

Financial Stability Review

OCTOBER 2022



RESERVE BANK OF AUSTRALIA

Financial Stability Review

OCTOBER 2022

Contents

Overview	1
1. The Global Financial Environment	5
Box A: Financial Stability Risks from Crypto-assets	16
2. Household and Business Finances in Australia	23
Box B: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows	36
Box C: Financial Stress and Contagion Risks in the Residential Construction Industry	42
3. The Australian Financial System	47
Box D: Stress Testing and Australian Bank Resilience	58
4. Domestic Regulatory Developments	65
Copyright and Disclaimer Notices	71

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Financial Stability Review enquiries:

Secretary's Department
Tel: +61 2 9551 8111
Email: rbainfo@rba.gov.au

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Overview

Financial stability risks have increased over recent months. Global financial conditions have continued to tighten as persistently high inflation has prompted an unusually rapid and synchronised increase in policy rates in advanced economies. Growth forecasts for the global economy have been revised down sharply and geopolitical tensions have severely disrupted energy markets. A turn in the global credit cycle is likely at hand, though from a starting point where loan arrears are very low and large banks are liquid and well capitalised.

In response to the sharp increase in interest rates and an increasingly uncertain outlook for the global economy, financial asset prices have declined significantly and volatility has risen over recent months. Trading conditions in energy markets, particularly for European gas, have remained fragile following Russia's invasion of Ukraine. Heightened volatility in global financial markets has seen margin calls and liquidity shortfalls transmit through parts of the financial system, including non-bank financial institutions where regulators have less visibility over the use of leverage. Bank funding markets have been less affected by the recent pick-up in financial market volatility.

Beyond financial markets, the impact of higher interest rates has been most evident in the slowing or reversing of housing price growth in many economies after a large run-up in prices over recent years. Credit remains readily available to households and firms, but growth in housing credit is slowing alongside higher interest rates.

Different regions are experiencing different financial stability challenges. A sharply deteriorating outlook for growth and inflation in Europe has reignited concerns over sovereign credit risk and related banking sector vulnerabilities in parts of the euro area. The tightening in global financial conditions, appreciation in the US dollar and high energy prices have contributed to difficult funding conditions for some emerging market economies. In China, policymakers have responded to deteriorating conditions in the property sector and the impact of rolling lockdowns by stepping up policy support; however, the policy challenges are becoming more complex and the medium-term outlook more uncertain as a result.

In Australia, households, firms and banks are generally entering this more challenging environment in a strong financial position, though pressures on household budgets and business cash flows are rising and housing prices are declining. Many Australian households and businesses built up substantial savings buffers during the pandemic, and strong growth in incomes has supported the recovery in household consumption and contributed to low levels of loan arrears.

However, the resilience across private sector balance sheets in Australia is unevenly distributed. Some households are already feeling the strain from higher interest rates and inflation, and this is likely to continue for some time. A small number of borrowers have both high debt relative to their income and low saving and equity buffers; these households are particularly vulnerable to shocks. Most borrowers have

accumulated a large amount of equity in their homes, reflecting the large run-up in housing prices over recent years and the small share of high loan-to-value lending. This reduces financial stability risks in instances where borrowers encounter debt-servicing difficulties. Business insolvencies have picked up toward more normal, pre-pandemic levels, including in sectors where cost pressures are acute.

Banks in Australia remain liquid and very well capitalised. Large capital buffers mean that banks are well positioned in the event that non-performing loans pick up from their very low levels in the period ahead. Non-bank lending has been very strong and it is important that lending standards remain prudent. Banks and non-banks continue to have ready access to wholesale funding.

Key risks to financial systems

1. Financial conditions could tighten further, leading to disorderly declines in asset prices and disruptions to financial system functioning

Financial stability risks would be magnified by a further substantial tightening in global financial conditions. One potential catalyst is that inflation stays high for longer than expected, requiring a larger and more persistent tightening in monetary policy than is currently reflected in financial market pricing. This would exacerbate the risk of a global recession and likely result in a further widening in risk premiums. Large and disorderly declines in financial asset and property prices as a result of higher interest rates and increased risk aversion could disrupt key funding markets and strain the balance sheets of some borrowers and lending institutions. A sharp drop in the demand for and supply of credit would worsen the ensuing downturn and increase the risks to financial stability.

2. As debt-servicing challenges increase, a turn in the credit cycle is likely; a sharp increase in unemployment would magnify these challenges

In aggregate, households and businesses in most jurisdictions have entered the interest rate tightening cycle with strong balance sheets and banks are well capitalised. This is also the case in Australia. However, the combination of higher interest rates and inflation will increase pressure on household budgets and business profitability over the period ahead. This is likely to lead to a turn in the credit cycle, including for lenders in Australia, following a period of very low loan arrears. Debt-servicing challenges will become more difficult still if household incomes are affected by worse-than-expected labour market outcomes.

A small group of borrowers in Australia are particularly vulnerable to repayment difficulties due to rising interest rates and cost-of-living pressures. Many of these households have low liquidity buffers, low incomes and high debt relative to their income. A large decline in housing prices that results in negative equity for households, alongside further shocks to disposable income, would increase the risk that some borrowers default on their loan commitments.

While corporate indebtedness in Australia remains low, many businesses face rising cost pressures, higher interest expenses and slowing revenue growth. Forbearance assisted many firms through the pandemic but is now winding down and insolvencies have started to pick up more recently. There is considerable variation across industries in businesses' capacity to service debt; those still dealing with pandemic-related disruptions or with energy-intensive cost bases, as well as those with low cash buffers and high levels of debt, are most vulnerable.

Bank balance sheets in Australia are expected to remain resilient to an increase in loan arrears under most plausible scenarios. However, in

some economies, a turn in the credit cycle could test the resilience of some lenders (including smaller banks and non-banks) – particularly those with relatively low capital buffers and high leverage, and/or whose lending standards have slipped in recent years.

3. Threats from outside the financial system – including cyber-attacks, geopolitical tensions and climate change – continue to pose risks to financial stability

Cyber-attacks could give rise to systemic risks, a point underscored by the recent attack on Optus. It is probable that a significant financial institution or market infrastructure will be subjected to a successful attack at some point given the increasing sophistication and frequency of cyber-attacks. This could create considerable difficulties for the institution or market concerned and undermine confidence in

the broader financial system. The growing risk of cyber-attacks calls for stepped up investment in cyber defence capabilities and increased focus on contingency and recovery plans.

Worsening geopolitical tensions present a growing risk to macroeconomic and financial stability. A deteriorating geopolitical environment has the potential to lead to widespread disruptions to global trade and capital flows. It could also magnify the risk of cyber-attacks on key institutions and infrastructure.

Finally, climate change and extreme weather events have the potential to affect economies and societies on a global scale, and thereby present a systemic challenge for private institutions and policymakers. Both physical and transition risks could result in large losses for financial institutions that are yet to put in place adequate risk controls and resilience strategies.

1. The Global Financial Environment

Amid a tightening in global financial conditions and a challenging geopolitical environment, risks to global financial stability have increased. Central banks in most economies have raised policy rates rapidly in response to persistently high inflation, alongside material downgrades to the global economic outlook. While banks are generally well capitalised and loan arrears remain low, financial asset prices have declined substantially and volatility in financial markets has increased. Liquidity conditions have deteriorated in some financial markets, most notably in government bond markets. In September, the Bank of England (BoE) intervened in the UK Government bond market to restore orderly functioning and avert material risks to financial stability. Conditions in energy markets remain volatile, and authorities in some countries announced liquidity support for energy companies that were facing margin calls and liquidity shortfalls. Higher interest rates have contributed to housing price growth slowing or reversing in many economies after a large run-up in prices over recent years.

Global financial conditions could tighten further given the high degree of uncertainty surrounding the outlook for inflation, growth and policy rates, alongside heightened geopolitical tensions and fragile liquidity conditions. A further sharp tightening in global financial conditions would increase financial stability risks, including the potential for a disorderly decline in asset prices and for high leverage and liquidity mismatches in some investment funds to amplify strains in global funding markets.

The combination of higher interest rates and inflation will make it more challenging for households and businesses to service debts, although banking systems globally are generally expected to remain resilient. Some countries – particularly in Europe, including the United Kingdom – are facing substantially higher energy costs due to disruptions in energy supply; this will impose a large negative real income shock on many households and businesses. Unemployment is expected to increase in many economies as tighter financial conditions weigh on economic growth, which is likely to contribute to an increase in loan arrears (albeit from low levels) and a decline in banks' asset quality. The downgrade to the outlook for growth and inflation in Europe has led to renewed concerns over sovereign credit risk and related banking sector vulnerabilities in some parts of the euro area.

The tightening in global financial conditions, appreciation of the US dollar and high energy prices have contributed to a pick-up in capital outflows from some emerging market economies. Energy-importing countries and those with large external financing requirements are particularly vulnerable. In China, policy-makers have responded to deteriorating conditions in the property sector and the impact of rolling lockdowns by stepping up policy support. Despite these measures, the property sector remains under considerable stress. This threatens to expose longstanding vulnerabilities affecting local governments, the shadow banking sector and small banks.

Globally, there are a number of longer term threats to financial stability that continue to attract the attention of policymakers and financial institutions. These include cyber risk, a worsening geopolitical environment, climate-related financial vulnerabilities and the emerging risks associated with crypto-assets (see 'Box A: Financial Stability Risks from Crypto-assets').

Financial market volatility has increased alongside high inflation, rising interest rates and geopolitical tensions

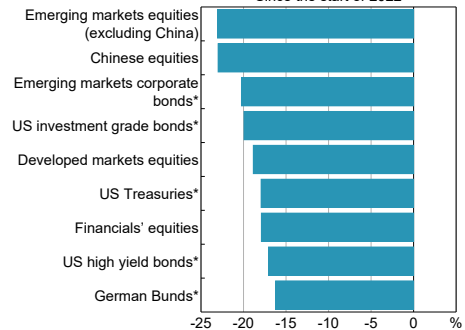
Financial asset prices have fallen in most economies this year due to a combination of higher interest rates, increased risk premia and weaker earnings outlooks for some companies (Graph 1.1). In equity markets, sectors that are more sensitive to the outlook for consumer spending (such as consumer discretionary) and those that are more sensitive to higher interest rates (such as some technology firms) have seen large equity price declines. Initial public offerings and high-yield bond issuance have fallen sharply, likely reflecting firms' reluctance to issue in an environment of higher funding costs and low or uncertain investor demand. There have been limited signs of funding stress among borrowers to date, as profitability for many firms has rebounded strongly from the pandemic and many businesses have been able to draw on cash reserves and/or have accessed other sources of funding (discussed below). Conditions in short-term funding markets have also been broadly stable.

Liquidity conditions have deteriorated in some financial markets in recent months, including government bond markets. Bid-ask spreads have widened in a number of economies' bond markets alongside high volatility and central banks slowing or ceasing purchases of government bonds (Graph 1.2). Participants in US and euro area government bond markets have noted that it has become more difficult to

execute larger trades without affecting prices. Measures of implied (i.e. expected) volatility in US Treasury bonds are elevated, reflecting the combination of the highly uncertain outlook for interest rates and liquidity strains. More severe dysfunction in government bond markets could interfere with government financing objectives, impede monetary policy transmission and amplify financial shocks.

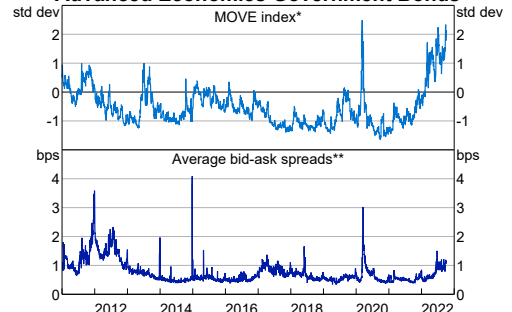
In late September, UK long-term government bond yields rose nearly 100 basis points over a two-day period, following the government's announcement of a large debt-financed fiscal stimulus package. The large increase in yields resulted in a significant increase in margin calls

Graph 1.1
Asset Price Changes
Since the start of 2022



* Increase represents lower yields.
Sources: Bloomberg; ICE Data is used with permission; RBA

Graph 1.2
Advanced Economies Government Bonds



* Implied volatility from options on US Treasury securities; number of standard deviations from historical mean.

** 10-year government bonds issued in Australia, Canada, France, Germany, Italy, Japan, Spain, the United Kingdom and the United States.

Sources: Bloomberg; RBA

associated with the interest rate hedging activity of defined benefit pension funds. This further increased the risk of asset fire sales, including of long-term government bonds, at a time when liquidity conditions were already under strain. The disorderly conditions in the bond market prompted the BoE to announce it would conduct government bond purchases over a period of a few weeks to restore orderly market functioning, and to limit financial instability. The BoE also announced it would delay plans to begin selling its holdings of UK Government debt.

More generally, aggregate outflows from investment funds into cash have increased but remained orderly. However, high leverage and liquidity mismatches in some investment funds have the potential to transmit and amplify stress, as occurred at the onset of the COVID-19 pandemic in March 2020. Major advanced jurisdictions – including the euro area, the United Kingdom and the United States – have continued work on reforms to address these vulnerabilities, but most proposals are yet to be finalised or implemented.

Energy markets, and commodity markets more broadly, have been very volatile this year as a result of disruptions to supply. Authorities in Europe and the United Kingdom announced liquidity support to energy companies in September, following a surge in gas prices, to ensure that large margin calls did not destabilise the financial system. This followed the suspension of trading in the nickel futures market on the London Metals Exchange (LME) in March 2022 under similar circumstances. As a result of these recent events and the liquidity strains experienced at some financial institutions and market infrastructures earlier in the pandemic, international bodies have reviewed margining practices in non-centrally and centrally cleared markets and are assessing whether central counterparty (CCP) margining practices can be improved to dampen

procyclicality.^[1] UK regulators have also been reviewing the governance, oversight and risk management practices of the LME and the associated CCP (LME Clear) to ensure they remain resilient. The results of the review are expected to be published in late 2022.

Pressure on some household balance sheets is growing in response to higher interest rates and inflation, and declining housing prices

Higher interest rates have begun transmitting through to new mortgage rates across advanced economies (Graph 1.3). In most advanced economies, mortgages are typically fixed for terms of five years or longer. This means that a relatively small share of existing borrowers in these economies are exposed to higher debt-servicing costs, although this share will increase as fixed-term periods expire, and new borrowers will have their borrowing capacity reduced by higher rates. Borrowers in Australia, New Zealand and some European countries will be exposed to higher rates sooner because fixed-rate mortgages are less common or have shorter average terms in these economies (Graph 1.4). For example, around 55 per cent of mortgage debt in New Zealand is variable or has a fixed term of one year or less remaining, while more than 90 per cent of mortgage debt in Norway is on a variable rate. By contrast, in the United States around 90 per cent of mortgages are fixed for 30 years; as a result, refinancing activity tends to decline sharply when interest rates rise.

Higher inflation – to the extent that it is associated with declining real wages – will make it more difficult for some borrowers to service debts, particularly lower income households that are less able to adjust their consumption because they spend a higher proportion of their income on essentials. Regulators expect that most households in their jurisdictions will be able to meet the challenges of higher debt-servicing costs and lower real incomes without

falling into financial difficulty. This is partly because many households have borrowed less than their maximum capacity, providing a buffer against higher living and debt-servicing costs. Some households also accumulated substantial saving buffers during the pandemic, which could be drawn down to meet higher costs for a time.

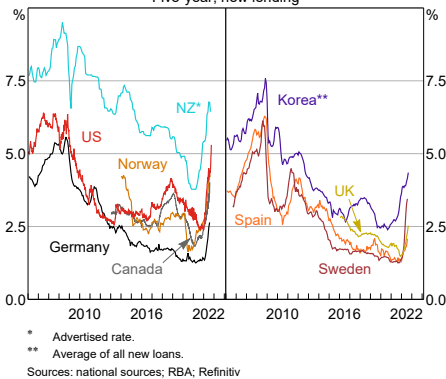
However, in contrast to those borrowers with older loans, households that took out loans more recently face more challenges and pose greater risks, as they have benefited the least from rising housing prices and have had less time to accumulate savings buffers. In some countries – such as Canada, New Zealand and

Sweden – a larger share of recent borrowers took on loans at high debt-to-income levels as a result of the sharp rise in housing prices since 2020. Debt-serviceability challenges would become more widespread if unemployment were to increase sharply or real incomes were to fall by more than is currently expected. This would increase financial stability risks, particularly if (as is plausible) such a slowdown occurred in conjunction with a sharp fall in housing prices.

After a period of very strong housing price growth, the pace of price increases has slowed in many advanced economies and prices have declined in recent months in Australia, Canada, New Zealand and Sweden (Graph 1.5). In the United States, price growth has slowed, and declining mortgage applications and other timely indicators of market conditions also suggest housing demand is easing. Private forecasters and policymakers in advanced economies generally expect prices to fall in the period ahead. Notably, the Reserve Bank of New Zealand expects housing prices to fall 15 per cent below their November 2021 peak by September 2023. Lower housing prices could amplify a slowdown in economic growth to the extent that indebted households respond to their decline in wealth by decreasing consumption and lower housing turnover reduces housing-related spending. In addition, a very large decline in housing prices would result in a larger share of borrowers falling into negative equity, increasing potential losses for lenders if borrowers default – this risk is most pronounced if unemployment rises sharply.

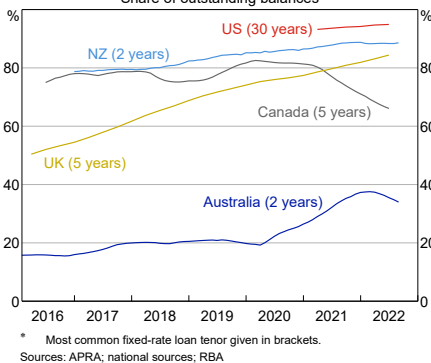
Graph 1.3

Mortgage Rates
Five-year, new lending



Graph 1.4

Fixed-rate Mortgages*
Share of outstanding balances



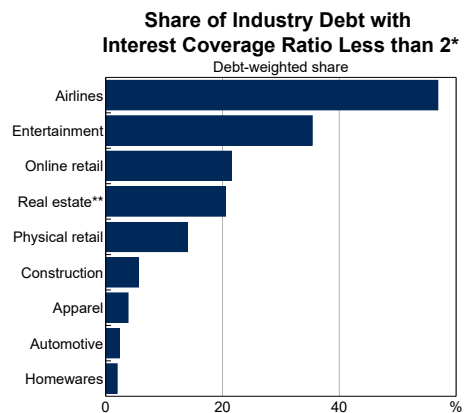
rates and higher risk premiums on corporate debt. Banks have also modestly tightened corporate lending standards. These developments pose risks for some indebted businesses, particularly those more exposed to higher input price inflation and weaker economic conditions. Businesses in the United Kingdom and Europe more broadly will face sharp cost increases due to high energy prices, although this will be mitigated to some extent by government support. Companies operating in sectors most adversely affected by the pandemic – such as airlines and some consumer discretionary industries – are yet to fully recover, and a larger share of these businesses have a low interest coverage ratio (the ratio of a company’s earnings to its interest expenses) (Graph 1.6). Real estate companies, such as investment companies and developers, also have a high share of firms with a low interest coverage ratio.

Lower rated issuers in the euro area have experienced a particularly sharp rise in corporate bond spreads and weak demand for new bonds, reflecting increased perceived default risk from higher costs and weaker economic conditions (Graph 1.7). More broadly, a higher share of debt issued by lower rated companies is floating-rate (such as leveraged loans). However, many other businesses locked in low fixed interest rates at extended maturities during the pandemic and so are not yet fully exposed to higher interest

rates. While some businesses may experience difficulty in refinancing their maturing loans, aggregate refinancing risks in advanced economies are expected to be low in the near term as cash reserves are above historical averages and corporate bond maturities are spread relatively evenly until around 2026.

The outlook for commercial real estate (CRE) is mixed. The shift towards e-commerce has supported demand for industrial properties such as distribution centres, while remote working has reduced demand for lower quality office and

Graph 1.6

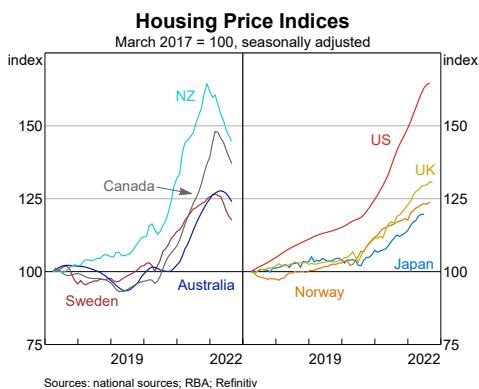


* Sample consists of public and private companies in Canada, Japan, New Zealand, the United Kingdom, the United States and 18 developed European countries. Interest coverage ratio is calculated as earnings before interest, tax, depreciation and amortisation divided by interest expense. Data are for the six-months-ended 30 June 2022.

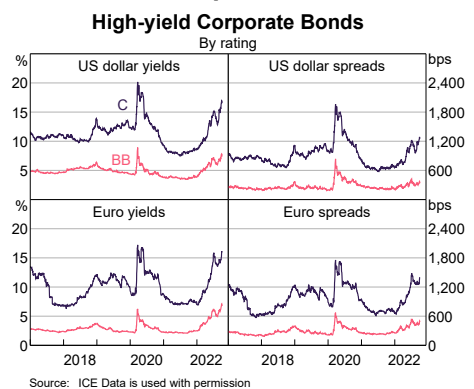
** Real estate companies include real estate operating and development companies, real estate services and REITs.

Sources: RBA; S&P Capital IQ

Graph 1.5



Graph 1.7



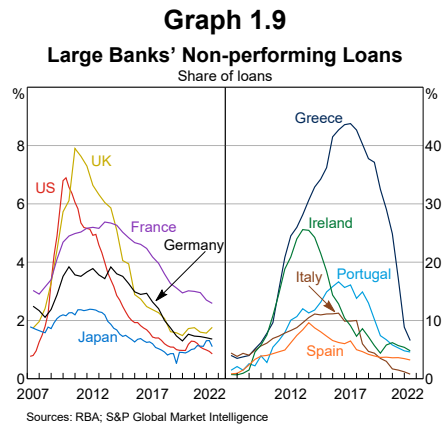
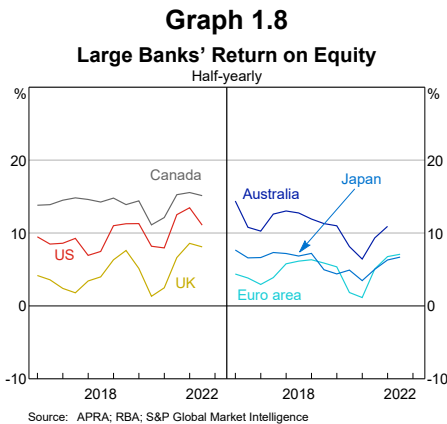
retail commercial spaces. CRE valuations are at risk of decreasing in the period ahead due to higher interest rates, tighter credit supply and macroeconomic uncertainty. CRE delinquency rates in the United States remain lower than historical averages, but are likely to pick up as economic growth slows. A large rise in CRE delinquency rates alongside lower valuations would pose financial stability risks in some economies, particularly in Norway and Sweden where banks have relatively large CRE exposures.

