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HC Coombs: Governor of Australia's Central Bank 1949–1968

Selwyn Cornish^[*]



Dr HC Coombs attending the United Nations Economic Commission for Asia and the Far East (ECAFE) meeting in December 1948 (RBA Archives PN-002868)

Abstract

Dr HC Coombs was Governor of Australia's central bank for nearly 20 years. His appointment followed significant roles in Australia's war-time administration and post-war reconstruction, where he was an architect of Australia's international full employment policy, known as the 'Positive Approach'. When appointed Governor of the central bank in 1949, Coombs remained committed to the pursuit of full employment. Influenced by Keynes, he sought to maintain aggregate demand and supply in 'reasonable balance', something the Reserve Bank continues to do today. After retiring from the Bank in 1968, Coombs continued to promote the arts in Australia and the rights and welfare of First Nations Australians. He became a senior adviser to the Whitlam Government and chaired the Royal Commission on Australian Government Administration – a fitting conclusion for someone often described as the nation's greatest public servant. This article considers the life and career of HC Coombs, and complements the series of records that have been released on Unreserved.

Introduction

HC Coombs was the longest-serving head of Australia's central bank. For 11 years (1949–1959) he was Governor of the original Commonwealth Bank of Australia, and for eight years (1960–1968) he was Governor of the Reserve Bank of Australia.

When Coombs was offered the position of Governor of the Commonwealth Bank in 1948, he was unsure whether to accept it, though he was well prepared for the responsibility. His postgraduate studies had focused on central banking and he had previously worked at the Commonwealth Bank as the Assistant Economist.

After five years at the Bank, he was appointed Economist at the Treasury in Canberra. In 1941, he joined the Board of the Commonwealth Bank, and in the following year he was asked by the Prime Minister (John Curtin) to fill the newly created position of Director of Rationing. With the establishment of the Department of Post-war Reconstruction (PWR) in 1943, Coombs was appointed Director-General of PWR with responsibility for formulating and directing the nation's reconstruction program after the war. He held the position until the beginning of 1949 when he moved back to the Commonwealth Bank as Governor.

During the 1950s and 1960s he was one of the distinguished group of senior public officials – the so-called 'Seven Dwarfs' – who were credited with the successful management of the Australian economy. In addition to his outstanding work as a central banker and government policy adviser, Coombs won public acclaim for: his work in promoting the arts, including theatre, opera, ballet, painting, sculpture and literature; his work to enhance the rights and welfare of First Nations Australians; and his support for the preservation of the natural environment.

The Bank's archives contain a rich set of records spanning Coombs' career, which are available on Unreserved and accompanied by the Research Guide: Dr Herbert Cole Coombs.

Early years

Herbert Cole Coombs was born on 24 February 1906 at Kalamunda, a village in the hills immediately east of Perth; he died in Sydney on 29 October 1997 at the age of 91. Throughout his life he was known as 'Nugget' Coombs because of his short, stocky build.

Coombs' father had migrated to Western Australia from England and worked for the government railways, first as a cleaner and later as a stationmaster. Because of his father's work, Coombs was raised in the country and attended rural primary schools. His mother encouraged the educational advancement of her children and Coombs won a scholarship to Perth Modern School

after achieving success in a state-wide entrance examination. A keen sportsman, he represented the school at cricket and Australian football. On leaving school, he became a trainee teacher at the public primary school in Busselton and secured a bursary to Claremont Teacher's College, graduating with qualifications to teach in government schools. At first, Coombs was assigned to schools in rural areas and so he enrolled for a Bachelor of Arts as an external student at the University of Western Australia (UWA). Later, he transferred to a school in metropolitan Perth and completed his degree as a part-time student. He majored in Economics and English; among his teachers were Edward Shann who was the Professor of History and Economics and Walter (later Sir Walter) Murdoch who was the Professor of English (Coombs 1981; Rowse 2002).

After graduating with first class honours in Economics, Coombs enrolled for a Master of Arts and chose as his thesis topic 'The Development of the Commonwealth Bank as a Central Bank' (Coombs 1931). He approved of cost cutting and devaluation to stimulate the economy, while opposing JT Lang's plan to repudiate government debt and EG Theodore's proposals for monetary expansion. Shann and LG Melville, Head of the Commonwealth Bank's Economist's Department and the first economist employed by the Bank, were the examiners of Coombs' thesis.^[1] Though they were critical of some aspects of the thesis, Coombs was awarded a Master's degree and secured a Hackett Travelling Scholarship, which allowed him to undertake a doctorate at the London School of Economics (LSE). His preference was Cambridge, but he was now married and thought he had a better chance of finding work as a school teacher in London to supplement his scholarship.

His doctoral thesis at the LSE – entitled 'Dominions Exchanges and Central Bank Problems' – examined central bank policies during the Depression in Australia, New Zealand, Canada and South Africa (Coombs 1933). His supervisor was John Coatman, Professor of Imperial Economic Relations. Coombs argued that the central banks of the dominions should seek to preserve exchange rate stability in the short term while permitting flexibility in the longer term, with the aim of maintaining domestic

price stability. Commercial banks, he contended, should have to lodge a proportion of their cash reserves with the central bank. However, Coombs also believed that open market operations should be used as a means of controlling the liquidity of banks and that central banks should actively use their discount rate for stabilisation purposes.

Assistant Economist at the Commonwealth Bank

When Coombs returned to Perth he found employment as a high school teacher and gave occasional lectures in economics at UWA. He was frequently invited to comment on economic issues for local radio stations and newspapers. In 1935, he moved to Sydney when he accepted the position of Assistant Economist at the Commonwealth Bank. Melville, who had the responsibility for appointing the Assistant Economist, was not altogether convinced that Coombs was the right person for the job. He wrote to Shann saying that he had 'not made up [his] mind about Coombs', and wanted 'to explore the possibilities a good deal further'.^[2] The position of Assistant Economist had become vacant when the former occupant, Mary Willmott Debenham, was compelled to resign from the Bank when she married JG Phillips, who later succeeded Coombs as Governor of the Reserve Bank. There can be little doubt that, had female staff been permitted to continue working at the Commonwealth Bank after they married, the history of central banking in Australia would have been rather different.

As Assistant Economist, Coombs occupied his time collecting and analysing economic data for Melville, and preparing policy papers for senior staff and the Bank's Board of Directors. He was often invited to give lectures at the University of Sydney; in 1938, he taught the History of Economic Thought course when the lecturer went on leave. When Keynes's *General Theory* was published in February 1936, Coombs at first had difficulty accepting some of the theoretical ideas advanced in the book.^[3] However, in Coombs' autobiography published in 1981, he acknowledged that Keynes's book was 'for me and for many of my generation the most seminal intellectual event of our time' (Coombs 1981, p 3).

Coombs is often regarded as Australia's pre-eminent Keynesian.

Public servant

In 1939, Coombs left the Bank to take up the position of Economist at the Commonwealth Treasury in Canberra. He was soon invited to join the influential Financial and Economic (F&E) Committee, chaired by LF Giblin. As a member of the Committee, Coombs provided advice to the government on war finance and post-war economic policy (Figure 1). With the change of government in October 1941 and the switch from a market approach to war finance to a greater reliance on direct controls, Coombs was persuaded by Prime Minister Curtin to take up the new position of Director of Rationing. In early 1943, he moved again to become Director-General of the Department of Post-war Reconstruction.

Among his new tasks as Director-General was the preparation of a paper for the government on employment policy after the war. This work led to the publication in 1945 of the white paper entitled 'Full Employment in Australia' (Cornish 1982). As well as responsibility for the preparation of the white paper, Coombs was an architect of the so-called 'Full Employment Approach' (or 'Positive Approach') – Australia's response to Article VII of the Mutual Aid Agreement between the United States and Britain (and later between the United States and other countries, including Australia). Article VII contained the so-called 'consideration': in return for US financial assistance during the war, recipient countries agreed to dismantle impediments to international trade, such as the British imperial preferences. Given uncertainty about the restoration of international trade after the war and concern about the termination of existing preferential trade arrangements, the 'Positive Approach' declared that Australia would support Article VII provided the United States and other major economic powers agreed to pursue domestic policies aimed at maintaining full employment. That, it was argued, would provide a buoyant demand for Australian exports, offsetting the removal of preferential trade agreements and other obstacles to international trade. Australian

delegations to all the important economic conferences during the 1940s sought the adoption of the 'Positive Approach' in the charters of the new international agencies that were being proposed. Coombs himself attended the first international economic conference on post-war policy convened in 1943 at Hot Springs, Virginia, to discuss food and agricultural policy. After the war, he attended important international trade conferences in London (1946), Geneva (1947) and Havana (1947–1948) (Cornish and Schuler 2019).

When Coombs was at the Department of Post-war Reconstruction he supported the establishment of a national research university in Canberra, so much so that he is regarded as the founder of the Australian National University (ANU). He was offered the foundation Vice-Chancellorship at ANU, which he declined on the grounds that he was committed to fulfilling his responsibilities relating to post-war planning. Even so, his close association with ANU

continued over succeeding decades with his appointments as Deputy Chairman of the Council, Pro-Chancellor and Chancellor (Cornish 2007; Rowse 2002, pp 133–139).

Appointment as Governor

Coombs acceded to the Governorship of the Commonwealth Bank on 1 January 1949 following the retirement of HT Armitage (Figure 2). The appointment came as a surprise to some since there was an expectation that Melville would be offered the job. Giblin, in his letter of congratulations to Coombs, said he 'thought Melville should have had it – or at least been offered it'; however, he added that 'if it was not to be Melville, then most certainly you'. Replying to Giblin, Coombs admitted that he 'always thought that Melville should have had this job and I have given that advice in the appropriate quarter.'^[4] He also

Figure 1: Coombs as a War-time Administrator



Dr HC Coombs in his role as Commonwealth Director of Rationing, May 1942 (RBA Archives PN-002879)

made it clear to Giblin that he was anxious 'to have the benefit of Melville's help' in the future.

In his own congratulatory letter to Coombs, Melville wrote that while he 'should have liked the job', he was sure that Coombs would 'do it as well as I should have done – others will think better'. He spoke warmly of his past association with Coombs, recalling that he had 'always enjoyed working' with him and was 'confident that that happy relationship will continue'. He assured Coombs that he would give him 'any help I can with your new tasks.'^[5] As for Coombs, he went out of his way to look after Melville, supporting his selection as ANU's Vice-Chancellor and his appointment as Australia's Executive Director at the International Monetary Fund and World Bank. When Melville resigned from the Commonwealth Bank to take up the ANU position, Coombs wrote to him saying that 'in the years you were with the Bank you made a contribution to the theory and practice of central banking which is without equal in the world.'^[6]

When the commercial and central banking responsibilities of the Commonwealth Bank were separated in January 1960, Coombs was appointed Governor of the Reserve Bank of Australia. While he did not support the separation, he made it clear to the Prime Minister (RG Menzies) that he would do everything in his power to make the separation a success (Coombs 1981, pp 133–139).

There were several reasons why Coombs opposed separation. For a start, he was not convinced that monetary policy could be successfully conducted in Australia without the commercial functions of the Commonwealth Bank. The advantage of a composite commercial and central bank, he argued, was that the commercial operations could be used to supplement the limited central banking instruments that were available. For example, when monetary tightening was called for, the commercial arm of the Commonwealth Bank could restrict its lending, and when a loosening of policy was appropriate, it could expand its lending. Also of concern to Coombs was that a smaller central bank would provide fewer opportunities for staff promotion and consequently the Bank would run the risk of losing promising staff. The privately owned commercial banks, on the other hand,

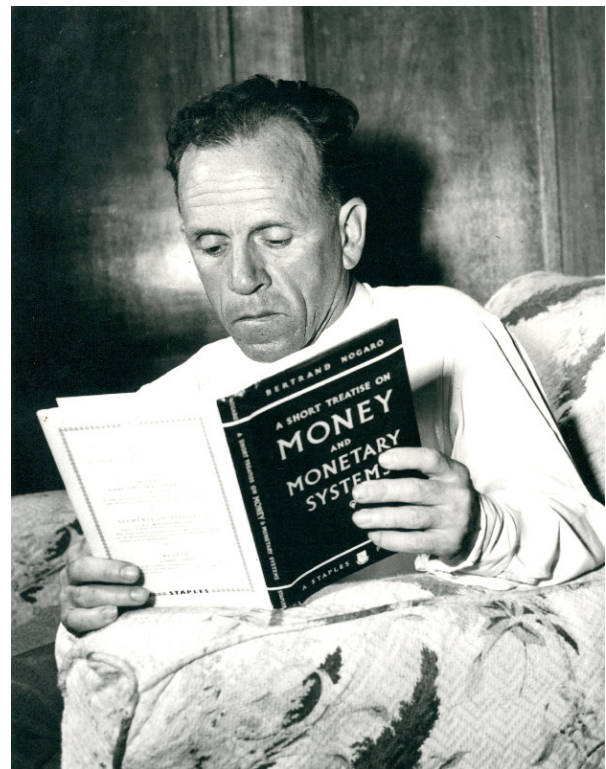
fought against the continuation of a composite commercial and central bank, asserting that it was inappropriate that their major competitor, the Commonwealth Bank, was also the nation's central bank.

