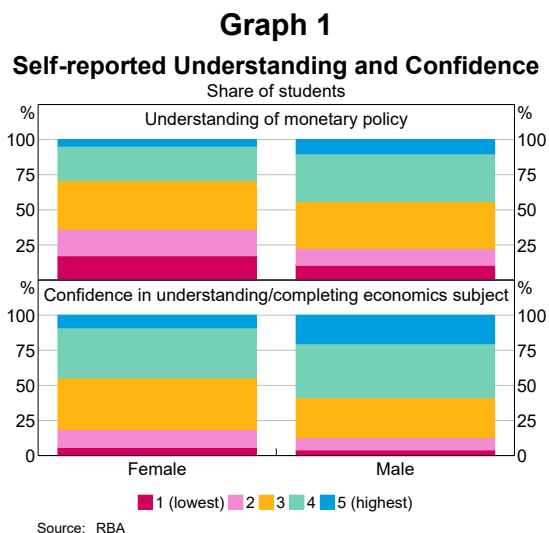
proficiency, it is a less comprehensive measure of economics understanding than a measure that also captures microeconomic topics.

Stylised facts on self-perceived and observed proficiency

Comparing female and male students

Without controlling for any other characteristics, female students were more likely to report having a lower understanding of economics and less confidence in the subject than males (Graph 1). For example, the share of females reporting a *poor* understanding of monetary policy (a rating of 1 or 2) was around 35 per cent, compared to just over 20 per cent for males (top panel of Graph 1). Additionally, the share of females reporting a *good* understanding (a rating of 4 or 5) was smaller at 30 per cent, compared to 45 per cent for males. This is consistent with the findings in Livermore and Major (2020, 2021).

Females remained more likely to report having a poorer understanding of economics than males irrespective of whether they attended a co-educational or single-sex school (Graph 2). That said, the difference between the shares of male and female students rating their economics understanding a 1 or 2 was greater at co-educational than single-sex schools.^[5] Females at co-educational schools were much more likely to give themselves lower ratings than other students. These results continued to hold even when



considering students' responses to the other 'self-perception' questions on the survey, such as their understanding of current economic conditions.

Using performance on the knowledge-based questions as a proxy for current proficiency, female students in the sample also tended to score lower than males at both co-educational and single-sex schools (Graph 3). At co-educational schools, around one-quarter of females achieved a high score above 75 per cent (dark teal bars) in the test, compared to over 35 per cent of males. Similarly, at single-sex schools, two-fifths of female students achieved a score above 75 per cent, relative to over half of males. The share of students with low scores below 25 per cent (dark orange bars) was greatest for females at co-educational schools but was relatively similar for female and male students at single-sex schools.

By socio-economic status

Students who reported having a good understanding of economics and greater confidence were more likely to come from more advantaged backgrounds (Graph 4). For instance, around one-quarter of students who rated their understanding of monetary policy a 5 had an Index of Community Socio-educational Advantage (ICSEA) score above 1,200, compared with only 5 per cent of those who selected a rating of 1.^[6] The ICSEA score measures the socio-educational background of a school and accounts for factors including parental occupation and education, as

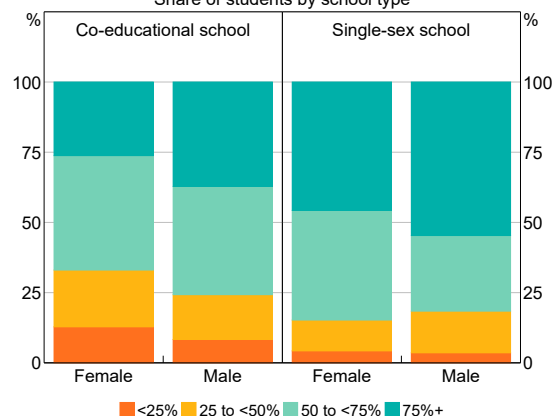
well as the school's geographical location. The median ICSEA score is 1,000 and the standard deviation is 100. However, the schools offering economics, and therefore our sample, tend to be more advantaged with a median ICSEA score of around 1,100.

Students who performed well on the knowledge-based survey questions also tended to come from more advantaged schools (Graph 5). For example, around one-quarter of students with a score above 75 per cent attended a school with an ICSEA score above 1,200, compared to around 5 per cent of students who scored below 25 per cent.

Graph 3

Distribution of Scores*

Share of students by school type

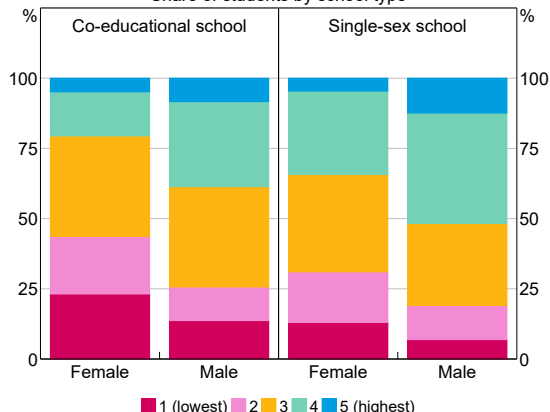


* Based on performance on knowledge-based questions. Sources: ACARA; RBA

Graph 2

Self-reported Understanding of Monetary Policy

Share of students by school type

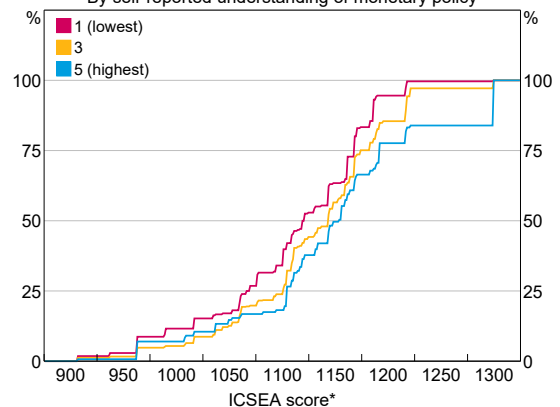


Sources: ACARA; RBA

Graph 4

Socio-economic Distribution

By self-reported understanding of monetary policy



* Measure of students' socio-educational background. Sources: ACARA; RBA

Identifying a confidence gap

The findings in the previous section showed that females and students from lower socio-economic backgrounds tended to have more negative perceptions of their economics understanding *and* also performed worse than other students on the set of knowledge-based questions in the survey. However, this does not tell us whether there is a confidence gap. To identify whether a confidence gap exists, it must be established that female and/or less advantaged students are systematically under-assessing their proficiency. To answer this question, the analysis examined how a student's self-perception correlated with being female and their socio-economic status before and after accounting for their observed proficiency, also controlling for other student- and school-level characteristics.^[7] The control variables included each student's year level (as Year 12 students may view their economics understanding more favourably given their greater exposure to economics-related content than Year 11 students), the school type (co-educational or single-sex schools) and the state location of the school.

As the dependent variable – namely, students' self-reported understanding or confidence – is a discrete and ordered variable taking the values of 1 to 5, an ordinal logistic regression was employed and the results are presented as average marginal effects.^[8] The estimated models are presented in Appendix B as 'odds ratios' – that is, the exponent of

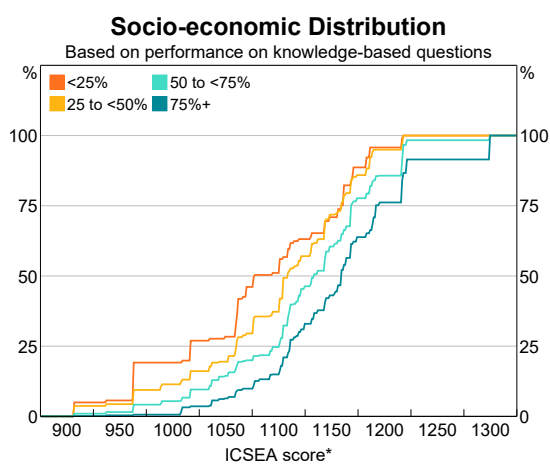
the estimated coefficient in the model. The results reported below used students' self-perceived understanding of monetary policy as the dependent variable as this most closely aligned with the topics that the knowledge-based questions covered. The findings are robust to using students' confidence in their ability to study their economics subject as the dependent variable. The results are also consistent when considering a partial proportional odds model (presented in Appendix B).

Amongst female students

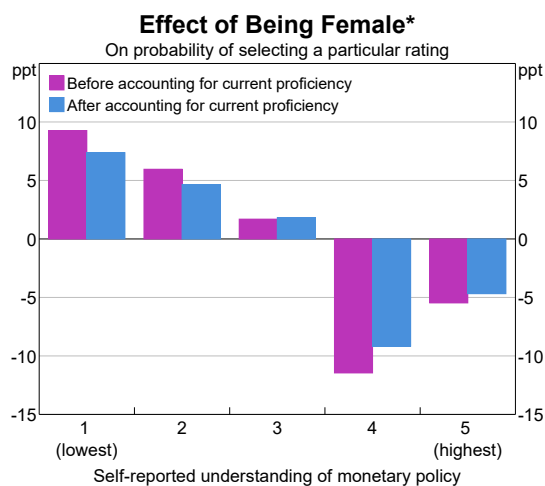
In line with the correlations presented above, females were statistically significantly more likely to report having a poorer understanding of monetary policy than males even after accounting for other characteristics (Graph 6). In a model that does not control for students' observed proficiency (pink bars), female students were around 9 percentage points more likely than males to rate their understanding of monetary policy a 1 (lowest rating) and more than 5 percentage points less likely to select a rating of 5 (highest rating) on average.

Importantly, the gap for female students remained even after accounting for students' observed proficiency (blue bars). Females continued to be more likely than males to choose a lower rating for their self-perceived understanding and less likely to choose a higher rating. The gap remained

Graph 5



Graph 6



statistically significant but narrowed relative to the previous model (which excludes a variable measuring students' observed proficiency). In this second model, females were 7½ percentage points more likely to rate their understanding a 1 and around 4½ percentage points less likely to rate it a 5 on average. This provides evidence of a confidence gap for female students that exists over and above the influence of their observed proficiency.

By socio-economic status

In a model that does not control for observed proficiency, students from more advantaged backgrounds were statistically significantly more likely to report having a good understanding of economics and greater confidence in the subject. However, the correlation between socio-economic status and self-perceived proficiency was no longer statistically significant after accounting for students' observed proficiency in the model. This suggests that the tendency for students from more advantaged backgrounds to have more positive perceptions of their understanding and greater confidence (Graph 4) was in line with their tendency to perform better on the survey (Graph 5). This does not necessarily imply that students at more advantaged schools are inherently more talented, as other factors such as the school's access to resources are likely contributing to the outcome.

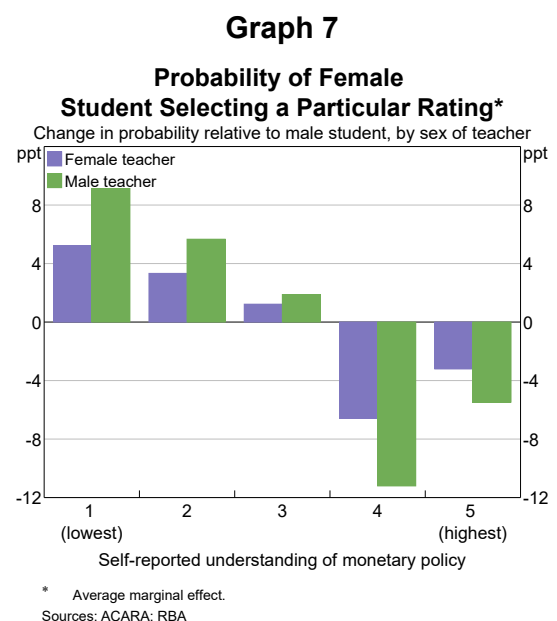
Role of teachers

The presence of a confidence gap for female students may implicitly deter some female students from studying economics at university and contribute to the low share of female enrolments (as has been the case for STEM subjects). Accordingly, it is useful to consider interventions that seek to narrow the confidence gap. One option is to increase the presence of female role models. Studies have shown that having a female teacher improved female students' self-perceived proficiency in both the mathematics and science fields but had little impact on male students (Xu and Li 2018; Cotner *et al* 2011).

Overall, female students with female teachers (purple bars) tended to have more positive

perceptions of their understanding compared with females with male teachers (green bars) even after controlling for observed proficiency (Graph 7). Female students were around 9 percentage points more likely to rate their understanding a 1 if they were taught by a *male* teacher (relative to male students). The presence of a *female* teacher lessened this gap to 5 percentage points. Additionally, female students with male teachers were around 5½ percentage points less likely to rate their understanding a '5' (compared to male students) but the gap closed somewhat (to 3 percentage points less likely) when taught by a female teacher.

However, irrespective of the sex of the teacher, female students continued to have more negative self-perceptions than male students. They were still more likely to report lower ratings (illustrated by the positive bars associated with the lower ratings) and less likely to report higher ratings (shown by the negative bars). This suggests that the confidence gap may be narrowed but not eliminated when female students are taught by a female teacher. For male students, the teacher's sex did not appear to have a statistically significant impact on their self-perceived proficiency. These findings are consistent with those in other studies for other disciplines.



Implications

As the presence of confidence gap for female students may inhibit female students from pursuing further study in economics and exacerbate their under-representation in economics enrolments, it is important for the economics community to consider how to address this issue. The finding that female teachers have a positive impact on female students' self-perceptions suggests one possible intervention is to increase the presence of female role models. This could be in the form of more female teachers, more publicly visible female economists or more effort by the RBA to have female presenters deliver school talks or advocate for economics.

Furthermore, this analysis indicates that the tendency for less advantaged students to report having a poor understanding of and low confidence in economics is in line with their tendency to perform less well at the subject. This suggests that measures aimed at boosting economics understanding will likely benefit these students. In particular, Rickards (2021) found that the RBA's school talks improved both students' self-perceived and actual economics understanding. Thus, the RBA could further expand, refine and raise awareness of its school talks program and suite of online student resources with an emphasis on targeting less advantaged schools.

Conclusion

Both female and less advantaged students tend to express having a poorer understanding of economics and lower confidence in the subject relative to other students. After accounting for students' observed proficiency, however, these negative perceptions persist only for females. This suggests there is a confidence gap for female students. This gap can act as an implicit barrier, deterring female students from entering the economics discipline. For students from less advantaged backgrounds, their tendency to hold less favourable self-perceptions appears to be consistent with their poorer performance in the subject than those from higher socio-economic backgrounds.

These findings suggest that interventions intended to narrow the confidence gap for female students are likely to have positive effects on females looking to study economics or work in the economics profession. For example, both the RBA and those working in the economics field could consider increasing the representation of female role models amongst their economists, female economics teachers and female advocates for economics in the public domain. Finally, students from less advantaged schools (which may be less well-resourced) could benefit from interventions aimed at increasing their actual understanding of the subject through active engagement with activities and resources that are designed to improve learning outcomes.

Appendix A: Knowledge-based questions on student survey

There were two surveys in total with each student given one survey out of the two options. The surveys were largely identical but there were slight

variations to some questions. For the full set of survey questions, see Rickards (2021).

Table A1: Knowledge-based Questions on Student Survey

Question	Response options
Imagine that you've just received a pay rise of 2% at your job. Inflation is expected to be 3% per year. After one year, would you be able to buy more than today, exactly the same as today, or less than today with your pay?	More than today Exactly the same as today Less than today Not sure
OR	
Imagine that the interest rate on your savings account was 3% per year and inflation was 2% per year. After one year, would you be able to buy more than today, exactly the same as today, or less than today with the money in this account?	
What is the Reserve Bank's inflation target? Inflation between:	0 – 1 per cent 1 – 2 per cent 2 – 3 per cent 3 – 4 per cent 4 – 5 per cent 5 – 6 per cent Not sure
Throughout 2020 and the COVID pandemic, the unemployment rate was: <i>(Hint: the NAIRU is the level of the unemployment rate where inflation is stable and in-line with the RBA's inflation target)</i>	Below the NAIRU (natural rate) At the NAIRU (natural rate) Above the NAIRU (natural rate) Not sure
Throughout 2020 and the COVID pandemic, the inflation rate was:	Below the RBA's target range Within the RBA's target range Above the RBA's target range Not sure
When the RBA changes monetary policy, it mainly influences ...?	Taxes Government spending Interest rates Not sure
It's decision time! It is 2025 and Philip Lowe, Governor of the Reserve Bank, is asking you for advice on what to do with the cash rate. The unemployment rate is 8 per cent and inflation is 1 per cent. To help the RBA board fulfil their mandates, what should you tell Phil?	Increase the cash rate Don't change the cash rate Decrease the cash rate Not sure
OR	
After acing your Economics subject, Phillip Lowe has asked you to join the RBA Board. Inflation is 4 per cent and the unemployment rate is 2 per cent. Keeping in mind the RBA's objectives, what should you and the RBA board do?	
If the RBA decided to raise the cash rate (make monetary policy more contractionary), what would likely happen to the unemployment rate?	Decrease Stay the same Increase Not sure
If the RBA decided to lower the cash rate (make monetary policy more expansionary), what would likely happen to housing prices?	Decrease Stay the same Increase Not sure
If the RBA decided to lower the cash rate, what would typically happen to the exchange rate ?	Depreciation Stay the same Appreciation Not sure
OR	
If the RBA decided to raise the cash rate, what would typically happen to the	

Question	Response options
exchange rate?	
Imagine that you have passed the driving test and have just got your provisional license. You have bought a new car to cruise around in. To pay for the car you took out a loan with an interest rate of 5 per cent. If the RBA lowers the cash rate, what do you expect to happen to the interest rate on your car loan and the repayments you must make?	Increase Decrease Stay the same Not sure
OR	OR
Let's flash forward a little bit. You've been CEO of the hottest tech start-up in Australia for the past few years, researching clean energy. You've decided to reward yourself and buy a house, borrowing money from the bank and taking out a variable-rate mortgage. A year later, the RBA lowers the cash rate. What will the RBA decision likely do to your monthly loan repayments, and your disposable income? (Hint: your disposable income is your income after taxes and interest)	Increase my monthly repayments, decrease my disposable income Decrease my monthly repayments, decrease my disposable income Increase my monthly repayments, increase my disposable income Decrease my monthly repayments, increase my disposable income Not sure
Congratulations! Your application to work at the RBA just got accepted. After a few months of working you have some savings in your bank account. The RBA then decides to raise the cash rate. What would this RBA cash rate decision do to your likelihood of spending money on a car?	More likely to spend money on a car Less likely to spend money on a car Not sure
OR	
Imagine that you own an apple-picking business in Australia and would like to borrow money to invest in more apple-picking machines. The RBA decides to increase the cash rate. How is this likely to change your decision?	
What typically happens to Australian asset prices and wealth when the RBA lowers the cash rate?	Asset prices and wealth decrease No change to asset prices and wealth Asset prices and wealth increase Not sure
How would you describe the RBA's overall stance of monetary policy over 2020 and the COVID pandemic?	Expansionary (trying to speed-up the economy) Neutral Contractionary (trying to slow-down the economy) Not sure
How would you describe the Government's overall stance of fiscal policy over 2020 and the COVID pandemic?	Expansionary (trying to speed-up the economy) Neutral Contractionary (trying to slow-down the economy) Not sure

Appendix B: Regression results

The odds ratios for each variable is measured as the odds of a student choosing a specific rating or a higher rating for their self-reported understanding or confidence relative to the odds they choose a

lower rating. An odds ratio above (below) 1 for a particular explanatory variable suggests a student with that characteristic is more (less) likely to choose a higher rating.

Table B1: Ordinal Logistic Regression Results

Odds ratios^(a)

	Understanding of monetary policy	Understanding of monetary policy	Self-reported Confidence in understanding and completing economics subject	Confidence in understanding and completing economics subject
Observed proficiency ^(b)		1.04***		1.03***
Female indicator	0.42***	0.46***	0.49***	0.53***

	Self-reported			
	Understanding of monetary policy	Understanding of monetary policy	Confidence in understanding and completing economics subject	Confidence in understanding and completing economics subject
ICSEA score	1.16**	0.90	1.17**	0.97
Single-sex school indicator	1.50***	1.39***	1.29***	1.22**
Year 12 indicator	5.05***	3.07***	1.66***	1.08
NSW indicator	3.76***	3.37***	1.48**	1.25
QLD indicator	1.75***	2.32***	1.39*	1.59**
VIC indicator	0.88	0.94	0.86	0.86

(a) **,*** denotes statistical significance at the 10, 5 and 1 per cent levels; robust standard errors.

(b) Using performance across knowledge-based questions as the measure of current proficiency.

Sources: ACARA; RBA

Robustness check using a partial proportional odds model

One caveat with using the ordinal logistic model is that it is underpinned by the proportional odds (PO) assumption. This assumption implies that the estimated coefficient for each explanatory variable is the same across all outcomes of the dependent variable. Specifically, the coefficient in a specification that describes the odds of a student rating their understanding a 1 over a higher category will be the same as the coefficient that describes the odds of a student rating their

understanding a 2 over a higher category. A Brant test suggests the assumption does not hold for these specified models, although the PO assumption is often violated in practice (Williams 2006). The study therefore also considered a partial proportional odds model that relaxed the assumption and allowed some coefficients to differ. The findings for females and socio-economic status are almost identical to those from the ordinal logistic model. This is because the few variables that violate the PO assumption were control variables instead of variables of interest. ↘

Table B2: Partial Proportional Odds Regression Results

Odds ratio^(a)

	Dependent variable: Self-reported understanding of monetary policy			
	Rating of 2 and above (relative to lower rating)	Rating of 3 and above (relative to lower rating)	Rating of 4 and above (relative to lower rating)	Rating of 5 (relative to lower rating)
Observed proficiency ^(b)	1.05***	1.04***	1.04***	1.01***
Female indicator	0.44***	0.44***	0.44***	0.44***
ICSEA score (/100)	0.91	0.91	0.91	0.91
Single-sex school indicator	1.40***	1.40***	1.40***	1.40***
Year 12 indicator	4.12***	3.29***	2.70***	1.94***
NSW indicator	3.55***	3.55***	3.55***	3.55***
QLD indicator	2.31***	2.31***	2.31***	2.31***
VIC indicator	0.94	0.94	0.94	0.94

(a) **,*** denotes statistical significance at the 10, 5 and 1 per cent levels; robust standard errors; only the 'observed proficiency' and 'Year 12 indicator' variables violated the proportional odds assumption and therefore have different coefficients.

(b) Using performance across knowledge-based questions as the measure of current proficiency.

Sources: ACARA; RBA

Endnotes

- [*] The author completed this work while in the Public Access and Education team. The author is grateful for assistance and guidance from Keaton Jenner, Benjamin Beckers, Jacqui Dwyer, Richard Evans, Ryan Couston, Christina You and members of the Educators Advisory Panel.
- [1] The original survey was administered such that students completed two surveys (some students completed a survey before and after an RBA school talk, while others completed both surveys before the school talk); however, as this study was interested in students' self-perceptions and observed proficiency prior to any treatment, only responses from the first completed survey, for which there was a larger sample, were used.
- [2] This question was not part of the original survey; rather, the teacher's sex was inferred from the details of the Bank's correspondence with the school and existing teacher relationships. It was not possible to infer the teacher's sex for schools that accounted for around 2 per cent of the student sample. This was partly because some names were unisex and there were multiple contacts at some schools.
- [3] Students were asked 'how would you describe your gender?' with four response options: 'male'; 'female'; 'other'; and 'prefer not to say'. However, this study only included students who identified as either male or female in the analysis, given the small number of students reporting non-binary genders or indicating they 'prefer not to say'.
- [4] Due to the limited availability of economics enrolments data, data on New South Wales Year 11 and 12 economics enrolments was used as a proxy for the overall Year 11 and Year 12 economics cohort.
- [5] This is consistent with Sullivan (2009) who found that attending a single-sex school reduced the gender gap in students' self-confidence.
- [6] The distribution of ICSEA scores for the sample was skewed towards schools with higher socio-economic backgrounds. This reflects the fact that schools that offer economics tend to be more advantaged.
- [7] This analysis focuses on the correlation between self-perceived and observed proficiency as opposed to establishing the direction of causality. For example, consistently achieving high marks may cause a student to rate their understanding more highly. On the other hand, a student who lacks confidence may work harder thereby improving their performance. Data limitations prevented further investigation into the nature of the causality.
- [8] Ordinary least squares is no longer appropriate as it requires the dependent variable to be a continuous variable. Results are presented as marginal effects because the non-linear nature of the logit model means that the estimated coefficients do not have intuitive interpretations. Calculation of average marginal effects involves computing the marginal effect for each observation and averaging it across all observations. Marginal effects differ across observations in non-linear models as they depend on the values of the other explanatory variables.

References

- Anaya L, Stafford F and Zamorro G (2021), 'Gender Gaps in Math Performance, Perceived Mathematical Ability and College Stem Education: The Role of Parental Occupation', *Education Economics*, pp 1–16.
- Bayer A and D Wilcox (2017), 'The Unequal Distribution of Economic Education: A Report on the Race, Ethnicity, and Gender of Economics Majors at US Colleges and Universities', Board of Governors of the Federal Reserve System Finance and Economics Discussion Series 2017-105.
- Cotner S, C Ballen, DC Brooks and R Moore (2011), 'Instructor Gender and Student Confidence in the Sciences: A Need for More Role Models?', *Journal of College Science Teaching*, 40(5), pp 96–101.
- Dwyer J (2017), 'Studying Economics: The Decline in Enrolments and Why it Matters', Address to the Business Educators Australasia Annual Council Meeting, Sydney, 29 July.
- Dwyer J (2018), 'What Happened to the Study of Economics?', Address to the Business Educators Australasia Annual Council Meeting, Sydney, 26 May.
- Filippin A and M Paccagnella (2012), 'Family Background, Self-confidence and Economic Outcomes', *Economics of Education Review*, 31(5), pp 824–834.

- Heyder A, R Steinmayr and U Kessels (2019), 'Do Teachers' Beliefs about Math Aptitude and Brilliance Explain Gender Differences in Children's Math Ability Self-concept?', *Frontiers in Education*, 4, pp 34.
- Hoogendoorn S, H Oosterbeek and M van Praag (2013), 'The Impact of Gender Diversity on the Performance of Business Teams: Evidence from a Field Experiment', *Management Science*, 59(7), pp 1514–1528.
- Kanny MA, LJ Sax and TA Riggers-Piehl (2014), 'Investigating Forty Years of STEM Research: How Explanations for the Gender Gap Have Evolved Over Time', *Journal of Women and Minorities in Science and Engineering*, 20(2), pp 127–148.
- Karaarslan G and S Sungur (2011), 'Elementary Students' Self-efficacy Beliefs in Science: Role of Grade Level, Gender, and Socio-economic Status', *Science Education International*, 22(1), pp 72–79.
- Livermore T and M Major (2020), 'Why Study (or Not Study) Economics? A Survey of High School Students', *RBA Bulletin*, June.
- Livermore T and M Major (2021), 'What Is Driving Participation and Diversity Trends in Economics? A Survey of High School Students', RBA Research Discussion Paper No 2021-06.
- Mobius MM, M Niederle, P Niehaus and TS Rosenblat (2011), 'Managing Self-confidence: Theory and Experimental Evidence', National Bureau of Economic Research, Working Paper No 17014.
- Parker PD, I Schoon, Y-M Tsai, G Nagy, U Trautwein and JS Eccles (2012), 'Achievement, Agency, Gender, and Socioeconomic Background as Predictors of Postschool Choices: A Multicontext Study', *Developmental Psychology*, 48(6), pp 1629–1642.
- Perez-Felkner L, S Nix and K Thomas (2017), 'Gendered Pathways: How Mathematics Ability Beliefs Shape Secondary and Postsecondary Course and Degree Field Choices', *Frontiers in Psychology*, 8, Art 386.
- Rickards P (2021), 'Do RBA School Talks Improve Student Outcomes?', *RBA Bulletin*, December.
- Sarsons H and G Xu (2015), 'Confidence Men? Evidence among Top Economists', Working Paper.
- Seyedi-Andi SJ, F Bakouei, HA Rad, S Khafri and A Salavati (2019), 'The Relationship Between Self-efficacy and Some Demographic and Socioeconomic Variables among Iranian Medical Sciences Students', *Advances in Medical Education and Practice*, 10, pp 645–651.
- Sullivan A (2009), 'Academic Self-concept, Gender and Single-sex Schooling', *British Educational Research Journal*, 35(2), pp 259–288.
- Williams R (2006), 'Generalized Order Logit/Partial Proportional Odds Models for Ordinal Dependent Variables', *The Stata Journal*, 6(1), pp 58–82.
- Woolley AW, CF Chabris, A Pentland, N Hashmi and TW Malone (2010), 'Evidence for a Collective Intelligence Factor in the Performance of Human Groups', *Science*, 330(6004), pp 686–688.
- Xie Y, M Fang and K Shauman (2015), 'STEM Education', *Annual Review of Sociology*, 41, pp 331–357.
- Xu D and Q Li (2018), 'Gender Achievement Gaps among Chinese Middle School Students and the Role of Teachers' Gender', *Economics of Education Review*, 67, pp 82–93.

Tracking Consumption during the COVID-19 Pandemic

Rosa Bishop, John Boulter and Tom Rosewall^[*]



Photo: Alan Powdrill – Getty Images

Abstract

The COVID-19 pandemic was an unprecedented shock to the economy that caused large and unexpected changes in household spending behaviour. Restrictions on household activity limited opportunities to consume services and people switched to purchasing more goods. The recovery in consumption was much stronger than expected earlier in the pandemic because households quickly adapted to the pandemic shock with the support of significant fiscal and monetary policy measures. This article examines household spending during the pandemic using a range of sources of information that have enabled the Reserve Bank of Australia to track consumption in a timely way.

Introduction

Changes in economic activity during the COVID-19 pandemic were the largest in close to a century. GDP declined by 7 per cent in the June quarter of 2020 following the onset of the pandemic at the start of that year, driven by a 12 per cent decline in household consumption (Graph 1). These were by far the largest changes in GDP and consumption since quarterly data were first published by the Australian Bureau of Statistics (ABS) in 1959.^[1] Household consumption accounts for over half of Australia's GDP and restrictions on household activity introduced by health authorities to contain

the virus significantly reduced consumption opportunities. Throughout the pandemic, the main effect of COVID-19 outbreaks on economic activity has been through household consumption.

Understanding the path of household consumption during economic shocks is of first order importance to policymakers. In addition to its large share of GDP, household consumption is directly related to a substantial share of jobs in the economy. Timely information about the extent of the fall in consumption in the first half of 2020 was critical for understanding the size of the shock to the overall economy and, in turn, calibrating the appropriate

policy response. Likewise, a timely understanding of the recovery in consumption over the second half of the year gave policymakers important information about the path back to normalisation for a shock unprecedented in modern times.

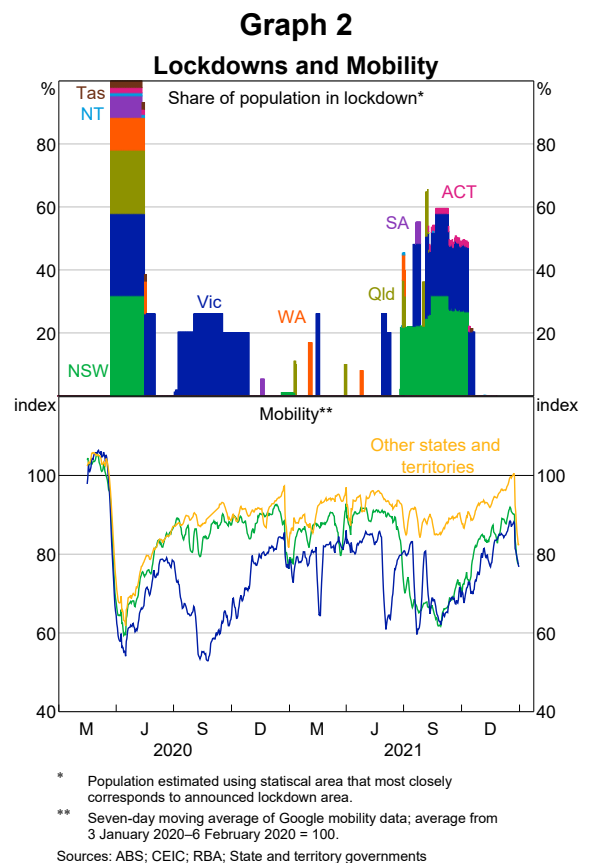
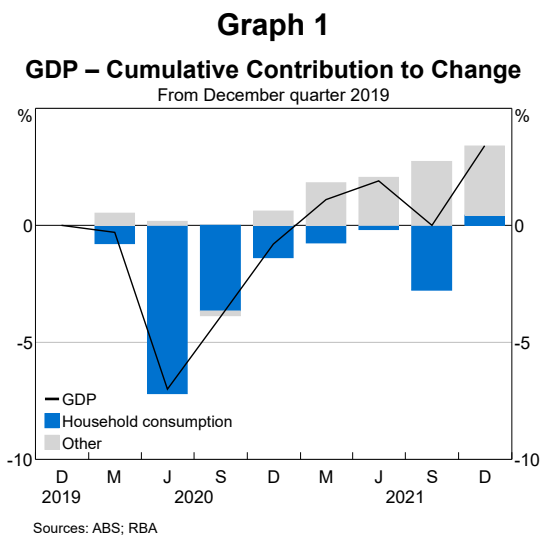
Lockdowns and their effect on household consumption

There have been three periods of major restrictions on household activity and associated economic disruption in Australia during the pandemic. The onset of the pandemic saw strict restrictions on household mobility – commonly referred to as ‘lockdowns’ – introduced across the country in March 2020 (Graph 2). Measures of population mobility – which became critical economic indicators due to the nature of the economic disruption – declined sharply. Although the strict lockdown ended for most parts of the country by the middle of the June quarter, some restrictions on household activity remained in place for an extended period of time. Melbourne re-entered lockdown for much of the second half of 2020. The third major disruption started in mid-2021, as a sharp rise in the number of COVID-19 Delta-variant cases led to the reintroduction of lockdowns in New South Wales, Victoria and the Australian Capital Territory. Around half of the Australian population were under significant restrictions for most of the September quarter of 2021. Lockdown rules have differed by state and across time, but typically households were only allowed to leave home for a

limited number of reasons and were required to work from home, if possible. Most in-person retail and household services were closed, along with schools and many other public services.