Banks in advanced economies have been profitable and are well capitalised ...

Large banks in advanced economies are well capitalised and have high liquid asset holdings. Banks' return on equity was above pre-pandemic levels on average in many advanced economies in the first half of 2022 (Graph 1.8). The rise in interest rates supported bank profitability, as loan rates increased by more than deposit rates.^[2] Lending growth also increased in many economies, though revenue from investment banking activity fell markedly. Capital ratios have fallen slightly across most large banks due to increases in risk-weighted assets and capital distributions to shareholders (e.g. dividends and share buybacks), but remain well above regulatory requirements. Over the

past six months, regulators in several countries have announced increases to counter-cyclical capital buffers (CCyBs) scheduled to take place over the next year, reversing reductions at the start of the pandemic. The CCyB is designed to provide resilience against vulnerabilities that can accumulate during periods of faster credit growth; regulators are able to lower CCyB buffers in the future if they judge it is appropriate to support bank lending during an economic downturn.

As pandemic-related risks have eased over the course of the year, advanced economy banks (with the exception of those in the euro area) have reduced loan loss provisions. Non-performing loan (NPL) ratios remain at low levels for most major banks (Graph 1.9). However, asset quality is likely to weaken in the period ahead as higher interest rates, rising inflation, and slower economic growth and higher unemployment make it more difficult for some households and businesses to service debt. Higher interest rates are also likely to contribute to slower loan growth. While these factors are likely to weigh on bank profits and capital ratios, recent bank stress tests indicate that large banks in advanced economies should be resilient to a sharp economic downturn.



... but vulnerabilities are higher in Europe

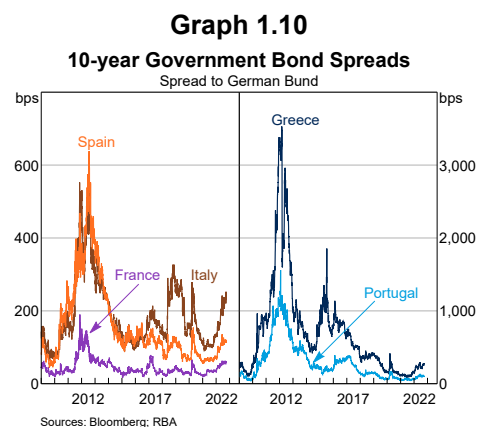
In September, the European Systemic Risk Board (ESRB) issued a warning on elevated financial stability risks in the European Union associated with the deteriorating macroeconomic outlook and tightening in financial conditions. European banks are more exposed to the macroeconomic consequences of Russia's invasion of Ukraine, including sharply higher energy prices. The ESRB noted that the worsening outlook would increase credit risks among some European banks, exacerbated by longstanding vulnerabilities – such as higher NPLs and weaker profitability stemming from underlying structural issues and high costs. Bank equity prices have declined by more in the euro area (and in Europe more broadly) than in most other advanced economies this year, consistent with a weaker outlook for profitability there. Credit default swap spreads have increased for most European banks, in particular for Credit Suisse, indicating increased demand from investors for protection against default.

Banks in some euro area periphery countries are also exposed to a deterioration in financing conditions for sovereign borrowers given their relatively large holdings of domestic and regional sovereign debt. In addition, governments in these countries are exposed to fragilities in banks' balance sheets, including because of perceptions that governments will bail out banks in trouble. Government measures to offset higher energy costs will add to government debt levels in the euro area, which could exacerbate strains in periphery debt markets. Spreads on Italian Government securities in particular have widened significantly over the past few months, reflecting high sovereign debt levels and political and economic uncertainty (Graph 1.10).

The 'sovereign-bank nexus' has been a longstanding vulnerability in the euro area,

though one that policymakers have sought to mitigate over the past decade. For example:

- The European banking union has been made more complete, partly due to the creation of the Single Supervisory Mechanism and Single Resolution Mechanism (though a European-wide deposit insurance scheme has yet to be developed).
- The NextGenerationEU package provides some countries access to relatively cheap funding and indicates a greater willingness for risk sharing among countries in the European Union.
- The European Central Bank (ECB) has taken steps recently to dampen the risk of a sharp widening in peripheral bond spreads. This has included the introduction of a Transmission Protection Instrument, which allows it to buy sovereign debt in countries experiencing a deterioration in financing conditions not warranted by country-specific fundamentals, and the reinvestment into peripheral country debt of the proceeds from maturing bonds from earlier bond purchase programs.



Stress in crypto-asset markets has not affected the broader financial system

A notable recent development has been the exceptionally large falls in the prices of crypto-assets. The total market capitalisation of all crypto-assets is currently 65 per cent lower in US dollar terms than its peak in November 2021. This revaluation has occurred alongside the sharp increase in global interest rates. Several major crypto projects have failed in recent months, starting with the collapse of the algorithmic stablecoin TerraUSD in May. TerraUSD's collapse resulted in material losses for a leveraged crypto investment fund, Three Arrows Capital, which had borrowed from a number of other crypto businesses to fund its holdings. Partly as a result, several large crypto lending platforms, including Celsius and Voyager, were unable to meet withdrawal requests from investors and some have since declared bankruptcy. The largest asset-backed stablecoin, Tether, also experienced large outflows and temporarily lost its peg to the US dollar.

These events exposed the substantial use of leverage and opaque interconnections within the crypto ecosystem, in turn highlighting the significant risks to crypto-asset investors. Spillovers into traditional financial markets have been limited, as links between crypto-assets and the broader financial system remain relatively small. However, crypto-assets could pose financial stability risks in the future if the crypto ecosystem grows and becomes more strongly interconnected with the traditional financial system (see 'Box A: Financial Stability Risks from Crypto-assets').

A number of emerging markets are vulnerable to tighter global financial conditions

Higher commodity prices and interest rates have led to financial stress in a number of commodity-importing emerging market

economies (EMEs), such as Turkey, and in some countries with a high share of external financing, such as Pakistan and Sri Lanka. Currency depreciation against the US dollar has raised the cost of servicing and refinancing US dollar-denominated debt, which comprises around 40 per cent of sovereign debt in Turkey and in some Latin American countries, such as Argentina and Colombia. The Turkish central bank has implemented a number of measures to contain a further depreciation of the lira; despite Turkey experiencing inflation of more than 80 per cent, its central bank recently lowered its policy rate to 12 per cent. Another key vulnerability for EMEs relates to the reduction in the average maturity of sovereign debt issued this year, which has increased rollover risk.

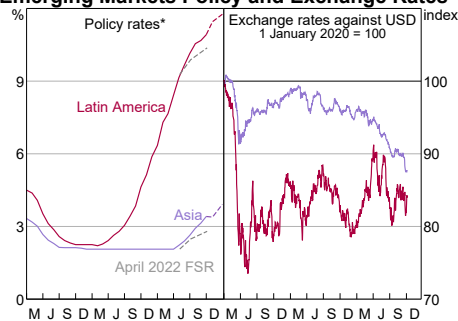
Financial conditions have also tightened for Asian EMEs, although a reduced reliance on external financing and larger holdings of foreign exchange reserves relative to previous tightening cycles have served as buffers against disorderly capital outflows. EMEs in Asia have experienced moderate portfolio outflows since March and currencies have depreciated by around 10 per cent on average against the US dollar (Graph 1.11). Portfolio outflows from Asia have been larger as a share of GDP than from Latin America, partly reflecting closer links with China (see below) and that some of these EMEs are net energy importers. Some central banks have intervened in the foreign exchange market and the Reserve Bank of India has implemented several measures to limit capital outflows and support the rupee, including liberalising rules for foreign investment in local debt markets. Most EME central banks are expected to tighten policy further in the months ahead alongside accelerated policy tightening in advanced economies and rising inflation.

Higher borrowing costs and currency depreciation have added to concerns over debt serviceability and weaker asset quality in EMEs, particularly in Asia. Household and corporate

debt are already high in Asian EMEs relative to other emerging economies (Graph 1.12). Around 10–15 per cent of bank loans are still under moratoria in Indonesia and Thailand, masking true asset quality, with some programs extended to 2023. However, capital levels in Asia are expected to be high enough to allow banks to absorb higher credit losses under most plausible scenarios: the average Common Equity Tier 1 capital ratio is 4 percentage points higher in emerging Asian economies than in other EMEs. Vulnerabilities remain elevated for India, where bank capital levels and asset quality are weaker than the regional average.

Graph 1.11

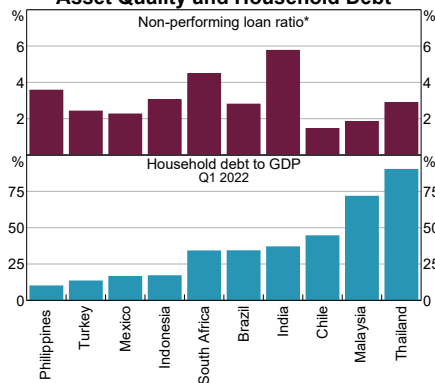
Emerging Markets Policy and Exchange Rates



* Solid lines indicate actual policy rates, dashed lines show current implied rates and implied rates as at April 2022.
Sources: Bloomberg; RBA; Refinitiv

Graph 1.12

Asset Quality and Household Debt



* Share of total loans; most recent available data.
Sources: BIS; CEIC Data; IMF

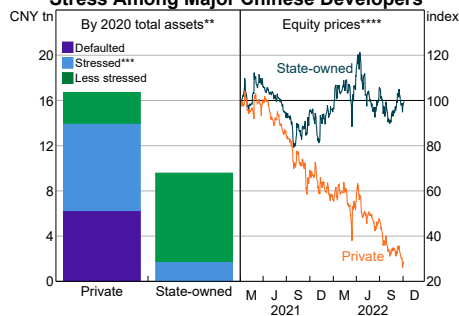
Stress in China's property sector is becoming more acute, further exacerbating vulnerabilities in its financial system

Policy challenges are growing in China and the outlook for the economy and financial system is particularly uncertain. Financial conditions for China's property developers have deteriorated further over the past six months, with higher bond yields, lower equity prices and very low pre-sales of properties (Graph 1.13). Property developers have been under increasing stress since the second half of 2021, largely reflecting their high debt levels and declining revenues. Around half of medium-to-large private developers have defaulted on offshore bonds or requested bond extensions, and stress has started to spread to some state-owned developers. There is considerable uncertainty about whether the policies announced to date will be sufficient to restore confidence in the housing market and developers are therefore likely to continue to encounter difficulties in refinancing the significant amount of debt maturing this year (US\$25 billion in bond financing).

In response to stress in the property sector and the broader economic slowdown, Chinese

Graph 1.13

Stress Among Major Chinese Developers*



* State-owned developers include mixed-ownership developers with majority state control.
** Listed property developers with total assets greater than CNY60 billion.
*** Includes those developers experiencing bond yields greater than 50 per cent, having requested a bond extension or defaulted on a trust product.
**** Equity prices of largest developers excluding those that have defaulted on bonds; 4 January 2021 = 100.
Sources: Bloomberg; Fitch; RBA; Wind

authorities have introduced several targeted measures to stimulate demand, including by further lowering key policy rates. Authorities have also promoted developer consolidation and encouraged greater provision of financing to developers, including by guaranteeing onshore bond issuance for some less-indebted developers and asking asset management companies (AMCs) to accelerate their acquisition and disposal of developers' bad debts. Some developers have received loans from state-owned enterprises and AMCs to support the delivery of stalled construction projects and to shore up buyer confidence; a plausible scenario is that local governments support the completion of some of these projects. Despite these measures, the property sector remains under considerable stress.

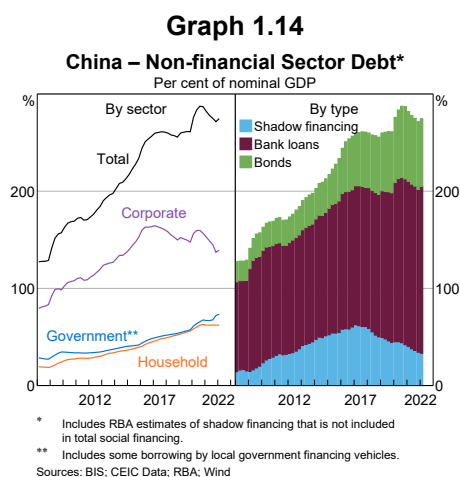
Property sector stress also threatens to expose vulnerabilities in local government balance sheets. Local governments face a potential funding gap as their expenditure on support programs increases at the same time revenues from land sales are falling. This could conflict with authorities' attempts to reduce leverage among local government financing vehicles (LGFVs), which have debt around half the size of China's GDP. LGFVs are also exposed to property prices via their purchase of land from local governments, which is often used as collateral when borrowing. A sharp fall in land prices will likely lead to losses for LGFV creditors in the event of a default.

Some LGFVs and property developers have defaulted on 'shadow banking' products, including trust loans and wealth management products. A loss of confidence in these products could spill over to the banking system because of the role banks play in their issuance and distribution, and shadow banks are an important source of funding for banks' off-balance sheet assets. The Chinese National Audit Office conducted a surprise review of Chinese trust companies' exposure to property in August

2022, highlighting the authorities' concern for contagion. The shadow financing sector remains a source of financial fragility in China as it is opaque, undercapitalised and has interlinkages with the wider financial system. This is despite a campaign by authorities to de-risk the sector and a 6 percentage point contraction in its size relative to GDP over 2021 (Graph 1.14).

Stress in the property sector could spread to AMCs (often referred to as 'bad banks'), which are highly exposed to the property sector. Indeed, expectations of large AMC losses caused declines in the prices of their perpetual bonds of around 13 per cent. Some AMCs may require government recapitalisation, which follows a recapitalisation of Huarong (a large national AMC) in 2021.

Large Chinese banks have high levels of capital and liquidity; however, repeated pandemic-related lockdowns and property sector stress have exacerbated asset quality risks for the banking system, particularly among smaller banks and especially those in poorer provinces. Smaller banks have much higher NPL ratios, have weaker provision coverage and capital positions, rely more on costly and volatile interbank markets for funding, are more closely aligned to shadow banks, and are more exposed to SMEs and the property sector. Moreover, NPL



ratios are widely believed to be under-reported, with the National Audit Office highlighting the prevalence of this practice among smaller banks in a June 2022 report. Authorities have increased local government bond quotas partly to help recapitalise smaller banks.

Overall, authorities face having to address financial vulnerabilities across many sectors at a time of weaker economic growth and a more challenging external environment. Allowing entities to fail will help achieve the longstanding priority of breaking perceptions of implicit guarantees, but at the risk of causing significant stress in the short term. As direct links between China's financial system and the rest of the world remain fairly limited, the emergence of widespread financial stress in China is likely to affect the global financial system mostly via its effect on Chinese economic activity and, to a lesser extent, an increase in risk aversion in global financial markets.

Regulators are continuing their efforts to address the financial effects of climate change

Central banks including the ECB and the BoE published results of their climate scenario

analyses earlier this year, which suggest that banks (and insurers in the BoE exercise) would generally be able to withstand financial losses from climate change. However, regulators highlighted that current analyses are likely to underestimate the impact from climate change due to gaps and limitations in available data. The ECB and the BoE reiterated that banks (and insurers) need to increase their efforts to incorporate climate risks into their strategies and risk management practices in order to meet supervisory expectations.

Throughout the year, a number of national regulators and international bodies have proposed or implemented climate-related reporting standards, as well as principles for managing climate-related risks.^[3] Regulators in Canada, the euro area and the United Kingdom have discussed the possibility of amending capital requirements to enhance the resilience of their financial systems against climate-related shocks, and some central banks, particularly in Europe, have also discussed the inclusion of climate-related factors in their monetary policy and foreign exchange reserve operations.

Endnotes

[1] See Bank for International Settlements and International Organization of Securities Commissions (2022), 'Review of Margining Practices', September.

[2] Banks' net interest margins have been compressed for several years in some economies (particularly in the euro area and Japan) as lending rates have declined while deposit rates (particularly for the retail sector) have generally remained at or above zero.

[3] For example, Canada's Office of the Superintendent of Financial Institutions (OSFI) and the US Federal Deposit Insurance Corporation published draft

climate risk management guidelines for banks, while the Basel Committee on Banking Supervision finalised principles for the effective management and supervision of climate-related financial risks. The European Banking Authority, the International Sustainability Standards Board, and the US Securities and Exchange Commission have proposed or implemented rules and standards to enhance climate-related disclosures. OSFI also introduced mandatory disclosures aligned with the Financial Stability Board Task Force on Climate-Related Financial Disclosures.

Box A

Financial Stability Risks from Crypto-assets

There are multiple types of crypto-assets

'Crypto-asset' is a broad term used to describe private sector digital assets that depend primarily on cryptography and distributed ledger technology.^[1] This Box focuses on unbacked crypto-assets and asset-backed stablecoins. **Unbacked crypto-assets** – such as Bitcoin and Ether – are so called because their value is not derived from a reserve of other financial assets. They often have very few use cases and derive most or all of their value from investors' speculation about future capital appreciation, which leaves them vulnerable to significant price volatility.

Stablecoins are crypto-assets that aim to minimise price volatility against another asset or a basket of assets – commonly a fiat currency (e.g. the US dollar) or a common store of value (e.g. gold). **Asset-backed stablecoins** maintain a reserve of financial assets that can be sold in order to meet redemption requests at 'par' (e.g. 1 Tether = 1 US dollar); however, for some stablecoins, these redemptions are not legally guaranteed and are subject to fees and restrictions.^[2] Asset-backed stablecoins are distinct from **algorithmic stablecoins**, which aim to maintain a peg against a financial asset price through various types of algorithms and incentive mechanisms tied to unbacked crypto-assets. Similar to other unbacked crypto-assets, algorithmic stablecoins are inherently fragile as the stability of the peg depends primarily on investors' confidence in the value of the underlying unbacked crypto-asset.

Stablecoins play an important role in the systems underpinning the trading and use of crypto-assets (the 'crypto ecosystem'). They are commonly used as a 'bridge' between traditional currency and other crypto-assets, or between different crypto-assets, as well as a safer store of value in the crypto ecosystem. More than 75 per cent of trading on crypto trading platforms in 2022 so far has involved a stablecoin.^[3]

Authorities in Australia and overseas are in the process of developing regulatory frameworks for stablecoins and other crypto-assets, in recognition of their potential to become systemically important in the future. A particular focus is '**payment stablecoins**' – a subset of asset-backed stablecoins with features that are specifically designed to facilitate their widespread use as a means of payment. This includes being fully backed by high-quality assets and the ability (or implied promise) for customers to be able to withdraw their funds on demand in fiat currency (similar to traditional financial products such as bank deposits or stored-value facilities).

The global crypto-asset market is small relative to other assets but has grown rapidly

The total value of crypto-assets is small relative to other asset markets such as equities; the market capitalisation of all crypto-assets is currently around US\$950 billion, equivalent to around 2.5 per cent of the US equity market. However, the crypto-asset market has grown rapidly in value and complexity over recent

Table A1: Risks to Crypto-asset Investors

	Asset-backed stablecoins	Unbacked crypto-assets
Market and liquidity risks	Redemption is not guaranteed due to the possibility of a ‘run’ (rapid withdrawal of funds with redemption compromised by illiquidity of assets). Reserves are subject to market, credit and liquidity risks.	Highly volatile and susceptible to runs because they derive all, or almost all, of their value from investors’ expectations of future capital appreciation. Losses could potentially be amplified because exchanges allow for high leverage.
Operational risks, including cyber-attacks and fraud	High risks due to opacity and reliance on unregulated service providers. Cyber-attacks on individuals or service providers are prevalent. There is minimal recourse for stolen or lost crypto-assets. Fraud and market manipulation are common. Issues for consumer protection and market integrity.	

Source: RBA

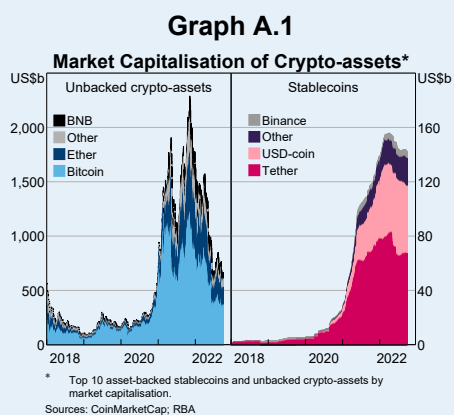
years, and has attracted increasing interest from mainstream financial institutions. Crypto-assets are also actively traded – trading values for the largest crypto-assets reached a peak of more than US\$2.2 trillion in May 2021, similar to the values traded on the Nasdaq exchange at that time.^[4] There are more than 16,000 crypto-assets in existence, although market capitalisation is heavily concentrated among a small number of larger crypto-assets (Graph A.1). As in many other economies, crypto-related activity has grown in Australia over recent years, although interconnections between the Australian financial system and crypto-assets remain small (see ‘Chapter 3: The Australian Financial System’).

Crypto-assets present significant risks to investors

Participants in crypto markets face a high level of market, liquidity and operational risks (Table A.1). These risks are exacerbated by the highly interconnected nature of the market and its sensitivity to changes in risk

sentiment. Crypto-asset prices fell sharply in early 2022 alongside increases in interest rates; these falls contributed to the failure of several major crypto projects (see ‘Chapter 1: The Global Financial Environment’).

Less-sophisticated retail participants may be particularly vulnerable to risks from crypto investments, owing to weaker security practices, less awareness of potential risks, and exposure to price manipulation by larger investors. Recent survey data indicate that retail investment remains too small to pose



issues for financial stability, although it has become much more widespread in the past couple of years. Survey data suggests around 10 per cent of households in the euro area hold crypto-assets (although most investors hold less than €5,000) and an estimated 12 per cent of US households hold or have used crypto-assets.^[5] More widespread retail investment could result in stronger real economy linkages in the future – for example, if movements in crypto-asset prices were to affect aggregate consumption through confidence and wealth effects. Highly leveraged retail investors could also pose financial stability risks if crypto investment were to become more widespread in the future.

Growing linkages between the crypto ecosystem and the traditional financial system could see risks spill over

Linkages between crypto-assets and traditional financial markets remain small. As a result, the recent episode of stress in crypto-asset markets did not spill over to affect other parts of the financial system. Nevertheless, linkages have grown in recent years due to greater involvement from institutional investors, banks and other financial institutions. The rapid growth of asset-backed stablecoins has also introduced direct linkages between crypto-assets and financial asset markets. Continued growth and stronger linkages could see financial stability risks arise from a number of sources in the future. Work is underway by policy-makers to consider what adjustments are needed to current regulatory frameworks to enable effective oversight of the risks presented by crypto-asset-related activities.

