

Bulletin

SEPTEMBER 2020



RESERVE BANK OF AUSTRALIA

Contents

1. Managing the Risks of Holding Self-securitisations as Collateral	1
2. Government Bond Market Functioning and COVID-19	11
3. The Economic Effects of Low Interest Rates and Unconventional Monetary Policy	21
4. Retail Central Bank Digital Currency: Design Considerations, Rationales and Implications	31
5. Insights from the New Economic and Financial Statistics Collection	48
6. The COVID-19 Outbreak and Access to Small Business Finance	58
7. Modernising Payments Messaging: The ISO 20022 Standard	66
8. The Rental Market and COVID-19	75
9. Labour Market Persistence from Recessions	85
10. Private Sector Financial Conditions in China	91
11. The Global Financial Safety Net and Australia	100
12. Different Approaches to Implementing a Countercyclical Capital Buffer	113

The *Bulletin* is published under the direction of the Bulletin Editorial Committee: Luci Ellis (Chair), Lynne Cockerell, Ellis Connolly, Darren Flood, Judy Hitchen, Carl Schwartz 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 17 December 2020.

The graphs in this publication were generated using Mathematica.

ISSN 1837–7211 (Online)

© Reserve Bank of Australia 2020

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 2020 OR Source: RBA 2020

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

Managing the Risks of Holding Self-securitisations as Collateral

Duke Cole and Calebe de Roure^[*]



Photo: sorbetto – Getty Images

Abstract

Self-securitisations are structured pools of assets, such as residential mortgages, created by banks specifically to use as collateral to access liquidity from the Reserve Bank. The ability of banks to transform illiquid mortgages into liquid assets improves overall liquidity in the financial system. Some financial risks the Reserve Bank faces by holding self-securitisations as collateral differ from other collateral assets (such as government and corporate securities). Unlike these assets, self-securitisations are not currently traded on any public market, and the risks of the self-securitisation are related to the risks of the bank using it as collateral. The Reserve Bank applies a series of additional controls to self-securitisations accepted as collateral to protect against potential financial losses.

Introduction

The Reserve Bank implements monetary policy and supports the smooth functioning of the payments system by managing the availability of liquidity (in the form of exchange-settlement account balances) in the financial system. The Reserve Bank can also provide liquidity to authorised deposit-taking institutions (ADIs) during periods of financial system stress to promote financial stability. Since March 2020, as part of the measures to support the

economy from the effects of COVID-19, the Bank also provides long-term funding under the Term Funding Facility (TFF) (RBA 2020).

Liquidity is provided to eligible counterparties under repurchase agreements (repos). The Reserve Bank lends cash to the counterparty and receives securities as collateral. Upon maturity of the repo, the collateral is returned to the counterparty in exchange for the cash lent plus interest. The collateral is the primary protection against

counterparty risk for the Reserve Bank. In the event the counterparty defaults, the collateral can be sold to recover the cash it has lent.

Self-securitised residential mortgage-backed securities (RMBS) (i.e. self-securitisations) are one type of eligible collateral for some of the Bank's liquidity facilities.^[1] Self-securitisations are structured pools of mortgages created by ADIs specifically to be offered as collateral to the Reserve Bank. When used as collateral in the Reserve Bank's liquidity facilities, they enable ADIs to transform illiquid assets into cash, enhancing overall liquidity in the banking sector during periods of market stress. However, the risks to the Reserve Bank associated with accepting self-securitisations as collateral differ from other eligible collateral, such as government and corporate bonds. Most notably, self-securitisations are large relative to outstanding public RMBS, illiquid and not currently traded on any public market. However, they are designed to be tradeable like other RMBS to enable the Reserve Bank to liquidate the collateral if necessary in the event the counterparty defaults. This article describes the role of self-securitisations in the Reserve Bank's liquidity facilities, the risks of accepting these securities as collateral, and the Reserve Bank's approach to managing these risks.

Self-securitisations and the Reserve Bank's Liquidity Facilities

The Reserve Bank accepts self-securitisations as collateral in three liquidity facilities – the Committed Liquidity Facility (CLF), Standing Facility Open Repos (Open Repos) and the TFF. Self-securitisations are not generally accepted as collateral in the Reserve Bank's daily open market operations (OMO), which allocate liquidity in a competitive auction.^[2]

ADIs that are required to comply with the Australian Prudential Regulation Authority's (APRA's) Liquidity Coverage Ratio (LCR) are offered access to the CLF.^[3] Under the CLF, the Reserve Bank commits to lend up to a pre-specified amount against eligible collateral and charges a fee for this commitment (Bergmann, Connolly and Muscatello 2019). The CLF counts towards ADIs' LCR requirement. Without the CLF, ADIs would be required to meet the LCR entirely by holding high-quality liquid assets such as

Australian Government Securities and semi-government securities, which have to date been in limited supply given low government debt levels. Although a range of securities are eligible as collateral under the CLF, self-securitisations could collateralise around 90 per cent of total CLF limits.

Open Repos are used to assist with the smooth functioning of the payments system. They address mismatches in the timing of payments within a day and support liquidity for 24/7 payments in the New Payments Platform by creating a liquidity buffer for payments made after hours (Rush and Louw 2018). ADIs that hold self-securitisations will typically present them as collateral for Open Repos.

The TFF was established in March 2020 in response to the economic impact of the COVID-19 pandemic. Under the TFF, ADIs can borrow up to a pre-specified allowance for a term of three years at 0.25 per cent. The facility is designed to reinforce the benefits of a lower cash rate by reducing the funding cost of ADIs, and to encourage ADIs to support lending to businesses. Around 75 per cent of aggregate TFF allowances as at 30 June 2020 could be collateralised by self-securitisations. As with the CLF and Open Repos, ADIs with self-securitisations typically use them as collateral when accessing funding under the TFF.

ADIs prefer to use self-securitisations as collateral where permitted because they are the most cost-effective collateral to use. The underlying mortgages in a self-securitisation would otherwise sit on an ADI's balance sheet with no alternative use as there is no active repo market for individual loans.

Self-securitisations represent the second-largest share of collateral held by the Reserve Bank under repo after Australian Government Securities (AGS), which have been used as the main form of collateral in OMO in recent years (Graph 1). The Reserve Bank first accepted self-securitisations as collateral in October 2008 in OMO in order to provide ADIs with greater flexibility to manage their liquidity amid stressed market conditions associated with the global financial crisis. Once market stresses receded, the Reserve Bank ceased accepting them as collateral. In November 2013, holdings expanded

as the Reserve Bank began accepting self-securitisations as collateral in Open Repos (RBA 2013).^[4] Holdings increased further in 2020 with the introduction of the TFF. Out of the total pool of securities that are eligible to be accepted as collateral under repo, self-securitisations comprised 21 per cent as at 30 June 2020 (Graph 2).

Key Features of Self-securitisations

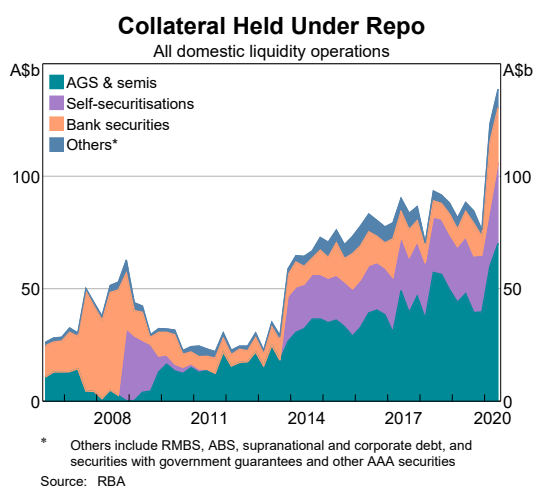
RMBS are debt securities backed by a pool of residential mortgages. Investors that purchase the securities receive income funded by the principal-and-interest payments from the pool of mortgages. Self-securitisations are a type of RMBS. A distinguishing feature of self-securitisations is that notes issued from the trust are typically not sold to the public (Table 1).^[5] Rather, they are held by the

ADI that issued them to use as collateral to access central bank liquidity. Typically, the ADI regularly adds mortgages to the self-securitisation to maintain its value as existing mortgages are repaid.

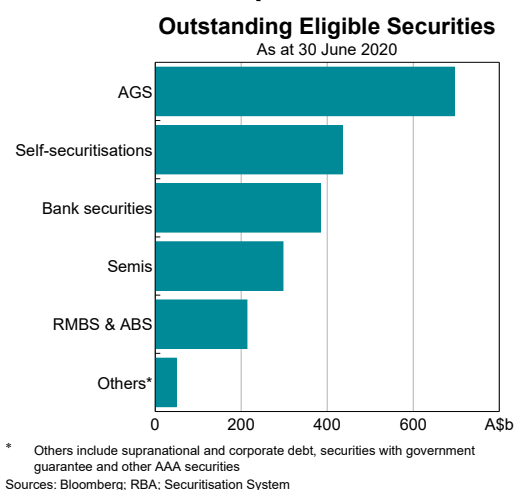
RMBS notes are organised in hierarchical order of repayment. This is referred to as tranching. Income is paid to the senior notes before the junior subordinated notes, and any losses arising from mortgage foreclosures are borne by the junior notes first. Rating agencies assess each note based on the subordination provided and the quality of the mortgage pool. The Reserve Bank accepts only AAA-rated notes, which are the most senior notes. The amount of subordination required to achieve a AAA rating can vary and is affected by a range of factors, including the creditworthiness of the borrowers and the size of the mortgages relative to the value of the properties (i.e. the loan-to-value ratio) (Arsov, Kim and Stacey 2015). Mortgage losses must be larger than the amount of subordination before the senior notes bear any loss.

RMBS are generally high-quality assets (Debelle 2009). In Australia, all tranches of RMBS (senior and junior) have been repaid in full since their first issuance in the late 1980s. This includes during the 2008–09 global financial crisis, which was associated with unusually lax mortgage lending standards and widespread mortgage defaults in the United States (Standard & Poors 2019). In the United States, the epicentre of the crisis, AAA-rated RMBS that were outstanding as at January 2007 encountered only modest losses, substantially smaller than the loss scenarios used by the Reserve Bank when calibrating its risk controls (Standard & Poors 2011; Ospina and Uhlig 2018).

Graph 1



Graph 2



Risks of Self-securitisations as Collateral

When the Reserve Bank provides liquidity to its counterparties under a repo, it would face a loss only if the counterparty failed to repurchase securities sold to the Reserve Bank under repo and at the same time the market value of the securities fell below the agreed repurchase amount. Entities must meet certain eligibility criteria before they can be counterparties to the Reserve Bank, and the Reserve Bank also actively manages the risks associated with the collateral held under repo.^[6] As

Table 1: Key Features of RMBS and Self-securitisations

	Definition	RMBS	Self-securitisation
Sponsor	Initiates the RMBS transaction and typically writes the mortgages provided to the pool	ADIs and non-ADIs	ADIs
Issuer	Issuer is the legal entity that owns assets and issues securities	Bankruptcy remote special purpose vehicle	Bankruptcy remote special purpose vehicle
Mortgage pool	Assets that are used to repay notes issued	Fixed pool, shrinks as investors are repaid	Pool is topped up regularly to maintain value
Note tranches	Number of different debt securities/notes issued	3–10 tranches, to meet investor preferences	2–3 tranches
Lead manager	Set up and sell the RMBS notes	Typically a group of banks	Typically no lead manager because notes are not sold to investors
Trustee	Legally responsible for the trust; assigns the trust its manager and servicer	Specialised firm	Specialised firm
Trust manager	Manages cash flows from the trust and other administration	Sponsor or specialised firm	Sponsor or specialised firm
Servicer	Manages the mortgages, collects payments from households	Sponsor	Sponsor
Service providers	ADIs that provide collection accounts, liquidity facilities and swaps to the trust ^(a)	Typically the sponsor for larger ADIs, otherwise a different ADI	Typically the sponsor for larger ADIs, otherwise a different ADI

(a) RMBS may enter into fixed-for-floating interest rate swaps, basis swaps or cross-currency basis swaps to hedge mismatches between the repayments from the mortgages and the payments on the notes it issues

Sources: RBA

such, the likelihood of the Reserve Bank incurring a loss on a repo is extremely low and to date it has never incurred a loss. This section describes the risks the Reserve Bank faces when holding self-securitisations under repo, some of which are unique to these securities.

Credit risk

Credit risk is the risk of losses because a self-securitisation cannot pay its obligations to noteholders in a timely manner. This would arise if some households cannot afford the principal-and-interest payments that are owed to the self-securitisation. Households might be unable to pay if their income falls or expenses increase (or both), which can be driven by a range of factors (Kearns 2019). These losses first affect the subordinated junior notes (which the Reserve Bank does not accept as collateral). Holders of senior notes only face losses if the losses on mortgages are greater than the value of the junior notes.

Although self-securitisations typically pay both interest and principal back to noteholders regularly,

only interest payments must be made on a regular schedule. Principal is only due to noteholders by the final maturity date of the self-securitisation. Delays in principal payments are acceptable, in part because the amount of principal repaid on the underlying loans can vary; some households may prepay their mortgage while others may fall behind on their regular principal payments. To reduce the risk of missed interest payments, self-securitisations typically have liquidity reserves and can use principal payments to pay interest if necessary.

Liquidity risk

Liquidity risk is the risk that the Reserve Bank could not sell collateral in a timely manner without a significant discount to fair value. Some eligible collateral assets, such as AGS, are highly liquid; they are traded frequently and can generally be easily sold if necessary. Other assets, such as RMBS, are infrequently traded and selling these assets may take days or weeks.

Self-securitisations are the least liquid of all eligible collateral because there is no active market and self-

securitisations tend to be large. If the Reserve Bank took ownership of notes in a self-securitisation because a counterparty defaulted on a repo, it is unlikely to be able to sell these securities quickly, especially if the default is associated with broader market stress. The Reserve Bank has the discretion to hold these securities for an extended period, if necessary, because central banks face no funding risk in the local currency. This is fundamental to a central bank's function in providing liquidity to the financial system (Kearns and Lowe 2008; Robertson 2017).

Wrong-way risk

Wrong-way risk occurs when the risk of the collateral is correlated with the risk of the counterparty. For example, assume Bank A presents a bond it has issued to the Reserve Bank as collateral under repo. If Bank A defaults on the repo with the Reserve Bank as well as on the Bank A bond, only a fraction of the bond's value may be recouped by the Reserve Bank. This would leave the Reserve Bank with much less collateral at the point at which it is relying on that collateral to recover the cash lent. To mitigate wrong-way risk, the Reserve Bank generally requires its counterparties to use collateral that is unrelated to them.

Self-securitisations are exempt from this related-party requirement. Unlike bonds issued by banks as in the example above, self-securitisations are separate legal entities that would continue to function after a counterparty defaults (i.e. they are bankruptcy remote). However, the credit quality of self-securitisations can still be correlated with that of the counterparty. The counterparty services the mortgages held by their self-securitisation and often provides other services to the self-securitisation, such as the collection account, liquidity reserves and swaps. New providers of these services would be required if the counterparty entered bankruptcy.

Market risk

Market risk reflects the possibility that the price of a security held under repo decreases. Self-securitisations have no market price because no organised market exists. The Reserve Bank values

these securities with an internal pricing model that has been reviewed and validated by an independent external consultant. The model accounts for the structure of each self-securitisation (including the weighted-average life of the mortgages) and the yields of similarly rated public RMBS. The Reserve Bank is subject to additional 'model risk' to the extent that modelled prices do not adequately capture the value of the securities.

When it established the TFF in April 2020, the Reserve Bank froze prices of eligible self-securitisations for three years for the purpose of valuing collateral accepted under repo. This is to ensure that the modelled prices are not unduly impacted by potential volatility in public RMBS due to the COVID-19 pandemic.

Operational and legal risks

Operational risk relates to errors in administering self-securitisations. This might include misreporting of mortgage pool characteristics to rating agencies and the Reserve Bank. For example, a principal-and-interest mortgage may be reported as interest-only and vice-versa. These types of errors can affect the assessment of the self-securitisation's credit risk and credit rating.

Self-securitisations also carry legal risks. The structure of these securities can be quite complex, and the legal documents can vary significantly between self-securitisations.^[7] Legal risks might include provisions that allow the counterparty to change the loan composition and adversely alter the risk of the self-securitisation without the consent of noteholders (i.e. the Reserve Bank). Hence, the Reserve Bank engages with its counterparties on the legal documentation underpinning the trusts before the self-securitisation is eligible for use as collateral.

How the Reserve Bank Manages These Risks

The Reserve Bank applies a number of controls to mitigate the risks outlined above. There are three primary controls: eligibility criteria; applying margins or haircuts to the collateral value received; and making margin calls each day if the collateral value

falls (for example, as households repay their mortgages).

Eligibility criteria

The Reserve Bank assesses each self-securitisation before it is eligible to be posted as collateral against published eligibility requirements.^[8] Of note, self-securitisations must:

- **Be rated AAA.** This implies there is a low risk of loss to noteholders even under scenarios of significant stress. This rating requirement is more onerous than the Reserve Bank applies to some other eligible securities, such as bank bonds and corporate bonds, which only require a minimum rating of BBB– (i.e. investment grade).
- **Not be highly structured.** RMBS can be set up with complicated structural features or triggers, often to suit the preferences of potential investors. The Reserve Bank expects self-securitisations to be uncomplicated so the risks are simple to evaluate. Further, the Reserve Bank does not accept ‘synthetic assets’, where the assets in the self-securitisation are derivatives or notes in other RMBS.
- **Have no restrictions on trading.** Although self-securitisations are not publicly traded, the self-securitisation must have no restrictions on trading. This would allow the Reserve Bank to sell the notes (for example, through an auction) if the counterparty defaults.

The Reserve Bank also requires that ADIs report detailed data on the self-securitisation and underlying loans. These data enable the Reserve Bank to investigate and model the risks of the self-securitisation and to value the securities. The data must be updated monthly to enable the Reserve Bank to assess the creditworthiness of self-securitisations in a timely manner. To mitigate the operational risk of errors in these data, the Reserve Bank exercises a high level of due diligence and engages with counterparties to promote a high standard of data quality and transparency in the industry.

Margin

To protect itself against changes in the value of collateral held under repo, the Reserve Bank lends an amount of cash that is lower than the value of the collateral presented by the counterparty. For example, for every \$100 of securities issued from a self-securitisation that is presented as collateral, counterparties may borrow, on average, \$78 from the RBA.^[9] This difference is the margin or haircut. Among all eligible securities rated AAA, the RBA applies the highest base margin to RMBS and self-securitisations because they are the least liquid (Graph 3).

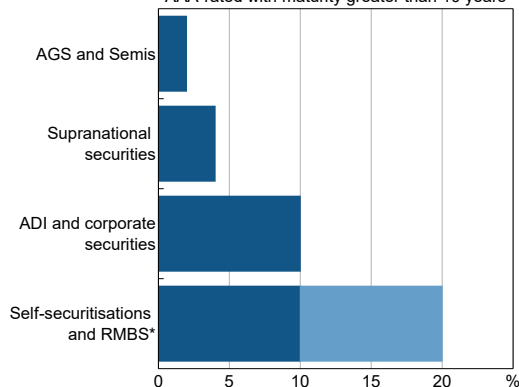
The Reserve Bank applies additional margins to self-securitisations (and other RMBS) based on certain features that pose higher risk to the Reserve Bank in the event of counterparty default (Graph 4). Some of these additional margins change dynamically as the risk changes (usually monthly when new data are submitted). For a typical self-securitisation, the sum of the additional margins can be at least as large as the base margin:

- **Collection account provider.** The collection account holds principal-and-interest payments from borrowers before they are paid to noteholders. If the counterparty is also the collection account provider, then those funds may not be available to the self-securitisation if the counterparty defaults. Therefore, the Reserve Bank applies an additional margin equal to the balance of the collection account. This mitigates a key source of wrong-way risk.

Graph 3

Base Margins on Eligible Securities

AAA-rated with maturity greater than 10 years



* Base margin varies depending on the mortgage pool and note seniority
Source: RBA

- **No market price.** The Reserve Bank applies an additional margin because it must rely on modelled prices to value the notes in a self-securitisation.
- **Swaps and liquidity facilities.** Certain risks in a self-securitisation can be reduced through the use of swaps and liquidity facilities. Often these facilities are provided to the self-securitisation by the issuer itself (which is the Reserve Bank's counterparty in a repo). In the event the counterparty defaults, alternative providers of these facilities would be required to ensure risks continue to be managed in a timely manner. It may be costly for the self-securitisation to access alternative providers of these facilities, which would adversely impact the Reserve Bank as noteholder. As with the collection account, these facilities increase the Reserve Bank's wrong-way risk.

For a typical self-securitisation with subordinated junior notes of 8 per cent and an average margin of 25.25 per cent, the RBA would provide around \$73 of cash for every \$100 of mortgages in the self-securitisation (Graph 5).^[10] This buffer provides the

Reserve Bank with significant protection from the financial risks described above.

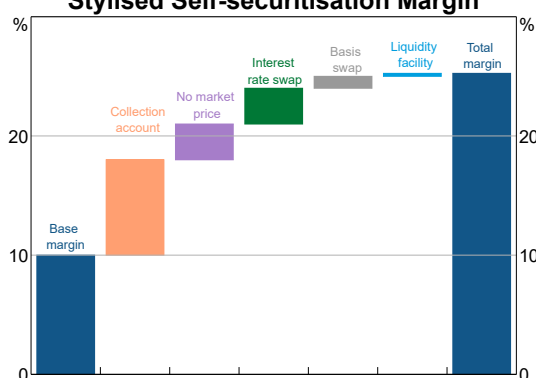
Margin calls

The Reserve Bank revalues the collateral it holds under repo on a daily basis. If the collateral value falls below a certain threshold, the Reserve Bank calls for additional collateral from the counterparty.^[11] Counterparties can meet a margin call by providing more notes issued from the self-securitisation. The additional collateral must be provided on the same day.

For self-securitisations, changes in collateral value are generally driven by changes in the margin and the mortgage pool. Changes in the margin may arise, for example, due to changes in the collection account balance (see above). Changes in the mortgage pool may arise due to principal payments from borrowers. Fluctuations in modelled prices can also have an impact on the value of collateral, although in the short term, this is not the case as modelled prices have been frozen for eligible self-securitisations until early 2023.

Graph 4

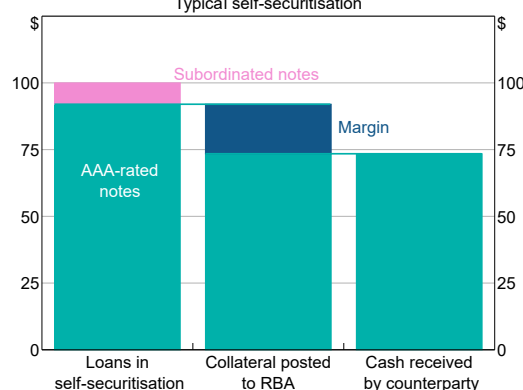
Stylised Self-securitisation Margin



* The average margin of self-securitisations is 25.25, i.e. on average a counterparty receives \$79.8 for each \$100 collateral pledged
Sources: RBA; Securitisation System

Graph 5

Cash Available from \$100 of Loans* Typical self-securitisation



* Assumes 8 per cent subordination, and total margin of 25.25
Source: RBA

Conclusion

Self-securitisations are an integral part of the Reserve Bank's collateral framework. The Reserve Bank's commitment to accept these assets as collateral under its liquidity facilities is an effective way of enhancing overall financial system liquidity. The Reserve Bank implements a suite of controls to mitigate risks to its balance sheet arising from accepting self-securitisations as collateral. A key component of the risk management process is the requirement by the Reserve Bank for issuers to submit detailed loan-level and deal-level data on a monthly basis. These data are used to model the risks of the securities, value the securities in the absence of traded prices, and assign margins to the securities. ✎

Footnotes

- [*] The authors are from the Risk and Compliance Department
- [1] Asset-backed securities can be set up using other types of assets such as car loans or personal loans. Self-securitisations can also be backed by these assets, but they are rare. The risks and controls described in this article also apply to these self-securitisations.
- [2] During the global financial crisis, the Reserve Bank accepted self-securitisations as collateral in OMO.
- [3] There are 15 ADIs required to comply with the Liquidity Coverage Ratio. All other ADIs are subject to Minimum Liquidity Holdings (MLH) requirements. APRA expects ADIs captured under the MLH regime with more than \$1 billion in liabilities to establish a self-securitisation that is repo eligible with the Reserve Bank for use in a contingency. See APRA's Prudential Standard APS 210.
- [4] The CLF was implemented in 2015 but was not immediately associated with a change in holdings of self-securitisations.
- [5] Self-securitisations could be sold to investors. However, to date, no issuing ADI has chosen to do so.
- [6] See Eligible Counterparties in the Domestic Market Operations Technical Notes (<https://www.rba.gov.au/mkt-operations/resources/tech-notes/eligible-counterparties.html>)
- [7] Some counterparties established their self-securitisations to align with existing public RMBS trusts. This has contributed to variability in legal documentation across ADIs.
- [8] See Eligible Securities in the Domestic Market Operations Technical Notes (<https://www.rba.gov.au/mkt-operations/resources/tech-notes/eligible-securities.html>).
- [9] The average margin ratio is 25.25 per cent. This includes a base margin plus a series of additional margins based on specific features of the self-securitisation. The calculation formula is: $\text{purchase price} = \text{market price} / (1 + \text{margin ratio})$.
- [10] In this example, the self-securitisation contains \$100 of mortgages and issues two notes: \$92 of senior notes and \$8 of junior notes. The junior notes bear the losses first, so the subordination is calculated as $8/100=8$ per cent. Assuming a margin on the senior note of 25.25 per cent, the Reserve Bank would only provide $92/(1+0.2525)\approx\$73$ in cash under repo. Therefore, the \$73 in cash provided by the RBA is collateralised by \$100 in mortgages.
- [11] Similarly, if the collateral value increases above a threshold, the counterparty may call the RBA to return some collateral.
- [12] The Reserve Bank first accepted RMBS as eligible collateral in October 2007. This was expanded to include self-securitisations in October 2008.

Box A: Loans as Collateral in Other Jurisdictions

A number of other central banks also accept residential mortgages and other types of loans as collateral under repo for certain types of liquidity facilities. In many cases, central banks accept loans without any securitisation structure (i.e. loan pools).

- The Bank of England accepts residential mortgages and other types of loans for certain standing and term-lending facilities, but not in its OMO (Alphandary 2014).
- Eurosystem central banks accept loans to entities including non-financial corporations (referred to as credit claims) across all central bank facilities (Tamura and Tabakis 2013). Some central banks can also accept residential mortgages under the additional credit claims framework (ECB 2020).
- In the US, the Federal Reserve accepts a variety of loans including residential mortgages, commercial loans and agricultural loans as collateral for lending to depository institutions through its discount window (Federal Reserve 2019).

Although the legal nature of collateral in the form of loan pools and securitised loans is different, economically they are broadly similar. For both self-securitisations and loan pools, the collateral represents future payments on a bundle of loans. For an equivalent bundle of loans, the credit risk is the same in each case. The liquidity risk is also similar; there is no active market for these loans. However, it could be somewhat easier for a central bank to liquidate notes from a self-securitisation than a loan pool because the notes are fungible and easily divisible, and transactions can be settled in Austraclear (or an equivalent securities settlement facility) in the same way as other debt securities.

Central banks apply a margin or haircut in all cases, requiring more collateral than the cash provided under repo. This haircut is generally significantly larger than the haircut applied to other collateral with a comparable credit rating. For loan pools, the haircut is the primary protection against financial losses on the assets. By contrast, self-securitisations are protected from losses by the subordinated junior notes and the haircut. For this reason, on average, the haircut on a self-securitisation can be expected to be lower than a pool of loans.

Accepting loans as collateral, whether they are securitised or not, poses additional legal risks and operational challenges. Central banks conduct significant due diligence before they accept loans as collateral, although it differs depending on the structure. For example, at the Bank of England, part of its review focuses on ensuring it has a strong legal claim on the loans in the event of default. For self-securitisations, the Reserve Bank conducts due diligence on the trust documents and structure, which provide the legal certainty that noteholders have a claim on the underlying mortgages.

The choice of legal structure by individual central banks depends on factors specific to each jurisdiction. The Reserve Bank first accepted mortgages as collateral in 2007 in the lead-up to the global financial crisis.^[12] The legal framework for securitisation was adopted because:

- the legal risks, specifically around the Reserve Bank's claim on the underlying mortgages, were relatively well understood;
- transactions could be settled in Austraclear; and
- it aligns with the Reserve Bank's 'earmarked' collateral system (see Naghiloo and Olivan (2017) for more detail on collateral systems).

These attributes remain relevant today.

References

- Alphandary A (2014), 'Risk managing loan collateral at the Bank of England', Bank of England Quarterly Bulletin, Q2.
- Arsov I, IS Kim and K Stacey (2015), 'Structural Features of Australian Residential Mortgage-backed Securities', RBA *Bulletin*, June, pp 43–58.
- Bergmann M, E Connolly and J Muscatello (2019), 'The Committed Lending Facility', RBA *Bulletin*, September, viewed 26 June 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2019/sep/the-committed-liquidity-facility.html>>.
- Debelle G (2009), 'Whither Securitisation?', Speech at the Australian Securitisation Conference 2009, Sydney, 18 November.
- ECB (European Central Bank) (2020), 'What are additional credit claim (ACC) frameworks?'. Available at <https://www.ecb.europa.eu/explainers/tell-me-more/html/acc_frameworks.en.html>.
- Federal Reserve (2020), 'Discount Window Margins and Collateral Guidelines'. Available at <<https://www.frbdiscountwindow.org/Home/Pages/Collateral/Discount%20Window%20Margins%20and%20Collateral%20Guidelines>>.
- Kearns J (2019), 'Understanding Rising Housing Loan Arrears', Speech to the 2019 Property Leaders' Summit, Canberra, 18 June.
- Kearns J and P Lowe (2008), 'Promoting Liquidity: Why and How?', RBA Research Discussion Paper No 2008-06.
- Naghiloo Y and D Olivan (2017), 'The Reserve Bank's Collateral Framework', RBA *Bulletin*, December, pp 7–18.
- Ospina J and H Uhlig (2018), 'Mortgage-Backed Securities and the Financial Crisis of 2008: a Post Mortem', NBER Working Paper No 24509.
- RBA (Reserve of Australia) (2013), *Annual Report 2013*, September, p 25.
- RBA (2020), 'Box E: The Reserve Bank's Term Funding Facility (TFF)', *Statement on Monetary Policy*, August, pp 78–80.
- Robertson B (2017), 'Structural Liquidity and Domestic Market Operations', RBA *Bulletin*, September, pp 35–44.
- Rush A and R Louw (2018), 'The New Payments Platform and Fast Settlement Service', RBA *Bulletin*, September, viewed 26 June 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2018/sep/the-new-payments-platform-and-fast-settlement-service.html>>.
- Standard & Poors (2011), 'Global Structured Finance Default Study—1978-2010: Credit Trends Started To Improve In 2010, But U.S. RMBS Faces Challenges', March.
- Standard & Poors (2019), 'An Overview of Australia's Housing Market and Residential Mortgage-Backed Securities', November.
- Tamura K and E Tabakis (2013), 'The Use of Credit Claims as Collateral for Eurosystem Credit Operations', ECB Occasional Paper Series No 148, June.
- Winters B (2012), 'Review of the Bank of England's Framework for Providing Liquidity to the Banking System', October.

Government Bond Market Functioning and COVID-19

Richard Finlay, Claudia Seibold and Michelle Xiang^[*]



Photo: bunhill – Getty Images

Abstract

The market for Australian Government Securities is a critical fixed income market in Australia, including because it serves as a pricing benchmark for many other interest rates in the economy. The extreme economic and financial uncertainty caused by the onset of the COVID-19 pandemic led to this market becoming dysfunctional, with investors unable to transact in reasonable size. In response to the pandemic, on 19 March 2020 the Reserve Bank announced a number of new policy measures, which, among other things, have been successful in restoring the functioning of government bond markets. This article discusses various measures of market functioning, their deterioration, and subsequent improvement.

Introduction

The outbreak of COVID-19 in many countries – and the associated adoption of measures to reduce the spread of the virus – had a significant effect on the outlook for economic activity and global financial markets.^[1] In particular, the growing realisation that COVID-19 would not be confined to just a handful of countries, and that the economic costs would be severe, saw the value of financial assets, including equities, decline sharply in Australia and around the world in late February and through March, and volatility in financial markets rise sharply. These

price falls and the spike in volatility were also accompanied by periods of dysfunction in a number of financial markets, both in Australia and overseas.^[2]

On 19 March – and as flagged three days earlier on 16 March – the Reserve Bank Board announced a package of policy measures aimed at reducing the economic and financial disruption associated with the pandemic (RBA 2020a, RBA 2020b). This article discusses how functioning in the government bond market – the benchmark fixed income market in Australia and a key market for the transmission of

monetary policy – as well as in the semi-government bond market, was impaired during the initial phase of the crisis, and how the Bank’s policy measures helped to address this dysfunction.

Market functioning in the government bond market deteriorated through March

In late February, concerns about the global spread of COVID-19 and the associated economic costs escalated. This led to falls in the value of risky assets, such as shares, and broad-based demand for risk-free assets. Risk-free assets – that is, bonds issued by highly rated governments – have historically increased in value during periods of heightened economic uncertainty, and this happened initially as COVID-19 concerns grew: the yields on Australian Government Securities (AGS) declined to record lows, with similar moves in many other advanced economy government bond markets (Graph 1).

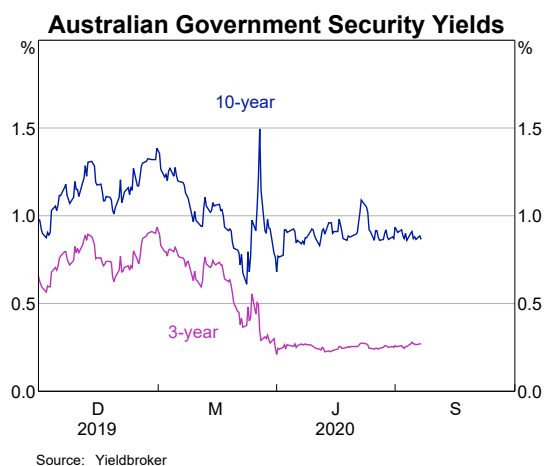
However, this typical response of a fall in yield (that is, increase in price) of government bonds in response to a deteriorating economic outlook soon gave way to an unexpected sharp rise in yields (fall in prices). The fall in risky asset prices, and the dramatic increase in economic uncertainty that drove it, led to a sharp increase in volatility as a range of investors needed to raise cash to reduce leverage, meet margin calls, and meet redemptions (Graph 2). Many investors chose to sell government bonds to do this because they are relatively liquid. Government bonds can typically be sold in size without adversely moving the price; this is something that is not true of many other asset

classes. Among those selling government bonds to raise cash were portfolio managers – both domestic and foreign – who needed to meet redemption requests and margin calls, and foreign central banks. There were also sales by investors who had purchased government bonds using substantial leverage in order to profit from small differences in price between otherwise similar bonds, or between bonds and the futures contracts that were tied to them, and who saw their trades move against them and/or faced margin calls due to the heightened volatility. The large increase in uncertainty around future government bond issuance may also have contributed to the rise in volatility and yields.

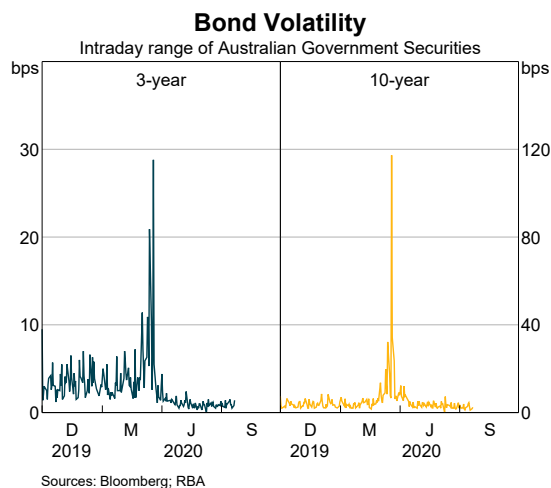
Bond dealers initially absorbed sales of government bonds, but their capacity to undertake further trades and assist the process of price discovery deteriorated as their own balance sheets began to run up against internal and regulatory risk limits, contributing to volatility and impaired market liquidity. In response to limited balance sheet space, dealers widened their bid-offer spreads (or opted not to quote prices), which contributed to an increase in the cost of transacting in these critical markets (Graph 3). Work-from-home arrangements were also reported to have reduced the ability of some investors who typically buy AGS to transact, which further reduced trading activity.

As noted, dysfunction in the government bond market was in part driven by leveraged investors – with positions based on small pricing anomalies – unwinding their positions in a hurry. A common

Graph 1



Graph 2

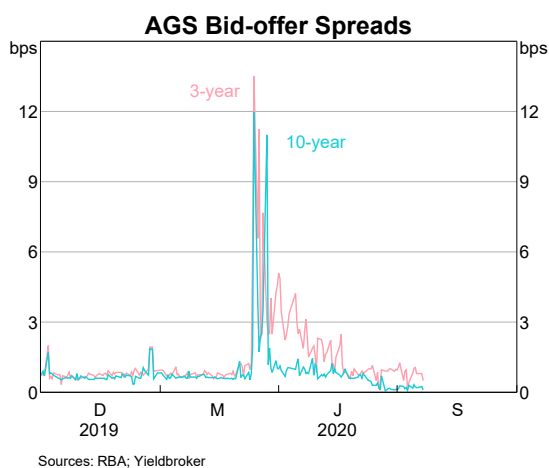


strategy, known as relative value trading, relies on buying government bonds that appear ‘cheap’ relative to otherwise similar bonds and selling those that appear ‘expensive’. Over time, these investors expect such a strategy to make money, and their activities can aid the functioning of the government bond market by helping to remove pricing anomalies. During times of stress, however, certain government bonds – for example those that have most recently been issued, and those that are referenced by futures contracts – tend to be more liquid, and therefore in greater demand, than otherwise similar bonds. This can lead to the yields of similar bonds diverging, and relative value strategies losing money. One way to measure the extent of pricing anomalies is to fit an estimated smooth yield curve to government bond yields, and examine the fitting errors: small errors suggest that a simple, smooth curve captures most of the variation seen in yields; conversely, larger fitting errors suggest that there are significant variations in yield between otherwise similar bonds which are not being arbitrated away. Applying this technique to the recent episode confirms the picture of market dysfunction: the root mean squared error (RMSE) from fitting a yield curve to AGS spiked to around 3½ basis points late in March after averaging ½ to 1 basis point over 2019 and early 2020, suggesting a large temporary increase in pricing anomalies in March (Graph 4; see Box A for further discussion on yield curve fitting errors as a measure of market function).

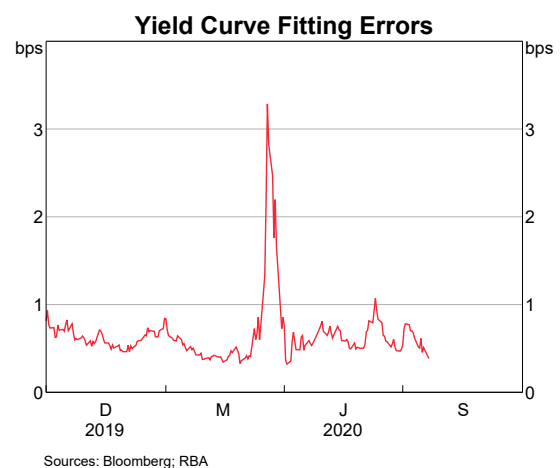
A deterioration in market functioning also occurred in the bond futures market ...

An important market closely related to the government bond market is the bond futures market. The payoff of a bond futures contract is linked to the average yield on a basket of underlying AGS, and so bond futures can be used to hedge (or take on) the interest rate risk associated with government bonds. Bond futures allow investors to take on a relatively large position for a relatively small initial outlay. They are also exchange traded, and so are typically more liquid than AGS. Nonetheless, as volatility rose sharply, liquidity providers withdrew from the bond futures market and the ability to trade in futures without moving prices deteriorated significantly. One measure of futures market function is the number of contracts that can be bought or sold at the best available price – the lower the number of ‘top-of-book’ futures contracts available to trade, the smaller the trade that can be executed without adversely moving the price. As market conditions deteriorated over March, this measure of market function fell significantly, with the average number of best bid or best offer futures contracts available for the 3-year contract at one point lower by 85 per cent compared with the level earlier in the year. The decline in this measure for the 10-year contract was even more pronounced, at 95 per cent (Graph 5).^[3] (The subsequent sharp increase in market depth for the 3-year contract relates to the Bank’s 3-year yield target, as described further below).

Graph 3



Graph 4



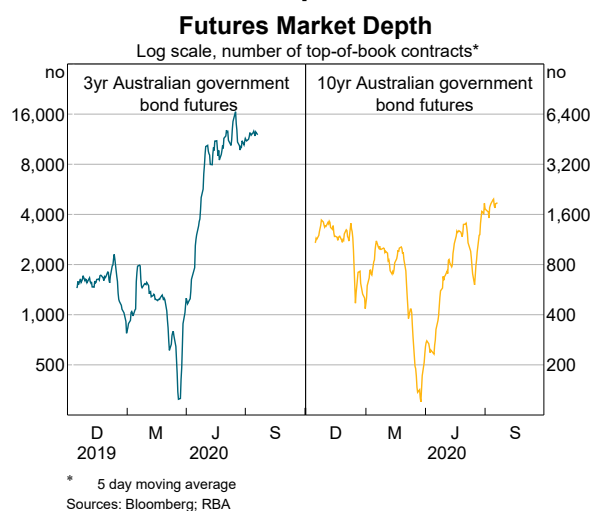
While the value of a futures contract is tied to that of the underlying basket of bonds at futures expiry, there is no automatic mechanism to keep futures prices in line with bond prices prior to expiry. Instead, this is achieved by investors acting on any arbitrage opportunities that emerge due to prices being misaligned, and trading to remove these (and make a profit in the process). This strategy is known as bond-futures basis trading, and, in normal times, it keeps bond and futures prices within a basis point or so of each other (the difference between the futures contract yield and the yield of the underlying bonds is known as the 'basis'). As with relative value strategies, bond-futures basis trading typically relies on significant leverage and, as the government bond market became dislocated, basis traders' positions moved against them and they were forced to unwind trades. This led to bond and futures prices diverging, and basis trades incurring losses (Graph 6 and Graph 7).^[4] See Box B for a further discussion of basis trading, and Schrimpf, Shin and Sushko (2020) for a discussion of similar events in the US Treasury market.

... and in other key Australian fixed income markets

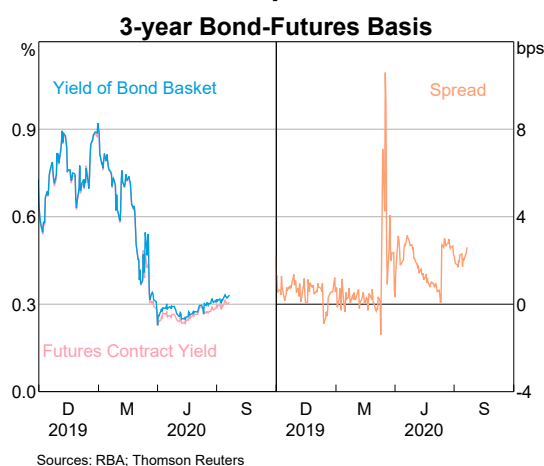
Semi-government securities – that is, bonds issued by Australian state and territory central borrowing authorities, and known as semis – are also considered to be high-quality liquid assets (Bergmann, Connolly and Muscatello, 2019), although the semis market is not as large or liquid

as the AGS market. As with AGS, market function in the semis market deteriorated significantly over March. This was driven by the need of some investors to raise cash to reduce leverage or meet redemption flows, by a reduction in demand as heightened volatility saw some investors tighten their risk limits around semi holdings, and by the inability of bond dealers to absorb large, one-sided flows. Expectations that the states and territories would need to increase debt issuance also contributed to the imbalance of supply and demand. Similar to AGS, dealers responded to the mismatch between sellers and buyers by widening their bid-offer spreads dramatically: wider spreads discourage some counterparties from selling bonds given the higher costs involved, and also give dealers more financial buffer to on-sell the bonds (Graph 8).^[5] The result of the wider bid-offer spreads was a fall in trading activity as investors became

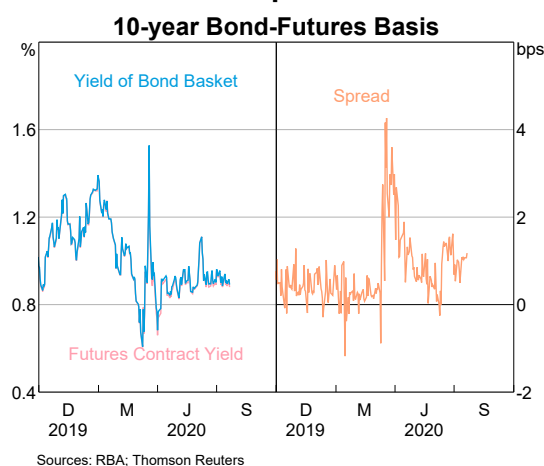
Graph 5



Graph 6



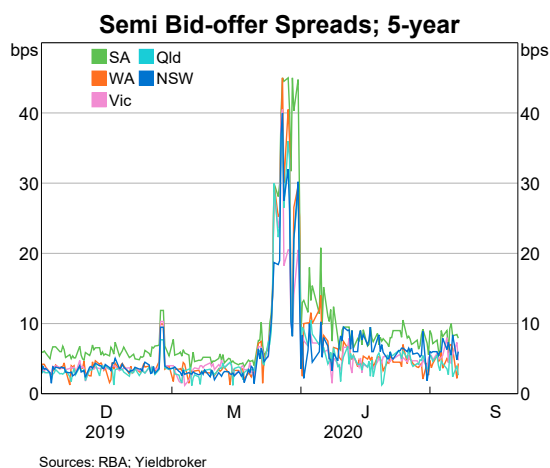
Graph 7



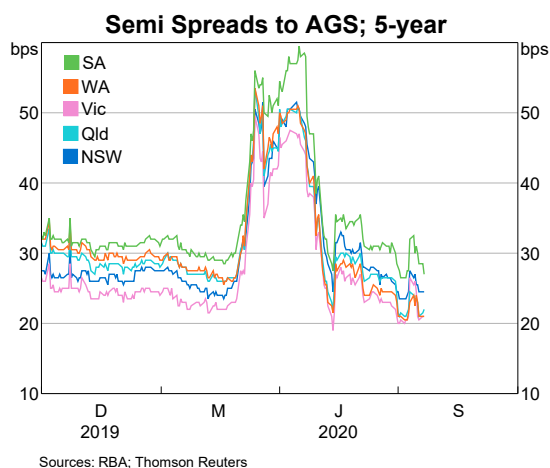
hesitant to transact in illiquid conditions, despite their ongoing need to sell. Dealers were also hesitant to tighten their bid-offer spreads after selling subsided, as they feared renewed selling once liquidity conditions improved.