In addition to the large decline in aggregate consumption, spending patterns also shifted considerably at the onset of the pandemic as households adapted to restrictions on activity. Goods consumption increased strongly as consumers substituted away from services where consumption possibilities were limited or not available. Groceries to cook homemade meals replaced restaurant visits, sports equipment substituted for closed gyms, home office equipment filled in for trips to workplaces, and toys and games stood in for organised children’s activities. Similar patterns have been observed in other advanced economies (Graph 3).

This increase in goods consumption, related to people spending more time at home, only partly offset the large falls in household services consumption from less time ‘out and about’ at hospitality venues and travelling (Graph 4, left panel). The strength in goods consumption was

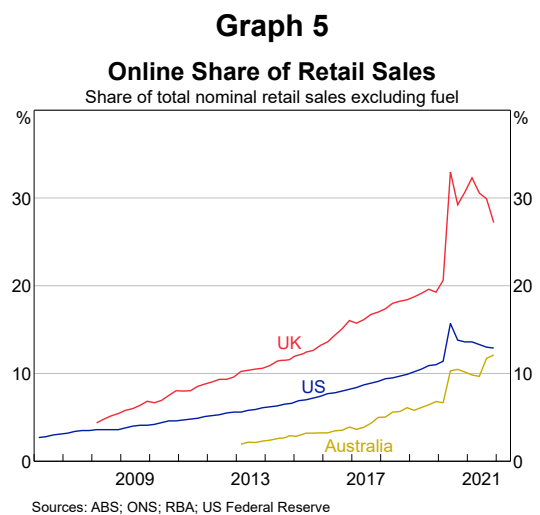
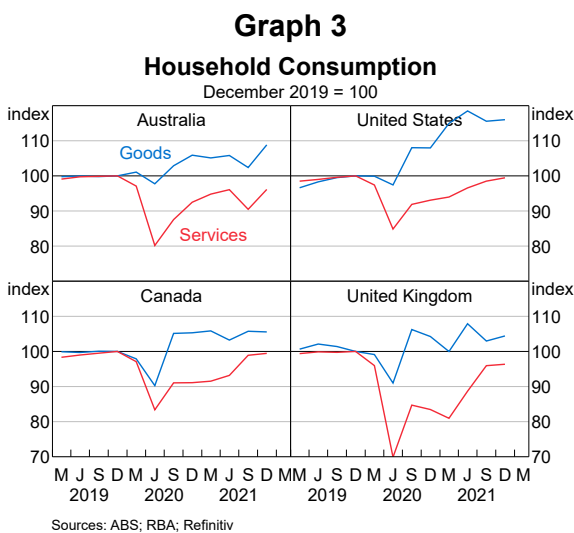
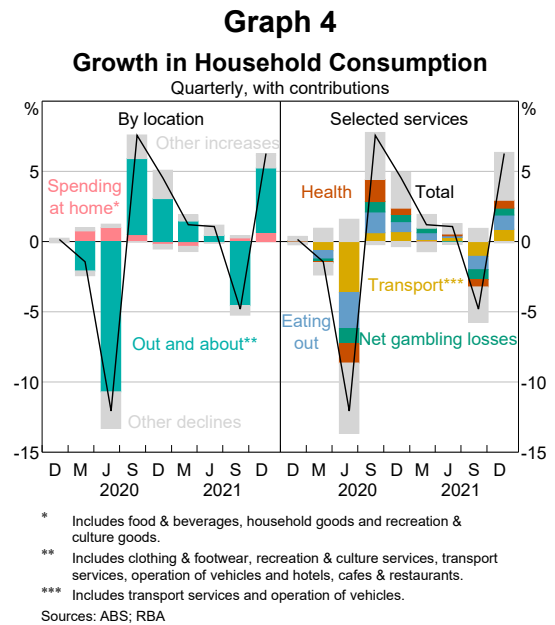


most pronounced for home entertainment items, appliances, furniture and home renovation goods, with retail sales for these categories in the June quarter of 2020 typically 20–30 per cent higher than a year earlier.^[2] Spending on non-durable goods also increased; retail sales of at-home food and beverages in the June quarter 2020 were close to 15 per cent higher. By contrast, ‘out and about’ consumption declined sharply during lockdowns. Reduced spending on transport services, eating out, health services and gambling accounted for two-thirds of the total decline in consumption in the lockdowns that occurred in the June quarter of 2020 and the September quarter of 2021 (Graph 4, right panel). Store closures also drove sharp declines on clothing & footwear and department store spending.

Households also adapted to restrictions by making more of their purchases online. Online retail sales accounted for 10–15 per cent of the total value of retail sales during the second half of 2021, up from an average of around 6 per cent in 2019, though the shift was less pronounced than in other economies (Graph 5). Information from retailers in the Bank’s liaison program suggests that they expect much of this shift to online purchases will remain long after health concerns have passed, and have invested heavily in their online platforms and distribution channels.^[3]

Timely sources of information for monitoring household consumption

The most comprehensive source of information on household consumption is the ABS’ national accounts. However, national accounts data are not available until two months after the end of each quarter. Economists at the Reserve Bank (and elsewhere) have used a wide range of timely information about household spending and activity to provide a real-time assessment of household consumption. While many of these indicators were only made available following the onset of the pandemic, and so their relationship with traditional economic indicators is still being explored, this information has been used in two main ways: first, to construct a granular real-time estimate of



household spending (a ‘nowcast’); and second, to construct near-term forecasts of household consumption (‘near casts’).

The ‘consumption tracker’

Prior to the COVID-19 pandemic, partial indicators of household activity, such as retail sales and consumer sentiment, were the main inputs to estimate changes in household consumption in real time. Since the onset of the pandemic, Bank economists have relied more heavily on ‘bottom-up’ methods, where a wider range of partial information is used to track components of consumption at a more granular level. The Bank’s ‘consumption tracker’ breaks down household consumption into more than 15 spending categories. Aggregating these monthly estimates gives an estimate of aggregate household consumption for the month or quarter (Graph 6). After the ABS national accounts are published, the estimates are updated to align the tracker estimates with the national accounts.

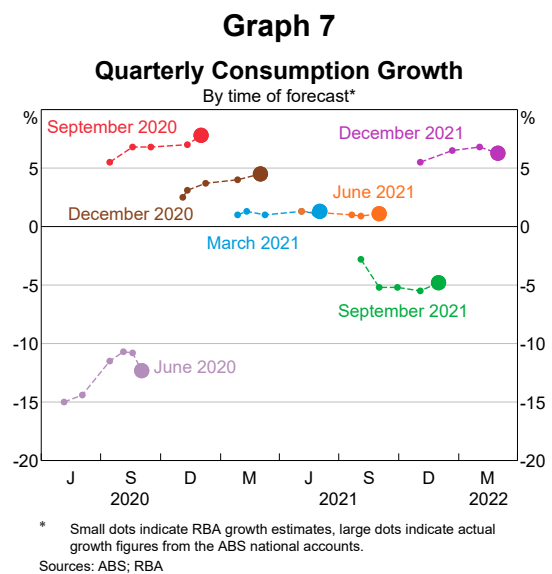
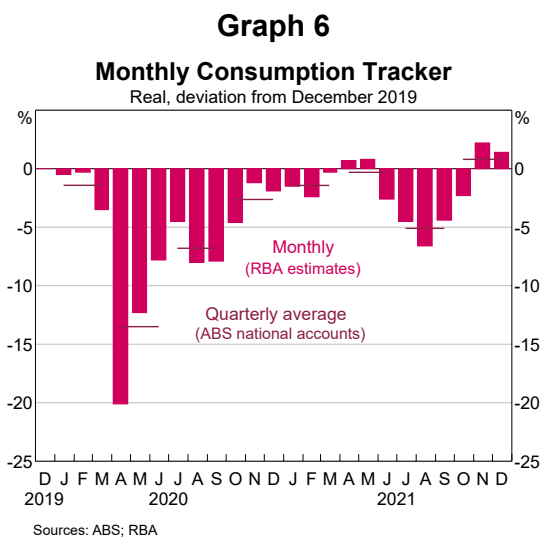
The consumption tracker draws on information from a range of sources to estimate changes in household consumption. High-frequency indicators include anonymised card transaction data, state government administrative data (including public transport use and gambling revenue), restaurant bookings, flight departures and mobility indicators. These are often available on a daily or weekly basis with very little lag.^[4] These new data sources are complemented by established sources of timely

information, such as monthly ABS retail sales data and motor vehicle sales, as well as information from the Bank’s liaison program. Many partial indicators combine the effect of price and quantity changes, and so the contributions from each need to be estimated. The categories of consumption for which timely indicators are not available are largely estimated based on historic growth trends.^[5]

The accuracy of the consumption tracker relative to the actual change in household consumption published in the national accounts has improved over time. The first quarterly growth estimate using the tracker is typically generated around the middle month of the quarter in question, when some forecasts are still required and outcomes in the final month might be subject to unexpected shocks. Nevertheless, the tracker has broadly predicted the change in consumption expenditure as measured by the national accounts a few months ahead of publication (Graph 7). Future tracker estimates will also incorporate information from the recently released ABS Monthly Household Spending Indicator, which draws on a broader range of card payments data (ABS 2022).

Key changes in household spending

The detailed tracking of household consumption with a wide range of sources has provided a timely read on household behaviour and activity in various parts of the economy. A closer examination of some of the categories that drove the changes in



household consumption highlight how high-frequency tracking methods have been used to enhance our understanding of household spending activity. These are: transport services, which made up 8 per cent of consumption before the pandemic; health services, which made up 3 per cent; hospitality, which made up 5 per cent; and gambling losses, which made up 2½ per cent.

Transport services

Household spending on transport services plummeted at the onset of the pandemic. High-frequency transport indicators including mobility, public transport, petrol sales and flight data generally declined sharply at the onset of lockdown periods, and then recovered as restrictions eased (Graph 8).

The recovery in transport spending still has a long way to go. While aggregate household consumption was a little above its pre-pandemic level in the December quarter of 2021, transport services remained around 70 per cent below. Spending on public transport has been particularly slow to recover, which reflects precautionary behaviour due to health concerns as well as many employees continuing to work from home for at least part of their working week. Flights have also been slow to

recover amid domestic and international border restrictions.

Health services

Household health spending fell sharply during both the June quarter of 2020 and the September quarter of 2021 due to temporary restrictions on non-essential services and the halt to elective surgeries and procedures. Publicly available Medicare benefits data provided an early read on these developments relative to the national accounts (Graph 9). The expansion of telehealth services in March 2020 provided some offset to the decline in health consumption during lockdown periods.

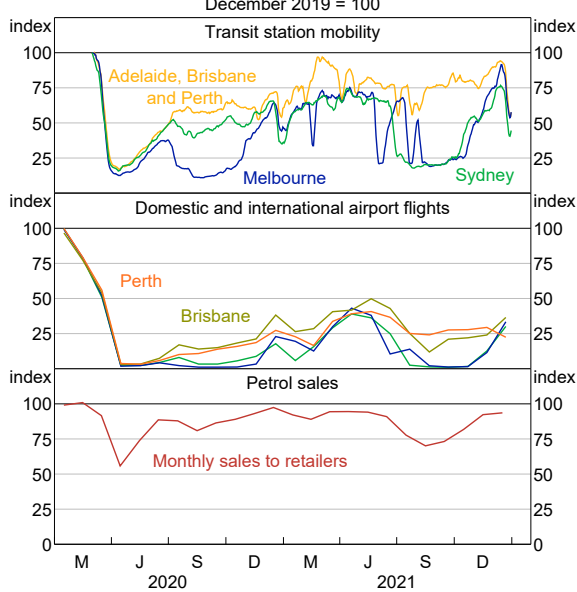
Hospitality

High frequency indicators such as card payments and reservation data provided an early read on hospitality spending as restrictions on dining out came into place (Graph 10). Spending at cafes and restaurants is also susceptible to precautionary behaviour, with restaurant bookings declining in January 2022 alongside rising COVID-19 case numbers despite no formal restrictions being imposed on eating out. Similar patterns were observed in high-frequency clothing & footwear data, which is also heavily reliant on in-person shopping and activity.

Gambling losses

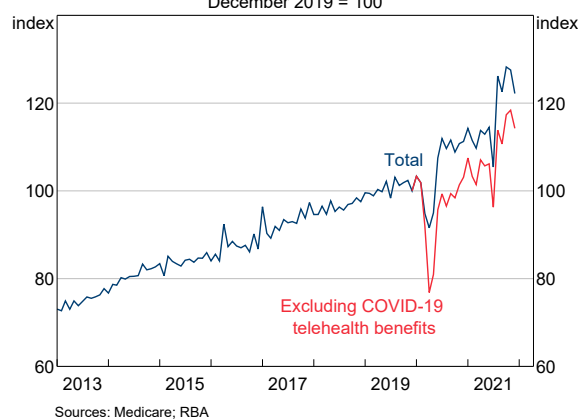
Household gambling expenditure, measured by net losses on gambling activities, fell sharply during

Graph 8
Transport Indicators
December 2019 = 100



Sources: Apple; BITRE; Department of Industry, Science, Energy and Resources; RBA

Graph 9
Monthly Medicare Benefits and Telehealth
December 2019 = 100



Sources: Medicare; RBA

lockdowns (Graph 11). The decline in gambling expenditure was mostly accounted for by reduced gaming (or 'pokie') machine losses as most gaming venues were closed in response to outbreaks. For example, households in New South Wales and Victoria reduced their gambling losses by \$1.7 billion in the September quarter of 2021 with most of the 110,000 gaming machines in these states not operating for much of the quarter. Changes in non-gaming machine gambling losses were relatively small across recent quarters, with changes in other gambling activities like in-person gambling at casinos and online gambling activity broadly offsetting each other. Unlike some other categories of consumption, gaming machine gambling losses typically rebounded completely once lockdowns ended.

Forecasting near-term consumption

Following the success of the initial Australia-wide lockdown in early 2020 in controlling virus numbers, state, city and local government area lockdowns were repeatedly used by authorities to gain control of outbreaks. This presented an additional challenge for tracking household spending, as consumption differed significantly across parts of the country. However, the information gathered during the first lockdown, coupled with the wider range of timely information available on household behaviour, strengthened the ability of forecasters to project the likely response of household consumption.

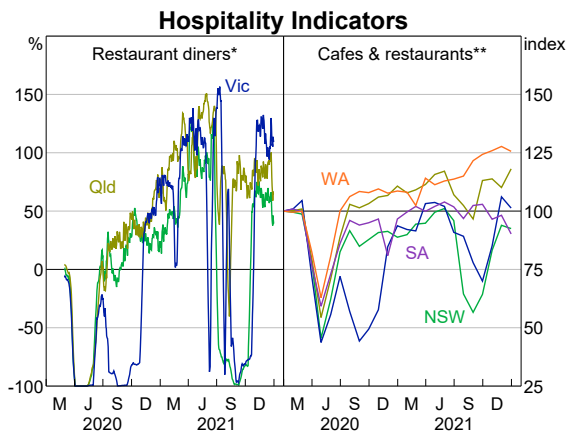
The 'rule of thumb'

A rough rule of thumb was that households in locked down areas consumed around 15 per cent less than they would without restrictions for the duration of the lockdown. This rule of thumb was built from assumptions about how much each consumption component is affected by a lockdown (see Appendix A). These assumptions were refined as more information about international and domestic household behaviour became available. For example, the estimated 15 per cent reduction in consumption was revised down from initial estimates at the onset of the pandemic, in part because households adapted to lockdown conditions over time. Victorian household consumption was around 15 per cent below its pre-pandemic level when the state was locked down for the September quarter of 2021.

This 15 per cent 'hit' to consumption could then be translated into a quarterly consumption effect by multiplying it by the share of the quarter for which households were expected to be in lockdown and by the share of the population that was affected. For example, the rule of thumb suggested that aggregate Australian consumption growth was around 0.3 per cent lower for every week of lockdown in the Greater Sydney region:

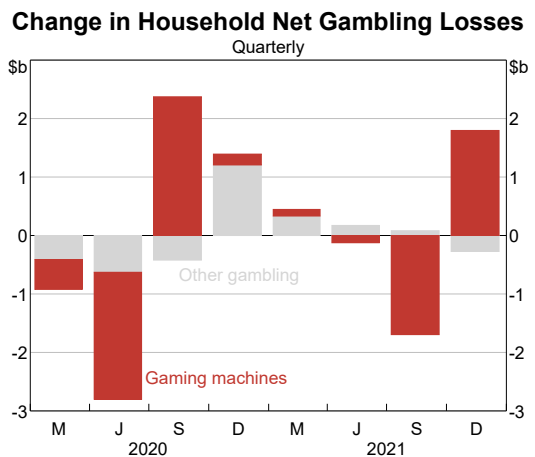
$$-15\% \text{ reduction in consumption} \times 8\% \text{ (one week of a quarter)} \times 25\% \text{ of the Australian population} = -0.3 \text{ per cent}$$

Graph 10



* Change relative to corresponding period in 2019, 14-day moving average. Seated diners in restaurants using OpenTable; across all channels including online and phone reservations and walk-ins.
 ** ABS monthly retail sales values, December 2019 = 100.
 Sources: ABS; CEIC Data; RBA

Graph 11



Sources: ABS; Consumer and Business Services (South Australia); Department of Treasury and Finance (Tasmania); Liquor and Gaming NSW; Queensland Office of Liquor and Gaming Regulation; RBA; Victorian Commission for Gambling and Liquor Regulation

This impact could then be subtracted from the estimate of quarterly consumption growth that would have occurred absent lockdown restrictions.

Consumption modelling

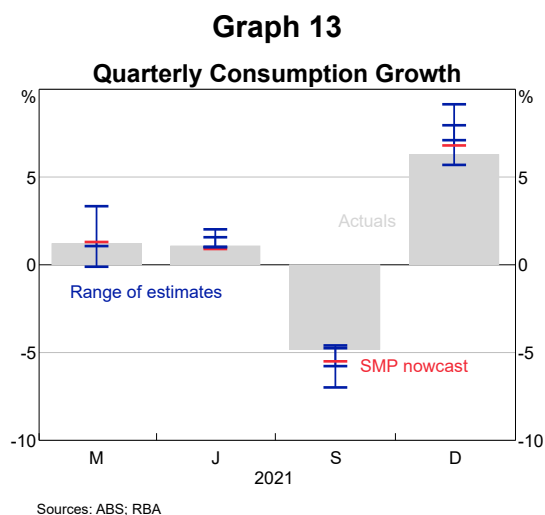
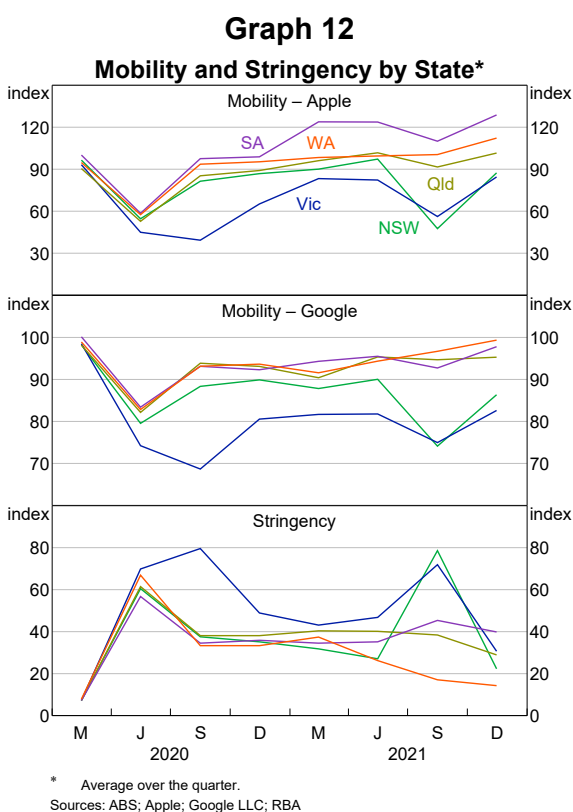
Models that use the relationship between household spending and measures of population mobility or restrictions by state have also been effective ways to forecast consumption growth (Graph 12). Although more complicated than the rule of thumb, a model can be applied to any period of time, not just when strict lockdowns are in place. At the Bank, a simple model was used, with different estimates arising from different inputs (see Appendix B). Apple and Google mobility data were used as mobility indicators, while a ‘stringency index’ was used as a measure of the relative severity of restrictions.^[6] This was constructed using a methodology based on the University of Oxford’s cross-country stringency index, information from the Bank’s liaison program, state government announcements and other sources (see Appendix C).

A model based on mobility indicators was useful for nowcasting consumption, while a model based on

measures of restrictions was useful for forecasting a little further into the future, using assumptions about the likely length of announced restrictions and government roadmaps for the timing of changes to restrictions. This work has been important in anchoring our forecasts and considering the range of possible outcomes (Graph 13).^[7]

Conclusion: Informing the longer-term outlook for household consumption

The recovery from the largest economic shock in Australia since the Great Depression has been much stronger than originally anticipated. The Bank’s forecasts for household consumption (and business investment) early in the COVID-19 pandemic assumed a significant impact from precautionary behaviour, due to health or economic uncertainty, for several quarters. Health outcomes have played a central role in explaining the better-than-expected path of the economy over the past two years, alongside the resilience of households and businesses and substantial public policy support (Ellis 2021). The large public policy support for household and business incomes during lockdowns ensured that spending levels recovered quickly as restrictions eased. For example, JobKeeper provided considerable certainty about future employment, lessening the spending reductions typically associated with heightened concerns about unemployment (Penrose and La Cava 2021). Insights from the detailed understanding of household consumption responses during the

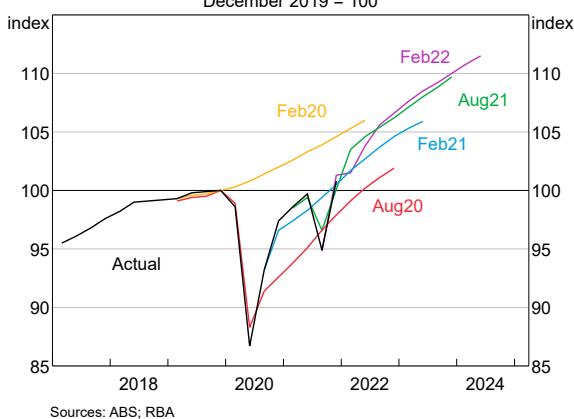


pandemic have helped to inform the Bank's view of the outlook for the economy. For example, high-frequency indicators showed that household activity snapped back to normal within days of lockdown restrictions being lifted. The observed smaller impact of lockdowns after the first lockdown episode was partly because households and businesses adapted and found ways to operate effectively while in lockdown. Against this backdrop, firms took confidence in the swift rebound in sales and in many cases elected to expand their labour force and increase investment, further supporting demand, and consumers took confidence from the strong labour market. These observations led to a significant reduction in the precautionary behaviour embedded within the Bank's central forecasts for household consumption.

While there is little evidence of lingering negative effects on the level of spending after lockdowns, much of the spending lost during lockdowns is generally not made up at least in the near term. For some categories this is to be expected because it is not possible or desirable to make up for lost spending – for example, a second hair cut or repeated rides on public transport are unnecessary. Overall, the limited scope to 'catch up' on lost consumption means that further above-trend growth in household consumption will require the complete range of pre-pandemic consumption possibilities to be available, including discretionary services such as international travel.

As at the December quarter of 2021, household consumption had recovered to be above its pre-pandemic level. But there is still considerable uncertainty around the medium-term outlook for consumption. The wide range of information about household spending and the methods used to analyse this information will help to provide a timely read on key questions, such as whether and when goods and services consumption patterns will normalise and whether and when households will spend the additional savings accumulated in recent years. These methods will also be valuable for monitoring future shocks that affect household activity.

Graph 14
Consumption Forecasts
December 2019 = 100



Appendix A: Lockdown ‘rule of thumb’ assumptions

Table A1: Lockdown ‘Rule of Thumb’ Assumptions

Per cent change in consumption

Consumption type	Share of consumption (per cent)	Lockdown effect (per cent)
Food	10	15
Discretionary services: eating out, travel, transport, recreation & cultural services and other	23	-60
Essential services: rent, utilities, telecommunications, health services, education and financial services	43	-5
Durables: household goods, clothing & footwear, cars and recreational goods	24	-10
Total	100	-15

Sources: ABS; RBA

Appendix B: Forecasting model

We estimate the model below for the five largest states by population in Australia (estimated over the period since 2010):^[8]

$$\Delta \log(C_{it}) = \alpha_i + \gamma_{tp} + \Delta \log(1 - \theta R_{it}) + \varepsilon_{it}$$

Where:

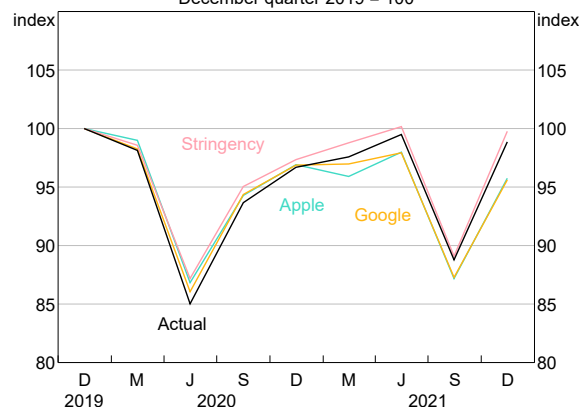
- C_{it} is consumption in state i in time t (the data is quarterly).
- R_{it} is some index of restriction on consumption level in state i in time t . We use an inverse of either one of the ‘mobility indicators’ (from Apple and Google), or a ‘stringency index’ based on the University of Oxford methodology.
- α_i is trend growth in state i .
- γ_{tp} are time-fixed effects for the pandemic (these quarterly parameters have a value of zero prior to the first quarter of 2020).
- θ determines the proportional effect of restrictions on consumption.
- ε_{it} is error in state i in time t .

Whichever metric for restrictions (R) is used, the model explains differences in state outcomes quite well (Graphs B1 to B5).

Graph B1

NSW Consumption – Mobility Model vs Actual

December quarter 2019 = 100

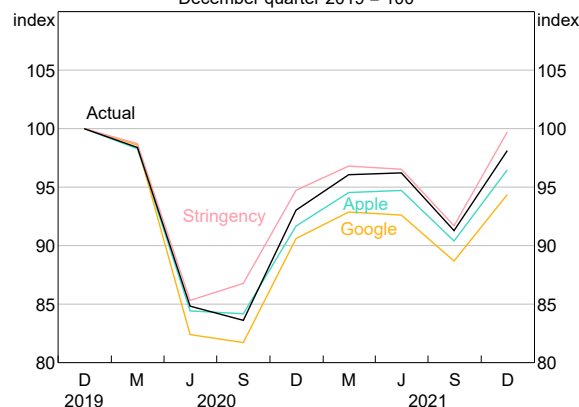


Sources: ABS; Apple; Google LLC; RBA

Graph B2

Vic Consumption – Mobility Model vs Actual

December quarter 2019 = 100

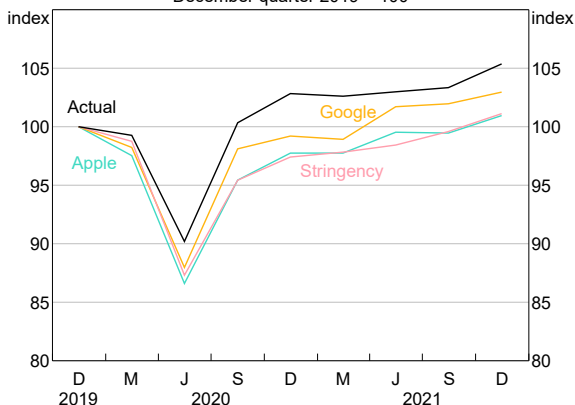


Sources: ABS; Apple; Google LLC; RBA

Graph B3

Qld Consumption – Mobility Model vs Actual

December quarter 2019 = 100

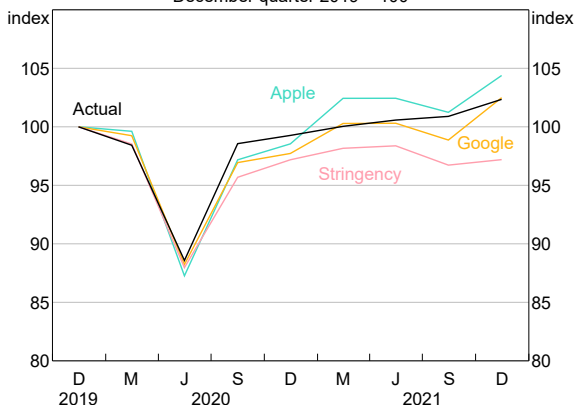


Sources: ABS; Apple; Google LLC; RBA

Graph B4

SA Consumption – Mobility Model vs Actual

December quarter 2019 = 100

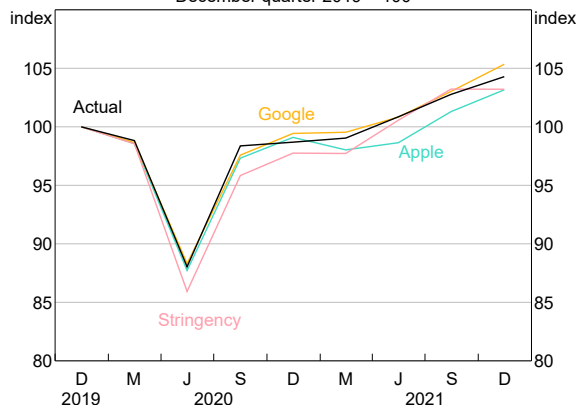


Sources: ABS; Apple; Google LLC; RBA

Graph B5

WA Consumption – Mobility Model vs Actual

December quarter 2019 = 100



Sources: ABS; Apple; Google LLC; RBA

Appendix C: Stringency index

The University of Oxford developed a ‘stringency index’ to compare the strictness of lockdown-style policies in response to COVID-19 across countries.^[9] Measures include restrictions such as stay-at-home requirements, border closures and limitations on gatherings. The stringency index converts these different ordinal measures into a score from 0 to 100 ($\frac{\text{score}}{\text{scoremax}} \times 100$) and averages these scores to get a total stringency score for a country or state out of 100. A higher level means more lockdown-style rules. This index does not reflect the degree to which mandated measures are observed or enforced.

We constructed a modified stringency index for the five largest states in Australia, using state guidelines

monitored by the Bank’s liaison program, supplemented by state government press conferences and information collected by the ABS in 2020. The index was constructed using University of Oxford methodology but the implementation differs slightly. For example, we removed international travel controls and public information campaigns in our modified index. To capture regional level differences, we also calculated stringency for areas within a state with distinct rules (e.g. regional New South Wales and Greater Sydney) and then calculated a weighted average stringency index by population for that state.^[10] The application of the methodology is somewhat subjective and the Bank’s construction does not

necessarily capture all available public information. As such, the index is a useful forecasting tool rather than a definitive indicator in its own right. ✖

Table C1: Stringency Index Composition

Name	Coding
School closing	0 – no measures
	1 – recommend closing or all schools open with alterations resulting in significant differences compared to non-COVID-19 operations
	2 – require closing (only some levels or categories, e.g. just high school, or just public schools)
	3 – require closing all levels
Workplace closing	0 – no measures
	1 – recommend closing (or recommend work from home) or all businesses open with alterations resulting in significant differences compared to non-COVID-19 operation
	2 – require closing (or work from home) for some sectors or categories of workers
	3 – require closing (or work from home) for all-but-essential workplaces (e.g. grocery stores, doctors)
Cancel public events	0 – no measures
	1 – recommend cancelling
	2 – require cancelling
Restrictions on gatherings	0 – no restrictions
	1 – restrictions on very large gatherings (the limit is above 1,000 people)
	2 – restrictions on gatherings between 101–1,000 people
	3 – restrictions on gatherings between 11–100 people
Close public transport	0 – no measures
	1 – recommend closing (or significantly reduce volume/route/means of transport available)
	2 – require closing (or prohibit most citizens from using it)
	3 – require not leaving house with minimal exceptions (e.g. allowed to leave once a week, or only one person can leave at a time etc)
Stay at home requirements	0 – no measures
	1 – recommend not leaving house
	2 – require not leaving house with exceptions for daily exercise, grocery shopping, and ‘essential’ trips
	3 – require not leaving house with minimal exceptions (e.g. allowed to leave once a week, or only one person can leave at a time etc)
Restrictions on internal movement	0 – no measures
	1 – recommend not to travel between regions/cities
	2 – internal movement restrictions in place
International travel controls	0 – no restrictions
	1 – screening arrivals
	2 – quarantine arrivals from some or all regions
	3 – ban arrivals from some regions
Public information campaigns	0 – no COVID-19 public information campaign
	1 – public officials urging caution about COVID-19
	2 – coordinated public information campaign (e.g. across traditional and social media)
	3 – ban on all regions or total border closure

Endnotes

- [*] The authors are from Economic Analysis Department and would like to thank Anthony Brassil, Matthew Carter, Iris Day, Melody Chang, Yad Haidari, Fred Hanmer, Calvin He, Cara Holland, Jahan Mand, Diego May, Kate McLoughlin and Tim Taylor for significant contributions to the authors' understanding of household consumption activity during the pandemic.
- [1] The June quarter 2020 decline in GDP is likely the largest quarterly decline in economic activity since the onset of the 1930s Great Depression, based on analysis of annual GDP data and the available quarterly economic statistics.
- [2] Some household goods spending can also be attributed to developments in the housing market, as house price growth and alterations & additions activity is closely related to spending on consumer durables (May, Nodari and Rees 2019).
- [3] The Reserve Bank liaison team conducts around 70–80 discussions each month with firms, agencies and community groups. Liaison meetings are held nationally with firms of all sizes, though most discussions are with mid-sized and large firms, where conditions are somewhat more likely to reflect economy-wide trends rather than firm-specific factors.
- [4] Many local and international policy institutions and statistical agencies have increased their use of alternative data, including the European Central Bank (Benatti *et al* 2020), the Federal Reserve Bank of St. Louis (Dvorkin and Isaacson 2021), the Organisation for Economic Co-operation and Development (Woloszko 2020) and the International Monetary Fund (Chen *et al* 2020).
- [5] For example, utilities, communication services and cigarettes & tobacco.
- [6] Apple mobility is based on the Apple Maps application. Apple data capture the number of trips users have requested directions for, categorised by mode of transportation available on the application (walking, transit and driving). Google uses data from devices with 'Location Services' on (the default for all devices is off) and publishes statistics categorised by location type, including: retail and recreation; supermarket and pharmacy; parks; public transport; workplaces; and residential. See Apple (2022); Google LLC (2022).
- [7] Step ahead estimates for the 'range of estimates' are out of sample and use full partial data for the quarter.
- [8] To calculate Australia-wide consumption growth, we assume consumption grows in line with the weighted average of the rest of the states for Tasmania, the Northern Territory and the Australian Capital Territory.
- [9] See University of Oxford COVID-19 Government Response Tracker or related paper (Hale *et al* 2021). Tracker information available at <<https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker>>.
- [10] The ABS has a published measure for each state and territory in the second half of 2020 (ABS 2021). Our index excludes the international borders and public health campaign categories, calculates by sub-state measures and is constructed over a longer time period.