By the middle of the 1950s, it was clear that Coombs had lost the battle to preserve the combined functions of the Commonwealth Bank. Legislation was drafted in 1957 to separate the commercial and central banking responsibilities of the Bank; legislation to establish the separate Reserve Bank was eventually passed by the Parliament in 1959 after it had been rejected by the Senate in 1957 and again in 1958.

Central banker

Coombs' advice to the government throughout the 1950s and 1960s continued to be based on the principles set out in the 1945 white paper – namely, to use monetary (and fiscal) instruments to fine-tune the economy so that aggregate demand and supply remained in balance. In 1949, he advised the

Figure 2: Coombs Reading *A Short Treatise on the Monetary System*



Dr HC Coombs, taken in February 1957 while Governor of the Commonwealth Bank (RBA Archives PN-002903)

government against devaluing fully with sterling against the US dollar, for to do so would accelerate inflationary forces that had already pushed the annual rate of inflation to nearly 10 per cent (Coombs 1981, pp 150–151).^[7] In 1951, in the midst of the Korean War boom, when inflation exceeded 20 per cent, he advised the government to tighten monetary policy by raising interest rates and increasing the special deposits that banks were compelled to hold at the central bank. The government, on the advice of the Treasury, was reluctant at first to increase interest rates, but in the end it was forced to act when the balance of payments deteriorated. A 'horror' budget was introduced, and the economy was driven into recession. This was the first of the 'stop-go' cycles that were to be repeated in the mid-1950s and again at the end of the 1950s into the early 1960s. Coombs and his central bank colleagues were invariably ahead of the Treasury in wanting to nip nascent booms in the bud by gently altering the stance of monetary policy; however, delays meant that when policy settings were eventually altered the measures adopted were excessive and too late.

Coombs himself was especially sensitive to the problem of inflation, devoting a public address given in 1959 to what he called 'A Matter of Prices' (Coombs 1971, pp 118, 120). A central theme of the address was that inflation was becoming acceptable to many in the community. For Coombs, this attitude possessed 'a specious charm' and required 'critical examination'. As he explained, a 'persistent tendency for prices to rise may, like the housemaid's baby, be very small at first – but once people have got used to it being around, they may well be astonished at how rapidly it will grow'. It was his view that the 'tendency of prices to creep upwards ... derives in part from the attitudes of people – those who make decisions in business and those whose passivity towards such decisions reduces the natural resistance to higher prices'. Inflation 'does matter', Coombs insisted, for if prices continued to rise it would pose 'a serious and growing threat to the health of our economy; if it continued uninterrupted there would be a grave danger that it will gather momentum from the efforts of people to protect themselves from its

effects and cease to be merely a "creeping inflation"'. He would no doubt have taken an interest in the work on 'inflationary expectations' that emerged not long after his speech in 1959.

A major problem faced by Coombs was that the monetary controls available to conduct monetary policy – including controls on interest rates, limits on bank lending and the special deposit system (from 1960, the Statutory Reserve Deposit ratio) – were thought to be confined by the Australian Constitution to banks. But to restrict the operations of banks in these ways encouraged the growth of non-banking financial intermediaries, including finance companies, building societies, credit unions and other financial institutions that were not subjected to the various direct controls. In the result, the area of the financial system over which the central bank had control diminished as time progressed. Coombs tried to overcome the problem by allowing banks to establish non-banking subsidiaries and partnerships. More particularly, though less successfully, he argued that monetary policy should be conducted by market mechanisms rather than through direct controls. Replacing direct controls with more flexible interest rates, meant greater central bank influence over the entire financial system instead of just the banking sector. He also saw merit in flexible exchange rates. On a visit to Canada in the early 1950s, he devoted some of his time to assessing the impact of the Canadian decision to float its currency, recommending on his return to Australia that the Commonwealth Bank should evaluate the benefits of floating currencies.^[8]

A source of Coombs' success as Governor was his ability to develop a close rapport with government ministers. About his relations with Curtin, Chifley, Fadden and Menzies, Coombs wrote in his autobiography that 'there developed a personal affection which greatly enriched the relationship and I believe added to its effectiveness'. It should perhaps come as no surprise that he was close to Curtin and Chifley. But it may be surprising to learn of the close relationship that developed between Coombs and Menzies (Figure 3). When Coombs was unable to persuade Treasurers Fadden and Holt of the need to change the direction of monetary

policy, he would take the matter to Menzies and generally receive a sympathetic hearing. And when Coombs retired from the Reserve Bank, Menzies, who had retired as Prime Minister two years before, wrote a warm letter to thank him for the support he had given to the governments that Menzies had led. Menzies wrote to Coombs:

You will remember when I came back into office you, as a man suspected of unorthodox ideas, were under a cloud of suspicion by some of my colleagues. The cloud soon disappeared as it became increasingly clear to the most prejudiced that we had as Governor a man of the most conspicuous ability and of the most shining integrity.

It remains a matter of great pride for me to have got to know you as well and to have benefited so much from your great services to our country.

But my happiest memory is that we have become close friends in a personal way.^[9]

Retirement

During his tenure as Governor, Dr Coombs had been a committed patron of the arts, responsible for the prescient acquisition of works by emerging Australian artists that now form a small but culturally significant mid-century collection. His patronage extended to performing arts, including as Chairman of the Elizabethan Theatre Trust, a role he continued in his retirement (Figure 4).

Coombs chose to retire as Governor of the Reserve Bank in 1968. Before leaving the Bank, he was appointed by Prime Minister Holt to two positions created especially for him – Chair of the Council for Aboriginal Affairs and Chair of the Australian Council for the Arts.

Figure 3: Coombs and Menzies



Robert Menzies, Prime Minister of Australia, with Dr and Mrs Coombs at a Reserve Bank of Australia Board dinner, 1962 (RBA Archives PN-002528)

Shortly before the 1972 election, the Leader of the Opposition, EG Whitlam, invited Coombs to join him as an adviser in the event of the Australian Labor Party (ALP) winning the election. When the ALP did win, Coombs took on a number of special assignments for the new Prime Minister, including the chairmanship of a committee (the 'Coombs Task Force') to evaluate expenditure programs introduced by previous governments. As wage demands stimulated excessive price inflation, Coombs was asked to advise the government on how to limit wage increases. He proposed a strategy that would allow low wage incomes to be fully indexed to price increases, but higher wage incomes would be indexed at rates below full indexation. This proved to be unacceptable to the trade unions and some members of the government. The rejection of Coombs' advice was something of a turning point in his role as economic adviser to Prime Minister Whitlam. His disillusionment with the government's handling of

economic matters plummeted further after Dr JE Cairns became Treasurer. Coombs was then appointed by the government to chair the Royal Commission on Australian Government Administration, which reported to the Fraser Government in 1976. The report called for a more 'responsive' public service and the selection of public servants from a wider and more diverse recruitment base.

With the completion of his work for the Royal Commission, Coombs was appointed to a Visiting Fellowship at the ANU's Centre for Environmental Research, spending half the year in Canberra and half the year in the Northern Territory at the ANU's Northern Australia Research Unit (Fenner and Harris undated). As a public intellectual, Coombs could be more outspoken than he had been as a public servant or central banker. Until now, he had been acutely aware of the problem of providing private advice to government on the one hand, while

Figure 4: Coombs and the Elizabethan Theatre Trust



Dr HC Coombs and Mrs Coombs with Board member of the Elizabethan Theatre Trust, Elsie Beyer, at the first Elizabethan Ball in October 1954 (RBA Archives PN-002843)

publicly criticising the government on the other. He supported autonomy for First Nations Australians, advocating their self-determination and proposing a Treaty of Reconciliation. He frequently visited Arnhem Land, the Western Desert and the Kimberley region. During this time, Coombs wrote his autobiography, *A Trial Balance*, together with a series of books covering Aboriginal and environmental issues.

While Coombs never sought public recognition, for his many contributions to public policy he received numerous awards. In 1972, he was *The Australian* newspaper's inaugural Australian of the Year, and in 1975 he was made a Companion in the Order of Australia (AC), the nation's highest honour, which he gave up the following year when he opposed the reintroduction of knighthoods. In 1969, he was appointed a Fellow of the Australian Academy of Science and was a foundation Fellow of both the Australian Academy of the Humanities and the Academy of the Social Sciences in Australia. He held honorary doctorates from ANU, UWA, the universities of Melbourne and Sydney and Macquarie University, and he was an Honorary Fellow of the LSE. In 1977, he was awarded the ANZAAS Medal at the 48th Congress of the Australian and New Zealand Association for the Advancement of Science. The HC Coombs Building at ANU is named after him (Figure 5).

Assessments of Coombs

Though much is known about Coombs the public official and 'enabler' of good causes, there is not a great deal known about Coombs the private man. To his biographer, Tim Rowse, Coombs remained an enigma: 'I can offer little insight into that inward Coombs that lay beyond his self-effacing ways of writing and talking.' The distinguished ANU philosopher, John Passmore, remarked: 'I just saw him as a series of admirable projects' (Rowse 2002, p 9). Coombs may not have been associated with

the development of an economic theory or major academic work, but he was clearly an outstanding economist, public administrator and adviser to governments. He was a superb communicator, able to articulate in lucid and cogent terms the essential elements of his policy advice. It was this ability that rendered him invaluable to government ministers and greatly endeared him to the Australian people. Above all was Coombs' abiding love of Australia, its people, art and the natural environment. ✎

Figure 5: Coombs at the ANU



Dr HC Coombs at the opening of the HC Coombs Building at the Australian National University, 11 September 1964, posing beside a portrait of himself by Australian artist Clifton Pugh (RBA Archives PN-002463)

Endnotes

- [*] Selwyn Cornish is the Reserve Bank of Australia's Historian and an Honorary Associate Professor at the Australian National University. The author acknowledges the assistance of Jacqui Dwyer, Virginia MacDonald and Greg Tyler.
- [1] For more information about Melville, see Cornish (2021).
- [2] RBA Archives GGM-35-2, LG Melville to EOG Shann, 18 February 1935.
- [3] RBA Archives C.3.20.2.32, HC Coombs to LG Melville, 8 June 1936 and 6 October 1936.
- [4] RBA Archives GHC-48-2, LF Giblin to HC Coombs 23 November 1948; HC Coombs to LF Giblin, 3 December 1948.
- [5] RBA Archives GHC-48-4, LG Melville to HC Coombs, 22 November 1948.
- [6] RBA Archives ST-PR-35, HC Coombs to LG Melville, 13 January 1954.
- [7] RBA Archives GHC-50-1 contains many of Coombs' memoranda on current economic conditions over the years 1949–1951.
- [8] RBA Archives GHC-53-2, Coombs to senior officers of the Bank, 18 June 1953.
- [9] Coombs (1981, p 268).

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Economic Literacy: What Is It and Why Is It Important?

Madeleine McCowage and Jacqui Dwyer^[*]



Photo: artpartner-images – Getty Images

Abstract

One of the core objectives of the Reserve Bank’s public education program is to improve economic literacy. While the social benefits of economic literacy are well established, defining what is meant by this term is not straightforward and has been the subject of debate over many decades. This article explores the meaning of ‘economic literacy’. To arrive at a working definition, it discusses the economic principles that should be understood for someone to be considered economically literate, along with the topics they should be familiar with and the ways of thinking that we would expect them to display. In doing so, it distinguishes between economic and financial literacy. The article concludes by posing questions for future research on how economic literacy in Australia might be measured and how it might be supported.