In addition to wider bid-offer spreads, the difference in yield between semis and AGS widened dramatically over March, albeit to levels that were not out of line with historical norms (Graph 9). The widening in yield spreads appears to have reflected the more marked deterioration in semi market liquidity and the lesser ability of the semis market to absorb supply of bonds, relative to AGS, rather than credit risk concerns.

Graph 8



Graph 9



The Reserve Bank announced a range of policy measures ...

Given the critical role that risk-free government bond yields play as financial benchmarks, the stress in these markets in early March was transmitted to markets for other financial securities, and contributed to a general tightening in financial conditions.

In response to this and to the deteriorating economic outlook more generally, on 19 March the Reserve Bank announced a package of policy measures to support the Australian economy, aimed at lowering funding costs across the economy and supporting the provision of credit. This package also included measures to address the significant dislocation in government bond markets. Next to other policy measures, the Bank announced that it would purchase government bonds across a range of maturities in secondary markets to achieve a yield target of 0.25 per cent for 3-year AGS and to address market dysfunction.

The Reserve Bank commenced government bond purchases on 20 March, buying \$5 billion face value of AGS with between 2 and 8 years residual maturity. Bond purchases were initially daily, and remained so until late April, although they were reduced in size in response to improved market functioning. The Bank also purchased semis once a week to assist market functioning. The first day the Bank chose not to conduct a purchase operation was on 24 April, and purchases have become less frequent, and smaller, since then.^[6]

... which contributed to a substantial improvement in market functioning

The policy actions taken by the Reserve Bank, together with a broader lessening in the extreme economic and financial uncertainty present at the beginning of the crisis, resulted in market functioning improving significantly over late March and through April. Subsequently, market functioning returned to be close to pre-crisis levels.

The extreme volatility seen in financial markets reduced rapidly, with actions taken by the Reserve Bank and other central banks helping to reassure market participants that authorities would not allow

important markets to remain dysfunctional. In Australia, this reduction in volatility was especially marked for AGS with maturities of around 3 years, with the Reserve Bank's target for the 3-year AGS yield of around 0.25 per cent serving as a strong anchor (Graphs 1 and 2). The reduction in volatility, in turn, contributed to an improvement in market functioning. This is particularly evident in 3-year futures market depth (Graph 5), where the number of contracts available to buy or sell at the best price increased to be well above pre-crisis levels: market participants, knowing that the Reserve Bank would act to keep 3-year yields close to 0.25 per cent, became confident to trade in large size at that level given the price was unlikely to move against them.^[7] In contrast, the reduction in volatility for longer-dated yields was less marked, and the 10-year futures contract took a little longer to regain pre-crisis levels of liquidity.

AGS bid-offer spreads also fell rapidly over late March, although did not return to pre-crisis levels until around May (Graph 3). While market functioning improved over late March, bond dealers were still left with greater-than-usual stocks of government bonds, as traditional buyers were slow to return to the market and significant client demand to sell bonds to raise funds remained for some time. It took a while for these imbalances to unwind, with the Reserve Bank's bond purchases a significant contributor to the improvement.

The bond-futures basis fell from its extremes relatively quickly, although has remained above pre-crisis levels (Graphs 6 and 7). Here, financial market participants whose trades previously kept the basis narrow may have reassessed the risks inherent in the trading strategy and increased their required returns.

Conditions in semis markets took a little longer to improve, although bid-offer spreads again returned to be close to pre-crisis levels within a few months (Graph 8). This reflects the fact that dealers allocate a smaller share of their balance sheet to semis relative to AGS, which limits their ability to absorb sizable buy or sell orders without having to widen spreads. Market liaison also suggests that investors' investment allocation decisions can be slower for

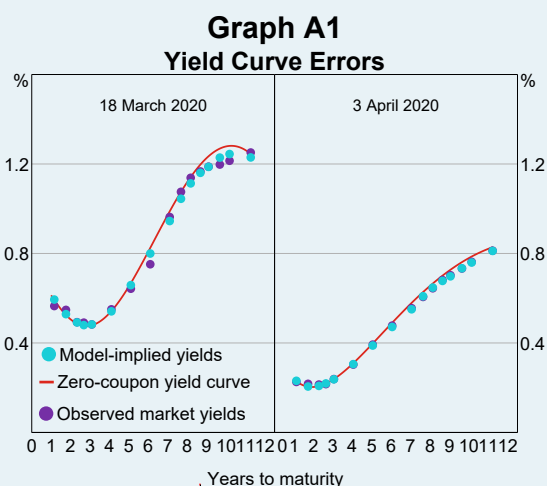
semis compared with AGS, leading to a slower normalisation in market conditions. ✎

Box A – Yield Curve Fitting Errors as a Measure of Market Function

A bond can be seen as series of cash flow payments, comprising regular coupon payments over the life of the bond and a larger payment – the principal – at bond maturity. The price of the bond represents the value an investor receives from each of those payments, appropriately discounted. As the payments occur at different times, the appropriate discount rate for each payment will in general vary; near-term payments are typically discounted using a lower yield, and more distant payments are typically discounted using a higher yield. This is because, in general, investors prefer to receive money sooner rather than later, and so demand a higher return for having to wait longer. The overall yield of all payments taken together – that is, the yield of the bond – is a weighted average of the yields applying to each payment, with weight approximately equal to the size of the payment.

Thinking about bond yields in this way is useful as it allows the yields of different bonds to be compared in a consistent way. Bond yields observed in the market can be used to estimate an underlying ‘zero-coupon’ yield curve – that is, a yield curve that would apply to individual payments. The estimated curve can then be used to price each payment in a bond, calculate what the yield of each bond ‘should’ be, and see if any bonds appear cheap or expensive relative to other bonds with similar maturities.^[8]

In a well-functioning market, observed bond yields would be expected to be close to those implied by an estimated zero-coupon yield curve. If this were not the case, it would imply that similar payments were being valued differently in different bonds, whereas arbitrage should prevent this from happening. Conversely, large discrepancies between observed yields and those implied by a fitted zero-coupon yield curve would suggest that some bonds are being mispriced, and that market participants are not taking advantage of arbitrage opportunities arising from the mispricing (and, through trading, reducing the pricing differences).



Graph A1 demonstrates this: the red lines represent fitted zero-coupon yield curves as at 18 March and 3 April, the purple dots are closing bond yields observed in the market, and the light blue dots are bond yields as implied by the fitted zero-coupon yield curves. On 18 March the difference between the observed and fitted yields (the purple and light blue dots) of some bonds was relatively large, with an RMSE of around 2 basis points. Conversely, on 3 April yield discrepancies had declined substantially, and the RMSE had fallen to less than ½ basis point.

More generally, large discrepancies between observed market yields and yields fitted from an estimated zero-coupon yield curve are indicative of bonds being mispriced, while small errors are

suggestive of a well-functioning market.

Box B – The Bond-Futures Basis

Bond-futures basis trading is an arbitrage trade that involves taking offsetting positions in a bond futures contract and the physical bonds that underlie the same contract when their prices are misaligned (after accounting for the cost of financing the bonds).^[9] The price of physical bonds often trades a little below the price implied from futures contracts, although it tends to converge to zero as the futures contract approaches expiry (discussed further below). Given this, basis trades in Australia typically involve buying physical bonds and selling the futures contracts, with the long bond position financed in the repo market. At expiry of the futures contract, these trades are reversed. With the basis typically small, investors generally look to increase their profit from a basis trade through leverage; for example, market participants can typically borrow in the order of 99 dollars for every 100 dollars of AGS collateral that they pledge in a repo. Participants in a basis trade only need a small capital outlay to hold a significant position.

Basis trading can deliver a steady stream of returns for investors when volatility is low. However, if market conditions force the trades to be unwound (to cover margin payments, for example, during periods of heightened volatility), the resulting flows can lead to significant losses and exacerbate mispricing, with bond and futures prices diverging significantly.

We measure the basis – defined as the theoretical average forward yield of the bond basket less the observed futures yield – as per Frino, He and Lepone (2014), and adjust for any coupons paid and for the cost of financing the bonds via repo. Most input data are readily observable in the market, with traded repo rates the main exception. For these we interpolate using repo rates from the Reserve Bank's daily open market operations, or, if there are no data, we interpolate the overnight indexed swap rate (adjusted for the appropriate spread); note, however, that the actual funding rate that leveraged investors can obtain may be different.

Moves in the basis

As the economic outlook worsened dramatically and volatility increased through early March, AGS yields declined less rapidly than those implied by futures contracts. That is, bond prices fell relative to futures prices, which is likely to have reflected relatively poorer liquidity and higher bid-offer spreads in the bond market. Leveraged investors, whose trades were designed to profit from the opposite happening, experienced significant mark-to-market losses. Some were forced to unwind their positions either to meet margin calls or to fulfil internal risk limits, putting further pressure on an already dysfunctional market and starting a spiral whereby a higher basis led to an even higher basis. Ultimately, the 3-year basis widened from one basis point to around 11 basis points, while the 10-year basis reached around 4 basis points.^[10]

Participants who may have wanted to exploit the rise in the basis faced considerable risks: liquidity in both the futures and AGS markets deteriorated significantly over March and bid-offer spreads widened; and, while the basis was very attractive, it could have widened even further, resulting in losses for any new arbitrage trades. Counterparty liaison suggests the Bank's purchases of AGS, and the subsequent improvement in liquidity conditions and bid-offer spreads, contributed to the subsequent reduction in the basis.

Although usually small, the basis is, on average, positive rather than hovering around zero. There are a few reasons for this. First, there is some risk in obtaining and rolling repo funding, which leveraged investors must do to take advantage of these arbitrage opportunities. Second, even a well-executed trade held to expiry is not risk free, since futures are an imperfect hedge for the underlying bonds (in other jurisdictions,

the cheapest-to-deliver bond from the deliverable basket can be used to satisfy the short futures position at contract expiry; in Australia, bond futures are settled using a cash payment based on the price of a hypothetical bond with a 6 per cent coupon and yield equal to the average yield of the bonds in the basket). Third, in times of market volatility, other impediments including execution risk and mark-to-market risk manifest, and investors demand compensation for this.

Footnotes

- [*] The authors are from Domestic Markets Department and would like to thank Matt Boge, Guy Debelle, Chris Kent, Marion Kohler, David Olivan, Carl Schwartz, and the members of Market Operations for their help with this article.
- [1] See RBA (2020c) and Debelle 2020 for further discussion of the economic and financial market consequences of COVID-19, and the Reserve Bank's response.
- [2] While there is no single definition, or measure, of 'market dysfunction', BIS (2019) notes that a well-functioning market 'allows timely, efficient market access to participants who wish to trade, obtain funding or invest, and it creates price signals that reflect fundamentals'.
- [3] Futures contracts are most actively traded for the three months immediately prior to their expiry, with trading volume moving to the next contract over the final few days of this period; market depth typically falls around this time. The period of peak market dysfunction coincided with this changeover from one futures contract to the next, when futures market depth tends to dip, although the fall in market depth was much more pronounced than is typical.
- [4] Note that the reduction in the basis over June is related to the approaching expiry of the June futures contract. Once trading moves to the next contract, this forced equalisation in yields breaks down and the basis can re-widen.
- [5] Bond market makers aim to profit by selling bonds for a little more than they bought them for, and vice versa, after accounting for any hedges that they have in place to minimise their exposure to changes in the overall level of yields. This difference in selling versus buying price is captured by the bid-offer spread. If market makers are confident that they can quickly sell a bond that they have purchased, they can offer a relatively tight bid-offer spread with confidence, whereas if they might have to hold the bond for a substantial period of time, they need to quote a wider bid-offer spread to cover the costs of holding the bond and to insure themselves against adverse price movements.
- [6] See Kent (2020) for further discussion of the Bank's bond purchase operations.
- [7] Note that the Reserve Bank's package of policy measures, including the 3-year yield target, were aimed at supporting the economy by keeping borrowing costs low and credit available, with the sharp reduction in volatility for AGS with maturities of around 3 years a by-product of this.
- [8] There are a number of different ways to estimate a zero-coupon yield curve, which give slightly differing results. As we are primarily interested in fitting errors, however, the exact method is less important, since, all else being equal, fitting errors will tend to increase as bond yields become more misaligned. In this article we use the method outlined in Appendix A of Finlay and Chambers (2008) and restrict our analysis to bonds with residual maturity between 1 and 12 years; as noted by Debelle (2020), longer tenor nominal bonds (and inflation-linked bonds) play a less important role as pricing benchmarks than do nominal bonds with tenors up to around 10 years, and few other financial instruments price off them.
- [9] A bond futures contract gives investors exposure to changes in bond prices for minimal initial outlay; while the futures price is set by supply and demand over the life of the contract, the final settlement value is based on the average yield of a pre-specified basket of bonds, and so, in principle, the yield before maturity should be closely tied to the yields of the bonds in the basket. See also Cheung (2014).
- [10] We discuss the basis in terms of yield for convenience, but futures contracts are traded and margined in terms of price; given its longer duration, a 4 basis point basis on the 10-year contract is roughly equivalent, in dollar terms, to a 12 basis point basis on the 3-year contract.

References

- Bergmann M, E Connolly and J Muscatello (2019), 'The Committed Liquidity Facility', *RBA Bulletin*, September, viewed 30 May 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2019/sep/the-committed-liquidity-facility.html>>
- BIS (2019). 'Large central bank balance sheets and market functioning'. Markets Committee Papers No. 11, prepared by a study group.
- Cheung B (2014), 'Trading in Treasury Bond Futures Contracts and Bonds in Australia', *RBA Bulletin*, September, pp 47—52.
- Debelle G (2020), 'The Reserve Bank's Policy Actions and Balance Sheet'. Speech at The Economic Society Australia, 30 June (online). Available at <<https://www.rba.gov.au/speeches/2020/sp-dg-2020-06-30.html>>
- Finlay R and M Chambers (2008), 'A Term Structure Decomposition of the Australian Yield Curve', *RBA RDP* 2008-09. Available at <<https://www.rba.gov.au/publications/rdp/2008/2008-09.html>>
- Frino A, He WP and A Lepone (2014), 'The Pricing and Efficiency of Australian Treasury Bond Futures', *Australasian Accounting, Business and Finance Journal*, 8(2), pp 3–14.
- Kent C (2020), 'The Reserve Bank's Operations – Liquidity, Market Function and Funding'. Speech, available at <<https://www.rba.gov.au/speeches/2020/sp-ag-2020-07-27.html>>
- RBA (2020a), 'Statement by Philip Lowe, Governor', Media Release No 2020-07, 16 March. Available at <<https://www.rba.gov.au/media-releases/2020/mr-20-07.html>>
- RBA (2020b), 'Statement by Philip Lowe, Governor: Monetary Policy Decision', Media Release No 2020-08, 19 March. Available at <<https://www.rba.gov.au/media-releases/2020/mr-20-08.html>>
- RBA (2020c), *Statement on Monetary Policy*, May. Available at <<https://www.rba.gov.au/publications/smp/2020/may/>>
- Schrimpf A, Shin HS and V Sushko (2020), 'Leverage and margin spirals in fixed income markets during the Covid-19 crisis' *BIS Bulletin* No. 2. Available at <<https://www.bis.org/publ/bisbull02.pdf>>

The Economic Effects of Low Interest Rates and Unconventional Monetary Policy

Rochelle Guttmann, Dana Lawson and Peter Rickards^[*]



Photo: erhui1979 – Getty Images

Abstract

The cash rate is currently at its effective lower bound and the Reserve Bank has put in place a suite of alternative monetary policy tools. This article uses the Bank's macroeconomic model of the Australian economy, MARTIN, to analyse the implications of a constrained cash rate and illustrate how unconventional monetary policies can support the Australian economy. By lowering interest rates that are typically affected indirectly through changes in the cash rate, unconventional policies can stimulate economic activity through many of the same channels as conventional monetary policy.

Introduction

A number of structural changes have contributed to a low interest rate and low inflation environment over the past decade, in Australia and across many advanced economies. These include demographic change, a decline in potential output growth and changes in households' and firms' risk appetite. Each of these factors has tended to lower the neutral real interest rate, which is the level of the real interest rate that brings about full employment and maintains economic activity around its

potential, while keeping inflation steady (McCririck and Rees 2017) (Graph 1).

The decline in the neutral real interest rate implies that, for any given inflation rate, nominal interest rates will fluctuate around a lower average level (the real interest rate is the nominal interest rate less the inflation rate). So, with a lower neutral interest rate, in order for the stance of monetary policy to be expansionary, the nominal cash rate must also be set at a relatively low level. This has been the case in recent years in Australia. There has been a need for

expansionary monetary policy and, consequently, the cash rate target has been set well below the neutral rate in order to support the economy and have inflation return to the target range.

A lower neutral interest rate increases the likelihood that the nominal cash rate will reach an effective lower bound (ELB), the rate below which changes in the cash rate have a diminishing effect on borrowing and lending rates. Interest rates below this level may strain parts of the banking system, which can reduce credit supply and encourage more cautious behaviour by households and firms, such that the net effect may not be stimulatory (Committee on the Global Financial System 2019; Brunnermeier and Koby 2018).

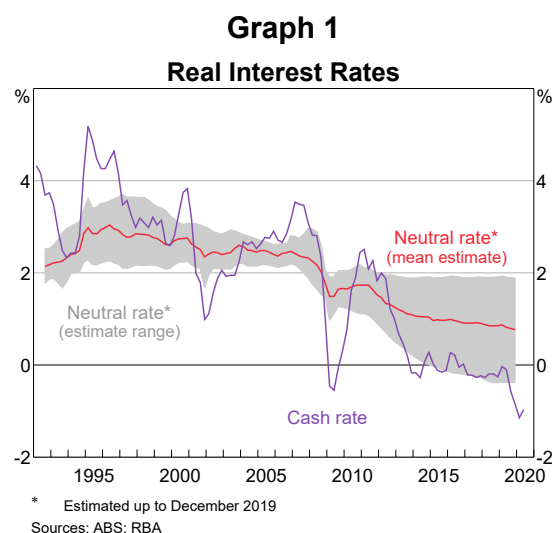
The key consequence of having the policy rate constrained by its ELB is that conventional monetary policy is unable to provide further stimulus to fully offset negative shocks. During previous easing phases of the monetary policy cycle, the nominal cash rate has been cut by around 250 basis points on average. During the global financial crisis it was cut by over 400 basis points. At low interest rates, that range of policy space is unavailable, and so it is difficult for conventional monetary policy to counteract a large negative shock in the way that it has previously.

As such, unconventional monetary policies may be implemented to counter economic downturns when the policy rate is near the ELB. These policies aim to alter financial variables other than short-term interest rates in order to provide additional

monetary stimulus. Unconventional monetary policy is of particular relevance in the current environment. The COVID-19 pandemic and ensuing mandated shutdowns have seen the Bank lower the cash rate target to 0.25 per cent, which is considered to be the ELB for Australia in the current circumstances (Debelle 2020; Lowe 2019). In addition, the Bank has enacted several policies to alleviate the effects of a slowing economy and ensure sufficient liquidity within the financial system. These stimulatory policies have been deployed along with a very large fiscal stimulus and support program.

This article first analyses the economic consequences of being unable to reduce the cash rate below its lower bound. We then explore the economic effects of conventional and unconventional monetary policies using the Bank's full-system macroeconomic model, MARTIN. The model captures domestic economic activity, the labour market, prices, and some overseas and financial market channels, and accounts for feedback between these variables (Ballantyne *et al* 2020). While the model is not equipped to evaluate specific policy interventions, such as government bond purchases or term lending facilities, it can be used to illustrate the different channels of monetary policy transmission that can be targeted through unconventional tools. These channels provide insight into the similarities and differences between typical cash rate cuts and alternative measures, as well as the potential effects of the specific policy package launched in response to COVID-19.

An important caveat is that the MARTIN model is based on average historical – and mostly linear – relationships between variables. As a result, the model results may not fully capture the effects of large movements in variables that have not occurred in the past, nor interactions between variables. These limitations may be particularly pertinent given the unprecedented changes that have occurred during the COVID-19 pandemic. Nevertheless, the model results provide a framework that can be useful for assessing the impact of different policy tools.



Consequences of an Effective Lower Bound

There are a number of implications of not being able to lower the cash rate beyond its lower bound, which we examine below. In the following analysis we take the ELB to be 0.25 per cent, although the cash rate has moved below 25 basis points due to the large supply of liquidity in the cash market (Debelle 2020). The constraints arising from the ELB and its implications for the economy are relevant at any particular level that the ELB is estimated to be.

More variable and adverse outcomes

A consequence of the cash rate being constrained by the ELB is that the central bank would be unable to stimulate the economy sufficiently, using conventional policies, in response to negative economic shocks. As such, it could take longer to get the economy back to full employment and for inflation to reach its target.

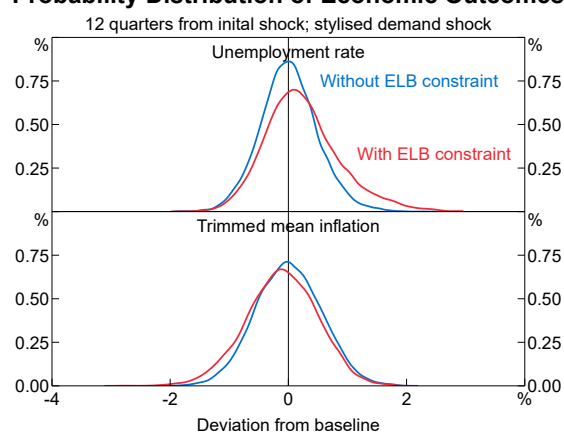
To illustrate the potential economic effect of a constrained cash rate, we use the MARTIN model to consider a range of outcomes for key economic variables in both the presence and absence of a lower bound constraint on the cash rate. We examine the path of the unemployment rate and inflation given a series of shocks to the economy.^[1] We take the starting point of the economy to be what is reflected in the November 2019 *Statement on Monetary Policy* (SMP) forecasts, as they represent the economy prior to the onset of the COVID-19 pandemic. We first allow the cash rate to respond as if it were not constrained by the lower bound, then repeat the exercise for when the cash rate cannot fall below the ELB.

We find that the effect of positive and negative economic shocks are similar when there is no constraint on the cash rate. This is because the cash rate can respond to the shocks with expansionary or contractionary settings as required, albeit with a lag. As such, inflation and unemployment outcomes are typically symmetrically distributed around their baseline paths after a number of years (Graph 2). When the cash rate is constrained, however, there tends to be a wider range of possible economic outcomes, and an adverse economic outcome becomes more likely.

For example, three years from the date of the initial economic shock, the unemployment rate is around four times more likely to have increased by 1 percentage point when the cash rate cannot fall below the ELB. Put another way, out of a large set of possible scenarios, there is a 12 per cent chance the unemployment rate will have risen by more than 1 percentage point with an ELB constraint compared with just a 3 per cent chance when there is no constraint on the cash rate. For inflation, the outcomes are also less favourable when there is an ELB constraint. However, the difference is small as a result of the relatively flat Philips curve relationship estimated in the model. Specifically, when the cash rate is constrained, inflation returns to baseline after three years 20 per cent less often.

These results are representative of the implications of the ELB when the starting point for the cash rate is close to the ELB and there is some slack in the economy. However, the initial state of the economy matters in these types of illustrations. If there were already considerable slack in the economy prior to it being hit by a negative shock, for example, a larger reduction in the cash rate would be necessary than if the economy had been operating above capacity. Similarly, conventional monetary policy is more likely to become constrained if the initial value of the cash rate is close to the ELB. Therefore, if this exercise were repeated on a set of forecasts where there was very little slack in the economy and the cash rate was much higher, the effects would be

Graph 2
Probability Distribution of Economic Outcomes



Source: RBA

different and the ELB would represent less of a constraint.

Interest rates remain lower for longer

When the cash rate is constrained by a lower bound, it may also have to remain at a low level for an extended period. To understand why, it is instructive to consider the typical conventional monetary policy response to a large, negative and unexpected demand shock to the economy. Using the same initial conditions as the earlier example, we impose a large negative demand shock. (While the COVID-19 pandemic is a specific example of a large negative event, this exercise uses a simple shock to GDP and does not include the specific features of the pandemic.) We again compare economic outcomes when the cash rate can respond as needed to outcomes when the cash rate is constrained by the ELB.

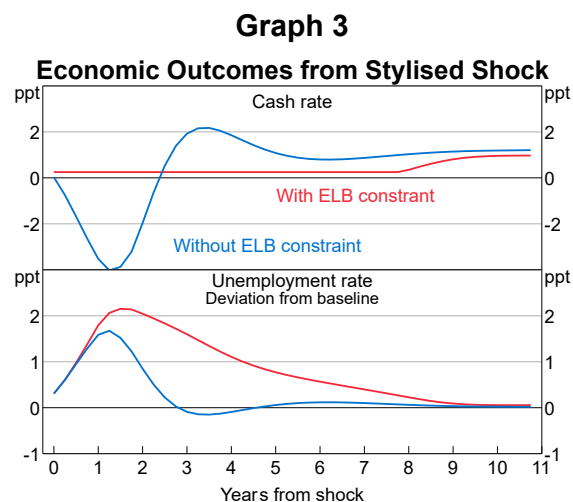
In the case where there is no lower bound constraint, the central bank could lower the cash rate to a level sufficient to counteract the negative shock (Graph 3). There would still be a period of high unemployment and low inflation, but monetary policy would be able to provide stimulus to limit the severity of the downturn and to hasten the recovery. In the situation where the cash rate is constrained by the lower bound, inflation and unemployment would take much longer to reach their respective targets. To compensate for this shortfall in economic stimulus, the cash rate would need to remain lower for a longer period of time to help the economy recover from the negative shock. These findings are also broadly in line with research in other countries (Schmidt 2016; Chung *et al* 2019).

The analysis, however, abstracts from the role of fiscal and other policies, which would most likely be deployed in the face of such a large contraction (as has been the case during the COVID-19 pandemic). Furthermore, the experience overseas, and more recently in Australia, shows that there is scope to deploy a wider monetary policy toolkit beyond changes to the cash rate. The next section uses the framework of the MARTIN model to explore how monetary policy can provide stimulus to the economy through so-called unconventional monetary policies.

Economic Outcomes of Unconventional Monetary Policy

Unconventional monetary policy measures can be used to provide additional stimulus when the cash rate is at its ELB. A cash rate cut affects economic activity by first lowering other interest rates, such as those faced by businesses, households and the government, as the cash rate serves as a benchmark to anchor short- and long-term rates (Atkin and La Cava 2017). Even when the cash rate is at its ELB, there is often space for these other rates to fall further. Unconventional policies can lower borrowing rates that are typically influenced indirectly by cutting the cash rate, thereby stimulating economic activity through many of the same transmission channels as conventional monetary policy (such as the exchange rate, saving/investment, cash flow and asset price/wealth channels).

The choice and design of different monetary policy options depends on the specific economic or financial market conditions that they are intended to address. For example, when the Bank lowered the cash rate to 0.25 per cent in March 2020, it also enacted a suite of policies to lower borrowing costs and support the availability of credit to the economy (RBA 2020). Debelle (2020) provides insight into why the Bank chose the specific suite of policy tools used in response to the COVID-19 pandemic, and explains how these actions have influenced financial markets so as to lower



Source: RBA

borrowing rates for businesses, households and the government.

Using the MARTIN model, we quantify the economic responses to changes in interest rates that can be targeted through unconventional policy.^[2] Taking as given the transmission of alternative policy actions to the broader interest rates in the economy, the modelling can inform our understanding of the potential macroeconomic effect of different monetary policy tools, depending on the specific interest rate(s) they influence. We do not examine the specific policies implemented in response to the COVID-19 pandemic, or do we calibrate the analysis to try to measure the effects of those policies to date. Rather, this exercise provides a framework for understanding the effect of unconventional monetary policies on the Australian economy through the interest rates they influence.

We consider three interest rate categories affected by a cash rate cut:

1. Government bond yields (2-year and 10-year yields)
2. Business lending rates
3. Household mortgage rates.

We isolate the effects of each by imposing a reduction in the given rate, while leaving all other conditions in the model unchanged, and comparing the path of key economic variables to a model baseline. In each case (as well as the baseline), it is assumed that the cash rate remains at the lower bound. We impose a reduction of 50 basis points for each interest rate in the first quarter of the exercise and, for simplicity, it remains at the new level thereafter (in reality, a reduction in rates of these magnitudes or durations may or may not be feasible through unconventional policy tools).

Government bond yields

We first explore the effects of a reduction in government bond yields relative to a stylised baseline projection. The Reserve Bank Board implemented two policies in response to COVID-19 that would be expected to lower government bond yields (RBA 2020). The first is guidance as to the future path of policy rates, where the cash rate will remain low until progress is being made towards full employ-

ment and the Board is confident that inflation will be sustainably within the target band. This is likely to affect the interest rate on longer-term bonds given that those rates reflect expectations of current and future short-term interest rates. The Bank is also explicitly targeting the 3-year Australian Government bond yield, reinforced through purchases of government bonds in the secondary market.

We impose an immediate 50 basis point reduction in the yield on both 2-year and 10-year government bonds.^[3] This is comparable with the approximately 30 and 50 basis point decline in Australian 2- and 10-year government bond yields, respectively, over the weeks following the 19 March 2020 policy announcement. (However, rates had declined prior to this, as financial market participants expected further cash rate cuts.) We then hold these bond yields constant at this lower rate over our analysis horizon. This modelling approach is loosely analogous to a yield curve target program in which the central bank purchases government bonds in sufficient quantities to achieve a stated target yield (or in this case, a persistent deviation from the model baseline yield).

Lower government bond yields – relative to the rest of the world, whose bond yields are left unchanged in the model – lead to a depreciation in the real trade-weighted exchange rate (real TWI) of around 3 per cent compared with the baseline. This depreciation is somewhat larger than typically observed following a 50 basis point cash rate cut, as government bond yields (a key determinant of the exchange rate) tend to move less than one-for-one with changes in the cash rate. The lower level of the real exchange rate incentivises households and businesses to substitute away from foreign goods and services towards Australian ones, and increases the competitiveness of Australian exports, which leads to a reduction in imports and an increase in export volumes. Growth in net exports accounts for around half of the effect of lower government bond yields on the level of GDP (Graph 4, upper right panel). In contrast, a 50 basis point cash rate cut has a more balanced effect on the different components of GDP (Graph 4, upper left panel).

The reduction in government bond yields also leads to a modest increase in business investment and consumption. Lower yields reduce the cost of capital for firms by lowering the discount rate applied to future earnings, boosting equity prices; equity accounts for around 60 per cent of Australian business financing (Connolly and Jackman 2017). The lower cost of capital, in combination with increased demand for Australian goods following the exchange rate depreciation, contribute to a modest increase in business investment. Nevertheless, this effect is small, as business investment tends to be relatively insensitive to borrowing costs (Lane and Rosewall 2015). Higher equity prices also boost consumption by increasing household wealth.

Stronger economic activity leads to a strengthening in the labour market and a pick-up in inflation (Graph 5). The unemployment rate falls by around 30 basis points relative to the baseline after three years. The stronger labour market results in a modest pick-up in wages growth, which supports a further increase in consumption. The combination of higher wages growth and an increase in the price of imported products results in inflation being around 20 basis points higher. As modelled in MARTIN, a policy that lowers government bond yields influences unemployment and inflation almost entirely through its direct influence on the exchange rate. In contrast, the exchange rate channel of *conventional* monetary policy accounts

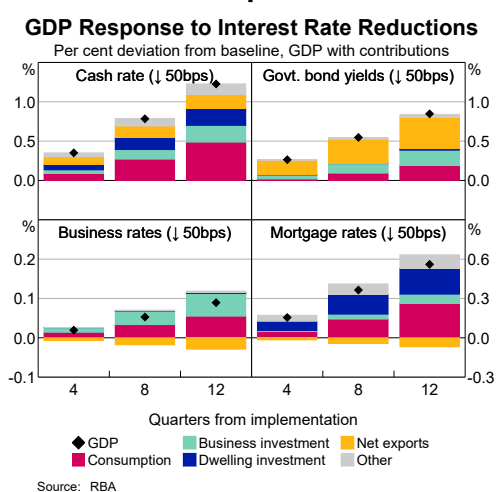
for around one-quarter of the total effect on key macroeconomic variables (Ballantyne *et al* 2020).

Business lending rates

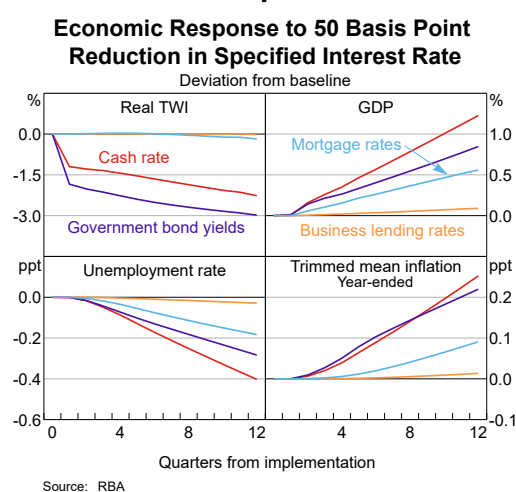
To consider the economic effect of lower business lending rates, we impose an immediate 50 basis point reduction in the positive spread that exists between business lending rates and the cash rate. Such a reduction could occur as a result of policies that increase the amount of liquidity in the financial system, and so help to reduce banks' cost of funding relative to the cash rate (Kent 2020). This includes government bond purchases as well as the Reserve Bank's Term Funding Facility (TFF), which provides low-cost funding to banks alongside incentives for them to expand lending to businesses. Corporate bond purchases have been used by other central banks to lower borrowing costs, although debt securities play a relatively minor role in Australian business debt funding (Connolly and Jackman 2017). The Bank has broadened its eligibility criteria in recent months to allow corporate bonds to be used as collateral for domestic market operations, which may assist with the smooth functioning of these markets.

As mentioned above, the empirical evidence suggests that lower business interest rates have a limited effect on economic activity. In MARTIN, business investment increases a little further in response to the lower cost of capital. As business investment is relatively import-intensive, a subsequent increase in imports offsets a portion of

Graph 4



Graph 5



the direct contribution of higher business investment to GDP. Higher business investment also reduces unemployment, contributing to an increase in consumption. However, the size of these effects is minimal. Within the MARTIN model, monetary policy stimulates business investment through increasing aggregate demand in the economy, rather than through its influence on the cost of funding.

Household mortgage rates

Household mortgage rates have declined to historic lows in recent months, reflecting the combined effects of forward guidance, lower government bond yields and the TFF (which encourages lending at more favourable rates by lowering bank funding costs). To examine the transmission of lower mortgage rates through the economy, we impose an immediate 50 basis point reduction in the mortgage rate spread to the cash rate in the model.

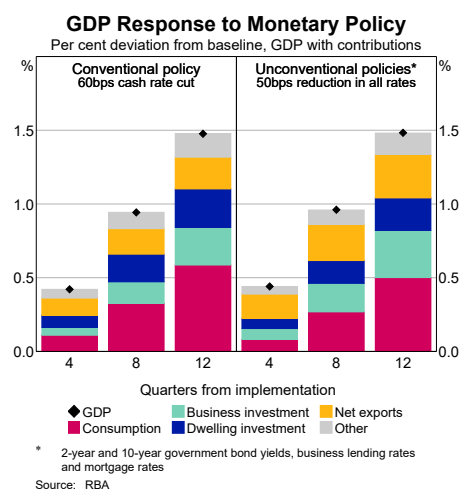
The effect on the economy is much larger than that seen in response to a simulated business lending rate reduction. The lower mortgage rate increases household disposable income through lower interest payments, boosting consumption (the cash flow channel of monetary policy transmission). It also increases demand for housing, increasing GDP through higher dwelling investment and associated costs of housing purchases. This policy also leads to an increase in housing price growth, which increases consumption through a wealth effect (May, Nodari and Rees 2020). The relatively broad-based effects on economic activity lead to a sizeable increase in year-ended GDP growth and a fall in the unemployment rate. However, the effects are smaller than would be seen with a similar-sized cut to the cash rate due to the lack of a substantial response of the exchange rate to lower mortgage rates. By the end of the analysis period, the unemployment rate is around 20 basis points lower than the baseline projections, and inflation is around 10 basis points higher. The effect on inflation is somewhat smaller than in the government bond yield example due to the absence of the imported inflation channel.

Comparison with a conventional cash rate cut

We finally consider a situation where unconventional policy lowers each of these interest rates in unison – that is, mortgage rates, business lending rates and 2- and 10-year government bond yields all decline by 50 basis points. This represents a comprehensive but stylised suite of alternative measures that affect each of the key interest rates typically influenced by conventional monetary policy. The combined unconventional policies in this example have a similar effect on GDP after three years to a 60 basis point cut to the cash rate (Graph 6). However, the strength of some of the channels of transmission differ. This leads to the unconventional policy suite having a larger effect on net exports and business investment, and a somewhat smaller effect on consumption and dwelling investment, than the conventional cash rate cut.

By the end of the three-year analysis period, the combination of interest rate reductions due to the suite of unconventional policy measures results in a nearly 50 basis point decline in the unemployment rate, and a 30 basis point increase in trimmed mean inflation (Graph 7). This suggests that alternative programs can stimulate the economy with similar outcomes to that of a conventional change to monetary policy, albeit through a greater reliance on the exchange rate channel.

Graph 6



Discussion

There are a number of reasons why unconventional monetary policies might have a larger or smaller effect than illustrated above.

First, our modelling framework does not capture the ways in which a policy that lowers one rate would also affect other interest rates in the economy. For example, in the case of government bond yields, lower yields do not translate into lower mortgage and business lending rates in MARTIN. In reality, lower bond yields can lower these rates by either signalling that policy rates will remain low for an extended period or, more directly, when used as a benchmark for mortgages and corporate bonds.^[4] Indeed, since the Bank launched its comprehensive package of policy measures in response to COVID-19, Australian housing (particularly fixed-rate) and business interest rates have declined to historically low levels. Those effects are not captured in the isolated interest rate examples presented above.

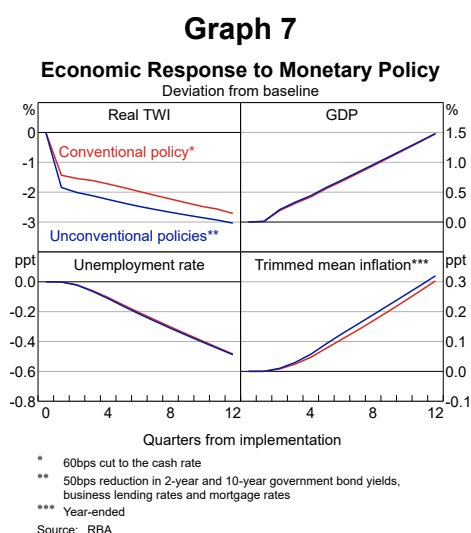
Second, the portfolio balance channel of unconventional monetary policy is absent from our model results. This is where policies that directly lower the rate of return on risk-free assets encourage investors to increase their holdings of assets with higher rates of return. This can include buying stocks or lending to households and firms, thereby encouraging greater investment and consumption. This transmission mechanism is an important way through which unconventional

policies indirectly stimulate a variety of sectors in the economy (Gagnon *et al* 2011).

Similarly, in the business lending rate example, quantity-based measures to encourage business lending may have a more meaningful effect on economic activity than the price-based example shown here. International experience suggests that the availability of credit, in addition to the cost, is a key channel through which unconventional policy stimulates activity. Previous research using microdata has found that business investment is responsive to lending rates when changes are due to a relaxation in lending standards and increased availability of credit, as opposed to changes in monetary policy (Hambur and La Cava 2018). Indeed, the TFF incorporates features to encourage banks to expand lending to businesses, promoting the availability of credit in addition to lowering interest rates. It is not currently feasible to model such a program in MARTIN, and so the model is likely missing some key channels of transmission from interest rates to business activity.

Finally, unconventional policies that lower various interest rates could have a smaller effect than estimated here if the transmission of those rates to the economy differs to the way it has worked in the past. For example, if

- the stimulatory effect of the exchange rate depreciation is muted, such as through restrictions on international travel put in place during the COVID-19 pandemic;
- actions by other central banks (such as the substantial policy stimulus provided globally in response to COVID-19) place upward pressure on the Australian dollar, muting the expansionary effect of policies that would otherwise be expected to result in a lower exchange rate;
- business or household demand for credit is less responsive to lower interest rates than historical experience suggests, such as due to heightened uncertainty; or
- policies to lower specific interest rates adversely affect market functioning and the banking sector. For instance, lower government bond yields and a flatter government bond yield



curve could place pressure on bank profitability and margins, which could stifle lending activity (CGFS 2019). In the most recent experience this has been (at least partially) addressed by remunerating balances held in Exchange Settlement Accounts at the Bank at 10 basis points rather than zero.

Conclusion

Although the cash rate is now at its ELB, alternative monetary policy tools are available to provide stimulus to the economy. Policies that lower government bond yields and household and business lending rates are effective in further reducing the unemployment rate and increasing inflation even though the cash rate is constrained by the ELB. Different tools can be used to affect different channels of transmission. A range of policies deployed in unison lowers the unemploy-

ment rate further and increases inflation in a way that closely replicates the channels of a conventional cash rate cut. Without these alternative monetary policies, and a range of other policies including fiscal stimulus, economic outcomes would be more varied and adverse.

Notwithstanding this, the COVID-19 pandemic poses unique challenges. Some of the responses to it may mute the efficacy of some channels through which monetary policies (conventional and unconventional) typically support the economy, for example the influence of the exchange rate on service exports due to travel restrictions. Nonetheless, the low level of the cash rate and unconventional policy measures will keep borrowing costs low and credit available, and so support businesses and households during the current challenging economic environment. ✎

Footnotes

[*] Peter Rickards is from Economic Analysis Department; Rochelle Guttmann and Dana Lawson completed this work in Economic Analysis Department.

[1] To examine a plausible range of outcomes, we perform stochastic simulations as described in Ballantyne *et al* (2020). We randomly select a sequence of historical forecast errors from the model and apply those errors to the future projected path. The cash rate is then allowed to respond to this new path for different economic variables. We do this 10,000 times, and we can then use the results to construct probability distributions.

[2] We use an expectations-augmented version of the MARTIN model, where 2-year government bond yields and the exchange rate respond immediately to financial participants' reassessment of expectations for future policy rates. A satellite VAR model – consisting of the cash

rate, inflation and the unemployment rate – is used to proxy expectations in the next quarter.

[3] This calibration implicitly assumes a shift down of the entire yield curve, although there is no explicit yield curve in MARTIN; only 2- and 10-year rates are modelled. These rates can be considered as proxies for medium- and long-term interest rates.

[4] The signalling channel is likely to be more important in Australia, where most mortgage and business lending rates are variable. In MARTIN, these rates are modelled as being equal to the cash rate plus a simple spread. The business lending rate spread also depends on the level of the unemployment gap.

References

- Atkin T and G La Cava (2017), 'The Transmission of Monetary Policy: How does it work?', *RBA Bulletin*, September, pp 1–8.
- Ballantyne A, T Cusbert, R Evans, R Guttmann, J Hambur, A Hamilton, E Kendall, R McCririck, G Nodari and D Rees (2020), 'MARTIN Has Its Place: A Macroeconometric Model of the Australian Economy', *Economic Record*, advance online publication. Available at <<https://doi.org/10.1111/1475-4932.12531>>.
- Brunnermeier M and Y Koby (2018), 'The Reversal Interest Rate', NBER Working Paper No 25406.
- Chung H, E Gagnon, T Nakata, M Paustian, B Schulsche, J Trevino, D Vilan and W Zheng (2019), 'Monetary Policy Options at the Effective Lower Bound: Assessing the Federal Reserve's Current Policy Toolkit', Finance and Economics Discussion Series 2019-003.

- CGFS (Committee on the Global Financial System) (2019), 'Unconventional Monetary Policy Tools: a Cross-country Analysis', CGFS Papers No 63, Bank for International Settlements.
- Connolly E and B Jackman (2017), 'The Availability of Business Finance', *RBA Bulletin*, December, pp 55–66.
- Debelle G (2020), 'The Reserve Bank's Policy Actions and Balance Sheet', Address to The Economic Society Australia, Online, 30 June.
- Gagnon J, M Raskin, J Remache and B Sack (2011), 'The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases', *International Journal of Central Banking*, 7(1), pp 3–43.
- Hambur J and G La Cava (2018), 'Do Interest Rates Affect Business Investment? Evidence from Australian Company-level Data', RBA Research Discussion Paper 2018-05.
- Kent C (2020), 'The Reserve Bank's Operations – Liquidity, Market Function and Funding', Address to KangaNews, Online, 27 July.
- Lane K and T Rosewall (2015), 'Firms' Investment Decisions and Interest Rates', *RBA Bulletin*, June, pp 1–8.
- Lowe P (2019), 'Unconventional Monetary Policy: Some Lessons From Overseas', Address to Australian Business Economists Dinner, Sydney, 26 November.
- May D, G Nodari and D Rees (2020), 'Wealth and Consumption in Australia', *Australian Economic Review*, 53(1), pp 105–117.
- McCririck R and D Rees (2017), 'The Neutral Interest Rate', *RBA Bulletin*, September, pp 9–18.
- RBA (Reserve Bank of Australia) (2020), 'Supporting the Economy and Financial System in Response to COVID-19', *rba.gov.au* site, viewed 1 July 2020. Available at <<https://www.rba.gov.au/covid-19/>>.
- Schmidt S (2016), 'The effective lower bound: some implications for inflation dynamics beyond the current low interest rate environment', *ECB Research Bulletin* 29.

Retail Central Bank Digital Currency: Design Considerations, Rationales and Implications

Tony Richards, Chris Thompson and Cameron Dark^[*]



Photo: alengo – Getty Images

Abstract

There has recently been increasing international focus on the possible issuance of central bank digital currencies (CBDC), or what might be considered a digital equivalent of banknotes. While the technical feasibility of such a new form of money is not yet established, this paper considers some issues around its possible design, the possible rationales for issuance, and the implications of issuance. Given the likely benefits and risks, at present there does not seem to be a strong public policy case for issuance in Australia. Nonetheless, it will be important to closely watch the experience of other jurisdictions that are considering implementing CBDC projects.

Introduction

Australian banknotes, which are a liability of the Reserve Bank, are a safe, accessible and widely accepted method of payment. But the use of cash for transactions has been declining over the past few decades in Australia as more people have switched to electronic payments such as cards. This trend has accelerated recently following the onset of the COVID-19 pandemic, as some consumers and businesses have sought to avoid using cash because of virus concerns. However, even though

cash is being used less frequently for transactions, the amount of cash on issue has continued to grow, reflecting demand to hold cash for precautionary purposes and as a store of value. Trends in the use and holdings of cash in Australia have been documented in the Bank's three-yearly consumer payments surveys, the most recent of which was conducted in late 2019 (Caddy *et al* 2020).