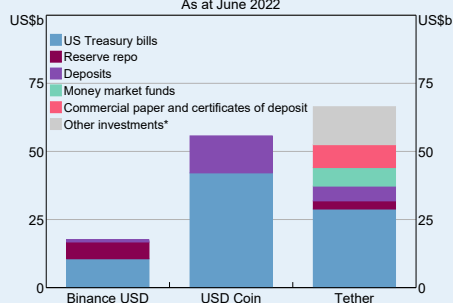
Fire sales of stablecoin reserves could cause dysfunction in funding markets

Asset-backed stablecoins are backed by financial assets, including short-term debt such as US Treasury bills and commercial paper. A run on a stablecoin – triggered by, for example, a price fall, rumours of instability or concerns about underlying asset quality – could impair the functioning of short-term funding markets if it resulted in large asset sales. Runs on money market funds (MMFs), which invest in similar assets to stablecoins, have contributed to disruptions in commercial paper markets in the past during periods of market-wide stress (including in 2008 and 2020). Relative to MMFs, some stablecoins are much more susceptible to runs because of their opacity and the lower quality of their reserve holdings – for example, Tether, the largest stablecoin, currently invests a portion of its reserves in higher yielding risky assets (Graph A.2).

At present, the stablecoin market does not yet seem large enough for a run to generate major disruptions in funding markets. The three largest stablecoins (which are all pegged to the US dollar) are comparable in size to some US MMFs, although the total value of stablecoins on issue is much smaller

Graph A.2

Stablecoin Reserves
As at June 2022



* Includes secured loans, corporate bonds, investment funds, precious metals, crypto-assets and non-US government debt securities.
Source: Stablecoin issuer disclosures

than the US MMF market (Graph A.3). Recent disclosures by these stablecoins also indicate that total holdings of reserve assets are small relative to measures of market depth. For example, Tether’s disclosed holdings of commercial paper in June 2022 accounted for less than 1 per cent of total supply outstanding and less than 10 per cent of average daily issuance. The total stock of US Treasury bills held by the three largest stablecoins in June 2022 was around US\$80 billion, while the average daily turnover in that market is more than US\$140 billion.

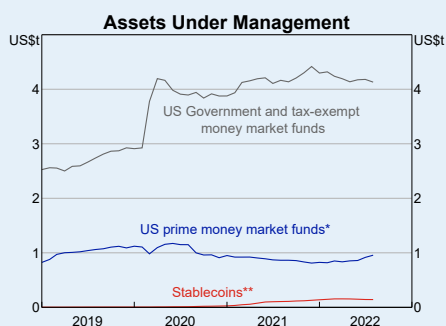
In contrast to asset-backed stablecoins, unbacked crypto-assets have minimal direct links with traditional asset markets. Nevertheless, the returns and price volatility of unbacked crypto-assets have become more correlated with traditional ‘risk assets’ such as equities since the start of the pandemic when interest rates declined to historically low levels (Graph A.4). This likely reflects the fact that a wider range of retail and institutional investors now include crypto-assets in investment portfolios and are buying and selling crypto-assets in response to broad market-wide developments that also affect other risky assets. While their

trading volumes may be large, the relatively small size of crypto-assets means spillovers from crypto-assets to financial markets such as equities are likely to be similarly small in aggregate. However, spillovers could increase if the crypto market were to grow significantly, particularly if crypto-assets were to become more actively traded by banks and other financial institutions. For example, volatility in crypto-assets that triggers margin calls could generate widespread liquidity pressures and force liquidation of traditional assets.

Banks face both direct and indirect exposures to crypto-assets

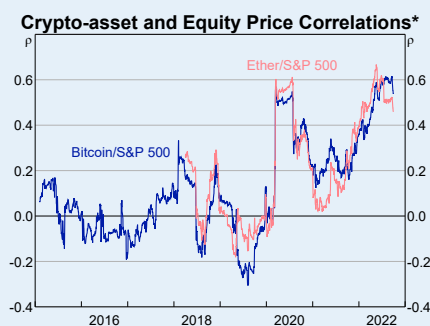
Advanced economy banks’ exposures to crypto-assets are very small at present, limiting financial stability risks. Global data collected by the Basel Committee on Banking Supervision indicated that in 2020 only a handful of internationally active banks reported having any cryptocurrency exposures, with the average exposure amounting to less than 0.02 per cent of their risk-weighted assets.^[6] More recent information from overseas authorities indicates that banks have been increasingly willing to provide crypto-related services and

Graph A.3



* Prime money market funds primarily invest in corporate debt securities.
 ** Market capitalisation; predominantly US dollar stablecoins.
 Sources: CoinMarketCap; RBA; US Office of Financial Research

Graph A.4



* 100 day rolling correlation between daily returns on unbacked crypto-assets and the S&P 500.
 Sources: CoinMarketCap; RBA

integrate crypto-assets into pre-existing services; however, the volumes and exposures involved remain small.^[7]

Banks face several risks associated with their involvement with crypto-assets, including the following:

- Banks that have direct exposures to crypto-assets, including through derivatives, face the same market, liquidity and operational risks as other investors. These risks are greatest if a bank invests in these assets directly, but they also arise if banks accept crypto-assets as collateral.
- Banks may perform broking, trading or other services that involve little market exposure but carry legal and reputational risks – for example, due to rules related to anti-money laundering and counter-terrorism financing or if customers make large losses on crypto investments facilitated by the bank.
- Banks have begun issuing their own stablecoins in experimental settings, and issuance could become more widespread in the future. This could have implications for the issuing bank's liquidity management and operational resilience, as well as for customers and payment systems, depending on factors such as the intended use case and the scale of the issuance.

Institutional investors could face large losses

Institutional investment in crypto-assets increases links between the crypto ecosystem and the traditional financial system. For example, portfolio rebalancing by large investors is likely to increase correlations between the prices of crypto-

assets and some other financial assets, increasing the likelihood that a shock to crypto-assets affects the prices of other assets.

Institutional investors' crypto-asset exposures are currently not large enough to constitute financial stability risks, but they have been increasing. Global survey data from 2022 suggests around one-third of surveyed funds held digital assets in their investment portfolios (up from around one-fifth in 2021), although crypto-assets comprised only 4 per cent of total assets under management on average.^[8]

More widespread use of crypto-assets for payments could generate risks for customers and merchants

At present, crypto-assets are not widely used for payments outside of the crypto ecosystem, and they are currently unsuitable for mainstream payments due to: high fees; capacity and speed constraints imposed by the underlying technology; and volatility (in the case of unbacked crypto-assets). However, there is considerable interest globally in the potential for stablecoins to enhance the efficiency of a range of payment and other financial services.

More widespread use of crypto-assets for payments would generate similar risks for customers and merchants as other payment systems (e.g. credit, liquidity, operational and settlement risks). The extent to which these issues pose risks for financial stability would depend on the scale and nature of the system; however, in an extreme case it could have the potential to disrupt critical financial services or threaten confidence in financial institutions. Regulators in Australia and overseas are attentive to these risks and are in the process of developing regulatory

frameworks that would apply to crypto-assets, with payment stablecoins being a particular focus.

Crypto-asset technologies are highly energy intensive

Some crypto-asset technologies – particularly ‘proof of work’ systems – require significant amounts of energy and therefore contribute to climate change, which itself poses risks to financial stability. Crypto-assets are estimated to contribute around 0.4–0.9 per cent to annual global energy usage; for comparison, the upper end of this range exceeds the total annual energy usage of Australia.^[9] Consumption increases over time, as competition for crypto-asset rewards encourages ‘miners’ verifying transactions to upgrade to faster, more energy-intensive computers. The high energy intensity of proof-of-work technologies has prompted a shift towards lower intensity technologies over recent years, such as Ethereum’s transition to a ‘proof of stake’ system in September 2022.^[10]

Work is being undertaken to better regulate crypto markets

Financial stability risks from crypto-assets remain small, but risks could escalate quickly if the crypto ecosystem grows and becomes more strongly interconnected with the traditional financial system. Central banks, domestic authorities and international bodies are undertaking significant work to understand the financial stability risks stemming from the crypto ecosystem and the need for regulatory adjustments. This

work has focused on identifying both the gaps in existing supervisory and regulatory frameworks and the infrastructure required to build resilience against risks. Greater regulatory certainty around the treatment of crypto-assets will also help to encourage innovation that could improve competition and efficiency in areas such as payments.

International regulatory bodies are currently consulting on the prudential treatment of banks’ crypto-asset exposures and have issued guidance on the application of the Principles for Financial Market Infrastructures to stablecoin arrangements.^[11] In addition, regulators are working to improve consumer protections around crypto-assets, including by targeting misleading or fraudulent advertising by crypto market operators such as exchanges and lending platforms. Most jurisdictions are consulting on, or are in the process of developing, domestic regulation – including Australia. Furthermore, regulators are working to ensure compliance of crypto activities with existing legislation. One focus is on identifying the extent to which crypto-assets and intermediaries share common features with the traditional financial system, with the goal of producing ‘technology neutral’ regulation (i.e. same activity, same risk, same regulation). For example, Australian regulators are exploring options for incorporating payment stablecoins into the proposed regulatory framework for stored-value facilities, reflecting their similar risks (see ‘Chapter 4: Domestic Regulatory Developments’).

Endnotes

- [1] Dark C, D Emery, J Ma and C Noone (2019), 'Cryptocurrency: Ten Years On', *RBA Bulletin*, June.
- [2] For example, the minimum withdrawal from Tether is US\$100,000 and incurs US\$1,000 in fees. Tether, 'Fees'. Available at <<https://tether.to/en/fees/>>.
- [3] The Block (2022), 'Share of Trade Volume by Pair Denomination', October. Available at <<https://www.theblock.co/data/crypto-markets/spot/share-of-trade-volume-by-pair-denomination>>.
- [4] Hermans L, A Ianiro, U Kochanska, V-M Törmälehto, A van der Kraaij and JM Vendrell Simón (2022), 'Decrypting Financial Stability Risks in Crypto-asset Markets', *ECB Financial Stability Review*, May.
- [5] Hermans *et al*, n 4; Board of Governors of the Federal Reserve System (2022), 'Economic Well-being of U.S. Households in 2021', May.
- [6] Auer R, M Farag, U Lewrick, L Orazem and M Zoss (2022), 'Banking in the Shadow of Bitcoin? The Institutional Adoption of Cryptocurrencies', BIS Working Paper No 1013, May.
- [7] See, for example, Hermans *et al*, n 4; Financial Policy Committee (2022), 'Financial Stability in Focus: Cryptoassets and Decentralised Finance', Bank of England, March.
- [8] Alternative Investment Management Association (2022), '4th Annual Global Crypto Hedge Fund Report', June.
- [9] The White House, 'Fact Sheet: Climate and Energy Implications of Crypto-Assets in the United States', Press Release, 8 September.
- [10] Ethereum (2022), 'The Merge'. Available at <<https://ethereum.org/en/upgrades/merge/>>.
- [11] Committee on Payments and Market Infrastructures and International Organization of Securities Commissions (2022), 'CPMI and IOSCO Publish Guidance, Call for Comments on Stablecoin Arrangements', BIS Press Release, 6 October; Basel Committee on Banking Supervision (2022), 'Basel Committee Publishes Second Consultation Document on the Prudential Treatment of Banks' Cryptoasset Exposures', BIS Press Release, 30 June.

2. Household and Business Finances in Australia

Households and business balance sheets are in strong shape overall. Strong employment growth has supported household incomes and the broader pick-up in economic activity has underpinned increases in business incomes across industries relative to the lows early in the COVID-19 pandemic. While increased consumption opportunities and higher interest payments have reduced the rate of saving, overall, households are continuing to save. Non-performing loans for households and businesses remain low.

Nonetheless, some households and businesses are already facing more challenging conditions and the combination of higher interest rates and inflation will further increase pressure on household budgets and business profitability over the period ahead (see 'Box B: The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows'). Although the labour market has tightened, household income growth has not kept pace with inflation. This has left households with less capacity to meet their rising housing costs (loan payments or rent) while maintaining their consumption and rate of saving. Reflecting this, as well as the strong recovery in household spending as pandemic restrictions eased, the household saving rate declined in the first half of 2022 from unusually high levels. To date, there have been limited signs of a pick-up in financial stress among household borrowers. This is in part due to strong employment conditions and the large liquidity and/or equity buffers established during the pandemic. It also reflects that higher policy rates feed through to higher mortgage

payments with a lag. A small group of variable-rate borrowers with low incomes, small liquidity buffers and high debt are most vulnerable to payment difficulties – including those with relatively new loans and less housing equity. Fixed-rate borrowers will also face large increases in their minimum loan payments when their fixed terms expire. As such, housing loan arrears rates are likely to increase from low levels in the period ahead.

Most businesses have benefited from the recent economic recovery and are in a strong financial position. However, some firms have been particularly affected by rising costs, labour shortages and supply disruptions and their profit margins are under pressure. Strains are acute in parts of the construction industry given the prevalence of fixed-price contracts (see 'Box C: Financial Stress and Contagion Risks in the Residential Construction Industry'). More broadly, firms with low cash buffers and high levels of debt are finding it more difficult to absorb the increases in their expenses; smaller firms are at greater risk than large and listed companies in this regard. Overall, company insolvencies have picked up, although they remain slightly lower than pre-pandemic levels. The cash flows of office and retail commercial property landlords have been impacted by subdued rental demand. In the commercial property sector, smaller landlords with lower quality properties and low liquidity may find themselves more exposed to cash flow strains.

The outlook for financial stability over the coming years will hinge in large part on the ability of households and businesses to weather

challenging economic conditions both in Australia and internationally, including higher interest rates, high inflation and slower growth. The financial resilience of households will remain closely tied to labour market conditions, both in terms of employment outcomes and growth in real incomes. While most borrowers are expected to be able to continue to service their debts, growth in household consumption is expected to slow as households cut back their discretionary spending. The trajectory for household consumption – which is subject to considerable uncertainty – will in turn influence business profits. Another source of uncertainty relates to the magnitude of potential declines in asset prices, including for housing and commercial property, following the significant price increases of recent years in most markets. Debt-servicing challenges will become more difficult if labour market conditions turn out to be worse than expected. However, liquidity buffers and high levels of net wealth and capital among leveraged asset owners and banks, respectively, should help to cushion direct financial stability risks.

In aggregate, the household sector entered the interest rate tightening cycle in a strong financial position

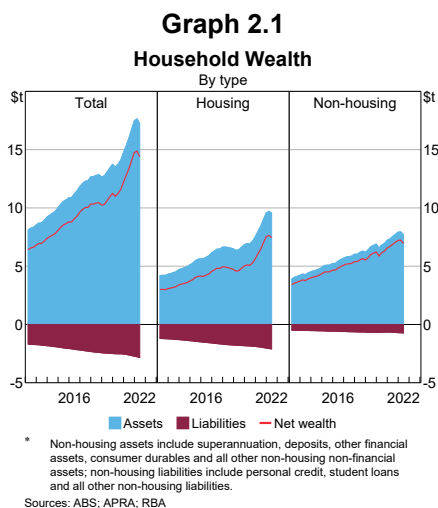
Overall, households' financial positions were strong as at the end of June (the period for which the most recent comprehensive data are available). The aggregate value of household assets was around six times larger than the aggregate value of household debt, compared to 5½ times larger at the end of 2019 (Graph 2.1). Household net wealth has increased strongly over the past two years, including for the two-thirds of households that own their homes, notwithstanding recent declines in housing prices. Non-housing wealth has also increased since the start of the pandemic, reflecting increased saving; however, this will have been weighed down more recently by declining

financial asset prices. Very low interest rates and strong growth in employment and income enabled households to continue to add to their already-large liquid saving buffers in the first half of 2022.

Financial stability risks from the large stock of household debt have been mitigated by a large increase in liquidity buffers since the start of the pandemic. Balances in offset and redraw accounts have increased by around \$110 billion – or 7 per cent of household disposable income – since March 2020. Indebted households have continued to add to their already-large liquidity buffers in recent months despite the rise in minimum loan payments. Consistent with this, housing loan arrears rates remain very low (see 'Chapter 3: The Australian Financial System').

Rising interest rates and declining real incomes are beginning to put pressure on household budgets ...

Increases in interest rates since May, together with high inflation, have reduced the amount of spare income available to households after meeting housing costs and basic living expenses. This has placed some strain on household budgets. For indebted households, the reductions in spare income have been



largest to date for the two-thirds of borrowers with variable-rate mortgage debt, although lags between changes in the cash rate and increases in payments mean the announced rate rises are yet to pass through completely.

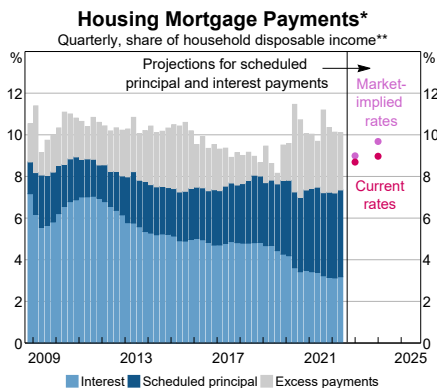
Total scheduled payments on housing loans are projected to increase to around 9 per cent of household disposable income by the end of 2023 (based on interest rate increases announced between May and October flowing through to variable loan payments and as fixed-rate loans roll off) (Graph 2.2). If interest rates were to increase broadly in line with market expectations out to the end of 2023, aggregate scheduled interest and principal payments are projected to rise to a level that is roughly on par with the total payments households were making (including excess payments into offset and redraw accounts) prior to the commencement of the tightening cycle. This suggests that households in aggregate are reasonably well placed to adjust to a period of higher interest rates – however, as discussed below, the experience across individual households will vary considerably.

Scenario and sensitivity analysis indicates that the majority of owner-occupiers with variable-

rate loans have the ability to adjust to a period of higher interest rates and inflation, in part due to their substantial savings buffers; however, a small share of these borrowers are vulnerable to debt-servicing difficulties and, ultimately, default (see ‘Box B: The Impact of Rising Interest Rates and Inflation on Indebted Households’ Cash Flows’). Borrowers with fixed-rate loans have experienced rising cost-of-living expenses in recent months, but will also face potentially large increases in mortgage payments as their fixed-rate terms expire in the period ahead. For housing investors, strong ongoing rental demand should support their housing income and therefore their loan payment capability over a period where debt-servicing costs increase. On the other hand, increases in rents and living costs more broadly have put pressure on renters’ spare cash flows recently.

Overall, there have been limited signs in the official data of a pick-up in financial stress across Australian households to date, in part reflecting strong ongoing growth in employment and incomes. This is consistent with timely indicators that show household spending has held up in recent months and information from liaison with banks. However, the experience across households has been uneven, and some more timely (albeit indirect) sentiment-based measures of financial stress among households have started to turn. For example, household perceptions of their own financial situation have weakened considerably to be around levels reached early in the pandemic (Graph 2.3). Google searches on financial stress and negative sentiment in financial news articles, which have historically borne some relationship with loan arrears, have generally trended higher. Information from the Bank’s liaison program also suggests that demand for a range of social and community services – including low-cost housing and food services – has increased of late. Increases in indicators of financial stress are likely in the period ahead.

Graph 2.2



* Dots show projections for the sum of interest and scheduled principal payments as a share of income. Based on OIS projections for the cash rate as end 2022 and end 2023. Assumes full pass-through to variable-rate mortgages and that fixed-rate loans roll onto variable-rate mortgages.

** Seasonally adjusted and break-adjusted.

Sources: ABS; APRA; RBA

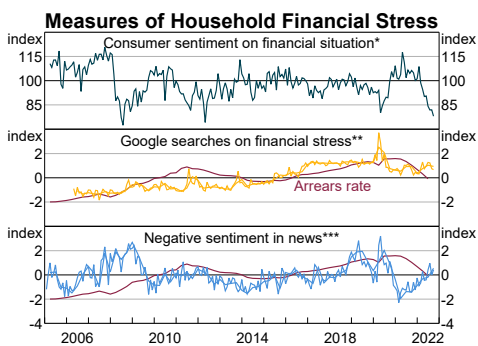
... but most borrowers remain well placed to service their debt

Most indebted households are well-placed to manage the recent increase in their housing and other living expenses as they have had sizeable spare income available after meeting their debt and basic living expenses and many have accumulated large savings buffers over recent years. When taking out a loan, a household's ability to service its debt is assessed based on higher interest rates than those prevailing at the time of origination. The Australian Prudential Regulation Authority requires lenders to apply minimum interest rate buffers when assessing the ability of new borrowers to service their debt; this minimum buffer is currently at least 3 percentage points above the loan interest rate. Further, only a small share of households borrow the maximum possible based on their lenders' assessment rate, and so most commence their loans with a larger effective cash flow buffer than required by their lender. Consistent with this, many indebted households have accumulated a sizeable stock of liquid savings that could be used to support their consumption and/or meet increased loan payments if necessary.

The Reserve Bank's Securitisation Dataset indicates that, as at August, a little over 35 per cent of all borrowers had prepayment buffers (in the form of offset and redraw account balances) equivalent to more than two years' worth of their minimum payments, while almost one-quarter had buffers of between three months and two years (Graph 2.4). For the median owner-occupier variable-rate borrower, mortgage prepayment balances in offset and redraw accounts were sufficient to cover 20 months' worth of required payments as at August. This is down from 22 months in April, reflecting the recent increase in interest rates and so larger required monthly payments.

By contrast, a little less than 40 per cent of borrowers have relatively low mortgage buffers (less than three months of payments). However, 40 per cent of these low-buffer borrowers have fixed-rate loans or are investors with loans originated before 2021. In general, fixed-rate borrowers and investors face contractual restrictions or disincentives to make excess payments. Accordingly, this subset of borrowers are likely to have liquid savings outside of their mortgage accounts, and so this metric could overstate their vulnerability. Indeed, survey data

Graph 2.3



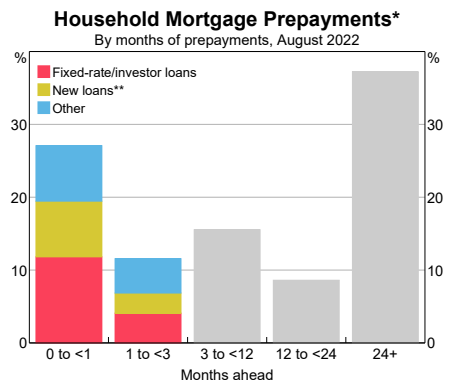
* Compared to a year ago, average since 1980 = 100.

** Tracks relative frequency of Google searches based on key words related to household financial stress; index normalised to have mean zero and standard deviation of one.

*** Tracks the relative negative sentiment within financial news articles published in Australia that are relevant to households; index normalised to have mean zero and standard deviation of one.