Introduction

The Reserve Bank, like many central banks, has a public education program designed to support economics students and educators. In Australia, economics is a subject that was once widely offered and widely chosen, but this is no longer so – a situation that has longer term implications for the economics discipline, the quality of public policymaking and economic literacy in society (Dwyer 2017; 2018). Consequently, one of the strategic aims of the Bank’s education program is to increase the size and diversity of the economics

student population. Economics is an important field of study. When someone studies economics they learn powerful concepts that help them better understand the choices involved in a multitude of personal decisions they make, as well as the economic conditions and policies that affect their lives. When many people study economics, they contribute to economic literacy in society.^[1]

The wider social benefits of citizens being economically literate have been cited by numerous commentators. An economically literate populace makes more informed economic choices and better

understands the world around them. They can contribute to the effectiveness of public policy by aligning their expectations and behaviour with it, or by influencing the actions of government and the quality of public discourse. Arguably, though, the case for economic literacy remains most powerfully expressed by the Nobel Laureate, George Stigler, who prompts us to ask why a citizen should be literate in economics rather than any other branch of knowledge. His answer is that economics is worth most people knowing something about because it, in turn, falls into these two specific classes of knowledge (Stigler 1970, p 63):

1. It is a 'means of communication among people, incorporating a basic vocabulary or logic that is so frequently encountered that knowledge should be possessed by everyone'.
2. It is a 'type of knowledge frequently needed and yet not susceptible to economic purchase from experts'.

In other words, citizens need to be able to both assess and talk about economic issues that affect them in the various economic roles they will play over their lifetime. Furthermore, these assessments and communications will need to be made frequently and without the ability to purchase advice from an expert.^[2] Stigler (1970) describes this as the need for 'do it yourself economic analysis'. He also states that this sort of economic analysis is significant because the public chooses 'to speak and vote on economic problems'.

For all these reasons, economic literacy is important. But what precisely is it? This article explores the meaning of 'economic literacy'. It seeks to express a practical working definition that is informed by the threshold concepts someone should understand, and the behaviours they should display, if they are to be considered 'economically literate'. It then poses questions for future consideration that could contribute to the project of measuring and raising economic literacy in Australia.

What is economic literacy?

Despite broad-based agreement that economic literacy is important, defining it is not

straightforward. This challenge is articulated charmingly by Wentworth:

This concept is as familiar to people in economic education as an old friend. We refer to it constantly as if we knew it well but economic literacy is a stranger. It is the golden fleece of economic education. Each person in the field goes on a quest to help find or develop the economically literate person. Unfortunately, economic literacy is a phantom and chameleon. ... There exists little common agreement over what economic literacy really is. This should be corrected. (Wentworth 1976, pp 3–4)

Hansen (1976, p 62) opines that the term 'economic literacy' crept into our vocabulary in the early 1960s following the release of a report in the United States by the National Taskforce on Economics Education (though it used the term 'economic understanding'). In addressing the school economics curriculum, this report emphasised the need for citizens to have an understanding of their economic system, as well as knowledge of the core economic tools and concepts to participate in that system. However, Hansen (1976) noted that it did not specify the precise combination of these things, or measurable levels of them, that would determine economic literacy.

So why has it been so difficult to arrive at a standard and accepted definition? Economics is a broad discipline that incorporates a wide range of concepts, the understanding of which is difficult to observe. Given the breadth of the discipline, how do we choose which particular concepts underpin economic literacy? In what context are they relevant? Should a consumer be considered economically literate based on different criteria to a business person?^[3] How do we deal with the fact that most economic concepts are underpinned by assumptions? That some economic theories can be proven wrong and all are incomplete?^[4] And what weight do we place on equipping someone to understand the economic decisions that affect them personally and those that affect others? Put another way, how do we choose and weight the understanding of concepts and principles that

equip individuals with skills for their personal lives versus those that support effective citizenry?^[5] After all, people vote on economic problems (not mathematical ones). Finally, a particular challenge to an agreed definition of economic literacy is that much of economics is not value free and 'these values are not easily separated from a discussion about established principles or ideas', such that 'one person's economics is another one's manifesto' (Fettig 1999).^[6]

As we consider the challenge of defining economic literacy, it is important to consider the meaning of 'literacy' itself. In essence, and as discussed in the literature, literacy is the development of knowledge and skills that can be applied outside the classroom to analyse, reason and communicate about a subject in *different contexts and throughout one's lifetime*.^[7] This suggests that a workable definition of economic literacy must also embody these ideas.

High-level definitions

We begin our discussion with some high-level definitions of economic literacy. While previous Bank work has acknowledged the lack of an agreed definition of economic literacy, it has described it as encompassing:

... an ability to apply economics skills and frameworks to explain or debate much of the world in which we live – from understanding opportunity costs in our personal decisions, through to forming a view about the efficacy of economic policies. (Livermore and Major 2021, p 1)

While implied, this does not speak directly to the ability of someone to apply these skills and frameworks in different contexts and over time. Michael Salemi, who has written extensively on economics education and literacy, makes this ability explicit. He provides a simple and useful definition that is more closely aligned with the requirements indicated by education authorities:

Students attain economic literacy if they can apply basic economic concepts years later, in situations relevant to their lives and different

from those encountered in the classroom. (Salemi 2005, p 47)

This is satisfactory as an overarching definition that can be understood in relation to descriptions of literacy in other branches of knowledge (especially language and mathematics). But, for it to be operationalised, we still must know *which* basic concepts should be understood and how they should be applied. Here there is much debate, as reflected in the rival views of those who design (and challenge) curricula, both at school and university. This debate has informed criteria-based definitions of economic literacy.

Criteria-based definitions

Wentworth (1976) argues that we need, in the first instance, to have a clear idea about what distinguishes an economically literate person from an illiterate one. We need clear criteria on such things as the minimum level of economic knowledge we expect them to have, the behaviours we expect them to display, and the specific analytical skills they should be able to utilise along with their economic knowledge. In this way, we obtain an insight into what that person 'is like' and what they should be able 'to do'. Importantly, a criteria-based approach to defining economic literacy allows for testing instruments to be developed and observable outcomes that can be measured. And when something is measurable, we can be confident when it has been achieved. As Wentworth (1976) says, this approach provides something that a teacher or researcher can 'get a grip on' to identify those who are economically literate.

All designers of an economics curriculum do so with the deliberate intent of helping students achieve a desired level of economic knowledge and skill for a given stage of learning. In the Australian context, the Australian Curriculum Assessment and Reporting Authority (ACARA) does this for students from Years 5 to 10,^[8] while state education authorities do so for senior high school. ACARA's work on shaping the national curriculum on economics (and business) was founded in the importance of students being able to understand

the many 'dimensions of economics and business that infuse their daily life' (ACARA 2012, p 6). However, while notions of economic literacy are implicit in these curricula, there is no explicit minimum set of learning outcomes that, if achieved, would make a student economically literate.^[9]

The CEE Voluntary National Content Standards in Economics

Arguably, the most comprehensive assessment of what should be understood by economics students in order for them to be economically literate has been undertaken by the Council of Economic Education (CEE) in the United States. The CEE produces the Voluntary National Content Standards in Economics (hereafter Standards), which form a widely accepted criteria-based definition of economic literacy. The Standards were first released in 1997 and the current edition, published in 2010, reflects the work of a writing committee chaired by Alan Krueger with John Siegfried as deputy chair, based on extensive consultation.^[10] These Standards, listed in Table 1 below, specify the essential economic content an economically literate student should know and what they should be able to do with this knowledge at Grade 4, Grade 8 and

upon leaving school. The Standards are primarily conceptual and described as principles-based, though they also require students to understand aspects of the current economic system, its institutions and the impact of economic decisions on different groups in society. To be included, the committee had to deem that a concept, principle or piece of knowledge was essential for a high school graduate to understand, because it was necessary for effective citizenship, employment, further learning and for dealing with the 'ordinary business of life'.

Importantly, the Standards have observable and measurable criteria for a student's understanding and their application of this understanding (i.e. behaviours, things a student can do), allowing them to be operationalised. The Standards are the basis of a comprehensive standardised testing program of high school students in the United States that is conducted regularly by the CEE, known as the Test for Economic Literacy (TEL). The TEL has been used in a number of countries. In fact, shortly after its introduction, Australian researchers conducted the TEL for high school students in Queensland (Leitz and Kotte 2000).^[11]

Table 1: Economic Literacy Standards

CEE Voluntary National Content Standards in Economics, United States

Content Standard	Student understanding	Student application
Scarcity	Resources are limited.	Identify trade-offs from decisions.
Decision-making	Decisions require comparing costs and benefits.	Make effective decisions as consumers and citizens.
Allocation	Different methods can be used to allocate resources.	Evaluate different allocation methods comparing costs and benefits.
Incentives	People (usually) respond predictably to incentives.	Identify incentives that affect their and others' behaviour.
Trade	Voluntary exchange only occurs when all parties expect to gain.	Compare costs and benefits from restraints to trade (e.g. tariffs).
Specialisation	Individuals, regions and countries specialise according to their relative advantage and then trade with others.	Identify advantages to themselves and others from developing specialised skills.
Markets and prices	Interaction between buyers and sellers determines market prices and the allocation of scarce resources.	Identify their own market interactions. Predict how prices change in response to a shortage or surplus.
Role of prices	Prices provide signals and incentives to buyers and sellers.	Predict how changes in preferences or production technology affect prices.
Competition and	Competition among sellers (buyers) usually decreases	Explain how changes in the level of

Content Standard	Student understanding	Student application
market structure	(increases) costs and prices.	competition affect price and output levels.
Institutions	Institutions (e.g. labour unions, markets, NGOs) are created to help individuals and groups achieve their goals.	Describe roles and functions of different economic institutions.
Money and inflation	Money facilitates trade, borrowing, saving and investment. Money affects the overall price level. Inflation is an increase in the overall price level.	Explain how their lives would be harder in a world without money, or with high inflation.
Interest rates	Real interest rates rise and fall to balance overall savings and investment. This affects the allocation of resources over time.	Explain situations in which they pay or receive interest and how a change in interest rates would affect those payments.
Income	Individuals' income is determined by the market value of the resources they sell.	Predict future earnings based on current plans for education, training and career options.
Entrepreneurship	Entrepreneurs take on risks to start new businesses or introduce new innovations. This is an important source of economic growth.	Identify risks and potential returns to entrepreneurship. Understand how public policies affect innovation and growth.
Economic growth	Investment in factories, machinery and technology stimulates economic growth and raises living standards.	Predict consequences of investment decisions.
Role of government and market failure	There is an economic role for government when a policy's benefits outweigh the costs.	Identify and evaluate the payoff from government policies and how costs and benefits are distributed.
Government failure	Costs of government policies sometimes exceed their benefits.	Identify instances where the cost of government policies exceed the benefits they generate.
Economic fluctuations	Fluctuations in a nation's overall income, employment and prices are determined by the interaction of household, firm and government spending decisions. Recessions occur when overall levels of income and employment decline.	Interpret media reports about current economic conditions and how these conditions can affect decisions by households, firms and governments.
Unemployment and inflation	Unemployment and inflation imposes costs on individuals and the overall economy.	Make informed decisions by anticipating the consequences of inflation and unemployment.
Fiscal and monetary policy	Governments' budget policy and the central bank's monetary policy affect the overall levels of employment, output and prices.	Anticipate the effects of government and central bank macroeconomic policy decisions.

Source: CEE (2010)

For specialists in economics education, at least in the United States, the Standards provide a well-accepted criteria-based definition of economic literacy with many practical uses in testing, program design and evaluation. However, if we are to promote wider community discussion of economic literacy, there is value in attempting to establish a shorter, more accessible working definition. There are several ways to do this, including the following three approaches:

1. identify a small number of core 'topics' from the Standards (or otherwise), where a topic is a group of subject matter that may include

concepts, principles, facts or institutional context;

2. identify a small number of core 'principles', where a principle is a conceptual mode of reasoning or analytical framework that is enduring and can be applied even as facts about the economy change; or
3. describe the core 'behaviours' of someone who is economically literate.

Approach 1: Core topics

Hansen, Salemi and Siegfried (2002) – who were involved in the development and subsequent review of the 20 Standards – undertook the first

Table 2: Seven Core Topics in Economics

As defined by Hansen, Salemi and Siegfried (2002)

Topic	CEE Standards covered
Scarcity	Scarcity
Economic behaviour	Decision-making Incentives Specialisation Trade Role of prices
Allocation of goods and services	Allocation Markets and prices Trade
Markets	Competition and market structure Markets and prices Role of prices
Factors of production	Income Entrepreneurship Economic growth
The economy as a whole ^(a)	Money and inflation Interest rates Economic fluctuations Unemployment and inflation Fiscal and monetary policy
Government and economic institutions	Institutions Role of government and market failure Government failure Fiscal and monetary policy

(a) The authors label this topic area 'macroeconomics'.

Sources: Hansen, Salemi and Siegfried (2002, p 464); RBA

approach by grouping the Standards into seven core 'topics' and describing how students might be expected to gain mastery of them. Their short list of topics, along with each Standard it covers, is shown in Table 2. Like the Standards, the topics short-listed by Hansen *et al* embody core principles as well as economic facts and institutional arrangements.^[12]

In promoting their short list of topics, Hansen *et al* examined the teaching of economics at universities, where a key foundation course is commonly called 'Principles of Economics'. They invited others to reflect on a short list of the core *principles* of economics and the extent to which Principles of Economics courses are, in fact, focused on them.^[13] We likewise seek to find a short list of principles, the understanding of which can be used to define economic literacy.