With the ongoing decline in the use of cash for transactions, a number of technological developments – such as the emergence of distributed

ledger technology (DLT), blockchain and cryptocurrencies – as well as the broader digitalisation of the economy, have prompted interest in the possibility of central banks issuing a new digital form of cash, known as central bank digital currency (CBDC).^[1] Many central banks are exploring the case for CBDC and the various policy and technical issues it would raise.

Consideration of a CBDC is particularly relevant to many aspects of the Reserve Bank's mandate and activities:

- The introduction of a CBDC would represent a change to a significant element of Australia's monetary system and could have effects on the structure of the financial system and financial stability, so it would be relevant to the Bank's responsibility for maintaining monetary and financial stability.
- A CBDC would also be relevant to the Bank's role as the issuer of banknotes in Australia. The *Reserve Bank Act 1959* stipulates, among other things, that Australian banknotes be printed by, or under the authority of, the Reserve Bank. The Bank's primary objective in carrying out this role is to maintain the capacity of Australian banknotes to provide a safe, secure and reliable means of payment and store of value.
- A CBDC would represent a major change to the payments system with implications for the Bank's payments system regulatory mandate. Under the *Payment Systems (Regulation) Act 1998*, the Bank's Payments System Board is required to determine the Bank's payment system policy in a way that will best contribute to controlling risk in the financial system and promoting competition and efficiency in the market for payment services, consistent with the overall stability of the financial system.
- The introduction of a CBDC could have major implications for the operation of the Reserve Bank Information and Transfer System (RITS), Australia's real-time gross settlement system. It could also be relevant to the Bank's role as provider of banking services to the Australian Government.

The Bank provided a first assessment of the issues around CBDC in late 2017 (Lowe 2017). This paper provides an update, focusing on a possible CBDC for general household use rather than a CBDC for wholesale settlement between banks and other wholesale market participants. It reviews some of the key concepts and issues associated with CBDC, including the various ways in which a CBDC could be designed, the problems it might address, the possible opportunities created and the potential consequences of issuance. It also reviews some of the work that other central banks have been doing on CBDC.

The main conclusion is that the public policy case for issuing a general purpose CBDC in Australia is still to be made. Even though the use of cash for transactions is declining, cash is still widely available and accepted as a means of payment. Households and businesses are also well served by a modern, efficient and resilient payment system that has undergone significant innovation in recent years, including the introduction of the New Payments Platform, a new real-time, 24/7 and data-rich electronic payments system. However, consistent with its mandate to promote competition and efficiency in the payments system and contribute to the stability of the financial system, the Bank will continue to consider the case for a CBDC, including how it might be designed, the various policy implications and the future conditions in which significant demand for a CBDC might emerge.

What Is Meant by a Central Bank Digital Currency?

In economics, 'money' is generally considered to be something that has three major functions: it provides a medium of exchange (i.e. a way to make payments), a unit of account and a store of value. Historically, many different things have served as money, ranging from whale teeth, to large stone discs, precious metals, metallic coins and more recently paper and polymer banknotes (Reserve Bank of Australia 2020).

Today in Australia money exists in both physical and electronic (or digital) form (Figure 1).^[2] Physical money (or 'currency', which we will generally refer to as 'cash') consists of banknotes and coins, which

can be held by anyone and are a bearer asset, meaning that no ownership information is recorded and the holder of the instrument is presumed to be the owner. Payment with a banknote occurs when someone passes the banknote to another person, resulting in a transfer of ownership, but without the involvement of a financial institution or any recording of the transaction or ownership on a ledger. In Australia, banknotes are issued by, and are a liability of, the Reserve Bank and can therefore be called 'central bank money'. The total value of banknotes and coins in circulation is currently around \$89 billion; as a ratio to annualised GDP, currency on issue in the June quarter was at the highest level seen in the period since the introduction of decimal currency in 1966.

As in most advanced economies, most of the money in Australia exists in digital form as deposit

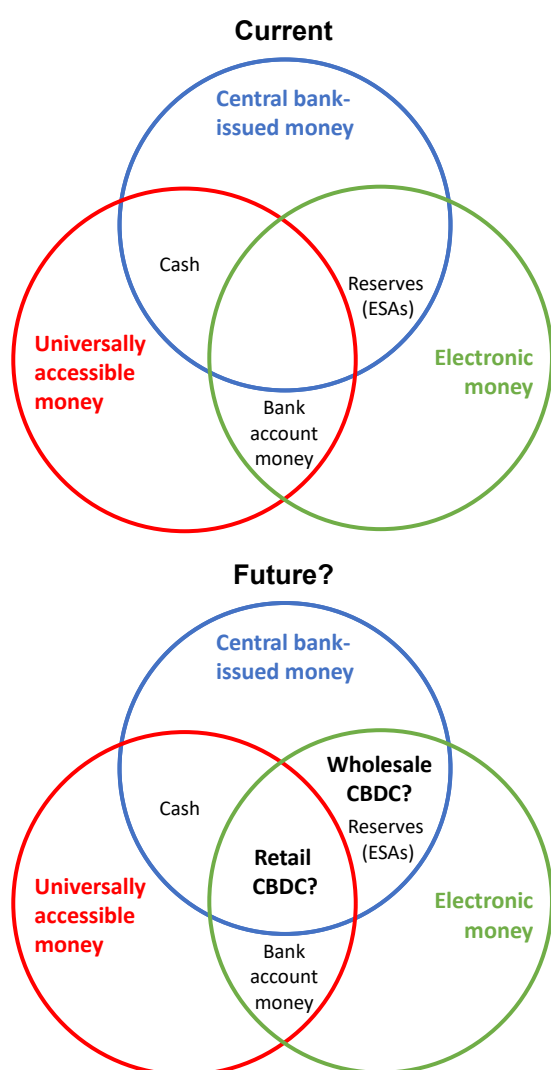
account balances recorded in electronic ledgers or databases. For example, in Australia, currency represents only 7 per cent of M1 and just 3.7 per cent of broad money.^[3]

The bulk of this digital money is in the form of deposits at commercial banks.^[4] These deposits are a liability of commercial banks, not the Reserve Bank, and therefore carry some additional (though still low) credit risk compared with liabilities of the Reserve Bank. Individuals who hold deposits at banks can exchange them for cash via withdrawals or can make payments using those deposits by instructing their bank, via a number of different payment systems, to transfer their deposit balance to another individual or business. In Australia, deposits at authorised deposit-taking institutions (ADIs) are subject to depositor preference and covered up to \$250,000 per account holder by the Australian Government's Financial Claims Scheme (FCS) (APRA 2020).

The Reserve Bank also issues digital money in the form of balances in Exchange Settlement Accounts (ESAs) that banks and a few other types of entities can hold, in exchange for providing the Reserve Bank with government securities or other high-quality assets. Banks can use their ESA balances to make payments to other ESA holders, including to settle transactions between their customers. They do so by instructing the Reserve Bank, which keeps the official ledger of account balances, to debit their ESA and credit the ESA of the intended recipient. Currently, however, individuals do not have direct access to central bank digital money. If they want to hold central bank money (i.e. a form of money that is issued directly by the Reserve Bank), individuals need to hold banknotes.

While ESA balances are a form of digital money issued by the central bank, when we talk about CBDC in this paper we are referring to a new form that is more widely accessible than ESA balances. We can further distinguish between *retail* CBDC, which would be like a digital version of cash that is essentially universally accessible, and a *wholesale* CBDC, which would be accessible only to a more limited range of participants (but probably including some that do not have access to ESAs presently).

Figure 1: Different Forms of Money



The focus of this paper is on retail CBDC, a form of CBDC that could be considered a digital alternative to cash that could be a widely accepted medium of exchange and a store of value. Like cash and central bank deposits, the unit of account of the CBDC would be the sovereign currency (i.e. the Australian dollar), and the CBDC would be convertible at par (i.e. one for one) with other forms of money. It would likely also be specified to serve as legal tender. Besides these core features, a CBDC would also have a number of other attributes that would be policy or design decisions to be made depending on its intended purpose and the underlying technologies used to implement it. These various design elements are discussed in the next section.

At this point, it is also useful to distinguish a retail CBDC from some other types of digital payment methods like e-money and cryptocurrencies. E-money (also known as stored-value facilities) is a form of electronically stored monetary value that can be used to make payments.^[5] This encompasses a wide variety of facilities, including prepaid cards and digital wallets like PayPal; in China, it would include the heavily used Alipay and WeChat Pay mobile wallet services. E-money facilities are similar in some ways to bank deposits, though they are issued by non-banks and are typically covered by a different regulatory framework than banks. While the user interface and technology employed for a CBDC could be similar to that for e-money, the key difference is that e-money is not issued by a central bank and, therefore, presents some credit risk to the user.

Cryptocurrencies or crypto-assets are another type of digital asset. They have their own 'currency' unit and are not denominated in the currency of any sovereign issuer. The distinguishing feature of most cryptocurrencies is that they utilise DLT and cryptography to store digital 'coin' ownership records and transactions in a digital ledger that is distributed (and synchronised) across a number of 'nodes' (or computers) rather than relying on a central party to operate the system. Bitcoin is the most prominent implementation of a decentralised cryptocurrency protocol, but thousands of variations have emerged. While a CBDC could also –

though need not – be designed to use DLT, a key difference is that cryptocurrencies are not issued by a central bank; indeed, they are not issued by any entity and effectively rely on users' complete trust in the software protocol that controls the system.

While the term 'cryptocurrency' may suggest that they are a form of money, the consensus is that existing cryptocurrencies do not provide the key attributes of money. As the Bank and many others (e.g. Carstens 2018) have previously noted, they are rarely used or accepted as a means of payment, they are not commonly used as a unit of account, and their prices can be quite volatile and so they are a poor store of value.

In recent years, a number of so-called 'stablecoins' have emerged as a type of cryptocurrency designed to minimise price volatility against a widely used unit of account (such as the US dollar) or a common store of value (such as gold), to attempt to make them more attractive as a means of payment. One way their promoters seek to maintain a stable value is by holding assets that back the coins on issue. Where a stablecoin is denominated in a single currency and backed by high-quality assets in that currency, it may have many of the attributes of e-money. For example, a consortium, which includes Facebook, has launched the Libra Association with the goal of issuing stablecoins that would be fully backed by high-quality assets; however, it remains to be seen if it will gain regulatory approval and become operational. In Australia, to date, there has been essentially no issuance of stablecoins nor any use of them as a payment method.

How Might a Retail CBDC Be Designed?

This section describes a number of the key attributes that would need to be considered in the design of any CBDC system. While choices on these would be driven by the intended purposes of a CBDC, including how it might address various policy objectives such as accessibility, resilience, privacy and security, we discuss them first to give the reader a better sense of what a CBDC might look like.

What roles for the central bank and the private sector?

A key question in the design of a CBDC would be the respective roles of the central bank and the private sector in facilitating access to and use of a CBDC. A one-tier CBDC system would be one where the central bank was responsible for all aspects of the system including issuance, account-keeping, transaction verification, and so on. Alternatively, in a two-tier or 'platform' system the central bank would develop the technology to issue CBDC to private sector entities with those entities then responsible for all customer-facing activities.^[6]

There is a strong presumption that any issuance of CBDC in a market economy like Australia would be via a two-tier system. There are a wide range of customer-facing activities where the central bank is unlikely to have a comparative advantage, especially in an environment where technology was changing rapidly. This includes distribution to households, account-keeping services, customer verification such as know-your-customer (KYC) and anti-money laundering and counter-terrorism financing (AML/CTF) checks, transaction verification, provisioning of any mobile devices, and so on. Instead, it is likely that these would be done by private sector entities like banks or newer fintech firms; we will refer to all these entities as payment service providers (PSPs).^[7]

Depending on the technology used (see below), PSPs might be responsible for maintaining separate records (sub-ledgers) of their customers' CBDC holdings or they might access a consolidated record of holdings, possibly held at the central bank or alternatively in some form of distributed ledger. PSPs would likely also provide their customers with the ability to transact in and out of CBDC using existing payment systems. Subject to decisions about whether the CBDC was interest-bearing (see below) it is possible that there would be no interest rate spread available to PSPs. Hence, the business model for service providers could potentially involve charging account-keeping fees or transaction fees, or providing CBDC payment services for free together with other paid financial services or in return for using the customer's data.

Account-based or token-based?

Broadly speaking, a retail CBDC could be structured as an 'account-based' or a 'token-based' system, or some combination of the two.

An account-based system would require the keeping of a record of balances and transactions of all holders of the CBDC. Transactions would involve transferring CBDC balances from one account to another and would depend on the ability to verify that a payer had the authority to use the account and that they had a sufficient balance in their account. Because the balance in a retail CBDC account would be a claim on the central bank, this model can be thought of as the equivalent of every citizen being offered a deposit account with the central bank, even though the central bank might not be responsible for user-facing and account-servicing functions.

By contrast, a token-based CBDC system would involve a type of digital token issued by and representing a claim on the central bank, and would effectively function as the digital equivalent of a banknote that could be transferred electronically from one holder to another. Such tokens would – like banknotes – be bearer instruments, meaning that whoever 'holds' the tokens at a given point in time would be presumed to own them, rather than there being a record of account balances.

Transactions in token-based CBDC might only depend on the ability to verify the authenticity of the token (to avoid counterfeits) rather than establishing the account holder's identity.^[8] CBDC tokens could be stored on devices, such as mobile phones or some kind of chip-based card, and move from one device to another when there is a transaction. A possible implication of a token-based CBDC is that it would allow payments to occur without the involvement of a central party, which might be an advantage in an offline environment.

Rather than a pure token-based or account-based system, a hybrid system would also be possible. This could involve both device-to-device token transfers between users and also some ongoing or periodic communication between devices and the central entity that had issued the tokens, allowing the creation of a record of transactions and balances

corresponding to those devices. This would enable the detection of counterfeiting of tokens and potentially also the restoration of value in the event that an individual lost their device. It would also permit some degree of traceability of CBDC by relevant authorities.

Decisions regarding in-person, online and offline usability

If a retail CBDC was being designed as a replacement for physical cash then, at a minimum, it would need to facilitate in-person payments – for example between two individuals or from an individual to a merchant in the retail environment. But, being an electronic system, it would presumably be possible to design it so that the CBDC could also be used to make remote (or online) payments. In this way it would function in much the same way as cards currently do.

As a form of electronic payment system, CBDC might be constrained by the availability of electricity and telecommunications systems, in contrast to physical cash which is ‘always on’ for exchange purposes. However, as noted above, it may be possible to design a CBDC system in such a way that it could be used (at least temporarily) in an ‘offline’ mode, which would be useful in remote locations and offer resilience benefits when power and telecommunications networks were down. For example, it might be possible for CBDC stored on a mobile device or some other small, battery-powered user-access device to be securely transferred to another device via wireless technologies even in the absence of power and telecommunications. However, there would still be a periodic need for power and network connectivity to reload or redeem CBDC balances against commercial bank deposits (and to recharge any batteries). As noted above, an offline mode might be easier to implement with a token-based system than an account-based system.

Would a CBDC bear interest?

While cash earns a zero rate of interest, a CBDC could earn a rate of interest that might be adjusted over time. Decisions as to whether the CBDC would bear interest could depend on the purpose of the

CBDC and the technologies and entities involved. For example, most discussions around retail CBDC envisage it being introduced primarily as a method of payment similar to cash, with the presumption that it would not bear interest. For example, the Bank of Canada (2020) has been explicit in indicating its expectation that a CBDC would not bear interest. However, some proponents of CBDC have envisaged it more as an asset or store of value that would bear interest and compete with commercial bank deposits. And some academic discussions have noted that a CBDC that could have either a positive or negative interest rate could improve the effectiveness of monetary policy, by increasing the pass-through from the central bank’s policy rate to the broader structure of interest rates in the financial system.^[9]

What degree of privacy would apply and who could hold CBDC?

Existing payment methods have a range of privacy levels. Cash offers a high degree of privacy – it is a bearer-instrument that does not require the services of an intermediary when passed from one person to the next and there is no record of who has held a banknote. Accounts at regulated financial institutions also typically provide a high degree of privacy; while there is a record of an individual’s transactions and holdings, that information is not generally available to others. At the other extreme, some payment methods may provide only quite limited privacy. For example, a user may have authorised an e-money wallet provider to use their transaction data for marketing purposes and there are some payment services (for example Venmo in the United States) where users are able to post details of their payments to be visible to their contacts on social media.

In principle, a significant degree of anonymity might be feasible for a token-based CBDC, potentially even equivalent to that of cash. Alternatively, an account-based CBDC would not allow complete privacy or anonymity; transaction data would be visible to the institutions providing account-keeping and transaction services, to the relevant authorities and potentially others. An intermediate degree of privacy might also be

possible. For example, the European Central Bank (2019) has experimented with the concept of a CBDC with elements of programmable money, by which individuals could be allotted a certain amount of ‘anonymity vouchers’ that could be used for small transactions, with larger transactions still visible to financial intermediaries and the authorities, including those responsible for AML and CTF.

Clearly, the degree of privacy or anonymity would be a key design decision for any CBDC and it is likely that there would be significant debate on this issue. Most central banks and other observers have, however, noted that the potential for anonymous digital currency to facilitate shadow-economy and illegal transactions, makes it highly unlikely that any CBDC would be designed to fully match the levels of anonymity and privacy currently available with physical cash.

A related issue is the question of who would be allowed to hold the CBDC and how much they could hold. Unlike physical cash, where it is not feasible to control who can hold it and how much they could hold, it would be possible to control these with a CBDC. For example, in an account-based model, users would likely be required to verify their identity with their service provider before opening an account, just as currently occurs with deposit accounts at financial institutions. While a retail CBDC would presumably be designed with universal access in mind, there may be a case to restrict access to domestic residents, and possibly to impose limits on holdings if a CBDC raised concerns about the possible effects on financial stability or the structure of the financial system (see below). On the other hand, temporary access for tourists and foreign visitors could be important if one of the rationales for introduction was to promote competition in the domestic payments system. In addition, allowing foreigners to hold CBDC could facilitate a safe and efficient mechanism for domestic residents to make payments abroad, thereby supporting remittances and international commerce.

Would a CBDC use blockchain or distributed ledger technology?

While Bitcoin and other cryptocurrencies are based on DLT, this would not necessarily be the case for a CBDC.^[10]

As discussed by the Bank of England (2020), the use of DLT for a CBDC could provide benefits in terms of enhanced resilience and availability. However, the overall benefits of decentralisation might not be all that large. In particular, in a retail context, the unavailability of a payment system is most often related to problems at an individual service provider or to localised network or power interruptions, not an interruption to the centralised infrastructure, which is generally built to be highly resilient.

Use of DLT could have a negative effect on aspects such as performance, privacy and security (BOE 2020). In a DLT-based system, each update of the ledger must be shared between nodes operating on the network, with the nodes coming to agreement on the state of the ledger through a consensus mechanism. The process of sharing information and finding consensus is the primary contributor to the performance issues of public blockchains such as Bitcoin. The ‘proof-of-work’ consensus and resulting competition between ‘miners’ in systems like Bitcoin is inefficient and characterised by low throughput (Dark *et al* 2019). Accordingly, it seems unlikely that there would be any serious consideration of public blockchain platforms for a CBDC. Instead, any DLT system considered for a CBDC would likely be permissioned, with access limited to PSPs or other regulated entities, and with a consensus mechanism that could achieve immediate, final and irrevocable settlement, probably with some degree of centralisation.

Would cash be withdrawn?

This can be thought of as a ‘design’ decision, though it is one relating more to the broader payments system and monetary system than to the design of a CBDC itself.

Any decision to introduce a CBDC would raise the question of whether physical notes and coins would continue to be issued or would be

withdrawn from circulation over a period of time. On the one hand, there may be resilience and accessibility benefits from retaining physical cash for as long as people want to continue using it. However, it would be costly for the economy to maintain systems to support two different types of central bank currency. So, if the CBDC had met most of the use cases of cash – including any objectives regarding privacy for legitimate transactions – and the use of cash had fallen significantly, there might be an argument for removing cash (including to ensure that it was not facilitating illegal transactions).

Why Introduce a Retail CBDC?

A number of reasons have been advanced for why central banks should consider CBDC issuance. The weight that is placed on these different reasons differs across jurisdictions and depends on factors such as the state of development and structure of the retail payments system and the degree of financial inclusion. This section reviews the main motivations that have been advanced for CBDC and discusses how relevant they might be in an Australian context.

Responding to the decline of cash

Many of the suggested rationales for CBDC have to do with the declining role of cash and the prospect of a significant reduction in the availability of cash deposit and withdrawal services, and the growing reliance of the economy on electronic payment services provided by the private sector.

Some arguments for CBDC include the following:

- For a century or more, central banks in most countries have provided a safe, default-free and free-to-use form of money for use by households. If cash was no longer widely available, some proponents of CBDC argue that central banks should provide a new form of central bank money so that households have an alternative to commercial bank or private money that is subject to default risk. They have also noted that the provision of central bank money (both currency and settlement balances) supports confidence in the use of commercial bank money and in the financial system more

broadly. These have been some of the main rationales for the work that Sweden's Riksbank is doing to explore issuing an e-krona.^[11]

- In the event that there was a significant reduction in the availability of cash deposit and withdrawal services, households that are heavy users of cash may not be willing or able to transition away from cash and might face challenges in making payments. Proponents of CBDC have suggested that a retail CBDC that was accessed by a simple device with a well-designed user experience could potentially meet the payment needs of these people who still rely on cash.
- Because cash currently functions as a back-up payment method for in-person payments when electronic payment systems are down, if cash were to disappear then the payments system may become less resilient. A CBDC could function as an alternative back-up payment method.
- As cash usage declines, there could be decreasing competition in the payment services market, leading to growing market power for large banks, international payments schemes, and possibly also technology companies. This reflects the tendency for a small number of players to dominate industries such as payments, where there are strong network effects and economies of scale and scope. Decreased competition could result in higher prices for payments services, and eventually in reduced innovation and poorer services. Introduction of a CBDC could provide a source of competition in the payments market that might mitigate the dominance of large private providers.

While these arguments point to some problems that could emerge from a further decline in the role of cash, issuance of a CBDC may not be a complete solution to the identified problems or there may be alternative responses other than a CBDC.

- The fact that households are increasingly moving away from using central bank money (cash) in their day-to-day transactions (reflecting a growing preference for electronic payments)

may indicate that most households in normal times do not feel strongly about any possible increase in risk from holding commercial bank money. If so, it may in turn reflect a perception that deposit insurance (or equivalent arrangements) provides adequate protection. For example, in Australia, deposits with ADIs are subject to depositor preference and covered by the Australian Government's FCS. Nevertheless, even with deposit insurance, there is evidence that some people still convert their bank deposits to cash during periods of increased uncertainty. This occurred during the 2008–09 global financial crisis and has been apparent recently during the COVID-19 pandemic. However, it is unclear if such episodes represent a changing view about the risk of banks or just a desire to keep some non-electronic payment method on hand in case there is greater risk of service interruptions at such times.

- The proposition that a simple device with a well-designed user experience and accessibility features could make it easier for some cash users to transition to electronic payments, while still meeting all needs in terms of security, is yet to be proven.^[12] Of course, if it is possible to provide easy access to payments using a CBDC, it would equally be possible for a similar user experience to be applied to payment services using e-money or commercial bank money; as noted above, the user experience for a CBDC might well be largely designed and provided by private sector entities.
- Payment services using a CBDC could potentially be provided with a high degree of resilience if such resilience was built into the systems of the central bank and PSPs. However, for a CBDC to provide a significant improvement in resilience for the payments system as a whole, payment services based on a CBDC would have to be provided to end users via different platforms and technologies to those currently used by banks and other PSPs. To be fully resilient a CBDC would also need to operate (at least temporarily) in the absence of functioning electricity and telecommunications

networks; as discussed above, this could be feasible for at least some CBDC use cases.

- As in many other industries, regulation may be an alternative to public sector provision of goods or services. The Reserve Bank has a mandate and regulatory powers to promote competition and efficiency and to control risk in the payments system. It has used its formal regulatory powers in the past to address competition and efficiency concerns in the card payments market. Concerning resilience, the Bank and the Australian Prudential Regulation Authority are currently working with the payments industry on an initiative to require improved disclosure of outages, with the aim of raising the focus on resilience within individual financial institutions. Accordingly, to the extent that the decline of cash heightens concerns about competition or risk in the payments system, the use of regulatory powers may be an alternative to the introduction of a CBDC. It should also be noted that the user-facing aspects of a CBDC system would presumably still rely heavily on the private sector, so competition and resilience concerns could still arise even in the presence of a CBDC.
- Finally, it should be noted that an alternative response to the risk of declining access to cash services is for the central bank to work with entities in the cash distribution chain to remove frictions and improve efficiency, with the goal of prolonging the feasibility of a viable cash system.^[13] Indeed, the Reserve Bank has recently been discussing ways to help sustain access to cash services with the major banks, cash-in-transit companies and ATM providers.

Responding to the emergence of stablecoins and cryptocurrencies

The emergence of cryptocurrencies like Bitcoin and the prospect of issuance of stablecoins have prompted some to call for central banks to introduce CBDCs as a precautionary or defensive measure. There are two major concerns here:

- Widespread substitution away from the domestic currency could threaten a country's monetary sovereignty and reduce the ability of

the central bank to influence domestic monetary conditions (including via changes to the structure of interest rates and the exchange rate) and to act as the lender of last resort if required. In principle, this could result from a shift to a cryptocurrency like Bitcoin or a stablecoin denominated either in some other currency. It could also result from more standard ‘dollarisation’ and the use of another sovereign currency in either traditional or CBDC form.^[14] The argument is that, by providing households and businesses with access to a digital form of the domestic currency, it may be possible to reduce the likelihood of a shift to other forms of money.

- An additional concern where technology companies are involved is that such companies may have very large user bases (perhaps via their social media services) and could encourage rapid adoption of stablecoins despite the privacy concerns associated with their collection, commercialisation and occasional misuse of user data. It is argued that central banks should provide CBDCs so that individuals have the option of using an alternative electronic form of money with greater privacy around any collection and usage of their payments-related data.

However, it may be that concerns about loss of monetary sovereignty are overstated and concerns about data privacy can be addressed in other ways.

- Traditionally, concerns about dollarisation and loss of monetary sovereignty have been confined to failed states or economies with histories of inflation or confiscation of financial assets. In countries with well-functioning financial and payment systems and a history of low inflation, like Australia, the risk of widespread adoption of money denominated in some other currency seems very low. However, this would not, for example, preclude adoption of a global stablecoin for specific use cases, such as cross-border payments, particularly if it was lower cost and offered a better user experience than existing services.

- It should also be noted that significant adoption of a stablecoin denominated in the domestic currency should not raise any concerns regarding monetary sovereignty. For example, if a stablecoin denominated in Australian dollars was marketed in Australia, it is likely that it would be subject to significant regulation in terms of safety and soundness, potentially including a requirement that issuance was fully backed by government securities or other very highly rated AUD-denominated assets.
- Similarly, stablecoins marketed in Australia would be subject to any required standards – existing or still to be established – regarding privacy as well as in other areas such as data usage, competition, KYC, and screening for AML and CTF purposes.

Providing stimulus for payments innovation

Given that much discussion of CBDC has focused on its use in a DLT environment, some proponents have argued for the introduction of CBDC to facilitate some of the payment innovations that are associated with DLT and blockchain. The focus here has been on enabling programmable or ‘smart’ money using the smart contract functionality of DLT. This could include making payments conditional on various events or characteristics, facilitating ‘atomic’ (i.e. all or nothing) transactions such as delivery-versus-payment, automatically triggering the immediate payment of taxes associated with particular transactions, and so on.

As discussed by the Bank of England (2020), to the extent that such capabilities were enabled with CBDC, they would presumably be provided as some form of overlay services by different PSPs rather than being part of the core functionality of the CBDC. The Bank of England also notes that smart contract functionality can be decoupled from DLT, and implemented on other types of ledgers, including centralised databases. This points to the possibility that many of the innovations that have been highlighted by DLT over the past decade might also prove to be feasible using existing payment instruments. For example, it might be possible to use the real-time nature of the New Payments Platform (NPP) and various types of

escrow arrangements to facilitate atomic transactions involving tokenised assets.^[15]

What Effects Could a CBDC Have on the Financial System and Financial Stability?

If a CBDC were to be introduced and adopted widely, it could represent a significant change to the structure of the financial system. While some of the demand for CBDC might come from switching out of cash, there might also be switching out of bank deposits. In the extreme, many households and businesses might decide they no longer wished to use deposit accounts at commercial banks (though, as discussed earlier, banks might well still provide some payment and account-servicing functions for the CBDC). These end users would instead keep their liquid funds in CBDC and use those to make payments.

Currently, commercial banks source about 60 per cent of their funding from deposits, with about two-thirds of that being at-call deposits. If banks were to experience an outflow of deposits, they would have to fund more of their lending in capital markets or from equity. The loss of deposit funding and greater reliance on other funding sources could result in some increase in banks' cost of funds and result in a reduction in the size of their balance sheets and in the amount of financial intermediation. Of course, this would depend on any changes to the structure of the central bank's assets resulting from the increase in its balance sheet, for example, whether it invested in government securities as opposed to lending funds back to banks or buying their securities.

Furthermore, the existence of a CBDC could raise challenges during times of stress in financial markets. Currently, if households or businesses become wary about their deposits in a particular bank, they are able to withdraw their funds by a transfer to an account at another bank (or by withdrawing cash at branches or ATMs). However, currently it is not really feasible for depositors to seek to withdraw deposits en masse from the banking system as there are practical limits to what can be withdrawn via ATMs and branches. However, in the presence of a CBDC, a run on the banking system as a whole would become feasible; if

depositors had concerns about the entire financial system, they could seek to make large-scale transfers of commercial bank deposits into CBDC.^[16]

Of course, this bank-run scenario is highly unlikely. In Australia, the FCS is likely to provide a significant level of assurance to households (though not necessarily to businesses). Furthermore, the Reserve Bank is able to provide liquidity, with appropriate collateral, to solvent but illiquid ADIs. Nevertheless, it does point to a possible risk from the introduction of a CBDC. One control that has been proposed would be to place limits on the amount of CBDC that could be held by any individual.^[17]

What Effects Could a CBDC Have on Monetary Policy?

The implementation of a CBDC could have implications for the central bank's balance sheet. To the extent that there was significant demand for CBDC at the expense of commercial bank deposits (as opposed to cash), household claims on the central bank would rise and the central bank's overall balance sheet would expand. A larger balance sheet need not have any significant implications for the operation of monetary policy, though changes to the composition of the central bank's assets may have implications for the risk profile of its balance sheet and the functioning of financial markets.

Furthermore, a simple change in the nature of currency on issue – from issuance of CBDC and an equivalent decline in the amount of cash in circulation – need not pose any challenges for the implementation of monetary policy. The reason is that monetary policy is not implemented through banknotes and coins, but rather through the quantity of ESA balances and the level of interest rates in the money market. Hence, there would be no need for any changes to the way monetary policy is implemented, and the Australian dollar would remain a store of value, medium of exchange and unit of account, even in the absence of physical cash.^[18]

How Much Demand Could There Be for a CBDC?

A project to launch a CBDC would be a major, multi-year project for the central bank, the payments industry, their technology partners, and a wide range of stakeholders in the public and private sectors. It would be costly in financial terms and quite risky from both a financial and technology perspective. The question of how much demand there would be for a CBDC, and whether it would be large enough to justify the work that would be required to launch a CBDC, would be very important.

As noted earlier, in Australia, currency in the form of banknotes and coins represents only 3.7 per cent of broad money. Instead, households and businesses hold the vast majority of their money in the form of commercial bank deposits, which come with a range of flexible electronic payment methods attached and often earn interest. Consistent with developments in a number of other countries, the services associated with bank deposits are being enhanced by the real-time, round-the-clock functionality that is being enabled by the NPP. For many end users, the existing ability to make and receive payments from an interest-bearing account in real time with continuous availability may imply little demand if CBDC was introduced as a new payment method in addition to bank deposits and cash.

However, any conclusions about the likely demand for CBDC are highly speculative. The Bank's most recent consumer payments survey sheds light on why some households might experience inconvenience or hardship if cash were no longer available, with the most cited reason being privacy or security concerns (Delaney, McClure and Finlay 2020). However, it does not really shed light on what proportion of cash users might want to switch to using CBDC nor what proportion of existing users of commercial bank electronic payments might switch to electronic payments based on a CBDC. More targeted research may be able to yield stronger evidence on these questions and issues such as whether households view the FCS as making their deposits as safe as cash (or any future CBDC) and the extent to which the ongoing growth

in demand for cash is related to the anonymity that it offers (but which presumably would not be fully replicated in a CBDC). We are not aware of any firm evidence from other countries on these or similar issues, although the Bank of Canada (2020) has recently noted that 'Initial public response through focus groups imply there could be a basic level of demand for a CBDC but that it may not be substantial at this time.'

What Are Other Central Banks Doing?^[19]

A survey conducted in late 2019 of 66 central banks by the Bank for International Settlements showed that most were doing some type of work on CBDCs, either retail or wholesale (Boar, Holden and Wadsworth 2020). However, around 70 per cent of central banks saw themselves as unlikely to issue either a retail or wholesale CBDC in the foreseeable future.

The jurisdictions which reported that they were likely or very likely to issue a CBDC over the next three years were all emerging market economies; in addition, 90 per cent of those likely or very likely to do so over the medium term were emerging markets. Indeed, a few emerging market economies have proceeded to conduct pilot studies of CBDCs, including the central banks of The Bahamas, Cambodia, Ecuador, Ukraine and the Eastern Caribbean. In most cases, the desire to improve financial inclusion has been cited as a major rationale for the central bank's work.

Given the complexity of the issues and some of the concerns discussed above, central banks in most advanced economies are proceeding cautiously and many have suggested that the case for CBDC issuance is not yet established. For example, the Federal Reserve has indicated that it is conducting research into CBDCs but that there are a number of issues that would have to be addressed before deciding to issue a CBDC. It has noted that 'Some of the motivations for a CBDC cited by other jurisdictions, such as rapidly declining cash use, weak financial institutions, and underdeveloped payment systems, are not shared by the United States. ... We have a robust and diverse banking system that provides important services, along with

a widely available and expanding variety of digital payment options.’ (Brainard 2020)

The two advanced economies that appear to have proceeded furthest in exploring the case for retail CBDC issuance are Sweden and Canada.

Sweden’s Riksbank has been considering the issues around a possible retail CBDC (the e-krona) for several years and announced in February that it is undertaking a DLT-based pilot to develop a technical solution for a CBDC that could serve as a complement to cash (Riksbank 2020). The Riksbank’s work is driven largely by Sweden’s rapid shift to electronic payments and the growing difficulty that some households and businesses face in continuing to use cash. It has expressed concern about resilience, competition, innovation and data integrity in the payments system in the event that households no longer had access to central bank money. Sweden has not taken a decision on issuing a CBDC, how it might be designed or what technology might be used. The main purpose of the pilot is for the Riksbank to increase its knowledge of a retail CBDC.

The Bank of Canada has an extensive CBDC work program underway and provided an update on this work in February (Bank of Canada 2020). It stated that, based on its research to date, there is currently no compelling case to issue a CBDC. It noted that the existing payments system provides Canadians with payment options that they can use with confidence and that offer a high degree of resilience and privacy. Nevertheless, it plans to ‘build the capacity to issue’ a retail CBDC in case it became desirable, including in circumstances where banknotes could no longer be used for everyday transactions or where Canada’s monetary sovereignty was being threatened by the adoption of some private-sector digital currency or another CBDC. It will be consulting with stakeholders about their payment needs and working over the next several years on the technological options for a CBDC.

More broadly, a number of central banks have been actively researching the possible use cases, design and implications of a *wholesale* form of CBDC. This would be a type of CBDC that would be accessible

by banks and possibly other market participants that could be used for the settlement of transactions in wholesale markets, such as purchases of financial assets or large-value payments. A number of central banks, often in collaboration with other market participants, have built proofs-of-concept for wholesale CBDC using DLT, exploring its potential use in domestic interbank and cross-border payments and securities settlement, among other use cases. Many of these experiments have sought to explore the potential benefits of embedding a wholesale CBDC in a DLT platform along with tokenised financial assets, focusing on the programmability and automation capabilities provided by smart contracts. However, given the current capabilities, performance and resilience of most existing (centralised) wholesale payment and securities settlement systems, the benefits of a potential wholesale CBDC have not always been obvious.

Where to from Here?

In late 2017, the Governor gave a speech on the possible issuance of a retail or wholesale CBDC and outlined a series of working hypotheses on the Reserve Bank’s thinking (Lowe 2017). He indicated that the Bank had no plans to issue a retail CBDC. The Bank expected the ongoing shift to electronic payments would continue, largely through products offered by the banking system rather than non-bank e-money providers or cryptocurrencies, though there would remain a place for banknotes in the payments system. In principle, it would be possible for a retail CBDC to exist side by side with commercial bank deposits and the electronic payment systems operated by the private sector. If a CBDC were issued, it would most likely be via a two-tier model, where the ultimate claim was on the central bank but the distribution and customer-facing aspects would be handled by private sector entities. The Bank did not consider that the case for issuing this new form of money had been established, though it would continue to consider the pros and cons of doing so.

The Bank’s views on a retail CBDC remain very much in line with the working hypotheses outlined in 2017, though it recognises that circumstances could

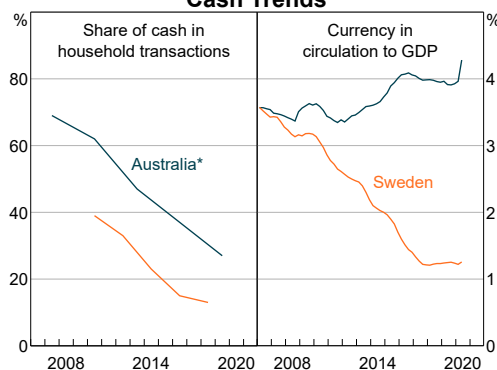
change so it will be important to keep an open mind. Any decision to introduce a retail CBDC could have economy-wide effects and would presumably require legislative change. Accordingly, the Bank stands ready to engage with the full range of stakeholders on the issue. In the meantime, the Bank has a commitment to providing high-quality banknotes, and ensuring reasonable access to them, for as long as Australians wish to keep using them.

The Bank's view is that there is currently no strong public policy case to introduce a CBDC for retail use. This reflects a number of factors:

- While the use of cash in transactions has been falling gradually, demand for Australian banknotes continues to increase and has indeed risen significantly since the onset of the COVID-19 pandemic. Although there were indications that some merchants had stopped accepting cash in the early stages of the pandemic, acceptance of cash at the point of sale remains very high, and households have good access to cash withdrawal and deposit services. So concerns about the declining role of cash are less pressing than in some other countries, most notably Sweden, where a retail CBDC is being considered more actively (Graph 1). Nevertheless, a continued decline in the use of cash for transactions in Australia could lead to the withdrawal of cash services in ways that may create challenges for people who still need or want to use cash. The Bank will be looking to work with banks, ATM providers and cash-in-transit companies to promote improvements in the efficiency of the cash distribution system so that cash can remain a viable payment option for as long as people want to use it.
- Australia's electronic payments system compares favourably with those in many other countries. Households and businesses have access to a range of safe, convenient and low-cost payment services from commercial banks and other providers. The NPP represents a major upgrade to the payments system, allowing real-time, data-rich, easily addressed account-to-account payments that can be made on a 24/7 basis. Growth of transactions through the NPP has been strong compared with fast payment systems implemented in other countries. Looking ahead, the Bank will continue to work with the payments industry where it has policy concerns or sees a case for coordinated investment to fill gaps in the services available to households and businesses. We expect that the quality of payment services provided to end users will continue to improve, with the private sector able to deal with many of the shortcomings in the payments system that have been highlighted by proponents of a retail CBDC.
- Regulation remains an option for dealing with any concerns associated with private-sector provision of payment services. The Bank has a clear mandate to promote competition and efficiency and to control risk and well-defined powers to set standards and impose access regimes where policy concerns cannot be addressed by the payments industry. Together with other regulators, the Bank expects to be able to deal with any policy concerns around the possible emergence of stablecoins.
- It would be a major decision to implement a retail CBDC. The introduction of a CBDC would be a very substantial and costly project in terms of its design, build and subsequent operation, especially given growing cybersecurity threats and the rate at which technology is changing. Indeed, it remains to be seen if a CBDC that

Graph 1

Cash Trends



* The last observation for the share of cash in transactions in Australia is for October/November 2019; some rough figuring by Reserve Bank staff suggests a share of around 20 per cent in mid 2020
Sources: Colmar Brunton; Ipsos; RBA; Roy Morgan Research; Statistics Sweden; Sveriges Riksbank

would meet all requirements, especially in terms of resilience to fraud and cybersecurity risks, is feasible. Furthermore, it is possible that there might be only very limited demand from households to hold and use CBDC. Given the Bank's current assessment of the likely benefits and risks, there may be benefits to waiting and to closely watching the experiences of other jurisdictions that are considering implementing CBDC projects.

Separate to its work monitoring the case for a retail CBDC, the Bank is conducting research on the technological and policy implications of a

wholesale CBDC. This work is taking place in the Bank's in-house Innovation Lab and included the development in 2019 of a limited proof-of-concept of a DLT-based interbank payment system using a tokenised form of CBDC backed by ESA balances. Currently, the Bank is collaborating with a number of external parties on a project to extend this proof-of-concept to incorporate tokenised financial assets to explore the implications of delivery-versus-payment settlement on a distributed-ledger platform as well as other programmability features of tokenised CBDC and financial assets. The Bank plans to publish information on the results of this research in due course. ❖

Footnotes

- [*] The authors are from Payments Policy Department.
- [1] Committee on Payments and Market Infrastructures and Markets Committee (2018) provides an overview of many of the issues in this area.
- [2] This figure draws on Bjerg (2017). See Bech and Garrett (2017) for further discussion of the different types of money, including a four-way taxonomy called the 'money flower', which adds an extra dimension based on whether types of money are transferable peer to peer (as opposed to requiring a central intermediary).
- [3] M1 is defined as holdings of notes and coins by the private non-bank sector plus transaction deposits at authorised deposit-taking institutions (ADIs) from the private non-ADI sector. Broad money includes M1, all other deposits at ADIs (including negotiable certificates of deposits) from the private non-ADI sector plus other borrowings from the private sector by all financial intermediaries.
- [4] Deposits are created when banks extend loans (and the loan proceeds are deposited at the same or another bank). See Doherty, Jackman and Perry (2018) for a discussion of the role of banks in the creation of money. Note also that references to 'commercial banks' in this paper should be taken as referring to all types of authorised deposit-taking institutions.
- [5] In Australia, e-money facilities are known as purchased payment facilities (PPFs) and are regulated by the Reserve Bank under the *Payment Systems (Regulation) Act 1998*, and by APRA under the *Banking Act 1959* where they are over a certain size, are deemed to be 'widely available' and have deposit-like features.
- [6] A variant of the two-tier model would be what the International Monetary Fund has called a synthetic CBDC (sCBDC) (see Adrian and Mancini-Griffoli 2019). Here, sCBDC providers would be able to hold deposits at the central bank to back their sCBDC issuance. However, the claims of sCBDC holders would be on the private sector provider and not the central bank, so would carry some degree of risk and there would be no guarantee that different sCBDCs would be exchangeable at par. Hence, sCBDCs are perhaps best viewed as domestic currency stablecoins, albeit with high-quality asset backing.
- [7] Of course, the central bank would also need to work with private sector partners in designing and implementing the initial issuance of a CBDC in a two-tier model, particularly with regard to technology and cybersecurity issues.
- [8] A CBDC issued in this form would most likely be subject to other restrictions (e.g. transaction limits or limits on holdings) to ensure it supported compliance with AML/CTF rules and other initiatives aimed at addressing the black economy.
- [9] Some academics (for example, Bordo and Levin 2017) have suggested this could be particularly useful in alleviating the 'zero lower bound' constraint to monetary policy, though for this to be fully effective it would rely on the removal of physical cash from circulation or some method of devaluation of cash relative to electronic money, otherwise a negative interest rate on CBDC could be avoided by a shift to cash. For the avoidance of doubt, the Reserve Bank is committed to ensuring adequate access to cash services, given that cash is still used heavily by some segments of the population, and has publicly stated that negative interest rates are very unlikely.
- [10] As DLT is an emerging technology with no deployments at the scale that would be required for a retail CBDC, it would be important for assumptions around performance, privacy and security to be thoroughly tested when selecting a DLT platform.
- [11] See Ingves (2018) for example.

- [12] See Miedema *et al* (2020) for a discussion of some of the attributes of a device that could provide easy access to payments using a CBDC (and presumably also to payments based on commercial bank money or e-money).
- [13] Alternatively, facing the prospect of declining cash services, some jurisdictions, such as Sweden, have introduced legislative requirements for banks to continue to provide a specified minimum level of cash services.
- [14] Concerns along these lines have been expressed in both Sweden and Canada. For example, Armelius *et al* (2020, p 7) note that ‘Sweden is a small, open, and highly digitalized economy with its own national currency that is not commonly used in international trade. Consequently, the Swedish krona may be particularly vulnerable to the advent of currencies such as stablecoins issued by private multinational enterprises’. The Bank of Canada (2020) has indicated that a CBDC could be beneficial or necessary if ‘one or more alternative digital currencies – likely issued by private sector entities – were to become widely used as an alternative to the Canadian dollar as a method of payment, store of value and unit of account’. It also referred to the possibility of a scenario where ‘a CBDC issued by a foreign central bank had extensive cross-border use in Canada’.
- [15] Here a ‘tokenised asset’ refers to a digital token on a DLT platform that represents ownership of an underlying asset (such as a bond). The token can be transferred from one participant to another on the distributed ledger, representing the transfer of ownership of the underlying asset.
- [16] While this points to risks to financial stability from sudden shifts into CBDC, some observers have noted that a significant permanent shift of deposits from commercial banks into CBDC could imply less maturity mismatch in banks, and possibly a safer financial system.
- [17] Of course, this points to a curious aspect of possible CBDC issuance, namely that the public sector would be simultaneously introducing a new asset while putting limits on holdings of it. An alternative control in the case of an interest-bearing CBDC would be for holdings above a certain amount to yield a lower (or zero) rate of interest, though it is not clear if this would be a significant deterrent to a bank run in the case of serious stress in the financial system.
- [18] Proponents of CBDC have, however, noted that if a CBDC attracted an interest rate that was linked to the policy rate it could strengthen the effects of monetary policy because policy would then have an influence on a broader range of interest rates in the economy.
- [19] Given that there is only limited information available about work by the People’s Bank of China (PBOC) on a retail CBDC, this section does not cover that work. However, available reports indicate that a pilot is well advanced and involves a two-tier model where the CBDC would be issued by the PBOC and then distributed by commercial banks or other payment providers. The primary rationale for the PBOC’s CBDC may be to promote a bigger role for central bank money as an alternative to the e-money provided by the large private sector wallet providers (most notably Alipay and WeChat Pay).