Sources: APRA; Dow Jones Factiva; Google; RBA; Westpac-Melbourne Institute

Graph 2.4



* Months ahead expressed as number of months that prepayments (including offset and redraw balances) can cover minimum scheduled payments. Includes split loans. Only loans with less than 3 months of prepayments are broken down by loan type.

** New loans are those originated during 2021 and 2022. These are somewhat under-represented in the Securitisation data as new loans can take some time to be securitised.

Sources: RBA; Securitisation System

suggest that, although investors have smaller buffers in the form of prepayment facilities, they have historically tended to hold more liquid assets than owner-occupiers (data limitations make it difficult to obtain a timely read on the liquid asset holdings of investors and fixed-rate borrowers).^[1] The remainder of low-buffer households (around 20 per cent of all borrowers) are more vulnerable to large shocks to their income or expenses, particularly if they entered the tightening cycle with little in the way of spare monthly cash flow.

In addition to large liquidity buffers, strong housing price growth over recent years has meant that most households have substantial equity buffers in their homes. Just 5 per cent of loans in the Bank's Securitisation Dataset were estimated to have an outstanding loan-to-valuation ratio (LVR) greater than 75 per cent as at August. Moreover, very few loans were in negative equity at that time and, as discussed below, very large further declines in housing prices would be required to materially increase the share of loans in negative equity.

Some recent borrowers and those with a combination of high debt and low liquidity buffers are vulnerable to rising expenses

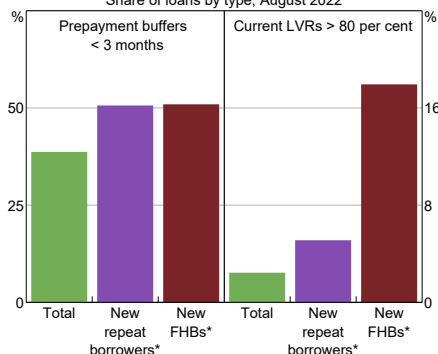
Recent home buyers are more vulnerable to debt-servicing challenges and default in a rising interest rate environment, as they have had less time to accumulate liquidity and equity buffers. Information from the Securitisation Dataset shows that, as at August, around half of all home buyers who took out loans since the start of 2021 had prepayment buffers equivalent to less than three months of their scheduled payments; this compares to less than 40 per cent of total borrowers (Graph 2.5). Recent home buyers – and in particular first home buyers (FHBs) – are also over-represented among borrowers with low equity buffers; this cohort has a higher share

of loans with current LVRs greater than 80 per cent.

In addition, highly indebted borrowers are more vulnerable than others because their interest expenses are more sensitive to increases in interest rates. Home owners who borrowed in the past two years are more likely to be highly indebted. The share of new lending with a debt-to-income (DTI) ratio greater than six has risen sharply over the past couple of years and, notwithstanding recent declines, remains elevated (Graph 2.6). The interest rate used by lenders to assess borrowers' capacity to service their debts (serviceability assessment rate) has also been lower, on average, for recent cohorts of borrowers, in line with lower interest rates during the pandemic. As a result, in addition to being more indebted, more recent borrowers are also likely to have smaller buffers between their actual loan interest rates and the rate at which their loans were assessed and so may be closer to encountering constraints on their ability to service their debts than other borrowers.

The most vulnerable borrowers are those who are both highly indebted and have low prepayment buffers; overall, these borrowers make up only a small share of indebted

Graph 2.5
Loans with Low Liquidity or Equity Buffers
Share of loans by type, August 2022



* New loans are those originated during 2021 and 2022. These are somewhat under-represented in the Securitisation data as new loans can take some time to be securitised.

Sources: ABS; CoreLogic; RBA; Securitisation System

households. As at August, around 1 per cent of all variable-rate owner-occupier loans had a loan-to-income (LTI) ratio greater than six and prepayment buffers equivalent to less than one month of payments, with lower income households over-represented in this group (Graph 2.7). Based on a much broader and more conservative metric of 'high' debt, those with an LTI ratio greater than four and prepayment buffers of less than three months accounted for around 6 per cent of all owner-occupier variable-rate loans. Overall, the low share of borrowers with both high debt and low buffers is consistent with survey data showing that highly indebted households tend to have large liquidity buffers.^[2]

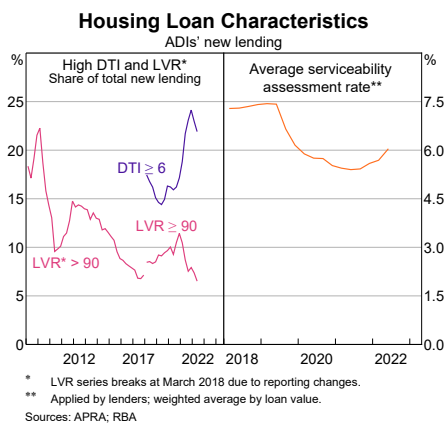
Variable-rate borrowers face large increases in their minimum payments, but many have been making large excess payments and so are well equipped to manage

Variable-rate mortgages account for around 65 per cent of outstanding housing credit. Although higher interest rates are increasing variable-rate borrowers' minimum mortgage payments, many borrowers' regular payments will not increase by as much as the required minimum as they have been making sizeable excess payments into offset and redraw facilities.

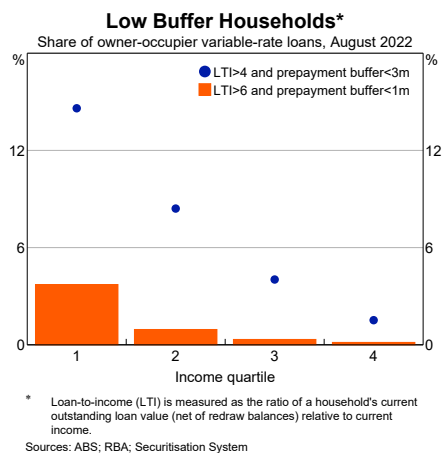
Once the 2½ percentage points of cash rate increases between May and October have been fully passed through to loan payments, estimates suggest:

- Around 40 per cent of variable-rate borrowers would not have to increase their payments at all, relative to their average payments (including excess payments) over the past year. A further 15 per cent would experience less than a 20 per cent increase in the dollar value of their monthly payments (relative to their average payments over the past year).
- Around 20 per cent of variable-rate borrowers will have their minimum loan payments increase to more than 30 per cent of their incomes (Graph 2.8).
 - Of this group, around one-third had been making payments that were larger than their new required minimums, suggesting they are relatively well equipped to manage.
 - However, others are more vulnerable because they have lower income and/or low saving buffers. Borrowers with projected debt-servicing ratios above 30 are much more likely to be in the lower half of the income distribution for

Graph 2.6



Graph 2.7



variable-rate borrowers than other borrowers, while around one-third are estimated to have low prepayment buffers (equivalent to less than three months' of minimum payments).

If interest rates were to rise by a cumulative 3½ percentage points (broadly in line with current market expectations to the end of 2023) and incomes were to grow in line with forecast wages growth, the share of borrowers facing a minimum debt-servicing ratio greater than 30 would increase to around 25 per cent by the end of 2023. This figure would be higher if unemployment were higher and income growth did not increase as expected.

Many fixed-rate borrowers will face a large increase in their payments when their fixed terms expire

Around 35 per cent of outstanding housing credit is on fixed-rate terms (including the fixed component of split loans, which have become increasingly popular in recent years). Around two-thirds of these loans are due to expire by the end of 2023 (Graph 2.9). Based on current

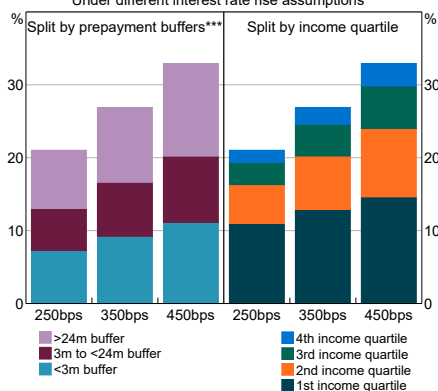
market pricing for the cash rate and assuming full pass-through to variable mortgage rates, most fixed-rate borrowers with loans expiring in 2023 will face discrete increases in their interest rates of 3–4 percentage points when they roll over to variable rates, depending on their current rate and the timing of their fixed loan term expiry.

If interest rates were to rise by a cumulative 3½ percentage points from the beginning of the current tightening cycle to the end of 2023, almost 60 per cent of borrowers with fixed-rate loans would face an increase in their minimum payments of at least 40 per cent when they expire (Graph 2.10). In this situation, just over one-third of fixed-rate borrowers will not experience any increases in their minimum payments by the end of 2023, mostly because they have loans that are due to expire in 2024 and beyond.

Only limited information is available to assess whether fixed-rate borrowers will experience difficulty with these increased minimum payments as these borrowers tend to accumulate savings outside of their mortgages (as contractual limitations restrict their ability to save via offset and redraw facilities). Given very low interest rates and the broad-based increase

Graph 2.8

Share of Variable-rate Loans with Loan-servicing Ratios Greater than 30 per cent*
Under different interest rate rise assumptions**



* New minimum loan payment to income ratio. Income at origination grown forward to the September 2022 quarter using WPI (including forecasts). Excludes split loans.

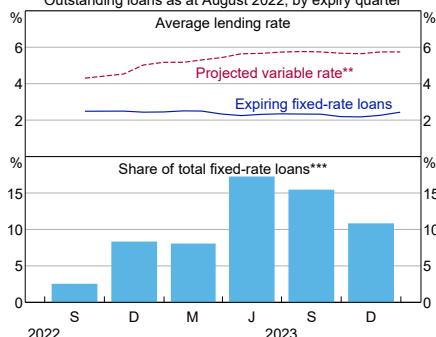
** Relative to the start of the monetary policy tightening cycle.

*** As at April 2022 (prior to tightening cycle).

Sources: ABS; RBA; Securitisation System

Graph 2.9

Projected Expiration of Fixed-rate Loans*
Outstanding loans as at August 2022, by expiry quarter



* Assumes fixed-rate loans are not repaid early or refinanced.

** Based on OIS market path for the cash rate as at 4 October and assuming full pass-through to variable mortgage rates.

*** Another 38 per cent of fixed-rate loans will expire in 2024 and beyond.

Sources: Bloomberg; RBA; Securitisation System

in household saving over recent years, many fixed-rate borrowers are likely to have accumulated liquidity buffers during the fixed loan term (particularly as many will have demonstrated a capacity to service higher interest rates prior to refinancing at lower fixed rates). However, some will be vulnerable. Information from the Bank's Securitisation Dataset indicates that the current (large) cohort of fixed-rate borrowers tend to have similar incomes to variable-rate borrowers, suggesting both groups are likely to have a similar capacity to save, on average. This is in contrast to less-timely survey data that indicate that fixed-rate owner-occupier borrowers have historically had lower liquid assets and disposable income than other borrowers. For split loans, borrowers are saving in the variable component of their loans, with the distribution of excess payments across split borrowers similar to that of borrowers with variable-rate loans.

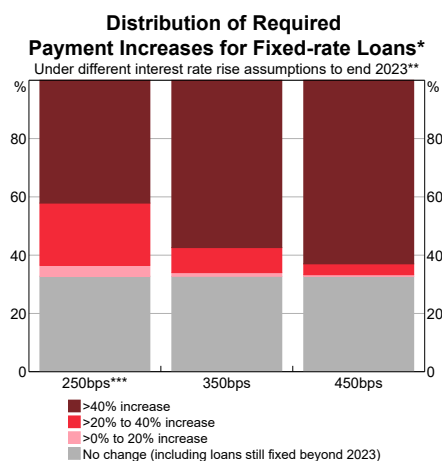
The small share of borrowers who have recently moved to variable-rate loans at the expiry of their fixed-rate terms appear to have managed the transition so far. Among owner-occupier

loans in the Securitisation Dataset that were observed to have rolled on to fully variable rates between February and June 2022, roughly 20 per cent increased their prepayment buffers by more than six months soon after transitioning to variable rates. This is suggestive of lump-sum transfers from other liquid asset holdings, and was 8 percentage points higher than the share of owner-occupier variable-rate loans that increased their buffers by six months or more over the same period. However, a little more than half did not adjust their prepayment buffers soon after they had transitioned to variable rates, indicating the practice was not particularly widespread.

Recent first home buyers would be more exposed to a sizeable fall in housing prices than other borrowers

Most indebted households have accumulated a large equity buffer over recent years through strong price growth and large excess payments, which reduces the likelihood of lenders' losses in the event of a default. However, recent borrowers are at greater risk of entering negative equity should housing prices decline significantly. This risk is more material for FHBs, who tend to enter the housing market with relatively high initial LVRs (Graph 2.11). Newer loans, including those taken out by FHBs, are more likely to experience negative equity not only because borrowers tend to start with higher LVRs than repeat buyers and investors but also because they have had less time to accumulate excess payments and to benefit from housing price growth. Recent FHBs are also more likely to experience financial stress. Nevertheless, these loans do not pose a systemic risk to banks as they account for less than 10 per cent of all outstanding loan balances. Consistent with this, even very large future housing price declines would only result in a small share of all loans entering negative equity, although an environment in which there were a

Graph 2.10



* Fixed rate loans that expire in 2022 and 2023 are assumed to roll on to the average variable rate (which depends on the assumed change in rates); fixed rate loans that expire beyond 2023 are in the 'No change' category.

** Relative to the start of the monetary policy tightening cycle.

*** Changes announced as at October 2022 Board meeting.

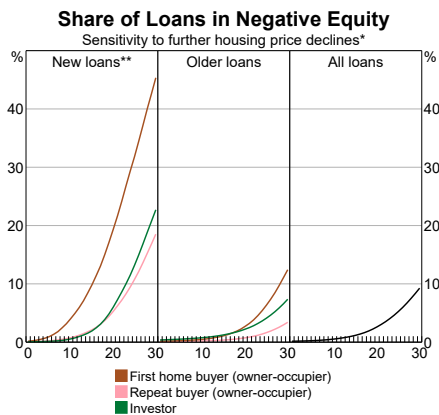
Sources: RBA; Securitisation System

large number of forced sales could further amplify the price cycle.

Renters are also facing heightened financial pressures

Strong growth in rents in response to low vacancy rates will support the cash flows of indebted housing investors and therefore their ability to service their debts. However, more renting households are likely to experience financial stress as cost pressures continue to increase. More than one in five renting households move home in a given year, and rents for newly advertised properties have risen sharply across the country (Graph 2.12). Compared to indebted households, renters tend to have lower spare incomes (after meeting their housing costs and basic living expenses) and lower savings buffers, making them more vulnerable to increases in rents and the cost of living more broadly. This is one reason why renters have historically been more likely to report experiencing financial stress than indebted owner-occupiers.

Graph 2.11



* Each percentage decline is applied to the price levels that prevailed in each SA3 region during August 2022, separately for houses and apartments.

** New loans are those originated during 2021 and 2022. These are somewhat under-represented in the Securitisation data as new loans can take some time to be securitised.

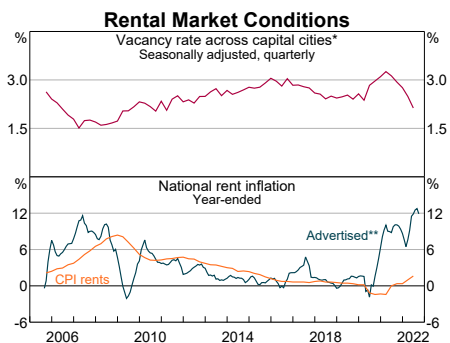
Sources: ABS; CoreLogic; RBA; Securitisation System

Many businesses are facing pressure on their profitability due to rising costs ...

Firm-level data suggests that many businesses' net profit margins were yet to fully recover to pre-pandemic levels by March 2022 (the latest available data). For the median company, the net operating profit margin was around 2.5 percentage points lower than before the pandemic, albeit with considerable variation by industry (Graph 2.13). While profit margins were broadly around pre-pandemic levels for many firms in the retail and accommodation & food services industries by the March quarter, they remained relatively low for many firms in the construction, transport and education industries. There was also considerable variation in profitability across individual firms, with around one-third reporting negative quarterly operating cash flows in the March quarter, a slightly higher share than prior to the pandemic.

While demand has generally been strong for many businesses, inflation pressures, labour shortages and supply disruptions have presented challenges to profitability, particularly for businesses with limited ability to raise their prices to offset higher input costs. This has been especially evident in the residential construction industry due to the prevalence of fixed-price contracts, and has contributed to a pick-up in financial stress and insolvencies (see 'Box C:

Graph 2.12



* Excludes Adelaide from 2015 to 2018.

** Hedonic rolling three-month average.

Sources: ABS; CoreLogic; RBA; REIA

Financial Stress and Contagion Risks in the Residential Construction Industry’).

... which could pose challenges for those with high levels of debt and low cash buffers

Lower profitability reduces debt-servicing capacity, compounding the effect of recent increases in variable business lending rates for some indebted firms. Currently unprofitable small and medium enterprises (SMEs) appear particularly exposed, as they tend to be more indebted than profitable SMEs – and are therefore already more vulnerable to rising interest rates (Graph 2.14). Larger firms are typically more indebted than smaller firms, but they also tend to have a higher capacity to service debt because they have more diversified and stable incomes. Overall, large businesses tend to have similar leverage regardless of whether they are currently profitable or unprofitable.

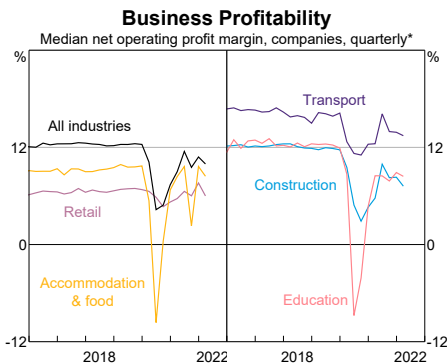
Firms with weak or negative operating profits will also need to rely more heavily on cash reserves to support their operations or service debts. While aggregate cash holdings were around 25 per cent higher in the June quarter than before the pandemic, data on businesses’ bank deposits indicate that this

disproportionately reflects increased cash balances for larger businesses. Average cash balances for SMEs are typically lower relative to their size and have been declining over 2022, again suggesting these firms are more vulnerable to weak profit outcomes in the period ahead.

Large listed companies nevertheless remain healthy ...

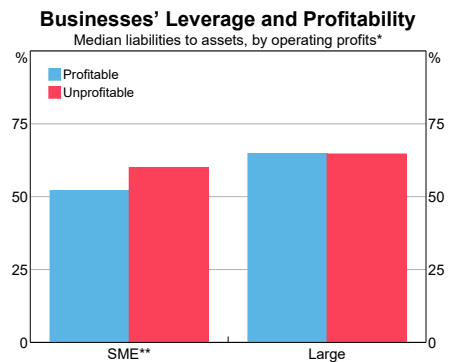
The financial positions of most listed companies remained strong over the first six months of 2022. Profitability was broadly stable, and liquidity ratios remained substantially higher than in pre-pandemic years (Graph 2.15). Gearing ratios have also been little changed over the past couple of years and, as at June 2022, the majority of companies had an interest coverage ratio (ICR) above two (i.e. annual profits were at least twice as large as interest expenses). Historically, firms with an ICR below two have tended to be at higher risk of insolvency. The share of leveraged listed companies that appear vulnerable to debt-servicing difficulties is reasonably low, with only around 15 per cent having both an ICR below two and a liquidity ratio (the ratio of short-term assets to short-term liabilities) of less than one. Financial market

Graph 2.13



* Net profits measured as operating revenue less operating costs and wages; not including government support payments (e.g. JobKeeper); includes all GST-remitting companies (~500,000); seasonally adjusted.
Sources: ABS; RBA

Graph 2.14



* Liabilities and assets as reported in June 2020; profits are operating revenue less operating costs and wages in the March quarter 2022; includes indebted GST-remitting companies (~150,000).
** Firms with annual turnover below \$50 million.
Sources: ABS; RBA

pricing of risk (which measures a company’s risk of technical default) remains low.

... and most remain well placed to service higher interest expenses

The average variable rate on large businesses’ outstanding bank loans has increased since the end of April. However, many listed companies source some of their borrowing through fixed rates and/or use interest-rate swaps that moderate the short-term effect of increases in interest rates. Indeed, as at the most recent data (to the end of June), listed companies’ interest expenses had so far been little changed. While increases in corporate bond yields have been somewhat larger, nearly all bonds outstanding for ASX-listed companies are issued on fixed-rate terms, and only around 10 per cent of bonds are due to expire in the next 12 months (equivalent to only a couple of per cent of ASX-listed company debt, excluding hybrid securities). Given these considerations, for most listed companies the pace of increases in debt-servicing costs is likely to be gradual.

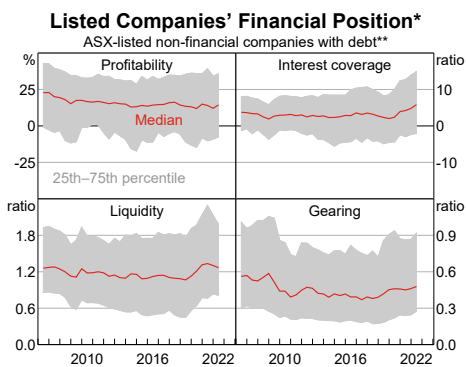
Higher lending rates will more fully pass through to listed companies’ debt-servicing costs over the medium term as fixed-rate loan terms expire

and hedges roll off; however, most leveraged firms are well placed to absorb higher interest expenses. Estimates based on current profits suggest that for each 100 basis point increase in the average variable business lending rate, relative to the start of the current tightening cycle, the debt-weighted share of listed companies with a low ICR would increase by between 2 and 5 percentage points (Graph 2.16). This may be a high estimate, as historically profits have typically increased alongside rising interest rates (this analysis assumes constant profits). A scenario where profits instead decline noticeably – assuming a simple 10 per cent decline for illustrative purposes – suggests the share of businesses with a low ICR would be somewhat, but not markedly, higher.

Company insolvencies have increased further, but remain low

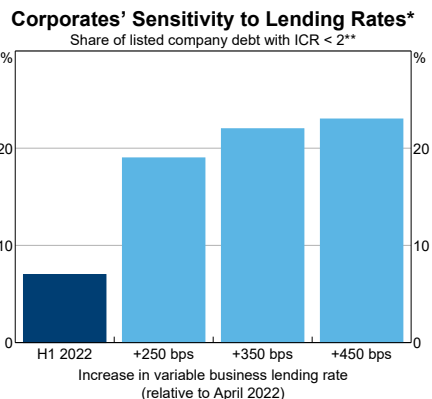
Policy support and cash buffers accumulated early in the pandemic helped build resilience for many businesses, and over recent quarters most firms benefited from the strong economic recovery. Accordingly, the non-performing share of banks’ business loans has remained very low. Trade credit payment times, which can be an

Graph 2.15



* Profitability measured by profits over equity, liquidity by current assets over current liabilities, gearing by debt over equity, and interest coverage by profits over gross interest expenses. There is a gradual structural break in gearing ratios over 2019 and 2020 due to an accounting change. Data are bi-annual; latest observation is as at June 2022.
** Excludes companies with a ratio of debt to assets less than 10 per cent.
Sources: Morningstar; RBA

Graph 2.16



* Leveraged ASX-listed non-financial companies. Full pass-through assumes all debts are variable rate.
** ICR is calculated as profits (EBITDA) over gross interest expenses.
Sources: Morningstar; RBA

early indicator of potential financial stress, also remain lower than prior to the pandemic and within the ranges of recent quarters.