Approach 2: Core principles

We reviewed a number of prominent foundational texts that are explicitly organised according to

principles. They are the work of economists who seek to influence how the principles of economics are understood and applied, both within economics and other fields of study. We are drawn to *Principles of Economics* by Robert Frank (one of the writers of the Standards) and Ben Bernanke (Nobel Laureate and former Federal Reserve Chair), who maintain that 'a small number of basic concepts do most of the heavy lifting in economics' (Frank and Bernanke 2007, p v). They rely on a short list of seven well-articulated core principles (Table 3) and argue that, by focusing on them 'narrowly and repeatedly', these principles can be mastered by students and their understanding of them will remain years after completion of the course. Furthermore, their students are encouraged to become 'economic naturalists' and use these core principles to explain the world around them. Hansen *et al* (2002, p 466) have stated that the approach by Frank and Bernanke (2007) comes 'closest to their vision', in terms of the number and choice of principles and the manner of teaching them.

Table 3: Seven Core Principles of Economics

As defined by Frank and Bernanke (2007)

Core principle	Author description
Scarcity	'Having more of one good thing usually means having less of another.'
Cost-benefit	'Take no action unless its marginal benefit is at least as great as its marginal cost.'
Incentives	'Cost-benefit comparisons are relevant not only for identifying the decisions that rational people should make, but also for predicting the actual decisions they do make.'
Comparative advantage	'Everyone does best when each concentrates on the activity for which he or she is relatively most productive.'
Increasing opportunity cost	'Use the resources with the lowest opportunity cost before turning to those with higher opportunity costs.'
Equilibrium	'A market in equilibrium leaves no unexploited opportunities for individuals but may not exploit all gains achievable through collective action.'
Efficiency	'Efficiency is an important social goal, because when the economic pie grows larger, everyone can have a larger slice.'

Sources: Frank and Bernanke (2007); RBA

Table 4: Four Core Principles of Economics

As defined by Stevenson and Wolfers (2020)

Principle	Author description
Cost-benefit	'Costs and benefits are the incentives that shape decisions. You should evaluate the full set of costs and benefits of any choice, and only pursue those whose benefits are at least as large as their costs.'
Opportunity cost	'The true cost of something is the next best alternative you have to give up to get it.'
Marginal principle	'Decisions about quantities are best made incrementally. You should break "how many" questions into a series of smaller, or marginal decisions, weighing marginal benefits and marginal costs.'
Interdependence	'Your best choice depends on your other choices, the choices others make, developments in other markets, and expectations about the future. When any of these factors changes, your best choice might change.'

Sources: Stevenson and Wolfers (2020); RBA

Stevenson and Wolfers (2020) go further and argue that there are only four core principles of economics that are truly foundational and can be applied to almost any economic decision – from the mundane domestic decisions of daily life to the complex decisions of public policy (Table 4). They note that '[s]uccessive cohorts of economists have transformed the field so that it has greater relevance and a closer relationship to actual human behaviour, making it more meaningful to more people' (Stevenson and Wolfers 2020, p v). To cater for this, they focus on the small number of principles that draw on human 'intuition' so that students can place themselves directly as economic actors and are equipped to 'think like an economist'.

Approach 3: Core behaviours

What then are the behaviours of someone who 'thinks like an economist'?

Wentworth (1976) provides a list of what an economically literate person should be able to do, and includes in it a list of competencies specified by Hansen (1976). Taking only those competencies that are behaviours – ways of thinking or acting – that are specific to economics, we arrive at a list of behaviours expected of an economically literate person. They should be able to:

- use the concept of opportunity cost as a criteria for economic decision-making
- recognise that every action has inherent costs and benefits

- know the criteria for evaluating economic actions and policies, and recognise the trade-offs they entail
- identify the broad outlines of the economic system and recognise the interdependencies of the system
- reach an understanding of everyday economic issues and be able to make personal judgements about these
- participate confidently in discussions of economic topics.^[14]

Wentworth (1976) and Hansen (1976) provided a foundation for others who have highlighted the additional behaviours of:

- thinking at the margin
- recognising comparative advantage.

These additional behaviours are emphasised by Siegfried *et al* (1991), Cooper (cited in Clement 2003) through to contemporary commentators like Malek (2022) as important examples of ‘thinking like an economist’.

Defining economic literacy with respect to behaviours allows us to come closer to the goal of individuals being equipped to challenge information presented to them about current affairs, public policy and the systems that influence economic outcomes – as envisioned by Rogers (2014) and Soroko (2022), and touched on by Zweig and Dawes (2000). Of course, economic literacy can only be achieved if the behaviours we consider to be innate to economics are accompanied by critical thinking, evidence-based decision-making, numeracy and skills in communication, which are intrinsic to many disciplines.

Towards a working definition

While economic topics, principles and behaviours each provide useful approaches for defining economic literacy in a practical and accessible way, they need not be mutually exclusive. For example, if an expected behaviour of an economically literate person is to reach an understanding of everyday economic issues and make judgements about them, they must also be familiar with key economic topics and some specific principles of economics.

As such, an effective definition will likely include aspects of all three approaches.

Let’s revisit our high-level definition of economic literacy and see if by embedding some criteria, we can give it practical form. Informed by our discussion so far, we propose the following definition.

Proposed working definition of economic literacy

Someone attains economic literacy if, years after they have been taught, they can apply the four essential principles of economics in situations relevant to their lives and different from those encountered in the classroom. They will use these principles as the basis of economic analysis and decision-making, and they will understand the basic aspects of seven core economic topics that explain the economic system in which they participate.

The four essential principles of economics are: the cost-benefit principle; the opportunity cost principle; the marginal principle; and the interdependence principle.

The seven core topics of economics are: scarcity; economic behaviour; the ways in which goods and services are allocated; the structure and operation of markets; the use of factors of production; core macroeconomic variables and features of a business cycle; and the role of government and economic institutions in influencing economic outcomes.

We chose the four economic principles nominated by Stevenson and Wolfers (2020) because they prepare the student for life, whereas more comprehensive groupings of principles go beyond this to also equip a student for further study in economics (or the application of economics to other fields of study).

We chose the seven topics of Hansen *et al* (2002) because they give appropriate emphasis to scarcity as the problem that economics is ultimately trying to solve, the ways in which economic agents

interact with each other in their attempts to solve it, the nature of an economy and the factors that influence economic outcomes and material wellbeing. They also align with the CEE Standards – a widely accepted criteria-based definition of economic literacy with observable and measurable criteria.

As with any definition or short list of what is ‘core’, elements are subjective. But the approach here is to invite others in the field to articulate the notion of economic literacy – something that has long been seen as an important problem for the profession to solve.

What is the difference between economic and financial literacy?

In popular parlance, economic and financial literacy are often used interchangeably – reflective of the misperception of many non-economists that economics is largely about ‘money and share markets’. But even in professional and academic literature, the distinction between the two is not always clear. So it is helpful to clarify the relationship.

In contrast to economic literacy, the meaning of ‘financial literacy’ is little contested, the study of it is more mature and there are agencies devoted to measuring and achieving it. In a widely accepted international standard, financial literacy is defined as:

A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing. (OECD 2018)

Furthermore, the OECD’s International Network on Financial Education has a toolkit for measuring financial literacy and supporting financial education across countries. Relatedly, there is extensive quantitative analysis of financial literacy and its determinants.^[15] In jurisdictions where attempts to improve financial literacy are more mature, the concept has evolved into ‘financial capability’, which includes more emphasis on positive financial behaviours. In Australia, the Treasury is responsible for the National Strategy on Financial Capability and

the Australian Securities and Investments Commission (ASIC) is responsible for provision of the services and tools associated with its implementation.^[16] For recent research on financial literacy in Australia, see Preston (2020) and Preston and Wright (2019).

The meaning of financial literacy is clear, as are the consequences of not having it. In fact, raising financial literacy is a policy imperative of many countries. Without financial literacy, individuals are unable to manage their money wisely and are vulnerable to forces that reduce their financial security. This matters from a social welfare perspective. And as noted in earlier Bank work, it also matters for ‘... the promotion of a more resilient financial system and, ultimately, to the more efficient allocation of resources within the real economy’ (Hall 2008). So financial literacy has a relationship with economics. Reflecting this, it is an ongoing focus area for many central banks, with some devoting significant resources to supporting financial literacy (Bowman 2022).

But there is a key difference between economic and financial literacy. Financial literacy is focused on the capability of someone to understand their own situation. Economic literacy is focused on the capability of someone to understand their own situation, its broader economic context and thereby the situation of others. For example, while a financially literate person would understand what an interest rate is and what it means for their personal finances, an economically literate person would also understand why an interest rate has been changed and how this change will affect the broader economy. Consequently, there is a sense in which financial literacy is nested within economic literacy.^[17]

Where to next?

This article has explored what is meant by the term ‘economic literacy’ and why it is important. In doing so, we have perhaps raised more questions than we have answered. While we have proposed an option, the definition of economic literacy is subjective, and not settled. We invite alternative views.

Even with an agreed-upon definition, how do we measure economic literacy? This is an important area for future research. Measurement is crucial to understanding the state of economic literacy in Australia, as well as how it may change over time or respond to measures aimed at improving it. Objective measurement criteria need to be developed, and applied consistently across populations and through time. But how can we measure a phenomenon like economic literacy that is 'lifelong' in nature, and relevant in a diverse range of settings in individuals' lives? What are the benefits and drawbacks of different measurement options, such as standardised tests or surveying individuals about their own sense of capability or engagement with economics?^[18] How might self-reported levels of economic literacy differ from actual literacy?

And where do we begin to approach the difficult task of raising economic literacy in Australia (assuming it is needed)? What sort of tools and

interventions in the classroom and beyond will be most effective? How would we determine whether they were having an impact? What lessons can we take from attempts to improve economic literacy in other jurisdictions? And what can we learn from those who have been working on improving financial literacy, where ideas and educational practices are more mature?

As Stevenson and Wolfers (2020) say, 'every decision is an economic decision'. Consequently, we need to do more as a profession to help people make them. The Reserve Bank is committed to understanding more about economic literacy and helping to raise economic literacy in Australia. The Bank's public education program, with a strategic aim of increasing the size and diversity of the economics student population, is just one important channel for this. We hope that this article provokes discussion and a wider body of work in the field of economic literacy. ✎

Endnotes

- [*] Madeleine McCowage is the current manager of the Bank's education program and Jacqui Dwyer is its founder and Head of Information Department. The authors wish to thank Keaton Jenner, a former Bank employee and member of the education team for his earlier contribution to reviewing the literature and internal debate. The authors are also grateful for comments by Professor Alison Preston of the University of Western Australia, Leonora Risse of RMIT and Mary Bennett of the University of Tasmania.
- [1] While people can acquire economic literacy outside the education system, it is most readily acquired through formal study, which is the focus of this article.
- [2] This may be because it is not feasible for an ordinary citizen to purchase expert economic advice, or because understanding the economic issue at hand requires an appreciation of social goals that is beyond the scope of an economic expert's technical knowledge (Stigler 1970, p 63).
- [3] A question asked by Wentworth (1976).
- [4] Something asked by Stigler (1970).
- [5] Early work on economic literacy was particularly focused on this distinction. See, for example, discussion in Wentworth (1976) and Hansen (1976).
- [6] This theme emerged at a symposium on economic literacy held by the Federal Reserve of Minneapolis.
- [7] See OECD (2021, p 18) for a discussion of literacy in general. See ACARA (2022) for definitions of literacy as applied to language and numeracy in the Australian school curriculum.
- [8] Specifically, ACARA develops the national curriculum for students from their foundation year (Kindergarten) to Year 10, with economic and business concepts introduced from Year 5 onwards, as part of humanities and social sciences. However, there is variation among the states in their implementation of the national curriculum.
- [9] This is in contrast to the requirements for financial literacy, which in the national curriculum and various state curricula are explicitly defined.
- [10] For the standards for Kindergarten to Year 12, see CEE (2010).
- [11] Where overlap between the Queensland syllabus and Standards could be found.
- [12] Hansen (1998, p 152) discusses the Standards as a principles-based framework and compares this with the different approaches taken by various disciplines to support progression in knowledge and understanding.
- [13] This challenge triggered a robust debate about the issue at an American Economic Association meeting, as summarised by Robert Lucas in his panel discussion (Lucas 2002).