References

- Adrian T and T Mancini-Griffoli (2019), ‘The Rise of Digital Money’, IMF FinTech Notes No 19/001.
- APRA (Australian Prudential Regulation Authority) (2020), ‘About the Financial Claims Scheme’, Available at <<https://www.apra.gov.au/about-financial-claims-scheme>>.
- Armelius H, G Guibourg, A Levin and G Söderberg (2020), ‘The rationale for issuing e-krona in the digital era’, Sveriges Riksbank Economic Review No 2, pp 6–18.
- Bank of Canada (2020), ‘Contingency Planning for a Central Bank Digital Currency’, February.
- Bank of England (2020), ‘Central Bank Digital Currency: Opportunities, Challenges and Design’, Discussion Paper, March.
- Bech M and R Garrett (2017), ‘Central bank cryptocurrencies’, BIS Quarterly Review, September 2017, pp 55–70.
- Bjerg O (2017), ‘Designing New Money: The Policy Trilemma of Central Bank Digital Currency’, Copenhagen Business School, CBS, MPP Working Paper.
- Boar C, H Holden and A Wadsworth (2020), ‘Impending arrival – a sequel to the survey on central bank digital currency’, BIS Papers No 107.
- Bordo M and A Levin (2017), ‘Central Bank Digital Currency and the Future of Monetary Policy’, NBER Working Paper No 23711.

Brainard L (2020), 'The Digitalization of Payments and Currency: Some Issues for Consideration', Speech at the Symposium on the Future of Payments, Stanford, California, 5 February.

Caddy J, L Delaney, C Fisher and C Noone (2020), 'Consumer Payment Behaviour in Australia', *RBA Bulletin*, March, viewed 26 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2020/mar/consumer-payment-behaviour-in-australia.html>>.

Carstens A (2018), 'Money in the digital age: what role for central banks?', Lecture at the House of Finance, Goethe University, Frankfurt, 6 February.

Committee on Payments and Market Infrastructures and Markets Committee (2018), 'Central bank digital currencies', March.

Dark C, D Emery, J Ma and C Noone (2019), 'Cryptocurrency: Ten Years On', *RBA Bulletin*, June, viewed 26 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2019/jun/cryptocurrency-ten-years-on.html>>.

Delaney L, N McClure and R Finlay (2020), 'Cash Use in Australia: Results from the 2019 Consumer Payments Survey', *RBA Bulletin*, June, viewed 26 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2020/jun/cash-use-in-australia-results-from-the-2019-consumer-payments-survey.html>>.

Doherty E, B Jackman and E Perry (2018), 'Money in the Australian Economy', *RBA Bulletin*, September, viewed 26 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2018/sep/money-in-the-australian-economy.html>>.

European Central Bank (2019), 'Exploring anonymity in central bank digital currencies', December.

Ingves S (2018), 'The e-krona and the payments of the future', Stockholm, 6 November.

Lowe P (2017), 'An eAUD?', Address to the 2017 Australian Payment Summit, Sydney, 13 December.

Miedema J, C Minwalla, M Warren and D Shah (2020), 'Designing a CBDC for universal access', Bank of Canada Staff Analytical Note 2020-10.

Reserve Bank of Australia (2020), 'What is Money?', Reserve Bank of Australia site.

Sveriges Riksbank (2020), 'The Riksbank's e-krona pilot', February.

Insights from the New Economic and Financial Statistics Collection

Megan Garner^[*]



Photo: Laurence Dutton – Getty Images

Abstract

The Reserve Bank has worked with the Australian Bureau of Statistics (ABS) and the Australian Prudential Regulation Authority (APRA) to modernise and expand data collected from Australia's financial sector. This article discusses some of the insights from the data, known as the Economic and Financial Statistics (EFS). The EFS collection has been used to monitor developments in the provision of finance to the Australian economy since the onset of the COVID-19 pandemic. For instance, new data on housing interest rates shows that there has been a decline in these rates alongside the package of measures implemented by the Reserve Bank in March this year.

The New EFS Collection

Over the past few years, the ABS, APRA and the Reserve Bank have worked together in close consultation with financial institutions to modernise and expand the data collected from Australia's financial sector. These data are collectively known as the EFS collection.^[1] The new data have enhanced the quality of information on financial institutions and their lending and borrowing activities available to policymakers and the wider community. The EFS collection has been a large-scale and complex

project, involving considerable collaboration between the three agencies and the industry.

The EFS collection has been implemented in three phases:

- Phase one improved existing data on financial institutions' balance sheets used to compile Australia's financial aggregates. The financial aggregates are statistics on the stocks of money and credit outstanding in the Australian economy (Bank, Durrani and Hatzvi 2019). Since August 2019, the financial aggregates have been published using data from the EFS

collection. The balance sheet data from the EFS collection are also used as an input into the national accounts finance and wealth estimates for Australia.^[2]

- Phase two improved existing data on housing and business finance. This phase of the collection has also provided policymakers with much more granular information on reporting institutions' lending, liabilities, and interest rates.
- Phase three has provided information on other aspects of reporting institutions' activity and performance, including profits and activity in specific financial markets. It will also provide information on the fees that reporting institutions charge and further information on specific financial products in the future. Some of these data are, or will be, used in the measurement of Australia's Gross Domestic Product (GDP).

One of the most important changes in the EFS collection is the more detailed definitions of the data reported.^[3] This helps institutions report consistent data which, in turn, increases the quality of the statistics compiled and used by the ABS, APRA and the Reserve Bank. A number of definitions were clarified or updated to align with international standards for compiling economic statistics. These include the definitions of different types of deposits, industry sectors, and the residency status of households and businesses (which are consistent with the compilation of Australia's national accounts). The definitions used in the EFS collection are accompanied by comprehensive guidance.

The EFS collection also captures types of financial institutions that were not included in previous data collected from the financial sector. This has improved the accuracy of the statistics compiled using the new collection. The new data are collected from authorised deposit-taking institutions (ADIs), including banks, building societies and credit unions, and non-ADIs (also known as registered financial corporations).^[4] Previously, only a small number of non-ADIs reported data to APRA. Legislative changes mean that more of these entities are now registered with

APRA and reporting data as part of the EFS collection, which has increased the coverage of the activities of non-ADIs.

This article focusses on the data and findings from phase two of the EFS collection. In particular, it describes the more comprehensive set of statistics now available on reporting institutions' lending and interest rates. Much of these data are now published – in an aggregate view – in some of the statistical tables on the Reserve Bank's website. APRA publishes selected information on individual banks within the domestic market using the EFS collection. The ABS also uses the EFS collection to compile aggregate statistics on new lending to households and businesses.

The following two sections outline some of the key insights on the provision of finance to businesses and households from phase two of the new EFS collection.

Better Data on Business Finance

The EFS collection provides a more complete view of the way that Australian businesses access finance from the banking sector. The new collection includes data on business credit outstanding by business size. The measured stock of outstanding business credit is higher than previous estimates due to improved coverage and more comprehensive measurement (Graph 1). The Reserve Bank's previous measure was based on data reported by a smaller number of lenders and did not include business lending for some business purposes. Currently, the ADI and non-ADI lenders reporting these data account for a little over 95 per cent of total business credit outstanding. Business lending by size, industry and interest rate type are now published on the Reserve Bank's website in Statistical Tables D14 and D14.1.^[5]

These data have assisted the Reserve Bank in assessing developments in business finance since the onset of the COVID-19 pandemic. Large businesses drew on lines of credit in March and April and held these funds as deposits, though about three quarters of this has since been repaid. In contrast, the overall volume of lending to small and medium-sized businesses has been little

changed since the onset of the COVID-19 outbreak. This could reflect weak demand for new loans due to the heightened uncertainty for businesses in the current environment (Lewis and Liu 2020). In addition, there are various short-term initiatives helping small and medium-sized businesses cover their operating costs, which lessen the need for finance from the banking sector.

Although weakness in lending growth to small and medium-sized businesses appears to be mostly driven by subdued demand, the availability of credit to businesses has also tightened since earlier in the year (Lewis and Liu 2020). Much of this reflects the application of existing lending standards in an environment of weak economic conditions and great uncertainty. In addition, banks are requiring a greater degree of verification of borrowers' information, and some banks are cautious about lending to new customers and to sectors significantly affected by the pandemic (such as smaller retailers, tourism and commercial property).

The EFS data on business lending by size have also been important for the implementation of the Reserve Bank's Term Funding Facility (TFF), which was announced in March 2020 as part of a comprehensive policy package (Reserve Bank of Australia 2020). The TFF provides a guaranteed source of low-cost funding to banks, and includes an incentive for the banking sector to increase lending to businesses, especially small and medium-sized businesses.^[6] This is because banks can borrow extra funding under the TFF if they

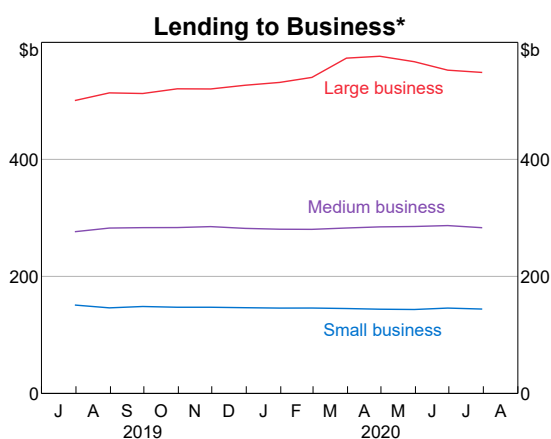
increase their lending to businesses; for every dollar of extra lending to small or medium-sized businesses, banks can access five dollars of extra funding under the TFF (for large businesses, the amount is one dollar of extra funding). Where available, the Reserve Bank is calculating the extra funding from the TFF using the data on business lending from the EFS collection.

The EFS collection also provides more frequent and disaggregated data on the interest rates paid by businesses (Graph 2). These data are now monthly, instead of quarterly, and broken down into rates for small, medium and large businesses, instead of rates for small and large business loans. The definitions of business size are also more accurate. Previously, small business loans were defined as those loans that were less than \$2 million, while all larger loans were considered to be large business loans. In other words, lending was classified by the size of the loan and not the size of the business.^[7]

Business interest rates are published in the new Statistical Table F7 and the Lenders' Interest Rates page on the Reserve Bank's website. These data have been important for monitoring how the Reserve Bank's recent package of policy measures is flowing through to business lending rates. Indeed, business lending rates have recently declined to historically low levels.

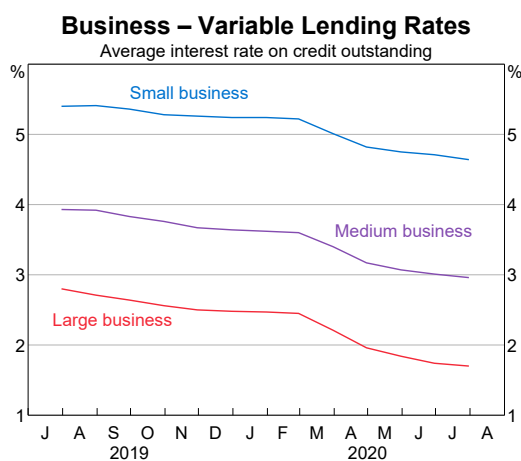
The new business interest rate data from the EFS collection also confirm our understanding that smaller businesses pay higher interest rates for

Graph 1



* Data cover financial institutions with \$2 billion or more in business credit
Sources: APRA; RBA

Graph 2



* Data cover financial institutions with \$2 billion or more in business credit
Sources: APRA; RBA

finance than larger businesses. A key reason for the difference is that smaller businesses typically have a higher risk profile due to their more volatile revenue streams (Lewis and Liu 2020). However, small-business borrowers pay significantly lower interest rates on loans secured by residential property compared with their other loans (Graph 3). This is consistent with the security provided by their property reducing the risk for lenders relative to unsecured finance.

Better Data on Household Finance

The EFS collection also provides a better, more detailed view of the way that Australian households access finance from the banking sector. Households generally seek finance for two main purposes – to purchase a house or for consumption purposes (via a personal loan to buy a car, for example).

Housing finance

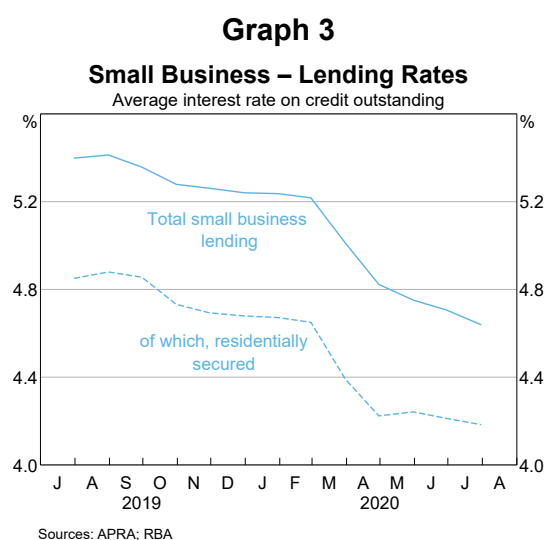
The stages of housing finance

The EFS collection includes data on four stages in the provision of housing finance. This is a considerable improvement on previously available data, as these new data provide more complete information on changes in the characteristics of and trends in housing finance. These data are reported by the largest providers of housing credit, accounting for around 95 per cent of total housing credit outstanding. The four stages of housing finance are:

- A housing **loan application**, which is typically received shortly after a contract of sale is agreed between the buyer and seller of a property. A housing loan application is the first stage reported in the establishment of a housing loan, and the earliest indicator of housing finance activity.
- A housing **loan commitment**, which exists for a loan once a borrower has accepted an offer of finance from a lender. These data have been published by the ABS since November 2019.^[8]
- A **funded housing loan** is one where the lender makes funds available to be drawn on by the borrower. These new data include details on the characteristics of housing lending, such as loan size, whether a loan has a variable or fixed interest rate, and whether a borrower makes repayments for the principal and interest of a loan or the interest component only.
- A new **drawdown** occurs when a borrower draws on the funds made available by the lender during settlement of a property. This is the final stage of the housing finance process, where the creation of credit has taken place and where the loan enters the Reserve Bank's credit aggregates.

The new EFS data on housing loan applications have been very valuable in recent months. Recently, applications for housing loans have been a little above the levels of earlier this year, despite the weak housing market activity observed since the end of March (Graph 4). The broadly stable level of housing loan applications in recent months is consistent with the very large volumes of refinancing activity that has occurred of late, as borrowers have sought to take advantage of lower interest rates and offers of cash back by refinancing an existing loan previously held with another lender.

The EFS housing loan commitments data provide a timely indicator of housing finance activity. They also give a better estimate of the average loan size for new housing lending than was previously available (Graph 5). Average loan sizes are calculated as the total value of new lending divided by the number of new lending facilities. Previous



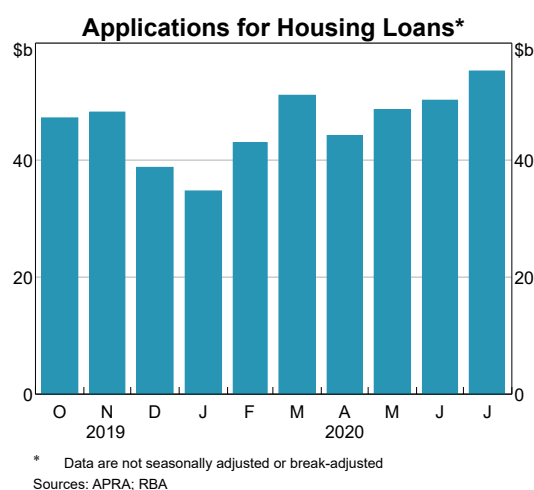
estimates of loan size were based on the number of loans extended by a lender. However, a borrower can have a single mortgage facility for a property that may include multiple loans, such as a fixed-rate loan for part of a mortgage and a variable-rate loan for the rest. The EFS collection includes data on the number of loan facilities instead of the number of loans. Since November 2019, the average new loan size (excluding refinancing) has been around \$530,000, higher than the measure of about \$480,000 based on the data available prior to the introduction of the EFS collection.

The new disaggregated EFS data available on housing loan characteristics can provide timely insights for policymakers. Monthly data are now available on the value and number of loans funded at different loan-to-valuation ratios (LVRs) and at

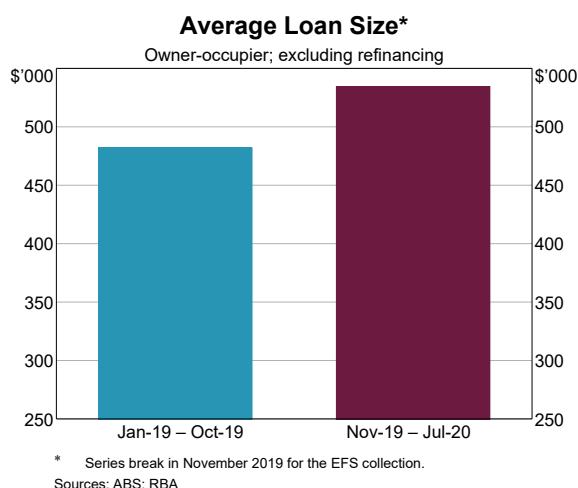
different loan sizes (Graph 6). The LVR is an important indicator of the riskiness of a loan. Higher LVR loans have lower equity buffers to absorb any potential declines in the value of the property.^[9]

The characteristics of funded housing loans reported in the EFS collection have also been useful for explaining recent trends in housing finance. For instance, these data show a very sharp increase in the share of housing loans funded with fixed interest rates in recent months (Graph 7). The rise in housing loans funded with fixed interest rates is due to borrowers refinancing from variable- to fixed-rate housing loans (discussed below). As a result, fixed-rate loans now account for around 25 per cent of total housing credit outstanding.

Graph 4

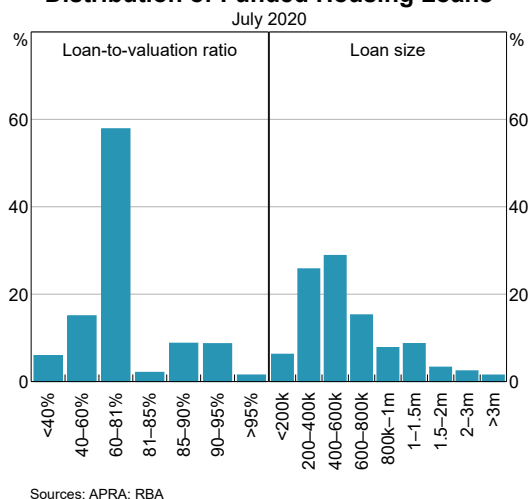


Graph 5

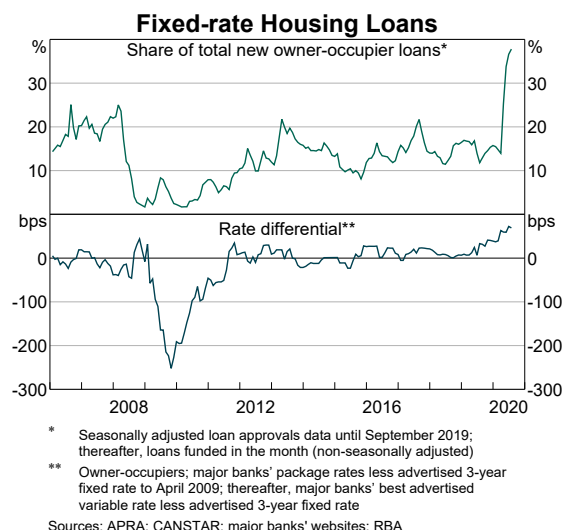


Graph 6

Distribution of Funded Housing Loans



Graph 7



Improving the transparency of mortgage interest rates

The EFS collection has greatly enhanced the transparency of interest rates paid by borrowers in Australia, which assists consumers in making better-informed choices about their finances. The absence of readily available data on interest rates paid by borrowers in relation to their mortgages had been highlighted as one factor impinging on competition in the Australian financial system (Productivity Commission 2018). Very few borrowers actually pay interest rates as high as the standard variable rates (SVRs) published by lenders. While SVRs are the reference rates against which variable-rate loans are priced, lenders also advertise a range of interest rates that are materially lower than their SVRs. In addition, most individual borrowers are offered, or may be able to negotiate, further discounts on the interest rate applied to their loan (Reserve Bank of Australia 2019).

To enhance the transparency of mortgage interest rates, the Lenders' Interest Rates page on the Reserve Bank's website and Statistical Table F6 now provide interest rates paid by borrowers on new and outstanding housing loans. This includes interest rates by loan repayment type (interest-only and principal-and-interest repayments), for variable- and fixed-rate loans, by different loan sizes, and by different LVRs. The Council of Financial Regulators has also worked with the Australian Competition and Consumer Commission to enhance the Mortgage Calculator on the Australian Securities and Investments Commission's Moneysmart website, based on the EFS collection (Council of Financial Regulators 2019).

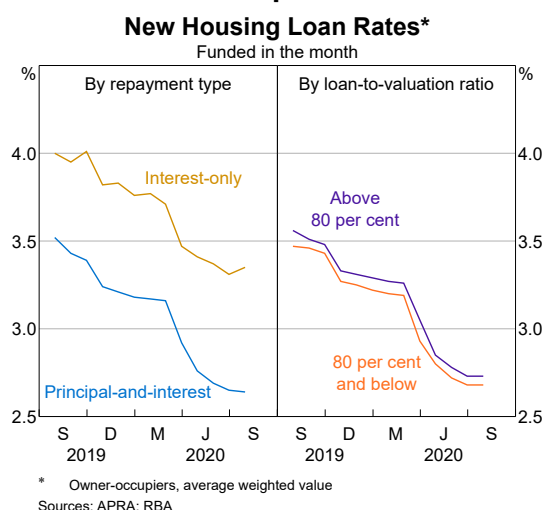
The EFS data show significant differences in interest rates across new interest-only and new principal-and-interest loans (Graph 8). For example, new owner-occupier borrowers have paid around 60 basis points more, on average, for interest-only loans than for principal-and-interest loans over the past year or so. Higher interest rates for interest-only loans have been evident since 2015, following measures taken by APRA to place limits on investor and interest-only lending.^[10] By contrast, there is much less differentiation in the average interest

rates paid by borrowers with different loan sizes or LVRs.

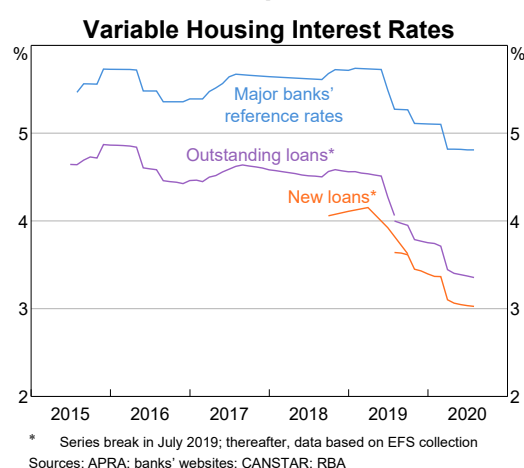
The information on new loans available from the EFS data is especially valuable given that competitive pressures are greater for these loans. These data confirm that new borrowers, on average, pay lower interest rates than existing borrowers (Graph 9). This reflects the tendency for competition to be strongest for borrowers who are in the process of shopping around for a loan. By offering lower interest rates to new or refinancing borrowers, lenders are able to compete for these borrowers without lowering the interest rates charged to existing borrowers.

The EFS collection also includes more comprehensive data on interest rates for new and existing fixed-rate loans. These data show that rates

Graph 8



Graph 9



for new fixed-rate loans are on average around 20–50 basis points lower than lenders' advertised interest rates (Graph 10). These discounts are much smaller than those for variable-rate loans, which are on average roughly 150 basis points below lenders' SVRs. There is less incentive for lenders to compete for new borrowers by offering large unadvertised discounts on new fixed-rate loans than there is on new variable-rate loans. This is because for fixed-rate borrowers, lowering the advertised fixed interest rate does not result in a lowering of the interest rates charged to existing fixed-rate borrowers. In contrast, for variable-rate borrowers, lowering the advertised SVR would result in a reduction of the interest rates paid by all existing variable-rate borrowers. As a result, much of the competition for new variable-rate borrowers has generally occurred via unadvertised discounting instead.

These new interest rate data can also help to explain the sharp rise in the share of housing loans funded with fixed interest rates in recent months. Interest rates on new fixed-rate loans have declined by around 65 basis points since February this year, consistent with the fixed interest rates derived from interest rate swaps (the benchmark for pricing fixed-rate loans). The interest rates on new fixed-rate loans are now around 60–70 basis points below new variable interest rates (see Graph 7 above). A large proportion of the increase in new fixed-rate housing loans is due to borrowers refinancing their

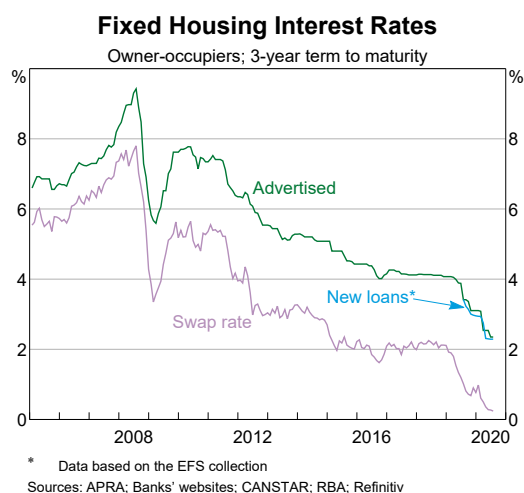
mortgages to take advantage of the lower level of fixed interest rates.

Personal finance

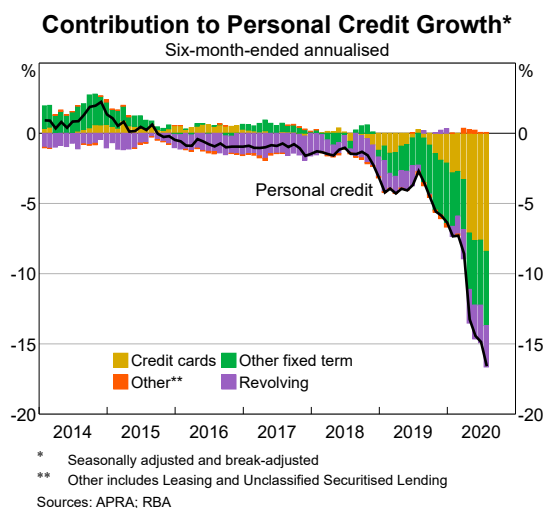
The data from the EFS collection also allow us to analyse trends in personal finance in more detail than was previously the case. Personal finance is extended to households for purposes other than housing, and includes products like credit cards and personal loans (such as for a holiday, some furniture, or whitegoods). This type of finance also includes margin loans – which are loans that enable households to borrow to invest directly in shares or managed funds – and finance leases, where the borrower essentially pays to lease an asset such as a car.

Following a steady decline for some years, personal credit has contracted sharply over the past six months or so, alongside the introduction of COVID-19 containment measures (Graph 11). Around half of the decline in the stock of personal credit outstanding since February has reflected a decline in the balances on credit cards. This is consistent with the decline in personal credit card transactions that occurred in March and April, as retail sales and household consumption declined. That is, households were spending less and so accumulating less credit card debt. In addition, repayments on credit card balances also declined during that period, but to a lesser extent than transactions. Taken together, these effects reduced the value of credit card debt outstanding.

Graph 10



Graph 11



The acceleration in the decline of personal credit since 2018 has occurred alongside the interim and final reports of the Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry and the associated policy changes that came into effect at around the same time.^[11] For instance, amendments to credit card contracts in 2018 and 2019 prohibited lenders offering unsolicited credit cards and credit limit increases, tightened serviceability requirements, banned retrospective interest charges on balances benefiting from an interest-free period, and provided consumers with the ability to reduce their credit limit or terminate their contract.

More broadly, there has been a decline in the use of personal credit over the past decade or so (Graph 12). As a share of household disposable income, personal credit has been steadily declining since 2008 (in contrast to household debt to income; Lowe 2017). The decline in the stock of personal credit has coincided with households' increasing use of mortgage offset and redraw accounts. These accounts offer borrowers the ability to finance spending through home equity, acting as a line of credit that can be used for any purpose. Offset accounts are often linked to a debit card for convenience, and so are a substitute for personal credit products such as credit cards. For instance, a household could redraw from their mortgage, for which they are currently charged an interest rate of around 2–4 per cent, and use the funds to repay balances outstanding on a credit card, for which they are currently charged an interest rate of around 16–17 per cent following the expiry of the interest-free period.

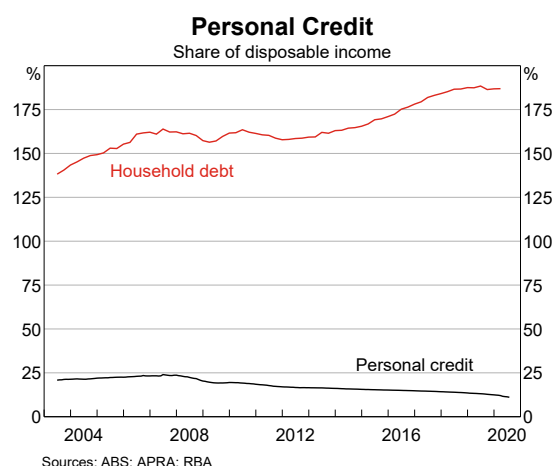
Similarly, mortgage debt has also become a more attractively priced source of funding relative to personal finance products over the past decade, as mortgage interest rates have drifted lower while unsecured personal lending rates remained stable. The new EFS data on interest rates for personal finance show that households pay much higher interest rates on personal credit card balances, which are a form of unsecured finance, compared with products that are secured by residential property (Graph 13). This reflects the lower risk of secured lending, as the lender has recourse to the

security pledged by a borrower in the event of default. These new EFS interest rate data for personal lending are available for public use in Statistical Table F8.

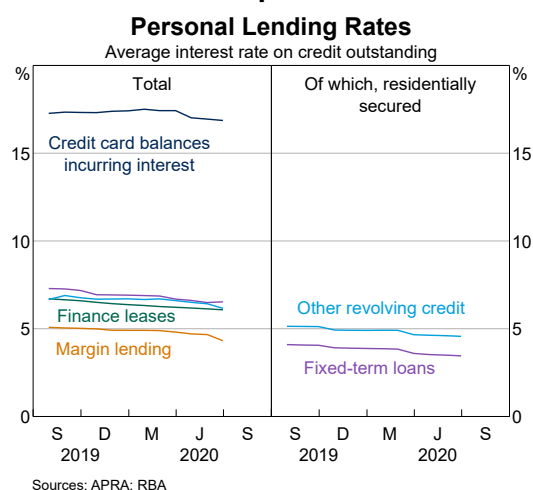
Conclusion

A broader range of information on the lending and borrowing activities of the financial sector is now available to policymakers and the wider community as a result of the introduction of the new EFS collection, and the quality of existing data has been greatly improved. The new data has aided policy-makers' understanding of recent developments relating to business and household finance. Moreover, the interest rate data from the EFS collection have improved the transparency of interest rates paid by borrowers in Australia. This large-scale project has involved considerable

Graph 12



Graph 13



cooperation and effort by the ABS, APRA, the Reserve Bank, and many financial institutions. ✎

Footnotes

- [*] The author is from Domestic Markets Department, and would like to thank Shane Aves, Susan Black, Stephanie Crews, Kassim Durrani, Lea Jurkovic, Qiang Liu, Kateryna Occhiutto, Dmitry Titkov, and Charlie Wenk for their assistance with this work.
- [1] The EFS collection is administered on behalf of the ABS and the Reserve Bank by APRA in APRA's role as the national statistical agency for the financial sector. *The Financial Sector (Collection of Data) Act 2001* enables APRA to collect information from the financial sector for the purposes of performing its functions or to assist another financial sector agency to do so.
- [2] See Australian Bureau of Statistics (2019), 'Implementing the new Economic and Financial Statistics collection in ABS economic outputs', Information Paper 5232.0.55.006. Available at: <<https://www.abs.gov.au/ausstats/abs@.nsf/mf/5232.0.55.006>>.
- [3] Supporting documentation for the EFS collection is available at: <<https://www.apra.gov.au/modernised-economic-and-financial-statistics>>.
- [4] APRA's list of Registered ADIs is available at: <<https://www.apra.gov.au/register-of-authorised-deposit-taking-institutions>>.
- [5] Historical data on bank lending to businesses is available from the Reserve Bank at: <<https://www.rba.gov.au/statistics/discontinued-data.html>>.
- [6] More information on the TFF is available at: <<https://www.rba.gov.au/mkt-operations/term-funding-facility/overview.html>>.
- [7] Businesses with turnover greater than or equal to \$50 million are classified as large businesses. For businesses with turnover less than \$50 million, when the lender has an exposure of more than \$1 million, the business is generally classified as medium. When the exposure is less than \$1 million, the business is usually classified as small.
- [8] For more information see Australian Bureau of Statistics (2019), 'Upcoming changes to Lending to Households and Businesses', *Information Paper 5601.0.55.002*, available at: <<https://www.abs.gov.au/ausstats/abs@.nsf/mf/5601.0.55.002>>.
- [9] Borrowers with an LVR above 80 per cent are also typically required to pay for lenders' mortgage insurance (LMI). Although LMI should reduce the risk to the lender, borrowers who are required to pay for LMI may also be more cash-constrained and have lower capacity to pay back a mortgage.
- [10] These measures have since been removed. For more information see APRA (2018), 'APRA to remove interest-only benchmark for residential mortgage lending', Media Release, 19 December.
- [11] The final report of the Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry is available at: <<https://financialservices.royalcommission.gov.au/Pages/reports.aspx>>.

References

- Australian Bureau of Statistics (2019), 'Implementing the new Economic and Financial Statistics collection in ABS economic outputs', Information Paper 5232.0.55.006.
- Australian Bureau of Statistics (2019), 'Upcoming changes to Lending to Households and Businesses', Information Paper 5601.0.55.002.
- Bank J, K Durrani and E Hatzvi (2019), 'Updates to Australia's Financial Aggregates', *RBA Bulletin*, 21 March.
- Council of Financial Regulators (2019), 'Quarterly Statement by the Council of Financial Regulators', Media Release No 2019-02, 10 July. Available at <<https://www.cfr.gov.au/news/2019/mr-19-02.html>>.
- Lewis M and Q Liu (2020), 'The COVID-19 Outbreak and Access to Small Business Finance', *RBA Bulletin*, 17 September.
- Lowe P (2017), 'Household Debt, Housing Prices and Resilience', Speech at the Economic Society of Australia (QLD) Business Lunch, Brisbane, 4 May.
- Productivity Commission (2018), 'Competition in the Australian Financial System', Inquiry report, 3 August. Available at <<https://www.pc.gov.au/inquiries/completed/financial-system#report>>.

Reserve Bank of Australia (2019), 'Box D: The Distribution of Variable Housing Interest Rates', *Statement on Monetary Policy*, November, pp 59–60.

Reserve Bank of Australia (2020), 'Box E: The Term Funding Facility', *Statement on Monetary Policy*, August, pp 1–3.

The COVID-19 Outbreak and Access to Small Business Finance

Michelle Lewis and Qiang Liu^[*]



Photo: Maskot Bildbyrå – Getty Images

Abstract

The COVID-19 pandemic has adversely affected the business sector. Overall, small businesses have been disproportionately affected because they are more likely to be in industries that have been harder hit by the pandemic. Demand for new loans appears to be weak, probably because businesses are reluctant to take on debt given heightened uncertainty about the economic outlook. The various short-term initiatives to support businesses' cash flows are also likely to have dampened the immediate demand for credit. At the same time, access to finance continues to be a challenge for small businesses. Banks have tightened their lending practices in recent years and are more cautious about lending to businesses that have been significantly affected by the pandemic.

Each year the Reserve Bank convenes its Small Business Finance Advisory Panel to better understand the financial challenges faced by small businesses. This year's panel focused on the effects of the COVID-19 outbreak. This article summarises recent developments in small business finance, drawing on the panel's discussions, as well as official survey data and the Bank's liaison with businesses and lenders.

Small businesses have been significantly affected by the pandemic

The outbreak of COVID-19 and measures to contain the spread of the virus have significantly affected businesses in all industries, although the extent of the disruption varies widely (Lowe 2020). Around 70 per cent of all businesses surveyed by the Australian Bureau of Statistics (ABS) in mid June reported a decline in revenue relative to the same time last year (Graph 1). Small businesses were twice as likely to record a large decline in revenue as

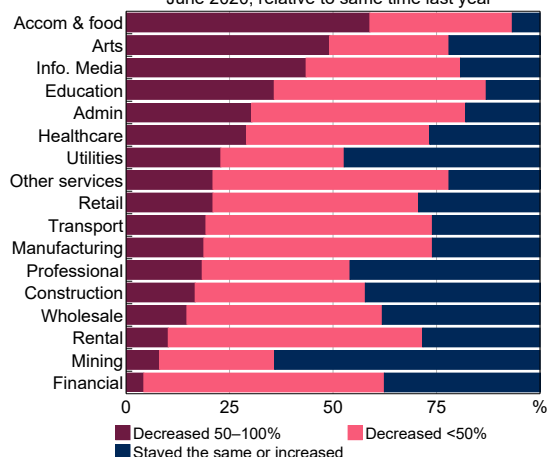
large businesses. This is consistent with small businesses being more strongly represented in the industries that have been most affected by the COVID-19 restrictions, such as cafes, restaurants, arts and recreation. Likewise, smaller retailers have seen a sharp decline in sales while larger retailers overall have seen stronger growth in their sales (Graph 2).

Some panellists noted that small businesses experienced a significant drop in demand in March as the effects of the COVID-19 outbreak became apparent in Australia; for some businesses, this came on the back of difficult business conditions resulting from the bushfires.^[1] The ongoing effects on demand have been negative for many panellists, although some businesses experienced growth in sales, such as for some goods and services

Graph 1

Changes in Revenue

June 2020, relative to same time last year*

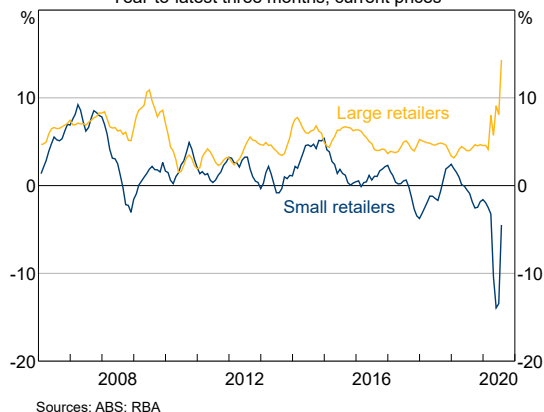


* Share of businesses; excluding responses of 'don't know'
Sources: ABS; RBA

Graph 2

Retail Sales Growth by Firm Size

Year-to-latest three months, current prices



Sources: ABS; RBA

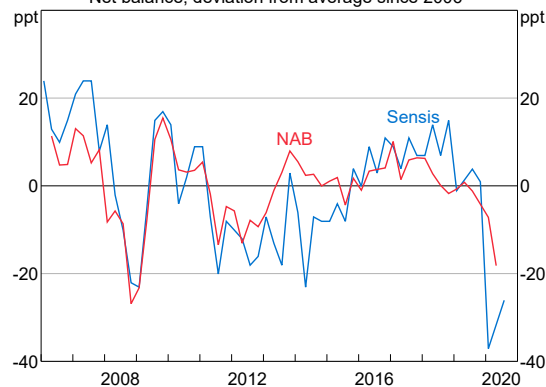
distributed through supermarkets and online channels. Survey data suggest that business confidence has fallen and many panellists confirmed that businesses are very uncertain about the future, which is a key factor leading many businesses to delay or cancel investment (Graph 3). In an ABS survey conducted in mid August, about 60 per cent of businesses identified uncertainty about the future state of the economy as a significant factor influencing investment decisions. Consistent with this, the ABS Capital Expenditure survey, which was conducted in July and the first half of August, suggests that non-mining investment will decline significantly over the next year or so.^[2]

To assist small and medium-sized enterprises (SMEs), the Australian Government has introduced a number of measures aimed at supporting cash flows and encouraging lending (Table A1 in the Appendix). This includes the JobKeeper program, which provides cash payments to workers through their employers, Boosting Cash Flow for Employers, which offers tax credits, and the SME loan guarantee scheme, which supports the flow of credit to businesses (Frydenberg 2020). Commercial banks and landlords have also provided support, in particular through deferred payments and rent reductions. In mid July, about 40 per cent of businesses surveyed by the ABS reported that they were accessing the various support measures at the time; businesses in the accommodation and food

Graph 3

Small Business Confidence

Net balance; deviation from average since 2006*



* The net balance is the difference between the percentage of positive responses and the percentage of negative responses
Sources: NAB; RBA; Sensis

services industry were the most likely to report doing so (Graph 4).^[3]

The Australian Government had been providing a range of assistance measures to SMEs prior to the pandemic. Recent initiatives have included the \$2 billion Australian Business Securitisation Fund, which invests in securitisations that are backed by SME loans and issued by smaller banks and non-bank lenders. The first investment through this fund (worth \$250 million) was announced in April 2020. Legislation to establish a \$540 million Australian Business Growth Fund to provide longer-term equity funding to small businesses was enacted in March 2020; the initiative is to be jointly funded by the Government and a number of banks.

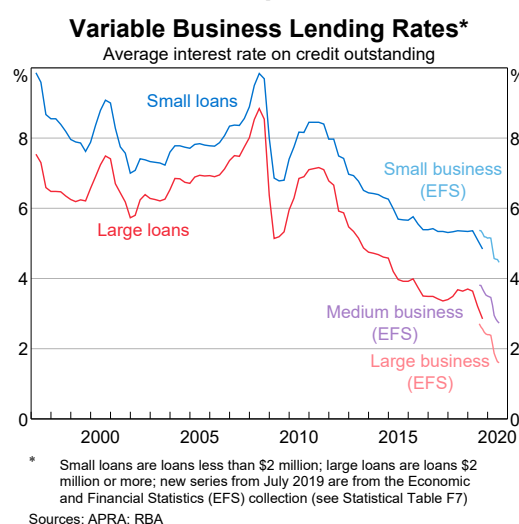
Demand for bank-based finance appears to be low ...

Interest rates on loans to SMEs have declined to historically low levels as the recent easing in monetary policy has flowed through to lending rates.^[4] Variable interest rates on SME loans have declined by an average of 70 to 75 basis points since the end of February, a little less than the 80 basis point decline in interest rates on large business loans (Graph 5). At the same time, lending to SMEs has remained little changed overall, though lending for agriculture has picked up recently (Graph 6).

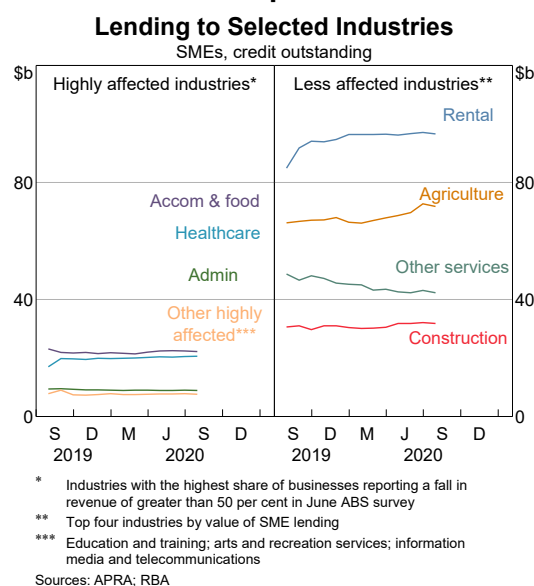
Overall, there appears to be little demand from SMEs for new loans given the heightened uncertainty about the economic outlook. Survey

data and liaison with businesses and banks suggest that few business are seeking additional bank credit in response to the pandemic; rather, they are reducing expenses and investment, seeking to reduce debt burdens and making use of government initiatives to shore up their balance sheets and have sufficient liquidity to withstand a temporary downturn in demand. A survey conducted in mid May by the ABS showed that only 5 per cent of businesses identified access to credit as an important requirement to return to normal trading conditions. Only around 1 in 10 businesses reported seeking additional finance more broadly as a result of the pandemic. A subsequent survey

Graph 5



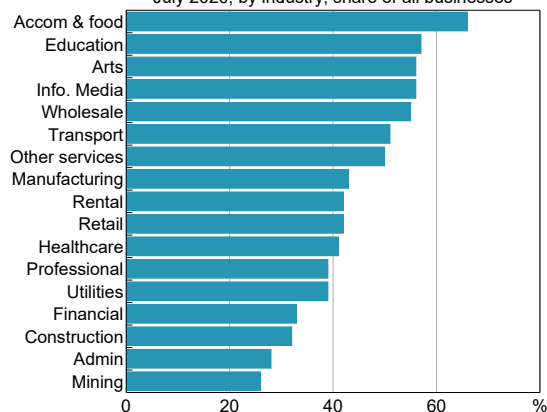
Graph 6



Graph 4

Currently Accessing Support Measures

July 2020, by industry, share of all businesses



Sources: ABS; RBA

conducted in mid July showed that one in three small businesses that received additional funds through a tax credit reported using some of the funds to repay debt and a similar proportion reported putting funds into savings. In contrast, around 15 per cent reported using the funds for capital investment (Graph 7).

Income support policies, such as the JobKeeper program and initiatives that offer tax credits, have helped to alleviate pressures facing businesses following the COVID-19 outbreak. These policies have reduced the need for some businesses to seek additional funds through debt finance.

The take-up of the Government's SME guarantee scheme has been modest, despite the relatively low cost of these funds. Around \$1.7 billion of loan commitments have been made under the scheme (equivalent to around ½ per cent of SME lending outstanding) to around 18,000 businesses. The scheme provides unsecured loans and the average interest rate on these loans has been similar to that of secured small business loans. In July, the Government announced changes to the scheme that will make it more flexible and extended its availability until June 2021 (from September 2020 previously). From October, under the new rules, the loans can be used for a variety of investment purposes (rather than limited to working capital), loans can be secured (but not against commercial or residential property) and SMEs will be able to borrow up to

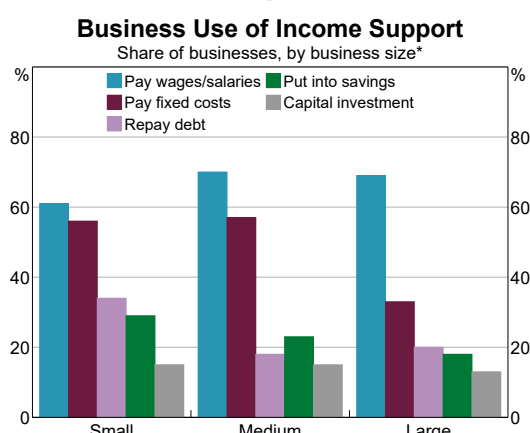
\$1 million for up to five years (up from \$250,000 for up to three years, previously). In addition, a repayment deferral period will no longer be required.