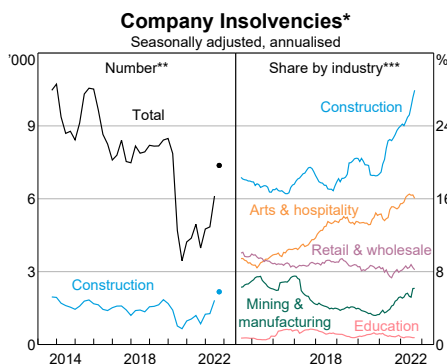
Insolvencies have risen further but remain slightly below pre-pandemic levels. The recent increase has been driven largely by developments in the construction industry, though insolvencies in a range of other industries have also drifted higher since September 2021 (Graph 2.17). Further increases in insolvencies are likely in the period ahead as economic activity slows and vulnerable businesses draw down further on cash buffers. The resumption of Australian Taxation Office enforcement activities on unpaid tax is also likely to continue to prompt some businesses that are unable to pay their debts to commence formal insolvency procedures, contributing to higher insolvencies. Nonetheless, broader financial stability risks from rising insolvencies appear low; a material deterioration in economic conditions would likely be required for this assessment to change.

Retail and office property market conditions remain weak but do not pose material financial stability risks at present

Underlying tenant demand for retail and central business district (CBD) office property remains weak. As at June 2022, market rents in both segments were around 10 per cent lower than pre-pandemic levels. Retail shopping centre vacancy rates remain elevated, particularly in the CBDs of major capital cities where the pandemic has had a persistent dampening effect on economic activity (Graph 2.18). Consistent with this, CBD office vacancy rates have also remained high over the past year. While demand for prime office space has increased modestly, this has been broadly matched by additions to the office stock. Conditions in secondary-grade office markets are weaker, in part because some tenant demand has moved to discounted higher grade properties. By contrast, demand for industrial property remains strong and vacancy rates are low.

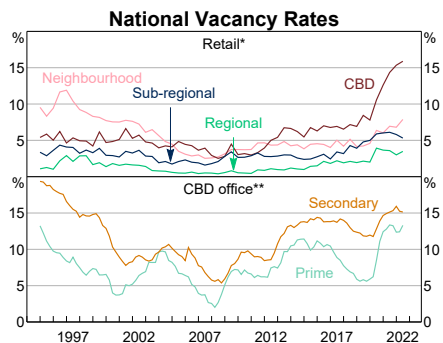
Financial stability risks from weak leasing conditions in the retail and office sectors remain low, but would be expected to increase if economic conditions were to deteriorate substantially. The non-performing share of banks' commercial property lending remains

Graph 2.17



* New external administrations and controller appointments.
 ** The dots are September quarter estimates based on monthly observations for July and August 2022.
 *** 12-month rolling basis; selected industries.
 Sources: ASIC; RBA

Graph 2.18



* Speciality store vacancy rates. Regional centres are anchored by department stores, sub-regional by discount department stores, and neighbourhood by supermarkets; CBD includes a variety of retail formats.
 ** Central business districts in mainland state capital cities and Canberra.
 Sources: JLL Research; RBA

negligible and banks' overall exposures remain low, at around 6 per cent of assets. Moreover, large listed Australian real estate investment trusts (A-REITs), which directly own around 60 per cent of retail shopping centre space and roughly 10 per cent of total office space, maintained healthy financial positions over the first half of 2022. Near-term increases in financing costs for A-REITs are likely to be manageable, as most have either fixed-rate debt or use interest-rate swaps to hedge interest rate exposure and only a small share of debt funding is due to roll off over the next year. While information on the financial health of smaller landlords is limited, liaison with banks suggests the vast majority of these borrowers will be able to meet higher debt payments, though some could struggle if their earnings were to decline significantly. Comprehensive information on the commercial property exposures of non-bank lenders is also not readily available, and so it is possible that impairment rates are higher in that part of the market.

Although declines in commercial property valuations are possible, risks to banks are contained

Commercial property valuations are likely to decline in coming quarters given recent and prospective increases in interest rates; ongoing

weakness in tenant demand in some segments could amplify the magnitude of falls. In this event, some leveraged investors in commercial property could realise sizeable losses. Some could be in breach of LVR covenants on their debt and, if they are unable to contribute more equity or renegotiate loan payment terms, could be forced to sell their properties. However, direct risks to the banking sector presently appear low. The banking sector has significant protection against declining commercial property valuations, owing to their conservative credit policies. Commercial property loans typically have relatively low LVRs (less than 65 per cent) and impose a range of minimum requirements on borrowers' debt-servicing capabilities (such as minimum ICRs and maximum debt-to-assets ratios). Moreover, banks' direct exposures to commercial property are considerably lower than a few decades ago, when higher interest rates and an economic downturn last precipitated a large decline in the value of commercial property assets.

Endnotes

- [1] See Wang L (2022), 'Household Liquidity Buffers and Financial Stress', *RBA Bulletin*, June.
- [2] See RBA (2022), 'Box B: How Risky is High-DTI and High-LVR Lending?', *Financial Stability Review*, April.

Box B

The Impact of Rising Interest Rates and Inflation on Indebted Households' Cash Flows

The balance sheets of Australian households are – in aggregate – in strong shape.

However, rising interest rates and inflation have increased indebted households' loan payments and living expenses, with further increases in prospect. In recent months, most indebted households have experienced a decline in 'spare cash flows', which is the income they have available to spend or save after meeting their loan payments and essential living expenses. There is uncertainty about how indebted households will respond to this pressure on their budgets.

This is partly because there are a number of adjustments households could make – some might reduce their non-essential spending and/or how much they save, while others may need to utilise at least a portion of their previously accumulated savings (which in aggregate are very large).

Although most households are likely to be able to weather increased pressure on their finances for some time, many will need to curtail their consumption and some could ultimately see their savings buffers exhausted. If these households have limited ability to make other adjustments to their financial situation (e.g. by increasing their hours worked) and pressure on their finances continues, they could fall into arrears on their loan obligations; some may eventually need to sell their homes or may even enter into foreclosure. Based on the Reserve Bank's central scenario for employment and income growth, the share of households at high risk

of falling into arrears is expected to remain low over the coming years, limiting direct risks to the stability of the financial system as a whole. However, with risks increasing for some vulnerable indebted households, the Bank will continue to closely monitor timely leading indicators of financial stress.

Given market expectations for future interest rate increases and the outlook for inflation and income growth, illustrative scenarios and sensitivity analysis can be used to gauge the potential impact of rising interest rates and inflation on households' spare cash flows. This Box focuses on households with owner-occupier variable-rate loans. These borrowers collectively account for around two-fifths of outstanding housing credit; much of their saving (in flow and stock terms) takes the form of mortgage prepayments and is therefore visible in the available data (in contrast to fixed-rate borrowers and investors). While the analysis that follows is subject to considerable uncertainty (related to both the economic outlook and borrowers' responses to it), it suggests that just over half of these borrowers would see their spare cash flows decline by more than 20 per cent over the next couple of years, including around 15 per cent whose spare cash flows would turn negative. While a relatively small share of the sample of households appears to be at high risk of falling behind on their loan payments, most borrowers will likely be able to manage for at least two years by reducing their non-

essential spending, reducing their saving flows and/or drawing down on their accumulated prepayment buffers. Should labour and housing market conditions deteriorate further than assumed in the Bank's central scenario, however, a larger share of households would be expected to fall into arrears on their mortgages.

Higher interest rates and inflation have reduced indebted households' spare cash flows ...

The effect of rising loan payments and living expenses on spare cash flows will vary across households, with the most important determinant being the amount of debt a household owes relative to their income. Household income levels are a second source of variation as lower income households tend to spend a larger proportion of their incomes on (unavoidable) essential living expenses.^[1]

Graph B.1 shows what the change in spare cash flows could be for eight hypothetical households with varying combinations of debt and income. The analysis is calibrated using recent outcomes for interest rates, inflation and wages growth, as well as short-range projections for inflation and wages growth. Specifically, it assumes the following:

- Interest rate increases of 2½ percentage points (the cumulative increase between May and October) are passed through fully and immediately to lending rates and loan payments (though in practice this can take up to a few months).
- Essential living expenses are based on the Household Expenditure Measure (HEM) benchmark and assumed to rise in line with actual and forecast headline consumer price inflation (CPI) over the six months to September.^[2] Note the HEM

benchmark, which is used by lenders in assessing whether a potential borrower can service a loan, incorporates spending on non-discretionary goods and services (such as groceries and fuel) as well as a small amount of discretionary expenditure (such as entertainment and meals out). Additional adjustments are made to factor in some other expenses that are excluded from the HEM (most notably private health insurance and school fees) resulting in a relatively broad measure of essential consumption.^[3]

- Indebted household incomes increase in line with the actual and forecast Wage Price Index (WPI) over the six months to September. The choice to use WPI to forecast income growth rather than a broader measure of household income reflects a judgement that non-wage sources of income such as social assistance benefits or investment income (including from superannuation) that are included in broader measures of income are less likely to be the main sources of income for indebted households than renters and outright owners. It is also a conservative choice in that growth in the WPI typically lags that of broader measures of labour compensation when labour markets are tight.

For a highly indebted household earning \$150,000 of gross income (around the median income for a couple family with dependent children) with \$800,000 in debt, the net effect would be a reduction in monthly spare cash flow (relative to April 2022 levels) of around \$1,300 – or 13 per cent of household disposable income. Around 80 per cent of the overall reduction in spare cash flows for this hypothetical household would be due to the impact of rising interest

rates on their mortgage payments, with inflation playing a much smaller role. For a household with the same income but with \$600,000 in debt (around the average loan size for owner-occupiers), the net decline in spare cash flow would be 10 per cent of disposable income. Households that have borrowed more recently tend to have larger debts than earlier cohorts and so are likely to be more affected than other borrowers. For a given amount of debt, households with lower incomes than these hypothetical borrowers would also likely be more affected.

... and scenario analysis suggests that further declines in spare cash flow are likely

Financial market pricing and surveys of economists indicate that further increases in the cash rate are expected over the next two years, alongside inflation outpacing growth in base wages. To estimate the combined impact of these forces, scenario analysis can be used to gauge the effect on individual borrowers over the next couple of years,

drawing on the Bank's Securitisation Dataset. The scenario assumes that interest rates rise by a further 1 percentage point from October 2022 levels by the end of 2023 (broadly in line with market pricing) and are fully passed through to variable-rate loan payments. Indebted households' living expenses and incomes are assumed to increase in line with the August 2022 *Statement on Monetary Policy* forecasts for CPI and WPI growth, respectively. Essential living expenses for each household are again calibrated using adjusted HEM benchmark estimates and information on borrowers' incomes and so include a small amount of discretionary consumption.

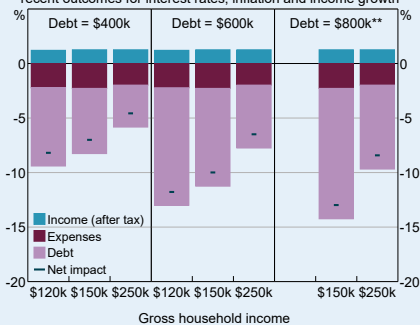
Under this scenario:

- Just over half of variable-rate owner-occupier borrowers would see their spare cash flows decline by more than 20 per cent over the next couple of years, including around 15 per cent of households whose spare cash flows would become negative as the combined burden of higher interest payments and the higher cost of essential goods and services exceeds their initial spare cash flows (Graph B.2). This latter group of (typically low-income, highly indebted) households would likely be forced to draw down on their stocks of saving in order to continue to meet their loan payments and essential living expenses. Some may have a limited ability to do this, given that low-income and highly indebted households typically have lower savings buffers.
- Another 40 per cent of variable-rate owner-occupier borrowers would face a more moderate decrease in their monthly spare cash flows of less than 20 per cent from their mid-2022 levels, but would be

Graph B.1

Illustrative Effect of Interest Rates and Inflation on Hypothetical Borrowers' Spare Cash Flows

As a share of household disposable income, calibrated using recent outcomes for interest rates, inflation and income growth*



* Assumes full pass-through of 250bps of interest rate increases to loan repayments, essential (HEM-based) living expenses and income rise in line with expected growth in headline consumer price inflation and wage price inflation over the six months to September 2022. Hypothetical households' income and expenses reflect estimates for a couple family with two dependent children.

** \$120k income borrower would not be approved for \$800k debt.

Sources: ABS; Melbourne Institute; RBA

able to accommodate this through reduced non-essential consumption and/or saving flows.

- The remainder of variable-rate owner-occupier borrowers (around 5 per cent) would experience an increase in their cash flows. This group are typically high-income borrowers who spend a low share of their income on essential living expenses and have very low levels of debt, such that the dollar value of their expected income growth would exceed that of their (loan and living) expenses.

It is important to note that these estimates are only indicative and are not firm predictions. They do not allow for variation in inflation or wages growth across individual households, nor do they make provisions for households to respond to declining spare cash flows (e.g. by working more hours). Some lower risk borrowers (e.g. those with a low outstanding loan-to-valuation ratio) may be able to respond by refinancing their debt at lower interest rates; other borrowers may have additional scope to reduce their consumption (the measure of ‘essential’

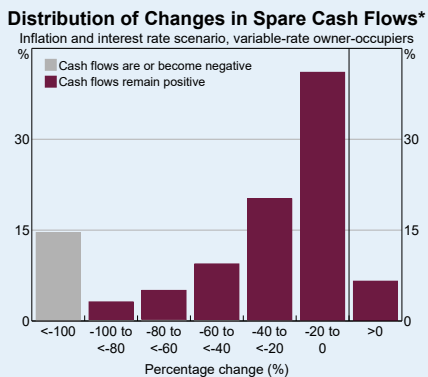
living expenses assumes borrowers will maintain at least some discretionary spending).^[4] It is also possible that some borrowers hold their savings in other less-visible forms than mortgage offset or redraw accounts and so have additional liquid buffers to draw on. Working in the opposite direction, the results abstract from a possible rise in unemployment over this horizon, which would reduce the cash flows of affected households significantly.^[5]

Overall, most borrowers are likely to be well placed to adjust their finances, with only a small share appearing vulnerable to falling into arrears

The declines in spare cash flow implied by this exercise would place some pressure on household budgets. However, there is uncertainty around how households would respond. In particular, it is not clear to what extent households would choose to prioritise maintaining their current non-essential consumption over adjusting their saving behaviour. Changes in household wealth are likely to have a bearing on this decision.

At one extreme, if the cumulative reductions to cash flows implied by the scenario were realised and households choose not to reduce their real non-essential spending and instead draw down on existing prepayment buffers, just over half of variable-rate owner-occupiers are estimated to have prepayment buffers large enough to allow them to meet their loan payments and essential living expenses for at least two years (Graph B.3). If households were instead to choose to reduce their real non-essential spending by 20 per cent, the share of borrowers with more than two years’ worth of prepayment buffers would increase to around 70 per cent.

Graph B.2



* Cash flow is estimated as income net of mortgage payments and essential living expenses; assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.
Sources: ABS; Melbourne Institute; RBA; Securitisation System

For simplicity, the scenario uses borrowers' prepayment buffers as at June 2022 rather than a projection of what these buffers could be at the end of 2023. As a result, it likely understates the available buffers of borrowers with large spare cash flows and overstates the available buffers of households with low spare cash flows (some of which may have already started to draw down their buffers).

At the other extreme, some households may choose to cut their non-essential spending quite sharply – either to retain their savings buffers or because they need to in order to meet loan payments. In this scenario, the vast majority of variable-rate owner-occupier borrowers would not need to deplete their buffers much at all. However, there remains around 8 per cent of variable-rate owner-

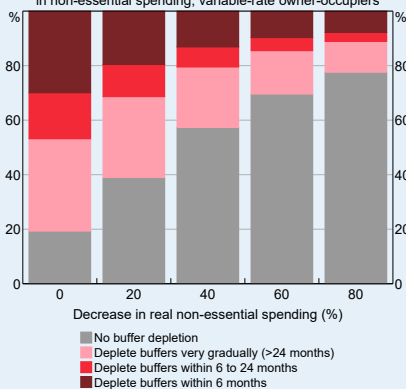
occupier borrowers who would fully exhaust their prepayment buffers within six months, even if they were to cut their real non-essential spending by a relatively extreme 80 per cent; around 40 per cent of these borrowers are in the lowest quartile of the income distribution and so are already more vulnerable to falling behind on their loan payments. In practice, many borrowers in this position may attempt to make other adjustments, such as supplementing their income or adjusting their current spending patterns in anticipation of future increases in their expenses.

Overall, most owner-occupiers with variable-rate loans appear well placed to adjust to rising expenses over the next couple of years through a combination of reducing non-essential spending, lowering saving rates (i.e. reducing excess mortgage payments) or by gradually drawing down on (in some cases very large) prepayment buffers. It is also possible that some households have other liquid financial assets on which they could draw to support their consumption and loan payment obligations (though this possibility is precluded from the analysis due to data limitations). Higher interest rates and inflation will slow aggregate household consumption and the pace of economic growth more broadly, but the direct financial stability risks posed by vulnerable borrowers appears modest. A large increase in unemployment combined with a historically large decline in housing prices would pose a more material risk to loan arrears and defaults, and therefore financial stability.

Graph B.3

Distribution of Time until Buffers are Depleted*

Inflation and interest rate scenario, sensitivity to reductions in non-essential spending, variable-rate owner-occupiers



* Assumes interest rates rise by 350 basis points relative to April 2022 levels; wages and inflation evolve in line with August 2022 SMP forecasts.

Sources: ABS; Melbourne Institute; RBA; Securitisation System

Endnotes

- [1] Lower income households may also be subject to a higher effective rate of inflation if they are less able to substitute away from purchases of goods and services with more rapidly rising prices, but this is not explicitly accounted for in this analysis.
- [2] CPI has been used as forecasts are readily available. Some components of the CPI basket, such as new dwellings and rents, are unlikely to be applicable to indebted home owners.
- [3] For simplicity, households with one loan applicant are assumed to have no dependants whereas households with two loan applicants are assumed to have two dependants.
- [4] Specifically, the HEM benchmark incorporates the 25th percentile of household expenditure on discretionary basics in the ABS Household Expenditure Survey based on the household's income level and number of dependants (along with the median expenditure on non-discretionary basics).
- [5] Kearns J, M Major and D Norman (2020), 'How Risky is Australian Household Debt?', RBA Research Discussion Paper No 2021-05.

Box C

Financial Stress and Contagion Risks in the Residential Construction Industry

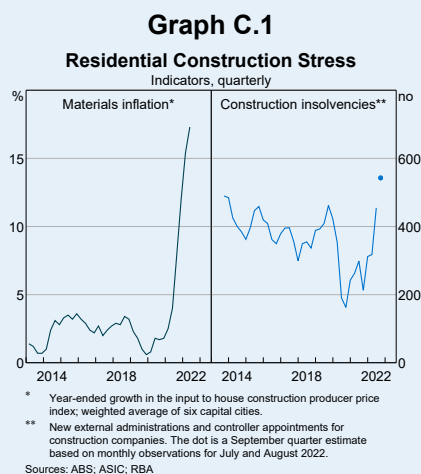
The residential construction industry in Australia is facing challenges due to the sharp rise in construction input costs, compounded by shortages of labour and materials, which has eroded profit margins on existing fixed-price contracts (Graph C.1). Reflecting these pressures, a number of large residential construction firms have entered into insolvency over the past year. Overall, construction company insolvencies have increased sharply, exceeding their pre-pandemic levels and accounting for close to 30 per cent of all company insolvencies. More recently, the increase in interest rates has begun to raise debt-servicing costs for many firms, adding to financial pressures. Further increases in insolvencies are likely. While the direct implications for the financial system are limited because banks have very small exposures to builders, there is potential for financial stress to spread to other businesses within the broader construction industry and to some households.

Profitability has declined for most builders and margins are likely to remain under pressure in the near term

Builders typically offer contracts to build homes at a fixed price with considerable lead time, which has left many builders exposed to the sharp increase in the costs of materials and labour since the start of 2021; the cost of building materials alone has increased by more than 20 per cent over this period. As such, profit margins for existing fixed-price contracts have compressed substantially, and

builders are now making losses on some contracts. Ongoing delays as a result of supply-chain disruptions, inclement weather and illness-related workers' absences have resulted in further increases in costs and have delayed when payment milestones are reached. According to industry contacts in the Bank's liaison program, construction delays for detached homes are currently around 12 weeks on average – and much longer than this in some instances. Builders have responded to these challenges by raising the prices on new contracts, shortening the period before a quote must be accepted and renegotiating some of their existing contracts.

Nonetheless, the share of medium-sized and large builders (who build the majority of new housing) recording negative net operating cash flows in a given quarter has risen sharply since the start of 2021 (Graph C.2). The likelihood of having persistently weak cash



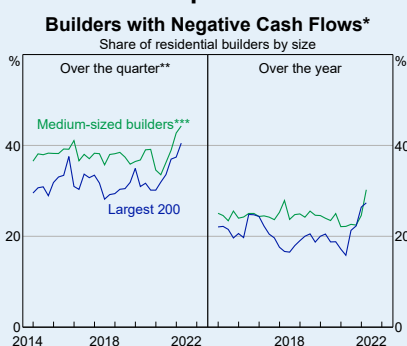
flows over the year has also increased, including for large builders whose size may have given them some advantages in managing the ongoing disruptions. Over 25 per cent of the largest 200 builders recorded an operating loss in the year to March 2022, up from a little over 15 per cent a year prior.

Recurring operating losses due to rising costs and delays have led some builders to run down their cash reserves, which were built up through the COVID-19 pandemic aided by the receipt of government support payments. Survey data from January 2022 suggest many firms in the broader construction industry were drawing down their cash reserves at a faster rate than firms in other industries. Running down reserves can quickly become problematic for builders because they tend to have lower liquidity buffers – that is, cash and other short-term assets (such as inventories and accounts receivable) – than other businesses. As of the latest available detailed data from June 2020, builders’ liquidity buffers were typically equivalent to less than three months of turnover, which was around 25 per cent

lower than for other businesses of similar size (Graph C.3).