- [14] In fact, Wentworth (1976) states that an economically literate person should 'enjoy' participating in such discussions.
- [15] For an international comparison, see Japelli (2010).
- [16] See Treasury (2022), as well as the ASIC and Moneysmart websites.
- [17] Others will have a different view. For example, Sawatzki *et al* (2022) consider 'economics + maths = financial capability', implying that financial literacy is not nested within economic literacy.
- [18] An example of the latter option conducted in the United Kingdom is the ING-Economics Network Survey of Public Understanding of Economic (ING and The Economics Network 2019).

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The Recovery in the Australian Tourism Industry

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Photo: Chris Williams Black Box – Getty Images

Abstract

The Australian tourism industry is gradually recovering from the COVID-19 pandemic that brought global travel to an unprecedented standstill. International tourism fell sharply in early 2020 and has only slowly recovered since restrictions were lifted in the first half of this year. By contrast, domestic tourism spending bounced back quickly as local restrictions eased and is now above pre-pandemic levels. This article outlines the recovery in the Australian tourism industry following the pandemic, the challenges the industry has faced in reopening, and the uncertainties around the outlook for the tourism industry over the next few years.

Introduction

Restrictions to contain the spread of COVID-19 and precautionary behaviour by consumers significantly disrupted the movement of people both domestically and internationally during the pandemic period. This had a devastating impact on many Australian businesses that provided services to domestic or international tourists. Nevertheless, many of these businesses have shown considerable resilience and flexibility, aided by a range of government support packages, and are now expanding to service the recovery.

This article presents a snapshot of the tourism industry through the pandemic, before focusing on

the recovery over the past year. While international tourism is recovering only slowly, domestic tourism spending has rebounded strongly – to above pre-pandemic levels – as many Australians have chosen to take domestic rather than overseas holidays. The article draws on information from the Bank's regional and industry liaison program to discuss the challenges the tourism industry has faced in meeting this sudden increase in demand, and the outlook for tourism activity over the next few years. Many tourism businesses have found it difficult to quickly scale up to meet demand, and these supply constraints have limited tourism activity and led to higher prices. Looking ahead, a continued recovery

in tourism activity is expected as supply-side issues are gradually resolved and international tourism picks up further. However, there are a number of uncertainties around the timing and extent of this recovery.

International tourism

The onset of the COVID-19 pandemic led to a sharp drop in international tourism, as governments around the world implemented travel and border restrictions (Graph 1). In April 2020, international tourism arrivals declined globally by around 90 per cent and Australia’s international tourist arrivals effectively came to a standstill for several months.

The timing and extent of the recovery in international tourism has been uneven across the world, as national governments removed restrictions at a different pace. Globally, international tourism arrivals picked up to be around three-quarters of their pre-pandemic levels by September 2022. In Australia, international tourist arrivals rose slightly in mid-2021 under the temporary operation of the Australia–New Zealand travel bubble, and also in November 2021 as border restrictions eased in some parts of the country. However, it wasn’t until February 2022 – when Australia removed border restrictions for vaccinated persons – that arrivals began to substantially pick up. Since July 2022, people have been able to travel to and from Australia without being required to declare their vaccination status.

Short-term overseas arrivals to Australia (which include tourists but also those visiting for less than 12 months for business, education and employment purposes) picked up to be around half of pre-pandemic levels by September 2022 (Graph 2). However, short-term departures of Australian residents have picked up more quickly than short-term arrivals of overseas visitors, and so the net outflow of travellers has been larger than pre-pandemic levels in recent months.

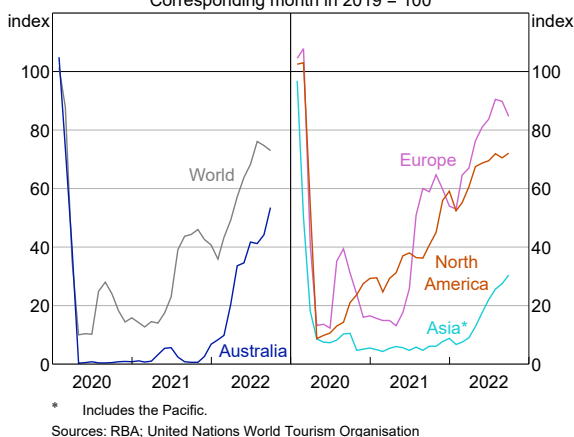
Reasons for travel

The recovery in short-term travel to and from Australia has been particularly pronounced among those visiting friends and relatives (VFR) (Graph 3). VFR accounted for just over half of all international visitors’ spending over the year to June 2022, whereas it accounted for just under one-fifth in 2019 (Table 1). Short-term travel for business and education purposes has also picked up. However, the recovery in outbound business travel (including conventions and conferences) has outpaced inbound business travel, with relatively few major business events held in Australia in 2022. Short-term travel for employment reasons has almost fully recovered to its 2019 levels. By contrast, the number of visitors arriving in Australia for holidays has picked up only slightly, to be around one-third of its pre-pandemic level (holiday visitors accounted for only 10 per cent of international visitor spending over the year to June 2022, compared to nearly 40 per cent in 2019).

Graph 1

International Tourism Arrivals

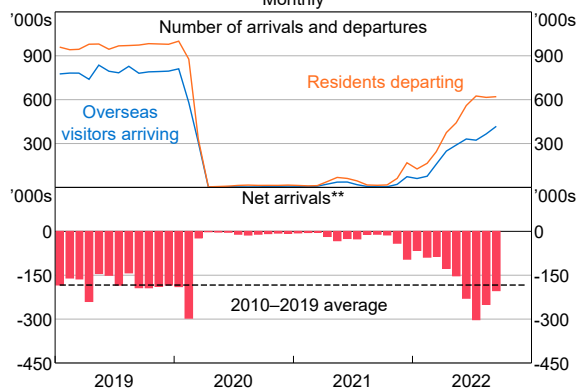
Corresponding month in 2019 = 100



Graph 2

Short-term Overseas Arrivals and Departures*

Monthly



* Short-term is defined as less than 12 months. Data when the borders were open have been seasonally adjusted by the RBA.
** Short-term overseas visitor arrivals less short-term resident departures.
Sources: ABS; RBA

Table 1: International Visitor Spending by Main Reason of TravelShare of total spending^(a)

	Year ending December 2019 Per cent	Year ending June 2022 Per cent
Visiting friends and relatives	17	52
Education	29	19
Holiday	38	10
Employment	5	9
Business	9	6
Other	2	5

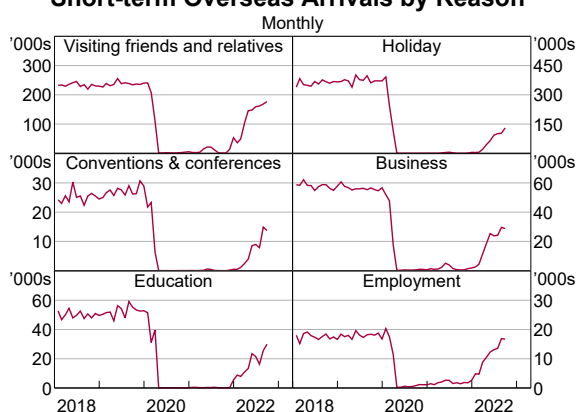
(a) Column totals may not add up to 100 per cent due to rounding.

Sources: RBA; Tourism Research Australia

Working holiday makers and international students who are in Australia for more than a year are not included in the short-term arrivals data, but they make a significant contribution to tourism spending. According to Hall and Godfrey (2019), visitors who state the main purpose of their trip as education stay longer and spend more than leisure and business tourists. International students and individuals on working holiday visas have a high propensity to travel within Australia, and often their friends and relatives come to visit. The number of international students and working holiday visa holders in Australia has risen to be around two-thirds and one-half of their pre-pandemic levels in the September quarter of 2022, respectively.

The recovery in international visitors to Australia has been uneven across source countries, reflecting both travel restrictions and the quicker recovery in

VFR relative to other types of travel (Graph 4). The recovery in the number of visitors from India, New Zealand and the United Kingdom has been faster than for other countries, possibly due to the close relationships residents from those countries have with Australian residents (in the 2021 Census, England and India were the top two countries of birth for Australian residents, other than Australia). While there has been a notable pick-up in people from India visiting friends and relatives, there has also been a pronounced recovery in the number of Indian students coming to Australia. By contrast, the number of Chinese visitors remains more than 90 per cent below pre-pandemic levels, due to ongoing travel restrictions to control the spread of COVID-19 in China. This is significant for the Australian tourism sector as, prior to the pandemic, Chinese visitors were the largest source of tourist spending and contributed around 20 per cent of total leisure travel exports in 2019 (or nearly 30 per cent if education-related travel is included).

Graph 3**Short-term Overseas Arrivals by Reason*****Domestic tourism**

Domestic tourism activity was severely disrupted by the COVID-19 pandemic, due to the introduction of strict restrictions on household mobility ('lockdowns') across the country in March 2020 (Graph 5). At the same time, a number of states and territories implemented interstate border restrictions and quarantine arrangements. As a result, domestic tourist visitor numbers declined sharply. By April 2020, domestic tourist numbers were less than 20 per cent of pre-pandemic levels.

The first lockdown ended for most parts of the country by the end of May 2020, although some restrictions on household activity and state border closures remained in place for an extended period of time. Melbourne re-entered lockdown for much of the second half of 2020. By the end of that year, however, a number of states and territories had eased restrictions and reopened domestic borders, allowing domestic visitor numbers to recover to around 80 per cent of pre-pandemic levels over the 2020/21 summer and the 2021 Easter holidays (Graph 6).

A third major disruption emerged in mid-2021, as a sharp rise in the number of Delta-variant cases led to the reintroduction of lockdowns in New South Wales, Victoria and the ACT. Around half of the Australian population were under significant

restrictions for most of the September quarter of 2021 and domestic visitor numbers declined to around 40 per cent of pre-pandemic levels.

Domestic tourism numbers rebounded again during the 2021/22 summer holidays as health restrictions eased once more, but not to the levels of the previous year; the Omicron outbreak in early 2022 tempered activity somewhat. As concerns about Omicron abated, domestic visitor numbers again recovered, and have been around 85 per cent of pre-pandemic levels since Easter 2022.

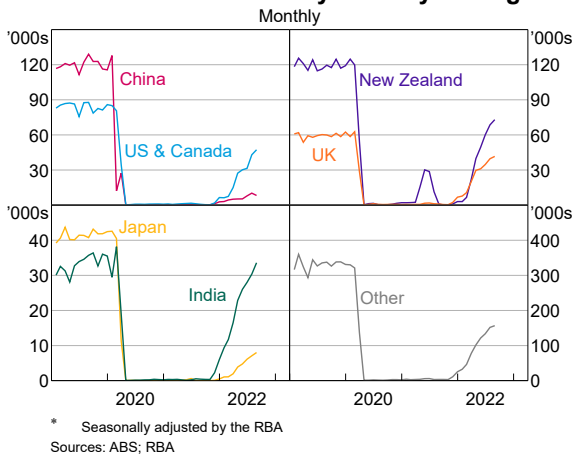
While domestic visitor numbers remain below pre-pandemic levels, total domestic tourism spending and the average spend per visitor have been above pre-pandemic levels since March 2022. Some liaison contacts report that domestic travellers are staying longer than they did before the pandemic and spending patterns have become more like those on overseas holidays, with domestic tourists spending more on tours and experiences to explore Australia. This higher spending also reflects an increase in domestic travel prices (see below).

By region

The recovery in domestic tourism spending in 2022, to around or above pre-pandemic levels, is evident in all states and territories (Graph 7). Naturally, states that experienced longer and stricter COVID-19 restrictions had much more significant declines in tourism activity over 2020 and 2021. Western Australia experienced the least disruption to the

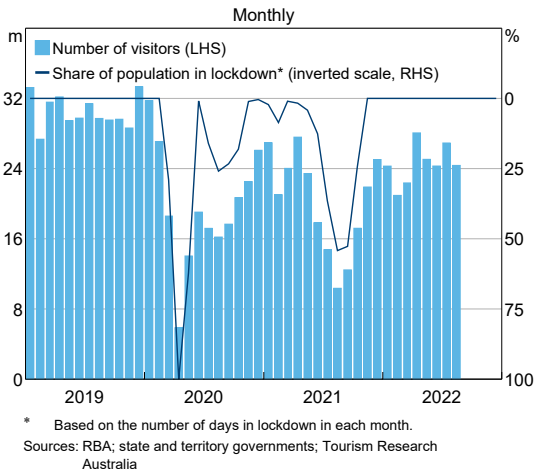
Graph 4

International Visitors – By Country of Origin*



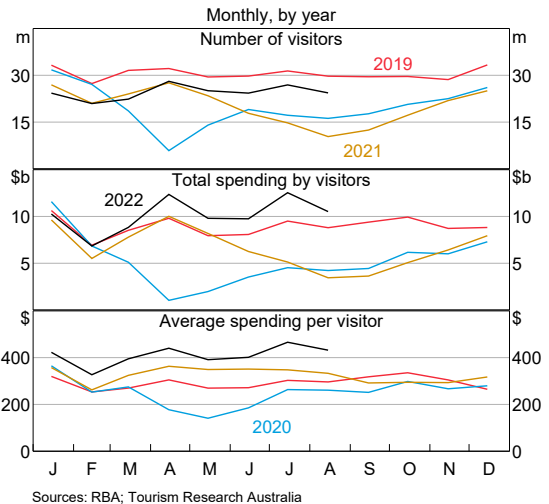
Graph 5

Lockdowns and Domestic Tourism Visitors



Graph 6

Domestic Tourism Indicators



tourism industry, partly due to having fewer restrictions on movement, but also because the closed state border meant that more Western Australians were holidaying in their own state. In recent months, the Northern Territory and Queensland have been the recipients of domestic tourism spending well above 2019 levels, perhaps because these travel destinations are regarded as closer substitutes for overseas holidays.