... but small businesses continue to report that access to finance from banks is difficult

For many years, small businesses have reported that they have found it challenging to access finance (Connolly and Bank 2018). Notwithstanding apparent low demand for new loans in the current environment, small businesses continue to report difficulty in accessing finance. Survey measures of small businesses' perceptions of their access to finance have deteriorated sharply over the past couple of years (Graph 8). Following the Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry, many banks have erred on the side of caution and applied responsible lending obligations for consumers to smaller businesses. Banks have noted in liaison that these standards are applied because there is often a blurred line between the personal and business finances of small business owners. These standards reportedly continue to be applied despite the Australian Securities and Investments Commission (ASIC) reiterating that these obligations should not apply to lending for business purposes.

Businesses often need to provide collateral or personal guarantees to receive finance from banks. The share of lending to SMEs that is secured is high relative to lending to larger businesses. Over 90 per cent of SME loans are secured and about half of small business loans are residentially secured. About two-thirds of large business loans are secured. Of the loans extended through the Government's SME guarantee scheme so far, about 60 per cent have a personal guarantee. Small businesses have previously highlighted that they find it difficult to borrow more than around \$100,000 on an unsecured basis (Connolly and Bank 2018). This is also consistent with data from the SME loan guarantee scheme, where three in four loan commitments are for \$100,000 or less.

Graph 7



* Survey taken between 15 July and 23 July 2020 of 997 businesses asking how they used additional funds received through the Boosting Cash Flow for Employers measure, a tax credit of up to \$100,000; businesses could nominate more than one use; shares are of businesses that reported receiving the tax credit

Sources: ABS; RBA

More recently, in response to the pandemic, the availability of credit to businesses has tightened a little further. Banks have indicated in liaison that much of this reflects the application of existing lending standards in an environment of weak economic conditions and great uncertainty. In addition, banks are requiring a greater degree of verification of borrowers' information, and some banks are cautious about lending to new customers and to sectors significantly affected by the pandemic (such as smaller retailers, tourism and commercial property).

Another reason that smaller businesses, in general, find it harder than other borrowers to access finance is their relative risk profiles. Modelling by the major banks, which draws on historical experience prior to the pandemic, suggests that SME loans are around twice as likely to default as standard mortgage customers and large corporations (Graph 9).^[5] This modelling suggests that in recent years SMEs have become a little more likely to default (the estimated probability of default has increased by around ¼ of a percentage point to 2½ per cent), while the default probabilities have been little changed for large businesses. This helps to explain – at least in part – why interest rates on loans to SMEs are higher than those for large businesses or mortgage holders. That said, a lack of alternative finance options is also likely to be a contributing factor to SMEs paying higher interest

rates than large businesses, which have access to a broader range of funding sources.

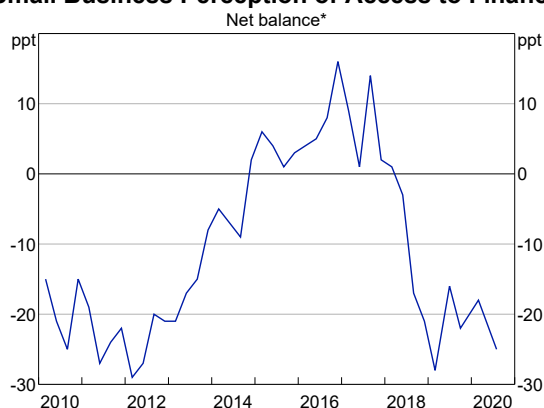
The use of non-traditional finance has increased but from a low level

Available data show that Australian small businesses have increased funding from non-traditional sources since earlier in the decade, although – based on the most recent survey from 2018 – these sources are a very small share of overall funding for SMEs, at less than 2 per cent. At that time, the largest sources of non-traditional finance were balance sheet lending and marketplace lending (Graph 10). Balance sheet lending is where an online platform lends directly to borrowers with funds from its own balance sheet. These platforms can use a large amount of customer information, such as transactional data from sales or payments platforms, to identify creditworthy borrowers, and then provide financial services. Marketplace lending is a type of alternative finance that uses new technology to connect fundraisers directly with funding sources (peer-to-peer). The aim is to avoid the costs and delays involved in traditional intermediated finance. This lending may be secured or unsecured.

Although much smaller than traditional finance, Australia was the largest non-traditional finance market in the Asia Pacific region after China, and the seventh largest globally as of 2018 (the latest available data). Institutional investors, such as banks

Graph 8

Small Business Perception of Access to Finance

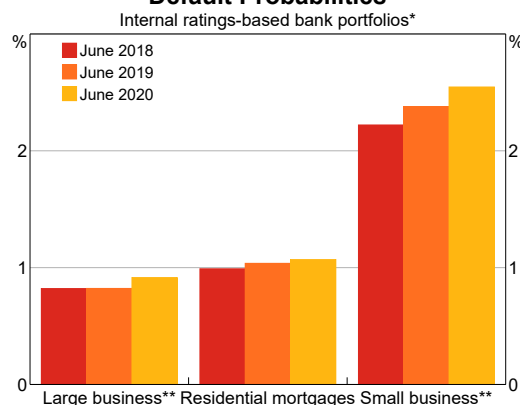


* Net balance is the difference between the percentage of firms indicating access is relatively easy and the percentage of firms indicating access is relatively difficult; from July 2019, survey asks about change in access relative to a previous period

Sources: RBA; Sensis

Graph 9

Default Probabilities



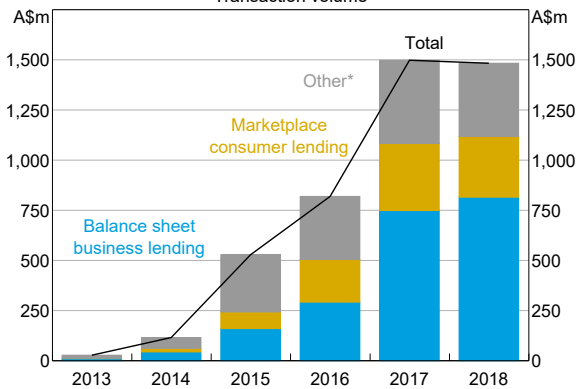
* On-balance sheet exposures of major banks

** 'Small business' is SME retail and SME corporate categories in APRA's capital framework; 'Large business' is the corporate category

Sources: APRA; RBA

Graph 10**Non-Traditional Finance**

Transaction volume



* Includes balance sheet consumer lending, marketplace business lending, property lending, invoice trading, crowdfunding, and other models

Sources: Cambridge Centre for Alternative Finance; RBA

and venture capital firms, are a significant source of funding for the transactions of non-traditional finance entities. The growth in the Australian market is likely to have been supported by access to funding from institutional investors and a receptive regulatory environment. Available data show that funding from institutional investors represents around 60 per cent of funding for finance provided by non-traditional finance entities in Australia, compared with a global average of around 50 per cent. Through its Innovation Hub, ASIC has provided informal advice to new technology companies developing financial products or services on the licensing process and key regulatory issues (Australian Securities and Investments Commission 2020). ❖

Appendix A

Table A1: Selected Policy Responses to the COVID-19 Pandemic targeted at SMEs^(a)

Announcement Date	Agency	Measure	Timeframe
12 Mar	Govt.	Cash flow assistance to SMEs ($\leq$ \$25k; expanded to $\leq$ \$100k and not-for-profits on 22 Mar)	From 28 Apr 20
	Govt.	Increased scope and size of instant asset write-offs (extended 7 Jun); earlier deduction of depreciation	Until 31 Dec 20 (assets) Until 30 Jun 21 (depreciation)
		Wage subsidy of 50 per cent to retain or re-employ apprentices and trainees (program expanded and extended 16 Jul)	To 30 Mar 21
19 Mar	RBA	Term Funding Facility (can borrow up to 3% of total credit outstanding for three years at 25bps, allocation to rise if increase lending to business, especially SMEs)	From 30 Mar 20 to ~31 Mar 21
20 Mar	Banks	Defer SME & household repayments for those affected (initially for six months, extended for additional four months for those who continue to experience financial difficulty)	From ~23 Mar 20
	Govt.	Six month exemption from responsible lending obligations for lenders providing credit to existing small business customers	Immediate for new credit
	Govt.	SME Guarantee Scheme of 50% (up to \$20b) to support \$40b in new SME loans (program expanded and extended 20 Jul)	From ~01 Apr 20 to 30 June 21
	Govt.	Increasing bankruptcy and insolvency thresholds and response time for creditor action; temporary relief from insolvent trading provisions (extended 7 Sep)	From 25 Mar 20 to 31 Dec 20
29 Mar–7 Apr	Govt.	National Cabinet announces common SME leasing principles forming a 'Mandatory Code of Conduct' during COVID-19. Applies to SMEs with annual turnover up to \$50m that are eligible for the Commonwealth JobKeeper program	SME leasing principles to be defined by each State and Territory Government and apply from 3 Apr 20 for the period that the JobKeeper program remains operational.
30 Mar	Govt.	JobKeeper wage subsidy of \$1,500 per fortnight per eligible employee for six months to Sep 20 (program extended with modified payment rates from 28 Sep)	From 31 Mar 20 (payments received from early May) to Mar 21
1 Apr	Govt.	International Freight Assistance Mechanism announced to subsidise air freight exports of perishable goods and imports of medical supplies (program extended 3 Jul)	To end 2020
24 Apr	Banks	Dedicated hotlines to expedite lending to cover wages for businesses that are eligible for JobKeeper	From 24 Apr
4 Jun	Govt.	HomeBuilder grant of \$25,000 to encourage new home builds and renovations	From 4 Jun to 31 Dec 20
25 Jun	Govt.	\$250 million package of measures to support the arts sector, including grants and concessional loans	Varies

(a) Fiscal responses outline initiatives announced by the Australian Government only

Sources: Media reports; RBA

Footnotes

- [*] The authors are from Domestic Markets Department.
- [1] See Nguyen and La Cava (2020) for a discussion on a new real-time indicator of developments in the Australian economy.
- [2] See Reserve Bank of Australia (2020) for further discussion on the impact of the pandemic on the domestic economy.
- [3] See Reserve Bank of Australia (2020) for recent developments in these initiatives.
- [4] For further details of measures that the Reserve Bank has undertaken in response to COVID-19, see www.rba.gov.au/covid-19.
- [5] These probabilities reflect long-run averages of default rates and are not tailored to an event such as the current pandemic, and so are not likely to be a good guide of default rates in the current period.

References

- Australian Securities and Investments Commission (2020), 'Innovation Hub', asic.gov.au site, 24 June. Available at <<https://asic.gov.au/for-business/innovation-hub/>>.
- Connolly E and J Bank (2018), 'Access to Small Business Finance', RBA *Bulletin*, September, viewed 10 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2018/sep/access-to-small-business-finance.html>>.
- Frydenberg J (2020), 'National Press Club Address', Speech to the National Press Club, Canberra, 24 July.
- Lowe P (2020), 'COVID-19, the Labour Market and Public Sector Balance Sheets', Address to the Anika Foundation, Online, 21 July.
- Nguyen K and G La Cava (2020), 'News Sentiment and the Economy', RBA *Bulletin*, June. viewed 10 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2020/jun/news-sentiment-and-the-economy.html>>.
- RBA (Reserve Bank of Australia) (2020), 'Domestic Economic Conditions', *Statement on Monetary Policy*, August, pp 47–59.

Modernising Payments Messaging: The ISO 20022 Standard

Tarnia Major and Joseph Mangano^[*]

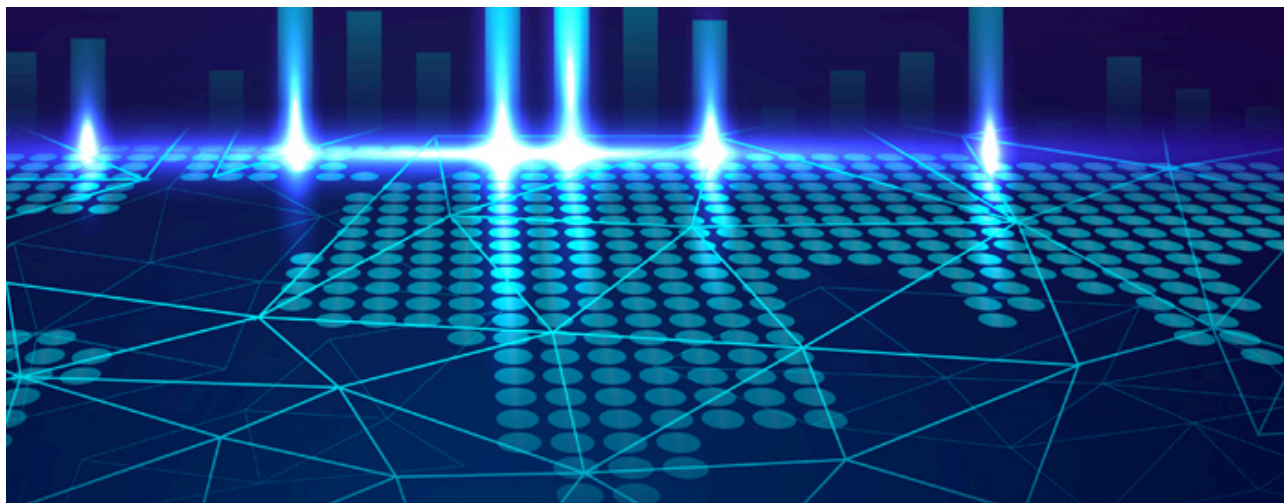


Photo: Berkah – Getty Images

Abstract

Electronic payments rely on the exchange of messages to instruct the flow of funds between financial institutions. The quality of payment messaging data is important as it determines what payment information is received by financial institutions and their customers. Worldwide, there is movement to develop new payment systems using the International Organization for Standardization (ISO) 20022 messaging standard, and to migrate some existing systems to the standard. In Australia, an industry-led project to migrate the High Value Payments System to ISO 20022 commenced this year. This will provide a number of benefits, including improved transfer of payment information to beneficiaries, better fraud and financial crime management for payments service providers and greater opportunities for straight-through processing.

Introduction

Payment systems facilitate the transfer of funds between consumers, businesses and financial institutions. The communication of payment information between these participants of payment systems occurs via the exchange of payment messages. Electronic payment message standards create a common language to facilitate automated transaction processing between participants domestically or across borders. Currently there are many different ‘open’ (publicly available) and

‘proprietary’ (privately owned) message standards used across the world. Many high-value payments systems globally use proprietary standards designed by the Society for Worldwide Interbank Financial Telecommunication (SWIFT).^[1] These SWIFT Message Type (MT) message standards are used across a range of domestic systems and are the most common standard used for account-to-account cross-border payments.

Over the past decade, there has been a global shift to adopt the ISO 20022 messaging standard in

payment systems. This shift has coincided with technology advancements and system renewals, which are transforming payment systems and payments processing. These changes allow standardisation, automation, improved reporting and carriage of data-rich payments, all of which are supported by the ISO 20022 messaging standard. Some domestic and international payment systems already use the ISO 20022 messaging standard, for example, Australia's New Payments Platform (NPP).^[2] Several key Financial Market Infrastructures (FMIs) also have planned migrations over the next five years, including in the United States, United Kingdom, the euro area, Canada and Hong Kong. In accord with this trend, SWIFT has announced that it will cease support for SWIFT MT payment and reporting messages used for cross-border payments, and will migrate these to ISO 20022 by November 2025.^[3]

In line with these developments, between April 2019 and February 2020, the Reserve Bank of Australia (RBA) and the Australian Payments Council (APC) conducted a consultation on the migration of domestic payments messages to ISO 20022.^[4] The consultation was aimed at helping the Australian payments industry reach agreement on the key strategic issues related to the migration. The conclusions of the consultation presented the agreed industry position on the migration. The industry would commence a project for Australia's high-value payments system, known as the High Value Clearing System (HVCS), to implement ISO 20022 messaging. The HVCS is critical to the functioning of the economy. It processes high-value payments between financial institutions and their clients. These payments are mainly related to the Australian dollar leg of foreign exchange transactions. The HVCS processed around \$131 billion on a daily basis during the 2019/20 financial year. Accordingly, in February 2020 the RBA's Payments System Board endorsed the planned industry-led migration project to modernise the messaging used in the HVCS, which it characterised as being strategically important.

The industry project to migrate HVCS messaging to ISO 20022 commenced in February 2020 and is expected to be complete by the end of 2024. This

will involve the coordination of multiple financial institution participants to define and migrate to a new ISO 20022 message set. Financial institutions will also need to undertake projects to upgrade their internal systems to accommodate the change. Governance arrangements and the program management office have been established and work has commenced on planning, industry coordination and resourcing, and the design of the HVCS ISO 20022 message set. The industry migration is being led by the Australian Payments Network (AusPayNet), the industry administrator of the HVCS. The RBA will work with the industry on the migration project and has commenced preparations to make the necessary changes to its core settlement system, the Reserve Bank Information and Transfer System (RITS).

This article provides an overview of the ISO 20022 payment messaging standard and considers the benefits that the message standard facilitates. The article then focuses on the planned adoption of ISO 20022 domestically and in some jurisdictions internationally.

What Is ISO 20022?

ISO 20022 was introduced by the International Organization for Standardization in 2004. It is an open and general purpose global financial electronic communications standard. The ISO 20022 message standard is a data library of business components from which messages can be defined. It is used for the development of financial industry messaging covering payments, securities, trade services, cards and foreign exchange industries. The ISO 20022 message standard covers a variety of communication between financial institutions, FMIs and corporates, including:

- end-to-end payment processing between the sender and receiver
- standing payment authorities, such as direct debit authorisations for bill payments
- account management, such as statements and account balance reporting
- extended 'remittance' fields within payment messages, which allows more data such as invoice details.

The ISO 20022 message standard provides flexibility as payment messages can be adapted over time to evolving requirements. It supports structured, well-defined and data-rich payment messaging. This improves the quality of payment information contained in the message.

Key Benefits of ISO 20022

The ISO 20022 message standard delivers benefits to all users throughout the payments chain. In the HVCS, the benefits are realised by the financial institutions and their corporate clients who send and receive these messages. Over time, customers are expected to benefit from data-rich payments, more efficient and lower cost payment processing, and enhanced customer services such as improved remittance services. Among the benefits financial institutions may gain from the migration to the ISO 20022 message standard are:

Adaptability and flexibility

The ISO 20022 library of business components supports a flexible range of information that is independent of the underlying data language of payment messages. It therefore can be adapted to new technologies and evolving requirements over time.^[5] This ability to adapt to new technologies means that ISO 20022 could form the basis for financial system messaging globally over the long term. The flexibility of the ISO 20022 message standard enables payment system administrators to design messages that are fit for purpose for their payment system.

One downside of a flexible message standard is that the different design of message sets across domestic and international payment systems can make it more difficult for those systems to interact seamlessly with each other. SWIFT and other coordinating institutions, such as central banks, have promoted the development of more standardised ISO 20022 message guidelines by international committees. These include the High Value Payments and Reporting Plus (HVPS+) and Cross-Border Payments and Reporting Plus (CBPR+) message guidelines that will be used for SWIFT cross-border payments.^[6] International alignment aims to support the easier end-to-end processing of

cross-border payments from the sender of a payment in one jurisdiction to the receiver in another jurisdiction.

Resilience

The payment messages used in some domestic payment systems can be aligned using the ISO 20022 message standard, and across common payment data fields. This is a step towards enabling payments to be more easily exchanged across alternate payment systems and networks. With ISO 20022 compatible technologies, payments can be more easily redirected to an alternative payment system in the event of an outage. This improves the resiliency of the domestic payments system as a whole.

In Australia, the alignment of NPP and HVCS messages may support resilience because it will be easier for each of these payment systems to accept and process messages as an alternative should the other system become unavailable.

Data structure and capacity

The ISO 20022 message standard addresses some drawbacks of SWIFT's existing MT message standard used in Australia's HVCS for over 20 years, including:

- limited data carriage, which restricts the amount of payment information that can be included in a message
- data string format, which limits the capability of automated technologies to read the information contained in the payment message.^[7]

The improved structure and data capacity of ISO 20022 can be used in a number of ways to drive efficiencies and deliver an improved quality of service in the payment system.

Efficiency

The efficiency gains from the ISO 20022 message standard stem from the ability of automated technologies to collect, read and integrate ISO 20022 structured and data-rich payment messages into other services. This may include new customer services provided by financial institutions to their corporate customers. For instance, integrated

Figure 1: Unstructured Messaging Formats vs Structured ISO 20022 Messaging Format

Unstructured Message Format		Structured ISO 20022 Message Format
Example: <i>Postal</i> field	<AdrLine>65MartinPlaceSydney2000Australia</AdrLine>	<StrtNm>MartinPlace</StrtNm>
	■ free text	<BldgNb>65</BldgNb>
		<PstCd>2000</PstCd>
		<TwnNm>Sydney</TwnNm>
		<Ctry>Australia</Ctry>
		■ Street Name ■ Building Number ■ Post Code ■ Town Name ■ Country

Source: RBA

services with Application Programming Interfaces (APIs) could provide corporates with the ability to initiate payments, as well as obtain improved transaction and account reporting services.^[9] Additionally, improved reporting, analytics and reconciliation processes are made possible for financial institutions with ISO 20022 messaging-based data. Reconciliation processes benefit from using structured data, while reporting and analytics are improved because specific payment data can be more easily retrieved.

More generally, the enhanced data structure and data carrying capacity of ISO 20022 messages improve the efficiency of end-to-end payment processing and payment transfers. ISO 20022 payment messages allow automated technologies to read and target specific information. This automation can be used to speed up end-to-end payment processing (sender to recipient) and reduce the amount of manual intervention required for payments processing. There is also the potential to enable easier transfer across systems as more payment systems migrate to ISO 20022 and standardise across common payment information fields. As noted above, this can support the resilience of the domestic payments system. For international payments, alignment of payment messages helps facilitate the easier processing of cross-border payments between international and domestic payment systems.

An example of what is meant by structured content in an ISO 20022 message is shown in Figure 1. Unstructured messaging formats present

information (in this case, an address) in a single uninterrupted string of characters. Structured content in ISO 20022 separates the address into its distinct components using tags (e.g. <Ctry> to identify the country). This level of precision makes it easier for automated payment processing systems to identify and select specific data from within the payment message to process the payment.

The ISO 20022 messaging standard also caters for investigation and reconciliation messages between financial institutions. This can aid efficiency by automating processes such as the investigation of incorrect payments (e.g. by using investigation and payment cancellation messages), lowering processing costs and improving resolution times for customers.

Innovation

By using the additional information in ISO 20022 messages, financial institutions may offer customers new services and improve the quality of existing services. One potential area for innovation is sending enhanced remittance information with the payment, such as including invoice details. Currently remittance advices, or invoices, are exchanged separately from the underlying payment in a different format (e.g. email) because of the limited data capacity of the current MT message standard. This lack of integration can make reconciling invoices and payments manual, time-consuming and error-prone for businesses. Additional data carried in payment messages can be used by financial institutions to offer new value-add services to their customers. These data could

include tax information, URL links to documents, defined payment purpose codes and payment and remittance advices.

Fraud and financial crime management

Implementing ISO 20022 can increase automation and enhance a range of compliance activities related to the management of fraud and other financial crimes. By using the enhanced data structure and capacity of ISO 20022 messages, fraud and financial crime management systems are better able to target specific information (such as the payment's sender and receiver) to perform the required screening. Not only does this capability result in increased efficiency and lower costs compared with manual exception checks, it also improves the quality of monitoring and screening.

International Developments

Over the past decade there has been an international push to migrate payments messaging to ISO 20022. This trend coincides with three key developments – the planned migration of SWIFT cross-border payment messages to the ISO 20022 message standard, numerous high-value payment system renewal projects and the development of fast payment systems. While SWIFT's focus is currently on cross-border payments, its long-term vision is to have the ISO 20022 message standard used across all SWIFT payments.

SWIFT's planned migration of *cross-border* payment messages affects financial institutions globally, including many in Australia. SWIFT's cross-border migration will occur from November 2022. It will feature a three-year period where cross-border payments can either use existing SWIFT MT messages or ISO 20022 messages. During the coexistence period, SWIFT will provide a translation service through a new 'Transaction Management Platform'. The service will enable compatibility between MT and ISO 20022 messages, as well as other translation options. At the end of this period, in November 2025, all SWIFT cross-border payments will use the ISO 20022 message standard.

A number of other jurisdictions are also migrating their *high-value* payments systems to ISO 20022 messaging. This includes the United States,

United Kingdom, the euro area, Canada, Singapore, New Zealand and Hong Kong. The majority of jurisdictions plan to complete their migration between late 2021 and 2025 (Figure 2). Some, such as the United Kingdom and Canada, are pairing their migrations to ISO 20022 with a renewal of the technology infrastructure underlying their high-value payments system. According to SWIFT, the vast majority of high-value payments globally will have migrated to the ISO 20022 message standard by 2025.

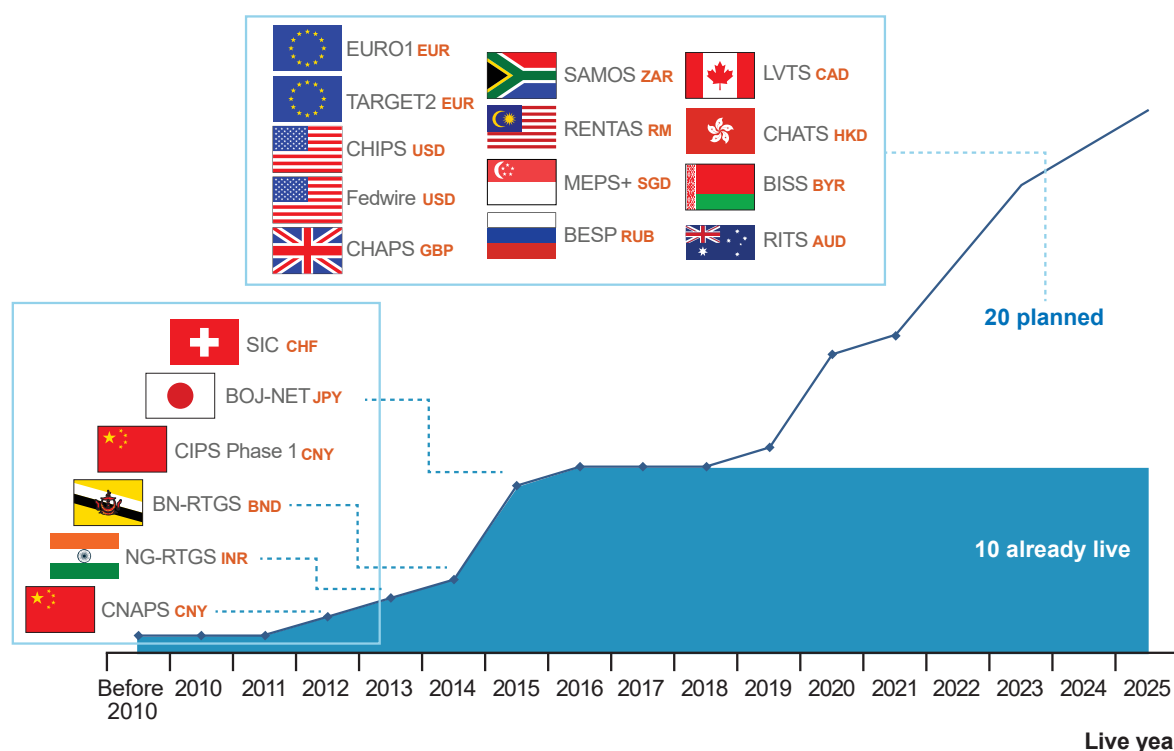
The ISO 20022 message standard has enabled a number of *fast payment* systems across various jurisdictions to deliver data rich and flexible and efficient payment processing. This includes the NPP in Australia, Singapore's FAST and Sweden's Swish. These fast payment systems are generally designed to process high payment volumes in near real time and maximise the efficiency of payments processing. The flexibility offered by ISO 20022 also enables more information to be sent with an NPP payment – for example up to 240 characters of remittance information. This is an expansion of the 18 character limit present in some other domestic payment systems, such as the Direct Entry system (used, for example, for 'Pay Anyone' transactions).

Migration for Australia's Payment Systems

The domestic migration

The RBA and APC's consultation program sought feedback on a range of strategic issues, including the scope, timing and approach for the domestic migration. Following responses received after the first phase of consultation, the scope of the domestic migration was limited to the HVCS.^[9] Consideration was given to the advantages of coordinating the timing of HVCS migration with SWIFT's migration of cross-border payments; a high proportion of Australia's HVCS payments arise from a cross-border payment as the final inbound payment leg of the transaction. The first consultation paper released by the RBA and APC outlined three key objectives for the migration of payments messaging to ISO 20022:

- modernisation – to modernise the payment messages used in the HVCS to a more flexible

Figure 2: Unstructured Messaging Formats vs Structured ISO 2022 Messaging Format

Sources: SWIFT, based on data from Bank of International Settlements

messaging standard that positions the payment system for the future

- simplification – to simplify payments processing and deliver efficiencies by facilitating automation through structured information, and, where possible, consistent service delivery across domestic payment systems
- use of enhanced content – to take advantage of the enhanced data structure and capacity in ISO 2022 messages to improve fraud and financial crime screening and monitoring, and increase competition in the delivery of payment products and services by enabling greater innovation.

To meet these objectives, the consultation program concluded that a number of key requirements should be incorporated in the HVCS migration. These requirements include the alignment of HVCS message guidelines with: CBPR+ standards that will be used for cross-border payments; SWIFT's HVPS+ guidelines for high-value payments; and, where possible, NPP message guidelines. This alignment lays a foundation for straight-through processing for

incoming cross-border ISO 2022 payments processed through the HVCS. It also supports the longer-term initiative of improving resilience between the HVCS and NPP, as noted earlier.

The domestic migration project will include a two-year coexistence period from November 2022 to November 2024, during which both SWIFT MT messages and ISO 2022 can be exchanged by HVCS participants.^[10] This timeline was selected to coincide with participants completing work as part of SWIFT's cross-border payments migration and to align with global adoptions by other FMIs. Domestically, all HVCS participants are expected to fully migrate their HVCS payments to ISO 2022 by the end of the domestic coexistence period in November 2024.

The industry-led project to migrate HVCS payment messaging to ISO 2022 commenced in February 2020. This project is being coordinated by AusPayNet as the industry administrator of the HVCS. Operationally, the project is governed by an Industry Migration Steering Committee, which has an independent chair and representation from

across the HVCS and other key stakeholders such as SWIFT.

Key considerations for the domestic migration

The RBA and APC's consultation program highlighted a range of key considerations that will need to be managed across the industry as part of the migration of HVCS messaging to ISO 20022.^[11]

Scale, timing and competing priorities

The migration of HVCS messaging involves significant work for financial institutions and potentially their corporate customers over an extended period. The new data structure and rich payment information impacts a range of processes, including monitoring, screening and analysis of payments, with flow-on effects for a range of supporting systems. These systems may need to be modified to process ISO 20022 transactions, and enhanced to be able to fully reap the benefits offered by the new message standard. The domestic migration also coincides with a range of other industry projects and international initiatives currently underway. These include several enhancements to functionality for the NPP, the ASX's CHES replacement program, and SWIFT's cross-border migration initiative.

With the extent of this concurrent work in progress in the payments industry, it is important that the domestic migration is appropriately managed to ensure that it does not place undue pressure on participants, which could give rise to additional risks. The industry Steering Committee will play a key role managing these risks.

Alignment

The straight-through processing of SWIFT cross-border payments relies on the alignment of HVCS messages with those that will be used for SWIFT cross-border payments. Domestic alignment between the HVCS and the NPP is also a consideration, particularly with the longer-term objective to create resilience through closer compatibility of the two systems.

Data truncation during coexistence of old and new message standards

Both the domestic HVCS and SWIFT's cross-border ISO 20022 migrations will support coexistence periods for several years, where both MT and ISO 20022 messages can be exchanged in parallel. To facilitate this, some financial institutions may need to translate incoming payment messages from one message standard to another until they have upgraded their back office systems to fully support ISO 20022. Where translation is required from ISO 20022 to more restrictive SWIFT MT messages, some ISO 20022 payment information may be removed or shortened – referred to as 'truncation'.

Truncated message data can potentially cause issues for financial institutions' compliance obligations if the data used for screening and monitoring is incomplete. Financial institutions should perform all screening and monitoring using the complete payment messages, regardless of how the payment is processed in their back office system. Financial institutions are expected to maintain this practice during the coexistence period and to continue to comply with regulatory obligations.

Importantly, the consultation Conclusions required that from November 2022, HVCS participants that act as an intermediary and receive incoming ISO 20022 messages for cross-border payments must pass on the full ISO 20022 message for HVCS processing. Since the ISO 20022 messages will be richer in data content and more structured, data would be truncated if these messages were to be translated into an MT message for processing through HVCS. Aligning the launch of the HVCS with SWIFT's launch of ISO 20022 for cross-border payments in November 2022 and avoids the need for message translation.

The Way Forward on the Domestic Migration

The domestic migration to modernise Australia's HVCS payment system comes at a time when payment systems worldwide are changing rapidly.

The domestic migration project is being coordinated by AusPayNet which has established an industry Steering Committee with broad payments

industry representation. The Steering Committee has overall responsibility, accountability, and governing authority for the migration's delivery. AusPayNet has also established a program management office and has engaged key partners, such as SWIFT, to support the work of industry working groups. These working groups will cover: design and requirements; back office requirements; industry testing; project delivery; and governance and legal.^[12] HVCS participants have also been encouraged to commence their own stakeholder engagement and project preparation, as well as to participate in the working groups.

The adoption of ISO 20022 message formats in HVCS is a substantial industry project, which is

being undertaken during challenging times. The ISO 20022 standard provides a platform that should take HVCS into the future, enabling this clearing system to offer efficiency benefits through improved transfer of payment information to beneficiaries, better fraud and financial crime management for payments service providers and greater opportunities for straight-through processing. The project also presents an opportunity to improve resiliency across domestic payment systems. It also allows closer alignment of HVCS and NPP messaging formats with those used overseas, to help facilitate a more seamless exchange of cross-border payments. ✎

Footnotes

- [*] Authors are from the Payments Settlements Department. The authors would like to thank Muhammad Ismail and Kylie Stewart for their help and suggestions.
- [1] SWIFT is a co-operative organisation that operates a global network for the exchange of payment and other financial messages between its members (that are mainly financial institutions).
- [2] The NPP enables consumers, businesses and Australian government agencies to make fast, versatile and data-rich payments 24 hours per day, every day of the year. See Rush and Louw (2018) for further details. Planned enhancements being undertaken by NPP Australia (NPPA) can be found in NPPA's Update on the New Payments Platform Roadmap.
- [3] SWIFT cross-border migration programme <<https://www.swift.com/standards/iso-20022-programme>>.
- [4] The APC was formed in 2014 as the strategic coordination body for the Australian payments industry. The APC's role is to help ensure the Australian payments system continues to meet changing customer needs with innovative, secure and competitive payment services. See <<https://australianpaymentscouncil.com.au/>>.
- [5] Data language refers to the rules, form and structure regarding the arrangement of data in a message. Extensible Mark-up Language (XML) is a commonly used data language.
- [6] HVPS+ is a task force formed by SWIFT, major global banks and market infrastructures tasked with the ongoing evolution of global best practice message usage guidelines for high-value payments. CBPR+ is a SWIFT working group with responsibility for developing global message usage guidelines for cross-border payments.
- [7] Data strings are an uninterrupted sequence of characters. These data strings can be difficult for application software to break up to target specific information for processing.
- [8] APIs allow two systems to communicate with each other to access the features or data of a system, application or service.
- [9] The RBA and APC consultation ruled out the migration of other payment system messages. See RBA (2019a), 'ISO 20022 Migration for the Australian Payments System – Issues Paper', April.
- [10] Since the release of the Conclusions Paper, the ISO 20022 Industry Migration Steering Committee have delayed the start of the coexistence period due to a revision to the start of SWIFT's cross-border coexistence phase and the impact of COVID-19.
- [11] RBA (2019b), 'ISO 20022 Migration for the Australian Payments System – Responses and Options Paper', September.
- [12] Some working groups are still in the process of being stood up. The design and requirements working group has already commenced work.

References

APC (Australian Payments Council) (2020), 'About Us', viewed 23 June 2020. Available at <<https://australianpaymentscouncil.com.au/about-us/>>.

ASX (2020), 'CHESS Replacement', August, viewed 25 August 2020. Available at <<https://www.asx.com.au/services/chess-replacement.htm>>.

AusPayNet (Australian Payments Network) (2020), 'High Value', viewed 3 July 2020. Available at <<https://auspaynet.com.au/network/high-value>>.

ISO 20022 Registration Authority, 'ISO 20022 Message Definitions', viewed 29 June 2020. Available at <<https://www.iso20022.org/iso-20022-message-definitions?business-domain=>>>.

NPPA (2020), 'New Payments Platform Roadmap 2020', April, viewed 3 August 2020. Available at <https://nppa.com.au/wp-content/uploads/2020/04/NPP-Roadmap-April-2020_final.pdf>.

RBA (Reserve Bank of Australia) (2019a), 'ISO 20022 Migration for the Australian Payments System – Issues Paper', April, viewed 14 July 2020. Available at <<https://www.rba.gov.au/media-releases/2019/mr-19-09.html>>.

RBA (2019b), 'ISO 20022 Migration for the Australian Payments System – Responses and Options Paper', September, viewed 14 July 2020. Available at <<https://www.rba.gov.au/media-releases/2019/mr-19-24.html>>.

RBA (2020), 'ISO 20022 Migration for the Australian Payments System – Conclusions Paper', February, viewed 14 July 2020. Available at <<https://www.rba.gov.au/media-releases/2020/mr-20-05.html>>.

Rush A and R Louw (2018), 'The New Payments Platform and Fast Settlement Service', RBA *Bulletin*, September, viewed 6 August 2020. Available at <<https://www.rba.gov.au/publications/bulletin/2018/sep/the-new-payments-platform-and-fast-settlement-service.html>>.

SWIFT (Society for Worldwide Interbank Financial Telecommunication) (2020), 'ISO 20022 Programme', viewed 13 August 2020. Available at <<https://www.swift.com/standards/iso-20022-programme>>.

The Rental Market and COVID-19

Richard Evans, Tom Rosewall and Aaron Wong^[*]



Photo: imamember – Getty Images

Abstract

The COVID-19 pandemic is an unprecedented shock to the rental housing market, reducing demand for rental properties at the same time as supply has increased. Households most affected by the economic impact are more likely to be renters, and border closures have reduced international arrivals. The number of vacant rental properties has increased as new dwellings have been completed and some landlords have offered short-term rentals on the long-term market, particularly in inner Sydney and Melbourne. Government policies have supported renters and landlords. Rents have declined, partly because of discounts on existing rental agreements and it is likely that rent growth in many areas will remain subdued over coming years.

The COVID-19 pandemic is an unprecedented shock to the rental housing market

The pandemic-induced economic downturn has disproportionately affected households with the strongest ties to the rental housing market. Job losses have been much more pronounced for younger workers, who are more likely to rent homes. By industry, the effects of Australia's COVID-19 restrictions have been largest in the accommodation & food and arts industries, where employment is tilted towards younger workers,

often living in the inner suburbs of Australia's major capitals.

One-third of Australian households rent, mostly in the private rental market (Graph 1). Renters tend to be younger than owners, with close to two-thirds of households headed by someone under the age of 35 renting. Renters also tend to have lower incomes and spend a larger share of their disposable income on housing costs compared with owner-occupied households (both outright owners and those with a mortgage).

In the wake of the pandemic, the rental market has experienced shocks to demand and supply. Weak

labour market conditions, including the temporary closure of many service businesses, have reduced demand for rental properties as households have consolidated to save money and requested rent reductions or deferrals. The closure of international borders magnified the demand shock, as the flow of international students and other migrants (who typically rent) has slowed. On the supply side, with the number of international tourists and domestic travellers falling, a large number of short-term accommodation providers have shifted their properties onto the long-term rental market. The vacancy rate has increased sharply in some markets.

Prices in rental markets have adjusted in response to reduced demand and higher supply, which in turn has had implications for consumer price inflation.^[1] Advertised rents declined sharply from April, particularly for apartments in Sydney and Melbourne. In addition, policy measures such as the moratorium on rental evictions have encouraged tenants and landlords to renegotiate the terms of their existing leases. In the June quarter, these factors drove the first quarterly fall in rents in the history of the Consumer Price Index (CPI). Over time, some of these trends in demand and supply are expected to evolve in a way that supports rents. For instance, the eventual reopening of the borders to international migration will lift demand for rental properties while reduced construction activity will translate into lower-than-otherwise growth in the supply of new dwellings.

Demand for rental properties has declined ...

The COVID-19 pandemic has resulted in the largest economic shock since the 1930s, and households' exposure to – and ability to weather – this shock is uneven. Around one in five households only have enough liquid assets to get from one pay period to the next (RBA 2020). These liquidity-constrained households tend to be younger, more likely to work in industries such as accommodation & food services and arts & recreation where job losses were initially most pronounced, and also twice as likely to rent. In metropolitan areas, payroll job losses from March to July have been most pronounced in Melbourne and inner Sydney. In the near term, renters with limited savings and who are experiencing job insecurity are likely to reduce their spending on housing.

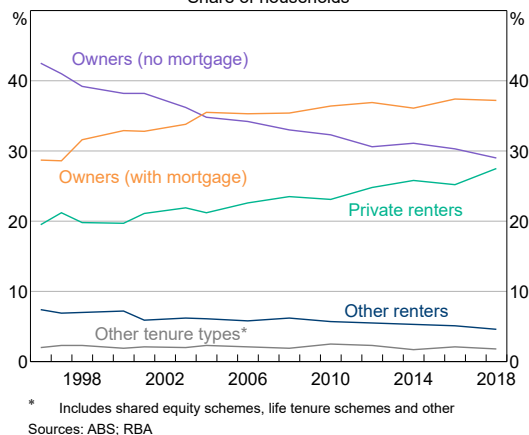
As a result of international border closures, net overseas migration is expected to slow considerably, further reducing demand for housing over the coming year. Treasury forecasts that Australia's population will be 1½ per cent lower by June 2021 compared with pre-COVID-19 projections, equivalent to around 400,000 fewer residents.^[2] A decline in population growth of this magnitude would result in a decline in rents of around 3 per cent nationally over the next few years, compared to pre-COVID-19 expectations, based on a model that uses historical experience (Saunders and Tulip 2019). The number of international students in Australia has declined; around one in five student visa holders had not arrived in the country by late March. According to the 2016 Census, international students are more likely to rent and live in apartments, and twice as likely to live in inner-city areas than domestic students.

... and the supply of longer-term rental accommodation has increased

The supply of properties on the long-term rental market has increased as properties previously listed on the short-term market and newly completed dwellings have become available. The increase in supply has not been uniform by dwelling type or location. Although rental market apartments

Graph 1

Housing Tenure Type Share of households



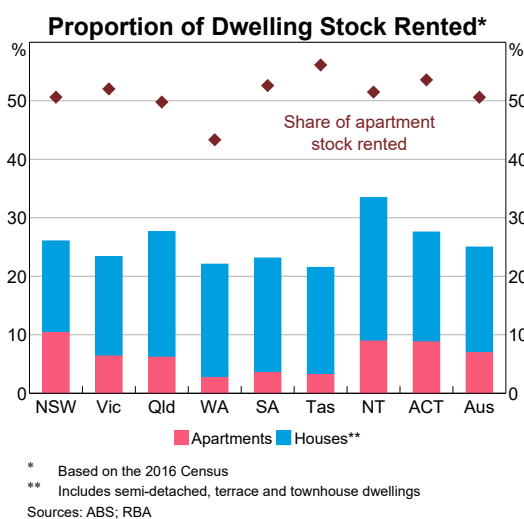
typically account for around 10 per cent or less of the total dwelling stock in each state, around half of all apartments are rented (Graph 2). As with the changes in demand, changes in supply have been pronounced in inner areas of Melbourne and Sydney. Since mid March, longer-term rental listings increased by much more in inner Sydney and Melbourne compared with the rest of the country (Owen 2020).^[3]

Many landlords have taken down their short-term accommodation listings in response to the sharp fall in international visitors and domestic travellers. On Airbnb alone, listings declined by around 20 per cent, or 40,000 properties, between February and May (Graph 3). Around three-quarters of all Airbnb listings are entire homes or apartments, which owners could list on the longer-term rental market (Sigler and Panczak 2020). Assuming entire dwellings make up a similar share of delisted properties and all these were converted to longer-term rental accommodation, the national vacancy rate would initially increase by around 1 percentage point.^[4] Short-term accommodation also tends to be more concentrated in the inner suburbs of Sydney and Melbourne and around 40 per cent are apartments.^[5] Looking ahead, if domestic virus containment measures are successful, some properties may transition back to the short-term market to take advantage of the recovery in domestic tourism and business travel.

Longer-term rental supply will also be boosted by apartments that are due to be completed over the next year or two. A large share of these are high-rise apartments that commenced construction a number of years ago when conditions in the established housing market were much stronger (Rosewall and Shoory 2017). In Sydney and Melbourne, the number of apartments estimated to be completed over the next two years is equivalent to around 4 per cent of the non-detached dwelling stock (Graph 4). In Melbourne, over half of the pipeline of apartments yet to be completed is located in the city and inner suburbs, compared to around one-quarter in Sydney.

It takes time for supply to adjust in response to weaker demand from lower population growth. While contacts in the Bank's liaison program have reported that low rents and higher rental vacancy rates are already contributing to weak investor demand for off-the-plan apartments in Melbourne and Sydney, these projects are yet to enter the pipeline of construction activity. Over the medium term, the pipeline of apartments due to be completed, combined with weaker population growth, is expected to see the national vacancy rate increase by around 1 percentage point by 2021 before declining slowly as supply adjusts and international borders reopen.^[6]

Graph 2



Graph 3



Government policies have helped support rental market conditions

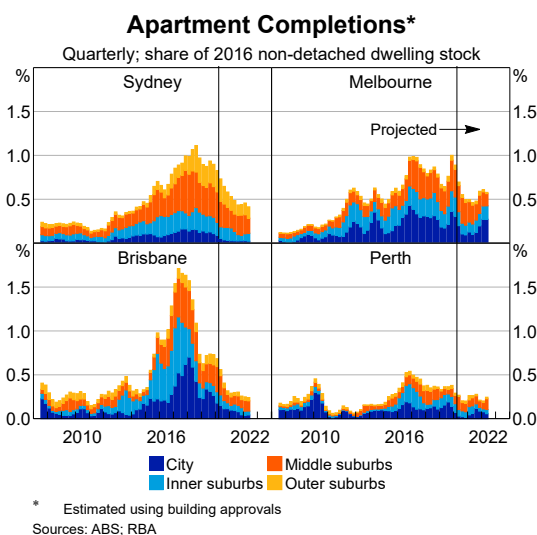
At the National Cabinet in late March, state and territory governments agreed to a set of guiding principles for temporary changes to legislation governing the rental housing market in response to COVID-19. Most jurisdictions implemented an initial 60-day moratorium (which expired in mid June) on evicting tenants and used this time to develop a more comprehensive policy package that supported both tenants and landlords, including restricting evictions for tenants impacted by the pandemic until at least 30 September.