In response to the financial stress caused by ongoing pressure on margins, information from liaison with banks suggests builders that predominantly work with other developers instead of retail buyers have been able to switch to more flexible contracts that allow them to pass higher materials or labour costs onto their customers even after the contract is signed. Banks have also responded by working more closely with financially stressed builders to resolve liquidity issues as they arise. However, further insolvencies are expected in the near term as many builders continue to work through fixed-price contracts taken on when costs were substantially lower and as higher interest rates increase debt-servicing costs. Moreover, new and existing fixed-price contracts remain exposed to further increases in input costs.

Graph C.2



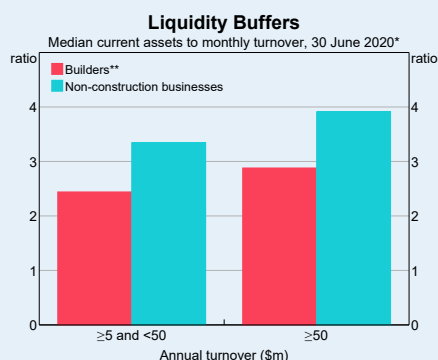
* Net operating cash flows calculated as operating revenue less operating expenses and wages; not including government support payments (e.g. JobKeeper); incorporated builders defined as per ANZSIC 301.

** Seasonally adjusted share.

*** Builders outside of the largest 200 with annual turnover of at least \$5 million (~1,400 firms).

Sources: ABS; RBA

Graph C.3



* Current assets include cash and other short-term assets; average monthly turnover for 2019/20; includes companies only.

** Builders defined as per ANZSIC 301.

Sources: ABS; RBA

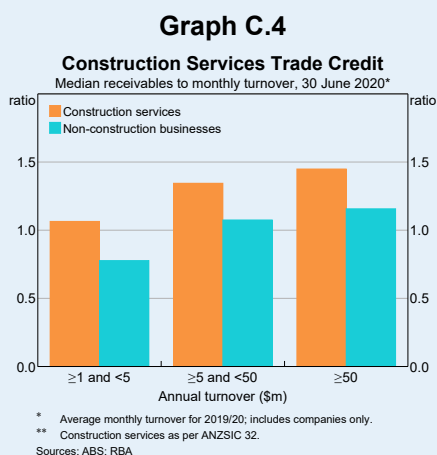
Subcontractors have absorbed builders' financial stress to date, but risks are elevated

Builders rely heavily on engaging subcontractors (e.g. for concreting, bricklaying, roofing, installation services etc), which means these businesses are highly connected. Financial stress can quickly spread from troubled builders to these construction services businesses through delays or defaults on payments for work already done. For the median builder, around 40 per cent of total liabilities were short-term unsecured trade credit (i.e. unpaid invoices) in June 2020 – around twice as much as for other businesses. Failures of larger builders tend to affect a high number of construction services businesses, which in turn have the potential to transmit stress more widely through their own subcontractors. Financial contagion risks in the construction services industry are exacerbated by these businesses having higher unpaid receivables than other businesses, typically around 1.5 times their monthly turnover for the largest firms (Graph C.4).

To date, transmission of financial stress from builders to their subcontractors appears to

have been limited. Liaison with banks suggests that the majority of subcontractors affected by recent builder insolvencies have been able to absorb disruptions to their cash flows using their cash reserves or existing lines of credit, and some have been able to access additional credit. Some subcontractors have also responded to higher risks by shortening payment times for builders, thereby reducing their stock of trade credit exposures at any given time.

Nonetheless, risks of more widespread financial stress in the construction sector remain elevated. Although construction services businesses are typically able to raise their prices more easily than builders, ongoing input cost inflation, material delays and labour shortages are also weighing on their profitability and liquidity buffers. By the start of 2022, the share of construction services businesses running operating losses had declined substantially from elevated levels that followed lockdown-related disruptions; however, net profit margins have generally remained lower than pre-pandemic levels (Graph C.5). Reflecting the ongoing challenges, the net operating profit margin at the 25th percentile has declined since the middle of 2021. Going forward, higher interest rates will contribute to increased debt servicing costs for indebted construction services businesses, and will increase the risk of insolvency for some. The most vulnerable subcontractors are those that are unable to diversify their revenues and primarily work with one builder at a time; should that builder default on outstanding invoices, the subcontractor could quickly struggle to meet its own payment obligations.



Banks' direct exposures to construction firms are low, but there are indirect links through households

Banks' exposures to builders and the construction services industry are small, which limits direct risks to the financial system. Combined lending to the two industries was less than \$40 billion as of August 2022 – or about 0.8 per cent of total bank assets – and accounted for only a small share of assets at each domestic bank individually. Some non-bank lenders may have more substantial exposures relative to their total assets, but their market shares are small. As of March 2022, major banks' arrears rates on construction business loans remained very low by historical standards. While banks expect arrears rates to rise following the increase in interest rates, ongoing prudent lending standards for construction businesses should help to contain the magnitude of any deterioration in credit quality.

On top of these direct exposures, banks also have indirect links to construction businesses – in particular, through households that own and operate small construction businesses and depend on business income to service

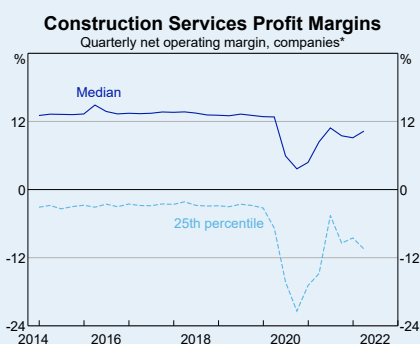
their own debts. Based on household surveys, around 2 per cent of residential mortgage borrowers are estimated to rely on business income from the construction industry. In addition, many household borrowers depend on the construction industry to some degree, as construction accounts for close to 10 per cent of total employment. Furthermore, those households currently building a new home are exposed to the industry and are likely to have mortgages with banks.

Risks of transmission to household financial stress depend on the outlook for construction activity

Financial stress remains low for the majority of households that own and operate small construction businesses as demand for their services (generally trade labour) remains strong. As such, even though net profit margins for construction services businesses are lower than before the pandemic, the additional turnover has partly offset this for many businesses. Personal insolvencies related to business failures – for example, insolvencies of company proprietors or sole traders – remain around record lows in the construction industry (Graph C.6). Continued strong demand for construction workers is also supporting employment incomes in the industry, and has allowed the small number of workers from failed construction firms to quickly find work elsewhere.

The large pipeline of work in the residential construction sector should continue to support activity and employment for the next year or so. However, once this pipeline has been worked through, activity is expected to be weaker, given the impact of falling housing prices and high construction costs. Risks of broader transmission of

Graph C.5



* Profits calculated as operating revenue less operating expenses and wages; incorporated businesses in ANZSIC 32, seasonally adjusted.
Sources: ABS, RBA

Graph C.6

Personal Insolvencies

Related to construction businesses, quarterly*



* New personal insolvencies of business owners/operators (e.g. sole traders or directors of proprietary companies).

Sources: AFSA; RBA

financial stress across the industry and to households would increase if residential construction activity slows substantially and input costs remain high.

3. The Australian Financial System

The Australian financial system is resilient and well positioned to support the economy through a more challenging period for households and businesses, as interest rates increase to bring inflation back to the target band.

Banks have strong capital and liquidity positions. Robust economic activity and solid employment growth have contributed to bank profitability and the low level of non-performing loans over the past year. Conditions in wholesale funding markets have been tight at times as investors adapt to the rapid increases in policy rates by central banks, amid ongoing geopolitical tensions and heightened economic uncertainty. Despite this, Australian banks' bond issuance has been high, supported by banks' strong credit ratings and the variety of funding options available. Overall, banks' balance sheets are expected to remain resilient to the impact of rising interest rates. Results from stress testing suggest that banks would be well placed to continue lending even if the economic outlook were to deteriorate markedly (see 'Box D: Stress Testing and Australian Bank Resilience').

Financial institutions more broadly have remained resilient. Insurers' capital levels remain well above regulatory minimums, despite a recent decline in profits as higher interest rates have reduced the value of insurers' fixed-income portfolios and several natural disasters have led to increased claims. Higher interest rates have also reduced returns for superannuation funds, although five-yearly returns remain above 5 per cent. Non-bank lending for housing has continued to grow rapidly in an environment of

strong competition for lending, but the size of the sector remains small and there is little evidence that lending standards have deteriorated. Funding conditions in the residential mortgage-backed securities (RMBS) market have tightened in recent months, which might weigh on non-banks' credit growth or profits.

The Australian financial system is continuing to manage a number of important challenges, including those related to cyber risks and climate change. The threat of a significant cyber incident remains high, and such an incident could have implications for financial stability. The recent Optus cyber incident – where data for a large number of customers were compromised – demonstrated that there can be indirect implications for the financial system of cyber-attacks. This, along with a number of other large-scale cyber incidents over the past year, has highlighted the need for regulators and financial institutions to continue building cyber resilience. Climate change also represents a major challenge for the financial system. Financial institutions and regulatory agencies continue to progress their understanding of the financial risks resulting from climate change. Australian financial institutions are taking actions to manage these risks, but this work is still in its early stages. Financial institutions will need to continue to invest in systems and processes to understand and manage climate-related risks, including by collecting, analysing and disclosing appropriate data; work done by global and Australian regulators on climate-related

disclosures and taxonomies should assist with this.

The resilience of the banking system is supported by banks' profitability ...

Bank profitability has been supported by strong credit growth and low levels of non-performing loans. However, net interest margins (NIMs) have trended lower for more than a decade, partly in response to the trend decline in, and low levels of, interest rates. Strong competition for lending further contributed to the narrowing in banks' NIMs (Graph 3.1). More recently, banks have increased their holdings of low-yielding liquid assets ahead of the wind down of the Committed Liquidity Facility (CLF) at the end of 2022 (discussed below).

Market pricing implies that the cash rate is expected to increase further over the coming year, which would have mixed implications for banks' profits. This reflects the interplay of banks' NIMs, asset growth and asset quality. Higher interest rates increase earnings on banks' interest-earning assets (such as variable rate loans) but they also increase funding costs for banks (such as for deposits and wholesale debt). As the cash rate moves further away from the effective lower bound, market analysts expect lending rates to increase by more than funding

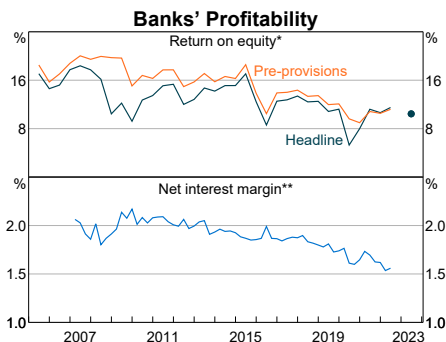
costs, unwinding the earlier compression on NIMs. However, higher interest rates are likely to reduce the demand for credit, which would slow the pace of growth in banks' assets, and lead to an increase in non-performing loans (discussed below); these developments would weigh on profits.

Market indicators suggest that investors are confident that banks' earnings will remain solid as interest rates rise. Market analysts expect banks' return on equity to remain around current levels over the coming year. The share-price-to-book ratio is above 1 for most banks, and within the range of the past decade; this is despite periods of volatility in markets due to uncertainty about the economic outlook and therefore banks' earnings (Graph 3.2).

... low levels of non-performing loans ...

Banks' asset quality has improved over the past couple of years. Non-performing loans (NPLs) are around their lowest level of the past decade, supported by a strong labour market, low interest rates and household savings accumulated throughout the pandemic (see 'Chapter 2: Household and Business Finances in Australia'). The decline in NPLs has mainly been driven by housing loans; business NPLs have

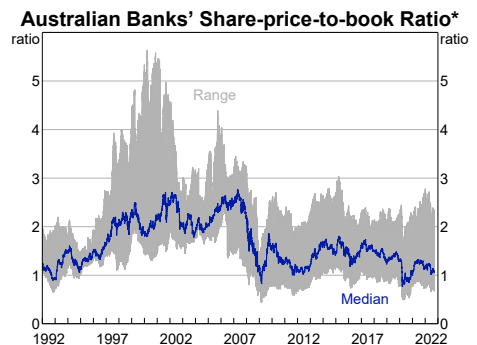
Graph 3.1



* Dot represents forecast based on 12-month forward earnings.
** Interest income received less interest expenses paid, expressed as a percentage of assets.

Sources: APRA; RBA; Refinitiv

Graph 3.2



* Share-price-to-book ratio is the market's valuation of a company relative to its book value. Book value represents the net assets of a company (assets minus liabilities). When this ratio is greater than 1, it indicates the company is trading at a premium to its book value.

Sources: RBA; Refinitiv

been little changed from their low levels for several years, and personal NPLs have increased recently but represent a very small share of banks' lending (Graph 3.3). This improvement in asset quality, along with better-than-expected economic outcomes during the pandemic, has resulted in banks' unwinding most of the provisions as a share of gross loans that were built up during this period (Graph 3.4). The unwinding of provisions has supported banks' headline profits (Graph 3.1).

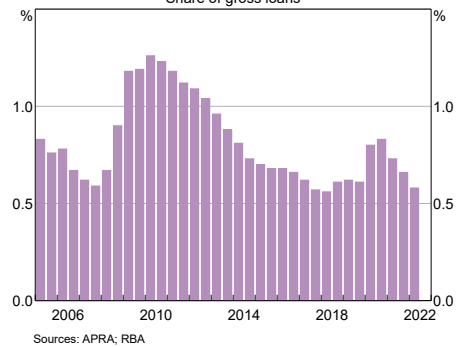
Higher interest rates, rising input costs and prices are likely to squeeze the incomes of many households and businesses, making it more difficult for them to service their debt (see 'Chapter 2: Household and Business Finances in Australia'). Higher interest rates could also result in lower collateral values of assets that secure loans. Market analysts and the Reserve Bank's liaison with banks suggest that arrears and bad debts are likely to increase from their current low levels. Some banks have increased their provision overlays to account for the possibility of a larger number of bad debts, leaving provision balances higher than they would be otherwise but still much lower than during the pandemic.

... and high capital levels

Banks' capital ratios remain high and well above regulatory minimum requirements (Graph 3.5). Banks' Common Equity Tier 1 (CET1) capital ratios have decreased slightly over the past year. In part, this has reflected the large increase in banks' risk-weighted assets, which has been driven by strong lending growth and a higher capital charge for increased risk on banks' balance sheets due to higher and more volatile interest rates. In addition, several of the major banks' have returned some capital to shareholders through share buybacks and dividends.

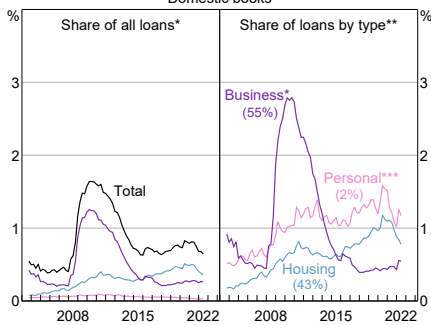
Graph 3.4

Banks' Provision Balances
Share of gross loans



Graph 3.3

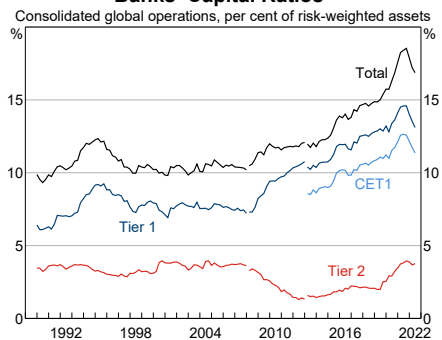
Banks' Non-performing Loans
Domestic books



Sources: APRA; RBA

Graph 3.5

Banks' Capital Ratios*



* Breaks in 2008 and 2013 due to the introduction of Basel II and III for most banks. CET1 is ordinary share capital and retained earnings; Tier 1 is CET1 and perpetual subordinated debt; Tier 2 is dated subordinated debt.
Source: APRA

High capital levels will underpin banks' resilience. Stress testing simulations that incorporate the impact of rising interest rates and inflation suggest that banks are well placed to absorb the resulting effects and to continue lending to households and businesses (see 'Box D: Stress Testing and Australian Bank Resilience').

Banks are well positioned to meet the Australian Prudential Regulation Authority's (APRA) 'unquestionably strong' capital framework that will come into effect in January 2023. The changes to the capital framework will increase APRA's alignment with international standards and will include a larger capital conservation buffer and a non-zero countercyclical capital buffer that can be drawn down in periods of stress. Risk weights for some loans to small and medium-sized businesses will decrease and risk weights for higher risk mortgages will increase; this is intended to improve the allocation of capital to risk. As a result, the average risk weight will decrease, which has the effect of increasing system-wide capital ratios for a given amount of capital (Graph 3.6). This, along with banks' already high levels of capital, means it is unlikely that banks will require any additional capital to meet the increased CET1 requirement. However, some banks may need to further increase their total capital, likely through the issuance of Tier 2 instruments, to meet APRA's 2026 loss-absorbing capital requirements. Consistent with this, banks have been raising Tier 2 capital over the past year or so.

The digital bank Volt exited banking in mid-2022 after failing to secure sufficient capital via equity funding. Its exit was orderly – depositors' funds were returned to depositors (deposits that were unable to be returned were transferred to another bank) – and there was no material impact on the broader financial system. Volt was the second digital bank to close in recent years. In late 2020, Xinja had an orderly exit from banking after it was unable to secure

additional capital. Other digital banks include 86400, which was meeting capital requirements at the time it was acquired by a major bank in 2021, and Judo, which is meeting capital requirements and continues to grow its business lending book.

Banks have strong liquidity positions ...

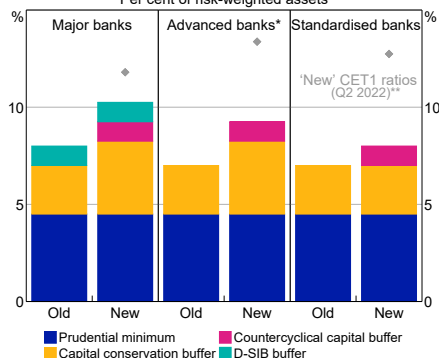
Banks' Liquidity Coverage Ratios (LCRs) – which measure banks' ability to meet cash outflows in a period of stress – are comfortably above regulatory requirements (Graph 3.7). Banks' holdings of high-quality liquid assets (HQLA) have increased since 2020. This has reflected banks' precautionary behaviour early in the pandemic, deposit inflows outpacing credit growth and Reserve Bank policy measures that resulted in higher Exchange Settlement balances at the Reserve Bank.

Reflecting sufficiently high levels of available HQLA, in late 2021 APRA considered that the CLF was no longer required to help banks meet liquidity requirements and that the facility would be wound down over 2022.^[1] Banks have managed CLF reductions totalling \$107 billion over the past year; the final reduction of \$33 billion is scheduled for 1 January 2023. To replace the CLF allocations, over recent months

Graph 3.6

CET1 Capital

Per cent of risk-weighted assets



* Non-major banks using the internal ratings-based approach to credit risk.
 ** Adjusted for changes to risk-weighted assets under the new framework.
 Sources: APRA; RBA

banks have increased their holdings of Australian Government Securities (AGS) and securities issued by the state and territory borrowing authorities (semis).

Banks also have stable longer term funding profiles, which support their resilience to more prolonged liquidity pressures. Banks' Net Stable Funding Ratios (NSFRs) – which measure the extent to which longer term liabilities are used to fund illiquid assets – comfortably meet regulatory requirements. Recently, NSFRs have decreased from high levels for some banks due to rapid credit growth.

... and are well placed for upcoming funding tasks

Banks have continued to experience strong deposit inflows. Almost two-thirds of banks' funding is from deposits (Graph 3.8). Banks have recently increased rates offered on deposits, particularly on some term deposits.

Banks' debt issuance over the year to date has been high, despite some periods of volatility in wholesale funding markets amid uncertainty about the economic outlook both globally and domestically (Graph 3.9). To make debt issuance more attractive during the period of higher interest rate volatility, banks have: issued with

higher yields; tilted their issuance to shorter tenors (e.g. three-year and five-year instead of seven-year); and/or issued secured debt such as covered bonds, which have a lower risk profile. While there is a regulatory limit to the amount of funding that banks can raise through covered bonds, banks still have ample capacity to issue these instruments. Banks' continued access to wholesale markets is also supported by their high credit ratings.

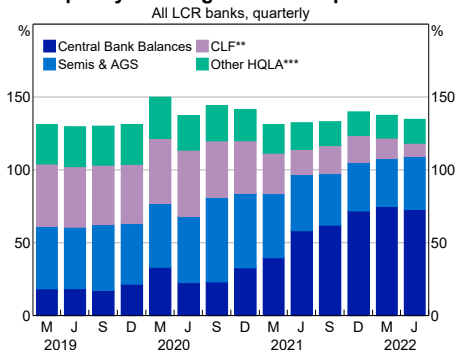
The upcoming wind-down of the CLF and the refinancing of funds borrowed from the Reserve Bank's Term Funding Facility (TFF) over the next 18 months are sizeable but not unprecedented. Given the lead times involved, this should not pose a significant challenge for the banking sector, provided banks manage their funding requirements prudently and absent a prolonged dislocation in funding markets. Smaller banks are likely to be disproportionately affected by any repricing or disruptions in funding markets.

Non-bank housing credit growth is strong but resulting risks to financial stability are limited

Non-bank housing credit has continued to grow rapidly, reaching its fastest pace of growth in over a decade at 21 per cent on a six-month-ended annualised basis. This is in contrast to slowing growth in housing credit by banks, and

Graph 3.7

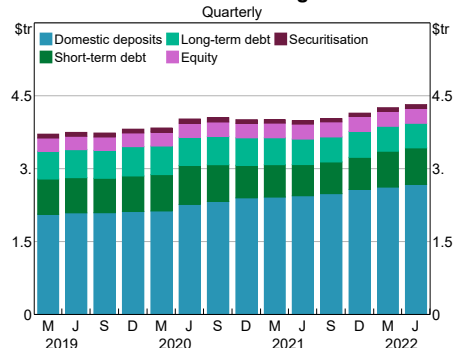
Liquidity Coverage Ratio Components*



* LCR is decomposed into HQLA relative to net cash outflows.
 ** Refers to eligible amount for LCR calculation.
 *** Includes HQLA type 2, coins and notes, RBNZ securities and other.
 Sources: APRA; RBA

Graph 3.8

Banks' Total Funding Base



Sources: ABS; APRA; Bloomberg; RBA; Refinitiv

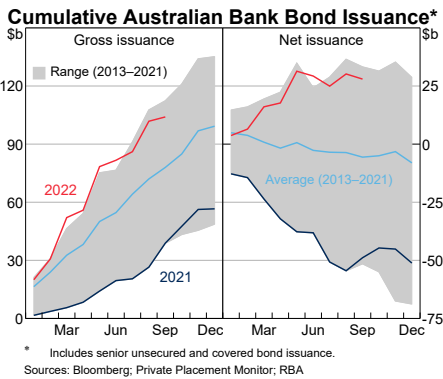
could indicate that financial stability risks from this source are building (Graph 3.10). One related scenario could see concerns from investors about non-banks' credit quality lead to disruptions in the RMBS market and a tightening of domestic financial conditions.