Travel to regional areas recovered more quickly and fully than travel to capital cities (Graph 8). Regional areas were less affected by lockdowns and liaison suggests that travellers preferred to avoid more densely populated areas. There was also a shift towards driving holidays, which has greatly benefited regions within two to three hours' drive from capital cities.

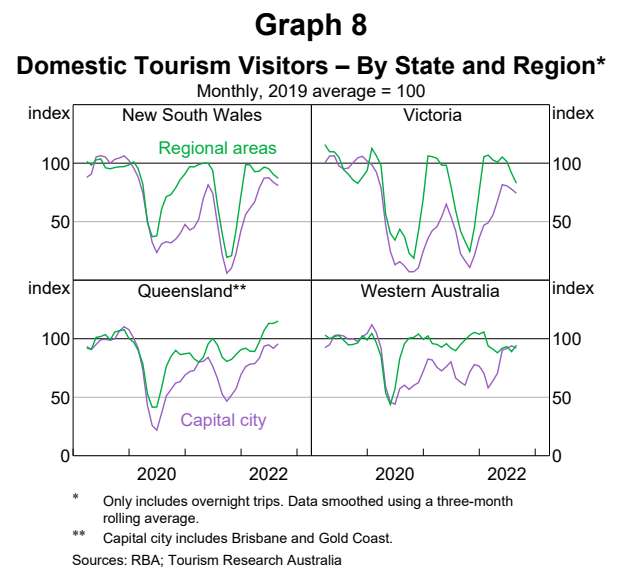
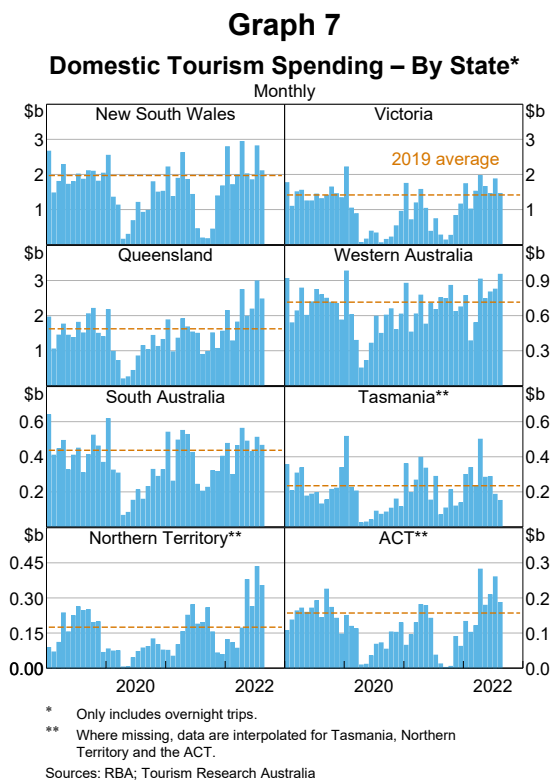
Challenges in reopening the Australian tourism industry

While pandemic-related declines in domestic and international tourism weighed heavily on the Australian tourism industry, many businesses have proved resilient and have experienced a strong rebound in demand from domestic tourists in recent months. Nevertheless, many businesses have

found it difficult to scale up to meet this demand, and supply constraints have acted to limit tourism activity and led to higher prices.

In 2022, the biggest constraint on the recovery in tourism activity has been difficulty finding sufficient labour to service tourism demand. The tourism industry lost a large number of experienced staff during the pandemic – and so when domestic tourism recovered, the sector had to rapidly hire workers in a tight labour market. Online advertisements for tourism jobs rose to record highs by mid-2022 (Graph 9). These jobs have been difficult to fill. Liaison contacts have suggested that many of the Australians who had worked in the tourism industry prior to the pandemic have since found jobs in other industries. Moreover, many tourism-related jobs had previously been filled by international students and, particularly in regional locations, working holiday makers – many of whom left Australia during the pandemic and have been slow to return. On top of the difficulties in attracting and retaining staff, illness-related absenteeism has been elevated more broadly through 2022.

Tourism businesses in many regional areas have had additional difficulties attracting staff, partly due to a shortage of housing. An increase in net migration to these areas has contributed to very low rental vacancy rates in many popular tourist areas. In response, some holiday accommodation providers have resorted to housing their own staff.



There have also been some changes in consumer behaviour resulting from the pandemic that have made it harder for tourism businesses to plan and have sufficient staff available to meet demand. Trends such as increased working from home and a reduction in business-related day trips have created a larger gap between peak and off-peak periods for many tourism businesses. There are also sharper peaks and troughs in demand because there are fewer international tourists, who often travel at different times to domestic travellers (e.g. filling accommodation mid-week and outside school holidays). Booking lead times substantially shortened during the pandemic, though there is some evidence that perhaps these are lengthening out again. Nevertheless, booking lead times have always been shorter for domestic travel than international travel, so the change in the composition of travellers has made it more difficult for tourism businesses to plan ahead.

While labour has been a constraint across most of the tourism industry, a lack of capital equipment has been an additional constraint for some businesses. Many tourism-related businesses sold off or retired vehicles, boats, aircraft and other equipment during the pandemic when they could not operate and were in need of cash (Grozinger and Parsons 2020). The sudden and stronger-than-anticipated recovery in domestic tourism in 2022, combined with supply chain issues delaying the manufacture and delivery of new equipment and vehicles, has meant that many businesses did not

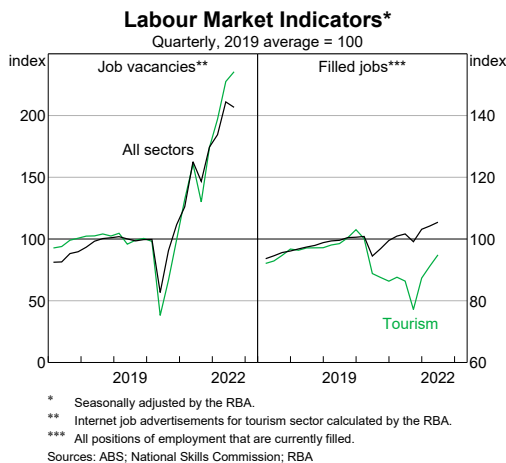
have the capital equipment they need to service the increase in demand.

These supply-side constraints (in both labour and capital) have limited the tourism industry’s ability to ramp up to meet demand. Liaison suggests many tourism operators are operating below their previous capacity – for example, many have had to limit their operating hours because of lack of staff, and some accommodation providers have not been able to offer all their rooms for booking as they do not have enough staff to service them. Labour shortages and supply chain delays have also weighed on aviation capacity and contributed to a decline in domestic airlines ‘on-time performance’ over 2022 (Graph 10).

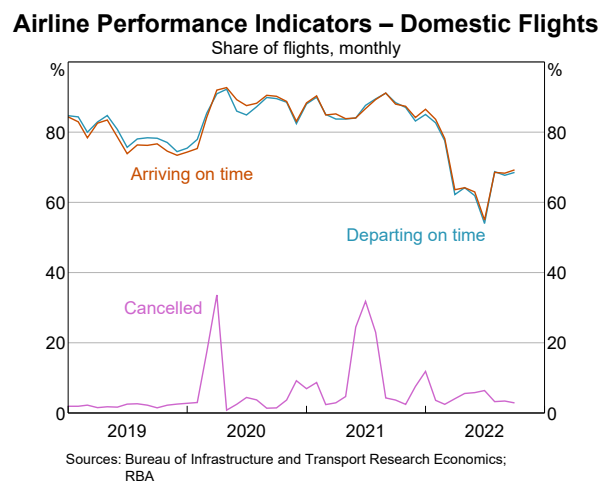
Similar constraints are also weighing on the recovery in international tourism. Contacts suggest that the recovery has been held back by limited flight availability, the higher cost of travel insurance and, in many cases, the higher cost of flights. Liaison contacts have indicated that delays in visa issuance in 2022 have also been a barrier for those seeking to travel to Australia. Over the past few months, however, visa processing times have shortened somewhat, and visa processing for applicants located overseas – including applicants for visitor, student and temporary skilled visas – have been given higher priority to allow more people to travel to Australia (Department of Home Affairs 2022).

The supply-side constraints in the tourism industry, combined with a strong pick-up in domestic demand and the higher cost of inputs such as fuel,

Graph 9



Graph 10

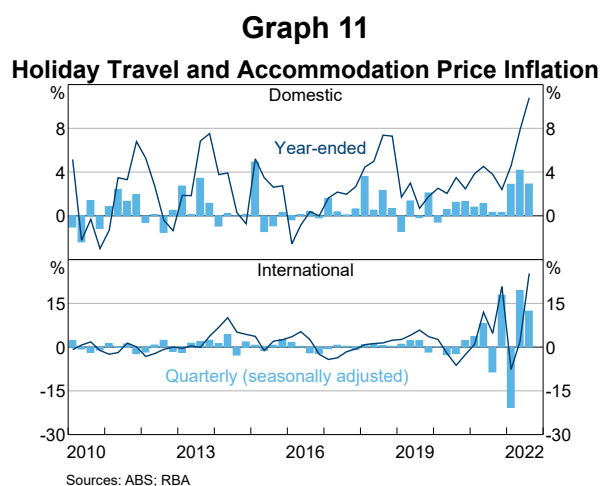


have led to a sharp increase in domestic travel prices (Graph 11). Liaison contacts suggest that consumers have been relatively accepting of price rises for services essential to travel, such as accommodation. However, smaller operators – particularly in highly discretionary services, such as tours – have had less scope to increase their prices, and their margins have been squeezed by the higher costs of inputs such as food, fuel, energy and insurance costs. Prices for overseas travel have also increased significantly in recent quarters, as demand for flights has outstripped capacity, alongside rising jet fuel costs and increases in prices for international tours (ABS 2022).

The outlook

Looking ahead, tourism activity is expected to continue to recover as supply-side issues are slowly resolved and international tourism picks up further. Most liaison contacts suggest a full recovery will not occur until at least mid-2023; many expect it to take a few more years. There are a number of factors that will affect the timing and extent of the ongoing recovery in tourism, including:

- **The easing of supply-side constraints:** It is unclear how long it may take for some of the supply-side constraints in the industry to ease, including whether planned changes in flight availability will be sufficient to meet changes in demand, and whether the sector will be able to fill more job vacancies over time and as migration returns.



- **The return of international students and working holiday visas:** Many people have recently had working holiday visas approved and are expected to arrive over the coming year. Liaison contacts also expect international student numbers to increase over the next few years. The return of working holiday and student visa holders will increase demand for tourism services, and will likely alleviate labour shortages as they take jobs in the sector.
- **Australians' preferences for domestic and international travel:** Demand for Australia's tourism services may decline if Australians' preference for overseas rather than domestic holidays picks up before international inbound tourism demand increases further. It is possible that cost-of-living pressures, combined with the higher cost of international travel, could lead Australian households to continue to prefer domestic holidays for a time. Nevertheless, many households have significant savings and pent-up demand for international travel after planned trips have been deferred over the past few years.
- **The global economic outlook:** Global economic conditions and the exchange rate affect decisions about whether to travel the long distance to Australia (as they have in the past) (Dobson and Hooper 2015). Financial concerns and the rising cost of living could make expensive, long-haul travel less attractive.
- **The timing and extent of recovery in Chinese tourism:** As noted above, China accounted for a large share of tourism spending prior to the pandemic. The outlook for Chinese tourism (and international students from China) remains highly uncertain and will depend on a number of factors, including China's policies to restrict the spread of COVID-19, the outlook for the Chinese economy and the travel preferences of Chinese tourists more generally.