Each state and territory implemented their own policy package for the rental housing market. Most governments introduced regulations limiting the ability of landlords to evict tenants who had suffered financial hardship as a result of the pandemic. In most states, landlords and tenants were required to negotiate in ‘good faith’ a rent reduction or deferral before administrative tribunals would consider an eviction application. In return, landlords received land tax relief and deferrals commensurate to the size of the rent reduction they granted to their tenants. Some states offered cash payments to tenants in financial distress due to the pandemic. South Australia and Victoria have extended these provisions until the end of March 2021 as economic conditions remained soft (for further details of the rental market measures by jurisdiction, see Table A1).

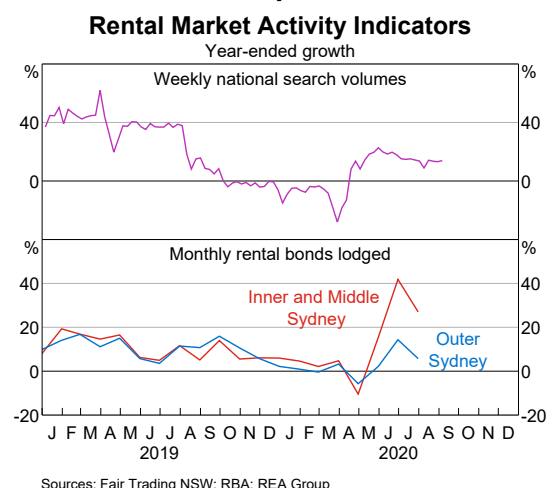
These policy measures combined with the provision of income support measures, including the JobKeeper program and the Coronavirus Supplement, helped offset the acute fall in rental demand and stabilise the rental market. Housing search interest fell sharply in late March (Graph 5). From April, these policy measures combined with a decrease in advertised rents have seen search volumes rebound. Bond lodgements have also increased, particularly in Sydney’s inner and middle suburbs. This suggests that a tenant-favourable market is enabling renters with the capacity to do so to move into properties with lower rents or better amenities.

Rent payment relief on existing leases has been an important way the rental market has adjusted. Since the end of March, close to 15 per cent of tenants with existing residential leases have received some relief on their leases, according to data from property management platform MRI (Graph 6).^[7] Rent relief has been split evenly between discounts and payment deferrals. Discounts reduce the rent owed by the tenant, whereas deferred rent is expected to be repaid eventually – lowering the rent paid temporarily, but not the rent owed. Evidence from surveys report a fairly wide range of estimates for the number of renters who have received some form of rent relief. The cumulative effect estimated from the MRI data is broadly consistent with the estimate suggested by the Australian Bureau of Statistics Household Impacts of COVID-19 Survey conducted in mid May but lower

Graph 4



Graph 5



than surveys conducted by the Australian National University and Better Renting (at the same point in time; see Biddle *et al* 2020 and Dignam 2020).

Discounting and deferral activity increased sharply in the last week of March – coinciding with the announcement of the six-month moratorium on evictions – and peaked in April. While the rate of new discounts and deferrals has slowed since May, both remain higher than at the same time last year. By state, the increase in discounting was most pronounced in New South Wales and remained elevated in recent months (Graph 7). In Victoria, the discounting rate peaked at a lower level in May and increased again following the reinstatement of restrictions. In most other states and territories, discounting rates have returned to around their early-March levels.

Vacancy rates have increased sharply and rents have fallen in inner Sydney and Melbourne

Rental vacancy rates have increased, particularly in areas where the pandemic has had the strongest impacts on rental demand and supply. While policy interventions have helped prevent much larger rental market dislocations, the increases in vacancies in Sydney and Melbourne since March have still been pronounced (Graph 8). Vacancy rates increased by around 2 percentage points in the inner regions of Sydney and Melbourne and a little more than 1 percentage point in the outer suburbs

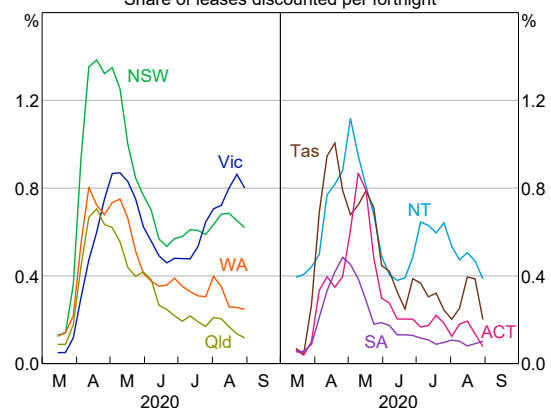
of Sydney, but were broadly unchanged in regional Victoria. In Brisbane, vacancy rate increases were also most pronounced in the inner suburbs, where vacancies increased by a little over 1 percentage point in the June quarter (REIQ 2020). In contrast, Perth vacancy rates declined to 1.6 per cent in the June quarter, reflecting limited new supply following the post-mining boom downturn in dwelling construction in Perth and strong demand (REIWA 2020). Vacancy rates increased in Canberra in the June quarter, but declined in Hobart.

This increase in the vacancy rate is putting downward pressure on advertised rents as landlords compete for tenants. Advertised rents for apartments have fallen by much more than for houses, with the declines particularly pronounced for units in Sydney and Melbourne (Graph 9). The concentration of the shock in these markets is

Graph 7

Rent Reductions

Share of leases discounted per fortnight

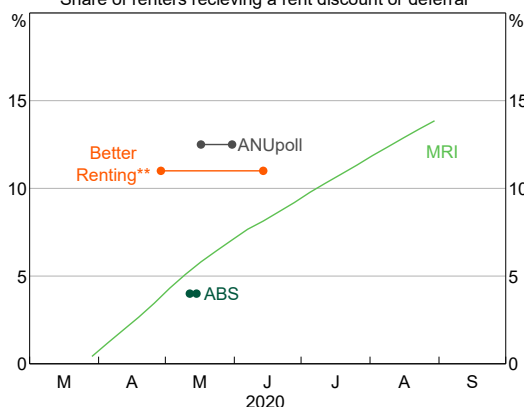


Sources: MRI; RBA

Graph 6

COVID-19 Rental Relief

Share of renters receiving a rent discount or deferral*



* Dots indicate start and end date of survey collection period

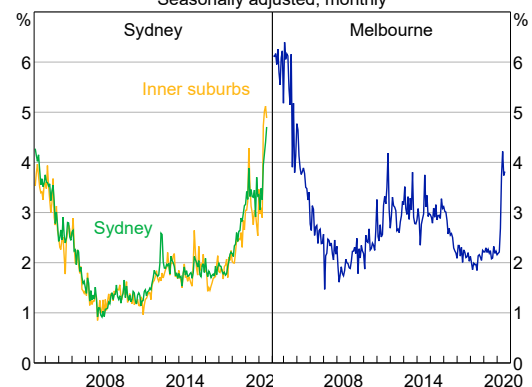
** Share of renters who reported receiving a deferral or 'satisfactory' rent reduction

Sources: ABS; ANUpoll; MRI; RBA

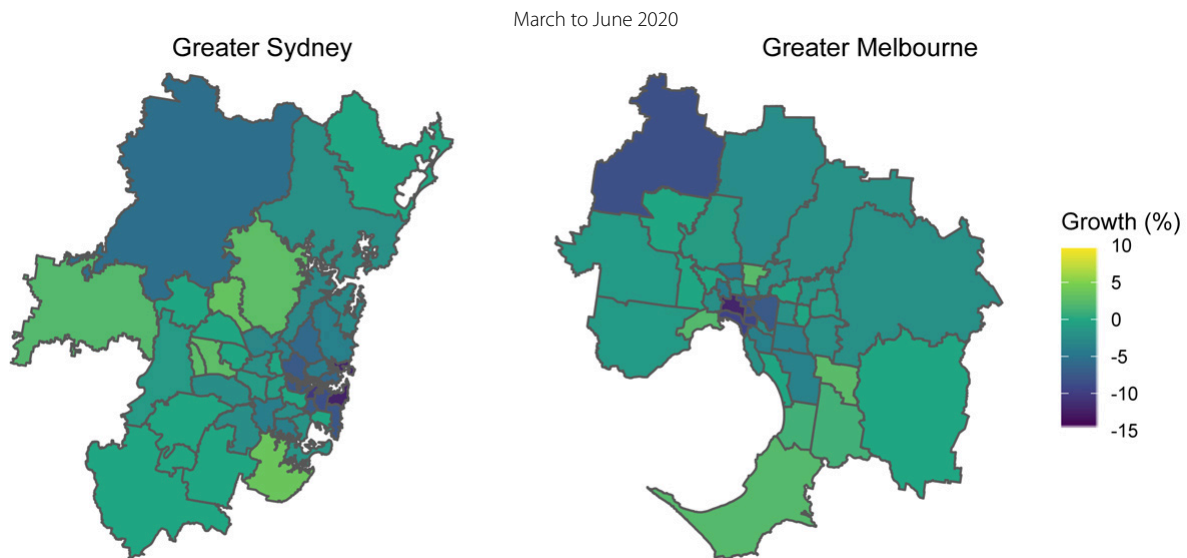
Graph 8

Rental Housing Vacancy Rates

Seasonally adjusted, monthly



Sources: RBA; REINSW; REIQ

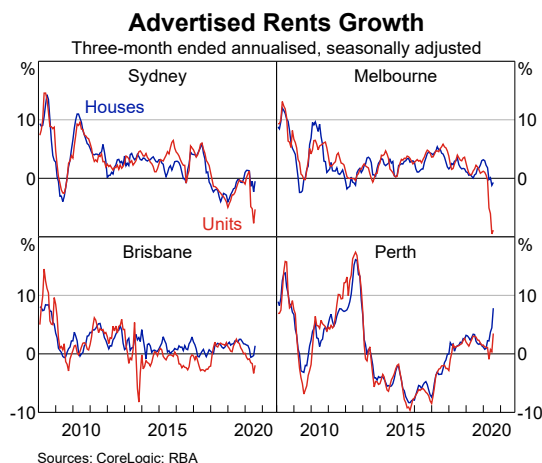
Figure 1: Growth in Median Dwelling Rent by Location

reflected in the largest divergence in housing and apartment rental growth since the start of the advertised rents series in 2005. By contrast, advertised rents for houses in Perth have increased strongly in recent months, although this follows several years of weak growth.

The falls in advertised rents have also been largest in the inner areas of Sydney and Melbourne (Figure 1). These areas were more adversely affected by declining demand from fewer international students and the conversion of short-term accommodation to the long-term rental market. These were also areas where employment was disproportionately affected by lockdowns. In

Sydney, the largest declines in median advertised rents were recorded in the Eastern Suburbs, Manly and Leichhardt areas, where rents declined by over 10 per cent in the June quarter while in the Melbourne CBD, rents declined by 13 per cent. These were the only capital city areas that recorded double digit declines in the June quarter.

Rental income for landlords has fallen as a result of the decline in rents and increase in vacancy rates. Many of these investors are lower-to-middle-income earners, and for some of these households a shock to their rental income would significantly impact their livelihood (RBA 2017). Around 60 per cent of investors with rental properties operated at a net rent loss in 2017/18 (ATO 2020). Some of these landlords may have trouble making debt payments, though mortgage payment deferment by lenders has mitigated these risks for now. Working in the other direction, investors with the highest level of debt relative to their income tend to have higher income and/or wealth and so may be better positioned to absorb income falls. In addition, the share of investors with large portfolios of rental properties is small; only 4 per cent of investors have interests in four or more investment properties. Since the onset of the pandemic, around one in ten investors have applied for mortgage payment deferrals, which is a little less than the share of owner occupiers who have applied for

Graph 9

mortgage relief. This suggests that from a serviceability perspective, most investors do not appear to be stretched.

Weaker rental market conditions are weighing on inflation. In the CPI, rent inflation measures the rent paid on the stock of existing rental properties. This means that changes in advertised rents, which only capture changes in the rents paid for the flow of new tenants, flow through to CPI rents with a lag. However, the rental relief provided by landlords on existing leases is reducing some tenants' rental burden; discounting reduced rent obligations in the June quarter by 0.5 per cent. In addition, because of the increase in renters entering into new leases, declines in advertised rents have been realised by more tenants. These two factors contributed to CPI rents falling by 1.3 per cent in the June quarter; the first ever decline in the 48 years for which quarterly data are available (Graph 10). The declines were largest in Sydney and Melbourne, the cities that have been most affected by COVID-19 containment measures.

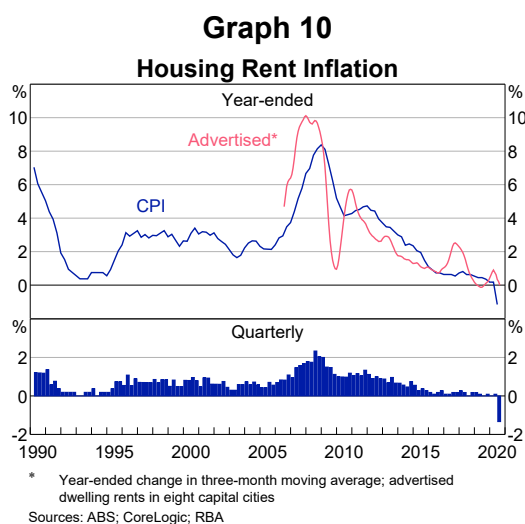
Implications and outlook

The COVID-19 pandemic is a unique shock to the rental market. The economic consequences have

disproportionately affected the households most likely to rent – young, inner-suburban workers, international students and new migrants. The ban on international tourism and significantly reduced domestic travel has increased supply as short-term rentals are offered on the long-term rental market.

In response, prices have adjusted in the rental market at the fastest pace in several decades. This has reflected both sharp declines in advertised rents for new leases and also rent relief on existing leases, encouraged by government policies to limit evictions and promote rent negotiations for affected tenants. The available evidence suggests these measures have been effective: rent discounts and deferrals rose sharply and remain above pre-COVID-19 levels in most states; and search interest for rental properties and bond lodgements in Sydney are high, suggesting renters who are able to do so are moving to realise lower rents. Income support measures have also smoothed the shock by reducing the magnitude of price adjustment needed, and likely reduced the number of tenants breaking leases.

In the near term, the successful suppression of COVID-19 and the controlled reopening of international borders in 2021 would result in increased rental demand in inner Sydney and Melbourne, reducing vacancy rates and supporting rents. Alternatively, setbacks in controlling the virus in Australia and internationally may delay the reopening of international borders, prolonging the loss of demand from international tourists and students. Domestic demand for inner-city rentals is also likely to remain lower in this scenario. Rent growth will likely remain subdued as a result. Over the next few years, it is likely that rents in these inner-city areas will remain lower than expected pre-pandemic given lower population growth and the anticipated supply of apartments coming on line in these markets. ✎



Appendix A

Table A1: State and territory rental housing market policy responses

State	Policies
New South Wales	\$440m in land tax relief of up to 25 per cent of land tax due between 1 April and 30 September if the savings were passed on to tenants. Outstanding land tax could also be deferred for three months. Evictions for rent arrears restricted until 15 October for COVID-19 impacted tenants. Impacted tenants could not be evicted for rent arrears unless an application was made to the NSW Civil and Administrative Tribunal and the landlord could demonstrate they engaged in good faith negotiations over rental payments, and it would be fair and reasonable to evict the tenant. Blacklisting tenants in rent arrears due to COVID-19 was also banned during this period.
Victoria	\$500m in land tax relief of up to 50 per cent (increased from 25 per cent in August 2020) of land tax due for commercial and residential tenancies, if rent relief was provided to tenants. Remaining land tax payable can be deferred to March 2021. Evictions were banned for residential tenancies (except in limited circumstances) from 29 March 2020 to 28 March 2021, after being extended from an initial six month period during the second lockdown, and rent increases paused for the same period. Tenants unable to secure a rent reduction could enter a binding dispute resolution process overseen by Consumer Affairs Victoria. Blacklisting tenants in rent arrears due to COVID-19 was also banned during this period. Both residential and commercial tenants could apply for grants of up to \$3,000 from the Rental Relief Grant Program. To be eligible, renters needed to have registered their revised agreement or gone through mediation, have less than \$5,000 in savings and still be paying at least 30 per cent of their income in rent.
Queensland	\$400m in land tax relief up to 30 October for residential tenancies if equivalent rent relief was provided. Land tax could also be deferred for three months. Payments of up to four weeks rent or \$2,000 to those affected by COVID-19 who had no access to other financial assistance, and met asset tests. Tenants who were significantly impacted due to COVID-19 could not be evicted or blacklisted until 30 September. Fixed-term leases expiring before this date were automatically extended to 30 September.
South Australia	\$189m in land tax relief of up to 50 per cent of land tax due for commercial and residential tenancies, if rent relief was provided to tenants. Remaining land tax payable could also be deferred for six months. From 30 March 2020 to 31 March 2021, landlords could not evict or blacklist tenants for non-payment of rent due to loss of income resulting from COVID-19. Rent increases were also banned during this period. \$1,000 grants were paid to landlords who provided rent relief to their tenants until 30 September.
Western Australia	\$100m for 25 per cent reductions in land tax for commercial landlords who provided at least three months' rent relief to tenants suffering financial hardship due to COVID-19. From 30 March to 30 September, landlords could not evict or blacklist tenants for non-payment of rent due to loss of income resulting from COVID-19. Rent increases were also banned during this period. \$30m in \$2,000 grants for residential tenants who faced financial hardship due to COVID-19.
Tasmania	From 30 March to 30 September, landlords could not evict or blacklist tenants for non-payment of rent due to loss of income resulting from COVID-19. Rent increases were also banned during this period. Rent support payments for tenants of up to four weeks or \$2,000 were available from 25 May to 30 September.
Australian Capital Territory	Land tax and rate relief of 50 per cent of the rent reduction to a maximum of \$100 per week from 1 April to 1 October, if rent reduced by at least 25 per cent for this period. From 22 April to 22 October, landlords could not evict or blacklist tenants for non-payment of

State	Policies
	rent due to loss of income resulting from COVID-19. Rent increases were also banned during this period.
Northern Territory	Extension on period for rent negotiation from 14 days to 60 days. Notice period for lease terminations were extended to 60 days. Unlike other states and territories, the NT did not implement a moratorium on evictions.

Sources: State and territory governments; RBA

Footnotes

- [*] The authors are from Economic Analysis Department and would like to thank Cameron Deans, Emma Greenland and Andrew Staib for their contributions to this article.
- [1] Rents make up around 7 per cent of the Consumer Price Index basket, meaning developments in rent inflation are an important driver of overall inflation.
- [2] This is based on the updated population growth assumptions in the July 2020 Fiscal and Economic Outlook, which are 0.5 percentage points lower in 2019/20 and 1.1 percentage points lower in 2020/21 than the previous Mid-Year Economic and Fiscal Outlook in December 2019 (Australian Government 2019; 2020).
- [3] The top six areas that recorded the largest percentage increase in listings from the four weeks to 15 March to the four weeks to 9 August were all located in inner Melbourne and Sydney.
- [4] This is an upper bound estimate of the initial (partial) effect. Over time vacancies would decline as rents adjust.
- [5] Three of the top six statistical area 2s (SA2s) by number of Airbnb listings are located in inner Sydney or Melbourne (Sigler and Panczak 2020).
- [6] According to results from the Saunders & Tulip (2019) housing model.
- [7] This platform covers around one fifth of all residential tenancy agreements in Australia. The rent relief estimate is an upper bound, and may double count leases that have had rent deferred or discounted more than once in the past four months.

References

- Australian Government (2019), 'Part 2: Economic outlook' *Mid-Year Economic and Fiscal Outlook*, December, viewed 8 September 2020. Available at <https://budget.gov.au/2019-20/content/myefo/download/02_Part_2.pdf>.
- Australian Government (2020), 'Part 2: Economic outlook' *Economic and Fiscal Update*, July, viewed 8 September 2020. Available at <https://budget.gov.au/2020-efu/downloads/02_Part_2_Economic_outlook.pdf>.
- ATO (Australian Taxation Office) (2020), 'Taxation statistics 2017-18: Individuals', 17 July, viewed 8 September 2020. Available at <<https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Taxation-statistics/Taxation-statistics-2017-18/?anchor=Individuals#Individuals>>.
- Biddle N, B Edwards, M Gray and K Sollis (2020), 'COVID-19 and mortgage and rental payments: May 2020', ANU Centre for Social Research and Methods, Canberra, June, viewed 8 September 2020. Available at <https://csrcm.cass.anu.edu.au/sites/default/files/docs/2020/6/COVID-19_and_housing_FINAL.pdf>.
- Dignam J (2020), 'Rent due: renting and stress during COVID-19', Better Renting, Canberra, August, viewed 8 September 2020. Available at <www.betterrenting.org.au/coronavirus_survey_report>.
- Owen E (2020), 'Corelogic Rent Listings Continue To Show Pain Points Around Inner City Markets', CoreLogic site, 13 August, viewed 8 September 2020. Available at <<https://www.corelogic.com.au/news/corelogic-rent-listings-continue-show-pain-points-around-inner-city-markets>>.
- REIQ (Real Estate Institute of Queensland) (2020), 'Brisbane CBD Vacancy Rtes Spike After COVID-19', 10 August, viewed 8 September 2020. Available at <<https://www.reiq.com/articles/brisbane-cbd-vacancy-rates-jun/>>.

REIWA (Real Estate Institute of Western Australia) (2020), 'Perth's vacancy rate drops to a 12-year low', reiwa.com.au site, 19 August, viewed 8 September 2020. Available at <<https://reiwa.com.au/about-us/news/perth-s-vacancy-rate-drops-to-a-12-year-low/>>.

RBA (Reserve Bank of Australia) (2017), 'Box B - Households' Investment Property Exposures: Insights from Tax Data', *Financial Stability Review*, October.

RBA (2020), '2. Household and Business Finances in Australia', *Financial Stability Review*, April.

Rosewall T and M Shoory (2017), 'Houses and Apartments', RBA *RBA Bulletin*, June, pp 1–12.

Saunders T and P Tulip (2019), 'A Model of the Australian Housing Market', RBA Research Discussion Paper No 2019-01.

Sigler T and R Panczak (2020), 'Ever wondered how many Airbnbs Australia has and where they all are? We have the answers', *The Conversation*, 2020/02/13.

Labour Market Persistence from Recessions

Iris Day and Keaton Jenner^[*]



Photo: Adam Smigielski – Getty Images

Abstract

The COVID-19 pandemic has led to a rapid deterioration in labour market outcomes, some of which may be long-lasting. This article examines the long-lived effects of previous downturns on unemployment in Australia, including by assessing how regional labour market outcomes varied during and after the GFC and early 1990s recession. We find that recessions have enduring effects on unemployment rates: regions that experienced larger-than-average downturns had significantly higher unemployment rates for around a decade afterwards.

COVID-19 and the Labour Market

The COVID-19 pandemic has led to the sharpest deterioration in Australian labour market conditions in several decades. At the time of writing, employment had contracted by around 4 per cent since the beginning of the year. Over that period the unemployment rate had increased by 2¼ percentage points and a further 1½ per cent of the working-age population exited the labour force (Graph 1). Average hours worked also decreased as many firms wound back operations but retained employer-employee connections, particularly via the JobKeeper program.

Many of those affected will be re-employed or have their hours increased once the virus is contained. However, COVID-19 may also have persistent effects on some segments of the labour market. This could occur if workers' skills decline due to a lack of use or because this is perceived to have occurred. It could also be because the skills a person used in their previous job were specific to a particular firm or industry and are not as well suited to other firms. Moreover, the COVID-19 contraction might speed up the process of structural change in the economy, making some workers' skills less well suited to the available jobs, at least until those workers can retrain. These effects, sometimes referred to as

scarring effects, could result in unemployment rates remaining above pre-virus levels even after the pandemic ends and economic conditions normalise.^[1]

Alternatively, sustained high levels of unemployment might instead reflect ongoing weak demand for labour in some areas; for instance, because the contraction causes some large employers in certain cities or regions to close down. Some workers in these areas will be temporarily unemployed until new businesses enter or they are able to retrain or relocate to areas with stronger labour markets, which may take some time.

Recessions can also affect labour markets if they result in lower potential economic growth (Ball 2014; Haltmaier 2012). One way this can occur is through lower business investment. If firms lower investment during recessions – because of weak current and expected demand, or heightened uncertainty – the future capital stock will be smaller, weighing on productivity and employment.

The potential for downturns to have long-lasting effects on the labour market has important implications for policymakers: recessions are even more costly if they have enduring effects, which means macro stabilisation policies should respond more aggressively (Yellen 2016). While it is too soon to assess whether COVID-19 will lead to persistently weak labour market outcomes, we can draw insights from past downturns. This article investigates the performance of the labour market following the GFC and early 1990s recession,

including at a regional level.^[2] We find that regions which experienced a larger-than-average deterioration in labour market conditions during national recessions had significantly higher unemployment rates for around a decade afterwards.

Regional Variation in Labour Markets

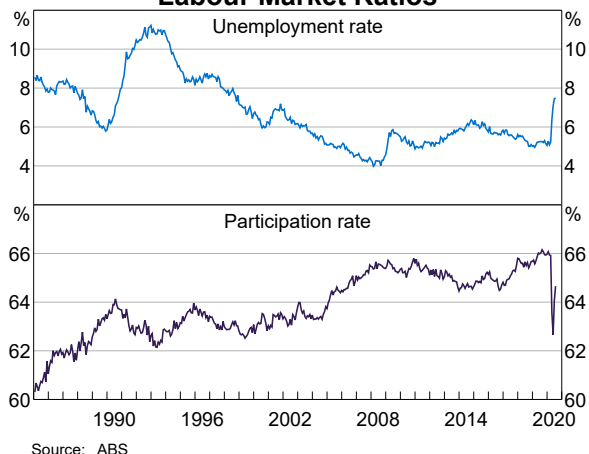
In both the GFC and 1990s recession there was a large and persistent increase in the aggregate unemployment rate. In the early 1990s, the unemployment rate rose by 5 percentage points and took around 10 years to decline to pre-recession levels. The size of the GFC-related increase was smaller, although the unemployment rate declined only gradually after the crisis. Both episodes tentatively suggest that downturns have long-lived effects, consistent with the international literature.

Despite this, it is not straightforward to identify the persistent effect of recessions on the labour market at a national level. This is because the business cycle is affected by other factors, including: housing and mining investment cycles; changes in interest rates; and the stance of fiscal policy. Moreover, structural changes that affect the economy over long periods occur alongside cyclical downturns (Yagan 2019). Over the past few decades, the Australian economy has experienced significant shifts in industry composition (such as the decline of industrial manufacturing and rise in household services), an increase in part-time work, a marked ageing of the workforce, and an increase in the female participation rate. Our challenge is to disentangle the effect of these changes from the long-lasting effects of recessions.

Our approach to abstracting from the many cyclical and structural changes occurring at a national level is to focus on the diverse experiences of *regional* labour markets. It also allows for a richer analysis as we observe outcomes for around 90 regions in each downturn. During the GFC most regions experienced a sizeable increase in their unemployment rates. However, in some regions the increase was larger than in others and in some areas the unemployment rate actually declined. The early 1990s recession led to an even wider range of

Graph 1

Labour Market Ratios



outcomes, with regional unemployment rates changing by between –5 and 13 percentage points (Graph 2). These differences in the ‘initial exposure’ of regions to national recessions can reflect differences in industry composition, demographics and average skill levels, among other factors.

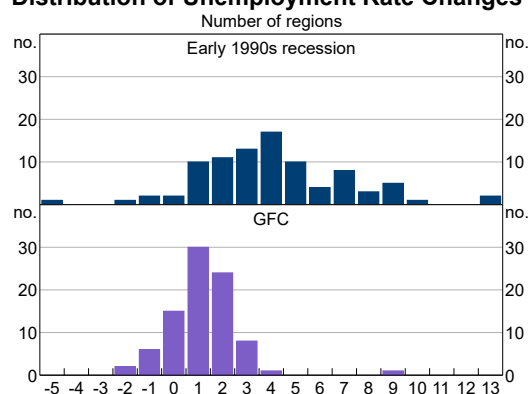
Examining the differences across regions in the aftermath of a national recession provides us with a more robust way of testing whether downturns have persistent effects on labour markets. Under the assumption that all regions are affected in a similar way by structural changes and macro policies that are occurring the national level, we can abstract from those aggregate forces by focusing on the differences across regions at each point in time. Specifically, we can compare whether unemployment rates in regions that were more highly exposed to national recessions – as indicated by a large rise in unemployment rates during the recession – remain elevated in subsequent years, relative to regions that were less exposed to those recessions. As a first pass, we make a simple comparison by grouping regions into those that experienced larger and smaller initial shocks, with each group containing roughly the same number of regions. This exercise points to substantial persistence in labour market outcomes: regions that experience larger initial increases have higher unemployment rates for up to a decade afterwards (Graph 3).

Estimating Labour Market Persistence

To further explore the nature of the persistence identified above, we model regional unemployment rates as a function of their exposure to the downturn and a set of control variables, with separate models estimated for the GFC and early 1990s recession. We measure a region’s ‘initial exposure’ to the recession as the change in its unemployment rate during each national downturn, which we also refer to as the ‘shock’. The controls include region, year and year by state indicator variables. The inclusion of the year and year by state variables address concerns that our results could be driven by changes in aggregate or state-specific economic conditions, while the regional indicators account for the average differences in unemployment rates across local labour markets. Our model also accounts for the possibility that some regions had different growth trends as a result of initial differences in their industry composition. This control means that our estimates may not necessarily generalise to the scarring effects from changes in industrial composition caused by economic downturns. However, we find that our results are qualitatively unchanged if we exclude the control for trends in industry composition. Further details of the regression model are provided in Appendix A.

Graph 4 shows our baseline regression estimates. The estimates reflect the degree of persistence from recessions on local labour markets. For example, a value of 0.3 in 1997 implies that a region that

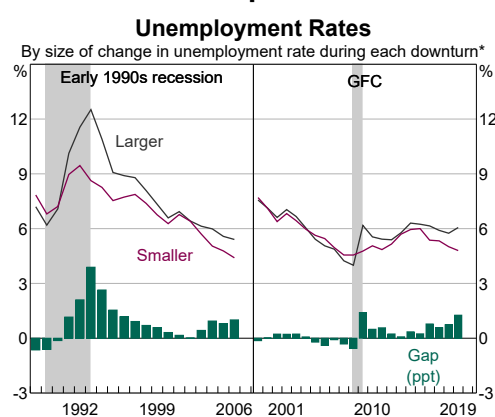
Graph 2
Distribution of Unemployment Rate Changes*



* Peak and trough dates are based on the national unemployment rate in each downturn

Sources: ABS; RBA

Graph 3



* Shaded area represents downturn period; average unemployment rate of regions that experienced above and below median changes in unemployment rates during recessions

Sources: ABS; RBA

experienced a 1 percentage point larger-than-average increase in its unemployment rate during the early 1990s recession will have a 0.3 percentage point higher-than-average unemployment rate in 1997. The results show that unemployment rates in the regions most adversely affected by the GFC remained significantly higher for around 10 years, relative to less-affected regions. There was an even greater degree of persistence following the early 1990s recession; the effects of the recession on unemployment rates were still statistically significant in the mid-2000s, around 15 years after the initial shock.^[3]

Using the same approach, we can also explore the lingering effect of recessions on other labour market indicators, such as the participation rate and the employment-to-population ratio. Regions with high exposure to the 1990s recession experienced large and enduring declines in both their rates of workforce participation and their employment-to-population ratios, relative to less-exposed regions (Graph 5). This is consistent with a discouraged worker effect where some individuals leave the labour force rather than actively look for work. The evidence for persistent effects from the GFC is mixed; while our estimates show a fall in the participation rate, this effect is not statistically significant after a few years. This might partly reflect that the GFC was a much milder downturn than the 1990s recession in Australia.

We do not control for population flows in our analysis. If people who became unemployed during

downturns relocate to areas with stronger labour markets, this would reduce our estimates of labour market persistence. However, the fact that we still find persistent effects suggests that inter-regional population flows are not large enough to quickly equalise labour market conditions across regions following recessions.

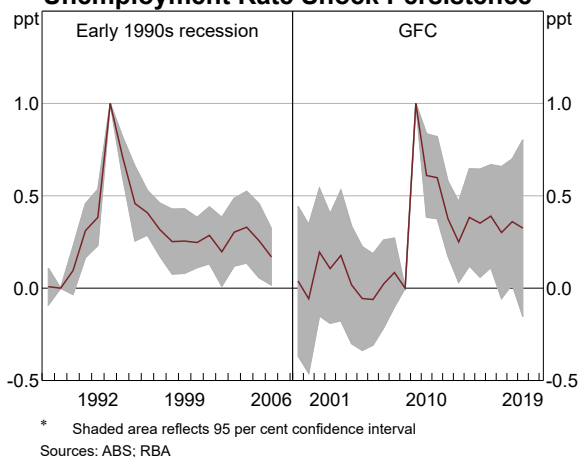
Insights for the COVID-19 Pandemic

The unemployment rate has risen by around 2¼ percentage points since the start of the year, and is expected to continue to increase further to around 10 per cent over the second half of 2020. Heightened activity restrictions and precautionary social distancing in Victoria are likely to more than offset a pick-up in conditions elsewhere. In addition, people who initially left the workforce and were therefore not recorded as unemployed may start to actively look for work.

Some features of this episode are very different to the early 1990s recession and GFC. The current episode stems from a pandemic, rather than an economic or financial crisis. Accordingly, health outcomes and the severity of containment measures needed to control the pandemic will play a large role in determining the persistence of unemployment outcomes. Another unique feature of this episode is that job losses have been largest in industries which typically have higher staff turnover, particularly food and accommodation (D'Arcy, Gustafsson, Lewis and Wiltshire 2012). This may enable workers to transition more quickly to

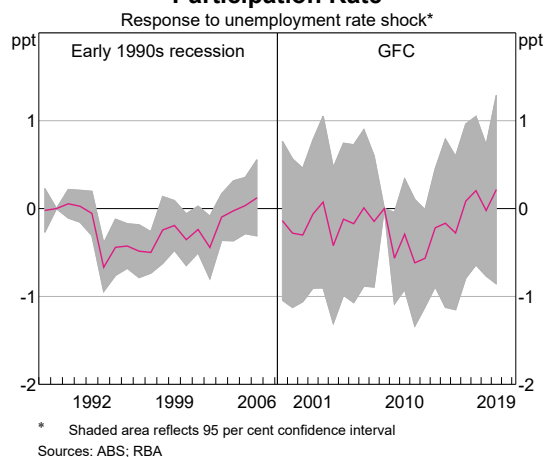
Graph 4

Unemployment Rate Shock Persistence*



Graph 5

Participation Rate



new jobs when normal activities resume than would be the case if the job losses were concentrated in industries with typically low staff turnover.

Other features are similar to previous downturns. The unemployment rate has risen by the most for young people, which is common in recessions both in Australia and overseas (Graph 6). Previous research both domestically and overseas finds that cohorts of students who graduate during a weak labour market have persistently lower employment and wages than similar people from cohorts that graduated during better times, with these effects lasting up to a decade (Andrews, Deutscher, Hambur and Hansell 2020; Rothstein 2019). This sensitivity is often explained with reference to the shorter work history of younger workers or the increased likelihood of poor early career firm-worker matches created by recessions (Fontenay *et al* 2020). A modified version of our model provides tentative evidence that younger and older cohorts experience similar degrees of persistence in their unemployment rates following recessions.

Another common feature has been a reorganisation of some economic activity, some of which may outlast the pandemic. The need for social distancing in response to COVID-19 has led to an increased uptake of online retailing, while there has also been a shift towards goods consumption as many service industries have been unable to operate at full capacity under social distancing restrictions. However, it is too early to tell whether structural

changes in the economy induced by the virus will lead to persistent dislocations in the labour market, such as skill mismatches.

Evidence from previous downturns, both domestically and overseas, shows that recessions can have long-lived effects. This suggests that the current episode may affect the economy beyond the time the pandemic is contained. The large scale fiscal and monetary policies introduced since the pandemic began were designed, in part, to reduce the risk of these persistent effects. In particular, wage subsidy programs such as JobKeeper should help reduce scarring effects by maintaining employee-employer relationships and limiting the rise in unemployment.

Appendix A

Our regression model is similar to the approach used by Hershbein and Stuart (2019). Specifically, we estimate the below equation separately for the 1990s recession and the GFC:

$$u_{it} = \alpha + \delta_i shock_i + \tau_t + \psi_i + (\tau_t \times B_i) + \epsilon_{it}$$

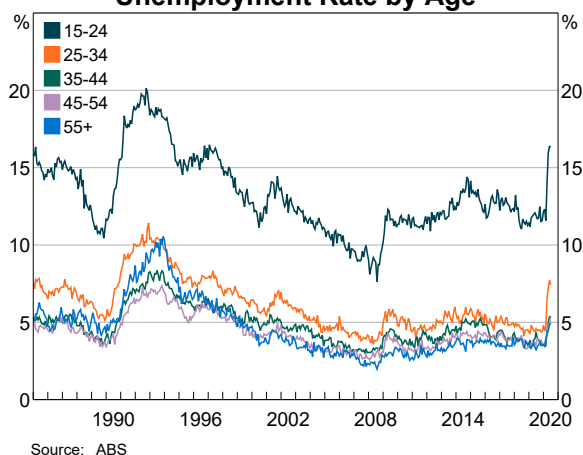
Where,

- u_{it} is the average unemployment rate in region i and year t . We also estimate versions of the model where the dependent variable is the labour force participation rate or the employment-to-population ratio.
- $shock_i$ is the change in a region's unemployment rate during the national recession/downturn.
- τ_t and ψ_i are year and region fixed effects.
- B_i is a vector of additional control variables, including state dummies and industry employment shares in 2006 and 1988 for the GFC and early 1990s estimations, respectively.

The parameter of interest is the vector, δ_i , which gives the association between a region's unemployment rate in year t and the size of the shock it experienced during the relevant downturn. For example, a value of $\delta_{1997} = 0.3$ implies that a region that experienced a 1 percentage point larger-than-average increase in its unemployment rate during

Graph 6

Unemployment Rate by Age



the early 1990s recession will have a 0.3 percentage point higher-than-average unemployment rate in

1997. Our estimates of this parameter are shown in Graphs 4 and 5. ✎

Footnotes

- [*] The authors both work in the Economic Research Department. We would like to thank James Bishop, Anthony Brassil, Natasha Cassidy, Blair Chapman, Amelia Gao, Calvin He, Adam Gorajek, Rochelle Guttmann and Gianni La Cava for helpful feedback and suggestions.
- [1] We deliberately avoid referring to these effects as 'hysteresis'. In the economics literature, hysteresis effects typically imply that changes in the unemployment rate affect the equilibrium unemployment rate. Testing this hypothesis is beyond the scope of this article.
- [2] Earlier recessions, such as the early 1980s and 1970s downturns, are not included in our analysis due to a lack of regional labour market data for these periods. Our analysis is based on the micro data from the ABS Labour Force Survey.
- [3] Importantly, there are not significant differences across regions in the period prior to the shock.

References

- Andrews D, N Deutscher, J Hambur and D Hansell, 2020, 'The Career Effects of Labour Market Conditions at Entry', Treasury Working Paper No 2020-01
- Ball L 2014 'Long-Term Damage from the Great Recession in OECD Countries' NBER Working Paper No 20185
- D'Arcy P, L Gustafsson, C Lewis and T Wiltshire (2012), 'Labour Market Turnover and Mobility', RBA *Bulletin*, December, pp 1–12.
- de Fontenay C, B Lampe, J Nugent and P Jomini (2020), 'Climbing the jobs ladder slower: Young people in a weak labour market', Productivity Commission Staff Working Paper.
- Haltmaier J (2012), 'Do Recessions Affect Potential Output?', International Finance Discussion Paper 1066, Federal Reserve Board, December.
- Hershbein B and B Stuart (2020), 'Recessions and Local Labor Market Hysteresis', Upjohn Institute Working Paper 20-325
- Rothstein J (2019), 'The Lost Generation? Scarring after the Great Recession' *Unpublished manuscript*.
- Yagan D, (2019), 'Employment hysteresis from the great recession', *Journal of Political Economy*, 127(5), pp2505-2558.
- Yellen J (2016), 'Macroeconomic Research After the Crisis', Speech at the 60th annual economic conference sponsored by the Federal Reserve Bank of Boston accessed, Boston, 14 October.

Private Sector Financial Conditions in China

Matthew Bunny^[*]



Photo: owngarden – Getty Images

Abstract

Historically it has been challenging to assess financial conditions for private firms in China. This article assembles a range of indicators that shows private firms find it more difficult and expensive to access financing than state-owned firms. Based on these indicators, the private sector had experienced a tightening in financial conditions over the past few years, although more recently conditions have generally eased as a result of new measures that direct more credit to private firms.

Background

The private sector plays a significant role in China following several decades of reforms to reduce the role of the state in resource allocation. In 2018, private enterprises accounted for more than 60 per cent of GDP and over 80 per cent of employment (Xinhua 2018b). As a result, financial conditions for the private sector are important for China's economic growth and financial stability, and have implications for countries with close economic ties to China, such as Australia.

Despite their large role in the economy, private enterprises struggle to compete for funding with

state-owned enterprises (SOEs) (Lardy 2018). As such, improving the allocation of credit has been a longstanding objective of the authorities. A key reason that private firms have relative difficulty accessing funding is they are generally regarded as riskier than SOEs, partly reflecting the widespread perception of credit guarantees in the Chinese financial system, which tend to be stronger for SOEs (Lam, Rodlauer and Schipke 2017).^[1] This is because the government is the ultimate owner of SOEs and so the perceived likelihood of SOEs defaulting is low. Investors also believe the authorities would not allow many SOEs to fail since they are often involved in achieving the authorities' policy

objectives. Indeed, SOEs tend to be more prevalent than private firms in strategically important industries.

Key characteristics of private firms may also mean that they pose a greater risk to lenders than state firms. In particular, private firms are usually smaller than SOEs and are more reliant on exports, so are more exposed to downturns in global trade (Bowman 2019). A range of other factors may also contribute to differences in access to financing. SOEs and private firms tend to operate in different industries; for example, manufacturing is dominated by private firms while SOEs comprise the majority of the energy and utility sectors, which tend to have steadier income streams (Lardy 2018).

This article outlines how efforts to improve the allocation of credit to the private sector have evolved over recent years. A range of indicators are compiled to examine private sector financial conditions, including the cost and availability of funding for private firms in bank lending, bond and equity markets and, where possible, shadow financing.^[2] In the past it has been difficult to assess financial conditions for the private sector and the effectiveness of policy support because data coverage of private firms is limited and the distinction between state and private firms is ambiguous.

Credit allocation policy

Improving the allocation of credit has been a longstanding objective of the government. To this end, the authorities have used a wide range of policy tools to support private firms' access to funding. The issue was brought more into focus over the past few years as the profitability of private firms was worn down by tighter financial regulation and as China's economic growth began to moderate (Bowman 2019; RBA 2018). There are two distinct phases in private firms' access to funding in recent history: first, a tightening in financial conditions through 2017 and 2018; followed by some easing since 2019 after concerted policy support for private firms. Some of the targeted measures introduced since early 2019 to ease policy include:

- providing liquidity to banks conditional on lending to private firms^[3]
- instructing banks to increase lending to private firms (window guidance)
- using fiscal measures, like providing banks with tax exemptions on interest income earned from loans to micro and small enterprises (MSEs). Measures to support private firms often overlap with support for MSEs
- reducing credit risk via a state-owned credit guarantee fund to provide a backstop on the debt of some private firms (Xinhua 2018a).

Earlier this year, the outbreak of COVID-19 put private firms under renewed pressure. Widespread shutdowns significantly disrupted cash flows. It was possible that some private firms could be cut off from funding in the event of a sharp tightening in financial conditions, given they are generally perceived as riskier borrowers. Subsequently, the authorities implemented a number of new measures to support financial conditions for private firms. Key policies have included:

- liquidity injections via existing bank funding facilities, and the creation of new facilities, to ease pressure on banks' capital and liquidity positions. This has allowed banks to extend more loans to smaller and private firms^[4]
- instructing large commercial banks that at least 40 per cent of new corporate lending should be directed to private firms (Li 2020)
- extending loan repayments for medium, small and micro enterprises to 2021
- a package of measures aimed at accelerating bond sales and easing the rollover of existing debts (National Development and Reform Commission 2020). This included allowing firms to issue bonds to refinance previous bond issues, a practice that was previously discouraged.

While the authorities have taken steps to direct more funding to private firms, there are still many reforms needed to improve the allocation of credit in China, some of which may be difficult to implement (International Monetary Fund 2019). For example, the authorities are allowing more SOEs to

default to unwind the perception of an implicit guarantee. In addition, some of the measures used to support private firms, like window guidance, are at odds with the pursuit of more market-based credit allocation.

It is unclear whether the outbreak of COVID-19 has dampened the appetite of policymakers to pursue these reforms in the near future. The government has continued to discuss efforts to move towards a more market-based allocation of resources in recent policy announcements. However, it may be challenging for the authorities to balance the implementation of these reforms with their objective of supporting employment in the wake of COVID-19 (Li 2020).

Financial conditions

This section provides a range of indicators that measure financial conditions for private sector firms. These indicators cover a range of asset markets that help illustrate the structural disadvantage that private sector firms often have to SOEs in terms of their access to financing. Private sector firms have higher funding costs and are more likely to face constraints in tapping certain markets for funds or to need to access alternative (or shadow financing) sources.