References

- ABS (Australian Bureau of Statistics) (2021), 'State Economies and the Stringency of COVID-19 Containment Measures', March. Available at <<https://www.abs.gov.au/articles/state-economies-and-stringency-covid-19-containment-measures-december-quarter-2020>>.
- ABS (2022), 'Monthly Household Spending Indicator', 22 February. Available at <<https://www.abs.gov.au/statistics/economy/finance/monthly-household-spending-indicator/latest-release>>.
- Apple (2022), 'Mobility Trends Reports', viewed 9 February 2022. Available at <<https://covid19.apple.com/mobility>>.
- Benatti N, V Botelho, A Consolo, A Dias da Silva and M Osiewicz (2020), 'High-frequency Data Developments in the Euro Area Labour Market', ECB *Economic Bulletin*, May.
- Chen S, D Igan, N Pierra and A Presbitero (2020), 'Tracking the Economic Impact of COVID-19 and Mitigation Policies in Europe and the United States', IMF Working Paper No 20/125.
- Dvorkin M and M Isaacson (2021), 'Assessing Labor Market Conditions Using High-Frequency Data', *Federal Reserve Bank of St. Louis Review*, 103(4), pp 461–476.
- Ellis L (2021), 'Lessons and Lasting Effects of the Pandemic', Speech to the Ai Group, Adelaide, 23 June.

Google LLC (2022), 'Google COVID-19 Community Mobility Reports', viewed 9 February 2022. Available at <<https://www.google.com/covid19/mobility/>>.

Hale T, N Angrist, R Goldszmidt, B Kira, A Petherick, T Phillips, S Webster, E Cameron-Blake, L Hallas, S Majumdar and H Tatlow (2021), 'A Global Panel Database of Pandemic Policies (Oxford COVID-19 Government Response Tracker)', *Nature Human Behaviour*, 5, pp 529–538.

May D, G Nodari and D Rees (2019), 'Wealth and Consumption', *RBA Bulletin*, March.

Penrose G and G La Cava (2021), 'Job Loss, Subjective Expectations and Household Spending', RBA Research Discussion Paper No 2021-08.

Woloszko N (2020), 'Tracking Activity in Real Time with Google Trends', OECD Economics Department Working Paper No 1634.

COVID-19 Health Risks and Labour Supply

Nalini Agarwal and James Bishop^[*]



Photo: d3sign – Getty Images

Abstract

There is evidence that concerns about becoming infected with COVID-19 at work have affected people's willingness to participate in the labour force in some countries. This article examines whether similar health concerns have contributed to a reduction in labour supply in Australia. It finds no evidence that these concerns had a discernible effect on labour supply during the COVID-19 outbreaks in 2020 and 2021. In early 2022, however, the substantial escalation in cases of the Omicron variant led a small number of people to avoid the workplace, at least temporarily.

Introduction

Since early 2020, outbreaks of the COVID-19 virus have caused significant disruptions to the labour market in Australia. These disruptions have originated from the direct effects of lockdowns on workers and, in the most recent outbreak, by sickness or requirements to isolate. In addition to these direct effects on the supply of labour, a key uncertainty is the extent to which the *fear* of infection has led people to drop out of the workforce, particularly during periods of high community transmission (Lowe 2021). For example, have health concerns dissuaded people from working in jobs where risk of infection is relatively high, or led them to retire earlier than otherwise?

This article assesses whether the risk of being infected with COVID-19 in the workplace has affected people's willingness to work at various points during the pandemic. We find no evidence of this during the COVID-19 outbreaks in 2020 and 2021 in Australia. Even during periods of higher community transmission and fewer public health measures, such as during the Omicron outbreak, the direct effects of isolation requirements and illness associated with COVID-19 appear to have been more important than the fear of infection for determining the path of labour supply. This contrasts with the evidence for some other countries, such as the United States, which suggest that a marked deterioration in the public health

situation meaningfully reduced people’s willingness to work and, consequently, exacerbated existing worker shortages. Although the current analysis is retrospective, the findings shed light on how labour supply might be affected by future outbreaks.

Health risks have been front of mind for many Australians

The COVID-19 pandemic has created significant health concerns for individuals and society. Despite better health outcomes in Australia relative to other countries, data from the 2020 Household Income and Labour Dynamics (HILDA) survey show that most Australians in 2020 viewed the risk of hospitalisation following a COVID-19 infection as high (Graph 1)^[1] – considerably higher than actual hospitalisation rates seen in early 2020. These data were collected prior to the vaccination rollout in 2021, which reduced these risks. The self-assessed risk of severe illness rises with age and is overall higher for those who identified as having a medical condition such as chronic bronchitis, diabetes, asthma or heart disease at the time of the survey (as indicated by the upward shift in the curve in Graph 1).

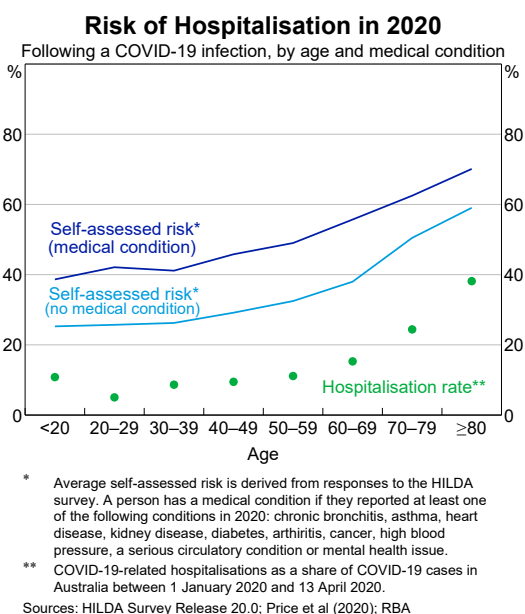
The *perceived risk* of COVID-19 is often a stronger predictor of how people will respond to an outbreak than the *actual risk* of infection and severe illness (Dryhurst *et al* 2021; Eichenbaum *et al* 2020). This connects to the concept of ‘dread risk’, which refers to how individuals might overestimate the risk of low probability events – particularly those that receive a great deal of media attention like the COVID-19 pandemic – and consequently, engage in risk averse behaviour.^[2]

Health risks can lead people to change their economic behaviour

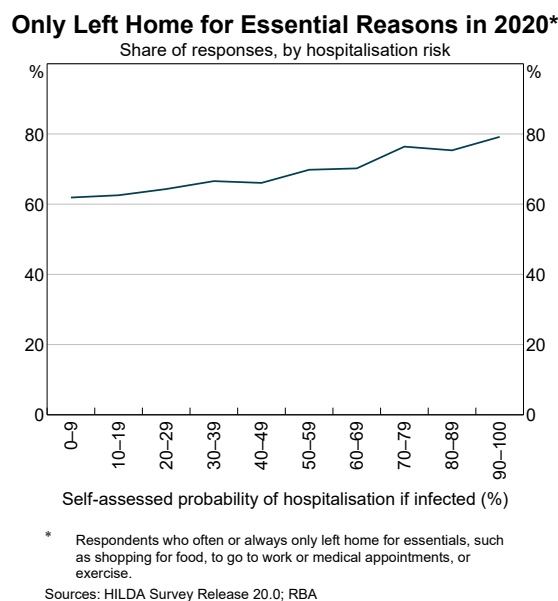
The HILDA survey provides evidence that the fear of infection associated with COVID-19 has led to changes in how people interact with each other and the community. For example, those who assessed they had a higher risk of severe illness were more likely to remain at home for anything but essential purposes, compared with those with a lower risk (Graph 2).

Overall, however, there is little quantitative evidence for Australia on the extent to which fear of infection has led to a voluntary change in economic behaviour. In particular, it is difficult to determine the extent to which people are voluntarily avoiding situations that might expose them to the virus – such as dining in at cafes, going to shopping centres or working in high-contact jobs like retail or hospitality – and the significance of this for the aggregate economy. The importance of voluntary behavioural changes, if any, are likely to be

Graph 1



Graph 2



obscured by the use of public health interventions (e.g. lockdowns) to curtail the virus’s spread.^[3] A growing body of international research has found that factors other than public health interventions, such as voluntary behaviour changes due to fear of infection, had a large effect on consumer spending and mobility in the early stages of the pandemic (Gupta, Simon and Wing 2020). This was evident in a range of countries that made use of public health interventions to differing extents, such as the United States and Sweden (Sheridan *et al* 2020; Eichenbaum *et al* 2020; Goolsbee and Syverson 2021; Fang, Wang and Yang 2020).

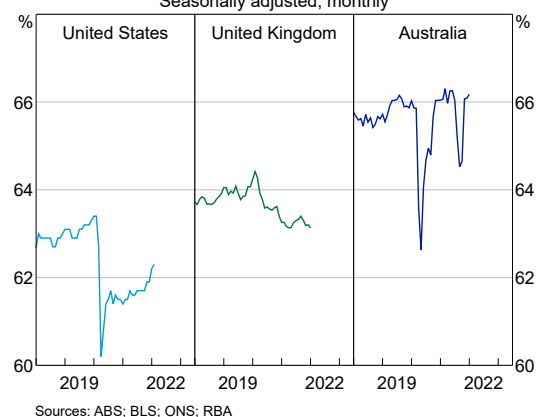
In terms of labour supply, large numbers of workers have left the labour market in countries like the United States and the United Kingdom, with international research suggesting that it could in part be due to a fear of becoming infected with COVID-19 (Forster van Aerssen *et al* 2021). In the early stages of the pandemic before vaccinations were available, a US survey found that nearly 6 million Americans (2.3 per cent of the working-age population) cited concerns of spreading or getting COVID-19 as a reason for not working.^[4] This number has since fallen but remains high due to the Omicron outbreak, at slightly more than 1 per cent of the working-age population. The pandemic also lowered people’s willingness to work (as measured by lower desired hours of work), particularly for those in jobs with higher potential exposure to the virus (Faberman, Mueller and Sahin 2022).

It is also notable that the labour force participation rates in the United States and the United Kingdom have not recovered to the same extent as in many other advanced economies, including Australia (Graph 3). One potential explanation for the difference between Australia and the United States and the United Kingdom could be the comparably worse health outcomes and associated health risks in the latter two countries. In turn, this may help to explain why wage pressures in the United States and the United Kingdom have built more quickly than in Australia, although a number of other factors, including inertia in Australia’s wage-setting institutions, are also likely to be relevant. On the other hand, the accumulation of household savings

and growth in household wealth during the pandemic may also be reducing people’s sense of urgency to return to work in the United States and the United Kingdom, relative to Australia. Similarly, the availability and nature of government support, a re-evaluation of longer-term personal and professional goals (perhaps as part of the ‘Great Resignation’ in the United States) or an increased need to care for young children could also be important factors. The observation that participation rates have recovered strongly in a number of European countries that experienced large COVID-19 outbreaks in 2020 and 2021 also suggests that the fear of infection may not be the main factor driving cross-country differences in labour force participation rates.

Declines in labour force participation in the United States and the United Kingdom have been particularly large for older workers, many of whom have opted to retire early (Nie and Yang 2021). This ‘retirement boom’ in the United States could reflect not only the greater risk of being infected with COVID-19 at work but also that rising asset values made retirement feasible (Faria e Castro 2021). In Australia, data from the Labour Force Survey suggests that retirements were not excessive compared to previous years, perhaps reflecting better health outcomes with less frequent outbreaks and lower infection numbers throughout 2020 and 2021 (Graph 4). Although the number of workers expecting to retire over the coming year picked up in November 2021, it is too early to tell whether this reflects the baby boomer cohort

Graph 3
Labour Force Participation Rates
Seasonally adjusted, monthly



reaching retirement age, fear of infection or the growth in housing prices encouraging older workers to pull forward their retirements as observed in the United States.

Measuring the effect of health risks on labour supply

In light of the above evidence, we now turn to the central question of this article: have COVID-19-related health risks affected people’s willingness to work at various points during the pandemic? By using a case study approach, the analysis focuses on two periods – the COVID-19 outbreaks in Victoria in 2020 and in Sydney in 2021, respectively – to measure the effect of health risks on labour supply decisions.

Case study 1: The second wave of COVID-19 infections in Victoria in mid-to-late 2020

The labour force participation rate in Victoria fell sharply during the ‘second wave’ of COVID-19 infections in the second half of 2020, both in absolute terms and relative to those states that did not have outbreaks at the same time.^[5] However, it is unclear how much of this decline in labour force participation reflected that workers were fearful of going to work because of health concerns, and how much of it was due to other factors, such as the lockdown, large swings in demand, the effects of the income support measures or the need to take care of family and children during the pandemic. To isolate the contribution of health concerns to the

fall in participation, a way of controlling for these other factors was required.

To do this, we used HILDA survey data to compare the employment outcomes of Victorians who were likely to have been particularly sensitive to the risk of being infected with COVID-19 at work, to those who were not as sensitive. The former were a group of people who indicated that they had been diagnosed with a long-term medical condition (such as chronic bronchitis, asthma or heart disease; see Graph 1, above) and were thus at greater risk of experiencing severe illness if they were infected with COVID-19 (Kompaniyets *et al* 2021).

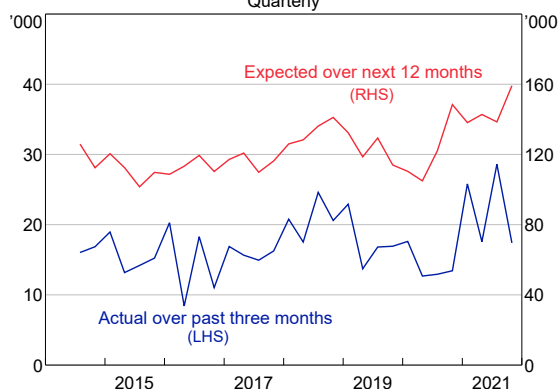
Graph 1 above suggests that these people were aware of this greater risk.^[6] The key assumption in this approach is that the labour force participation rates of these two groups would have followed the same trajectory in the absence of the COVID-19 outbreak in Victoria, controlling for factors like age and sex that would also otherwise affect changes in participation.^[7]

The rate at which Victorians with underlying medical issues participated in the labour force fell sharply during the second wave (Graph 5). However, this decline in labour force participation was no larger than that of Victorians who did not have pre-existing medical issues – the difference in the magnitude of this fall was small at a 1/3 percentage point, and not statistically significant. This finding of no statistically significant relationship between the degree of health risks and changes in labour force participation rates was also apparent when we controlled for other differences across these two groups that might have been relevant for peoples’ willingness or ability to work during the outbreak, such as age, sex, education level and child caring responsibilities.

Case study 2: The COVID-19 outbreak in Sydney in mid-2021

The second case study looks at the third wave of COVID-19 infections in mid-2021 that was associated with the Delta variant. This period provided a so-called ‘natural experiment’ for estimating the effects of health risks on labour supply, arising from the early stages of the vaccination rollout in Australia. In late-May 2021,

Graph 4
Retirements
Quarterly



Sources: ABS; RBA

people aged 40 years and over were prioritised for vaccinations. This led to otherwise similar people facing very different health risks from a COVID-19 infection: those just over 40 years of age who received the vaccine faced lower risks of infection and, in case of a break-through infection, less risk of severe disease and hospitalisation than otherwise similar people just below 40 who had not yet received the vaccine (Bernal *et al* 2021). Even though vaccination rates were low, the first dose vaccination rate for 40–44 year olds was 15 percentage points higher than that for 35–39 year olds by mid-July (Graph 6).^[8] This suggests that vaccine age-eligibility led to an increase in the probability of receiving a vaccination and created an important difference between the two groups in terms of COVID-19 risk profiles. We exploited this difference to understand the impact of vaccine eligibility – and accordingly, different health risks – on labour supply.

Accordingly, we compared the employment outcomes of people who narrowly passed this age-based eligibility test with those who narrowly missed out to see if there was any difference between the two groups. By focusing only on people very close to the age of 40, we could ensure that these two groups were very similar in all characteristics *on average*, except for their vaccine eligibility; for example, people who had their 40th birthday in April 2021 – and were eligible for the vaccine – and were likely to live in similar areas,

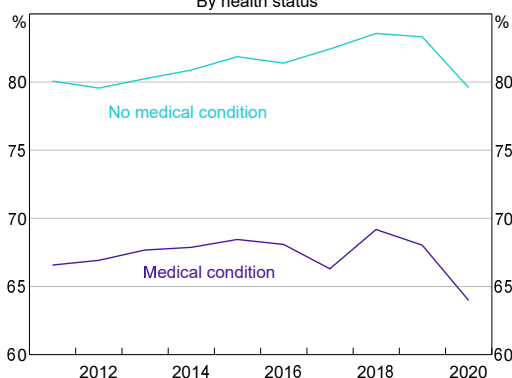
work in similar jobs and be subject to similar lockdown rules as those who had their 40th birthday in August 2021 but were not eligible for the vaccine. As such, this approach allowed us to attribute any difference in employment across these two groups to differences in their COVID-19 risk profile while controlling for other factors that might be relevant to their decision to remain at work.^[9] For the period studied, it was likely that any link between vaccination and employment would reflect the effect of vaccines in lowering health risks at work, rather than via other channels that have been more important recently during the Omicron outbreak, such as the role of vaccination mandates and isolation requirements.

It is easy to determine whether there is any effect on employment just by looking at a graph. Graph 7 plots the number of paid jobs in Greater Sydney region (including Blue Mountains, Central Coast and Wollongong) up until 15 July 2021 against the age of the job-holder. The dots represent the total number of paid jobs held by people falling into different age buckets (with each bucket being one month wide). The solid lines show lines-of-best-fit, estimated separately for people above and below the age of 40. We focused on Sydney as, at that time, it was experiencing about 100 COVID-19 cases per day, case numbers were rising and the region was in lockdown. Intuitively, the effect of health risks on people’s behaviour (if any) are likely to be larger in regions where the virus is circulating in the community.

Graph 5

Labour Force Participation Rate in Victoria

By health status*



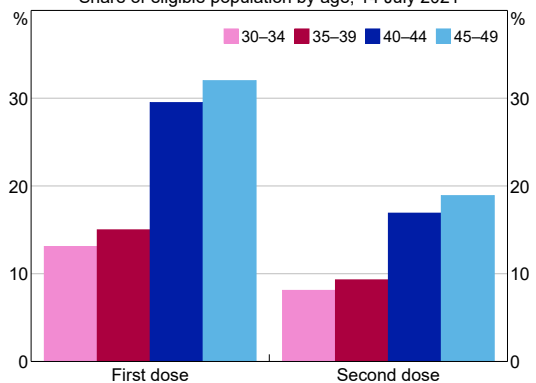
* A person has a medical condition if they reported in the HILDA Survey to have at least one of the following conditions in 2020 and prior to the pandemic: chronic bronchitis, asthma, heart disease, diabetes, arthritis, cancer, high blood pressure, a serious circulatory condition or a mental health issue. The sample is restricted to the working age population in Victoria below the age of 70.

Sources: HILDA Survey Release 20.0; RBA

Graph 6

COVID-19 Vaccinations

Share of eligible population by age, 14 July 2021



Source: Australian Immunisation Register

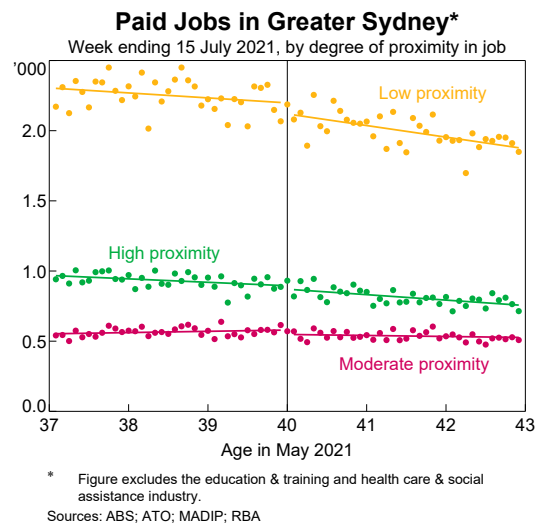
If vaccination eligibility had a positive effect on labour supply at the individual level, we would expect to see an upward level shift in the dots just above the cut-off relative to the dots just below the cut-off; that is, there would be more paid jobs for workers slightly above the age of 40 due to a decline in COVID-19 health risks stemming from vaccine eligibility. There is no evidence of this. Indeed, comparing the estimated line-of-best-fit on either side of cut-off point suggests that, if anything, being eligible for a vaccine led to a very small decline in paid employment.^[10] However, this effect is not statistically significant.

We also tested to see whether an individual's labour supply response to COVID-19-related health risk depended on the type of job they held. In particular, we might expect that a person's ability to remain socially distant at work would influence their willingness to work. For example, health risks may be more relevant to labour supply decisions of people working in hospitality or other customer-facing service industries where social distancing is difficult. On the other hand, health risks are likely to be largely irrelevant to labour supply decisions in jobs that can be done from home. To examine this, we classified individuals' jobs by the expected degree of physical proximity to others in their workplace.^[11] For example, hospitality, retail and construction were all classified as jobs that require a high degree of physical proximity, while professional and financial services were characterised as 'low proximity' jobs due to a

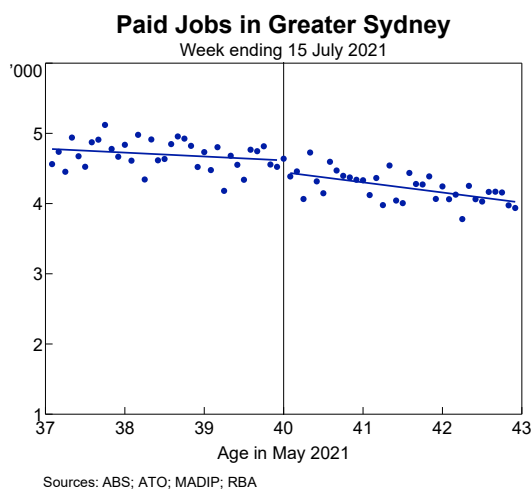
greater ability to work from home. Again, we found no evidence of a discontinuity and hence an effect of vaccine eligibility on labour supply – even in jobs involving a high degree of physical proximity to others (Graph 8).

These results were consistent for Australia as a whole and those living in regions with higher community transmission at the time, like Melbourne and those Sydney Local Government Areas (LGAs) that had the highest rates of community transmission in mid-July (Graph 9) – referred to by the authorities as 'LGAs of concern'. We also found no effects of vaccine eligibility on other measures of labour supply, such as total employed persons and hours worked.

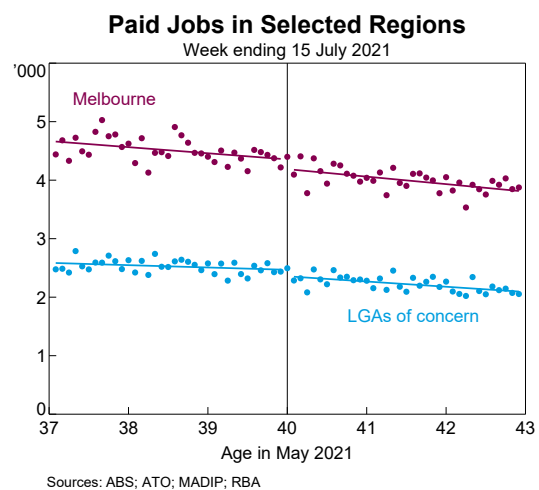
Graph 8



Graph 7



Graph 9



Overall, we found that changes in vaccine eligibility – and, accordingly, changes in COVID-19-related health risks – had no discernible effect on labour supply for people close to the age of 40 years during the Delta outbreak. One potential explanation for this result is that the risk profile for those close to the age of 40 was actually quite small, due to the lower probability of severe illness associated with catching COVID-19 at that age and the much lower infection rates in the community relative to overseas and the recent Omicron outbreak. In saying that, data from the HILDA survey in late 2020 suggested that more than one-third of all individuals around the age of 40 years believed there was at least a 50 per cent chance that they would need to be hospitalised if infected with COVID-19. As mentioned above, such subjective assessments are likely to matter more than the actual risk for behaviour.

Nevertheless, we might expect to see a stronger response from older people or in environments with higher community transmission and/or less protection from public health measures. The experience in other countries, such as the United States, is informative here, although there are important differences between these countries that need to be factored in. For example, in the United States, workers in customer-facing jobs may be more willing to forgo work during an outbreak since the wage rates for those jobs are generally much lower than in Australia.

Health concerns during the Omicron outbreak

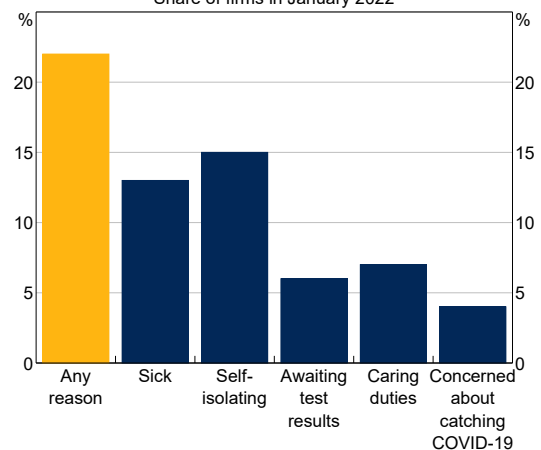
While we found no evidence of changes in labour supply due to COVID-19 health risks during the second and third waves in Melbourne and Sydney, respectively, it is possible that workers will respond differently now that we are ‘living with COVID-19’. Australian Bureau of Statistics survey data show that around one-fifth of all employing firms experienced staff availability issues in January 2022, reflecting the large increase in COVID-19 cases due to the Omicron outbreak (Graph 10). Although most staff shortages appeared to be driven by isolation requirements as a result of infection or close contact, 4 per cent of all firms mentioned that

concerns about catching COVID-19 at the workplace affected the availability of at least some of their employees. In turn, this suggests that *less than 4 per cent of all workers* were unavailable due to concerns about catching COVID-19, although it is difficult to infer from these data the precise number or age group of workers affected. In February, when COVID-19 cases fell, the share of firms citing concerns about COVID-19 as a reason for staff absences also fell, to 2 per cent. This provides some evidence of a voluntary behaviour change due to health risks, at least temporarily during periods of high community transmission. Because similar survey questions were not asked during earlier outbreaks, we need to be cautious in drawing the conclusion that health concerns had a larger effect on labour supply than they did during those previous outbreaks.

Although the effects of the Omicron outbreak on labour supply are expected to be short lived at the time of writing, a key uncertainty is whether future outbreaks of the COVID-19 virus will contribute to recurring staff unavailability issues, due to sickness or fear of infection. Indeed, retirement intentions picked up at the end of 2021 and may reflect older Australians responding to a higher perceived risk with COVID-19 circulating in the community – although it is too early to determine whether this will result in actual retirement and whether it is entirely due to fear of infection (see Graph 4, above).

Graph 10

COVID-19 Factors Affecting Staff Availability*
Share of firms in January 2022



* Firms could select more than one response.
Sources: ABS; RBA

Conclusion

By looking at two case studies, we found no clear evidence that a fear of being infected with COVID-19 reduced the supply of labour in a meaningful way during previous outbreaks in Australia. More timely data suggest that the emergence of the Omicron variant – and with it, greater community transmission and fewer public activity restrictions – has discouraged a small number of people from going to the workplace, at least temporarily. The international experience is also informative in thinking about whether people may opt to withdraw from the workforce. However, it is also important to keep in mind the differences in public health systems and other features of the labour market (such as the higher wages for lower-paid workers in Australia relative to the United States) when drawing any lessons.

Appendix A

Regression discontinuity model with Single Touch Payroll (STP) data

We used a regression discontinuity model to estimate the effect of vaccine age eligibility on labour supply. We only included individuals who were aged between 38 and 42 years in May 2021 in our estimation sample. We estimated the below equation using data that was aggregated by year and month of birth:

$$\ln E_{i, July} = \alpha + \beta_1 A_{genorm_{i, May}} + \beta_2 Elig_{i, May} + \beta_3 Elig_{i, May} \cdot A_{genorm_{i, May}} + \epsilon_{it}$$

Where:

- $\ln E_{i, July}$ refers to the log of the number of paid jobs in the week ending 15 July worked by people in age group i (where age groups are defined by year and month of birth).
- $A_{genorm_{i, May}}$ refers to the age (in years and months) of the workers in age group i in mid-May minus 40 years.
- $Elig_{i, May}$ is a dummy variable that is equal to 1 if the individuals were aged 40 and above in mid-May and zero otherwise. We excluded those who turned 40 years old between May and July 2021 (inclusive) from the estimation sample, because that group could not be cleanly allocated to the treatment or control.
- β_2 is the coefficient of interest, which captures the effect of vaccine age-eligibility on labour supply.

Table A1 shows the estimates of β_2 from the above specification. Column (1) presents the results for all of Australia, while Columns (2)–(4) show results for Greater Sydney, Sydney ‘LGAs of concern’ and Greater Melbourne, respectively. The point estimates are small and not statistically significant for all regions studied. As such, there was no evidence that changes to vaccine eligibility affected the number of payroll jobs. We found similar results when using a measure of employment as the dependent variables (calculated as the number of unique employed individuals in the STP microdata) and when we used a slightly later period to measure outcomes (mid-August 2021). ✎

Table A1: Regression Discontinuity Regression Results

Main results

	(1) Australia	(2) Greater Sydney	(3) LGAs of concern	(4) Greater Melbourne
ln(Jobs)	−0.00730 (0.0291)	−0.0253 (0.0320)	−0.0400 (0.0325)	−0.0435 (0.0289)
ln(EmployedPersons)	−0.00840 (0.0290)	−0.0254 (0.0313)	−0.0374 (0.0326)	−0.0450 (0.0287)
Observations (Age groups)	45	45	45	45

Notes: standard errors in parentheses. Coefficients shown are the treatment effect of vaccine eligibility on labour market outcomes.

Sources: ATO; ABS; RBA

Endnotes

- [*] The authors are from Economic Research Department. They would like to thank Benjamin Beckers, Emma Chow, Jessica Meredith and Neya Suthaharan for their thoughtful advice and suggestions.
- [1] The majority of the fieldwork for the 2020 HILDA survey was conducted in August and September 2020, which followed the first lockdown in New South Wales and overlapped with lockdowns in Victoria (Watson, Jin and Summerfield 2021). The remaining surveys were conducted until February 2021, which coincided with localised lockdowns in parts of Sydney, Perth and Melbourne. Outside of these lockdowns, activity restrictions were still in place, such as visitor limitations and mask-wearing requirements in certain situations.
- [2] For a related discussion, see Jones (2021); Haldane (2015). For a discussion on dread risk in the literature, see Kahneman and Tversky (2013); Barro (2006); Nakamura *et al* (2013).
- [3] As discussed in RBA (2022), the emergence of the Omicron variant has led to increased precautionary behaviour on the part of consumers related to health considerations. Information from the Bank's business liaison program and other timely indicators suggest that spending on a range of discretionary goods and services declined in January 2022, particularly in hospitality and tourism, but the overall impact on consumer spending has been much smaller than during periods of lockdown. This is despite many jurisdictions winding back public health restrictions.
- [4] These data are part of the US Census Bureau's Experimental Data Series; as such, data products may not meet some of the Census Bureau's statistical quality standards.
- [5] Our key data source for this analysis – the HILDA survey – was in the field during the second wave in Victoria; 95 per cent of surveys were conducted while restrictions were in place.
- [6] The self-assessed probability of hospitalisation (if infected) was 13 percentage points higher on average for people with health issues compared to those without health issues (this calculation compared people of similar ages).
- To account for the possibility that job loss during the pandemic could lead to a deterioration in a person's health (which would bias our estimates), we required the health condition to have been diagnosed before the pandemic. We also restricted the sample to the working age population below the age of 70.
- [7] This exercise is akin to a difference-in-difference model, where the treatment and control groups are defined as those with and without underlying health conditions, respectively. By focusing on the *change* in participation rates during the pandemic relative to pre-pandemic rates, this approach abstracts from the fact that people with health conditions tend to be less likely to participate in the labour market in general. Controls (e.g. age) are interacted with the time dummy to absorb the effects of any, say, age-specific shocks during the outbreak.
- [8] This was six weeks after individuals aged over 40 became eligible for vaccinations but before vaccines were prioritised for those under the age of 40.
- [9] This approach is called a regression discontinuity design (RDD) method, which is discussed in further detail in Appendix A. To get such a narrow band around the vaccine eligibility cut off (and hence a very similar group of people), we used novel administrative taxation data collected through Single Touch Payroll enabled firms. This provided us with high frequency and near-real time data on individual's pay and employment outcomes for almost all employing firms from January 2020, merged with data on the individual's month and year of their birth from the ATO's client register accessed via the Multi-Agency Data Integration Project (MADIP) (2006 – 2020).
- [10] This difference between the two lines-of-best fit is essentially our estimate for the regression discontinuity model. The estimate reflects the local average treatment effect for a narrow group of people around the age of 40 years who were affected by the age-based vaccination program only. The results are provided in Appendix A.
- [11] This classification is based on a Grattan Institute Report, which calculates the degree of physical proximity within an industry by the extent to which occupations in that industry require close physical proximity to other people (Coates *et al* 2020).