Conclusion

Restrictions to contain the spread of COVID-19 and precautionary behaviour significantly disrupted the movement of people both domestically and

internationally throughout the pandemic. Since restrictions have eased, international travel has been slow to recover, but domestic tourism spending has rebounded to be above pre-pandemic levels and many tourism service providers are currently operating at capacity. Looking ahead, tourism activity is expected to continue to recover, as supply-side issues are slowly

resolved and international tourism picks up further. Australia remains an attractive destination for both domestic and international tourists, and the resilience and flexibility demonstrated by Australian tourism businesses in recent years bode well for the opportunities and challenges that lie ahead. ✎

Endnotes

[*] The authors are from the Regional and Industry Analysis section of Economic Analysis Department. The authors are grateful for the assistance provided by others in the department, in particular Aaron Walker and James Holloway.

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New Measures of Financial Stress from Non-traditional Data

Finn Lattimore and Max Zang^[*]



Photo: Laurence Dutton – Getty Images

Abstract

Household and business financial stress has significant implications for financial stability and monetary policy. However, high-frequency and timely indicators of emerging signs of financial stress are not readily available. To address this information gap, the Reserve Bank has developed novel measures of financial stress based on news, search and social media data. This article describes these new metrics and how they can capture meaningful changes in financial conditions and, in some cases, predict traditional measures of financial stress, such as loan arrears. Going forward, these indices will continue to be monitored for early signs of financial difficulties.

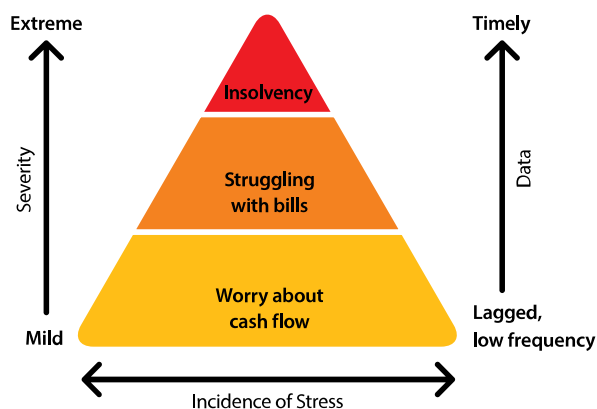
Introduction

Not having enough money to meet basic needs or uphold financial commitments has a major impact on people's wellbeing. The effect of financial stress can also spill over from individual households and businesses to the broader economy – and, by extension, financial stability. Financially stressed or constrained households are more likely to curb consumption in response to unexpected reductions in income or wealth, while businesses that are under financial strain may cut back on investment and employment.^[1] These responses can amplify the effect of an initial shock, leading to deeper and

more pronounced downturns. In extreme cases, financial stress can lead to sizable defaults on loans

Financial stress falls on a spectrum, ranging in severity from general concerns about the availability of money to difficulty paying for essential items to insolvency and default (Figure 1).^[2] Households may fall into financial stress after experiencing a loss of income due to unemployment or illness, and are particularly vulnerable if they hold few liquid assets relative to debt (Wang 2022). Characteristics that may make a business more vulnerable to distress include high leverage, significant debt-servicing burden, low profitability and limited liquidity.

Figure 1
Spectrum of Financial Stress



Reliable data on severe financial stress are provided by indicators such as non-performing loans, insolvencies, property repossessions, business administrations and court actions against companies. However, these measures are backward-looking and capture rare events that occur late in an episode of financial difficulty. Household financial stress is also measured in surveys, including the Household, Income and Labour Dynamics in Australia (HILDA) Survey and the Survey of Income and Housing. These surveys track whether households have experienced problems such as struggling to pay bills on time, needing to ask family or friends for financial help, and an inability to make rental or mortgage payments (Breunig and McKibbin 2011). While these measurements are rich in information and provide insight on the full spectrum of financial stress and the extent to which it is experienced by different groups of the population, they are neither timely nor frequent. The lack of timely data on mild-to-moderate financial stress makes it difficult to identify emerging risks.

In response to this data gap, the Bank has constructed timely, high-frequency indicators of financial stress among households and businesses, using information from Google Trends, news data and Twitter. There is a growing body of research on the benefits of using such alternative data sources to complement official statistical measures. Baker *et al* (2016; 2021) have measured economic uncertainty using Twitter and news data, and Google Trends has been used by Preis, Moat and

Stanley (2013) to quantify trading behaviour and by Austin *et al* (2021) to measure economic activity.

These non-traditional data sources are generated as a side effect of some other activity, rather than being carefully designed and collected for statistical purposes to measure a given economic concept. As a result, they often reflect a somewhat biased sample of the population and are not guaranteed to accurately track the underlying concept of interest. For example, people aged over 50 years old are significantly less likely to use Twitter than younger people, so an index based on Twitter might not capture changes in the levels of financial stress experienced by older people.^[3] It is therefore important that these indicators are used in conjunction with more traditional indicators and interpreted with subject matter expertise. That said, these indicators can provide timely – even real-time – insight into what is going on across broad sections of the economy, which is critical for providing early-warning indicators of potential problems. To our knowledge, this is the first time globally these non-traditional data sources have been used to construct indicators of financial stress.

Measuring stress with Google Trends, news and tweets

Our analysis of non-traditional data for monitoring financial stress is inductive. That is, we start with the data first and then explore its usefulness in providing indicators for financial stress. Three non-traditional data sources were selected to provide complementary insights into financial stress:

- **News data (Dow Jones Factiva Archive)** – these data aggregate information from a wide range of sources, from expert views and opinions to personal stories of financial difficulty. The news reflects what news agencies believe is of interest to readers, which is likely to capture both the general level of concern about financial conditions in the population as well as what is politically topical and key events happening overseas.
- **Social media data (Twitter)** – these data provide a more direct view of what individuals, including small business owners, are concerned

about, and also feeds off political and media discussion. For instance, on Twitter it is common to see users publicly tweet about examples of financial difficulties they or their friends are struggling with as it relates to broader issues being covered in the news media. Comments on events overseas are also quite common.

- **Search data (Google Trends)** – these data provide some insight into the private concerns of individuals, as captured by the searches they make for financial information and assistance.

All three sources are likely to provide a mixture of backward- and forward-looking views of stress. Tweets and news stories discuss both events in the past and concerns for the future. Google searches may be driven by interest in past events or by individual concerns around current and future financial stress.

This article first outlines how the Bank constructs indicators of financial stress from each of these data sources before considering what these indicators show.

Google Trends

Google Trends is a public interface for exploring the number of Google searches for specific terms or topics relative to the total volume of searches. The Bank's Financial Stress Index is based on the volume of Google searches for a set of keywords, phrases and topics that people may search for when their household or business is experiencing financial stress. For example, the index includes searches such as 'defer my utility bill' as well as searches for 'cash assistance' and 'loan support'. The index also incorporates topics identified by Google as relevant to financial stress keywords. (A topic is a group of search terms determined by Google to belong to the same concept; including these allows us to capture queries that relate to financial stress but do not contain the specific keywords we have specified.)

Our financial stress indices for households and businesses are constructed in three steps:

1. We define a list of queries, defined by keywords or topics that are related to financial stress. See Appendix A for the full list of queries.
2. For a given query, we extract its daily relative search volume compared to every other query from 2004 onwards. This requires the chaining together of multiple overlapping data requests because the Google Trends interface limits comparisons of search volumes to a maximum of five queries and only provides daily data for up to nine months. Details of this chaining process and how we normalise the results to obtain comparative relative volumes across all queries is provided in Appendix B.
3. The overall financial stress indicator is constructed by summing the relative search volumes for each term so that queries with the highest relative volume contribute the most to the overall index.

For households, the index is mostly driven by concepts related to 'debt', followed by 'personal loans' and 'bankruptcy'; for businesses, the main components are related to 'cash-flow', 'liquidation' and 'business support' (Graph 1).

Movements in the business index are driven almost entirely by the experiences of small and medium-sized businesses (SMEs), given they comprise almost all businesses in Australia and so dominate search activity; furthermore, larger listed businesses are unlikely to turn to Google when experiencing financial problems as they have other resources to draw on. The index's focus on SMEs is one of its key features as timely, high-frequency data on financial stress for smaller businesses is otherwise not readily available.

News

Our news-based indicators of financial stress are constructed using the Dow Jones Factiva Database, which is a large, international news database containing the full-text of news articles from over 30,000 sources, going back to the late 1980s. We extract all articles published in Australia that are categorised as 'economic news', resulting in a dataset of around 600,000 unique articles (Graph 2).

We quantify financial stress from the content of these articles by computing the net sentiment of relevant articles over time. For household financial stress, articles are selected as relevant if the article

summary contains a word indicating it is about households (e.g. ‘households’, ‘families’, ‘borrowers’) or a financial commitment that could be a source of financial stress (e.g. ‘mortgage’, ‘rent’, ‘electricity’). For business financial stress, articles are included if the summary contains a word indicating it is about businesses; we attempt to filter out articles about overseas business activity.

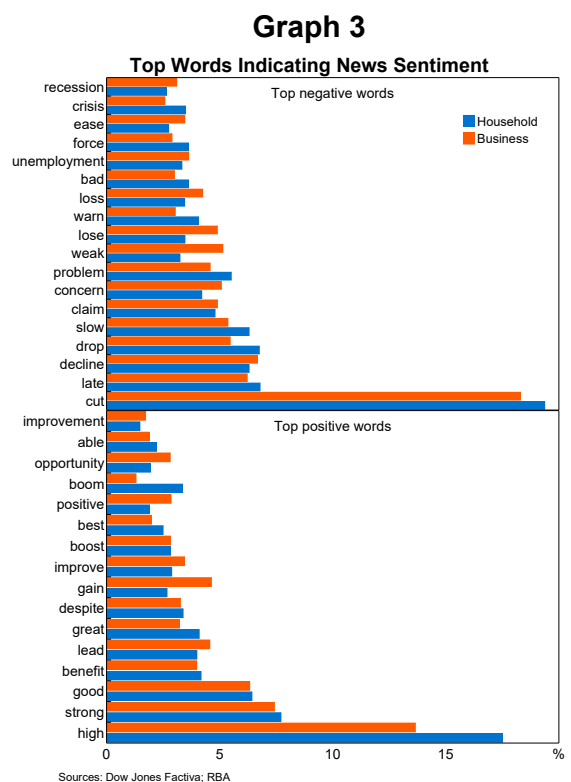
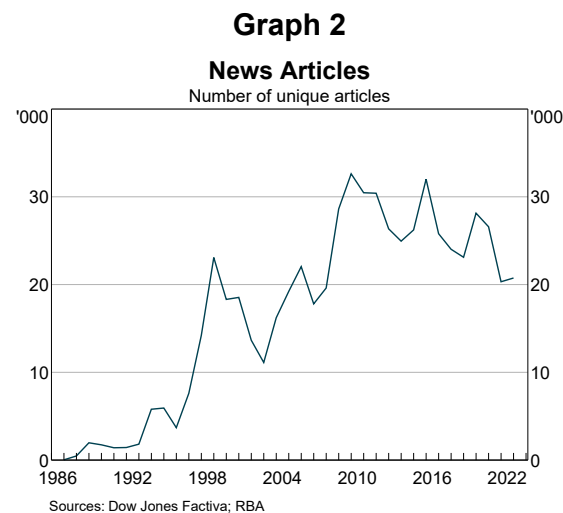
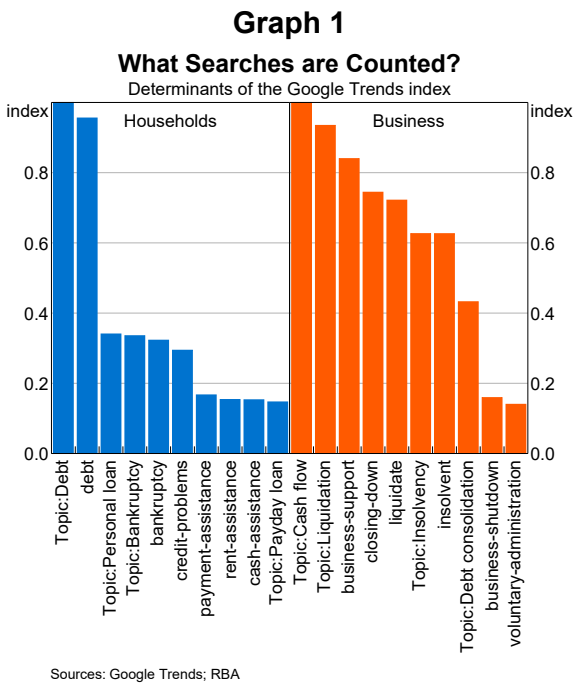
The sentiment of each selected article is estimated using the Loughran-McDonald dictionary, which is a set of keywords tagged as positive or negative, developed specifically for financial texts using company performance filings (Loughran and McDonald 2011). The Financial Stress Index is then

constructed by computing the number of positive keywords minus the number of negative keywords, divided by the total number of words in the selected articles for each month and quarter. Graph 3 shows that the keywords playing the largest role in determining sentiment are similar for those articles about businesses and those about households.