However, given the small size of the sector, this risk to financial stability would likely require non-bank housing lending standards to ease materially and result in a sharp rise in expected loan arrears, and for any resulting funding difficulties to spill over to the banking sector. While non-bank lenders tend to have higher shares (compared with banks) of borrowers that are self-employed or work in industries more sensitive to economic conditions, as well as a

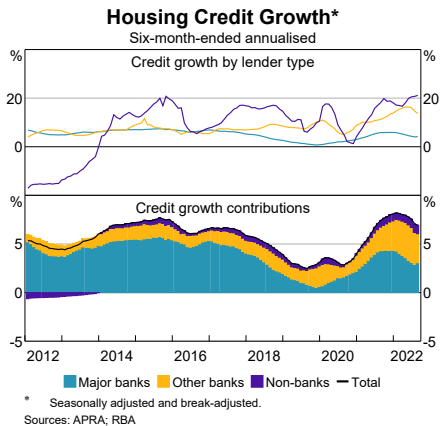
greater proportion of loans with higher loan-to-income (LTI) ratios, there is little evidence that these risks have increased in a material way overall. Loan-to-value ratios for non-bank lending are below those at banks and have decreased over the past year, but LTI ratios have ticked higher amid rising housing prices. Loan arrears are at historically low levels, and the share of total housing lending by non-banks remains small at less than 5 per cent. Funding costs and arrears are likely to pick up over the coming year as interest rates rise, income growth slows and housing prices decline, following a similar trend as banks.

Non-banks' reliance for funding from warehouse facilities (which are typically supplied by banks and have parameters set for newly written loans, such as LVR limits) and the RMBS market (where the credit quality of underlying loans is closely scrutinised by investors) is also likely to restrict non-bank lenders from moving too far out the credit risk spectrum. Consistent with this, over the past year or so, the bulk of non-bank RMBS issuance has been for prime loans (Graph 3.11). Liaison suggests that non-bank lenders have become more active in lending for property development and have increased their market share over recent years. However, risks to banks and wider financial system stability are limited

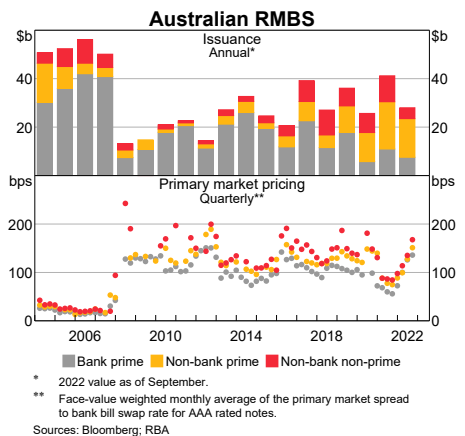
Graph 3.9



Graph 3.10



Graph 3.11



because this lending is primarily done by specialist lenders that are typically funded by investor equity.

Insurers face challenges, but capital positions are robust

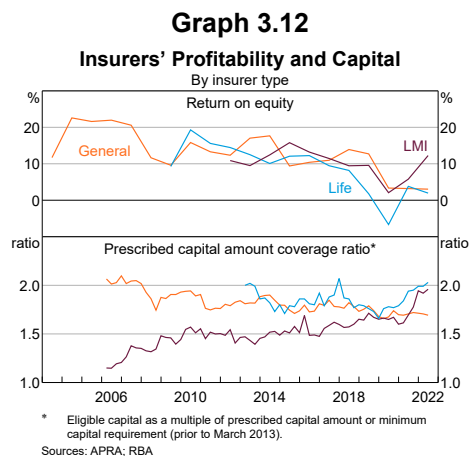
Insurers' capital positions remain well above APRA's prescribed capital amount, despite higher interest rates, rising inflation and natural disasters weighing on profits (Graph 3.12). Higher interest rates have reduced the value of insurers' bond holdings and resulted in large mark-to-market investment losses. At the same time, higher interest rates reduce the present value of liabilities to the extent that nominal interest rates increase due to higher real interest rates (insurers might adjust assumptions for future payouts to account for higher expected inflation, which could leave liabilities little changed). Rising inflation has also increased the cost of claims for inflation-indexed policies sold by life insurers, while strong economic conditions have supported profits for lenders mortgage insurers (LMIs).^[2]

General insurers have experienced an increase in both the cost and frequency of claims. Higher inflation and labour shortages have increased the cost of claims that are paid, particularly for building repairs. At the same time, the number of insurance claims have increased following several natural disasters along the east coast of Australia. Insurers use reinsurance to mitigate the impact of rising claims on profits, along with increasing premiums. Climate change is expected to exacerbate these trends as more frequent and severe natural disasters lead to larger claim payouts and could lead to further premium rises and the possibility of insurance becoming unaffordable or unavailable in some locations. The Australian Government has established a reinsurance pool for cyclone and related flood damage, which is backed by a \$10 billion government guarantee, to improve insurance affordability in cyclone-prone areas.

Declines in asset prices have reduced returns for superannuation funds

Superannuation funds' returns declined over the first half of 2022, driven by rising interest rates and falling asset prices, particularly equities (Graph 3.13). Over this time, investment income fell by \$200 billion, although this was partly offset by member contributions (Graph 3.14, right panel). Negative returns do not pose a solvency risk to most superannuation funds in Australia due to their lack of leverage and defined contribution structure where the investment risk is passed on to members. However, most members are still accumulating their superannuation and have longer term investment horizons. Five-year annualised returns are currently above 5 per cent (Graph 3.14, left panel).

To improve the sector's resilience and outcomes for members, APRA conducts an annual performance test for MySuper products, using returns from the previous eight years. The assessment compares the performance of individual funds to industry benchmarks (after fees). Superannuation funds that underperform the industry benchmark by 0.5 per cent must notify their members; if a fund underperforms for two consecutive years, they are prohibited from accepting new members on some



products. In 2022, five superannuation funds failed the performance test (four of which also failed in 2021), accounting for 3 per cent of financial assets. Of the 13 products that failed the test in 2021, five improved their performance and seven have exited or plan to exit the industry. The government is currently reviewing the performance test to ensure superannuation funds are not discouraged from certain investments, such as nation-building investments like infrastructure. With asset prices falling, APRA is also monitoring how superannuation funds are valuing their unlisted assets, to ensure appropriate valuation procedures are in place.

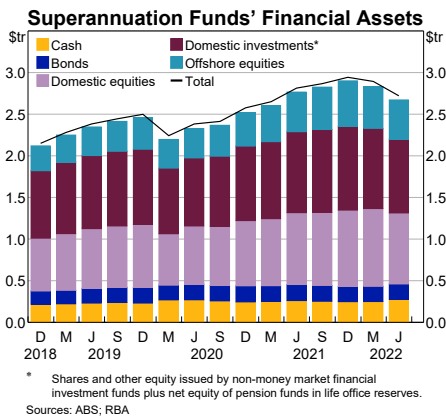
Superannuation funds are currently well placed to manage liquidity flows that result from member contributions, withdrawals and portfolio rebalancing. A large portion of superannuation funds' financial assets are liquid (such as cash, bonds and equities), which supports their ability to meet liquidity needs. Net contributions for workers will be supported over the coming years by the mandated increase in the minimum employer superannuation contributions from 10.5 per cent of wages to 12 per cent by 2025.

Crypto-assets currently pose limited risks to the Australian financial system, but this could change

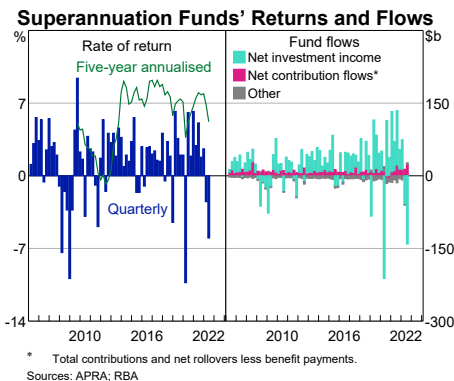
The decline in crypto-asset prices in the first half of 2022 had limited impact on Australia's financial system, despite causing large losses for some investors (see 'Chapter 1: The Global Financial Environment'). As is the case internationally, the interconnections between crypto-assets and the traditional financial system in Australia are small, which limits the impact of crypto-asset volatility on financial stability. However, this could change if the crypto-asset market continues to grow and there is significant engagement by traditional financial institutions (see 'Box A: Financial Stability Risks from Crypto-assets').

Some Australian banks, payment service providers and other organisations have demonstrated their interest in crypto-assets, particularly AUD-denominated stablecoins. Earlier this year, a major bank – ANZ – conducted some test transactions in a controlled environment with its pilot stablecoin (A\$DC) that was fully backed by deposits of the customers involved. Several other AUD stablecoins have been issued or announced, though their value on issue remains low. Stablecoins backed by financial assets are less risky than algorithmic stablecoins or other unbacked crypto-assets. However, the asset

Graph 3.13



Graph 3.14



holdings backing some of these stablecoins are not transparent to investors, which could expose customers to the risk of runs if the value of the underlying assets proves to be less stable or liquid than envisaged.

Another major bank – CBA – had announced plans to allow some crypto-assets to be purchased using the CommBank app, though these plans are on hold pending further clarity on the regulatory environment for crypto-assets. There are now many other providers offering similar services. The increased ability to purchase crypto-assets through a trusted platform could lead to an increase in the number of Australians investing in them, including where the crypto-asset lacks a functional use case and derives its value from investors' speculation about future capital gains. With crypto-assets' increasing popularity, the Australian Securities and Investments Commission (ASIC) and the Australian Competition and Consumer Commission have warned investors of related scams.^[3] Crypto-asset scams account for the majority of recent investment scam losses.

Australian policymakers are currently working on a regulatory framework for crypto-assets in an effort to protect the public and limit risks to financial stability (see 'Chapter 4: Domestic Regulatory Developments'). The need for a robust regulatory framework was highlighted by the recent volatility in crypto-asset markets and concern that investors do not fully recognise the risks involved in crypto-assets; ASIC's 2022 retail investor survey suggested that only 20 per cent of crypto-asset investors considered their investment to be risky.

Financial market infrastructures continue to focus on improving resilience

Financial market infrastructures (FMIs) – such as central counterparties (CCPs), securities settlement facilities and high-value payment systems – enable financial system participants to

manage credit and liquidity risks. The Reserve Bank's 2022 assessments of Australian FMIs concluded that, on balance, all had conducted their affairs in a way that helped to promote overall stability in the Australian financial system.^[4] However, it also found that FMIs must continue to focus on enhancing their resilience.

In August, ASX announced that the replacement of its ageing CHES system – which supports clearing and settlement of nearly all listed Australian equities – would be delayed by at least another 18 months, to late 2024 at the earliest. ASIC and the Reserve Bank have expressed disappointment at this further delay, while welcoming an external review initiated by ASX to assess the work required to complete the program and to determine a new go-live date. ASX will need to continue to invest in and maintain the current CHES system so that it can service the market reliably until the CHES replacement goes live.

FMIs have also had to manage risks from recent volatility in commodity markets. ASX Clear (Futures) provides central clearing for Australian electricity derivatives, which were affected by the temporary suspension of the National Electricity Market in June, as well as ongoing price volatility. The CCP has increased margin requirements and introduced new stress test scenarios to ensure that its financial resources remain adequate. CCPs hold margin and other financial resources to minimise the effect a potential participant default might have on other participants, the CCP and the financial system.

Agencies and financial institutions continue to work together to address longer term challenges

The threat from cyber incidents to financial institutions and the broader financial system remains high. There have been further large-scale and high-profile international cyber incidents over recent months, including the

Conti and Maui malware attacks and the Shanghai police data breach. In Australia, Optus recently experienced a cyber-attack that resulted in the theft of its customers' data. Given the scale of the data breach and the potential harm to affected customers, the Australian Government is seeking to remove legal barriers to Optus temporarily sharing approved customer information with financial institutions – under strict conditions – to allow them to implement enhanced monitoring and safeguards for affected customers. APRA has instructed banks to tighten their controls further where possible to limit the risk of fraud. A cyber-attack of this size has potential systemic implications, as an increase in fraudulent activity associated with the leaked information could undermine confidence in banks. More broadly, financial regulators continue to work with the government and institutions to further enhance the Australian financial system's resilience to cyber risks (see 'Chapter 4: Domestic Regulatory Developments'). APRA is also undertaking consultations on strengthening operational risk standards for banks, insurers and superannuation funds, which could include new requirements on operational risk and updated requirements on business continuity and managing third-party service providers.

Climate change remains a key long-term risk for the financial system that will need to be carefully managed by financial institutions and monitored by regulatory agencies.^[5] The Australian financial system is vulnerable to physical risks through direct losses on assets from climate events, and transition risks that arise from changes to policies and the economy in the move towards lower emissions. Reflecting this, Australian financial institutions have begun to take action to manage climate risks, including by committing to lending that supports the transition to a net-zero economy. All four major banks have joined the Net-Zero Banking Alliance, which requires a commitment to

reduce emissions from their lending and investment portfolios, with a target of net-zero emissions by 2050 along with intermediate emission reduction targets. While the major banks have not announced a universal exit from financing thermal coal, they have made commitments to restrict lending to the sector to varying degrees. CBA and Westpac recently released reports detailing their climate strategies and their progress on meeting their targets and commitments. Beyond banks, some superannuation funds and insurers have been reducing their investments in fossil fuel producers, citing concerns that they lack viable plans to decarbonise their activities.

Nonetheless, it will take time for financial institutions to adjust their lending and risk management practices in response to the risks and opportunities from climate change. For example, climate-related disclosure standards are still being finalised. These standards are expected to improve the quality of data needed by financial institutions for their own climate risk reporting. Related to this, taxonomies are being developed internationally and domestically, which will improve the quality and consistency of information available to financial market participants. Australian financial institutions are also still in the process of embedding climate risk into their risk management frameworks; a recent APRA self-assessment survey found that 23 per cent of institutions did not have metrics to monitor climate risks.

APRA, the Reserve Bank and the other agencies on the Council of Financial Regulators (CFR) are undertaking further work to better understand the financial risks associated with climate change. APRA is leading the Climate Vulnerability Assessment (CVA), which examines the effect of two climate scenarios on Australia's five largest banks. Banks provided results based on the CVA scenarios to APRA in May 2022 and APRA is seeking to publish an assessment later this year. The Reserve Bank is using scenario

analysis to further develop its understanding of the risks to financial stability from climate change. Internationally, other central banks and prudential regulators are assessing climate risks in their own jurisdictions, and in the process are continually improving how these exercises are conducted. The Reserve Bank, along with other

CFR agencies, collaborate with international peers to share learnings, both directly and through forums such as the Network for Greening the Financial System, the Financial Stability Board and the G20 Sustainable Finance Working Group.

Endnotes

- [1] The CLF complements available HQLA to ensure banks have sufficient access to liquid assets during a period of stress. It is a contractual liquidity commitment from the Reserve Bank that banks are able to use towards meeting their LCR requirements. The CLF has been required in Australia given the historically limited supply of HQLA due to low levels of HQLA securities (AGS and semis) on issue. APRA instructed banks to phase out CLF holdings over 2022 as there is now sufficient HQLA (such as AGS and semis) available for banks to meet liquidity requirements without the need for the CLF.
- [2] For more information on the effects of rising interest rates and inflation for insurers, see RBA (2018), 'Box C: Interest Rate Risk in the Australian Financial System', *Financial Stability Review*, April.
- [3] See Armour C (2022), 'Regulating Crypto-asset-based Investment Products within the Financial Services Framework', AFR Cryptocurrency Summit, 6 April; ACCC (2022), 'Australians Are Losing More Money to Investment Scams', Media Release, 6 June.
- [4] See RBA (2022), 'Assessment of the Reserve Bank Information and Transfer System', June; RBA (2022), *Payments System Board Annual Report*; RBA (2022), 'Assessment of ASX Clearing and Settlement Facilities', September.
- [5] See Kearns J (2022), 'Climate Change Risk in the Financial System', Speech at the Credit Law Conference, Sydney, 24 August.

Box D

Stress Testing and Australian Bank Resilience

Stress testing is a common tool that policy-makers use to assess vulnerabilities and the resilience of financial systems. The Reserve Bank has recently released details of its 'top down' bank stress testing model, which primarily focuses on the credit side of bank balance sheets to assess possible implications of various macroeconomic conditions for the banking system.^[1] It is designed to be simple and transparent, and to help the Reserve Bank identify which aspects of the macroeconomic environment and banking system are driving the results of the test. As was demonstrated early in the pandemic, the adaptability of the model also allows for additional layers of financial stress to be assessed and for a variety of scenarios to be run quickly. This top-down modelling approach complements the 'bottom up' stress testing undertaken by the Australian Prudential Regulation Authority (APRA) that uses results from individual banks to assess the impact of a particular scenario on bank balance sheets.

Stress testing shows the effects of macroeconomic scenarios for bank capital ratios

The Reserve Bank's stress testing model translates a macroeconomic scenario into implications for bank capital ratios through a series of decision rules and accounting identities. The model uses the same set of equations for each of the nine largest banks in Australia and the scenarios are based on projections of four key macroeconomic variables: GDP growth; the unemployment rate; housing prices; and commercial

property prices. The main way these variables affect bank balance sheets is through their effect on credit losses, which ultimately feed through to bank capital ratios. For example, in a scenario where macroeconomic conditions deteriorate (say, the unemployment rate increases and housing prices decline), there is an increase in losses on housing credit, which leads to a decrease in bank profits and capital ratios.

Figure D.1 presents a simplified diagram of the general model dynamics.

At a high level, once credit losses are calculated, a series of decision rules – which take into account the size of each bank's profits and the strength of their capital ratio – determine dividend payments and the amount spent on new assets. If banks remain profitable and capital ratios are sufficiently above APRA's regulatory requirements, banks pay out dividends in line with their historical norms. The profits that are not used for dividend payments (along with additional borrowing by the bank) fund new assets. The capital ratio measures the amount of capital that a bank has relative to its total risk-weighted assets (RWAs). The amount of profits not paid out in dividends results in an increase in bank capital, while the amount spent on new assets increases total assets, which determine total RWAs.

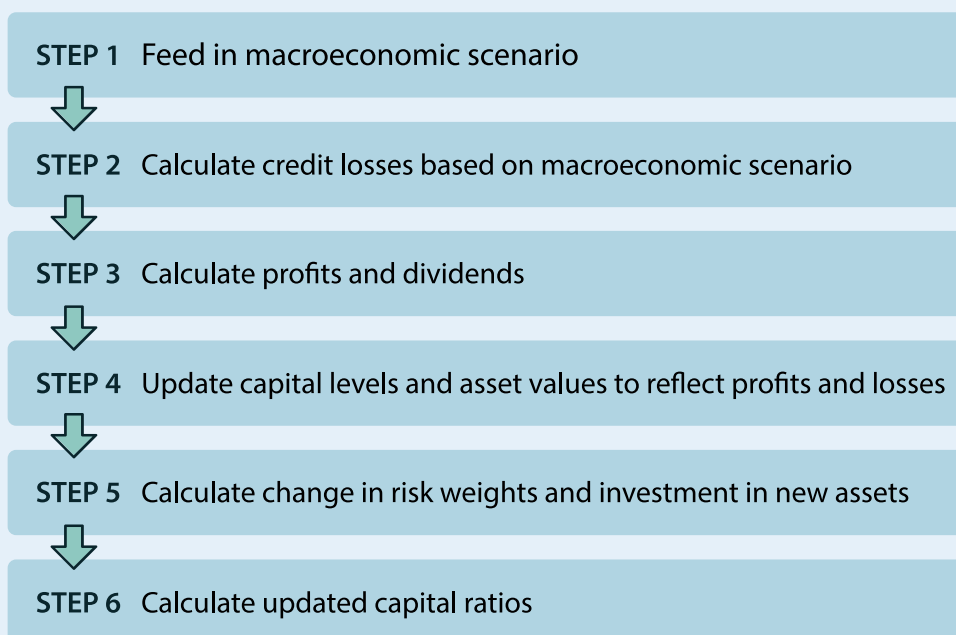
The credit losses for each bank are calculated by mapping the macroeconomic scenario to the rate of loan defaults – often referred to as the 'probability of default' (PD) – and to the losses that occur when a borrower defaults – known as the 'loss-given-default' (LGD).^[2] PDs and LGDs are calculated for the different

types of loans that banks have on their balance sheets. For example: multiplying the PD and LGD for a portfolio of housing loans and then multiplying the result by the dollar value of housing loans outstanding gives the dollar value of expected credit losses on housing loans.

The two most important types of loans for bank credit losses are housing and business loans, which together comprise around 80 per cent of bank loans and around 50 per cent of banks' total assets. In the model, mortgage PDs are determined by two variables: the unemployment rate; and the loan-to-valuation ratio (LVR) of the mortgage. This is consistent with a large body of economic literature both in Australia and overseas that suggests an increase in the unemployment rate and higher LVR loans are key drivers of housing defaults.^[3] LGDs for

housing loans are driven by changes in housing prices in a given scenario (as the property is used as collateral for the loan) and the current LVR of the mortgage. For business loans, changes in GDP growth affect the profitability of businesses and their ability to cover debt payments. If a firm's ability to cover debt payments falls to a sufficiently low level, it is assumed to default. Similar to housing loans, changes in property prices affect the LGDs of business loans by changing the values of collateral that secure these loans. Interest rates do not have a direct impact on credit losses in the model, rather the effect is indirect. This is so the model can focus on the effects of the macroeconomic environment on bank balance sheets outside of the effects of monetary easing that are likely to occur during economic downturns.

Figure D.1: Stress Testing Model Dynamics



During the COVID-19 pandemic, stress testing was used to assess bank resilience in a highly uncertain environment

At the onset of the COVID-19 pandemic there was an unusually high degree of uncertainty about the economic outlook and the resilience of banks in Australia. The Reserve Bank used stress testing to assess possible implications for the banking system of the pandemic and associated restrictions.

The Reserve Bank simulated a variety of macroeconomic scenarios – including those based on the downside scenarios published in the *Statement on Monetary Policy* – to assess implications for bank capital ratios and banks' ability to continue extending credit to the economy.^[4] This analysis helped to inform the Reserve Bank's understanding of whether banks were appropriately capitalised to withstand the effects of the health crisis or whether additional capital raising was needed. These results also provided a useful complement to stress testing undertaken by APRA, allowing for coordinated analysis across the agencies on the Council of Financial Regulators.