References

- Barro R (2006), 'Rare Disasters and Asset Markets in the Twentieth Century', *Quarterly Journal of Economics*, 121(3), pp 823–866.
- Bernal J, N Andrews, C Gower, E Gallagher, R Simmons, S Thelwall, J Stowe, N Groves, G Dabrera, R Myers, C Campbell, G Amirthalingam, M Edmunds, M Zambon, K Brown, S Hopkins, M Chand and M Ramsay (2021), 'Effectiveness of Covid-19 Vaccines against the B.1.617.2 (Delta) Variant', *The New England Journal of Medicine*, 385(7), pp 585–594.

- Coates B, M Cowgill, T Chen and W Mackey (2020), 'Shutdown: Estimating the COVID-19 Employment Shock', Grattan Institute Working Paper No 2020-03.
- Dryhurst S, J Kerr, A Freeman, G Reechia, D Spiegelhalter and S van der Linden (2021), 'COVID-19 Risk Perception: A Longitudinal Analysis of its Predictors and Associations with Health Protective Behaviours in the United Kingdom', *Journal of Risk Perception*, 24(3–4), pp 294–313.
- Eichenbaum M, M Godinho de Matos, F Lima, S Rebelo and M Trabandt (2020), 'How Do People Respond to Small Probability Events with Large, Negative Consequences?', NBER Working Paper Series No 27988.
- Faberman JR, A Mueller and A Sahin (2022), 'Has the Willingness To Work Fallen During the COVID Pandemic?', NBER Working Paper Series No 29784.
- Fang H, L Wang and Y Yang (2020), 'Human Mobility Restrictions and the Spread of the Novel Coronavirus (2019-nCoV) in China', *Journal of Public Economics*, 191, Art 104272.
- Faria e Castro M (2021), 'The COVID Retirement Boom', *Economic Synopses*, No 25.
- Forster van Aerssen K, R Gomez-Salvador, M Soudan and S Tajda (2021), 'The US and UK Labour Markets in the Post-pandemic Recovery', *ECB Economic Bulletin*, 8.
- Goolsbee A and C Syverson (2021), 'Fear, Lockdown, and Diversion: Comparing Drivers of Pandemic Economic Decline 2020', *Journal of Public Economics*, 193, Art 104311.
- Gupta S, K Simon and C Wing (2020), 'Mandated and Voluntary Social Distancing during the COVID-19 Epidemic', *Brookings Papers on Economic Activity*, Summer(Special Edition), pp 269–326.
- Haldane A (2015), 'Stuck', Speech at Open University, Bank of England, 30 June.
- Jones B (2021), 'Uncertainty and Risk Aversion – Before and After the Pandemic', Keynote Address at the Minerals Week Australia-Asia Investment Outlook, Canberra, 2 June.
- Kahneman D and A Tversky (2013), 'Prospect Theory: An Analysis of Decision Under Risk', in W Scientific (ed), *Handbook of the Fundamentals of Financial Decision Making*, World Scientific Handbook in Financial Economics Series, pp 99–127.
- Kompaniyets L, AF Pennington, AB Goodman, HG Rosenblum, B Belay, JY Ko et al (2021), 'Underlying Medical Conditions and Severe Illness Among 540,667 Adults Hospitalized With COVID-19, March 2020–March 2021', *Preventing Chronic Disease*, 18(E66), pp 1–13.
- Lowe P (2021), 'Delta, the Economy and Monetary Policy', Address to the Anika Foundation, Online, 14 September.
- Nakamura E, J Steinsson, R Barro and J Ursua (2013), 'Crises and Recoveries in an Empirical Model of Consumption Disasters', *American Economic Journal: Macroeconomics*, 5(3), pp 35–74.
- Nie J and S-KX Yang (2021), 'What Has Driven the Recent Increase in Retirements?', Federal Reserve Bank of Kansas City *Economic Bulletin*, 11 August.
- Price DJ, FM Shearer, MT Meehan, E McBryde, R Moss, N Golding, EJ Conway, P Dawson, D Cromer, J Wood, S Abbott, J McVernon and JM McCaw (2020), 'Early Analysis of the Australian COVID-19 Epidemic', *eLife*, 9(e58785).
- RBA (Reserve Bank of Australia) (2022), *Statement on Monetary Policy*, February.
- Sheridan A, AL Anderson, ET Hansen and N Johannesen (2020), 'Social Distancing Laws Cause Only Small Losses of Economic Activity during the COVID-19 Pandemic in Scandinavia', *Proceedings of National Academy of Sciences United States of America*, 117(34), pp 20468–20473.
- Watson N, Y Jin and M Summerfield (2021), 'Wave 20 Data Quality and HTE Impact of Questionnaire and Fieldwork Changes Due to the COVID-19 Pandemic', HILDA Project Discussion Paper Series No 1/12.

HILDA Disclaimer

The Significant Shift in Australia's Balance of Payments

Nicole Adams and Tim Atkin^[*]



Photo: William Voon / EyeEm – Getty Images

Abstract

Over recent years Australia has seen a large shift in its external accounts. In contrast to long-running deficits, the current account balance has now been in surplus for over two years, supported by record trade surpluses. The corollary of this is that the level of national savings has surpassed investment and Australia has become a net exporter of capital. This article examines these changes and highlights some key trends that are associated with this shift. These include the decline of foreign direct investment following the end of the mining boom, as well as an increase in purchases of foreign equities by Australian superannuation and investment funds. These developments have contributed to a significant decline in Australia's net foreign liability position as a percentage of GDP, which is at its lowest levels in a number of decades.

Introduction

The balance of payments is a statistical statement that summarises the economic transactions of an economy with the rest of the world for a specific time period. It divides transactions into two broad accounts: the current account; and the combined capital and financial account. In essence, the current account captures the net flow of money that results from Australia engaging in international trade, while the combined capital and financial account captures Australia's net change in ownership of assets and liabilities. These broad accounts are often

referred to as the 'two sides' of the balance of payments (RBA 2022).

In recent years, Australia's current account position has shifted from a long history of deficits to being in surplus, reflecting the largest trade surpluses on record. Over the three decades from the early 1980s, Australia ran current account deficits equivalent to around 4 per cent of nominal GDP. This was largely due to a surplus of attractive investment opportunities in excess of Australia's capacity to fund those via domestic savings, and so funding was sourced from overseas. At times, these deficits

have been the source of much economic debate about the sustainability of Australia's macroeconomic growth.^[1]

While the current account balance is the sum of the trade balance and the net income balance, it is also equal to the difference between national savings and investment. This relationship is helpful for understanding how developments in the domestic economy relate to changes in the external accounts. Unlike in the past, Australia's economy now generates savings in excess of domestic investment, and the current account is in surplus (Graph 1).

As a result of saving exceeding domestic investment, Australia is now a net lender to the rest of the world. This is recorded as a capital outflow, and the capital and financial account is now in deficit (Graph 2). The composition of Australia's capital flows has also changed significantly in the past decade or so. Some recent (and probably temporary) factors related to the COVID-19 pandemic have contributed to these trends.

This shift to a capital and financial account deficit (net capital outflow) has contributed to a decline in Australia's net foreign liabilities – the total amount we owe foreigners less what foreigners owe us – which are at their lowest levels as a per cent of nominal GDP in a number of decades (Graph 3). The primary reason for this decrease in net liabilities has been the widening of Australia's net foreign equity asset position, while net foreign debt has remained little changed.

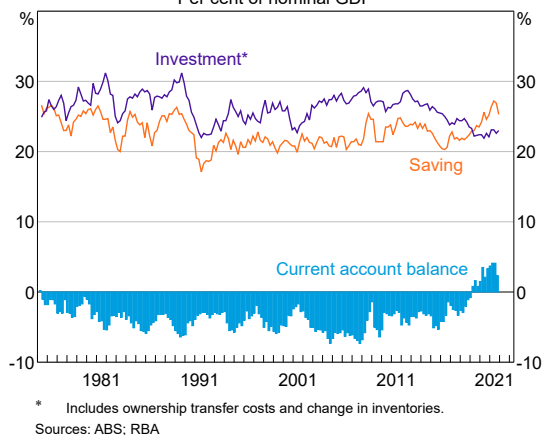
This article highlights some key trends that are associated with the development of a current account surplus in Australia. First, it examines the perspective of national saving and investment. It then focuses on the nature and extent of this change across the components of the current account and the combined capital and financial account.

Setting the scene through saving and investment trends

Investment in the Australian economy has historically been greater than saving, and as a corollary Australia has run current account deficits (Bishop and Cassidy 2012).^[2] Historically, saving as a per cent of nominal GDP was similar to other advanced economies, while investment was

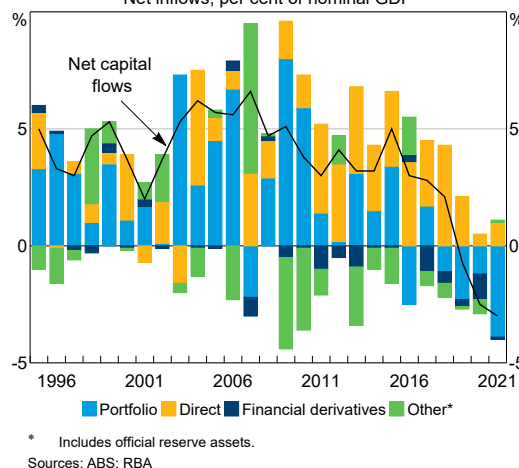
Graph 1

Saving and Investment
Per cent of nominal GDP



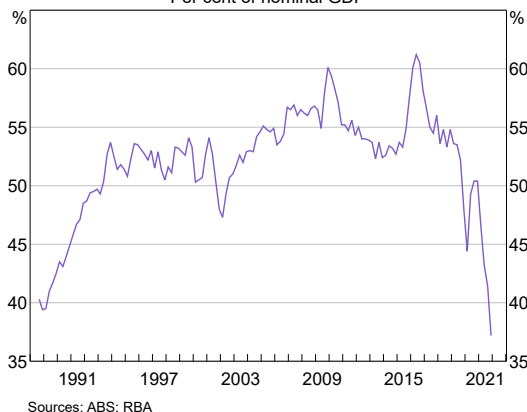
Graph 2

Australian Capital Flows by Type
Net inflows, per cent of nominal GDP



Graph 3

Net Foreign Liabilities
Per cent of nominal GDP



relatively high, particularly over the decade or so from the early 2000s (Graph 4).

The relatively high level of investment in Australia over this period was associated with the investment phase of the mining boom, which attracted foreign capital. Companies in the resource sector expanded their productive capacity substantially in response to high commodity prices. By contrast, the investment share of GDP in other advanced economies declined over a similar period, particularly after the onset of the global financial crisis, and has remained low for a number of years (ECB 2017).

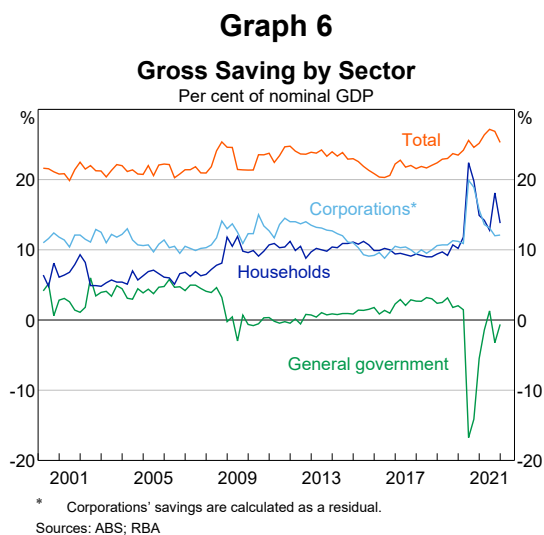
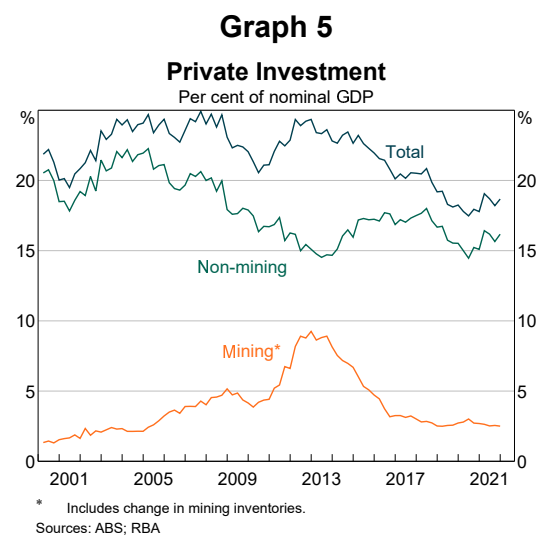
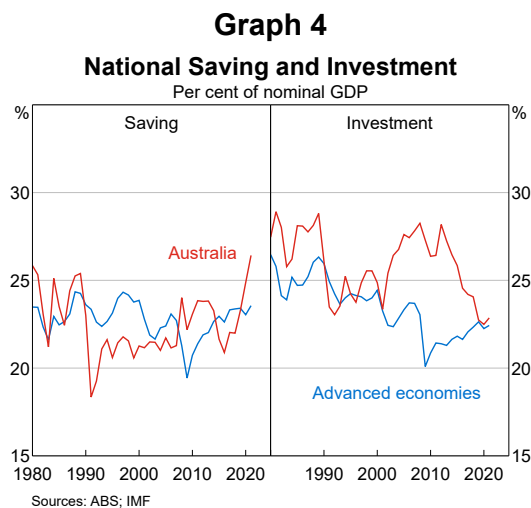
More recently, the investment share of GDP in Australia has declined to levels similar to those in other advanced economies. This largely reflects a decline in mining investment as the investment phase of the mining boom came to an end as well as a longer-run decline in the non-mining business investment share of output (van der Merwe *et al* 2018) (Graph 5). Meanwhile, housing-related and public sector investment has maintained a fairly steady share of output.

In addition, national saving has risen over recent years and now exceeds national investment. An upward trend was evident prior to the pandemic. This partly reflected the increase in commodity export revenues that occurred as a result of new production capacity following the mining investment boom, as well as a large improvement in Australia's terms of trade. These factors raised Australia's national income, part of which was saved.

It also reflects a large increase in saving by the corporate and household sectors during the pandemic (Graph 6). The increase in household saving was associated with health-related activity restrictions reducing consumption opportunities, and a boost to incomes from government support measures. The rise in private sector saving was partly offset by a decline in (and indeed negative) government saving; the extraordinary fiscal policy measures put in place by federal and state governments to support incomes and employment during the pandemic led to a large increase in government deficits.

The current account perspective

Australia's current account balance shifted into surplus in mid-2019 for the first time since the 1970s



(Graph 7). Developments in the trade balance have been the main driver of this shift. After being in deficit for most of the previous four decades, the trade balance has been mostly in surplus since late 2016; it increased to its highest level on record at around 7 per cent of nominal GDP in the September quarter of 2021.

As mentioned above, this shift in the trade balance was primarily driven by the end of the mining boom – specifically the move from the investment phase to the production phase. The relative price of exports also rose over that time; the terms of trade are currently around 50 per cent higher than their trough in 2016, primarily reflecting large increases in iron ore, LNG and coal prices.

The other part of the current account is the net income balance. Since Australia's foreign liabilities are larger than foreign assets, Australia's payments are larger than its income received – accordingly, Australia has a net income deficit. The net income deficit narrowed over the few years prior to the pandemic mainly because the payments Australia made on its debt decreased as global interest rates declined (Graph 8). Interest rates paid to Australians that hold debt issued by foreigners likewise declined, but the stock of these assets is smaller than the stock of debt liabilities, so this decline was more than offset by the decrease in debt liability payments. After the onset of the pandemic the net income deficit narrowed further as Australian companies implemented dividend freezes and income outflows declined. However, the net

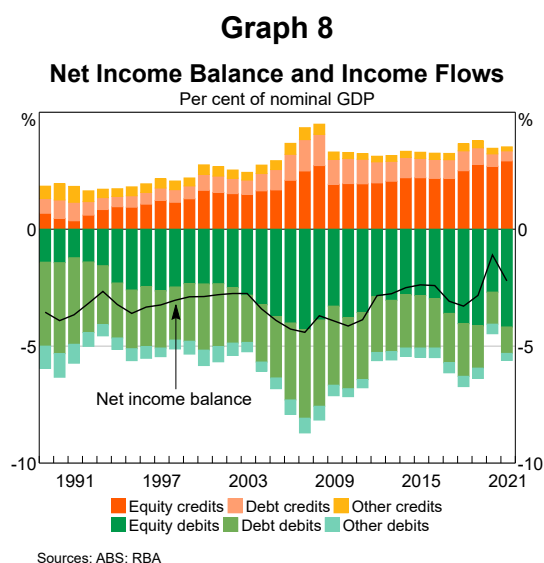
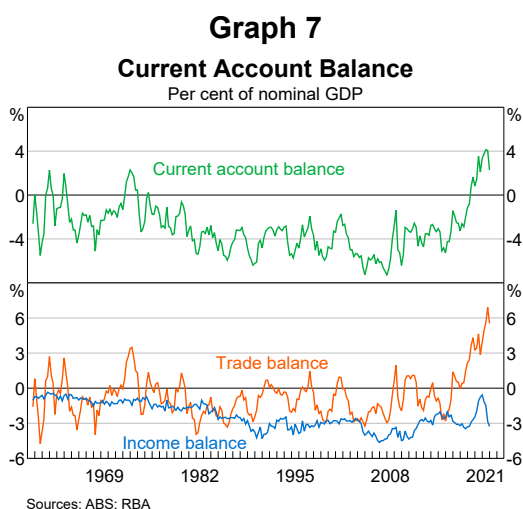
income deficit has widened once more as dividend payments resumed.

The financial account – the other side of the coin

Australia's history of current account deficits has meant it has sourced capital from the rest of the world in net terms. This inflow of capital has meant Australia has historically run a capital and financial account surplus. However, since 2019, when domestic savings became greater than investment, Australia has recorded a deficit on the capital and financial account (net capital outflows). These net outflows do not imply a lack of attractive investment opportunities in Australia – in fact, investment is at a similar level to other advanced economies, and there are still gross inflows of foreign investment (Graph 9). Rather, these developments reflect the outcomes of saving and investment decisions by all sectors of the Australian economy, which are influenced by the prices of assets and liabilities in different markets.

As such, there are three key factors that have contributed to Australia's shift to a net exporter of capital:

1. **The decline in investment from very high levels following the end of the mining investment boom.** In the financial account, this was reflected in a large decline in foreign direct investment (FDI) inflows. For the decade before 2018, net FDI inflows were equivalent to around



3 per cent of nominal GDP – a large share of which went to the mining sector. More recently, net inflows have declined to around 1 per cent of nominal GDP. The pandemic has added to this downward trend, reflecting the broader decline in FDI flows across the world (UNCTAD 2021).

2. **Mining companies now reinvest less of their earnings.** As export revenues have increased over recent years, mining companies have instead paid out larger dividends to an investor base with a relatively high share of foreign ownership. This change from reinvesting earnings (which are recorded as an income outflow in the current account and a financial inflow in the financial account) to dividend payments (shown as an income outflow) has contributed to equity outflows (Black, Chapman and Windsor 2017).
3. **The continued expansion of the superannuation sector.** The superannuation sector has grown substantially and there has been an increasing trend towards investment in equities, including foreign equities, as investors have moved out of other asset classes with lower returns, such as cash and fixed income. Reflecting this, portfolio equity outflows have increased over the past five years or so, as superannuation funds have increased the share of foreign equity assets in their portfolios (APRA 2021). In the past, portfolio equity outflows were

more than offset by inflows of equity from FDI; however, more recently Australia has recorded a net outflow of equity as FDI inflows have declined and portfolio equity outflows have increased.

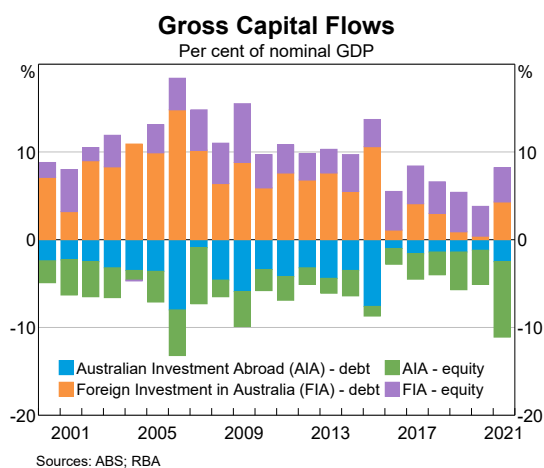
Some of the significant policy responses by the Australian Government and the Reserve Bank of Australia during the pandemic are also evident in the financial account. In 2020, there were large capital outflows related to the decline in the stock of the banking sector's offshore debt. In part, this reflected access to low-cost funding domestically, including through the Reserve Bank's Term Funding Facility, as well as a decline in credit growth. As a result, banks did not need to borrow in offshore markets and the outstanding offshore debt decreased by around 20 per cent in 2020 compared with the year prior. There were also large inflows of debt capital related to foreign purchases of Australian federal and state government debt in 2020. These inflows were the result of the government issuing a large amount of debt to fund the fiscal policies that supported incomes and employment during the pandemic.

Net foreign liability position

The net foreign liability position is the stock of debt and equity that Australia owes to foreigners less how much foreigners owe Australia; it represents the accumulation of Australia's net capital inflows over many years, as well as changes in the value of the stock of assets and liabilities. Historically, Australia's net borrowing from overseas increased its net foreign liability position and most offshore borrowing was in foreign currency. This led to debate about the level of Australia's external debt and its sustainability, as the extent of that debt measured in Australian dollars would increase whenever the exchange rate depreciated (Tease 1990). However, since the 1990s, most of Australia's foreign debt has either been borrowed in, or hedged back into, Australian dollars, thereby mitigating the exchange rate risk, particularly for the banking sector (Berger-Thomson and Chapman 2017).^[3]

Australia's net foreign liability position has decreased over recent years (Graph 10). After

Graph 9



peaking in 2016 at just above 60 per cent of nominal GDP, it has declined to below 40 per cent of nominal GDP – its lowest level since the 1980s – consistent with the growing pool of domestic savings available to finance investment. The ratio of Australia's external debt to external equity has also been relatively low compared to other advanced economies; this is because much of the external financing of the mining boom was in the form of equity (Graph 11). As such, the composition of external liabilities means Australia should be less exposed to volatility in global funding conditions than if external debt was higher (Jacobs 2019).

The gross stock of external assets and liabilities has continued to grow as the Australian economy has become more integrated with global capital markets (Jacobs 2019). As discussed below, the composition of Australia's debt and equity positions

has also changed significantly over the past three decades.

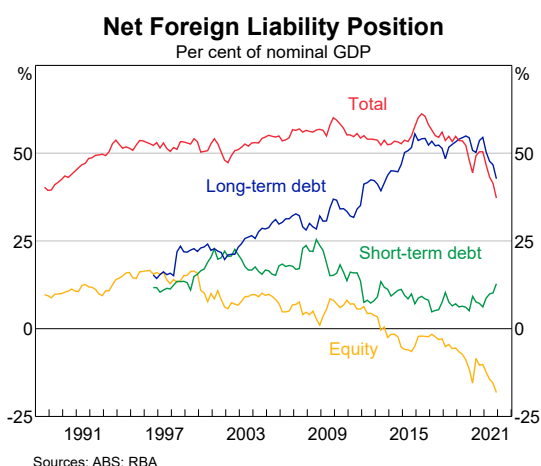
Equity

Underlying the decline in Australia's net foreign liability position has been the increase in Australia's net foreign equity assets. Since 2013, Australians have increasingly owned more foreign equities than foreigners own of Australian equities (Graph 12). This is in contrast to the net equity liability position recorded for most of Australia's history. The increase in net foreign equity assets has been driven by the net asset valuation effect (foreign equities have outperformed Australian equities) and other measurement changes.^[4] The ongoing accumulation of foreign equity assets by Australia's superannuation sector, as discussed above, has also partly offset foreign purchases of Australian equities (Debelle 2019).

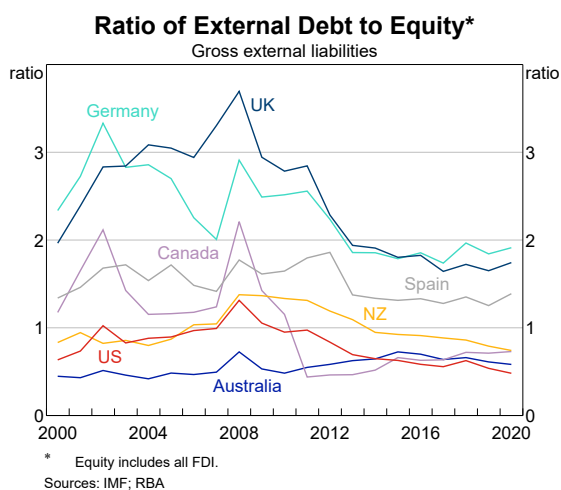
Debt

Australia's net debt liability position, as a share of nominal GDP, has remained fairly steady over the past five years or so. Over recent decades there has been a shift from short-term to long-term debt, facilitated by foreign investors purchasing Australian Government debt (Debelle 2019). Also, following the global financial crisis, regulatory changes such as Basel III provided an incentive for banks to reduce their use of short-term wholesale funding from offshore. Long-term debt reduces risks around having to roll over this funding during periods of heightened stress in financial markets (Jacobs 2019).

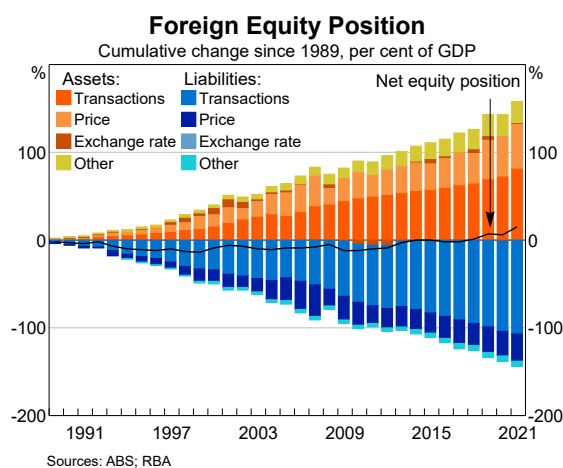
Graph 10



Graph 11



Graph 12



Responses to the COVID-19 pandemic have seen some changes to the composition of foreign debt liabilities. A large share of Australia's foreign-owned debt is issued by the banking sector (Graph 13). Prior to the pandemic, Australian banks' foreign portfolio debt liabilities had increased steadily as they chose to access international markets for around one-fifth of their total funding (Bellrose and Norman 2019). Since March 2020, the stock of Australian banks' foreign debt liabilities has declined to levels of around five years ago (as discussed above). Only recently have Australian banks started to return to international markets to raise funding in similar amounts to before the pandemic.

The stock of government debt owned by foreign investors has increased by around 20 per cent since March 2020, suggesting that foreign demand for Australian Government debt remains strong. While foreign ownership of government debt has increased, the large volume of issuance in this period means that the share of foreign ownership remains relatively low.

Conclusion

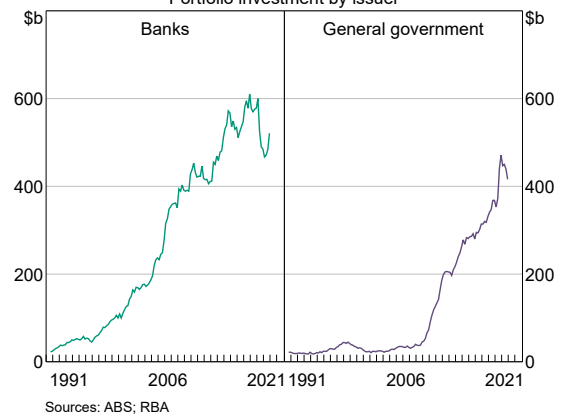
Australia's balance of payments and external position provide a useful lens through which to

view changes in the domestic and global economy. As savings have exceeded investment over the past few years, the current account shifted from a deficit to a surplus. This followed the end of the investment phase of the mining boom as production came on line. Higher domestic savings throughout the pandemic have also contributed to this shift. Australia is now a net exporter of capital, as excess savings led to portfolio equity outflows and banks reduced their offshore borrowing, and the capital and financial account has shifted from a surplus to a deficit. ❖

Graph 13

Foreign Debt Liabilities

Portfolio investment by issuer



Endnotes

[*] The authors are from International Department. They would like to thank Nicholas Prokhovnik, David Jacobs, Matt Boge, Alex Heath, Jason Griffin, Grace Anthony, John Boulter and Matthew Carter for their valuable input and feedback.

[1] For detail on this discussion, see Belkar, Cockerell and Kent (2007); Debelle (2011).

[2] Saving is a flow measure (rather than stock).

[3] The updated Survey of Foreign Currency Exposure will provide some insights into these implications later in the year.

[4] Other changes include adjustments in asset and liabilities positions not due to transactions or revaluation effects (e.g. reclassifications, holding gains or losses, and debt cancellation). For more detail, see IMF (2013).

References

APRA (Australian Prudential Regulation Authority) (2021), 'Quarterly Superannuation Performance Statistics', September.

Belkar R, L Cockerell and C Kent (2007), 'Current Account L Deficits: The Australian Debate', RBA Research Discussion Paper No 2007-2.

Bellrose K and D Norman (2019), 'The Nature of Australian Banks' Offshore Funding', RBA *Bulletin*, December.

Berger-Thomson L and B Chapman (2017), 'Foreign Currency Exposure and Hedging in Australia', RBA *Bulletin*, December, pp 67–76.

Bishop J and N Cassidy (2012), 'Trends in National Saving and Investment', RBA *Bulletin*, March, pp 9–18.

- Black S, B Chapman and C Windsor (2017), 'Australian Capital Flows', *RBA Bulletin*, June, pp 23–34.
- Debelle G (2011), 'In Defence of Current Account Deficits', Address at ADBI/UniSA Workshop on Growth and Integration in Asia, Adelaide, 8 July.
- Debelle G (2019), 'A Balance of Payments', Address to the Economic Society of Australia, Canberra, August.
- ECB (European Central Bank) (2017), 'Box 1: Investment Dynamics in Advanced Economies since the Financial Crisis', *Economic Bulletin*, Issue 6, September.
- IMF (International Monetary Fund) (2013), *Sixth Edition of the IMF's Balance of Payments and International Investment Position Manual (BPM6)*, November.
- Jacobs D (2019), 'How Do Global Financial Conditions Affect Australia?', *RBA Bulletin*, December.
- RBA (Reserve Bank of Australia) (2022), 'Trends in Australia's Balance of Payments', Explainer.
- Tease W (1990), 'The Balance of Payments in the 1980s', RBA Research Discussion Paper No 9003.
- UNCTAD (United Nations Conference on Trade and Development) (2021), *Investment Trends Monitor*, Issue 38, January.
- van der Merwe M, L Cockerell, M Chambers and J Jääskelä (2018), 'Private Non-mining Investment in Australia', *RBA Bulletin*, June.

Are First Home Buyer Loans More Risky?

Maia Alfonzetti^[*]



Photo: Witthaya Prasongsin – Getty Images

Abstract

Despite the rate of home ownership in Australia drifting down over recent decades, 2020 saw a large increase in first home purchases. Given the high level of housing prices and household indebtedness, this raises the question of whether first home buyer (FHB) loans contribute disproportionately to financial stability and macroeconomic risks. FHBs appear to be riskier than other owner-occupiers, at least during the first five years of the loan. They have higher loan-to-valuation ratios and lower liquidity buffers. While this might suggest FHBs would be more vulnerable than other borrowers during a negative income or housing price shock, recent experience indicates that FHBs have been no more likely to report financial stress or be in arrears. One potential explanation is that FHBs have historically experienced better labour market outcomes than other borrowers.

Introduction

Over recent years, there has been a build-up of systemic risks associated with rising and high levels of household indebtedness. These risks can threaten the stability of the financial system as well as macroeconomic stability given the potential for highly indebted households to amplify economic shocks (RBA 2021). When assessing these risks, regulators monitor and analyse trends across various types of lending. This article focuses on whether lending to first home buyers (FHBs)

contributes disproportionately to overall systemic risks.

Housing loan commitments to FHBs increased sharply over 2020, supported by government programs aimed at boosting home ownership such as the First Home Loan Deposit Scheme, as well as low interest rates (Graph 1). Over 2021, the value of FHB commitments declined a little as rapid growth in housing prices made it more difficult for FHBs to enter the market. Alongside the increase in investor activity, this saw FHBs' share of commitments

decline to just over 20 per cent of the value of total housing loan commitments in 2021.