Bank lending

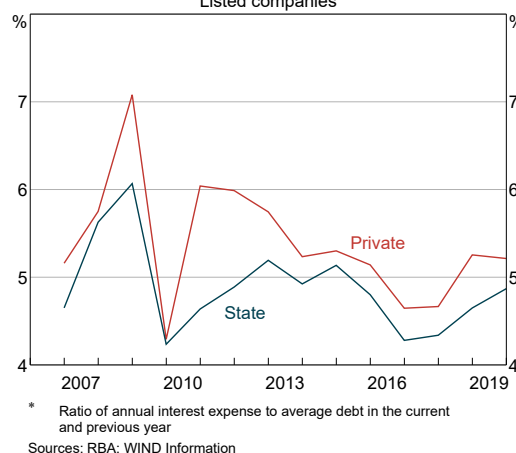
Bank lending is the main external source of business funding in China, accounting for around 59 per cent of total funding.^[5] It is particularly important for private firms because they tend to have less access to capital markets than SOEs. There are no up-to-date official data on bank lending to the private sector, but proxies can be used to make broad-based assessments of the cost and availability of bank credit. This article takes firm ownership as classified by WIND Information, where SOEs include only wholly state-funded firms.^[6]

The cost of bank funding is generally thought to be higher for private than state firms. This appears to be confirmed by implied interest rates constructed from the financial statements of listed companies (see Bowman (2019) and Bowman (forthcoming)).^[7] The rates facing both state and privately listed firms increased over 2017 and 2018; this is consistent

with the tightening phase of financial conditions for private firms, but also suggests that access to bank financing had become more expensive for all borrowers (Graph 1). Implied rates for private firms remain higher than those for state firms, which is consistent with the commonly cited view that state firms receive loans on better terms (Yi and Liang 2016). During 2017–18, tighter regulatory scrutiny left banks less willing, and less able, to lend to firms with higher credit risk. This widened the spread between the implied interest rates for listed private and state firms. In 2019, the implied interest rates for private firms declined slightly and the spread narrowed, reflecting the phase of easing financial conditions after a range of policies were put in place to support the private sector.

Proxies for loan growth indicate that it became more difficult for private firms to obtain bank funding in 2018. MSE data are often used as a proxy for the private sector, including by the authorities, since MSEs tend to be privately owned.^[8] In 2016, lending to MSEs accounted for around half of outstanding loans to private firms. Business loan growth declined in 2018, with a particularly pronounced fall in lending to MSEs as per the tightening phase in financial conditions for private firms (Graph 2). A survey on loan demand published by the People's Bank of China suggests that MSEs' demand for bank credit actually increased over this period, implying the fall in lending was primarily driven by supply factors, consistent with the regulatory tightening. State-owned banks may face

Graph 1
Implied Interest Rates*
Listed companies



incentives to lend to state firms which could impede the ability of private firms to access bank funding. In addition, interest rates in China's banking system are not fully liberalised. This makes it difficult to apply risk-weighted pricing to loans, which may disincentivise banks from lending to riskier borrowers like private firms. Since 2019, loan growth to MSEs has increased, particularly following the outbreak of COVID-19.

Bond market

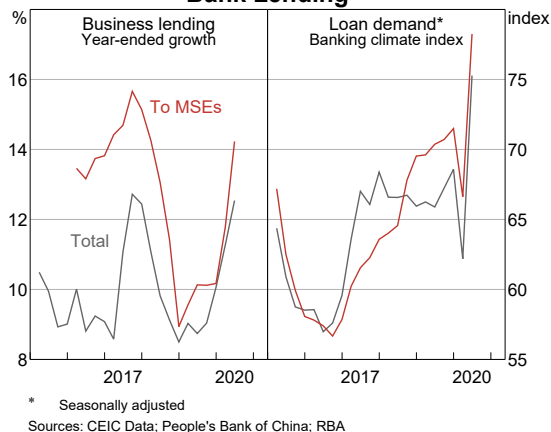
The corporate bond market accounts for a notable share of credit to the economy, at around 16 per cent of business financing. It is useful to examine bond market data because they are available on a more timely and granular basis than bank lending data. Similar to bank lending, it is more difficult and expensive for private firms to access bond funding than for SOEs.

Private firms pay higher interest rates on bonds than SOEs with the same credit rating. For example, over the past few years, there has been around a 150 basis point spread on yields between three-year bonds issued by private firms and SOEs (Graph 3).^[9] This spread could be partially driven by the perception of implicit guarantees, although this is difficult to disentangle from a range of other factors like firm size and industry composition. The spread on bonds with the highest credit rating (AAA) tends to be wider than the spread on lower-rated (AA+) bonds (based on ratings by Chinese credit rating agencies, which employ different standards than those used in other major markets). This is

consistent with implicit guarantees varying in strength across SOEs, partly reflecting their proximity to the government and its objectives. An increase in this spread may suggest that investors are demanding greater compensation to lend to private firms, although the volatility of these data make it challenging to draw robust conclusions from short-term fluctuations. In 2020, the signal from the change in the spread has been mixed – the spread for AAA rated bonds increased but the spread on AA+ rated bonds has narrowed.

Private firms appear to have relatively restricted access to bond financing and remain a small share of the market. There have been signs that private firms have had increasing difficulty issuing bonds onshore, although this trend appears to have reversed this year (Graph 4). Net issuance by private firms began declining from 2016, and turned negative in 2019, even while issuance from SOEs remained steady. Since 2016, private firms increasingly turned to offshore markets to issue bonds. The decline in private sector issuance was broad based although particularly driven by the real estate and industrial sectors, following regulatory changes in 2016 that tightened access to the bond market for firms in these industries (Graph 5).^[10] It became even more difficult for the private sector to issue bonds after a pick-up in defaults from private firms in 2018 contributed to some reluctance among investors to buy private bonds (Gatley 2018). This followed measures to curtail shadow financing, which led to liquidity shortages for some

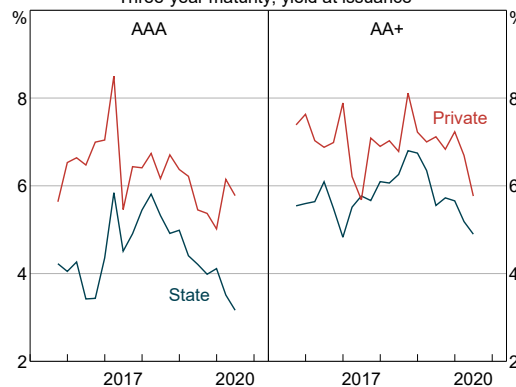
Graph 2
Bank Lending



Graph 3

Corporate Bond Yields

Three-year maturity, yield at issuance*



* Quarterly average, weighted by capital raised. This does not control for variation in firm size or industry composition.
Sources: RBA; WIND Information

private firms (see 'Shadow financing' discussion below). Earlier this year, net onshore bond issuance by private firms increased sharply, alongside a broader increase in onshore corporate bond issuance, after a number of measures were implemented to support the bond market following the outbreak of COVID-19.

Equity market

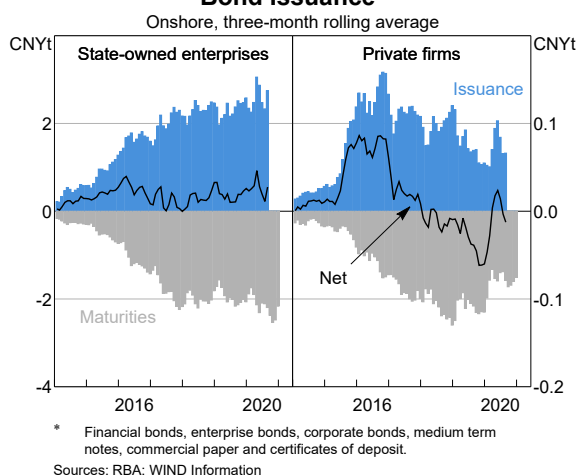
The equity market accounts for a small, although growing, share of economy-wide funding, with equity to nonfinancial corporates currently representing 5 per cent of business financing. The market capitalisation of shares of listed private firms has increased eight-fold in the past 10 years, and now accounts for around one-third of Chinese companies listed onshore (Graph 6). This follows a

significant pick-up in listings from private firms, alongside a series of market-oriented reforms, including changes to the initial public offering (IPO) process (Li, Wang and Tsai 2017). It is useful to examine the equity market because, similar to bond markets, it presents more timely and disaggregated data than bank lending. However, the Chinese equity market has a history of periods of high volatility that do not necessarily reflect broader trends in financial conditions. This is because the market has a large proportion of retail investors, which can drive speculative investment, and there is a widespread perception of state support in the market. Notably, the government has appeared to direct state-owned financial institutions to purchase stocks to stabilise prices in previous episodes of volatility.

The equity prices of private firms track the broader market, although in some periods they have experienced larger swings, consistent with the higher risk of private firms (Graph 7). In the absence of an official equity price index for private firms, one can be constructed using weekly data from around 2,500 companies listed on the Shanghai and Shenzhen stock exchanges, weighted by market capitalisation. The steep increase and decline in equity prices in 2015, which coincided with rapid growth in debt-financed retail investment, saw much larger fluctuations in the equity prices of private firms than state firms (RBA 2015). In 2018, the private index fell by around 40 per cent, while the state index declined by only 30 per cent. This is

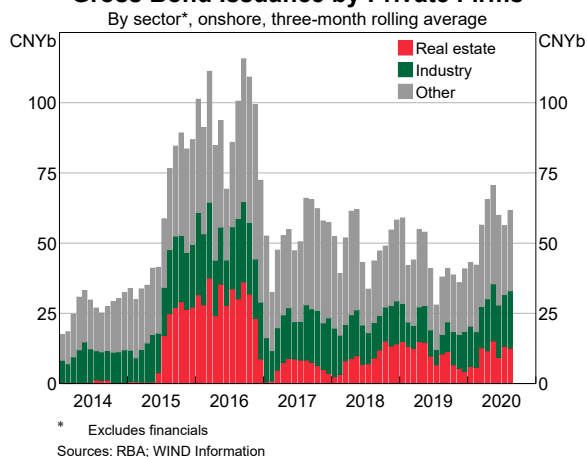
Graph 4

Bond Issuance*



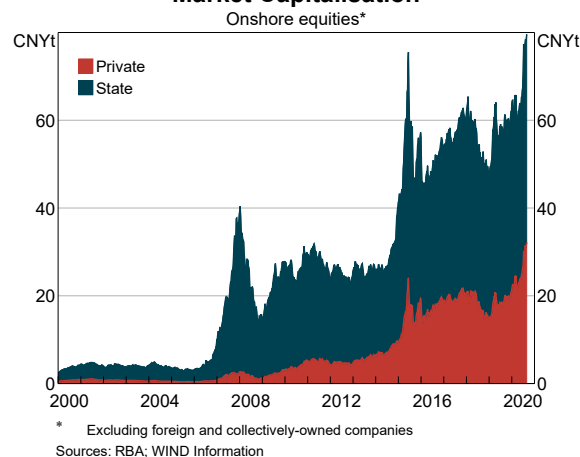
Graph 5

Gross Bond Issuance by Private Firms



Graph 6

Market Capitalisation



consistent with the tightening phase in financial conditions, and is further evidence that the tightening in this period was more severe for private firms than SOEs. There are broadly similar trends in private firms' equity prices relative to SOEs' when disaggregated by industry. This suggests factors other than industry composition are contributing to the variation in the performance of the state and private indices, including perhaps implicit guarantees. This year, private firms have generally performed in line with the state index including the sharp increase in prices in July supported by low numbers of COVID-19 cases and subsequent better-than-expected economic data.

Private firms accounted for a relatively large share of IPOs over recent years, possibly reflecting the private sector's restricted access to other markets (Graph 8). The trends in the value of IPOs from private firms are broadly consistent with trends in bank lending and bond issuance data. There was a slowdown in IPOs over 2017 and 2018 reflecting the general tightening in financial conditions. IPOs picked up in late 2019, reflecting policy support, in particular for private firms, and reforms to reduce listing requirements for some companies.^[11]

Shadow financing

Given that private firms have had more constrained access to conventional funding via banks or capital markets, they have tended to make significant use of alternative financing channels. Financing from non-bank financial institutions, or shadow financing,

is a sizeable source of funding in China, accounting for around 12 per cent of business financing.^[12]

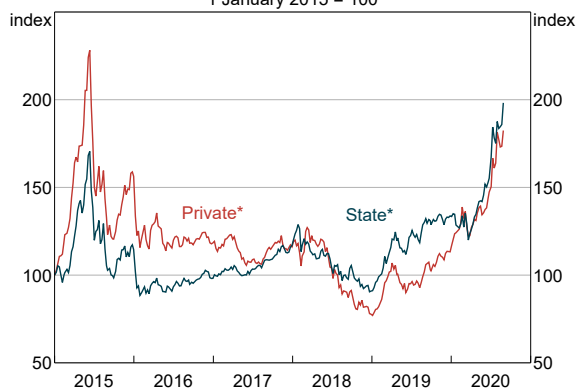
Shadow financing captures a range of instruments that tend to be opaque and illiquid. As such, there is less visibility over this funding channel than other Chinese markets and there are no data on the split of shadow financing by firm ownership. However, it is reasonable to assume private firms make up a sizeable share of shadow funding given they have restricted access to other funding markets. In addition, there is an incentive for SOEs to prioritise funding from conventional channels because shadow financing tends to be more expensive. For these reasons, the growth rate of several major off-balance sheet instruments can provide a timely indication of the rate at which shadow credit is flowing to private firms.

Shadow banking activities can pose financial stability risks by facilitating an excessive build-up of leverage, eroding capital and liquidity buffers, and adding opacity to the financial system (Bowman, Hack and Waring 2018). The authorities have been taking steps to address these risks, and shadow financing has contracted since 2018, reflecting another channel through which private firms experienced a tightening in financial conditions (Graph 9). Chinese policymakers face a difficult balance between reducing financial risks and avoiding a slowing in credit which constrains economic growth, particularly for MSEs and private firms. Indeed, there is evidence that the tightening in shadow financing exacerbated the structural

Graph 7

Equity Prices

1 January 2015 = 100



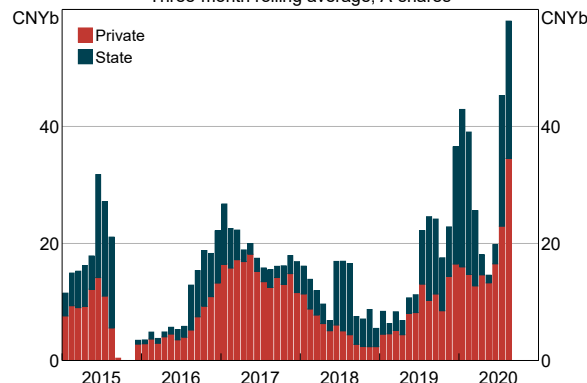
* Includes A-shares only. Calculated from firm-level data, weighted by market capitalisation.

Sources: RBA; WIND Information

Graph 8

Initial Public Offerings

Three-month rolling average, A-shares



* Excludes foreign and collectively-owned companies.

Source: RBA; WIND Information

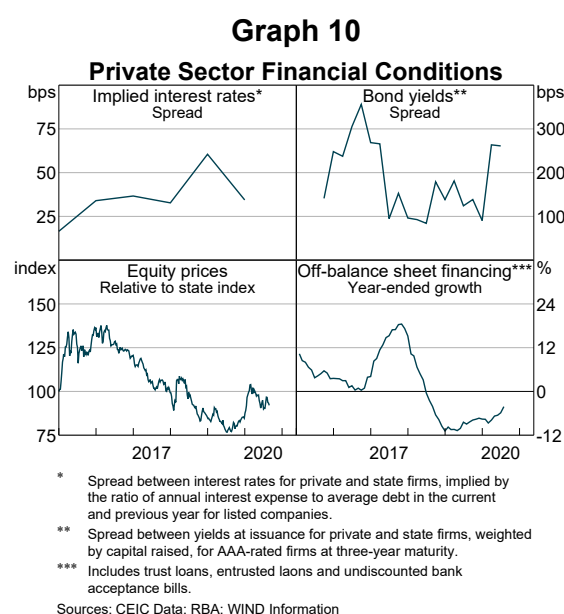
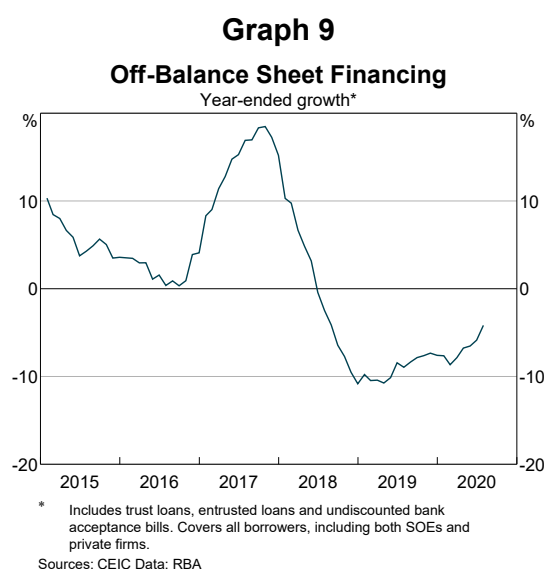
disadvantages for private firms in funding markets, leading to liquidity shortages and pushing some private firms to default on their debt obligations. The contraction in off-balance sheet financing has slowed over the last couple of years, including since the outbreak of COVID-19, marginally easing pressure on the private sector's access to funding. At the same time, the authorities have continued to tighten regulation for some types of off-balance sheet financing, like trust loans.

Assessment

It is more expensive and difficult for private firms to access funding in bank lending, bond and equity markets than state firms. This likely partly reflects pervasive perceptions of implicit guarantees for state firms in China. Private firms experienced a phase of tightening in financial conditions in 2017 and 2018, in absolute terms and relative to those for state firms. This was consistent with heightened risk aversion as financial regulations tightened and economic growth slowed (Graph 10). Implied interest rates on bank loans increased more rapidly for private firms than state firms and the spread between yields on bonds issued by private

and state firms widened. Similarly, private firms' equity prices fell further than the equity prices of state firms. There is also evidence that lending to private firms fell sharply during this period and it became more difficult for private firms to raise funds in bond and equity markets. This occurred alongside a broad-based contraction in shadow financing.

Over the past year or so, there has been a phase of general easing across all of these markets, with the exception of the increase in private sector yields in some segments of the bond market. This suggests that the authorities have had some success in directing credit to private firms, particularly since the outbreak of COVID-19. However, the continued focus on this objective implies that the authorities believe there is more to be done. The government also continues to face a difficult trade-off between their objectives of addressing risks in the financial system and improving the allocation of credit. Over the longer term, a range of reforms are needed to direct Chinese financial markets towards more market-driven credit allocation, some of which may be challenging to implement. ✎



Footnotes

- [*] Matthew Bunny is from International Department.
- [1] Zhu (2016), Elliott, Kroeber and Qiao (2015) and Cong, Gao, Ponticelli and Yang (2019) are other notable studies in the large literature exploring the prevalence of implicit guarantees in China.

- [2] This analysis does not account for possible differences in the funding composition of SOEs and private enterprises given limited visibility over these data.

- [3] Some of these tools include the targeted reserve requirement ratio, targeted medium-term lending facility and relending and rediscount facilities.
- [4] The People's Bank of China (PBC) increased relending and rediscounting quotas and cut the targeted reserve requirement ratio. The PBC also created two new funding facilities: one to support banks in extending the repayment deadlines for MSE loans and the second to fund local banks' MSE lending (PBC 2020). The PBC expects the program to support up to CNY 1 trillion of unsecured MSE loans.
- [5] This analysis focuses on private sector firm's access to external funding sources. Historically, retained earnings have also been an important funding source for private firms. For a more detailed discussion of this issue, see Lardy (2016).
- [6] China has a complex firm classification system which varies across official data sources. The National Bureau of Statistics' *China Statistical Yearbook* defines eight types of ownership, with varying degrees of state funding and supervision (NBS 2019). However, financial market data are generally not published with the same granularity. In this analysis, SOEs cover public enterprises, central SOEs and local SOEs, as defined by WIND Information. Private firms includes only private enterprises. Foreign companies and firms where the extent of government involvement is less clear, like collectively-owned enterprises, are excluded.
- [7] The implied interest rates are calculated based on total debt and so do not differentiate between the interest rates paid on bank loans and bonds. Listed companies are also generally much larger than the average firm and are likely to benefit from better access to bank funding. Nonetheless, these data provide an unusually detailed insight into the conditions facing Chinese firms in bank lending markets.
- [8] Official data on bank lending to private enterprises has not been published since 2016.
- [9] Yields at the three-year tenor are used because this is the largest segment of the corporate bond market.
- [10] Regulators tightened access to the bond market for real estate developers and industrial firms in excess capacity sectors as the economy recovered from a slowdown in 2015 and concerns about financial stability risks in the housing market intensified (Zhang 2019).
- [11] The Shanghai Stock Exchange Science and Technology Innovation Board, or STAR Market, was launched in July 2019 to facilitate listings from technology firms. It accounts for a significant share of IPOs over the last year or so. The STAR Market has less stringent listing conditions than other boards in China, including waiving the requirement that companies are profitable.
- [12] The stock of shadow financing is estimated by the sum of trust loans, entrusted loans and undiscounted bank acceptance bills.

References

- Bowman J (2019), 'Conditions in China's Corporate Sector', RBA *Bulletin*, December, viewed 31 July 2020. Available at <https://www.rba.gov.au/publications/bulletin/2019/dec/conditions-in-chinas-corporate-sector.html>
- Bowman J (forthcoming), 'Conditions in China's Corporate Sector' in Song L, Y Zhou and L Hurst (eds) *China: Moving towards a High-Income Economy*, ANU Press, Canberra.
- Cong L, H Gao, J Ponticelli and X Yang (2019), 'Credit Allocation Under Economic Stimulus: Evidence from China', *Review of Financial Studies*, 32(9), pp 3412–3460.
- Ding S and L Shen (2020), 'China SMEI – Broad-based improvement in May', Standard Chartered Research Note, May.
- Elliot D, A Kroeber and Y Qiao (2015), 'Shadow Banking in China: A Primer'. Available at <https://www.brookings.edu/wp-content/uploads/2016/06/shadow_banking_china_elliott_kroeber_yu.pdf>.
- Gatley T (2018), 'Solving the Private Sector's Liquidity Crisis', Gavekal Research Note, November.
- International Monetary Fund (2019), 'People's Republic of China: Selected Issues', IMF Country Report No. 19/274, August.
- Lam W and A Schipke (2017), 'State-owned Enterprise Reform', Lam W, M Rodlauer and A Schipke (ed), *Modernizing China: Investing in Soft Infrastructure*, International Monetary Fund, Washington DC.
- Lardy N (2016), 'The Changing Role of the Private Sector in China', Proceedings of a Conference, Reserve Bank of Australia, Sydney.

- Lardy N (2018), 'Private Sector Development', Garnaut R, L Song and C Fang (ed), *China's 40 Years of Reform and Development: 1978–2018*, ANU Press, Canberra.
- Li K (2020), 'Report on the Work of the Government', Delivered at the Third Session of the 13th National People's Congress of the People's Republic of China, 22 May, Beijing.
- Li Q, J Tsai and Y Wang (2017), 'Policy Impact on the Chinese Stock Market: From the 1994 Bailout Policies to the 2015 Shanghai-Hong Kong Stock Connect', *International Journal of Financial Studies*, 5(1) pp 1–19.
- National Development and Reform Commission (2020), 'NDRC Circular on Effectively Carrying out the Work Relating to Corporate Bonds during the Period of Pandemic Prevention and Control [In Chinese]'. Available at <https://www.ndrc.gov.cn/xxgk/zcfb/tz/202002/t20200208_1220174.html>
- NBS (National Bureau of Statistics of China) (2019), *China Statistical Yearbook 2019*, China Statistics Press, Beijing.
- PBC (People's Bank of China) (2020), 'Question and Answer on Monetary Policy Hot Topics: Innovating Monetary Policy Tools that Directly Support the Real Economy [In Chinese]'. Available at <<http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4032263/index.html>>.
- RBA (Reserve Bank of Australia) (2015), 'Box B: Recent Developments in Chinese Equity Prices', *Statement on Monetary Policy*, May. Available at <<https://www.rba.gov.au/publications/smp/2015/may/box-b.html>>
- RBA (2018), 'Box A: Ongoing Financial Regulatory Reform in China', *Financial Stability Review*, October, viewed 31 July 2020. Available at <https://www.rba.gov.au/publications/fsr/2018/oct/box-a.html>
- Xinhua (2018a), 'Central Bank Explains: Use Market Principles for Private Enterprise Credit Enhancement [In Chinese]'. Available at <http://www.xinhuanet.com/finance/2018-10/27/c_129980212.htm>.
- Xinhua (2018b), 'China's private sector contributes greatly to economic growth'. Available at <http://www.xinhuanet.com/english/2018-03/06/c_137020127.htm>.
- Yi E and H Liang (2016), 'How High is the Funding Cost for Private Investment?', China International Capital Corporation Macro Brief, 21 July.
- Zhang X (2019), 'The Financing Squeeze Spreads to Corporate Bonds', Gavekal Research Note, November.
- Zhu N (2016), *China's Guarantee Bubble*, McGraw-Hill Education, New York.

The Global Financial Safety Net and Australia

Meika Ball, Ashwin Clarke and Clare Noone^[*]



Photo: imaginima – Getty Images

Abstract

The Global Financial Safety Net (GFSN) allows for financial assistance to be provided to economies in the event of an economic or financial crisis. Together with the substantial monetary and fiscal policy response globally, the GFSN has played a key role in helping economies respond to the COVID-19 pandemic. The GFSN has a number of elements, including the assistance provided by the International Monetary Fund, regional financing arrangements and some bilateral swap lines established by central banks. This article provides an overview of the GFSN, how it has evolved and been used over recent months, and the role the Reserve Bank of Australia plays in it. Use of the GFSN could increase materially over the period ahead if economic and financial market conditions around the world deteriorate.

Introduction

The Global Financial Safety Net (GFSN) allows for financial assistance to be provided to economies should they experience an economic or financial crisis that leaves them unable to meet external financing needs. The purpose of this assistance is generally to prevent a liquidity problem (in this context, a short-term foreign currency shortfall) from causing a solvency problem. If an economy is unable to meet their international payment obligations (such as debt repayments), its problems

can easily spill over to other countries. This is one reason why most countries commit funds to the GFSN.

The GFSN has played an important role in response to the current COVID-19 crisis, particularly to support emerging and low-income economies. Alongside policy action by advanced economies, the support provided by the GFSN helped to ease the sharp tightening of financial conditions experienced in the immediate wake of the pandemic. This tightening of conditions had been

particularly acute for emerging market economies (EMEs), where government bond yields rose significantly, equity prices declined, and exchange rates depreciated sharply alongside substantial portfolio outflows of equities and bonds (Graph 1). Drawing on the GFSN has also helped some EMEs and low-income countries meet urgent external financing needs arising from the pandemic and facilitated immediate additional health care spending. While financial conditions have improved, the challenges of the pandemic remain. The GFSN is likely to continue to provide an important source of stability to the global financial system over the period ahead, with its use potentially increasing materially if economic and financial market conditions around the world deteriorate further.

This article describes the size and characteristics of the different layers of the GFSN. It discusses use of, and changes to, the GFSN in the wake of the COVID-19 crisis. In addition, the article sets out the Reserve Bank's role in Australia's participation in the GFSN.

Layers of the GFSN

There are four distinct parts or 'layers' of the GFSN (Figure 1).^[1]

- **International reserves** are foreign currency assets owned by country authorities and are generally thought of as the first layer of defence in a foreign currency liquidity crisis. Reserves include a country's official foreign currency

holdings, gold holdings, Special Drawing Rights (SDRs) and reserve position at the International Monetary Fund (IMF) (i.e. funds lent by a country to the IMF).^[2] Reserves can be used to dampen volatility in a country's exchange rate, repay official sector international debts and provide foreign currency liquidity to the financial system during periods of stress.

- **Bilateral swap agreements (BSAs)** are agreements between two central banks.^[3] They usually take the form of lending one currency in return for collateral (in the borrower's currency) plus interest. The funds lent are typically denominated in the local currency of the lender country, but can be in another currency (e.g. a reserve currency like the US dollar). Not all BSAs are part of the GFSN and, as we explore later in article, there is some debate as to where to draw the line on their classification. This issue notwithstanding, most BSAs have the effect of alleviating market stress and at a minimum can be thought of as a complement to the GFSN.
- **Regional Financing Arrangements (RFAs)** are financing arrangements between groups of countries to pool resources such that most members have access to more resources than they contribute. There is no single model for an RFA. For example, some RFAs use central bank foreign exchange reserves to fund lending, while for others the governments may provide the full amount of funds.
- **The IMF** provides financial assistance in the form of loans or credit lines often with specific conditions attached (these conditions relate to policy measures that the recipient must implement to receive the funds); almost all countries are members of the IMF and most contribute financial resources to fund lending. For these reasons, the IMF is often referred to as the 'centre of the GFSN'.

The layers of the GFSN differ along a number of dimensions, including purpose, cost, ease of use, size and access.

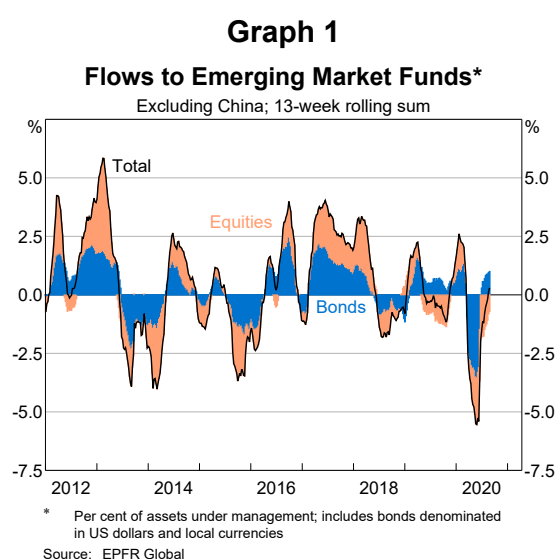


Table 1: Uses of the GFSN

	BoP crisis	FX liquidity crisis	Sovereign debt crisis
Reserves	Yes	Yes	Yes
BSAs	In some cases ^(a)	Yes	No
RFAs	Yes	Yes	In some cases ^(b)
IMF	Yes	Yes	Yes

(a) BSAs that are supported by, or done on behalf of, a signatory's government can sometimes be used for a BoP crisis.

(b) RFAs generally do not specify whether they can be used for sovereign debt crises, although there have been instances of their use, in particular during the European debt crisis.

Sources: RBA

Purpose

There are three main types of crises that the GFSN attempts to mitigate (Denbee, Jung and Paternò 2016).

- **A balance of payments (BoP) crisis** in which countries lack (or potentially lack) the financing needed to meet international payment obligations. This may be due to unsustainable domestic policies, natural disasters (including health disasters like pandemics) or other sudden changes in market conditions such as commodity price shocks (IMF 2020a).
- **A foreign currency (FX) liquidity crisis** in which banks or other financial system participants cannot access adequate short-term funding in foreign currency (typically a reserve currency such as the US dollar).
- **A sovereign debt crisis** in which governments are shut out of debt markets because investors are unwilling to lend. This could be due to a range of factors including levels of public debt that are perceived as unsustainable or heightened global risk aversion.

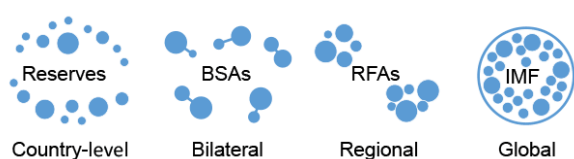
In practice, these types of crises are not necessarily independent of one another and can be

concurrent. For instance, at the onset of the COVID-19 pandemic, uncertainty and risk aversion led to market volatility and high demand for US dollars which limited market participants' access to funding in US dollars (an FX liquidity crisis). At the same time, COVID-19 has also caused some countries to experience sharply lower net foreign income, causing BoP pressures. These crises can also occur alongside other types of crises (such as banking crises).

Only the IMF and a country's own reserves are available to respond to all three types of crises (Table 1). By contrast, use of BSAs and RFAs depends on the parties involved and the terms of the specific agreement. For example, most BSAs are only available for use in FX liquidity crises; BSAs that are supported by, or done on behalf of, a signatory's government can sometimes be used for a BoP crisis.

In many cases, the primary purpose of a central bank swap line is to support market functioning and mitigate financial stability risks *domestically* (including where risks arise due to spillovers from foreign markets). It is also the case that swap lines are not extended to all economies. These attributes reflect the fact that when establishing a swap line, a central bank must consider its mandate and risk tolerance, which typically does not stretch to alleviating BoP or other types of crises in other countries. This notwithstanding, swap lines can in practice provide an important financial safety net to other countries.

For this reason, it is debatable whether some BSAs – such as swap lines issued by the US Federal Reserve and some of the major currency issuers – should be considered part of the GFSN. For the purposes of

Figure 1: Layers of the Global Financial Safety Net

Source: RBA

the analysis in this article, we have included swap lines that can mitigate an FX liquidity crisis, even when they were extended primarily to address domestic financial market issues. However, we have identified these separately in tables and graphs. More broadly, in our definition of the GFSN we have included BSAs that have at least one of the following characteristics: are in a reserve currency; issued by the People's Bank of China (PBC); sponsored by a finance ministry; or specifically intended to address BoP issues.^[4] BSAs that do not have at least one of these characteristics are likely to be of limited use in the three types of crises listed above, and on this basis are excluded from our definition of the GFSN.

Cost

In normal times (i.e. outside a crisis), reserves are the most expensive layer of the GFSN. This is because countries pay a cost of carry to hold them and also may be required to allocate capital against the risk of valuation losses associated with their holdings.^[5] In this context, reserves provide self-insurance against a crisis. By contrast, RFAs and the IMF are mutualised insurance; they allow countries to pool resources such that in a country-specific crisis, each member can generally access more emergency assistance than they commit to lending. This means that the cost of these types of insurance are lower than for reserves.

Ease of use and robustness

While reserves are expensive, they are easy for a country to use since it has direct control over them. In comparison, for a loan from the IMF the country must go through an application process and may also be required to meet specific conditions set by the IMF.^[6] The ease of access to RFAs varies by the specific arrangement. Some large RFAs allow access to funding below a moderate limit without conditions, but above that limit require an IMF program to be in place before funds can be provided. BSAs are easier to use than IMF funding or RFAs due to the lack of conditionality to access funds once a BSA has been agreed. However, access to BSAs are limited as they are extended at the

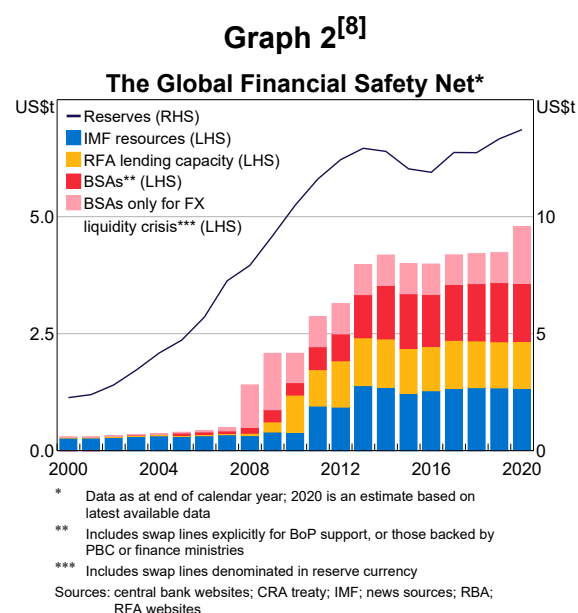
discretion of central banks and/or governments, as discussed above.

Size of and Access to the GFSN

The lending capacity of the GFSN has grown significantly over the past two decades, and is now equivalent to around 20 per cent of world GDP.^[7] In particular, since the global financial crisis (GFC) RFAs and BSAs have become much more widespread, and the value of swap lines has increased considerably (Graph 2). This strong growth in the GFSN is partly because of the strong economic growth of EMEs, and the desire of many of these economies to improve their resilience to risks arising from the volatility of capital flows. Indeed, EMEs and developing economies as a proportion of the global economy have grown from around 40 per cent in the early 1990s to almost 60 per cent in 2019.

Reserves

By value, reserves are the largest component of the GFSN, amounting to more than US\$13 trillion as of mid 2020. Access to reserves varies significantly across regions. In particular, EMEs in Asia have accumulated reserves at a much faster rate than other regions to build up self-insurance in the wake of the Asian Financial Crisis (Stevens 2007). This growth has slowed in recent years (Graph 3). Most large EMEs have accumulated a level of reserves



that exceeds the minimum threshold for what the IMF considers to be adequate.^[9]

International Monetary Fund

The rest of the GFSN is worth around one-third of the value of reserves, amounting to almost US\$5 trillion. Of this, the IMF accounts for US\$1.3 trillion. The primary source of IMF funds are the 'quota' contributions made by member countries, which are a form of paid-in capital. Some countries also contribute to the IMF via lending arrangements; under these agreements, member countries essentially promise to lend funds to the IMF if required.^[10] The level of IMF funding has not changed materially since 2012, though in 2020 countries agreed to an increase in the size of lending arrangements, which is expected to become effective in 2021.^[11]

The IMF provides a number of different lending facilities that cater to a range of country circumstances and shocks (Table A1). For most IMF facilities, the funding limits are determined as a proportion of a country's quota contribution. The quota share of each country attempts to reflect their relative importance in the world economy, but over time quotas have become less representative of countries' position in the world. This is because some economies have grown more quickly than others, and updates to quota have not fully kept pace with this change.^[12] In particular, economies in the Asian region have lower access to IMF funding relative to countries in other regions due to

the pace of growth in the Asian region in recent years (Graph 4).

Offsetting their relatively limited access to IMF funding, EMEs in Asia have access to more external funding through BSAs and RFAs, and have built up larger reserve buffers than countries in other regions. In comparison, the IMF remains the primary or only external source of financing support for many EMEs outside Europe or Asia. In particular, EMEs across the Middle East, Central Asia and Africa have lower access to external funding; reserve buffers in these economies are also, on average, lower than in other regions.

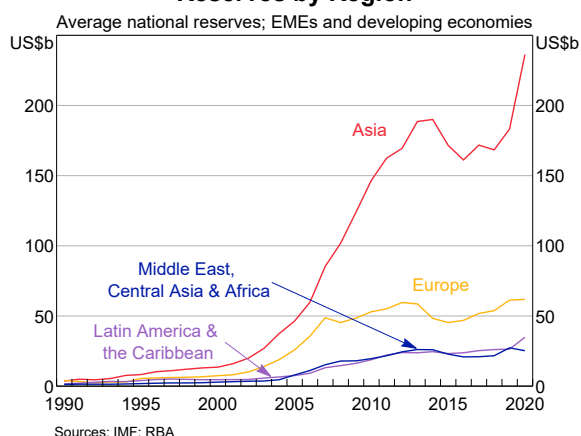
Bilateral swap agreements

By value, swap lines currently account for an estimated US\$2.5 trillion of the total size of the GFSN. Around half of this amount is provided by the US Federal Reserve and other reserve currency issuers specifically to mitigate strains in cross-border funding markets (that is, for FX liquidity crises) that could spill over to affect the domestic markets of the reserve currency issuers (Table 2).

As mentioned earlier, some BSAs are potentially available for BoP crises, but these swap lines are mostly sponsored or endorsed by a government

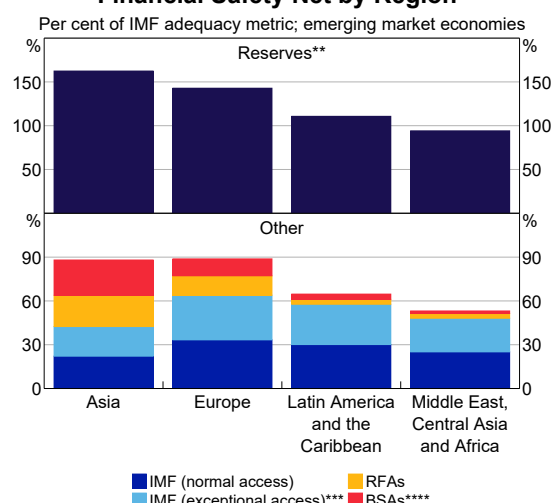
Graph 3

Reserves by Region



Graph 4

Financial Safety Net by Region*



* Unweighted average of available countries
 ** Official reserve assets
 *** Average of exceptional access programs since 1993, excluding programs approved between 2010 and 2012
 **** Agreements backed by PBC or finance ministries, those that are in reserve currencies, or those that are explicitly for BoP support; temporary US Federal Reserve swap lines are excluded
 Sources: central bank websites; CRA treaty; IMF; news sources; RBA; RFA websites

Table 2: Major Providers of Central Bank Swap Lines in or Complementing the GFSN

August 2020

	Value US\$ billion	Number Purpose
Reserve currency issuers ^(a)	713	15 FX liquidity only
Federal Reserve (other)	450	9 FX liquidity only
People's Bank of China ^(b)	1,042	34 Cooperation or promotion of trade/investment; financial stability ^(c)
Bank of Japan ^(d)	224	6 Financial stability; cooperation or promotion of trade/investment; foreign currency liquidity
Other	48	13 Various

(a) Swap lines between the US Federal Reserve, European Central Bank, Bank of Japan, Bank of England, Bank of Canada and Swiss National Bank. These are unlimited, so are valued at their one-way maximum historical usage. This group covers all issuers of currencies individually identified in the IMF's reserve currency composition database except for Australia and China

(b) Assumes that PBC swap lines are automatically renewed at expiry, since it is sometimes uncertain whether a swap line has been renewed

(c) Smaller share are also for foreign currency liquidity, local currency settlement or BoP difficulties. Beyond the express reason for their establishment, the PBC swap lines have also been used to address BoP difficulties

(d) Supported by the Japanese Ministry of Finance

Sources: central bank websites; news sources; RBA

entity. The two largest providers of these swap lines are the PBC and the Bank of Japan (backed by the Japanese Ministry of Finance). These swap lines have only been used to a limited extent and are therefore largely untested.

Regional financing arrangements

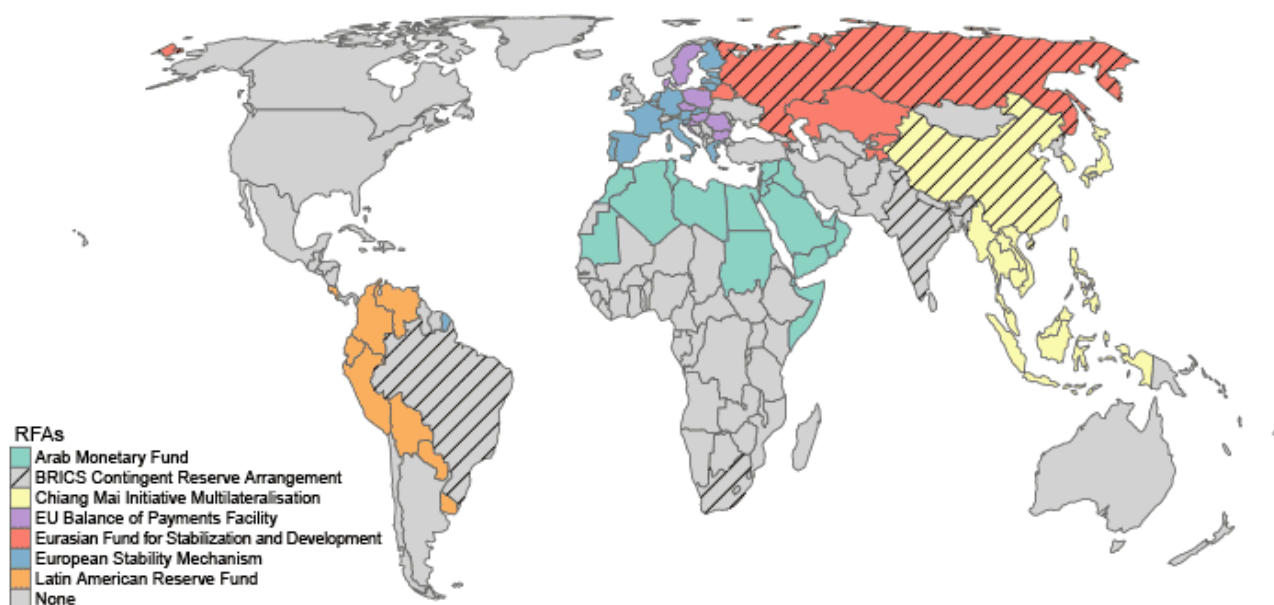
Total RFA lending capacity amounts to US\$1.0 trillion, which is similar in magnitude to IMF resources. Access to RFAs varies significantly across regions, with many countries having no access to RFA financing (Figure 2). Together, the two largest RFAs (European Stability Mechanism (ESM) and Chiang Mai Initiative Multilateralisation (CMIM)) account for over 80 per cent of the value of RFA funds. The ESM has total lending capacity worth €500 billion, equivalent to over 4 per cent of euro area GDP, and is available to euro area countries experiencing financing difficulties. The CMIM, comprising US\$240 billion of commitments, was set up to address members' BoP and short-term liquidity difficulties and complement existing financial arrangements. Like swap lines, some RFAs (including CMIM) have not yet been used, and are therefore untested in an active crisis.

Recent Developments

Enhancements to the GFSN

The COVID-19 pandemic has led to developments in both access to the GFSN and its size. Starting with the IMF, the organisation has announced significant changes to its lending facilities to provide support during the crisis. These changes cover:

- **Access.** The IMF clarified early in the crisis that countries hit by the pandemic would be eligible for its emergency facilities, which gave countries more certainty in their ability to access this class of assistance. The IMF has also temporarily increased its lending limits to individual members, including the access limits for its emergency facilities and its overall annual lending limits, as well as increased the number of times that countries can access certain emergency facilities.
- **New Facility.** The IMF also introduced a new precautionary facility – the Short-term Liquidity Line – which is designed to provide liquidity to countries with 'very strong policy frameworks and fundamentals' that have short-term liquidity needs as a result of an external shock (IMF 2020b). This supplements existing precautionary facilities.

Figure 2: Regional Financing Arrangements^[13]

Sources: RBA; RFA websites

- **Increased Funding.** In addition, the IMF secured increased funding for its concessional financing of low-income countries through its Poverty Reduction and Growth Trust, including an in-principle SDR500 million commitment from the Australian Government.

Also, IMF and RFA cooperation has increased during the COVID-19 crisis. This has included an increased and more regular exchange of information between these two layers of the GFSN (G20 2020), and, in June 2020, the amendment of the CMIM agreement to strengthen its coordination and better align its lending facilities with the IMF. This builds on significant efforts in recent years to enhance coordination between the IMF and the RFAs, which has included undertaking simulations of joint programs, high-level dialogues, and building on G20-endorsed principles to guide cooperation between the IMF and RFAs (IMF 2017).

The number of BSAs has increased since the start of the COVID-19 pandemic (Graph 5). The US Federal Reserve has temporarily extended its existing US dollar swap lines to a number of additional central banks from both advanced economies and EMEs, including the Reserve Bank of Australia. In addition, it has established a temporary facility that allows foreign central banks to borrow US dollars by providing US Treasury securities as collateral

(Federal Reserve 2020). This facility is aimed at supporting the functioning of the US Treasuries market, but it also has the effect of supporting US dollar liquidity globally. Indeed, the new and existing Federal Reserve measures have been important in decreasing disruptions in US dollar cross-border funding markets and more broadly supporting confidence in global financial markets (Avdjiev, Eren and McGuire 2020). The European Central Bank has introduced a similar facility, aimed at providing euro liquidity to limit market dysfunction (European Central Bank 2020).^[14] They also established BSAs with several other European central banks.

Use of the GFSN

So far, the GFSN has played a significant role in responding to the COVID-19 pandemic. However, use has varied significantly across countries and layers.