An important feature of the stress testing modelling approach was its ability to perform sensitivity analysis on the banking system. For example, stress testing helped the Reserve Bank to explore:

- how credit losses could evolve with worse economic conditions
- how expected credit losses and the depletion of bank capital differed depending on whether a recession was short and sharp or prolonged
- whether capital levels were sufficient to support continued lending growth or could act to amplify the shock.

Such analyses were important for understanding non-linearities in the banking system, where credit losses increase at a faster rate as the economy deteriorates further. The model was also applied to smaller banks (that were not formally part of the model) to examine their potential losses by using estimates of credit loss rates.

Another way the stress testing model was used during the pandemic was to assess how severe economic conditions needed to be for bank capital ratios to breach key thresholds. These 'reverse stress tests' can be especially useful in situations of heightened uncertainty. For example, in reverse stress tests presented in the October 2020 *Financial Stability Review*, it was found that economic conditions would need to be materially worse than the Bank's downside forecasts at the time – and not dissimilar to the Great Depression – for a major bank to breach a Common Equity Tier 1 (CET1) capital ratio threshold of 6 per cent.

Banks are resilient to materially higher interest rates and inflation

In response to high inflation, the Reserve Bank has increased the cash rate target by a total of 250 basis points since May 2022, and market pricing implies the cash rate is expected to increase further.

Higher inflation and higher interest rates could lead to larger credit losses despite continued, albeit slower, economic growth. The stress testing model can provide insights into the magnitude of potential credit losses and how important they could be for the capital positions of large and mid-sized banks. The model applies two principal stresses to examine the resilience of the banking system to higher inflation and interest rates:

1. Higher inflation and higher interest rates on mortgages squeeze households' real incomes, making it more difficult to service debt, which could lead to more defaults and larger credit losses for banks. Similarly, higher input costs and higher interest rates passed onto business loans can make it more difficult for businesses to service their debts, potentially leading to higher default rates (see 'Chapter 2: Household and Business Finances in Australia').
2. Higher interest rates typically reduce the prices of housing and commercial property that are held as collateral by banks against their loans, which increases LGDs as well as PDs on loans.

Based on these avenues for stress, two scenarios are used to analyse the potential impact of higher interest rates on bank capital:

- *Baseline scenario* – the cash rate increases broadly in line with current market pricing, peaking at around 3.5 per cent. GDP growth slows as higher interest rates weigh on spending, and the unemployment rate is assumed to increase slightly but remain low by historical standards.^[5] Property prices – both housing and commercial – are assumed to fall by 10 per cent from peak to trough.
- *Severe scenario* – market-based interest rates increase by an additional 300 basis points than in the baseline scenario. This scenario assumes the economy deteriorates substantially: the level of GDP falls by 4 per cent and the unemployment rate increases to around 11 per cent over about three years. Property prices fall by 30 per cent, reflecting the larger increase in interest rates and the more severe decline in

economic activity. Bank's net interest margins (NIMs) are assumed to narrow by 50 basis points, reflecting an additional increase in the cost of funds for banks that is not passed on to borrowers.

The severe economic scenario does not allow for an offsetting policy response by the Reserve Bank. This assumption helps to assess whether banks are able to withstand severe shocks without policy support and also compensates for aspects of bank balance sheets that are not captured in the model (particularly the non-credit side of balance sheets).

Since inflation and interest rates do not directly feed into the stress testing model, credit losses on housing loans are estimated using the impact on borrowers' incomes and interest payments from higher inflation and interest rates, based on data from the Reserve Bank's Securitisation Dataset. This dataset provides loan-level characteristics of housing loans, such as incomes of borrowers and the value of the underlying collateral behind these loans at origination. Defaults on housing loans are estimated by adjusting loan repayments with the assumed path of interest rates, adjusting incomes at origination with past and forecast wages growth, and adjusting household expenses to grow in line with forecast inflation. Adjusting the level of collateral at origination by past movements in housing prices and then the assumed fall in housing prices provides estimates of housing losses for those borrowers that default. Losses on business loans are assumed to be proportional to losses on housing loans. This proportion is determined by the average relative profile of housing and business non-performing loans since 2004 and scaled by the size of a bank's business exposures.^[6]

In the baseline scenario, the expected *direct* credit losses on housing loans from the effects of higher interest rates and inflation are around \$9 billion. These losses are equivalent to around 4 per cent of the around \$240 billion in CET1 capital currently on bank balance sheets, and occur before taking into account profits generated by banks over the period. The model's decision rules dictate that banks would raise provisions in anticipation of future expected losses on housing loans. If the effects from slower economic growth and losses that accrue directly from higher interest rates and inflation are aggregated, the combined credit losses and provisions on housing loans lead to a reduction in the aggregate capital ratio of around 50 basis points. The equivalent impact on business loans leads to a further decline in the capital ratio of around 40 basis points. However, the total impact on the CET1 ratio is smaller at around 85 basis points. The total impact includes offsetting increases in the CET1 ratio from the profits that banks continue to generate from their portfolio of loans throughout the scenario (Graph D.1).^[7] Overall, in the baseline scenario, the aggregate bank CET1 capital ratio remains well above minimum requirements.

The severe scenario has an additional increase in interest rates of 300 basis points from the baseline scenario. The expected direct credit losses attributable to higher interest rates and inflation on housing loans in this scenario is around \$24 billion. These direct losses amount to around 10 per cent of banks' CET1 capital. However, this is before taking into account additional losses from the deterioration in the economic environment. In this case, total losses and associated provisions on housing and

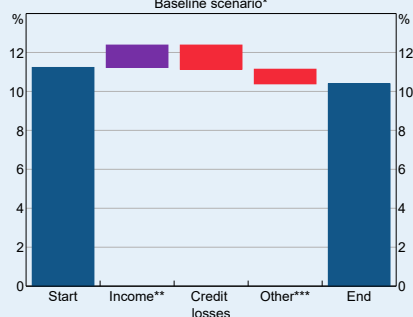
business loans reduce the aggregate CET1 ratio by 270 basis points. The overall reduction in the aggregate CET1 ratio is 345 basis points, reflecting credit losses from housing and business loans as well as other credit portfolios and from an increase in risk weights. In this scenario, despite the significant decline, bank capital levels remain well above regulatory minimums, although some banks do breach their regulatory buffers.^[8]

In both scenarios, banks are resilient to estimated additional credit losses that occur from the effects of higher inflation and interest rates. The losses on housing and business loans contribute to declines in bank capital ratios, but the high initial levels of capital and continued income generated on banks' loan portfolios mean that aggregate capital levels still remain well above minimum requirements (Graph D.2).

These stress testing results are subject to considerable uncertainty. This is especially true in the severe scenario where such a sharp increase in interest rates has not recently been experienced in Australia. In

Graph D.1

Banks' CET1 Capital Ratios
Baseline scenario*



* GDP growth and unemployment rate follow consensus forecasts, the cash rate follows a path broadly in line with market expectations, and property prices fall 10 per cent.

** Retained earnings before credit losses.

*** Includes contributions from changes in balance sheet size and risk weights.

Sources: APRA; RBA

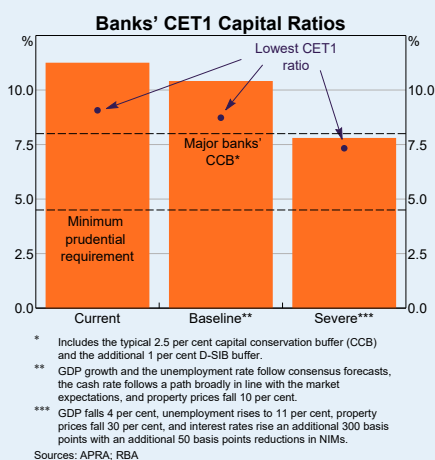
addition, there could be important non-linearities and feedback mechanisms that are not captured in these scenarios, such as a case where credit losses result in banks pulling back on their lending, which leads to a further deterioration in the economic environment and further increases in credit losses. The nature of the shock will also have a bearing on bank resilience. For instance, banks are assumed to have continued access to funding markets – the price of these funds

increase but market functioning remains orderly.

The above analysis focuses on credit risks because this is likely to be the most important variable for bank resilience in Australia. However, there are some other variables that could reduce capital ratios. For example, higher interest rates could lead to some losses on banks' trading and banking books. Indeed, the major banks have already experienced declines in their CET1 ratios from higher RWAs related to increases in interest rate risk on the banking book.^[9]

Conversely, the scenarios do not account for some possible benefits accruing to banks from higher interest rates. For example, market analysts expect rising interest rates to result in wider NIMs for banks (see 'Chapter 3: The Australian Financial System'). While it is possible that NIMs widen in response to higher interest rates, it does not necessarily follow that higher interest rates will lead to an increase in bank profitability because it depends on the pace of loan growth, the extent of competition in funding and lending markets, and asset quality.

Graph D.2



Endnotes

- [1] For more details, see Garvin N, S Kurian, M Major and D Norman (2022), 'Macrofinancial Stress Testing on Australian Banks', RBA Research Discussion Paper No 2022-03.
- [2] Losses that occur when there is a default on a loan are not usually equal to the total value of the loan because banks often have collateral, such as housing, that can be sold in the event of a default with the sale proceeds mitigating the loss.
- [3] For Australian studies on mortgage defaults, see Read M, C Stewart and G La Cava (2014), 'Mortgage-related Financial Difficulties: Evidence from Australian Micro-level Data', RBA Research Discussion Paper No 2014-13; Bergmann M (2020),

'The Determinants of Mortgage Defaults in Australia – Evidence for the Double-trigger Hypothesis', RBA Research Discussion Paper No 2020-03. For international evidence, see Anastasiou D, H Louri and M Tsionas (2016), 'Determinants of Non-performing Loans: Evidence from Euro Area Countries', *Finance Research Letters*, 18, pp 116–119.

- [4] See RBA (2020), 'The Australian Financial System', *Financial Stability Review*, October; RBA (2021), 'The Australian Financial System', *Financial Stability Review*, October.
- [5] The scenario uses forecasts from Bloomberg's survey of economists.

- [6] The overall effects on business credit losses from higher inflation and interest rates are difficult to estimate due to assumptions around interest rate pass-through and the uneven effects of inflation on business profitability. For this reason, losses are assumed to rise proportionally with the increase in housing credit losses.
- [7] Balance sheet growth as well as growth in average risk weights also contribute to the decline in the capital ratio.
- [8] Major banks hold a capital conservation buffer (CCB) of 3.5 per cent, which includes the typical CCB buffer of 2.5 per cent and an additional 1 per cent domestic systemically important bank (D-SIB) buffer.
- [9] In Australia's case, losses on the trading and banking books are likely to be modest given the underlying exposures and nature of hedging arrangements. For a 200 basis point increase in interest rates, losses on banking and trading books are estimated to lead to a 28 basis point reduction in the CET1 capital ratio for the major banks. See RBA (2022), 'The Australian Financial System', *Financial Stability Review*, April.

4. Domestic Regulatory Developments

The Council of Financial Regulators (CFR) is the forum for coordination between Australia's key financial regulatory agencies: the Australian Prudential Regulation Authority (APRA); the Australian Securities and Investments Commission (ASIC); the Australian Treasury; and the Reserve Bank of Australia. The CFR is chaired by the Bank, which also provides the secretariat. CFR agency heads typically meet quarterly, but inter-agency coordination and collaboration is ongoing, through CFR working groups and bilateral engagement at a number of levels and on a range of subjects.

Over the past six months, the CFR has been assessing the effects of inflation, rising interest rates and falling housing prices on households, businesses and the financial system. It has maintained its ongoing focus on climate-related financial risks and the need for financial institutions to increase their resilience to cyber-attacks. In conjunction with some non-CFR agencies, it has provided advice to the Australian Government on topics including de-banking, the use of derivatives by superannuation funds, and leverage and risk in the superannuation system. The CFR has also supported initiatives to modernise the regulatory framework in response to innovation in the financial sector.

The CFR is monitoring the effects of inflation, rising interest rates and falling housing prices

As discussed in the preceding chapters, the global economy and financial system are facing considerable uncertainty, including as a result of high inflation, rising interest rates, sharp

increases in energy prices and disruptions to supply chains. These forces are also at play in Australia, along with a marked softening in housing market conditions and falling housing prices. These factors are placing pressure on some household budgets and businesses' cash flows, and this is likely to continue in the period ahead. Understanding the effects of these developments and the associated risks in order to support appropriate and consistent policies is a high priority for the CFR and has been an important topic of discussion at recent meetings. The CFR is continuing to closely monitor trends in borrowing and lending behaviour, against the backdrop of high household debt, declining housing prices and rising interest rates.

Advice on de-banking has been provided to the government

In recent years, numerous non-bank providers of financial services have faced difficulties obtaining or retaining core banking services, a process often referred to as 'de-banking'. In March 2022, the Morrison Government requested that the CFR – with assistance from the Australian Transaction Reports and Analysis Centre (AUSTRAC), the Australian Competition and Consumer Commission (ACCC) and the Department of Home Affairs – provide advice on the 'de-banking' of financial technology firms, digital currency exchanges and remittance providers. Addressing de-banking has been a challenge in many countries, reflecting the balance faced by regulators between promoting innovation and competition on one hand and

controlling financial crime and associated reputational risks on the other. A working group comprising representatives of the seven agencies has examined these issues in the Australian context and consulted with the affected industries. The CFR and other agency heads discussed de-banking in June 2022. They considered how banks' risk aversion in dealing with some sectors might be addressed, along with ways to improve the transparency and processes associated with banks' decisions on the provision of banking services.

The CFR's advice was provided to the Albanese Government in late August 2022 and published in early October. The advice presents options to address de-banking across all businesses and individuals. It recommends that:

1. voluntary data collection on de-banking be undertaken by the four major banks, following which consideration be given to a formal phase of data collection, subject to appropriate resourcing for relevant agencies
2. all banks implement a number of specific measures to improve transparency and fairness, which would apply to all instances of de-banking
3. the four major banks be advised of the government's expectations that they publish guidance applicable to the digital currency exchange, financial technology and remittance sectors concerning their risk tolerance and their requirements to bank these sectors
4. consideration be given by government to funding targeted education, outreach and guidance to the financial technology, digital currency exchange and remittance sectors.

The government has indicated that it will release a response to the recommendations in due course.

The CFR is supporting the modernisation of financial regulation in light of technological innovation

The past year has seen volatility in crypto-asset markets, the failure of some crypto service providers internationally, a rise in crypto-related scams, and increased interest in issuing Australian dollar stablecoins (see 'Box A: Financial Stability Risks from Crypto-assets'). In this context, the CFR's June 2022 statement highlighted the importance of establishing a robust regulatory framework for these new technologies to protect investors and guard against potential financial stability risks. Following the release of the Morrison Government's 'Transforming Australia's Payments System' policy package in late 2021, the CFR agencies have been supporting Treasury in the development of a regulatory framework for crypto-assets in Australia. This has occurred through a working group comprising CFR members, the ACCC, AUSTRAC, the Australian Taxation Office (ATO) and the Department of Home Affairs. The working group has been providing input on key workstreams, such as licensing of crypto-asset secondary service providers and the regulation of payment stablecoins. Given that a number of the risks presented by payment stablecoins are similar to those posed by stored-value facilities (SVF), the CFR has endorsed the working group's proposal to incorporate payment stablecoins into the proposed SVF regulatory framework. A separate CFR working group is currently examining options for the implementation of this proposal. The CFR agencies have also been supporting work on modernising payments system regulation more generally in light of the 'Transforming Australia's Payments System' package.

In September 2022, the CFR discussed the Reserve Bank's collaboration with the Digital Finance Cooperative Research Centre on a pilot project for a central bank digital currency

(CBDC). Given that Australia already has modern and well-functioning payment and settlement systems, this research will focus on innovative use cases and business models that could be supported by the issuance of a CBDC. The project will also be an opportunity to further understand the technological, legal and regulatory considerations associated with a CBDC. The CFR has an open mind as to whether a public policy case will emerge to support the issuance of a digital form of the Australian dollar by the Bank. A paper was published in September explaining the objectives and approach of the project in more detail.

CFR agencies have continued to engage with ASX Group, including on the CHES replacement system

The Reserve Bank and ASIC have joint supervisory responsibility for the four clearing and settlement facilities in the ASX Group: two central counterparties – ASX Clear Pty Limited and ASX Clear (Futures) Pty Limited; and two securities settlement facilities – ASX Settlement Pty Limited and Austraclear Limited. Some elements of regulatory coordination occur through the CFR's Financial Market Infrastructure Steering Committee, as well as the CFR itself. The CFR has been monitoring ASX's program to replace its equities settlement system, CHES, with a system based on distributed ledger technology (CHES replacement). This is a critical project, affecting an important piece of national financial infrastructure. It is paramount that ASX continues to invest in and maintain the current CHES system so that it can continue to service the market reliably until the CHES replacement can safely go live. The CFR has discussed the repeated delays to the project, and ASIC and the Reserve Bank have welcomed an external review of the new CHES application software. The CFR has also discussed operational outages affecting ASX facilities over recent years and areas where ASX's regulatory engagement

could be strengthened. CFR agencies will continue to work closely with ASX on these issues over the period ahead.

Enhancing the cyber resilience of the financial system is an important ongoing focus of the CFR

The CFR's Cyber Security Working Group continues to pursue a program of work aimed at further improving the cyber resilience of the Australian financial system. The domestic cyber-attack protocol developed by CFR agencies has now been expanded to include New Zealand financial regulators, given the strong links between the Australian and New Zealand financial systems. The protocol outlines processes and procedures to better coordinate activities during cyber threats or incidents.

The CFR has also been developing the Cyber Operational Resilience Intelligence-led Exercises (CORIE) framework, to aid in the preparation and execution of industry cyber resilience exercises. These exercises use intelligence gathered on adversaries to simulate their modes of operation and assess the overall maturity of a financial institution's cyber defence and response capability.

A pilot program under the CORIE framework was successfully completed in 2021, with the participation of a number of financial institutions. The CFR's Cyber Security Working Group has since reviewed the framework in light of the feedback received. The CFR endorsed some minor changes at its June 2022 meeting, along with a plan for the wider rollout of the testing program. The updated framework (CORIE framework v2.0) has been published on the CFR website. While agencies have begun working towards the next round of formal exercises with the industry, institutions can also use the framework to support their own testing programs. The CFR continues to urge financial institutions to step up measures to strengthen their cyber resilience in light of growing threats.

CFR agencies continue to work closely with the Department of Home Affairs Cyber Infrastructure Security Centre through regular engagement on the rollout of the amended *Security of Critical Infrastructure Act 2018* and involvement in the Cyber Security Best Practice Regulation Task Force. This includes engaging with the Australian Cyber Security Centre. CFR agencies are working to ensure the new regime is as aligned as possible with existing cyber-security obligations placed on the financial sector.

CFR agencies are promoting the management of risks to the financial system from climate change

With CFR agencies and financial institutions increasing their focus on the financial risks associated with climate change, the CFR in recent years has regularly discussed agencies' activities and planned future work on climate. The 2022 annual stocktake of climate activities was discussed at the CFR's September meeting and published on its website. CFR agencies aim to improve the ability of Australian corporates and financial institutions to manage the financial risks associated with climate change and to provide high-quality comparable disclosures on these risks. For example:

- APRA's Climate Vulnerability Assessment (CVA) of the five largest banks will play a key role in assisting APRA-regulated entities to understand and manage the financial risks associated with climate change. The CVA is in its final stages, with APRA intending to publish aggregate insights and lessons later in 2022. APRA has also issued prudential guidance on climate-related financial risks.
- ASIC continues to encourage Australian large and listed companies to improve standards of climate-related governance and disclosure. The CFR's Climate Working Group will prioritise its work to facilitate high-quality comparable climate-related disclosures, in line with the government's

commitment to introduce disclosure requirements aligned with international standards.

- CFR agencies have been engaging with the Australian Sustainable Finance Institute as it develops an industry-led sustainable finance taxonomy for Australia.

A significant international development in the past year has been the establishment of the International Sustainability Standards Board (ISSB). The ISSB is preparing a global baseline of disclosure standards that provide investors and other capital market participants with information about companies' sustainability-related risks and opportunities. The CFR provided a submission on the proposed disclosure standards for sustainability and climate-related financial information in July 2022, in which it expressed its support for the ISSB's work. The submission highlighted that the provision of consistent, comparable and reliable climate and sustainability-related information is a critical component of ensuring investors can make fully informed decisions and that capital markets remain fair and efficient. The CFR also drew attention to several areas of the draft standards for further consideration, including transitional arrangements and proportionality for smaller entities.

Reviews of the use of derivatives and leverage in the superannuation system have been provided to the government

The CFR has completed two pieces of work related to superannuation funds in recent months. First, it undertook an assessment of the use of derivatives by superannuation funds following a request for advice by the Morrison Government. The CFR concluded that derivatives usage by superannuation funds is predominantly for risk management purposes and is supported by appropriate financial and operational risk management regulatory standards and frameworks. Funds' capabilities in

respect of derivatives investment are monitored by APRA for ongoing compliance with prudential requirements. The CFR concluded that there is currently limited scope for financial instability to result from the use of derivatives by superannuation funds, noting that the industry had managed the liquidity issues arising from pandemic-related withdrawals reasonably well. It highlighted the importance of both strong liquidity risk management regulatory standards and trustees maintaining a strong focus on funds' liquidity positions.

The second superannuation-related workstream – undertaken jointly with the ATO – responded to a previous government request to review leverage and risk in the superannuation system, focused on limited recourse borrowing arrangements (LRBA). Whereas superannuation funds are generally restricted from borrowing, LRBA's allow a fund to borrow to purchase an asset to be held in a separate trust. If the loan defaults, the lender's rights are limited to the asset held in that trust. These arrangements are almost exclusively used by self-managed superannuation funds, predominantly for the purchase of property. The CFR discussed the implications of the review's findings and provided a report to the government in September 2022.

The CFR engages with other regulators, domestically and in New Zealand

Each year in June, the CFR meets with other domestic regulators that are involved with the

financial system, including the ACCC, AUSTRAC and the ATO. The Australian Financial Complaints Authority (AFCA) also participated in the 2022 meeting.

This year's meeting provided an opportunity to discuss the agencies' work on de-banking and regulation of the crypto-ecosystem (see above), along with competition in banking and the pass-through of interest rate increases. Participants also discussed with AFCA trends in financial complaints. Key developments included: increased investment in internal dispute resolution, particularly among some of the large financial institutions; and a sharp rise in complaints related to scams, including crypto-asset scams and other investment scams. The CFR has indicated that it supports actions being taken by banks and other financial institutions to block scams, build awareness and, where appropriate, remediate losses by customers.

The CFR agencies continue to meet periodically with their New Zealand counterparts through the Trans-Tasman Council on Banking Supervision (TTBC). The TTBC currently meets separately at the agency heads, deputies and working levels. The TTBC heads met most recently in June 2022, with discussions including economic and housing market developments, initiatives related to managing climate financial risks and cooperation on responses to cyber-attacks.

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