To assess the riskiness of FHB loans relative to other loans, I used a broad range of metrics at different stages of the loan life. These metrics informed whether FHBs could be more at risk of defaulting on their loans or pulling back on their consumption during an economic shock than other borrowers. FHBs typically borrow a much higher share of the value of the property than other owner-occupiers or investors, as accumulating a deposit is often their main barrier to entering the housing market. FHBs also tend to have lower buffers of liquid assets that could be used to shield their consumption during a negative income or expenses shock in the first few years of the loan. However, FHBs are also generally at an earlier stage of their career, and so have historically experienced stronger income growth and have been no more likely to experience income loss than other borrowers.

A number of data sources were used to assess the relative riskiness of FHBs. For timely information on the characteristics of new FHB loans, I used monthly data collected by the Australian Prudential Regulation Authority (APRA) on a ‘best endeavours basis’ for the largest mortgage lenders and loan-level data from the Reserve Bank’s Securitisation System. The Securitisation System contains detailed data on each of the mortgages underlying Australian residential mortgage-backed securities, representing roughly one-third of Australian mortgages. Household-level survey data from the

ABS’ Survey of Income and Housing (SIH) and the Household, Income and Labour Dynamics in Australia (HILDA) Survey provided a broader range of FHB borrower characteristics, including financial stress experiences and labour market outcomes.^[1]

Characteristics of FHBs

FHBs are typically younger than other new owner-occupiers and investors, although the average age of FHBs has been steadily increasing over time (Table 1). In 2017/18, the median age of FHBs (with loans up to three years old) was 33, which was around 10 years younger than the median age of other borrowers with loans up to three years old. This age gap has been relatively persistent over the past couple of decades. The rising age of FHBs has been driven by higher housing prices increasing the time required to save for a deposit, as well as demographic factors such as marriage and starting a family occurring later in life (Simon and Stone 2017). The average time required to save for a deposit on a median-priced dwelling across Australian capital cities has continued to rise to be almost eight years in 2021.

The younger age of most FHBs also means they are usually at an earlier stage of their career. Consistent with this, Securitisation System data on loans originated over the year to January 2022 indicate that the median gross income at origination of FHBs was below that of other borrowers.^[2] More broadly, owner-occupiers tend to have lower incomes than investors at origination.

The survey data suggest that FHBs and other new owner-occupiers were equally likely to be in a couple household in 2017/18. More timely data from the Securitisation System show that FHB loans originated over the past year were less likely to be joint loans than other new owner-occupier loans. FHBs have historically been much less likely to have dependents; more than half of FHBs in 2017/18 had no dependents, compared with around 40 per cent of both other new owner-occupiers and investors. FHBs were also somewhat more likely to be employed full-time and less likely to be self-employed. Similar shares of FHBs and other borrowers purchased in a capital city.

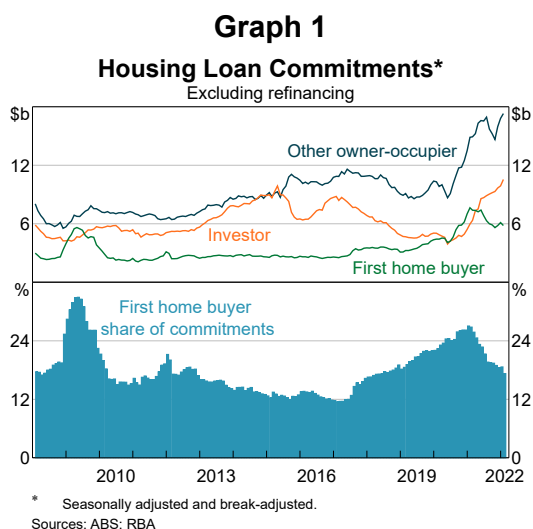


Table 1: Demographic Characteristics of New Borrowers

Share by number

	First home buyer	Other owner-occupier	Investor
Median age (years) ^(a)	33	43	44
Tertiary education (%) ^(a)	62	56	65
Employed full-time (%) ^(a)	85	81	78
Couple household (%) ^(a)	73	75	80
Average number of dependents ^(a)	0.68	1.08	1.06
Self-employed (%) ^(b)	9	17	21
Joint application (%) ^(b)	55	71	63
Capital city (%) ^(b)	76	74	74
Median gross income (\$) ^(b)	114,000	151,000	189,000

(a) Loans originated in the three years to 2017/18; age, education and employment status are for the household reference person.

(b) Loans originated in the year to January 2022.

Sources: ABS; RBA; Securitisation System

FHBs look riskier than other owner-occupiers

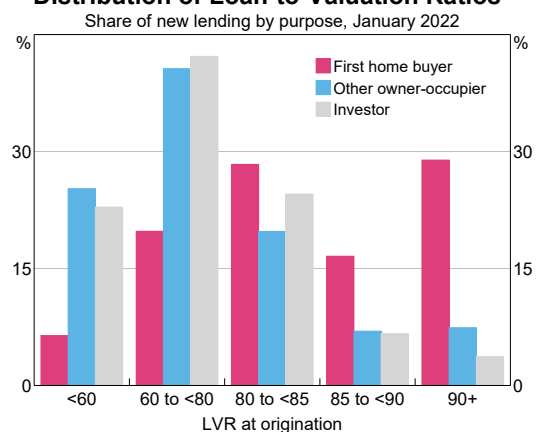
FHBs are more likely to be constrained by deposit requirements than owner-occupiers who are not purchasing their first property, as they have less savings due to their younger age and no equity in an existing dwelling to contribute to the deposit. As such, FHBs typically have to borrow a much higher share of the value of the property at origination. Almost 30 per cent of FHBs borrowed at a loan-to-valuation ratio (LVR) of 90 or more in January 2022, compared with 7 per cent of other owner-occupiers and 4 per cent of investors (Graph 2). Unsurprisingly, the LVR distribution of all outstanding FHB loans in the Securitisation System is more skewed towards higher LVRs than other owner-occupier loans (Graph 3). FHBs therefore have less of a buffer against housing price falls than other owner-occupiers and would be more likely to have their property price fall below the outstanding value of their loan (i.e. be in negative equity) for a given decline in housing prices. However, given the strong housing price growth over recent years, FHB loans were no more likely than other owner-occupier loans to be in negative equity in early 2022. The share of new lending to FHBs at high LVRs has also declined over the past year.

Household survey data show that FHBs historically had higher levels of debt relative to their income

than other owner-occupiers when they took out their loans, and therefore had higher debt-servicing costs for a given interest rate. However, strong housing price growth in excess of income growth over recent years has led to the deposit constraint becoming more binding on loan sizes of FHBs than in the past. As such, recent FHBs have been less likely than other new borrowers to have high debt-to-income (DTI) ratios. In January 2022, FHBs were equally likely as other owner-occupiers to borrow at DTI ratios of six up to eight at origination, but they rarely borrowed at very high DTI ratios of eight or above (Graph 4). By comparison, investors are much more likely to have high DTI ratios, as they typically

Graph 2

Distribution of Loan-to-Valuation Ratios*



* For the largest ADI mortgage lenders; data provided on a 'best endeavours' basis.

Sources: APRA; RBA

have more than one mortgage and tax incentives discourage them from paying down debt ahead of schedule. Some repeat buyers take out bridging loans to finance the purchase of their subsequent property; almost 30 per cent of lending to non-FHBs at DTI ratios of eight or more in January 2022 was bridging finance. Lenders may also be less willing to extend very high DTI loans to FHBs as they have less credit history than repeat borrowers. The share of new lending to FHBs at DTI ratios of six or above has increased a little over the past year.

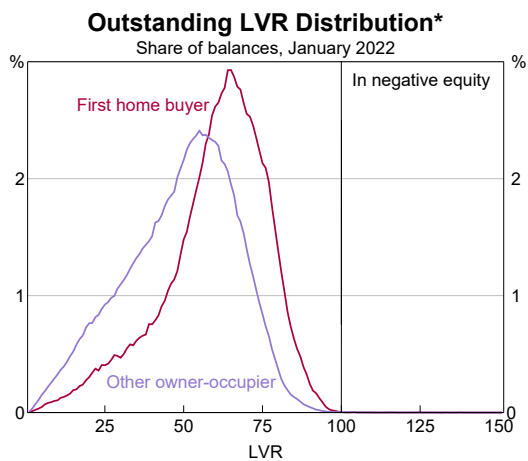
Another, more direct, measure of debt-servicing capacity is the net income surplus (NIS). The NIS refers to the amount of income remaining each month after covering basic living expenses and

mortgage payments. Lenders calculate the NIS for all new borrowers as part of their serviceability assessment, incorporating various buffers to factor in future interest rate increases and potential falls in income. Estimates from household survey data suggest that FHBs who took out a loan in the three years to 2017/18 typically had a lower NIS than other owner-occupiers and investors who took out loans at a similar time. This implies that FHBs have less capacity to absorb negative shocks to their income or expenses than other borrowers, and therefore may be more likely to face repayment difficulties or cut back their consumption during a shock.

Consistent with their tendency to have a lower NIS, household survey data show that FHBs with loans up to three years old have also typically had lower liquidity buffers than other borrowers with loans of the same age (Graph 5). Liquid assets (e.g. cash) help households get through periods of financial stress such as a loss of job. A liquidity buffer is measured here as the number of months of a borrower's disposable income that could be covered by their liquid assets (including deposits, shares and bonds). FHBs have generally had less time to accumulate liquid assets than other borrowers and, being at an earlier stage of their career, also typically have lower incomes than other borrowers in the first few years of the loan life. However, despite having lower liquidity buffers, FHBs were no more likely to be liquidity constrained than other owner-occupiers, with similar shares of FHBs and other owner-occupiers having liquid wealth (i.e. liquid assets less liquid debt) that was below their fortnightly disposable income in 2017/18.^[3]

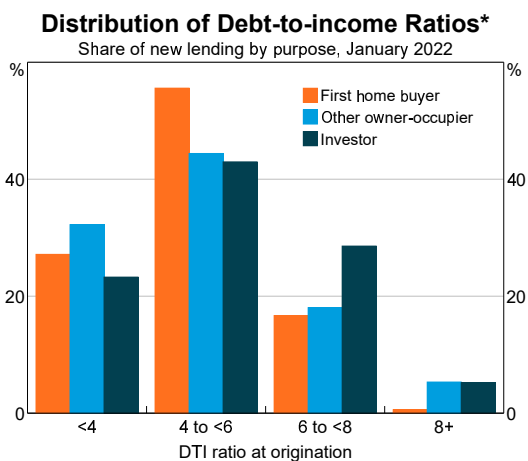
For indebted households, a key component of liquid assets is prepayment balances in offset and redraw facilities. Data from the Securitisation System show that variable rate FHB loans have lower starting prepayment balances than other new variable rate owner-occupier loans on average. This is unsurprising, as the deposit constraint is generally more binding for FHBs and so they have less capacity to put excess funds in an offset or redraw account in the early stages of the loan life.

Graph 3



* Loan balances adjusted for redraw and offset account balances; property prices estimated using SA3 price indices. Sources: ABS; CoreLogic; RBA; Securitisation System

Graph 4



* For the largest ADI mortgage lenders; data provided on a 'best endeavours' basis. Sources: APRA; RBA

While FHB loans appear to be riskier than other owner-occupier loans at origination, it is also useful to see if this changes as the loan matures. Data from the HILDA Survey suggest that FHBs pay down debt at a similar pace to other owner-occupiers over the first five years of the loan life, as their median housing DTI ratio and median LVR decline at a similar rate over time (Graph 6). Meanwhile, data from the Securitisation System show that average prepayment balances of FHB loans remain below those of other owner-occupier loans for up to five years. These findings suggest that the relative risk factors of FHB loans are persistent.

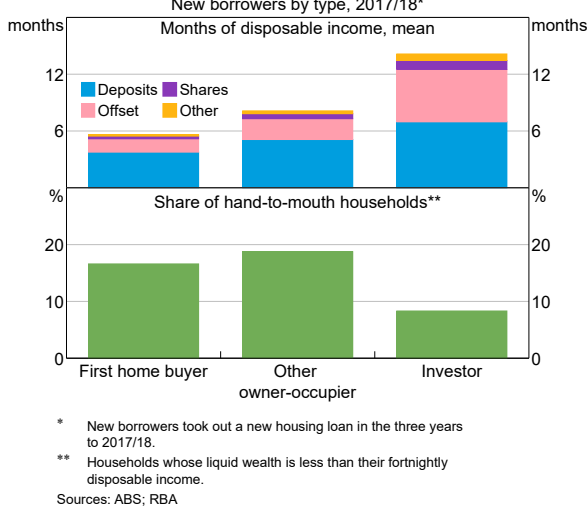
FHBs are no more likely to report financial stress or be in arrears

Despite appearing riskier across a range of metrics, survey data suggest that FHBs have been no more likely to report experiencing financial stress than other owner-occupiers over the loan life. The HILDA Survey asks respondents a number of questions relating to financial stress each year, such as whether they were unable to pay their mortgage on time, unable to pay their bills on time or had to miss a meal. In the loan origination year, FHBs were half as likely as other owner-occupiers to report making a late mortgage payment (Graph 7). The share of borrowers making late mortgage payments broadly increases in the years following the loan being taken out, as borrowers face a higher cumulative chance of shocks that may cause financial difficulty. But the differences between FHBs and other owner-occupiers with loans of the same age are small and not statistically significant. Similarly, FHBs and other owner-occupiers with loans of the same age were equally likely to report experiencing three or more financial stress events unrelated to paying their mortgage. Regression analysis, which controls for personal characteristics such as income and household composition, and loan characteristics such as LVR and loan age, confirms that being a FHB has no statistically significant impact on financial stress. Significant predictors of financial stress include having lower liquidity buffers, lower levels of income (both of which are more likely to apply to FHBs), a larger household size, poorer health or more negative perceptions of job security.

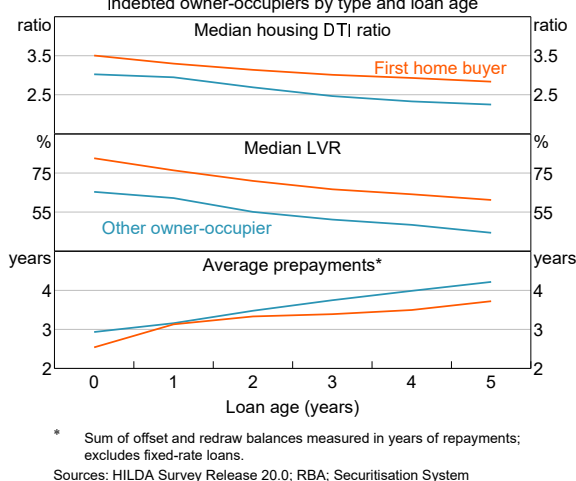
While making a late mortgage payment can be an early indicator of default, it may only represent a short-term liquidity problem. Loan-level data from the Securitisation System on 90-plus days housing loan arrears was used to complement the analysis on financial stress from the HILDA Survey.^[4] Loans that are behind on their payments by at least three monthly contractual payments are more likely to correspond to borrowers experiencing serious financial difficulty.

Aggregate arrears rates for FHB loans and other owner-occupier loans tracked reasonably closely until the beginning of 2020 (Graph 8). FHB arrears

Graph 5
Household Liquid Assets
New borrowers by type, 2017/18*



Graph 6
Housing Loan Characteristics
Indebted owner-occupiers by type and loan age



rates then experienced a much sharper drop and have remained lower since.

Arrears rates are influenced by both changes in the composition of outstanding loans and time effects that are common to all loans. The composition of outstanding loans changes with the shares of loans of different ages and loans originated in different years (cohorts). Common time effects on arrears include macroeconomic or housing market conditions as well as policy changes relating to how banks treat loans in arrears. A model that separates out the effects of the age, cohort and time period of the loan on arrears was estimated to better understand trends in FHB arrears rates.

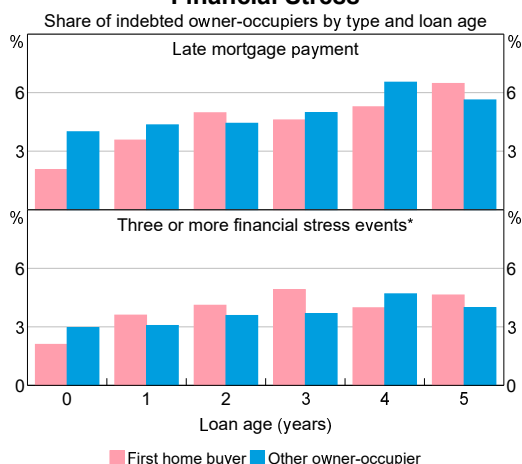
The drop in arrears rates in April 2020 was driven by a sharp decrease in the average age of outstanding owner-occupier loans in the Securitisation System at this time.^[5] All else equal, younger loans tend to display lower arrears rates as they have had less time to encounter shocks to employment or family circumstances. The decrease in average loan age was much more pronounced for FHB loans, following stronger growth in new FHB lending. Age effects have since had a stronger downward influence on arrears rates for FHBs than for other owner-occupiers, as the average age of FHB loans has remained lower. The model suggests that after around five years old, FHB loans become slightly more likely to be in arrears (after controlling for cohort and time effects), which makes the downward influence of rapid growth in new FHB lending on arrears even more pronounced.

Loans in different cohorts display different arrears rates, reflecting differences in lending standards or borrower expectations for future macroeconomic conditions in the year the loan was taken out. The model suggests that average cohort effects have been consistently lower for FHB loans than for other owner-occupier loans. One potential explanation is that tighter lending standards have been applied to FHB loans, which implies that for a given standard of lending, the quality of FHB borrowers is higher. Kelly, O'Malley and O'Toole (2014) and Giuliana (2019) found that FHBs were less likely to default on their loans in Ireland from 2013 to 2017; they suggested that banks applied stricter lending standards to FHBs due to lack of credit history. Another possible implication of having lower average cohort effects is that FHBs have more conservative expectations for future housing price and income growth, though this would be difficult to prove.

Macroeconomic conditions, which are part of the common time effects, are important drivers of changes in arrears rates. For example, periods of high unemployment or slow income growth can push arrears rates higher if borrowers experience income loss and struggle to meet their mortgage payments. Similarly, weak housing market conditions make it harder for borrowers to get out of arrears by selling their property. Estimates of common time effects have been lower for FHB

Graph 7

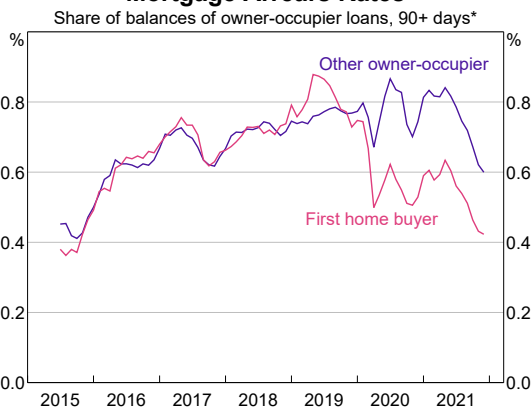
Financial Stress



* Includes being unable to pay bills on time, unable to heat home, etc.
Sources: HILDA Survey Release 20.0; RBA

Graph 8

Mortgage Arrears Rates



* Excludes self-securitised loan pools that have been actively managed to remove loans in arrears.
Sources: RBA; Securitisation System

loans than for other owner-occupier loans since early 2020. This suggests that on average FHBs may have experienced better economic outcomes than other owner-occupiers through the pandemic. Without timely survey data, it is difficult to look into this further at present. It may be the case that FHBs were more likely to defer their loan repayments during the pandemic, which would have reduced the number of FHB loans entering arrears relative to other owner-occupier loans.^[6]

FHBs have historically had more favourable labour market outcomes

One possibility for why FHBs have been no more likely to experience financial stress than other owner-occupiers despite having higher LVRs and lower buffers, is that they experienced more favourable labour market outcomes. Data from the HILDA Survey show that FHBs experienced faster income growth than other owner-occupiers on average for a couple years before and after taking out their loan. Consistent with this, FHBs were persistently less likely than other owner-occupiers of the same loan age to report job insecurity and more likely to receive a promotion over the loan life (especially in the year the loan was originated) (Graph 9). This has meant that while FHBs have typically started out with lower incomes than other owner-occupiers at origination, their level of income has caught up after two to three years.

These results are unsurprising as FHBs are generally younger and therefore have greater potential for

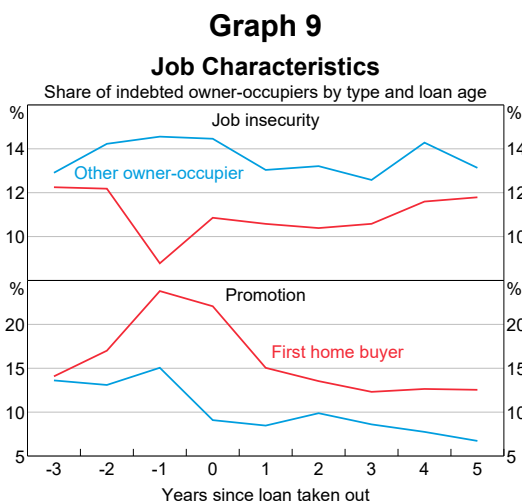
future income growth. Indeed, regression analysis shows that after controlling for the age of the borrower, the positive effect of being a FHB on job security and income growth is no longer statistically significant. Without timely information on the age profile of the recent cohort of FHBs relative to other owner-occupiers, it is unclear whether the trend towards older FHBs continued or if the above income findings held during the pandemic. The better labour market outcomes of FHBs relative to other owner-occupiers may also be partly explained if only those who expect strong future income growth choose to enter the housing market as FHBs.

With higher debt-servicing burdens and lower liquidity buffers, FHBs would be more vulnerable to a negative income shock in the early years of their loans than other borrowers. However, FHBs have been no more likely to experience a negative income shock than other indebted households throughout the loan life. In particular, the HILDA Survey suggests they have been no more likely to report losing their job. FHBs have been less likely than other owner-occupiers to report income that is more than 20 per cent below the income they received in the previous year. This finding is consistent across a range of indicators of income loss, though the difference between FHBs and other owner-occupiers loses statistical significance after controlling for personal characteristics. There was also no difference in volatility of working hours across FHBs and other owner-occupiers.

Overall, the HILDA Survey suggests that FHBs and other owner-occupiers have historically had similar probabilities of losing their job or experiencing partial loss in income or hours worked. As new FHBs could only be identified in HILDA up to 2018, more timely survey data is needed to determine whether these results held during the pandemic. Given the strong increase in FHBs entering the housing market over the past couple years, it is possible that the characteristics of recent FHBs are different from earlier cohorts.

Conclusion

First home buyer loans appear more risky than other owner-occupier loans across a range of



metrics. They start with higher LVRs and lower liquidity buffers than other borrowers, which persists several years after the loan is taken out. However, FHBs have been no more likely to report financial stress or be in arrears than other owner-occupiers. One possible explanation is that FHBs have historically experienced more favourable labour market outcomes, including higher levels of job security and income growth. Overall, there are some mitigating characteristics that partially offset the risks associated with FHBs, but it remains the

case that FHBs would be more vulnerable than other owner-occupiers for a given housing price or income shock. The risks associated with FHB borrowers should be weighed against broader policy aims of housing affordability and accessibility for FHBs. As more household survey data for the past couple years become available, further research can look at whether the characteristics of FHBs who have taken out loans in recent years have changed. ✎

Endnotes

- [*] The author is from the Financial Stability Department. The author would like to thank Amelia Gao for the analysis of first home buyer loans in the Reserve Bank's Securitisation System, and Natasha Cassidy for her assistance in drafting this article.
- [1] The SIH household-level data are available every second year from 2003/04 to 2017/18. FHB households are identified by a question that asks whether the dwelling purchased or built in the last three years is the first home owned. The HILDA Survey is a longitudinal study that has tracked a panel of around 9,000 Australian households from 2001 to 2020. Every four years it includes a wealth module, which collects detailed information on household assets and liabilities; the latest observation is for 2018. I followed the method of Simon and Stone (2017) to identify FHBs in HILDA. This method relies on responses to the wealth module and so can only identify FHBs in the year they took out their loan up to 2018.
- [2] Loans in the Securitisation System are not representative of the entire mortgage market in some aspects. Issuers of securitisations may face incentives to disproportionately select higher quality loans to meet credit rating agencies' criteria. Recently originated loans are also under-represented due to lags between loan origination and securitisation. For more information, see Fernandes and Jones (2018).
- [3] This is the definition of 'hand-to-mouth' households from Kaplan, Violante and Weidner (2014).
- [4] As loans in the Securitisation System tend to be of higher credit quality, the level of arrears rates in the Securitisation System is lower than that of the broader mortgage market, but the trends are similar.
- [5] The sharp decrease in average age followed a significant increase in the Reserve Bank's holdings of self-securitised residential mortgage-backed securities (RMBS) at the creation of the Term Funding Facility (TFF). The Bank introduced the TFF as part of its response to COVID-19, providing \$188 billion in three-year funding to banks by the time the program closed in June 2021. These loans were backed by collateral, mostly in the form of self-securitised RMBS. See Black, Jackman and Schwartz (2021).
- [6] APRA offered capital concessions to lenders providing loan repayment deferrals to COVID-19-impacted customers for up to six months, with a possible extension of four months. This meant that the period of deferral did not need to be treated as a period of arrears for capital adequacy and regulatory reporting purposes.

References

- Black S, B Jackman and C Schwartz (2021), 'An Assessment of the Term Funding Facility', *RBA Bulletin*, September.
- Fernandes K and D Jones (2018), 'The Reserve Bank's Securitisation Dataset', *RBA Bulletin*, December.
- Giuliana R (2019), 'Have First-Time Buyers continued to default less?', Central Bank of Ireland Financial Stability Notes 14.
- Kaplan G, GL Violante and J Weidner (2014), 'The Wealthy Hand-to-Mouth', *Brookings Papers on Economic Activity*, Spring, pp 77–138.
- Kelly R, T O'Malley and C O'Toole (2014), 'Do First Time Buyers Default Less? Implications for Macro-prudential Policy', Central Bank of Ireland Economic Letter Series, 2014(14).
- RBA (Reserve Bank of Australia) (2021), 'Mortgage Macroprudential Policies', *Financial Stability Review*, October.

Simon J and T Stone (2017), 'The Property Ladder after the Financial Crisis: The First Step is a Stretch but Those Who Make It Are Doing OK'; RBA Research Discussion Paper No 2017-05.

HILDA Disclaimer

Developments in Banks' Funding Costs and Lending Rates

Rachael Fitzpatrick, Callum Shaw and Anirudh Suthakar^[*]



Photo: Bob Bosewell – Getty Images

Abstract

This article updates previous Reserve Bank research on the ways in which developments in the composition and pricing of banks' funding sources have affected their overall cost of funds and influenced lending rates. Banks' funding costs declined a little over 2021 – after falling substantially in the previous year – supported by the Reserve Bank's policy measures. In aggregate, lending rates declined by more than funding costs. As a result, the major banks' average interest rate spread narrowed over the year. The decline in the aggregate lending rate primarily reflected strong price competition and ongoing refinancing activity, particularly in housing lending.

Introduction

The cost of banks' funding is a key determinant of the rates that banks offer on loans to households and businesses (RBA 2022a).^[1] Banks can fund themselves from a range of sources, including deposits, wholesale debt or equity. The Reserve Bank's monetary policy – primarily through its influence on a range of key interest rates in the economy – can affect banks' funding costs and, in turn, lending rates. Indeed, this is a key channel through which monetary policy is transmitted through the Australian financial system and affects the real economy (RBA 2022b). This article updates

previous Reserve Bank analysis, focusing on developments in the major banks' funding costs and lending rates over 2021 (Suthakar and Garner 2021).

Funding costs and lending rates were historically low in 2021

In response to the COVID-19 pandemic, the Reserve Bank reduced the cash rate target to historically low levels and implemented other policy measures to lower the cost of funding for banks and to support the supply of credit to households and businesses (RBA 2022c).^[2] Over 2020, banks' outstanding non-

equity funding costs and aggregate lending rates fell by a similar amount to the cash rate (Graph 1). Over 2021, banks' funding costs declined a little further, supported by the Reserve Bank's other policy measures, including the Term Funding Facility (TFF) and the bond purchase program. In aggregate, banks' lending rates declined by more than funding costs over the year. In part, this reflected refinancing and competition in housing lending, as well as a shift in the composition of bank lending to lower-margin products.

The low level of funding costs is consistent with the low level of the cash rate, which is an anchor for other interest rates in the Australian financial system. Much of banks' wholesale debt and deposit funding is linked to bank bill swap rates (BBSW) (either directly or via hedging), and these rates remained very low compared with pre-pandemic levels throughout 2021 (Graph 2). Lower deposit costs and low-cost funding from the TFF also contributed to the decline in banks' overall funding costs over 2021. While the cost to banks of issuing new wholesale debt increased towards the end of the year, this had little immediate impact on outstanding funding costs. Higher issuance costs may impact banks' funding costs over time as banks issue more new debt, to the extent that this issuance is more costly than maturing or existing funding.

The decline in banks' funding costs over the past two years has flowed through to historically low

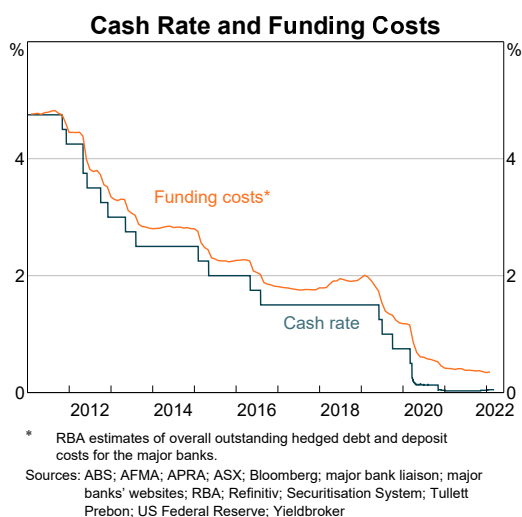
household and business lending rates. We estimate that banks' outstanding funding costs have declined by around 85 basis points, and that outstanding housing and business interest rates paid by borrowers have fallen by around 100 and 115 basis points, respectively, over the same period. Interest rates on outstanding housing loans declined through a number of channels. Lenders lowered their standard variable reference rates on housing loans following the Reserve Bank's initial package of policy measures in 2020, which automatically flowed through to all variable-rate loans. The low level of new lending rates also encouraged new housing borrowing and ongoing refinancing by existing borrowers to lower loan rates over the past two years. Price competition was particularly strong for fixed-rate loans for much of 2021, although rates on new fixed rate loans increased alongside swap rates (the benchmark for fixed-rate lending) towards the end of the year.

Composition of funding

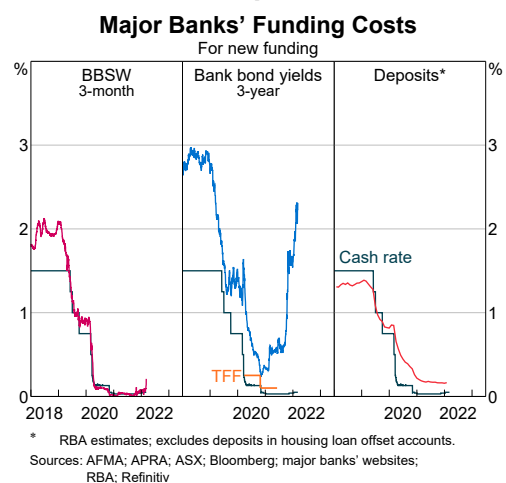
Banks' deposit share of funding remained over 60 per cent

Banks obtain funding from retail and wholesale deposits, wholesale debt (including securitisation) and equity. From April 2020 until June 2021, banks were also able to obtain low-cost funding for three years from the Reserve Bank's TFF. Although the TFF has since closed to new drawdowns, the funding provided will continue to support lower funding

Graph 1



Graph 2



costs until mid-2024 (Black, Jackman and Schwartz 2021).

Over 2021, the share of the major banks' funding obtained from deposits remained higher than it was in the pre-pandemic period. Deposits accounted for a little more than 60 per cent of the major banks' overall funding at the end of December 2021, up from a little more than 55 per cent at the end of 2019 (Graph 3).^[3] This increase was driven by growth in the stock of deposits in the banking system over the past two years (discussed further below). By contrast, the share of the major banks' funding drawn from long-term wholesale debt declined further over 2021, partly reflecting increased use of TFF funding, which displaced new issuance (Kent 2021). Around 5 per cent of the major banks' funding came from the TFF at the end of December 2021, increasing from around 2 per cent at the start of the year. The major banks took up all of their allocated funding allowances under the TFF over 2020 and 2021 (Black, Jackman and Schwartz 2021).

Growth in the stock of deposits has been an important driver of the change in the major banks' funding composition over the past two years. From the end of 2019 to the end of 2021, the stock of deposits at the major banks increased by roughly \$360 billion (or a little more than 20 per cent). Deposit growth is typically driven by new lending by the banking sector (Kent 2018). New lending creates deposits as the funds made available to a

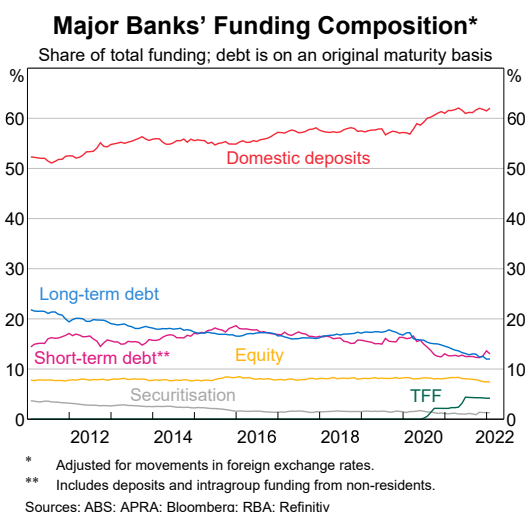
borrower find their way into a deposit somewhere in the banking system, either as a deposit in the borrower's account or in another account when the borrower uses those funds to make a purchase (RBA 2020). While the provision of new credit to the economy has added to deposits over the past two years, it has not been the only driver of the increase. Government bond purchases by the Reserve Bank and the decline in the stock of banks' outstanding wholesale debt also contributed to deposit growth over this period. Both of these channels can add to deposits by converting the original asset (government or bank debt) held by private (non-bank) investors into deposits (RBA 2020).^[4]

Most of the new deposits created over the past two years have flowed into at-call accounts held by households and businesses (Graph 4). By contrast, the volume of term deposits – which place time-based restrictions on the withdrawal of deposited funds, typically compensating the depositor with higher returns than at-call accounts – has decreased over this period. Both deposit growth and the changing composition of deposits contributed to a decline in the cost of deposit funding for the major banks over 2021 (discussed further below).