The IMF has played a central role in assisting countries in need of BoP support in recent months, in particular to help fund the additional health care spending required in some countries. By number, the primary form of assistance has been emergency facilities that can be quickly paid out and do not come with conditions that must be met after the funds have been provided. So far the IMF has

approved 74 emergency facilities in response to the pandemic (Graph 6), as well as increased the funding limits of some existing programs. Apart from a few exceptions, emergency financing has mostly been provided to small EMEs and low-income countries. This, combined with the lower access limits of emergency facilities, has meant that the total value of these facilities has been modest.

The few large EMEs to draw on IMF emergency financing so far include South Africa, Nigeria, Pakistan and Egypt, which have each been granted lending to support spending on health and address the economic impact of the crisis. New IMF programs were also approved for Ukraine and Egypt, with the impact of the pandemic adding to existing challenges.

In addition, Chile and Peru have joined Colombia and Mexico in requesting access to the IMF's Flexible Credit Line, one of the IMF's *precautionary* facilities that allow countries with very strong fundamentals and policy track records to draw on IMF funding at any time should a crisis emerge. By value these account for the majority of funds committed by the IMF in recent months. However, these precautionary facilities are for potential rather than existing BoP needs, and to date have not been drawn down.

One reason that most large EMEs have not drawn on IMF support is that they have not needed it. The

initial market disruption caused by the pandemic in March eased relatively quickly following the unprecedented policy responses in both advanced economies and EMEs, including the introduction of swap lines (see below). These actions, in effect, supported external financing conditions for many EMEs. In addition, many EMEs, especially in the Asia Pacific region, entered the pandemic with strong fundamentals and large precautionary reserves (IMF 2020c). Furthermore, in many countries in the region, the proactive relief policies and lockdowns implemented by policymakers supported market confidence.

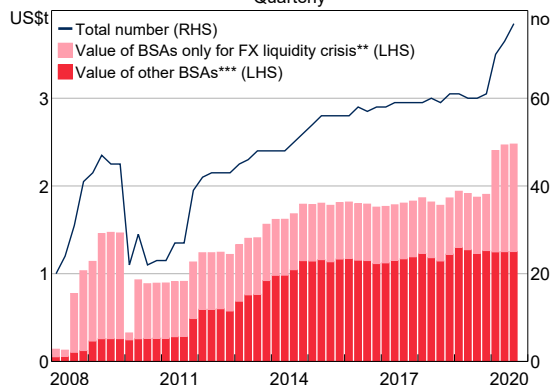
Central bank swap lines have played a key role in the response to COVID-19, specifically by reducing disruptions in cross-border financial markets and thereby contributing to the easing in emerging market financial conditions. Swap lines with the Federal Reserve have been used in large volumes since March (Graph 7). Even while some of the lines have not yet been used, their existence has supported confidence in those countries' markets.

A number of EMEs also used their reserve holdings to intervene in the foreign exchange market in March when markets were most volatile. This intervention was used to counter large depreciations in some currencies and reduce

Graph 5

Central Bank Swap Lines*

Quarterly



* Includes swap lines that are considered to be part of GFSN or complementary of GFSN; the value of both directions of two-way swap lines are included; unlimited swap lines valued at their one-way historical maximum usage; latest bar is for August 2020

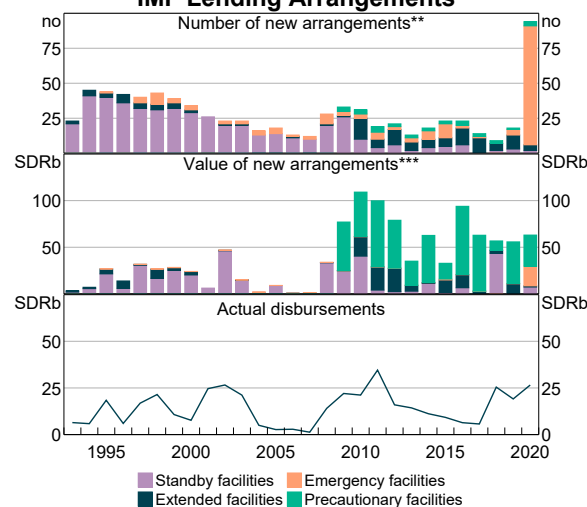
Includes swap lines denominated in reserve currency

*** Includes swap lines explicitly for BoP support, or those backed by the PBC or finance ministries

Sources: central bank websites; news reports; RBA

Graph 6

IMF Lending Arrangements*



* Data is by calendar year; 2020 observation is to July 2020 for disbursements, and to August 2020 for new arrangements; a renewal of a facility is counted as a new arrangement

Both arrangements are counted when funds are jointly approved under two different facilities

*** The value shown for precautionary facilities represent the total amount committed, rather than the amount drawn down

Sources: IMF; RBA

excessive volatility. The pace of intervention declined once volatility in market conditions subsided.

There has been little usage of any RFAs to date. The Arab Monetary Fund and Eurasian Fund for Stabilization and Development appear to be the only RFAs that have extended loans to some members since March. This is partly because the countries with the most access to RFAs have generally not experienced BoP difficulties beyond the initial turbulence in March and April. They also typically have larger IMF access limits, and are more likely to be able to access swap lines or other sources of support. The majority of countries that have applied for IMF emergency lending are those that are not members of an RFA.

The GFSN and the RBA

Australia participates in three layers of the GFSN: it is a member of the IMF; has a range of central bank BSAs; and it holds reserves.

As a member of the IMF, Australia contributes funds to support its lending. The total funding is worth SDR13.4 billion, comprising of a paid-in (quota) contribution worth SDR6.6 billion and a further SDR6.8 billion pledged under the New Arrangements to Borrow and Bilateral Borrowing Agreement arrangements (Graph 8). Australia has also recently committed, in principle, an extra SDR500 million to support concessional lending by the IMF. It is important to note that this is the maximum possible financial commitment of

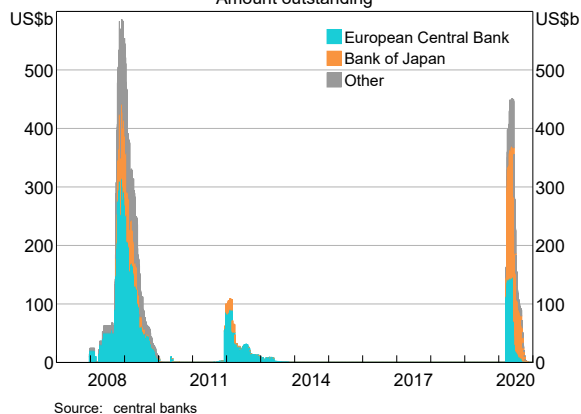
Australia to the IMF, with the borrowing arrangements only drawn on as required.

The rights and obligations associated with Australia's membership of the IMF are vested with the Australian Government. This means that Australia's contributions to the IMF are funded out of the government's revenue. The Reserve Bank acts as the banker for transactions between the IMF and the Australian Government, and will sell foreign currency to the government for it to make these transactions.^[15] Although these transactions have implications for the Reserve Bank's balance sheet, the historically small size of IMF transactions means that these transactions generally have not materially affected the Reserve Bank's reserve holdings or balance sheet.

The RBA also has five swap line arrangements with foreign central banks (Table 3). The largest of these is the arrangement with the Federal Reserve, which was originally established following the GFC and re-established earlier this year. Under this arrangement the RBA makes US dollars available to eligible Australian market participants. However, in line with modest demand for US dollar funding, this has had minimal usage (Reserve Bank of Australia 2020). The purpose of the other swap lines varies by counterparty, but the reasons are broadly to support trade and investment, local currency settlement and financial stability. Not all of these swap lines can be considered part of the GFSN; in some cases their attributes – such as not being denominated in a reserve currency – may materially

Graph 7

Central Bank US Dollar Swap Facilities
Amount outstanding



Graph 8

Australia's Financial Commitment to the IMF*

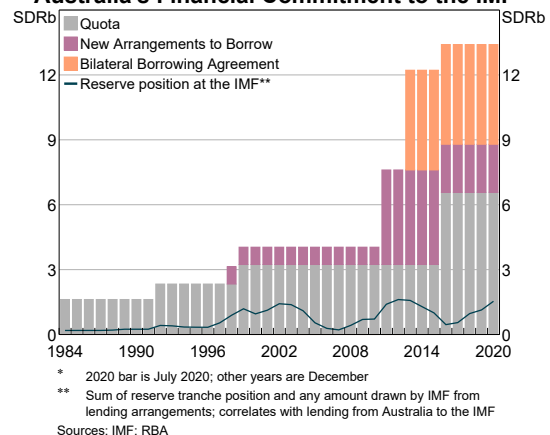


Table 4: Current Swap Agreements between the RBA and Other Central Banks

Counterparty central bank	Size A\$ billion	Established	Stated purpose
People's Bank of China	40 ^(a)	2012 (renewed 2015, 2018)	Support trade and investment; strengthen financial cooperation
Bank of Korea	12 ^(b)	2014 (renewed 2017, 2020)	Promote trade; enhance financial stability; other mutually agreed purposes
Bank Indonesia	10	2015 (renewed 2018)	Promote trade; enable currency settlement during times of financial stress
Bank of Japan	20	2016 (renewed 2019)	Enhance financial stability
US Federal Reserve	US\$60 billion	2020 (previously established in 2008 and expired in 2010)	Foreign currency liquidity

(a) Originally agreed for A\$30 billion; increased to A\$40 billion in 2015

(b) Originally agreed for A\$5 billion; increased to A\$10 billion in 2017; increased to A\$12 billion in 2020

Source: RBA

limit their scope to address the types of crises on which the GFSN is focused.

The Reserve Bank also holds the bulk of Australia's official reserve assets on its balance sheet. Specifically, the Reserve Bank owns and manages Australia's gold, SDR and foreign exchange holdings (Vallence 2012). The Australian Government holds the only other component of Australia's official reserve assets – the reserve position with the IMF. This portion is held on the government's balance sheet since Australia's membership of the IMF is vested with the government.

Conclusion and Looking Ahead

The GFSN has played an important role in the official sector response to the COVID-19 pandemic, together with other policy measures by central banks and fiscal authorities. So far, the IMF's response has included the provision of funding for EMEs and low-income countries to address their BoP problems and support spending on health. Central bank swap lines have also helped a range of countries by addressing stresses in cross-border funding markets. More broadly, the existence of the GFSN has played a stabilising effect by providing

confidence that countries have a backstop if they experience a crisis.

The GFSN has considerable scope to provide further support. Most large EMEs continue to have sizable reserve buffers, and so far only one-quarter of the IMF's resources has been lent or committed to being lent. Many swap lines have not been used, and those that have been used have generally not reached limits, and RFAs have largely not yet been called upon.^[16]

This notwithstanding, the synchronised nature of the current crisis and the highly uncertain outlook mean that there could be very large calls on the GFSN over the period ahead. This is particularly the case if downside risks to the health and economic outlook materialise. This could see demand for resources from previously untested parts of the GFSN, such as RFAs and some government endorsed or sponsored swap lines. It may also see more coordinated use of the different layers of the GFSN. The GFSN itself may also evolve further as countries respond to collective challenges and work together to promote the stability of the global financial system. ✎

Appendix A

Table A1: IMF Lending Facilities^(a)

	Purpose	Cumulative Limit	Eligibility ^(b)	Conditionality
Emergency				
Rapid Financing Instrument	Help countries facing urgent BoP needs	100 per cent of quota (temporarily increased during COVID-19 to 150 per cent of quota)	All members	None after funds are provided, although the country is expected to cooperate with the IMF to resolve BoP issues
Standard				
Stand-by Arrangement	Help countries facing BoP needs, and provide support for adjustment policies	435 per cent of quota ^(c)	All members	Yes
Extended Fund Facility	Help countries facing long-term BoP needs, and provide extended support for policies to correct structural problems	435 per cent of quota ^(c)	All members	Yes
Precautionary				
Precautionary Liquidity Line	Meet liquidity needs	500 per cent of quota	Members with sound economic fundamentals	Yes
Flexible Credit Line	Provide backstop funds in event of a crisis	Case-by-case assessment	Members with very strong economic fundamentals	None
Short-term Liquidity Line	Meet liquidity needs due to external shocks	145 per cent of quota (annual)	Members with very strong economic fundamentals	None

(a) Non-concessional facilities only; there are equivalent concessional facilities for standard and emergency facilities

(b) Qualification as a member with 'very strong' or 'sound' economic fundamentals is based on an assessment of factors such as economic fundamentals, institutional policy frameworks, implementation of and commitment to strong policies, a sound financial system, low and stable inflation, a sustainable external position, and data transparency, among others

(c) These programs offer exceptional access on a case-by-case basis, which has historically been as high as 3,000 per cent of quota (during the European debt crisis)

Sources: IMF; RBA

Footnotes

[*] Meika Ball and Clare Noone are from International Department, and Ashwin Clarke contributed to this work while in International Department. We would like to thank Anna Park, Rosa Bishop and David Lancaster for their comments and assistance.

[1] While multilateral development banks, for example the World Bank, have provided important financial assistance to support countries' responses to the pandemic, these institutions are not technically part of the GFSN since the funding they provide is typically targeted at specific needs, rather than general support for balance of payments or sovereign debt difficulties.

[2] SDRs are an international reserve asset that can be used as a claim on currencies held by IMF member countries. They were created by the IMF to supplement member

countries' existing reserves, and are valued as a basket of major currencies.

[3] Swap lines can also be directly between two finance ministries, but these are generally not considered part of the GFSN (due to their different purposes) and so are excluded from the analysis undertaken in this article.

[4] We assess that swap lines backed by governments are more likely to be utilised in a broader range of crises as a form of bilateral cooperation. The written purpose of these swap lines can be very varied, and there is some evidence of their use in different crises. Similarly, swap lines issued by the PBC have been used to address a range of crises, including BoP crises. Both Pakistan in 2014 and Argentina in 2015 drew on their PBC swap lines to bolster their reserves and avoid a currency crisis. While both

countries borrowed local currency (RMB) under their respective swap line, they were able to convert the funds to USD in the offshore RMB market (Li 2015).

- [5] See Vallence (2012) for more detail.
- [6] There could be domestic opposition to this. There can also be stigma associated with an IMF loan: foreign investors may interpret an IMF program as signalling that the country is facing bigger challenges than expected (Ito 2012).
- [7] This has increased from around 8 per cent of world GDP in 2000. Given that a number of swap lines are only available for an FX liquidity crisis, the total lending capacity of the GFSN is a little less than this for other crises. There is some double counting in calculating the overall size of the GFSN, since countries' FX reserves fund various parts of the GFSN.
- [8] PBC swap lines are assumed to automatically renew (given data inconsistencies). Unlimited swap lines are assigned a potential value equivalent to the historical maximum. Data for Latin American Reserve Fund not available prior to 2008. Includes IMF liquidity buffer.
- [9] The IMF adequacy metric assesses the ratio of reserves available to a weighted average of resources required to cover three months of imports, 20 per cent of broad money, and total short-term debt (IMF 2015).
- [10] There are two types of lending arrangements: a common multilateral arrangement that has been signed by a number of countries, called the New Arrangements to Borrow; and a range of Bilateral Borrowing Agreements.
- [11] Although commitments have not changed since 2012, the total value of commitments has varied in line with exchange rate movements.
- [12] Changes to quota have been implemented periodically, but this misalignment still exists. This constraint is mitigated to an extent by the IMF's exceptional access framework, which allows the Fund to extend lending above limits under specific circumstances. For instance, during the European debt crisis, when large lending programs were provided to Greece, Ireland and Portugal (Edwards and Hsieh 2011).
- [13] Comoros (member of the Arab Monetary Fund) and Malta (member of the ESM) not shown on map. For a list of members: Arab Monetary Fund, BRICS Contingent Reserve Arrangement, Chiang–Mai Initiative Multilateralisation, European Stability Mechanism, EU Balance of Payments Facility (EU countries not in the ESM), Eurasian Fund for Stabilization and Development, Latin American Reserve Fund.
- [14] It is debateable whether the central bank repurchase facilities of the Federal Reserve and European Central Bank should be considered part of the GFSN. While they do help countries address foreign currency liquidity shortages, this is not their only objective. Moreover, a country has to use its foreign exchange reserves (specifically, the country's official holdings of US or European government securities) to access these facilities. Including them in our analysis would therefore lead to substantial double counting when calculating the size of the GFSN. For this reason they are not included in our analysis of the size of the GFSN.
- [15] Poole (2012) provides more detail on the interaction between IMF transactions and the RBA's balance sheet.
- [16] Indeed, the swap lines that have been used the most in recent months are for an unlimited value in theory.

References

- Avdjiev S, E Eren and P McGuire (2020), 'Dollar funding costs during the Covid-19 crisis through the lens of the FX swap market', BIS Bulletin No 1, 1 April.
- Denbee E, C Jung and F Paternò (2016), 'Stitching together the global financial safety net', Bank of England Financial Stability Paper No. 36, 12 February.
- Edwards K and W Hsieh (2011), 'Recent Changes in IMF Lending', RBA *Bulletin*, December, pp 77–82.
- European Central Bank (2020), 'New Eurosystem repo facility to provide euro liquidity to non-euro area central banks', Press Release, 25 June.
- Federal Reserve (2020), 'Federal Reserve announces establishment of a temporary FIMA Repo Facility to help support the smooth functioning of financial markets', Press Release, 31 March.
- G20 (2020), 'Communiqué', G20 Finance Ministers & Central Bank Governors Meeting, 18 July.
- IMF (2015), 'Assessing Reserve Adequacy - Specific Proposals', April.
- IMF (2017), 'Collaboration between Regional Financing Arrangements and the IMF', IMF Policy Paper, 31 July.
- IMF (2020a), 'IMF Factsheets: IMF Lending', International Monetary Fund site, 27 March. Available at <<https://www.imf.org/en/About/Factsheets/IMF-Lending>>.

IMF (2020b), 'IMF Factsheets: Short-term Liquidity Line (SLL)', International Monetary Fund site, 22 April. Available at <<https://www.imf.org/en/About/Factsheets/Sheets/2020/04/17/short-term-liquidity-line>>.

IMF (2020c), 'Transcript of April 2020 Asia and Pacific Department Press Briefing', International Monetary Fund site, 15 April. Available at <<https://www.imf.org/en/News/Articles/2020/04/16/tr041520-transcript-of-april-2020-asia-and-pacific-department-press-briefing>>.

Ito T (2012), 'Can Asia Overcome the IMF Stigma?', *American Economic Review: Papers and Proceedings* 2012, 102(3), pp 198–202.

Li C (2015), 'Banking on China through Currency Swap Agreements' *Pacific Exchange Blog*, Federal Reserve Bank of San Francisco site, 23 October. Available at <<https://www.frbsf.org/banking/asia-program/pacific-exchange-blog/banking-on-china-renminbi-currency-swap-agreements/>>.

Poole E (2012), 'Australia's Financial Relationship with the International Monetary Fund', *RBA Bulletin*, December, pp 65–71.

Reserve Bank of Australia (2020), 'International Financial Conditions', *Statement on Monetary Policy*, May, pp 19–30.

Stevens G (2007), 'The Asian Crisis: A Retrospective', Address to The Anika Foundation Luncheon, Sydney, 18 July.

Vallence C (2012), 'Foreign Exchange Reserves and the Reserve Bank's Balance Sheet', *RBA Bulletin*, December, pp 57–64.

Different Approaches to Implementing a Countercyclical Capital Buffer

Katarina Stojkov^[*]



Photo: Ezra Bailey – Getty Images

Abstract

The countercyclical capital buffer (CCyB) was one of the measures designed to improve the resilience of the global banking system following the global financial crisis (GFC). It is a bank capital buffer that can be raised or lowered by jurisdictions depending on the level of risk in the financial system. This article describes different approaches to implementing the CCyB. Most jurisdictions set the 'default' CCyB rate at zero until risks are elevated; however, recently, several have adopted frameworks where the CCyB is positive through most of the financial cycle. The Australian Prudential Regulation Authority (APRA) has recently announced that it is also considering moving to a non-zero (positive) default CCyB (APRA 2019). This article discusses the possible benefits of a positive default CCyB.

Features of the Countercyclical Capital Buffer (CCyB) Framework

Banks' capital requirements are made up of several components, one of which is the CCyB. In their simplest form, capital requirements specify how much of a bank's funding must come from equity (for example, by issuing shares or retaining earnings) versus liabilities (debt owing to other parties, such as deposits). Capital is therefore a measure of the financial cushion available to a bank to absorb losses on its assets.

The CCyB was part of the Basel III reforms introduced by the Basel Committee on Banking Supervision (BCBS) to address the regulatory gaps revealed by the global financial crisis (GFC). The Basel III framework was an update to the global standards for the prudential regulation of banks, and was intended to improve the resilience of the global banking system. When 'activated' by the regulator, the CCyB requires banks to hold an additional buffer of Common Equity Tier 1 (CET1) capital.^[1] The CCyB is the only component of capital

requirements that regulators can vary according to the ‘financial cycle’;^[2] thereby making it an explicit macroprudential instrument. All BCBS member jurisdictions have now implemented a CCyB framework, as have a number of other jurisdictions.

A financial system regulator can raise or lower the CCyB depending on its assessment of the level of systemic risk. Regulators use a number of indicators, including credit and asset price growth, to support this assessment. When the regulator considers that there is an excessive build-up in financial system risk, it can raise the CCyB. Then, following a shock or when risks dissipate, the regulator can reduce the CCyB to support the flow of credit to the economy. By requiring banks to build up the proportion of capital funding when risks are increasing, and allowing them to use relatively less capital funding when risks recede or are realised, the CCyB helps to reduce the likelihood that the banking system will amplify the effects of adverse shocks to the economy.

If a regulator decides to increase the CCyB, it will give banks up to 12 months’ notice to comply. In contrast, a reduction in the CCyB applies immediately. The higher capital requirements resulting from a positive CCyB apply only to banks’ domestic private sector exposures. However, BCBS member jurisdictions have agreed to reciprocate each other’s CCyBs up to 2.5 per cent of risk-weighted assets. This means that if one BCBS jurisdiction imposes a positive CCyB, foreign banks operating in that jurisdiction will also be required by their home regulator to hold a CCyB against their exposures in that jurisdiction.^[3]

How Does the CCyB Support Orderly Functioning of the Financial System?

The CCyB is likely to be particularly effective in a downturn because, when it is released, it reduces the likelihood that capital requirements will be a constraint on banks’ activities that could support the economy. Its release effectively increases the banks’ capital buffers, providing them with greater capacity to absorb losses without breaching their minimum capital requirements, and so supports them to continue lending without the need to raise additional capital. This allows banks to act as a

shock absorber for the financial system and the broader economy during a downturn (BCBS 2010).

Under Basel III, an increase in the CCyB is not intended to slow the build-up of credit or ‘lean against the wind’ – this is identified only as a possible side benefit (BCBS 2010).^[4] As a result, regulators only activate (i.e. increase) the CCyB when credit growth is considered ‘excessive’ and contributing to a build-up of system-wide risk (BCBS 2010). Evidence from empirical studies of bank capital suggests that an increase in capital requirements (for example, through raising the CCyB) may not be effective at restraining a financial cycle upswing.^[5] There are several reasons why this might be the case. First, during that stage of the financial cycle, lending is usually highly profitable and so banks generate internal capital to meet any increased regulatory requirements and to accommodate an expanding balance sheet. Second, in the short term, banks can be incentivised to reduce their voluntary buffers rather than to materially reduce lending. Banks’ voluntary buffers mean that at least initially, the CCyB is unlikely to be binding when it is raised, making it less likely that it will be effective at slowing the build-up of credit.^[6] Third, the notice period given to banks by the regulator slows the rate at which capital needs to increase, softening the constraint on credit growth to an extent.

How Has the CCyB Been Used Around the World?

All 28 BCBS member jurisdictions, including Australia, have implemented a CCyB framework. A number of non-BCBS countries have also implemented the framework. However, before the COVID-19 pandemic, active use of the CCyB was limited. Three-quarters of BCBS jurisdictions and around two-thirds of non-BCBS jurisdictions have never raised their CCyBs above zero.^[7] Even in countries that had a positive CCyB, it remained at low levels, often significantly below the 2.5 per cent reciprocity threshold (Figure 1).

Further, CCyBs have been *reduced* in an even smaller number of countries, with most of these reductions taking place after the onset of COVID-19. Prior to COVID-19, the United Kingdom and Hong Kong

were the only jurisdictions that had ever reduced their CCyBs. The Bank of England lowered the CCyB in 2016 to zero due to high levels of uncertainty following the outcome of the Brexit referendum, but this only unwound a pending rate of 0.5 per cent that was still within a 12-month notice period and so had not yet taken effect (BoE 2016a). The Hong Kong Monetary Authority reduced the CCyB in late 2019 (from 2.5 per cent to 2 per cent) in response to a deteriorating economic environment. However, this was only a short time before the COVID-19 pandemic began. Given that the CCyB is primarily intended to support the economy when it is reduced, the limited number of reductions means that there is limited evidence regarding the practical effectiveness of the CCyB.

When the COVID-19 pandemic took hold, most jurisdictions that had a positive CCyB in 2019 reduced it (Graph 1). Jurisdictions' reasons have included deteriorating global and domestic economies, financial market volatility and the desire to encourage banks to continue supporting businesses in various sectors (BoE 2020; BaFin 2020; CNB 2020; HKMA 2020). These recent cuts are examples of jurisdictions using the CCyB largely as intended, namely to support bank lending and the broader financial sector following an adverse shock. However, this current episode has important distinctive features. The CCyB cuts have not been in response to the crystallisation of the known financial sector risks that the CCyB was initially raised to target. The pandemic is first and foremost a health crisis – one that has resulted in economic and financial sector stress. As such, the recent cuts are examples of regulators making use of flexibility in the CCyB framework. As both the health and economic crises are still ongoing, it is too early to know whether the reductions have been effective in supporting the supply of credit in those jurisdictions.

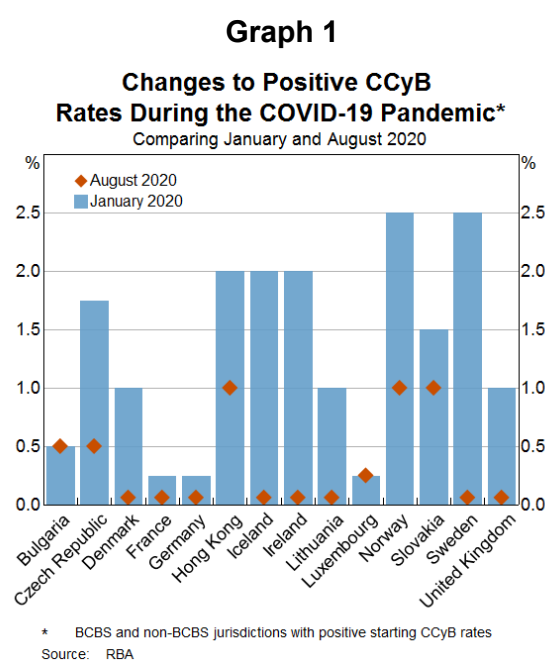
What Are the Different Approaches to Implementing the CCyB?

The CCyB's 'default' setting refers to its level when financial stability risks are neither elevated nor subdued. Global CCyB frameworks fall broadly into two categories: those with a zero default setting

and those with a positive default. The Basel III framework originally envisaged a zero default framework. The CCyB was expected to be set at zero for most of the cycle and only 'activated' or raised when systemic vulnerabilities were heightened. In recent years some jurisdictions have switched to a pre-announced positive default setting, which the BCBS considers acceptable within the broad flexibility of the Basel III framework.

Apart from the default setting, all other aspects of the two frameworks are the same, including their objectives, the reasons for increasing the CCyB, and the notice period of up to 12 months for rate increases. A positive default CCyB does not necessarily mean that overall capital requirements are higher (on average) because many BCBS jurisdictions set minimum capital requirements above BCBS requirements (APRA 2018).^[8] Conceptually, a positive default CCyB focuses on making overall capital requirements more countercyclical, rather than on increasing the total 'level' of capital requirements. A higher default CCyB may be offset by adjusting other parts of the capital framework, including other buffers (Figure 1) or risk weights.

Table 1 summarises the key aspects of the zero and positive default CCyB frameworks.



Source: RBA

Figure 1: Illustrative Comparison of CCyB Levels under the Zero and Positive Default Frameworks through Time

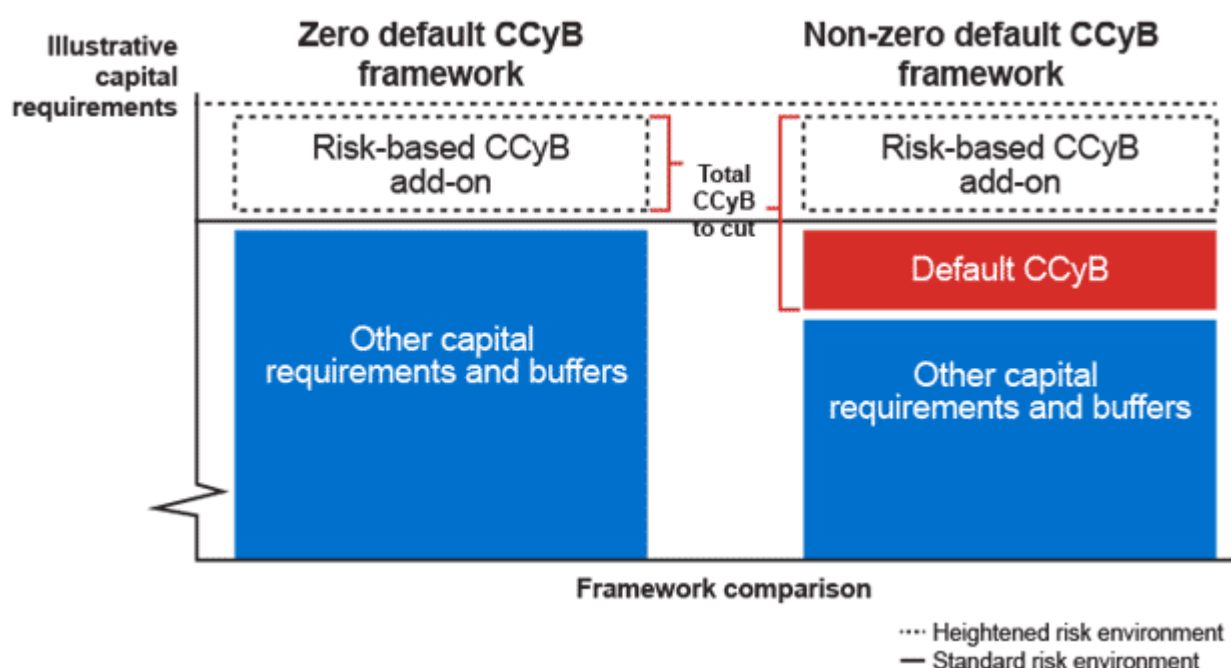


Table 1: Key Features of the Zero and Positive Default CCyB Frameworks

The zero default framework (Basel III original description)	The positive default framework
- This is the most common approach – it is presently used by all BCBS member jurisdictions except the United Kingdom, and most non-BCBS jurisdictions with a CCyB framework. - The CCyB is zero 'by default' in a standard risk environment (for most of the cycle, the CCyB is zero). - The CCyB is only raised above zero when systemic vulnerabilities are heightened. - The CCyB is cut when systemic stress occurs or vulnerabilities recede.	- This is a more recent approach – the United Kingdom is the only BCBS jurisdiction currently using it (as mentioned, Australia is considering the shift). - The CCyB is positive for most of the cycle (except immediately following a stress event). - The CCyB is increased above the default when systemic risks are heightened. - The CCyB is cut when systemic stress occurs or vulnerabilities recede. - Some time after the system recovers, the CCyB is increased back to the default level. - Overall, capital requirements are not elevated compared with the zero default approach. (They are the same when risks are normal or high, and may be lower following a downturn.)

The United Kingdom was the first to adopt a positive default approach, after previously operating a standard zero default framework. In December 2015, the Bank of England's Financial Policy Committee (FPC) indicated that it would be setting its CCyB at a positive level *before* risks become elevated (BoE 2015a). It explicitly announced a 1 per cent default CCyB rate in 2016 (BoE 2016b). In December 2019, the FPC announced that it would be increasing this to a 2 per cent default CCyB, to

increase the countercyclical component of its capital requirements (BoE 2019). Outside of the BCBS, Lithuania also has a pre-announced positive default CCyB and in New Zealand the shift is being phased in as part of a broader review of capital requirements.

Similarly, a number of other jurisdictions have changed their approaches to moving earlier in the financial cycle than would be the case under the standard zero default approach. In these

frameworks, the CCyB is increased above zero *before* vulnerabilities become elevated, meaning that the CCyB becomes positive early in the financial cycle. These ‘early’ approaches bear similarities to the positive default framework because it means that the CCyB is positive for a larger proportion of the financial cycle. Jurisdictions using these types of ‘early approach’ frameworks include the Czech Republic, Denmark and Ireland (Hajek, Frait and Plasil 2017; Danish Systemic Risk Council 2017; O’Brien, O’Brien, and Velasco 2018).

Another notable case is Canada’s domestic stability buffer (DSB). While this is a different buffer to the CCyB, it is also a countercyclical buffer. The DSB has been set at a positive value since its introduction, while the CCyB has remained at zero. The objective has been to build up the DSB during benign times and release it upon the materialisation of risks. Accordingly, in March 2020, the DSB was lowered from 2.25 per cent to 1.0 per cent of risk-weighted assets in response to the COVID-19 pandemic. The DSB applies only to Canada’s domestic systemically important banks; however it applies to their *global* exposures. Given the scale of Canadian banks’ foreign operations, the DSB ends up significantly larger than an equivalent CCyB based on domestic exposures alone.

In December 2019, APRA announced that it is likely to introduce a positive default level for the CCyB in Australia. APRA stated that this would be considered as part of upcoming reforms to further calibrate its capital framework (see APRA 2019). However, these possible changes have been delayed due to the COVID-19 pandemic.

The Advantages of a Positive Default CCyB

There are three key advantages to a positive default CCyB, all relating to the regulator having more flexibility under this framework. Compared with the zero default framework, the benefits of a positive default are that:

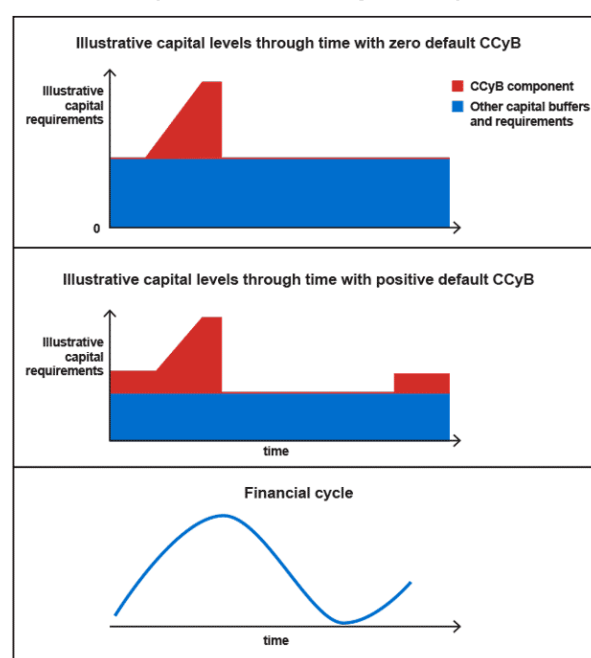
1. The regulator can cut capital requirements at any point in the financial cycle
2. The regulator can cut capital requirements by a relatively larger amount, providing more support to the system

3. It has the potential to improve buffer usability.

Capacity to cut capital requirements at any point in the financial cycle

Under a positive default CCyB framework, the CCyB is positive at every point in the financial cycle, except soon after a shock (Figure 2). This means that regulators can cut the CCyB and free up capital at almost any time. It also means that the regulator does not risk giving the signal that a crisis is coming by raising and actively managing CCyB policy. As a result, regulators are better able to respond to a greater variety of shocks, not just those that originate in the financial system. This is important as systemic stress can crystallise in otherwise ‘normal’ financial conditions (when the CCyB is at its default level) following a shock external to the financial system. The COVID-19 pandemic, Brexit, and the 2019 Hong Kong protests are all examples of shocks outside of the financial system that led to economic downturns. Only regulators in jurisdictions that had positive CCyBs were able to lower capital requirements in response to these crises.

Figure 2: Comparison of the Total Available CCyB to Cut under the Zero and Positive Default Frameworks (Illustrative Depiction)



Source: RBA

Greater capacity to cut capital requirements

A positive starting point also means that a jurisdiction has a larger CCyB throughout the financial cycle, relative to the zero default CCyB framework. This is because the CCyB makes up a relatively greater proportion of the capital requirements applying to a bank throughout the cycle. A larger CCyB allows a positive default regulator to cut capital requirements by more at the start of a downturn, releasing relatively more capital to support the economy (Figure 1).

The relatively larger CCyB also assists the regulator to manage the inherent uncertainty in identifying points in the financial cycle. Timely identification of growing financial stability risks can be challenging, no matter how closely indicators are monitored (BCBS 2017). Indicators might not always give an accurate signal and the conceptualisation of a financial cycle as the main determinant of risk might not be appropriate in the circumstances. Stress can also occur sooner than expected. A positive default CCyB gives the regulator the flexibility to reduce capital requirements by more than would be possible under a zero default framework, even if the CCyB had not been significantly built up in advance of systemic stress.

Potential to improve buffer usability

Following an adverse shock, regulators may want banks to use capital to absorb losses and continue lending largely unabated. This would mean encouraging banks to operate with lower capital ratios by entering their voluntary buffers and, if necessary, by entering their capital conservation buffers. The BCBS has encouraged regulators and banks to access and use their buffers during the COVID-19 pandemic, while maintaining some buffer capacity over the broader period of uncertainty. However, it has also been noted that banks might face a disincentive to enter their buffers at all (FSB 2020). If this is the case, the buffers may in practice be unusable and banks will therefore restrict the supply of credit to the economy in order to maintain capital ratios in a downturn, even when there is no danger of regulatory requirements being breached.

Currently, there is a concern banks internationally may be reluctant to allow their capital ratios to fall and to 'enter' their capital buffers, for a number of reasons. First, there is always an element of uncertainty in a downturn, making banks more cautious about lowering their capital ratios. Second, a bank may be wary of being the first to lower its capital ratio in a downturn. It may worry that this would send a negative signal to investors and rating agencies about its future profitability and even solvency, relative to other banks. Third, it could make it more costly for the bank to raise capital in the future, particularly because under the Basel III framework, entering a regulatory buffer triggers distribution restrictions.

In contrast to other regulatory buffers, banks do not need to 'enter' the CCyB in a downturn to operate with lower capital ratios. When a regulator cuts the CCyB, total capital requirements *fall*, leaving banks with larger voluntary buffers than before. By cutting the CCyB, the regulator can allow banks to maintain the pre-crisis voluntary buffers that the market expects, without losses threatening either new lending or regulatory requirements. As the cut applies to *all* banks at the same time, lowering the CCyB may also be a way for the regulator to reduce the stigma associated with individual banks operating with reduced capital ratios in a downturn (BCBS 2017). That said, evidence suggests that a large cut in capital requirements may be necessary to encourage banks to operate with lower capital ratios, in order to offset market stigma and uncertainty in a downturn. This is because of the relatively low sensitivity of lending to excess capital (Berrospide and Edge 2010; de-Ramon, Francis and Harris 2016).

Practical Considerations for a Positive Default CCyB Framework

There are a number of practical issues for regulators to consider if moving to a positive default framework. First, while the positive default approach may have benefits, it is not clear what the appropriate positive default level would be, and whether this would vary by jurisdiction. For example, the Bank of England initially set the default CCyB at 1 per cent in 2016, but subsequently raised

that to 2 per cent in 2019 (BoE 2019). Larger concerns regarding buffer usability might suggest a higher CCyB default level may be appropriate in a given jurisdiction. Finding the appropriate default level may be an iterative process as frameworks are refined. It will also be up to individual jurisdictions to decide whether they implement a maximum ceiling in their CCyB framework, and how this may change under a positive default framework.

Second, in order for a positive default CCyB to be effective in a downturn, regulators would need to commit to keeping the CCyB low for some time after reducing it. Banks would likely need this reassurance in order to be incentivised to operate with lower capital ratios in a downturn because they would need to have some certainty about how long they would have to rebuild their capital. It is unclear how long the CCyB would need to remain low, partly because there would be uncertainty around the duration of the downturn, and partly because banks may still need to be incentivised to continue lending during the recovery. Regulators operating a positive default framework may need to review what indicators they use to decide when to increase the CCyB back to the default rate given the approach used to increase it above the default may not be appropriate.

Finally, the regulator would need to clearly communicate that the shift alone would not result in an increase in capital requirements for banks on average, and that the higher default CCyB does not reflect a higher level of systemic risk. It would be important to communicate that, while it differs

somewhat from the original Basel III approach, it is still consistent with the Basel III framework.

Conclusion

Following the GFC, the BCBS introduced the CCyB as part of the Basel III capital framework. The CCyB is the only capital buffer that is explicitly intended to vary depending on the macrofinancial environment. The Basel III framework originally envisaged a zero default, and this is the approach still used by the majority of countries. However, a number of countries have implemented a positive default. The primary objectives of both the zero and positive default CCyB approaches are the same: to absorb losses and support lending in a downturn, thereby smoothing the financial (and economic) cycle. Events during the COVID-19 pandemic suggest that there may be advantages to a positive default approach. In particular, it allows regulators to reduce capital requirements at any point in the financial cycle, and by more. Thus it may be better able to support the supply of credit to the economy in a downturn. It will be important to assess the effectiveness of the positive approach as more evidence is built up over time. Prior to the COVID-19 pandemic, CCyB frameworks around the world had not been tested through a complete financial cycle. The different experiences of countries with positive CCyBs prior to the pandemic, compared with those that relied solely on other tools, could be a valuable input into CCyB framework considerations in the future. ✎

Footnotes

[*] Katarina Stojkov is from Financial Stability Department

[1] CET1 capital is considered the highest quality capital because it does not result in any repayment or distribution obligations on the institution. As a result, it is also the riskiest for capital owners (shareholders) and therefore carries the highest cost. It is an unrestricted commitment of funds that is available to absorb losses without triggering legal proceedings, and ranks behind the claims of depositors and other creditors in the event that the issuer is wound up.

[2] The 'financial cycle' refers to a common cycle in financial variables. There is an extensive literature as to whether the financial cycle is synchronous with the business cycle, or

differs in timing, length or amplitude – see Cagliarini and Price (2017). The extent to which the business and financial cycles are synchronised influences how the CCyB interacts with other policies, but is not central to the discussion in this article.

[3] This requirement on foreign banks means that their total global exposures are weighted by the different CCyB rates imposed by various jurisdictions.

[4] When an authority attempts to use policy to slow a financial cycle upswing, this is termed 'leaning against the wind'. A side benefit of increasing the CCyB may be that it leans against the wind because the increase in capital

- requirements makes it relatively more expensive for a bank to lend.
- [5] Including Cohen and Scantigna (2014), O'Brien, O'Brien, and Velasco (2018), and World Bank (2019). The conclusion that the CCyB may be of limited effectiveness in restraining an upswing is based on pre-existing literature applying to aggregate capital, rather than specifically to just the CCyB. Empirical evidence for just the CCyB is sparse as the CCyB is a relatively new tool that has been activated infrequently since it was developed by the BCBS.
- [6] Banks hold voluntary buffers in excess of regulatory minima at all stages of the financial cycle. These give the market more confidence about the financial health of banks.
- [7] For the BCBS jurisdictions, the main reasons prompting authorities to raise the CCyB in the years prior to COVID-19 were imbalances in the residential real estate market and excessive credit growth (BCBS 2017).
- [8] A regulator could also decide to increase capital requirements as well as implementing a positive default CCyB, but this would be a separate policy decision.

References

- APRA (Australian Prudential Regulation Authority) (2015), 'International capital comparison study', Information Paper, July.
- APRA (2019), 'Countercyclical capital buffer', Information Paper, December.
- BaFin (2020), 'General Administrative Act regarding a decrease in the domestic countercyclical capital buffer rate', IFR 2-QA 2102-2020/0002, April.
- BCBS (Basel Committee on Banking Supervision) (2010), 'Guidance for national authorities operating the countercyclical capital buffer', December.
- BCBS (2017), 'Implementation: Range of practices in implementing the countercyclical capital buffer policy', Report, June.
- BCBS (2020), Basel Committee meets; discusses impact of Covid-19; reiterates guidance on buffers, Press Release, 17 June.
- Berrospide J and R Edge (2010), 'The Effects of Bank Capital on Lending: What Do We Know, and What Does It Mean?', Federal Reserve Board, Finance and Economics Discussion Series no 2010-44.
- BoE (Bank of England) (2015a), Financial Stability Report, Issue No. 37, July.
- BoE (2015b), Financial Stability Report, Issue No. 38, December.
- BoE (2016a), Financial Stability Report, Issue No. 39, July.
- BoE (2016b), 'The Financial Policy Committee's approach to setting the countercyclical capital buffer', Policy Statement, April.
- BoE (2019), Financial Stability Report, December.
- BoE (2020), Bank of England measures to respond to the economic shock from Covid-19, March.
- Cagliarini A and F Price (2017), 'Exploring the Link between Macroeconomic and Financial Cycles', in J Hambur and J Simon (eds), *Monetary Policy and Financial Stability in a World of Low Interest Rates*, Proceedings of a 2017 Conference held by the RBA, Sydney, pp 7–50.
- CNB (Czech National Bank) (2020), Provision of a general nature II/2020 on setting the countercyclical capital buffer rate for the Czech Republic, No. II/2020, June.
- FSB (Financial Stability Board) (2020), 'COVID-19 Pandemic: Financial Stability Implications and Policy Measures Taken', Report submitted to the G20 Finance Ministers and Governors, July.
- Cohen BH and M Scatigna (2014), 'Banks and Capital Requirements: Channels of Adjustment', BIS Working Paper No 443.
- Danish Systemic Risk Council (2017), 'The countercyclical capital buffer', Framework document.

de-Ramon S, W Francis and Q Harris (2016), 'Bank capital requirements and balance sheet management practices: has the relationship changed after the crisis?', Bank of England Staff Working Paper No. 635, December.

Hajek J, J Frait and M Plasil (2017), 'The countercyclical capital buffer in the Czech Republic', Czech National Bank, Financial Stability Papers 2016/17.

HKMA (Hong Kong Monetary Authority) (2020), 'Monetary Authority Announces Countercyclical Capital Buffer for Hong Kong', Press Release, 16 March.

O'Brien O, M O'Brien and S Velasco (2018), 'Measuring and mitigating cyclical systemic risk in Ireland: the application of the countercyclical capital buffer', Central Bank of Ireland Financial Stability Note No.4.

World Bank (2019), 'Bank Capital Regulation', *Global Financial Development Report*, pp 78–100.