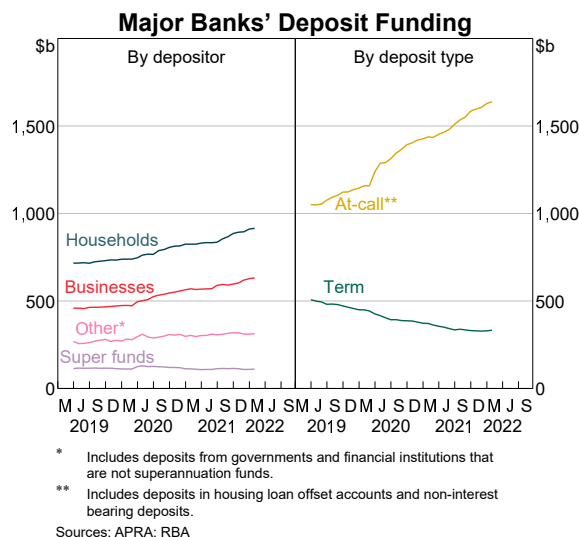
The share of wholesale debt funding declined

The share of funding that banks source from wholesale debt markets declined over 2021 as banks reduced their use of long-term wholesale debt funding. The major banks did not issue new

Graph 3



Graph 4



bonds (which account for the bulk of their long-term wholesale debt funding) in the first quarter of 2021, consistent with the very low levels of issuance seen in 2020. While banks started to issue more bonds in the second half of the year (after the closure of the TFF to new drawdowns), bonds outstanding over the year declined as more debt matured than was newly issued. Even so, the stock of offshore short-term debt funding increased over 2021, supported in part by favourable pricing conditions (Graph 5) (Aziz *et al* 2022).

Banks may issue more wholesale debt in the coming years (in comparison with 2020 and 2021) in order to finance the TFF maturities that will occur in 2023 and 2024 (Graph 6). Banks might also seek to fund purchases of government securities to satisfy High Quality Liquid Asset requirements given the changes to the Committed Liquidity Facility (which is to be reduced to zero over 2022) (APRA 2021a). The Reserve Bank has previously assessed that the funding task related to the refinancing of the TFF is sizeable but manageable; this assessment has been supported by public statements made by some banks (Black, Jackman and Schwartz 2021; NAB 2021; ANZ 2021). Banks' decisions about how to repay TFF funding will depend on a number of factors, such as their asset growth and the price and availability of the full range of funding sources, including deposits.

While banks' bond issuance remained low over 2021 when compared with the levels seen prior to the pandemic, banks continued to raise long-term

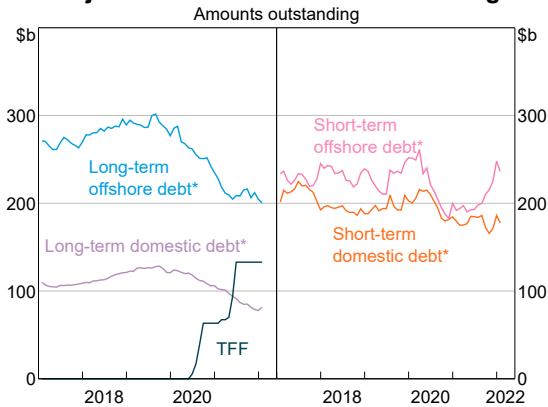
debt funding from Tier 2 hybrid securities over this period (Graph 7). Hybrid securities have both equity- and debt-like features, and can be used to fulfil a part of banks' regulatory capital requirements (RBA 2012). Issuance of hybrids has increased over the past few years as the major banks' prepare for an increase in their regulatory minimum capital requirements.^[5]

Banks' share of equity funding declined slightly

The amount of banks' equity funding (or 'equity capital') was little changed over 2021, though non-equity funding increased, leading to a small decline in the share attributable to equity over the year. Banks returned more capital to shareholders over

Graph 5

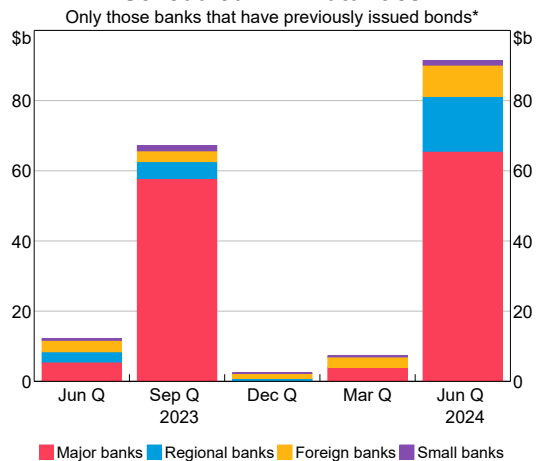
Major Banks' Wholesale Debt Funding



* Excludes hybrids. Sources: ABS; APRA; Bloomberg; RBA; Refinitiv

Graph 6

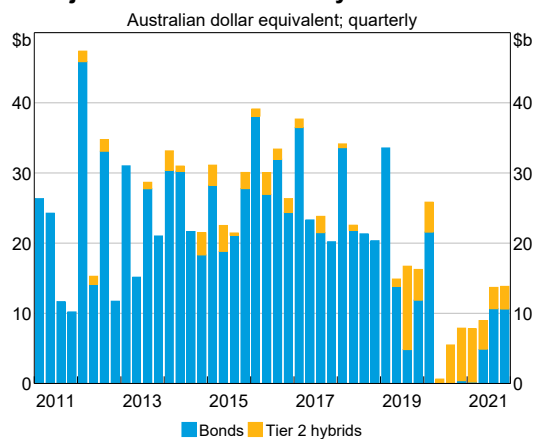
Scheduled TFF Maturities



* These banks account for 96 per cent of TFF drawdowns; maturities on 1 July 2024 included in June 2024 quarter value. Source: RBA

Graph 7

Major Banks' Bond and Hybrid Issuance



Sources: Bloomberg; KangaNews; Private Placement Monitor; RBA

2021 than in 2020 (through dividend payments and share buybacks), consistent with APRA's removal of restrictions on capital distributions (APRA 2020a). These restrictions were introduced in 2020 in response to the economic uncertainty resulting from the COVID-19 pandemic and were removed around the end of 2020 in recognition of banks' strong capital positions and the improved economic outlook (APRA 2020b). The major banks maintained capital buffers well above their regulatory requirements over 2021, as retained earnings were supported by improved profitability compared with 2020.

Cost of funding

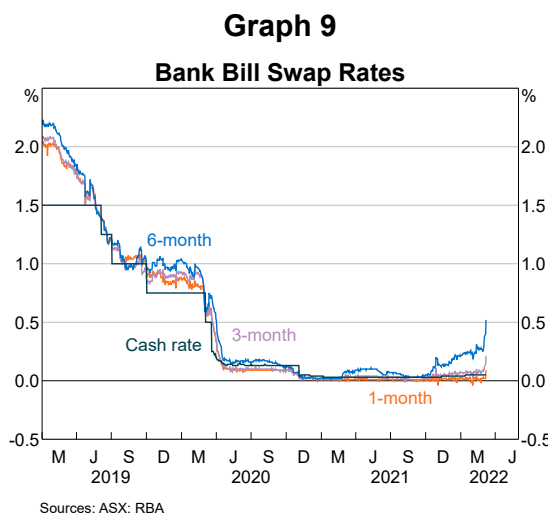
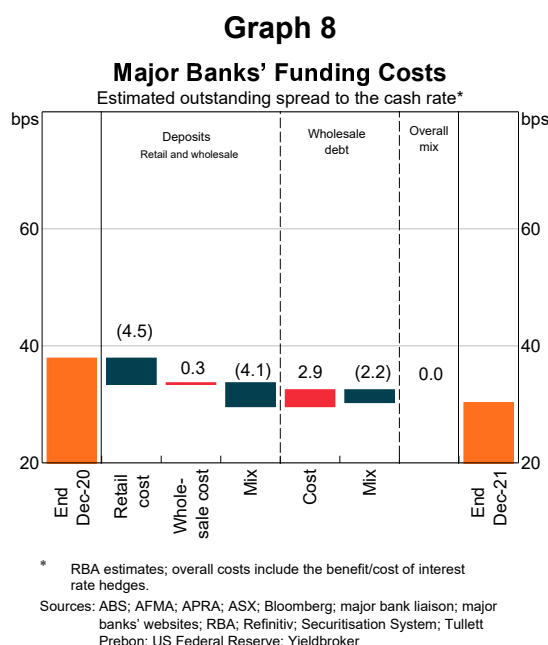
As discussed above, the major banks' outstanding non-equity funding costs declined a little over 2021, reflecting the support provided by the monetary policy measures implemented by the Reserve Bank (Graph 8). Historically, the cash rate has been a key determinant of the overall cost of banks' funding, as it is an anchor for other interest rates in the Australian financial system. In line with this, banks' funding costs were estimated to have declined by a similar amount to the cash rate over 2020. While the cash rate was little changed over 2021, its very low level helped to keep funding costs low over the year. The Reserve Bank's other policy measures, such as the TFF and bond purchase program, also put downward pressure on funding costs. In particular, growth in at-call deposits – supported by the bond purchase program – and the decline in deposit rates helped push funding costs lower over 2021.

Outstanding wholesale funding costs remained low

After falling substantially over 2020, banks' outstanding wholesale funding costs remained low over 2021, primarily reflecting the low level of BBSW rates (although these rates ticked up in late 2021) (Graph 9). This is because much of the major banks' wholesale debt and deposit costs are ultimately linked (either directly or via hedging) to short-term BBSW rates, which are important interest rate benchmarks for the Australian financial system. BBSW rates are heavily influenced by the cash rate, which fell to historically low levels over 2020 as the

Reserve Bank responded to the impacts of the COVID-19 pandemic on the Australian economy (Domestic Markets Department 2019).

Access to the TFF has put downward pressure on banks' wholesale funding costs over the past two years by providing banks with an alternative source of funding that was less expensive than market-based funding options at the same three-year term (Graph 10). Banks therefore replaced more expensive wholesale debt funding with the TFF over 2021 and 2022. A rough estimate is that the *direct* effect of this replacement lowered the major banks' funding costs by around 5 basis points. However, the TFF has also affected funding costs *indirectly* by reducing the need for banks to issue



new wholesale debt. The reduced supply of wholesale debt led to lower yields than otherwise, contributing to the very low issuance costs observed over much of 2021 (Kent 2021). In this way, the TFF benefited both banks and non-banks (which source funding from wholesale debt markets), regardless of their access to the facility.

While the TFF and low bond issuance by the banks helped keep bond yields low for much of 2020 and 2021, banks started to issue more bonds in the second half of the year. In late 2021, swap rates (which are a benchmark for bank bond pricing) rose sharply and spreads between bank bond yields and these rates also rose, albeit more moderately (Graph 11).^[6] These increases meant that the cost of issuing *new* bonds increased for banks. The effect of higher issuance costs on banks' *outstanding* funding costs will reflect the amount of new debt banks issue and how costly it is compared to the funding it might replace. However, to date, higher issuance costs have had little impact on outstanding funding costs.

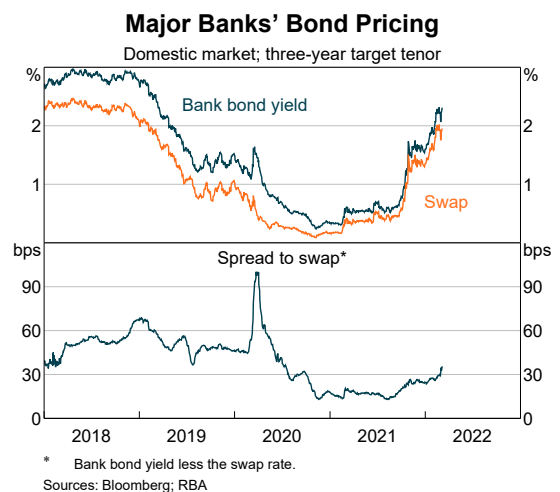
Household deposit rates edged lower

The major banks' household deposit rates decreased over 2021 alongside continued growth in the stock of household deposits. Interest rates for at-call and new term deposits from households declined by 5–10 basis points over the year (Graph 12). The spread between at-call and new term deposits remained low over 2021 after

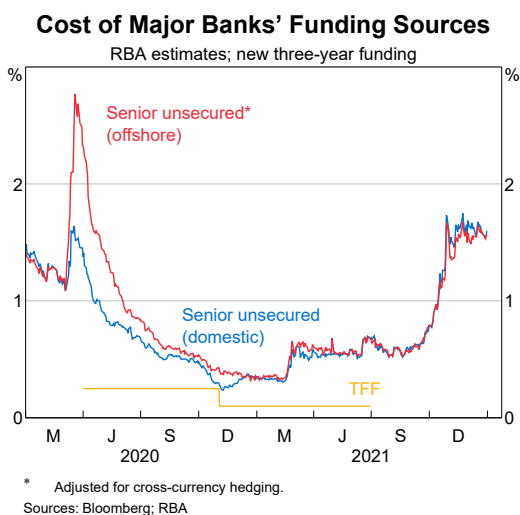
narrowing substantially over 2020, and so more deposits flowed into relatively less expensive at-call deposits.

In contrast to the modest declines in at-call and new term deposit rates over 2021, average rates on outstanding term deposits for households fell quite noticeably, declining by around 50 basis points over the year. This is because the substantial declines in new term deposit rates seen over 2020 have flowed through to outstanding term deposit rates with a lag, as older (more expensive) deposits mature. Most outstanding term deposits have a term to maturity of less than one year, so much of the decline in new term deposit rates has now passed through to outstanding rates.

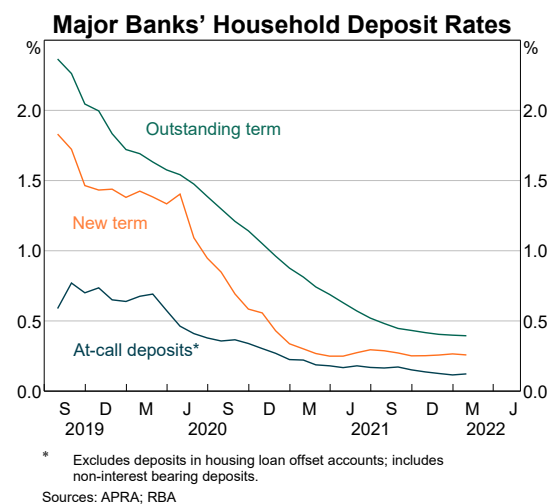
Graph 11



Graph 10



Graph 12



The decline in outstanding term deposit and at-call rates over 2021 translated into an increase in the stock of the major banks' deposits that are paying low rates of interest (between zero and 25 basis points). For the major banks, the share of debt funding from low-rate deposits was nearly 40 per cent in the September quarter of 2021, compared with a little over one-third at the end of February 2021 and around 15 per cent in late 2019 (Graph 13). Despite the bulk of major bank deposits paying relatively low deposit rates, depositors were still able to find some deposit accounts paying 1 per cent or more in interest at non-major banks.

Banks' lending spread

The spread between the average rate on banks' outstanding loans and the average cost of their debt and deposit funding provides some insight into the profitability of that lending. We estimate that this lending spread for the major banks narrowed over 2021, as the average lending rate declined by more than these funding costs (Graph 14). The decline in the average lending rate primarily reflects decreases in the interest rates paid by new and refinancing borrowers (particularly on housing loans). A shift in the composition of banks' outstanding loans away from personal credit (which is on average charged a comparatively higher interest rate) towards housing credit also contributed, as the stock of personal lending declined over the year. By contrast, average lending rates and funding costs fell by roughly the same

amount in 2020, such that the implied lending spread was little changed in that year.

The lending spread shown above differs from some other reported measures of bank profitability, such as the net interest margin (NIM). For instance, the lending spread excludes the effects of non-loan interest-earning assets, such as cash and other high-quality liquid assets, which are captured in banks' NIMs. These assets currently offer relatively low yields – for instance, Exchange Settlement (ES) balances held at the Reserve Bank currently pay an interest rate of zero per cent. In addition, banks are holding more of these assets, partly as a result of the Reserve Banks' TFF and bond purchases, which both added to ES balances in the banking system.

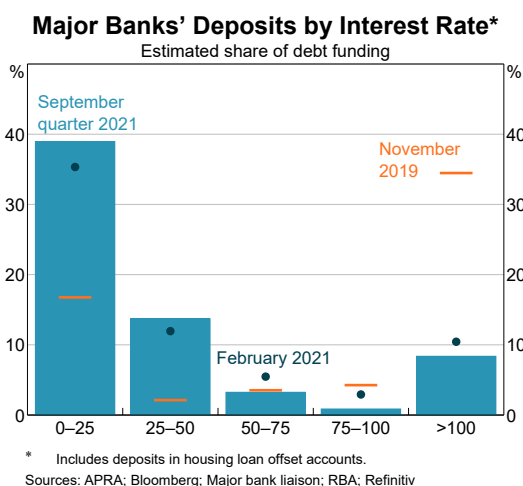
Lending rates

The extent of reductions in interest rates varied across housing and business loans. While outstanding interest rates declined further for business loans than for housing loans over 2020, the reverse occurred over 2021. In total, the decline in outstanding funding costs over the past two years (of around 85 basis points) has flowed through to outstanding housing and business interest rates (which are lower by around 100 and 115 basis points, respectively).

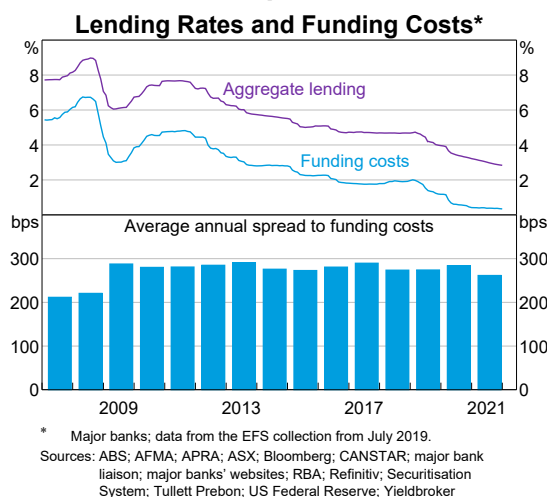
Housing lending rates declined

The fall in outstanding housing interest rates over 2021 (of around 40 basis points) largely reflected the strong uptake of fixed-rate housing loans at low

Graph 13



Graph 14



interest rates by both new and refinancing borrowers. Fixed-rate loans became more popular as interest rates on many of these products declined to be below the interest rates charged on variable-rate loans (Graph 15). The stock of fixed-rate housing loans rose from 20 per cent to around 40 per cent of housing credit outstanding over the past two years. The average outstanding variable rate on housing lending also declined, as banks increased discounts (particularly on basic loans that do not include an offset account) and existing borrowers refinanced to lower rates.^[7]

Although fixed rates on housing loans remain low, rates on new loans increased in the second half of the year, alongside higher swap rates (which are the key benchmarks for fixed-rate lending). The largest increases to date have been for loans with longer fixed terms, while shorter-term fixed rates rose by a smaller amount over 2021 (Graph 16). The effect of these increases on average outstanding housing rates has been limited, as borrowers increased their uptake of low-rate variable loans and pivoted away from longer-term to shorter-term fixed-rate housing loans.

Business lending rates remained steady

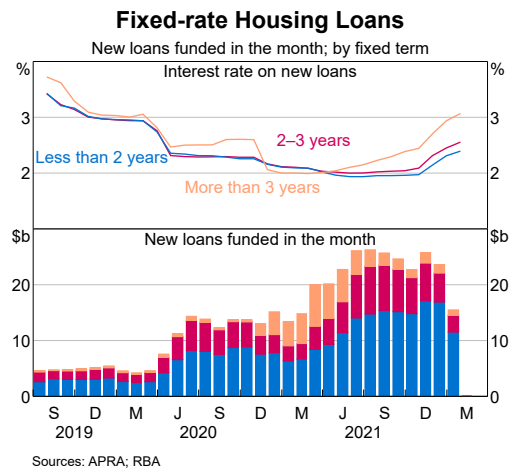
Interest rates on new business loans were little changed over 2021, but the average outstanding interest rate paid declined by around 25 basis points. Levels of refinancing by small and medium-sized businesses were elevated over 2021, which led

to slightly larger declines in the average outstanding interest rate paid by these borrowers compared to large businesses (Graph 17). Average interest rates paid on *new* fixed-rate loans by small business increased in late 2021 as swap rates rose, while those paid on new medium-sized and large business loans were little changed (potentially reflecting longer lags in swap rate pass-through). However, unlike housing lending, fixed-rate lending remains a small share of total business lending so the impact of these increases has been more limited.

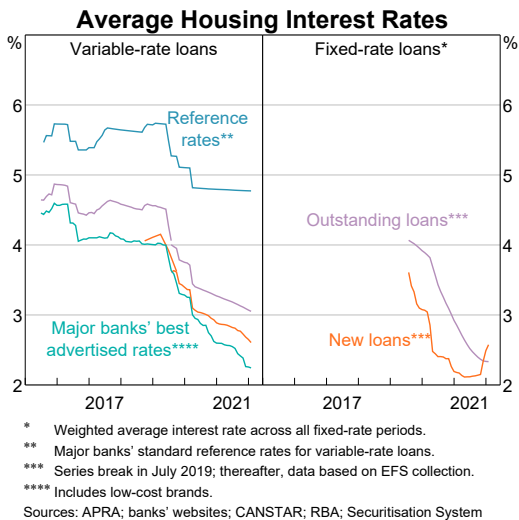
Conclusion

The monetary policy measures implemented by the Reserve Bank during the COVID-19 pandemic have supported very low funding costs for banks, and in

Graph 16

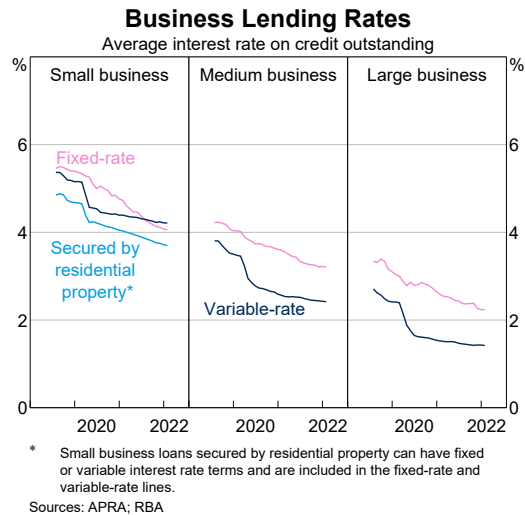


Graph 15



* Weighted average interest rate across all fixed-rate periods.
 ** Major banks' standard reference rates for variable-rate loans.
 *** Series break in July 2019; thereafter, data based on EFS collection.
 **** Includes low-cost brands.
 Sources: APRA; banks' websites; CANSTAR; RBA; Securitisation System

Graph 17



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

turn historically low borrowing rates for households and businesses over this period. Average lending rates declined by more than funding costs over 2021, primarily reflecting competition among banks

for borrowers and the associated strong refinancing activity in the housing market. ✎

Endnotes

- [*] The authors are from Domestic Markets Department.
- [1] Banks also take into account the risks inherent in lending, such as the credit risk associated with loans and the liquidity risk involved in funding long-term assets with short-term liabilities. Banks' growth strategies, competition in the financial sector and their desired return to equity holders also affect their lending rates.
- [2] Additional policy measures implemented by the Reserve Bank in 2020 included the purchase of government bonds, a yield target for three-year government bonds, the Term Funding Facility and providing liquidity to financial markets.
- [3] All measures in this article (unless otherwise noted) use banks' 'domestic books' as the basis of measurement, rather than their global balance sheet (APRA 2017).
- [4] For instance, the Reserve Bank's purchases of government bonds have contributed to deposit growth because payments for bonds purchased from the private (non-bank) sector are ultimately credited to the deposit accounts of the sellers of those bonds.
- [5] In 2019, APRA announced an increase in banks' total loss-absorbing capacity (TLAC) requirements, which was due to come into effect at the beginning of 2024 (APRA 2019). In late 2021, APRA announced that this change would instead be implemented later – in 2026 – but require a larger increase in the banks' TLAC requirements (APRA 2021b).
- [6] The spread to swap is relevant for banks' funding costs since banks tend to enter into interest-rate hedges where they swap fixed-rate payments (e.g. coupons on new bonds issued) into short-term floating-rate payments to better match the bulk of their assets (i.e. variable rate loans). The cost of the hedged funding to the bank is then effectively the spread to swap plus the relevant (short-term) variable rate.
- [7] Banks' standard variable reference rates were little changed over 2021. However, very few borrowers pay rates as high as these. Instead, borrowers are offered, or negotiate, a discount relative to this reference rate (RBA 2019).

References

ANZ (Australia and New Zealand Banking Group Limited (2021), '2021 Full Year Results', Results Presentation and Investor Discussion Pack, 28 October. Available at <<https://www.anz.com/content/dam/anzcom/shareholder/2021-FY-results-investor-discussion-pack.pdf>>.

APRA (Australian Prudential Regulation Authority) (2017), 'Reporting Standard ARS 701.0', ABS/RBA Definitions for the EFS Collection, August.

APRA (2019), 'APRA Responds to Submissions on Plans to Boost the Loss-absorbing Capacity of ADIs to Support Orderly Resolution', Media Release, 9 July.

APRA (2020a), 'Capital Management', Letters, 15 December.

APRA (2020b), 'APRA Updates Guidance on Capital Management for Banks and Insurers', Media Release, 29 July.

APRA (2021a), 'Committed Liquidity Facility Update', Letters, 10 September.

APRA (2021b), 'Finalising Loss-absorbing Capacity Requirements for Domestic Systematically Important banks', Letters, 2 December.

Aziz A, C de Roure, P Hutchinson and S Nightingale (2022), 'Australian Money Markets through the Pandemic', *RBA Bulletin*, March.

Black S, B Jackman and C Schwartz (2021), 'An Assessment of the Term Funding Facility', *RBA Bulletin*, September.

Domestic Markets Department (2019), 'The Framework for Monetary Policy Implementation in Australia', *Bulletin*, June.

Kent C (2018), 'Money – Born of Credit?', Remarks at the Reserve Bank's Topical Talks Event for Educators, Sydney, 19 September.

Kent C (2021), 'The Term Funding Facility, Other Policy Measures, and Financial Conditions', Address to KangaNews, Online, 9 June.

NAB (National Australia Bank Limited) (2021), 'Full Year Results 2021', Investor Presentation, 9 November. Available at <<https://www.nab.com.au/content/dam/nab/documents/reports/corporate/2021-investor-presentation.pdf>>.

RBA (Reserve Bank of Australia) (2012), 'Box C: Recent Trends in Hybrid Issuance', *Statement on Monetary Policy*, November.

RBA (2019), 'Box D: The Distribution of Variable Housing Interest Rates', *Statement on Monetary Policy*, November.

RBA (2020), 'Box D: Recent Growth in the Money Supply and Deposits', *Statement on Monetary Policy*, August.

RBA (2022a), 'Banks' Funding Costs and Lending Rates', Explainer.

RBA (2022b), 'The Transmission of Monetary Policy', Explainer.

RBA (2022c), 'Supporting the Economy and Financial System in Response to COVID-19', 29 January.

Suthakar A and M Garner (2021), 'Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March.

Australian Money Markets through the COVID-19 Pandemic

Ahmet Aziz, Calebe de Roure, Paul Hutchinson and Samuel Nightingale^[*]



Photo: Yuichiro Chino – Getty Images

Abstract

Money markets are used by banks and other entities to borrow and lend funds for short terms, and are central to the implementation and transmission of monetary policy in Australia. It is important that these markets function effectively in all economic conditions, including during the uncertain times of the COVID-19 pandemic. This article examines how the various money markets – including the cash, repo, bank bills, FX swaps and Treasury Notes markets – responded to events of the past two years. Ultimately it finds that Australian money markets have generally functioned well over this time. Short-term funding has remained readily available from these markets, as the RBA has substantially increased the supply of Exchange Settlement balances and investors have continued to desire safe and liquid investments. Over the past two years, money market rates have declined significantly as a result of the decreases in the cash rate target and the increased supply of Australian dollars in these markets.

Introduction

Money markets are an integral part of the Australian financial system. In normal times, they are deep and liquid markets where Australian dollars can be borrowed or invested for short terms, generally 12 months or less. Money markets provide banks and other entities with access to short-term funding and offer investors liquid, short-term instruments that are issued by highly rated counterparties. Well-

functioning money markets provide liquidity to other financial markets and support an efficient payments system.

Money markets are also central to the implementation and transmission of monetary policy in Australia (Domestic Markets Department 2019; DeBelle 2021). The Reserve Bank of Australia (RBA) sets a target for the cash rate – that is, the interest rate on overnight loans of Exchange

Settlement (ES) balances between banks.^[1] The cash rate is a key determinant of other short-term interest rates and is, in turn, passed through to the whole structure of interest rates in the financial system.

This article examines how Australian money markets – covering cash, repo, bank bills, FX swaps and Treasury Notes – have performed since the onset of the COVID-19 pandemic in March 2020. It considers how this period of heightened economic uncertainty and the RBA’s policy response have affected the cost and availability of short-term funding in these markets.

The pandemic and the RBA’s policy response

In the very initial stages of the pandemic, interest rates in some Australian money markets rose as liquidity conditions deteriorated. Borrowers’ demand for liquidity rose, for precautionary purposes and to meet immediate needs, while investors reduced the money lent into these markets to meet their own liquidity needs (RBA 2020). However, pressures in Australian money markets were contained and the rise in money market rates was short-lived, due largely to the actions of the RBA.

During 2020, the RBA adopted a package of policies to support the Australian economy in the face of significant disruption caused by COVID-19, including:^[2]

- a cumulative 65 basis point cut in the cash rate target to 0.10 per cent and a reduction in the rate at which ES balances are remunerated to zero
- a target for the yield on three-year Australian Government bonds
- government bond purchases to address dislocations in the government bond market and achieve the yield target, and later in 2020 a bond purchase program to lower yields on longer-term government bonds
- a Term Funding Facility (TFF) to provide low-cost three-year repo funding to the banking system, with incentives to lend to businesses,

particularly small- and medium-sized enterprises

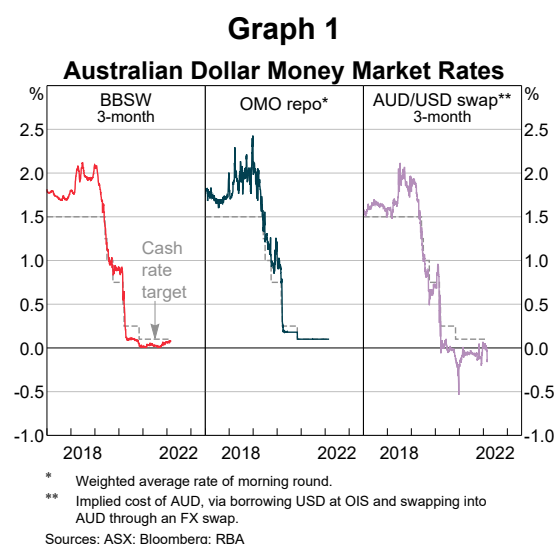
- an increase in the amount of lending under regular open market operations (OMO) and over longer terms, to support liquidity in the banking system.

These policies have supported the availability of short-term funding across Australian money markets throughout the pandemic. Interest rates across money markets declined noticeably, making it significantly cheaper for borrowers to secure short-term funding (Graph 1). While much of the decline can be explained by the reductions in the cash rate target and the remuneration on ES balances, money market rates fell by more. This reflects the significant increase in the supply of liquidity in these markets, particularly as a result of the considerable increase in the level of ES balances due to the RBA’s actions (Graph 2).

The below discussion considers key Australian money markets in turn, examining how they have performed through the pandemic to this point.

Cash market

The cash market facilitates the settlement of payments between banks and transmits the monetary policy decisions of the RBA to the wider economy. It is the market for unsecured overnight loans between banks. Banks borrow in the cash market to ensure their ES balances remain positive; they lend excess balances to earn a higher interest



rate than if they had retained the funds. The cash rate is the weighted average interest rate on these loans (Hing, Kelly and Olivan 2016). It is the primary anchor for other short-term interest rates and hence the wider structure of interest rates in the financial system. It is also an important benchmark, used as the reference rate in many other transactions.

Prior to March 2020, the cash rate was the sole operational target of monetary policy in Australia. The RBA closely managed the level of ES balances, maintaining surplus balances at around \$2 billion to \$3 billion, such that demand and supply in the cash market were roughly equal at the cash rate target.

However, since the onset of the pandemic, ES balances have increased significantly, to over \$400 billion, owing to the RBA’s policy actions. As a result, most banks have ample liquidity to settle their payments and little need to borrow more. The drop in demand has caused activity in the cash market to fall (Graph 3).^[3] Nonetheless, a few banks continue to borrow in the cash market. This partly reflects the uneven distribution of ES balances – since the onset of the pandemic, around 90 per cent of the increase in balances has gone to 10 per cent of banks (Graph 4). Furthermore, there has been an increase in the size of payment flows between banks, such that large daily changes in individual banks’ ES balances have become more frequent. There are many banks with high ES balances willing to lend and the cash market has remained a reliable source of funding for those

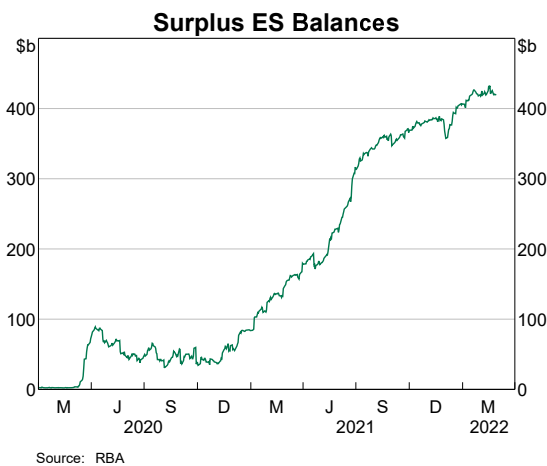
banks that need to borrow to ensure their ES balances remain positive.

As was expected, the fall in demand and increase in supply in the cash market saw the actual cash rate decline to trade below the cash rate target but above the remuneration rate paid by the RBA on ES balances. The remuneration rate paid on ES balances acts as a floor for the cash rate. The actual cash rate has traded a little above this throughout the pandemic, reflecting a small credit premium and operational costs of transacting in the cash market (Debelle 2021). The decline in the cash rate below the target represents an additional easing in financial conditions.

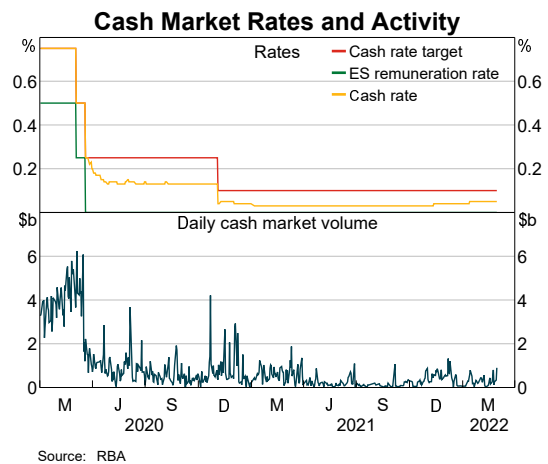
Repo market

The repo market plays an important role in Australian financial markets, promoting liquidity in

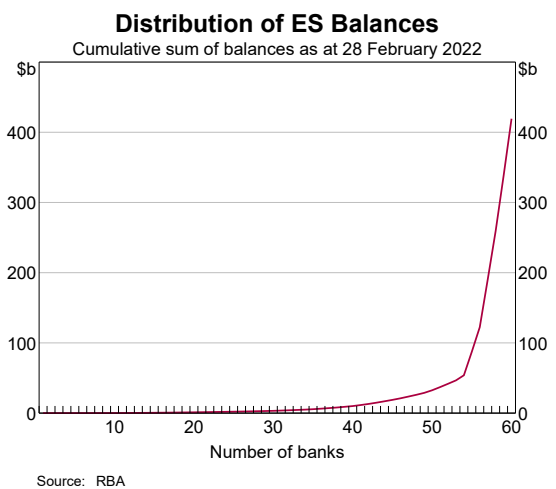
Graph 2



Graph 3



Graph 4



securities markets and supporting efficiency in the financial system.^[4] Participants use repos to finance holdings of securities, borrow securities, arbitrage price differentials in other markets, manage cash flows and raise short-term funding. Because repos are collateralised, they provide investors with a lower risk alternative to unsecured money markets.^[5] Banks tend to act as intermediaries in the repo market, borrowing and lending similar amounts of cash in aggregate. Accordingly, the repo market is not a key net funding market for banks and accounts for a very small share of banks’ balance sheet funding.

The RBA has historically used the repo market to implement monetary policy.^[6] Prior to the pandemic, the RBA conducted regular OMO to provide just enough ES balances to match demand at the cash rate target. However, with ES balances increasing significantly, the nature of OMO has changed over the past two years. At the onset of the pandemic, demand for OMO repo funding rose substantially, reflecting financial institutions’ precautionary demand for liquidity amid heightened economic uncertainty and bond dealers’ need to fund their growing inventory of bonds purchased from investors who were liquidating positions. In response, the RBA substantially increased the amount it lent via OMO and lengthened the terms of this lending. Since then, the demand for OMO funding has declined significantly because of the substantial increase in liquidity in the banking system that resulted from the RBA’s other policies – particularly the TFF and the bond purchase program. OMO now complements these other policies by providing short-term funding to financial institutions where demand remains (Dowling 2021).

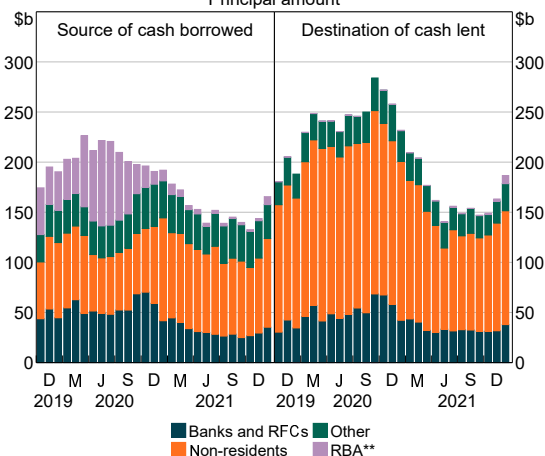
The total amount that banks have borrowed from the private repo market has remained steady throughout the pandemic, in contrast to their borrowing from the RBA (Graph 5, left panel). This suggests that the sharp increase in borrowing from the RBA early in the pandemic was a complement to, rather than substitute for, borrowing from other sources. That is, banks were able to meet their increased liquidity needs (alongside their clients’ demand for repo funding) by drawing on the

additional liquidity made available by the RBA. As demand for liquidity subsequently receded, banks curbed their borrowing from the RBA while continuing to borrow more cheaply from the private market.

Since the onset of the pandemic, repo rates have declined sharply (Graph 6). Rates in the private repo market were, on average, around 20–40 basis points above the cash rate prior to the pandemic but are now a few basis points below the cash rate. This is largely due to the substantial rise in banking-system liquidity, which has increased the supply of cash that banks are willing to lend under repo while lowering their demand to borrow cash. The decline in OMO rates has been less pronounced than that for private market rates, reflecting a change in how OMO are being conducted. Prior to the pandemic, in order to maintain a targeted amount of system liquidity, OMO were conducted as competitive auctions under which rates would vary with changes in demand. In the current setting of high system liquidity, OMO now provide repo funding at or above a predefined hurdle rate that is set above prevailing market rates (Kent 2020a; Kent 2022). As a result of this change, and the diminished role of OMO in overall repo funding, the OMO rate no longer acts as an anchor for private repo market rates.

The spread earned by banks and other repo dealers in intermediating repo funding has remained little

Graph 5
Outstanding Repo Positions*
Principal amount



* Positions of reporting institutions.
** Excludes TFF and open repo.
Sources: APRA; RBA

changed over the past two years at about 5 basis points, around the level prevailing prior to the pandemic. They earn this spread by borrowing funds under repo from the private market and the RBA, and lending these funds on to their non-bank clients at a higher rate.

Liquidity in the repo market has remained robust throughout the pandemic. Repo dealers have been able to source plenty of funding and the cost of this funding has fallen. Dealers have, in turn, passed these lower interest rates on to their clients. As such, clients have been able to source a lot of cash at low interest rates when needed. This ongoing liquidity, particularly during the height of economic uncertainty and resulting illiquidity in many other markets, was in part due to the RBA's various policy measures that provided additional liquidity to the banking system.

Bank bill market

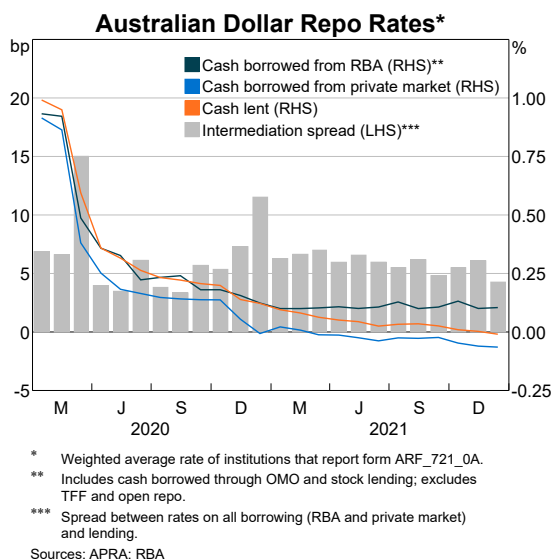
The domestic bank bill market (including negotiable certificates of deposit) is a key short-term funding market for Australian banks, accounting for around 15 per cent of their overall wholesale funding.^[7] Yields on bank bills issued by highly rated 'prime banks' provide a key interest rate benchmark – the bank bill swap rate (BBSW) – for a wide range of financial instruments and contractual obligations.^[8] Much of banks' other wholesale debt (including in foreign currencies) and deposits are

also linked to BBSW either directly or as part of their interest rate hedging practices (Black and Titkov 2019). This underlines the importance of the bank bill market for financial conditions in the wider economy.

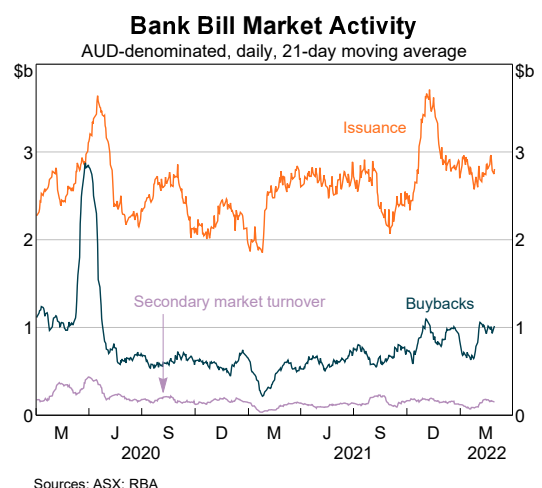
For the most part, the bank bill market has functioned well through the pandemic, providing banks with a reliable source of short-term funding. While at the onset of the pandemic there was a spike in buyback activity, where holders of bank bills sourced liquidity by selling their securities back to issuers, demand for bank bills quickly recovered (Graph 7). Outside of that period, demand for bank bills from superannuation funds and asset managers has remained stable. To a large extent, this reflects the mandates of some funds, which require a certain proportion of their investment portfolios to be held in short-term liquid securities.

On the supply side, banks' need to raise short-term funding in the bank bill market declined during the pandemic, owing to both liquidity provided by the RBA's policies and an increase in deposits with banks (Garner and Suthakar 2021). Despite this, issuing banks have sought to meet the ongoing demand for bank bills to maintain relationships with investors and ensure that the bank bill market remains a consistent source of funding in the future. Issuance was initially concentrated in shorter tenors amid high demand for shorter-dated investments in a period of heightened uncertainty. More recently, the maturity profile of issuance has returned to that prevailing before the pandemic.

Graph 6



Graph 7



The stock of domestic bank bills outstanding has remained relatively stable throughout the pandemic (Graph 8). By contrast, over 2020 Australian banks reduced offshore bill issuance to around half the levels seen prior to the pandemic. This was in response to the banks' lower funding needs and a period of dislocation experienced in the US commercial paper market (Boyarchenko *et al* 2021). Offshore issuance has since rebounded as Australian banks now seek to take advantage of favourable issuance conditions in offshore markets.

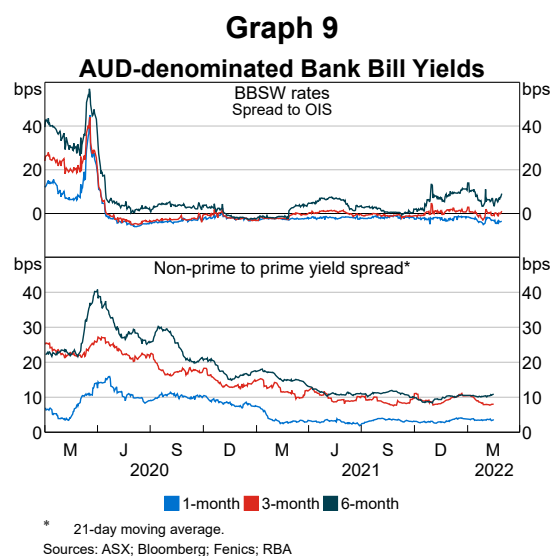
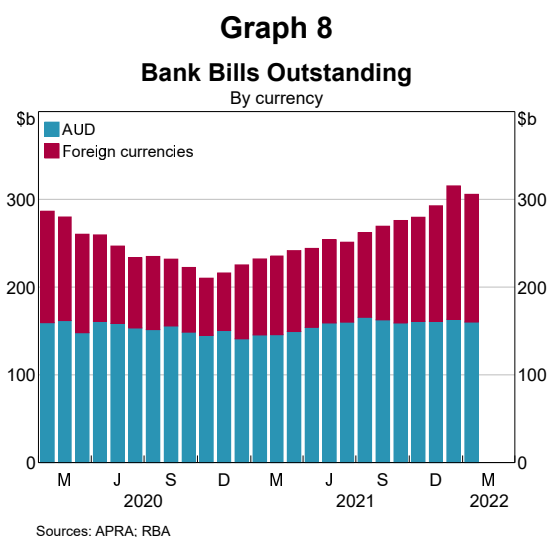
In March and April 2020, the spread between BBSW and overnight indexed swap (OIS) rates initially widened as investors sold some of the bills they were holding back to the issuing banks (Graph 9). Subsequently, spreads narrowed sharply, reflecting banks' reduced needs for short-term funding amid ample liquidity in the financial system and the rebound in investor demand. Given the importance of BBSW as a reference rate, the narrowing of spreads contributed to a decline in the broader cost of wholesale funding. Early in the pandemic, spreads between yields on bank bills issued by non-prime and prime banks widened amid heightened uncertainty. As market conditions subsequently improved, the non-prime to prime spread narrowed to historically low levels as investor demand for the higher-yielding non-prime bills increased.

FX swap market

Another key short-term funding market for Australian banks is the foreign exchange (FX) swap market. Banks obtain funding in this market by first issuing short-term debt in a foreign currency (such as US dollars) and then swapping that foreign currency back into Australian dollars using an 'FX swap'. The use of an FX swap allows banks to access offshore funding markets without incurring foreign exchange risk.

Prior to the pandemic, the implied yield for borrowing Australian dollars via the FX swap market was persistently higher than the cash rate.^[9] However, since the onset of the pandemic, the implied yield for borrowing Australian dollars in that market has fallen below the cash rate (and a little below zero) alongside the large increase in ES balances, which helped to stimulate a more reliable supply of Australian dollars available to lend in the FX swap market (Graph 10).

The significant decline in offshore debt issuance by Australian banks contributed to the decline in Australian dollar implied yields in the FX swap market. Banks were issuing less debt offshore given that they were able to access cheaper funding from domestic sources, including deposits and the TFF. Lower offshore debt issuance in turn reduced the demand by banks for Australian dollars in the FX swap market to hedge these exposures. By contrast, Australian asset managers (particularly superannuation funds) continued to supply



Australian dollars (and borrow foreign currency) in the FX swap market in order to manage the hedges on the exchange rate risk on their foreign investments.

The decline below zero in Australian dollar implied yields in the FX swap market has generally been limited despite a continued rise in ES balances. At yields more meaningfully below zero, some FX swap market participants could generate an arbitrage profit by borrowing Australian dollars at negative implied interest rates in the FX swap market and leaving the funds in their ES account, which the RBA currently remunerate at zero. In addition, when implied yields are sufficiently low, participants with access to US dollar funding markets (such as US investment banks) may find it cheaper to fund their Australian activities by borrowing Australian dollars in the FX swap market (in exchange for US dollars raised via US funding markets). Both of these actions would put upward pressure on implied negative yields, pushing them back towards zero.

As surplus ES balances have risen, liquidity in the FX swap market increased markedly. The increase in the overall level of Australian dollar cash in the banking system has seen FX swap dealers become more comfortable in warehousing larger amounts of risk, especially at shorter maturities, with liaison suggesting that the size of positions are substantially larger compared with those held prior to the pandemic. Alongside this willingness to

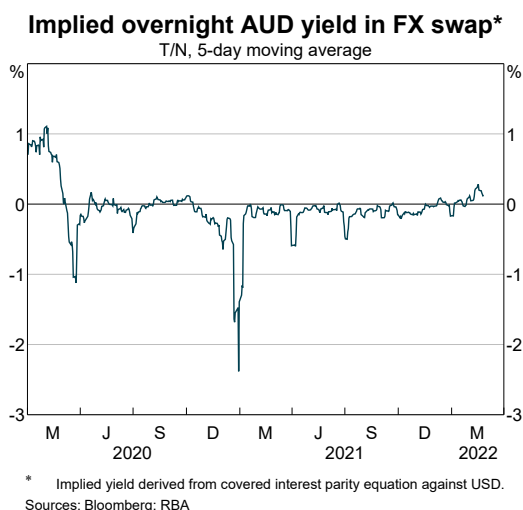
warehouse larger positions, bid-ask spreads have narrowed by around half. Turnover in short-dated swaps remains high, and similar to pre-pandemic levels (Graph 11).

Treasury Notes market

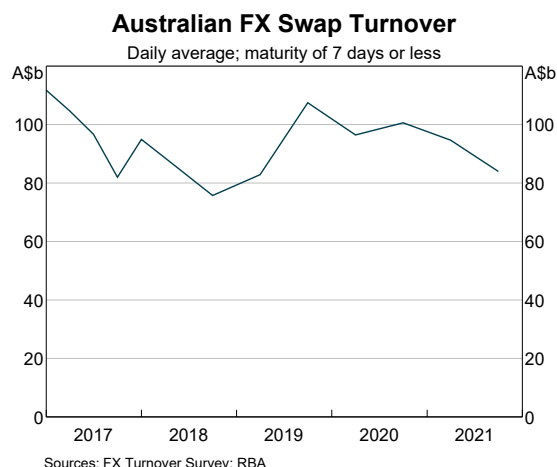
The Australian Government also uses money markets to raise funding, through the issuance of Treasury Notes. In the early stages of the pandemic, the government significantly increased its issuance of these short-term securities (Graph 12). This reflected an increase in the government's financing requirement, owing to higher expenditure related to its pandemic response and a decline in tax received due to the downturn in economic activity. In addition, the government sought to issue well ahead of its financing needs, building up its cash balances as a buffer against uncertainty surrounding its expenditures and revenues, and insuring against potential difficulties in accessing funding markets (Nicholl 2021). Indeed, the government sourced a greater-than-usual share of its financing via the issuance of Treasury Notes. This was partly because the Treasury Notes market continued to function well throughout this period amid strong investor demand for low-risk short-term assets (Nicholl 2020).

In line with other money market rates, yields on Treasury Notes declined, and their spread to OIS narrowed significantly, despite the sharp increase in issuance (Graph 13). The spread between yields on Treasury Notes and BBSW widened in the early

Graph 10



Graph 11



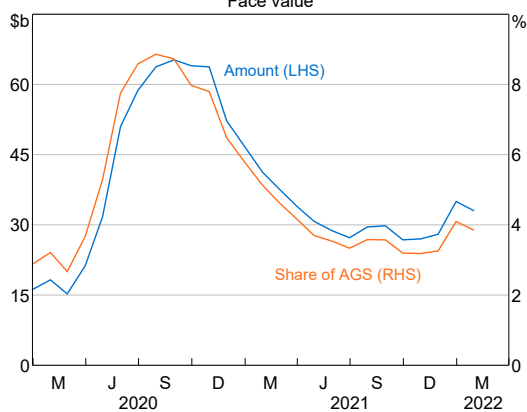
stages of the pandemic, alongside the sharp increase in Treasury Note issuance. But the spread has since narrowed as the pace of issuance has slowed and more investors have moved into the asset class.

Conclusion

Well-functioning money markets are important for the functioning of the broader financial system. They provide banks and other borrowers with access to short-term funding and support liquidity in other markets. They also allow for the effective transmission of the RBA's monetary policy settings. In response to the economic disruption caused by the pandemic, the RBA implemented a package of

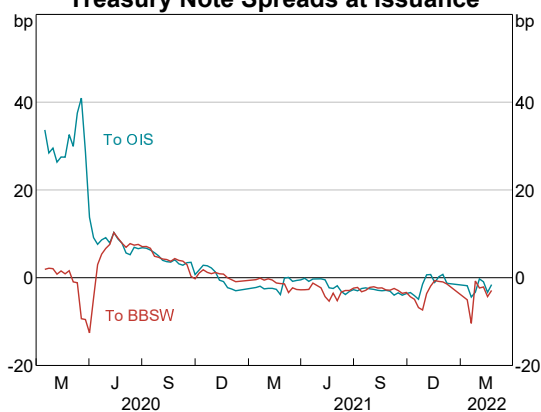
policies. These policies led to a significant reduction in money market rates: the cash rate target was cut to 10 basis points; the actual cash rate declined below that, trading between the target cash rate and the remuneration rate of zero on ES balances; and many money market rates have traded somewhat below the cash rate. The substantial increase in ES balances has also contributed to significant liquidity in money markets throughout the pandemic. The ongoing availability of funding in money markets, at much lower interest rates than before the pandemic, has helped to underpin very accommodative financial conditions across the financial system and supported the Australian economy. ✨

Graph 12
Treasury Notes on Issue
Face value



Sources: AOFM; RBA

Graph 13
Treasury Note Spreads at Issuance



Sources: AOFM; ASX; Bloomberg; Fenics; RBA

Endnotes

- [*] Ahmet Aziz, Calebe de Roure and Paul Hutchinson are from Domestic Markets Department; Samuel Nightingale is from International Department.
- [1] ES balances are deposits held at the RBA that banks use to settle their payment obligations to other banks.
- [2] For a more comprehensive discussion of the RBA's policy response to the pandemic, see Kent (2020b); Debelle (2021); Dowling and Printant (2021).
- [3] The decline in activity has been such that the use of fall-back procedures to determine the cash rate have been required on approximately 60 per cent of days since March 2020 (RBA 2021).
- [4] Under a repurchase agreement (repo), one party sells a security to another party and agrees to buy it back at a later date. The difference between the sale and

- repurchase price reflects the rate of interest (or 'repo rate') earned by the cash lender.
- [5] For more in-depth discussions of the Australian repo market, see Wakeling and Wilson (2010); Becker and Rickards (2017).
- [6] Although the RBA's TFF provides three-year funding via repo, the facility is not considered in this section because of the long term of the repos.
- [7] Based on data from the EFS collection: see APRA (2018).
- [8] Prime banks need to be of a high credit quality and with a sufficiently large issuance program so as to promote liquidity. Currently, there are four prime banks: ANZ, CBA, NAB and WBC (ASX 2021).
- [9] The implied yield on AUD in the FX swap market is derived from covered interest parity and is the cost of borrowing US dollars at OIS and swapping them into

Australian dollars via an FX swap. The contract allows a bank to swap the foreign proceeds of offshore debt

issuance back into Australian dollars to fund their Australian operations.

References

- APRA (Australian Prudential Regulation Authority) (2018), 'Reporting Standard ARS 748.0', ABS/RBA Wholesale Funding Stocks, Flows and Interest Rates, September. Available at <https://www.apra.gov.au/sites/default/files/ars_748.0_absrba_wholesale_funding_stocks_flows_and_interest_rates.pdf>.
- ASX (2021), 'ASX Bank Bill Swap (BBSW) Conventions and BBSW Methodology'. Available at <<https://www2.asx.com.au/content/dam/asx/benchmarks/asx-bbsw-conventions.pdf>>.
- Becker C and P Rickards (2017), 'Secured Money Market Transactions: Trends in the Australian Repo Rate', 22nd Melbourne Money and Finance Conference: Evolutionary Trends in the Australian Financial Sector, Monash Business School, Melbourne, 10–11 July. Available at <https://www.monash.edu/__data/assets/pdf_file/0004/2326522/2017-D2P4.pdf>.
- Black S and Titkov D (2019), 'Developments in Banks' Funding Costs and Lending Rates', RBA *Bulletin*, March.
- Boyarchenko N, Crump R, Kovner A and Leonard D (2021), 'COVID Response: The Commercial Paper Funding Facility', FED-NY Staff Report No 982, September. Available at <https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr982.pdf>.
- Debelle G (2021), 'Monetary Policy During COVID', Shann Memorial Lecture, Online, 6 May.
- Domestic Markets Department (2019), 'The Framework for Monetary Policy Implementation in Australia', RBA *Bulletin*, June.
- Dowling S (2021), 'Recent Changes to the Reserve Bank's Liquidity Operations', RBA *Bulletin*, December.
- Dowling S and S Printant (2021), 'Monetary Policy, Liquidity, and the Central Bank Balance Sheet', RBA *Bulletin*, June.
- Garner M and Suthakar A (2021), 'Developments in Banks' Funding Costs and Lending Rates', RBA *Bulletin*, March.
- Hing A, Kelly G and Olivian D (2016), 'The Cash Market', RBA *Bulletin*, December, pp 33–42.
- Kent C (2020a), 'The Reserve Bank's Operations – Liquidity, Market Function and Funding', Address to KangaNews, Online, 27 July.
- Kent C (2020b), 'The Stance of Monetary Policy in a World of Numerous Tools', Address to the IFR Australia DCM Roundtable Webinar, Online, 20 October.
- Kent C (2022), 'Changes to the Reserve Bank's Open Market Operations', Remarks to the Australian Financial Markets Association, Sydney, 22 February.
- Nicholl R (2020), 'How Did We Get Here – and What's Next?', Australian Business Economists Webinar, Online, 30 July. Available at <<https://www.aofm.gov.au/publications/speeches/how-did-we-get-here-and-whats-next-abe-webinar>>.
- Nicholl R (2021), 'Last Year: Not Just One To Remember, But One To Learn From', Australian Business Economists Luncheon, Sydney, 8 June. Available at <<https://www.aofm.gov.au/publications/speeches/last-year-not-just-one-remember-one-learn-sydney>>.
- RBA (2020), 'Domestic Financial Conditions', *Statement on Monetary Policy*, May.
- RBA (2021), 'Cash Rate Procedures Manual', 10 December.
- Wakeling D and I Wilson (2010), 'The Repo Market in Australia', RBA *Bulletin*, December, pp 27–36.

Australian Securities Markets through the COVID-19 Pandemic

Claire Johnson, Kevin Lane and Nina McClure^[*]



Photo: d3sign – Getty Images

Abstract

The COVID-19 pandemic disrupted many parts of the Australian economy, including securities markets. These markets play an important role in our economy, including as a source of funding for firms and in the transmission of monetary policy. This article describes how Australian markets for private securities weathered the impact of the COVID-19 shock. As the pandemic escalated, volatility in securities markets increased sharply, and some assets became difficult or costly to trade. The Reserve Bank, along with federal, state and territory governments in Australia, introduced policies to help support the economy and to ensure financial institutions were able to continue lending to households and businesses. These measures helped to support conditions in securities markets, which improved substantially from mid-2020. In turn, the recovery in securities markets helped to support the availability of low-cost funding for Australian businesses and households. Overall, the volatility in these markets at the beginning of the pandemic was brief when compared with the global financial crisis.

Introduction

The COVID-19 pandemic had a noticeable effect on Australian securities markets. These markets – where financial instruments including bonds and listed equity can be issued and traded – play an important role for firms and households. They provide an opportunity for savers to invest and for firms to source funding; firms can raise debt or

equity by issuing securities in primary markets. Securities markets also provide real-time information on the performance of firms and on market participants' expectations, via changes in the prices of securities as they are traded. Moreover, the pricing of securities helps to facilitate the transmission of monetary policy to the broader economy. Any of these roles can be interrupted

during periods of economic stress. This article discusses how Australian securities markets weathered the economic impact of the COVID-19 pandemic. Overall, prices in securities markets declined sharply, while volatility in equity markets increased substantially for a time. However, the period of volatility was brief, particularly when compared with the disruption experienced during the global financial crisis of 2007–2009.

The importance of securities markets

Securities markets channel funds from savers (investors) through to businesses that need finance. Firms rely on securities markets for funding to varied degrees (Graph 1). For non-financial corporations, debt securities constitute a relatively small share of funding – less than 10 per cent. For most of these firms, the majority of debt funding is from bank loans, which reflects the large role of the banking system in Australia. Around one-third of the funding for non-financial corporations comes from issuing equity on listed markets, though this is an aggregate figure and includes firms that are not listed on equity markets. Among listed firms, equity generally accounts for around three-fifths of funding.

While banks source most of their funding from deposits, bonds, along with other debt securities such as bank bills and asset-backed securities (ABS), provide one-fifth of banks’ funding. Banks have a significant presence in the bond market – over the past five years, they accounted for 60 per cent of all Australian non-government corporate bonds that were issued in Australia or international bond markets. Non-bank lenders source the majority of their funding (55 per cent) via debt securities, predominantly ABS.

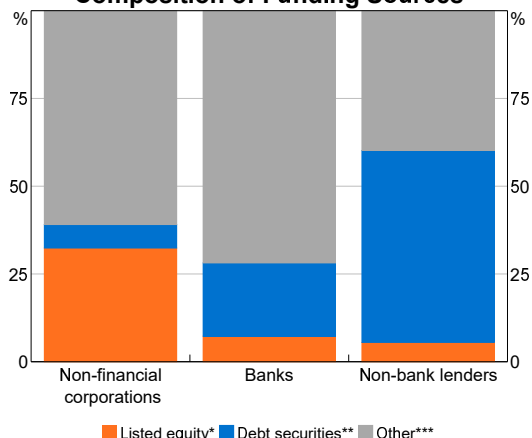
Firms source funding from securities markets for several reasons. They may be able to obtain larger volumes of funds, or funding at longer tenors, than might be available from other sources such as bank loans. Securities funding can also provide diversity to firms’ funding sources, particularly as debt securities can be issued in both domestic and offshore markets. Issuing debt securities and, to a lesser extent, equity securities might enable an issuer to retain more control of the business than

would be the case using some other sources of funding, such as private equity. In addition, conditions in secondary markets provide a real-time read on the performance of firms, as well as the expectations of market participants. Moreover, by offering an alternate source of finance, securities markets provide competition to bank and non-bank loans, thereby placing downward pressure on funding costs.

Securities markets and monetary policy

One benefit of securities markets is that they can provide additional channels for the transmission of monetary policy. The price of a security is the present value of expected cash flows, where the discount rate used to calculate the present value comprises a risk-free rate plus a risk premium. When the Reserve Bank of Australia (RBA) reduces the cash rate target, risk-free rates tends to decline. All else equal, this will lower the discount rate and increase the present value of the security. This higher present value, or lower discount rate, reduces the cost of securities funding for businesses, including banks and non-bank lenders. A lower cost of funding for financial institutions will also put downward pressure on the interest rates they charge to households and non-financial businesses. However, economic stress can impede the ability of securities markets to provide funding and to

Graph 1
Composition of Funding Sources



* For non-bank lenders, listed equity is estimated as a share of total equity based on whether issuer is listed on the ASX.
 ** Debt securities includes bonds, bank bills and ABS.
 *** Other includes deposits (for banks), unlisted equity, bank loans and other debt.

Sources: ABS; APRA; Bloomberg; RBA; Refinitiv

facilitate the transmission of monetary policy. In a downturn, businesses' expected cash flows can decline and become more uncertain, and so too does the value of their assets. This can cause investors to demand a higher risk premium. The increase in risk premiums can offset the effect on firms' funding costs of easier monetary policy, which acts to reduce the risk-free rate.

In addition, frictions in securities markets could exacerbate an economic downturn. For example, if banks are uncertain about the availability and cost of their securities funding, they may reduce new lending. If this impedes firms' access to funding, either through securities or bank loans, they may also reduce employment and investment.

The impact of the pandemic on secondary markets

The first known cases of COVID-19 in Australia were diagnosed in late January 2020. Throughout much of February, securities markets were relatively unaffected as market participants were cautiously optimistic about the expected economic effects of the virus. However, with rising case numbers both here and abroad it became apparent that the virus was highly transmissible and that economic activity would be severely disrupted by measures necessary to contain it. On 11 March, the World Health Organization declared COVID-19 a pandemic.

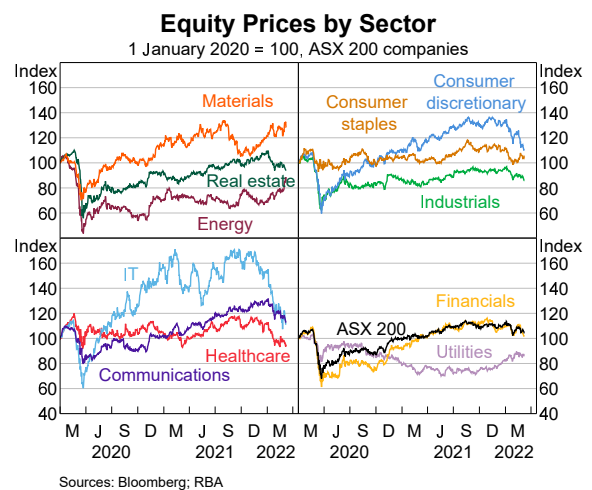
Concerns about the economic effects of the pandemic soon became evident in equity markets, where prices fell across all sectors (Graph 2). These falls were particularly large for sectors that tend to be more exposed to the economic cycle, such as energy, financials, consumer discretionary and IT. On 16 March, the ASX 200 fell by 9.7 per cent – the largest one-day fall in over 30 years. By 23 March, the ASX 200 was 35 per cent below its 20 February peak. By this time, prices were very volatile and changing in either direction by an average of nearly 4.5 per cent each day (Graph 3). Meanwhile, the average share of securities that were bought and sold each day more than doubled.

Conditions in non-government bond markets deteriorated in mid-March 2020 as investors reassessed credit risks, and corporate and bank

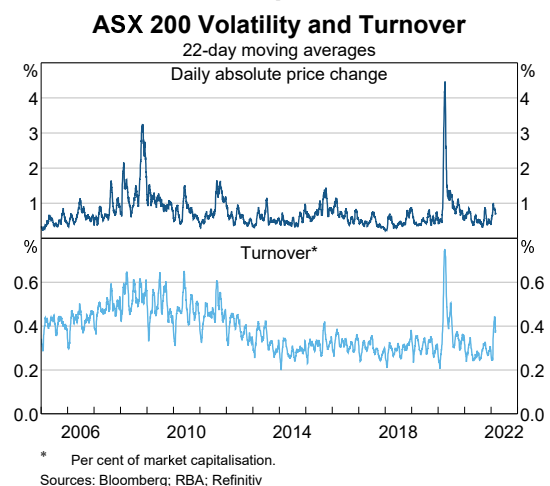
bond spreads widened significantly (Graph 4).^[1] This led to a significant reduction in investor demand. At the same time, many fund managers were facing increasing redemptions, creating general selling pressures and contributing to an overhang of supply in the secondary market. Market liquidity declined, as bond dealers (which act as intermediaries between buyers and sellers) became constrained in their ability to undertake more trades. Bid-ask spreads – the difference between the price at which participants are willing to buy and sell securities – increased notably. Similar issues arose in the ABS market, where selling by offshore investors was particularly heavy, albeit brief.

In March 2020, governments in Australia began introducing movement restrictions to prevent the transmission of the virus. Meanwhile, a range of

Graph 2



Graph 3



economic policies were announced by governments, regulators and the RBA. These were largely designed to cushion the economic impact of those movement restrictions.

Business and household finances were supported by government fiscal policies like JobKeeper, as well as relaxed eligibility criteria for accessing JobSeeker. Banks offered borrowers repayment holidays on their loans. This action was supported by the Australian Prudential Regulation Authority (APRA), which confirmed that the banks did not need to automatically classify those loans as being in arrears (APRA 2020).

The RBA announced a package of measures to support the economy on 19 March 2020 (Lowe 2020). These included a reduction to the cash rate, as well as the introduction of a target yield for the three-year Australian Government bond. The RBA also introduced the Term Funding Facility (TFF), through which banks could access low-cost three-year funding. The aim of the TFF was to lower funding costs for banks and encourage them to continue lending, particularly to small and medium-sized businesses. Other actions from the RBA included committing to purchase government bonds if doing so was necessary to ensure market functioning. The RBA also increased the tenor of its repurchase operations – this is where the RBA provides funding to financial institutions in exchange for collateral, thereby providing greater

funding stability at a time of heightened uncertainty.

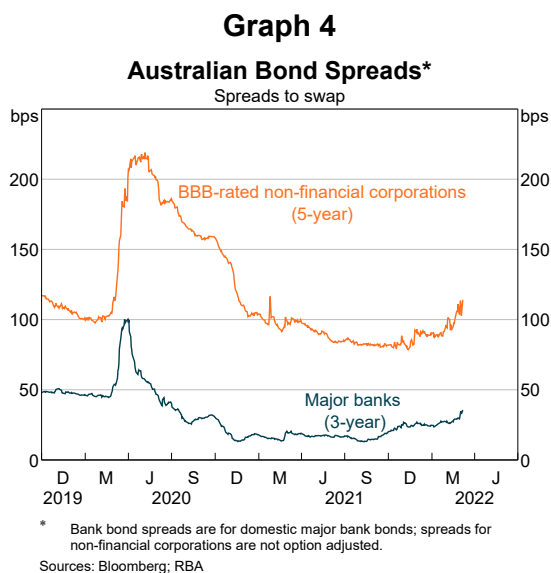
Also in March, the Australian Office of Financial Management (AOFM) announced that it would purchase ABS in both primary and secondary public securitisation markets, as well as invest in private securitisations (or ‘warehouses’). These actions supported non-bank lenders, who rely heavily on securitisation markets for their funding, as well as smaller bank lenders that could not access the TFF. With the support of these policies, conditions in financial markets began to stabilise in late March 2020. Bank bond spreads to benchmark rates, along with bid-ask spreads, started to decline in early April. This occurred quite rapidly, particularly as it became clear that banks had ample access to funding – from both the TFF and strong inflows of deposit funding – and so the need to issue new bank bonds would be subdued for a time. Non-financial corporate bond spreads remained elevated for slightly longer, before starting to fall in early May. Overall, the adjustment in securities prices as COVID-19 spread was sharp, but also brief.

Raising funding – the primary market

The early stages of the pandemic created a high degree of uncertainty around the economic outlook. As a result, firms were unsure about their future cash flows and many sought to build precautionary liquidity buffers. This section describes the role of securities markets in providing liquidity to firms during this period.

Banks

Even though banks sought precautionary liquidity in the early stages of the crisis, bank bond issuance volumes declined significantly after January 2020 (Graph 5). This was partly because banks had issued an unusually high level of bonds in January 2020 – which is already a month known for high bank bond issuance – providing some buffer for the months to follow. More importantly, large volumes of funding became available to banks as a result of RBA policies. As the pandemic unfolded, the RBA provided substantially more liquidity, at longer maturities than usual, through its daily liquidity operations (Dowling 2021). And then, with the



announcement of the TFF on 19 March, banks knew that they would have access to ample funding through that facility when it became operational (in early April). At the same time, low-cost deposit inflows further reduced banks' need to access funding from securities markets. These deposit inflows were a result of strong business credit growth as businesses drew down credit lines, as well as banks acquiring government bonds and repaying their own maturing bonds (both of which can create deposits).^[2]

The large banks, however, continued to issue Tier 2 hybrid securities at a pace similar to that prevailing before the pandemic. Hybrid bonds are a type of security with both debt and equity features. Rather than purely for funding purposes, this issuance was partly to prepare for an increase in certain capital requirements set for 2024. These hybrid bonds were predominantly issued offshore, where they attracted strong demand.

The reduction in the supply of bank bonds contributed to a significant decline in secondary market bank bond spreads over 2020 (Graph 6). After the close of the TFF drawdown period at the end of June 2021, there was a modest pick-up in bank bond issuance, and spreads widened moderately over the second half of 2021. The spreads paid on hybrid bonds remained around pre-COVID-19 levels in the first half of 2020, before narrowing as the year progressed.

Non-bank lenders

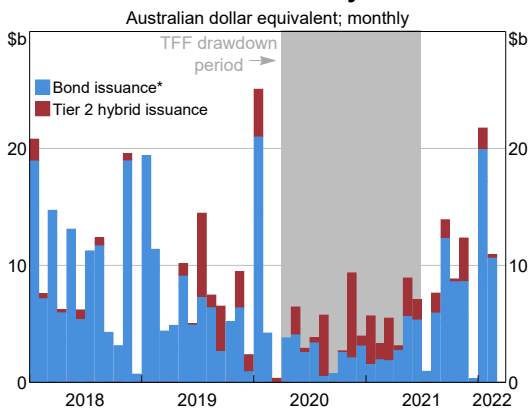
Non-bank lenders use securities markets extensively to fund the loans that they originate. They generally raise funding by issuing ABS (i.e. securities backed by a pool of loans). Launching a public ABS deal typically requires a large pool of assets, and so it is common for these lenders to use 'warehouse' facilities – which act as a line of credit and are structured as private securitisations – until the issuer has generated a sufficient volume of assets to launch a public deal.

In the early stages of the pandemic, many investors tried to sell their holdings of ABS. This resulted in an overhang of supply in the secondary market as well as uncertainty about the market's ability to absorb new issuance. If this uncertainty had continued, non-bank lenders might have become concerned about their ability to fund new loans. This could have led to non-bank lenders trying to slow the flow of new lending by either tightening their lending standards or increasing their interest rates. Ultimately, however, market conditions improved, and so these actions were not necessary on a prolonged basis.

Market conditions were bolstered by the Structured Finance Support Fund, which was administered by the AOFM. Through this fund, the AOFM invested in public securitisations in both the primary and secondary markets. It also replaced some of the private warehouse investment that had been

Graph 5

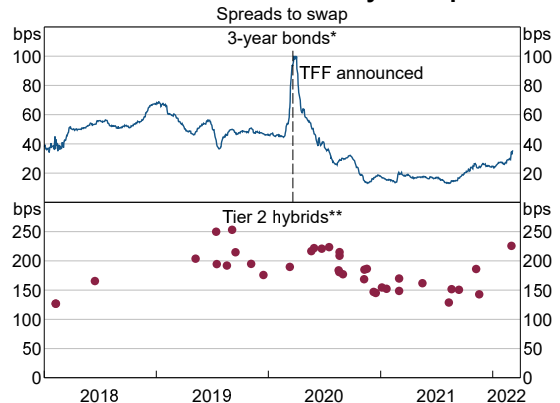
Australian Bank Bond and Hybrid Issuance



* Includes senior unsecured and covered bond issuance.
Sources: Bloomberg; Private Placement Monitor; RBA

Graph 6

Australian Bank Bond and Hybrid Spreads



* Secondary market spreads for domestic major bank senior unsecured bonds.
** Primary market spreads for major bank Tier 2 hybrids; hedged to first call date.
Sources: Bloomberg; RBA

withdrawn by offshore investors. This intervention helped to clear some of the secondary market overhang and to restore confidence in the market. The slow pace of bank ABS issuance also contributed to improved conditions, as investors in these securities instead purchased non-bank ABS. In addition, demand reportedly grew as investors searched for alternative investments amid the low level of bank bond issuance.

Volumes of ABS issuance by non-bank lenders picked up by the second half of 2020 and remained high through 2021, supported by a lack of competing supply of bank securities, which bolstered demand for non-bank issuance. The September quarter of 2020 saw a record volume of non-bank residential-mortgage backed securities (RMBS) issuance, at \$9.6 billion (Graph 7). By early 2021, the spreads paid on those securities had narrowed to the lowest levels since the global financial crisis. Again, this was largely caused by strong demand for these assets, combined with record-low market interest rates more generally.

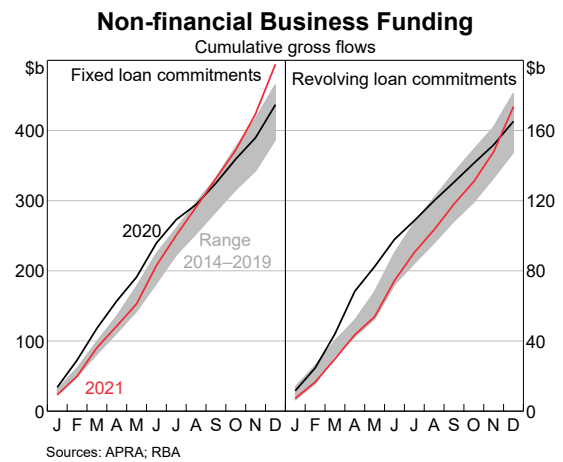
Non-financial corporations

Non-financial corporations first turned to banks for liquidity in the early stages of the pandemic. Firms drew down revolving lines of credit at a faster pace than average, while also increasing their credit lines further (Graph 8). As a result, business credit increased by nearly 3 per cent over the month of March 2020 – about 10 times faster than the average monthly growth rate in the preceding year.

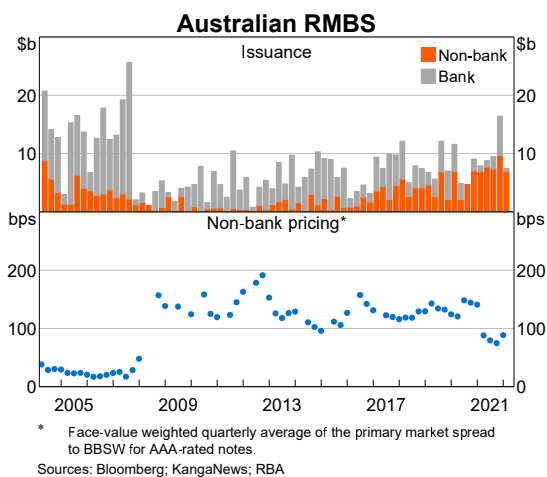
A similar phenomenon was seen overseas, including in the United States, with firms drawing down credit lines in the early stages of the pandemic (Li, Strahan and Zhang 2020).

From late March 2020 through to the June quarter, listed firms raised large volumes of equity funding via secondary issues (Graph 9). This activity was dominated by firms from the sectors that had experienced the largest peak-to-trough price falls, many of which were looking to strengthen their balance sheets (Graph 10). While there were large volumes from secondary raisings, there were very few initial public offering (IPO) listings; this likely reflected the fact that investors typically view IPOs as higher risk than secondary issues, and so are more reluctant to invest in IPOs during times of stress.

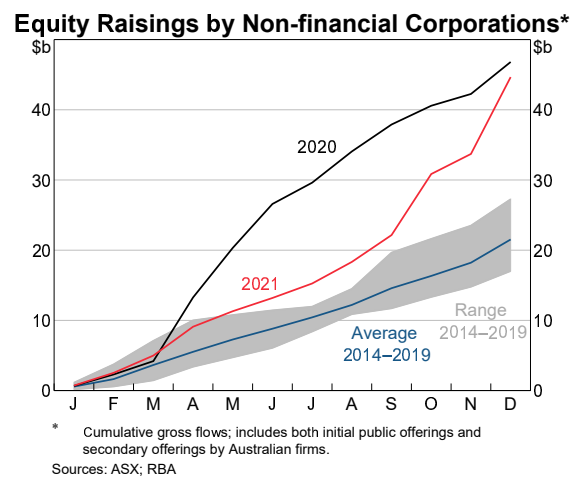
Graph 8



Graph 7



Graph 9



Many of these secondary issues were conducted via a placement, which is a comparatively quick way to raise capital because the disclosure requirements are lower than other structures for raising equity. The restrictions on the quantity of capital that a firm can raise via placements were temporarily eased by the Australian Securities and Investments Commission (ASIC), and the Australian Securities Exchange (ASX) temporarily enabled companies to request back-to-back trading halts (ASIC 2020a; ASX 2020). These measures helped firms to both plan and execute raisings.

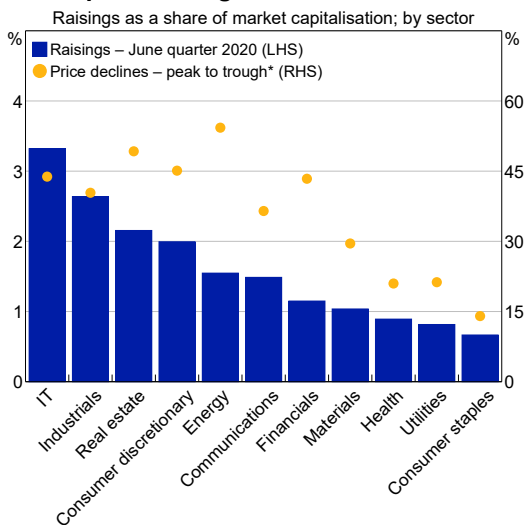
These raisings, alongside the recovery of pandemic-related equity price falls, caused the market value of equity outstanding to increase significantly from mid-2020 (Graph 11). The value of securities held by each major investor type increased by similar proportions, such that the share of equity outstanding held by each group remained steady. The stability in households' share of equity ownership through the pandemic masked a significant rise in trading activity, as was seen in many economies overseas. ASIC reported that, in the early stages of the pandemic, the number of new retail accounts created each day increased to be well above average, and a large number of 'dormant' account holders resumed trading (ASIC 2020b).^[3]

Bond issuance from non-financial corporations was low in the initial months of 2020 (Graph 12). Like the ABS market discussed above, there was an overhang of supply in the secondary market for non-financial corporate bonds. This overhang, combined with an increase in spreads, created uncertainty about the volumes and prices that could be achieved in the primary market, and some firms postponed their planned February and March bond issuance. Over March and April, several Australian firms issued into overseas markets, much of which was denominated in euros. These offshore markets were performing well at the time, buoyed in part by purchases of other bonds by central banks such as the European Central Bank.^[4] The only non-government bonds issued in the domestic market during these months had very high credit ratings, such as covered bonds from banks and a few unsecured bonds from highly rated supranational development banks.

Around May 2020, conditions in the secondary market started to improve and issuance began to pick up. This occurred along with a general improvement in market conditions, and also came soon after the RBA broadened the range of non-financial corporate bonds eligible to be used as collateral in open market operations to include all of those with an investment grade rating (previously AAA only). This broadening was done to assist with the smooth functioning of the market, and liaison suggested it boosted sentiment among some issuers; however, it is difficult to quantify any effect

Graph 10

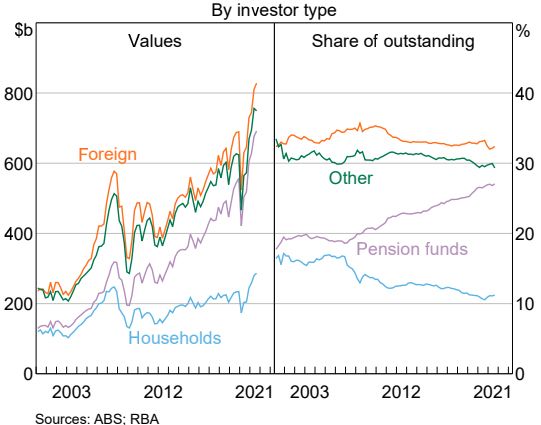
Capital Raisings and Price Declines



* Change in price from 20 February 2020 to 23 March 2020. Sources: ASX; Bloomberg; RBA

Graph 11

Ownership of Equity



on issuance or pricing given the high level of volatility during this period.

Domestic issuance was high for the remainder of 2020, with \$14.4 billion raised across the year (Graph 13). This compared to an annual average of \$8 billion for the five years prior. Moreover, the share of issuance with a tenor of at least 10 years doubled to 50 per cent. There were suggestions in liaison that this lengthening in bond tenor was a response to changing investor demand. It is possible that, in a very-low rate environment, these investors were seeking the higher returns provided by longer-dated bonds. On the other hand, several long-dated bonds were issued in late 2019, so it could also be the case that this was a continuation of a pre-existing trend. However, in 2021, the share of domestic bonds with a long tenor declined to around 30 per cent, which is close to the pre-pandemic average.

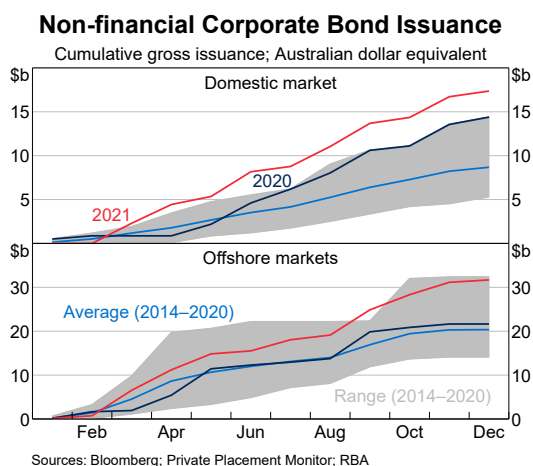
Comparison with the global financial crisis

Before the COVID-19 pandemic, the most severe economic disruption in recent history was the global financial crisis of 2007–2009. Given the significance of both these shocks, it is useful to understand some of the similarities and differences in financial market conditions during the two episodes. This section provides a comparison of outcomes in securities markets and offers possible explanations for why conditions differed between the two periods. Overall, the deterioration in financial market conditions during the global financial crisis was more severe, and had a longer

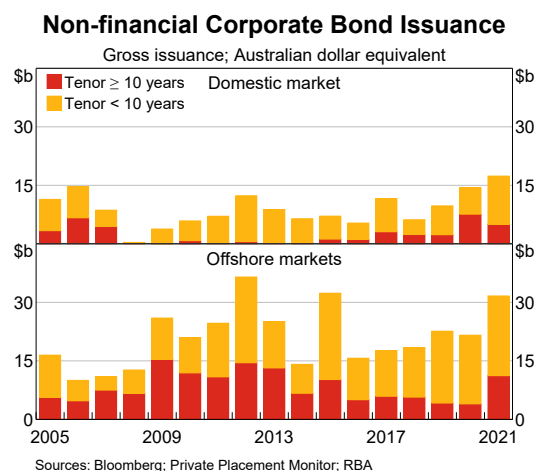
duration, than in the pandemic. In large part, this is likely to be because the financial crisis originated from within the financial sector itself. During the financial crisis, stress in the US mortgage market spilled over to the broader global financial system, with many financial institutions curtailing lending as a result. These developments amplified the initial shock to the real economy and hampered the recovery in economic and financial conditions. In the recent episode, the economic effects originated from a pandemic rather than from within the financial sector, and financial institutions were in a stronger position than in the late 2000s.

Corporate bond spreads and equity volatility increased during both the financial crisis and the pandemic (Graph 14). These measures tend to be closely correlated because a higher level of expected equity volatility is associated with a higher perceived probability of default, causing investors to demand a wider risk premium on bonds.^[5] While the spike in equity volatility during the pandemic was higher than the spike of late 2008, the period of elevated volatility in 2020 was shorter and had returned to pre-pandemic levels by late that year. Notwithstanding the larger spike in equity volatility, the pandemic-induced increase in corporate bond spreads was much smaller than during the financial crisis. This may be partly because, in the recent episode, investors correctly anticipated that the period of elevated equity volatility would be less prolonged.

Graph 12



Graph 13



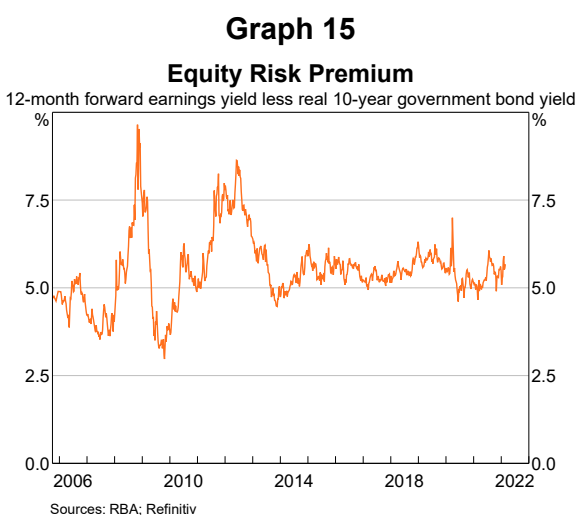
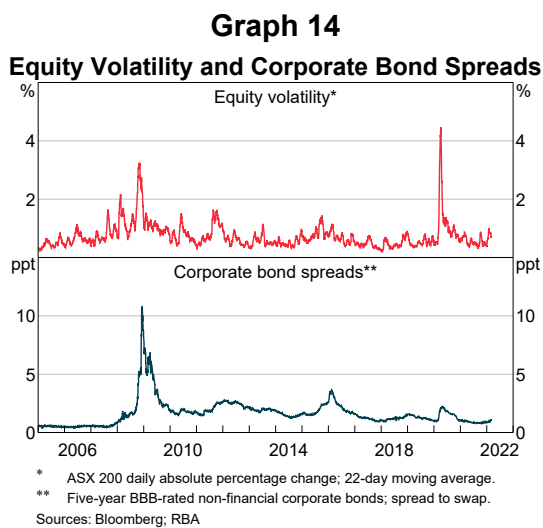
The equity risk premium – which represents the additional return that equity investors require over risk-free rates to compensate them for the risk of holding equities – was elevated during both periods but, at least by some measures, was much more volatile during the financial crisis than during the pandemic (Graph 15). This was because the financial crisis originated within the financial sector, making it difficult to assess the risk of financial instruments, and causing financial institutions to be less able to bear risk. The equity risk premium can be difficult to measure, and can be estimated in several ways. One such method – the earnings yield less the 10-year risk-free rate – did not increase substantially as the pandemic unfolded.^[6]

The impact of the financial crisis on the ABS market was particularly severe. The crisis originated in US securitisations, causing distrust of the asset class

that spread to other economies. This affected sentiment towards Australian ABS, even though these securitisations were not plagued by the same underlying issues as those in the United States. Foreign investors sold Australian ABS heavily from mid-2007, creating a severe overhang in the secondary market (Graph 16). In response, the AOFM provided support to the market by investing in ABS, as it did during the pandemic. Although this helped improve conditions significantly, issuance remained low by pre-crisis standards.

The deterioration in the bank bond market was also more apparent during the financial crisis and funding concerns were addressed with a strong policy response. The availability and cost of wholesale funding for banks deteriorated amid concerns about the stability of the global financial system. At the height of the crisis in the September quarter of 2008, investor appetite for bank bonds evaporated globally and foreign investors sold off Australian bank bonds (Black and Kirkwood 2010) (Graph 16). These disruptions led governments around the world, including the Australian Government, to introduce debt guarantee schemes, whereby banks could issue bonds backed by the government (Schwartz and Tan 2016). Australian banks utilised this scheme heavily, issuing large volumes of guaranteed bonds over the life of the scheme, from late 2008 to early 2010. Demand from foreign investors recovered in 2009, and they absorbed the majority of guaranteed issuance (Black and Kirkwood 2010). By contrast, the deterioration in conditions in the bank bond market as the pandemic unfolded was relatively mild. This reflects that the pandemic shock was external to the banking sector, and that banks’ balance sheets and risk management practices have been strengthened by Basel III reforms enacted since the financial crisis. Foreign investors did not sell bank bonds in large volumes in early 2020. However, the policy response from the RBA meant that banks did not need to issue bonds for an extended period. As a result, the stock of bank bonds outstanding decreased over 2020, causing a decline in foreign investors’ holdings as existing bonds matured.

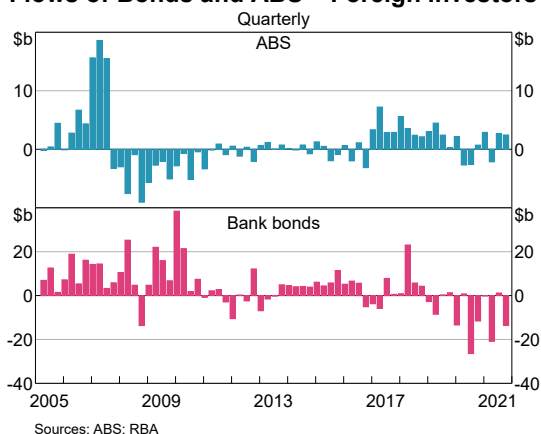
As well as being less severe overall, the period of volatility during the pandemic was also



comparatively quick. Within a few months, conditions in the securitisation market had improved markedly and non-financial corporations were issuing domestic bonds with long tenors. The domestic bond market was slower to recover during the financial crisis, with corporate issuance remaining low until late 2009. By late 2020, risk premiums had generally declined to pre-pandemic levels. And, combined with declines in risk-free rates, the estimated weighted average cost of capital for a typical firm was lower by late 2020 than before the outbreak of COVID-19 (Graph 17). The ASX 200 also rebounded relatively quickly, rising back to its February 2020 level just over a year later, whereas it took over a decade to recover to its pre-crisis level following the financial crisis.

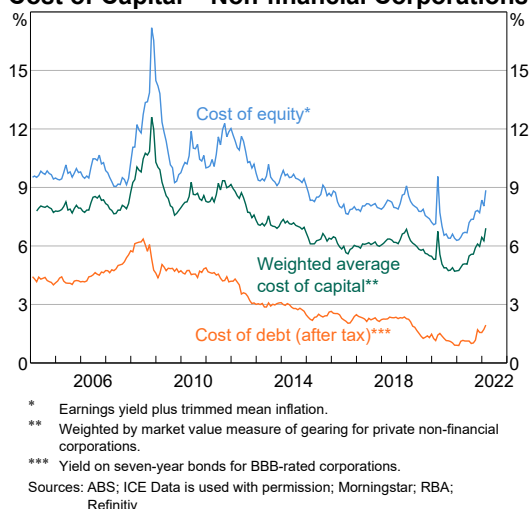
Graph 16

Flows of Bonds and ABS – Foreign Investors



Graph 17

Cost of Capital – Non-financial Corporations



The relative resilience of Australian securities markets throughout the pandemic when compared with the global financial crisis partly reflects the strength of financial institutions. This can be largely attributed to the Basel III reforms implemented since the financial crisis, which included requirements for banks to hold increased levels of capital and liquid assets, and improved risk management practices. The financial crisis highlighted the economic consequences of a reduction in the banking sector’s appetite to lend in response to a shock, although Australia was less affected than other countries in this regard. Owing to the strength of their balance sheets throughout the pandemic, banks continued to lend to businesses and households, and facilitated the easing of monetary policy by reducing lending rates. Beyond the financial sector, many other Australian corporations were also better placed to weather the shock of the pandemic. In particular, real estate firms had lower leverage in 2020 than was the case in the late 2000s. Finally, the performance of securities markets following both the global financial crisis and the pandemic benefited from support, tailored to circumstances at the time, from central banks and fiscal authorities globally.

Conclusion

The COVID-19 pandemic led to a deterioration in conditions in Australian securities markets in early 2020. In secondary markets, concerns about the economic effects of the virus and associated restrictions caused steep declines in equity prices and an increase in bank and corporate bond spreads. At the same time, selling pressures in secondary markets for corporate bonds and ABS created an uncertain environment for firms wanting to raise funding in those markets. Non-financial corporations sought liquidity as the pandemic unfolded, drawing on lines of bank credit. Listed firms raised equity funding in large volumes to support their balance sheets.

The suite of policy measures introduced by the RBA, governments and other regulators supported the economy and financial market functioning during the pandemic. These comprehensive levels of

support made an important contribution to the resilience of Australian securities markets throughout the period, ensuring that funding

remained available to households and businesses at low cost. ✎

Endnotes

- [*] The authors are from Domestic Markets Department. This article builds on the speech by Kohler (2021).
- [1] For a discussion of conditions in the government bond market, see Finlay, Seibold and Xiang (2020).
- [2] For further detail about the creation of bank deposits in 2020, see RBA (2020). For a broader discussion of the deposit creation process, see Kent (2018).
- [3] These retail investors may have been trading with the aim of supplementing their income. Commentators have also suggested that some investors may have been investing in equity as an alternative to gambling that was inaccessible during the lockdown. For further exploration of this hypothesis, see Chiah, Tian and Zhong (2021).
- [4] Bonds issued by Australian firms were not eligible to be purchased, but nonetheless these purchases indirectly helped by contributing to improved conditions in those markets.
- [5] The expected level of volatility in a firm's assets, for which equity volatility can serve as a proxy, is a key determinant of bond spreads in so-called structural models (Merton 1974). When the value of assets is more volatile, it is more likely to decline below the level of a firm's debt, prompting default on bondholders.
- [6] The earnings yield is calculated as expected aggregate earnings over the next 12 months divided by the current aggregate market capitalisation.

References

- APRA (Australian Prudential Regulation Authority) (2020), 'APRA Advises Regulatory Approach to COVID-19 Support', Media Release, 23 March.
- ASIC (Australian Securities and Investment Commission) (2020a), 'Facilitating Capital Raisings during COVID-19 Period', Media Release, 31 March.
- ASIC (2020b), 'Retail Investor Trading during COVID-19 Volatility', May. Available at <<https://download.asic.gov.au/media/5584799/retail-investor-trading-during-covid-19-volatility-published-6-may-2020.pdf>>.
- ASX (Australian Securities Exchange) (2020), 'Listed@ASX Compliance Update', 31 March. Available at <<https://www.asx.com.au/documents/asx-news/Listed-Compliance-Update-31-mar2020.pdf>>.
- Black S and J Kirkwood (2010), 'Ownership of Australian Equities and Corporate Bonds', *RBA Bulletin*, September, pp 25–34.
- Chiah M, X Tian and A Zhong (2021), 'Lockdown and Retail Trading in the Equity Market', *Journal of Behavioral and Experimental Finance*, 33, Art 100598.
- Dowling S (2021), 'Recent Changes to the Reserve Bank's Liquidity Operations', *RBA Bulletin*, December, pp 43–49.
- Finlay R, C Seibold and M Xiang (2020), 'Government Bond Market Functioning and COVID-19', *RBA Bulletin*, September, pp 11–20.
- Kent C (2018), 'Money – Born of Credit?', Remarks at the Reserve Bank's Topical Talks Event for Educators, Sydney, 19 September.
- Kohler M (2021), 'Australian Securities Markets Through the Pandemic', Keynote address to the Australian Securitisation Forum, Online, 23 November
- Li L, P Strahan and S Zhang (2020), 'Banks as Lenders of First Resort: Evidence from the COVID-19 Crisis', *The Review of Corporate Finance Studies*, 9(3), pp 472–500.
- Lowe P (2020), 'Responding to the Economic and Financial Impact of COVID-19', Speech at the Reserve Bank of Australia, Sydney, 19 March.
- Merton R (1974), 'On the Pricing of Corporate Debt: The Risk Structure of Interest Rates', *The Journal of Finance*, 29(2), pp 449–470.

RBA (Reserve Bank of Australia) (2020), 'Box D: Recent Growth in the Money Supply and Deposits', *Statement on Monetary Policy*, August.

Schwartz C and N Tan (2016), 'The Australian Government Guarantee Scheme: 2008-15', *RBA Bulletin*, March, pp 39–46.

Copyright and Disclaimer Notices

HILDA

Disclaimer

This publication uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The unit record data from the HILDA Survey were obtained from the Australian Data Archive, which is hosted by The Australian National University. The HILDA Survey was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views based on the data, however, are those of the author(s) and should not be attributed to the Australian Government, DSS, the Melbourne Institute, the Australian Data Archive or The Australian National University and none of those entities bear any responsibility for the analysis or interpretation of the unit record data from the HILDA Survey provided by the author(s).