A limitation of the dictionary approach is that each word is associated with a single sentiment, regardless of the context in which it occurs. For example, the word ‘high’ is labelled as positive, so the sentence ‘high unemployment rates are affecting family cash flows’ would be flagged as positive even though ‘high unemployment’ clearly has a negative connotation. To address this issue, we identified words that frequently occur together with sentiment keywords and manually labelled the sentiment of those pairs. This means that terms such as ‘high unemployment’ get their own entry in the dictionary and are tagged with the appropriate sentiment. See Appendix C for more details.

Twitter

We construct measures of financial stress based on Twitter data by tracking the proportion of all tweets



from Australian users that contain keywords suggesting financial difficulties. The queries are constructed to capture both the relevant topic and negative sentiments. We do so by counting all tweets that contain pair-wise combinations of words related to household or business debt with associated negative connotations. For example, the tweet 'feeling **overwhelmed** by my **mortgage**' would be counted in our indicator. See Appendix D for the full list of topic words and qualifiers.

The stress indicator is then a time series of these tweets as a share of the total number of tweets, which can be aggregated to a desired frequency. Tweet counts matching a given query can be obtained in real-time via Twitter's Application Programming Interface (API), allowing us to construct daily indicators with no lag. Sufficient volumes of tweets to produce indices are available from 2016 onwards.

Measuring household financial stress

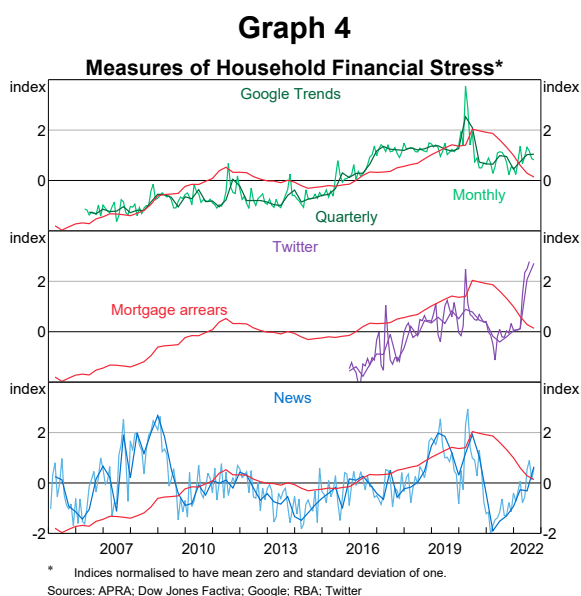
Evaluating the quality of our indicators is challenging due to the absence of existing, high-frequency measures of mild-to-moderate financial stress to compare them against. This notwithstanding, Graph 4 plots our new measures of household financial stress against the mortgage arrears rate.

Our benchmark, the arrears rate, has been gradually increasing since 2007.^[4] This trend is broadly

reflected by our indicators, except for the large spike in the news-based indicator associated with the global financial crisis. Both the arrears rate and our new measures increased sharply early in the COVID-19 pandemic, before falling below pre-pandemic levels as the federal and state governments introduced a wide range of support measures, including increased welfare benefits, pandemic leave payments, temporary loan deferrals, eviction moratoriums and wage subsidies (JobKeeper). The overall correlation to the arrears rate is around 0.8 for both the Google Trends and Twitter indices; however, it is very low for the news-based index, which was heavily influenced by the global financial crisis that drove up arrears rates in other economies while remaining low in Australia.

All three indices – particularly the more zeitgeist-driven news and Twitter indices – have risen over 2022, despite limited signs in official data of a pick-up in financial stress across Australian households as a whole. This may reflect that the new indicators capture early-stage financial stress and that the impact of the combination of higher interest rates and inflation varies significantly across households. It could also be driven by anticipation of future financial stress based on overseas news and events.

To more rigorously examine the relationship between Google Trends, Twitter and the arrears rate, we ran Granger causality tests.^[5] We found that the Google Trends index Granger-causes the arrears rate, while the arrears rate does not Granger-cause the Google Trends index. Although the simple correlation between the Twitter index and the arrears rate is promising, a sufficient volume of Twitter data to produce the index is only available from 2016, which provides insufficient statistical power to confirm the form of the relationship with arrears. We did not test Granger causality for the news indicator because, due to its sensitivity to overseas events, its correlation with arrears is too low to be directly useful for forecasting. These results suggest that the Google Trend and Twitter indices could help provide an early-warning indicator of the overall level of household financial stress that is relevant both for financial stability and in anticipating how households may respond to income shocks.



By contrast, measures of financial stress from the annual HILDA Survey show no clear association with the arrears rate or our non-traditional metrics (Graph 5). While the self-assessed HILDA measures of financial stress vary meaningfully between households at a given point in time – for example, households that report higher self-assessed levels of financial stress also tend to have lower liquidity buffers and higher debt servicing ratios – they exhibit little variation over time from 2005 onwards.

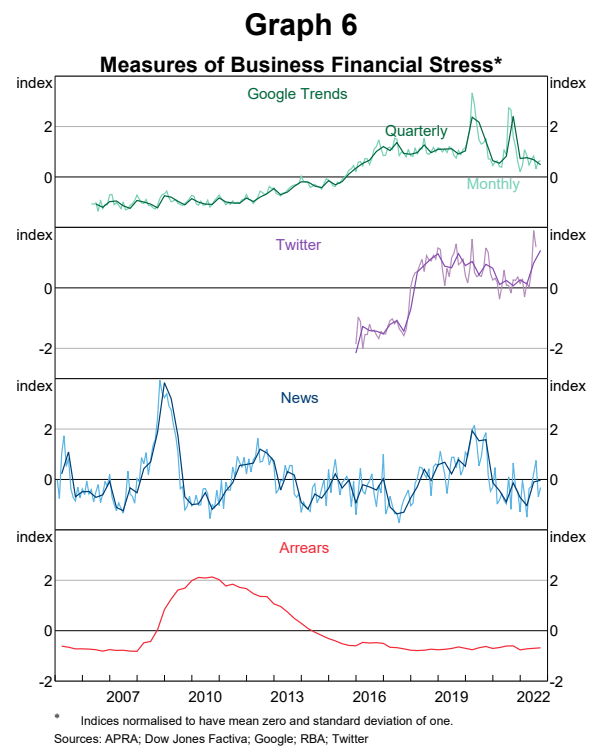
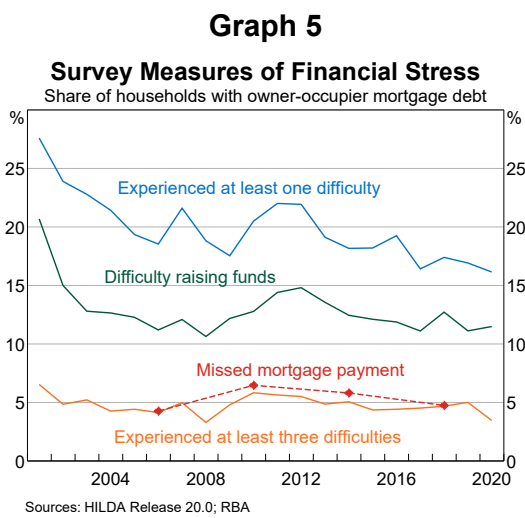
Measuring business financial stress

In regard to business financial stress, our non-traditional indicators are less consistent with each other than they are for households (Graph 6). This is because they are capturing different segments of the population of Australian businesses. News articles tend to report on large (often listed) companies, including multinationals, and discuss business conditions in aggregate. On the other hand, the Google Trends index captures concerns among smaller businesses. Finally, in the sample of tweets that contribute to our business-stress indicator, there is a mix of anecdotes on the struggles involved in operating a business along with commentary on general market and economic conditions.

Despite these differences, the indices capture some meaningful changes in financial conditions. The news indicator shows a significant spike in financial stress associated with the financial crisis. This is also reflected in sharply rising business arrears rates. However, news interest in the crisis dissipated

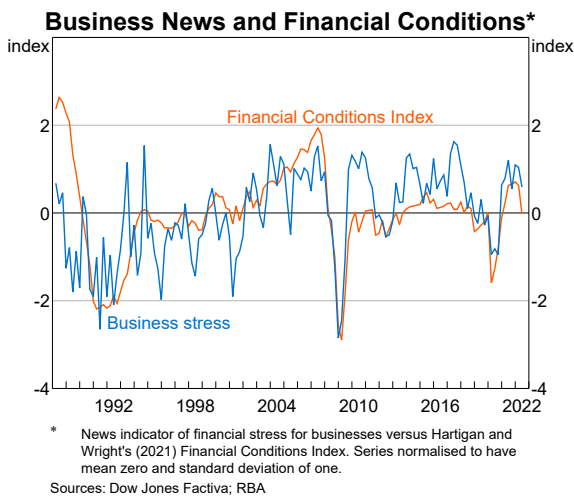
rapidly, returning to pre-financial crisis levels by 2010, whereas the arrears rate was slower to recover. Both the news and Google Trends indices show spikes in stress associated with the first major COVID-19-related lockdown in Australia in 2020, when many businesses faced enormous disruptions to their trading. Likewise, Google Trends data shows searches around business financial stress peaked again during the second lockdown. By contrast, changes in financial conditions facing businesses during the pandemic were not evident in other (late-stage) indicators of financial stress, such as business insolvencies. This is because of the significant policy support measures provided to businesses during this period, including income support, loan deferrals and temporary insolvency relief.

Another way of quantifying whether these indicators capture meaningful changes in financial conditions is to test what weight they receive if incorporated in an overall financial conditions index (FCI) for Australia. The FCI we use here is a summary measure of financial conditions that includes a broad range of indicators, including survey measures of stress as well as variables capturing interest rates and spreads, credit and money, asset prices, debt burdens, the banking sector and



financial market measures of risk (Hartigan and Wright 2021). When incorporated in the FCI, the news-based indicator of business financial stress is ranked as one of the top contributors out of 76 other variables. This tells us that this measure is quite effective at capturing overall variation in financial conditions. The relevance of the business indicator can be seen directly by looking at its correspondence with the overall FCI for Australia (Graph 7). We only focus on the news-based indicator here, as the FCI model requires a longer time series than is available from Google Trends or Twitter.

Graph 7



Conclusion

The introduction of new high-frequency measures of household and business financial stress based on news, search and social media data is intended to complement existing, more reliable indicators by potentially providing an early warning of emerging financial stress. The Bank's new Google- and Twitter-based measures of household stress are strongly associated with, and for Google Trends lead, the household arrears rate. On the business front, the new metrics capture the early-stage financial stress triggered by the COVID-19 pandemic even though, due to policy support, this stress did not ultimately flow through to increases in measures of severe financial stress such as the arrears rate. This suggests these metrics could help fill the data gap on early-stage financial stress experienced by unlisted businesses.

This is the first attempt to build financial stability indicators using non-traditional data sources. We hope to stimulate interest for further explorations of the topic. These indices will continue to be refined and modified as needed for the Bank's policy publications over time, including the *Financial Stability Review* (RBA 2022). This includes disaggregating the indices to the state level, where possible, as well as improving the predictive capacity by pooling data across countries. ↘

Appendix A: Terms used to construct Google Trends indicators

Table A.1: Constructing Google Searches for Household Stress

Query name	Query details (actual query submitted to the Google Trends API)
Topic:Arrears	/m/079k8t
Topic:Bankruptcy	/m/01hhz
Topic:Debt	/m/013y7y
Topic:Debt collection	/m/05csgb
Topic:Debt consolidation	/m/01nny6
Topic:Debt relief	/m/018ct4
Topic:Eviction	/m/02my10
Topic:Food bank	/m/059plx
Topic:Foodbank	/g/11csq7t78m
Topic:Foreclosure	/m/02tp2m
Topic:Payday loan	/m/02ynk0

Query name	Query details (actual query submitted to the Google Trends API)
Topic:Personal loan	/g/121bdfn8
bankruptcy	bankrupt OR bankruptcy OR bankruptcies
bill-assistance	(bills AND support) OR (bills AND assistance) OR (bills AND help) OR (bill AND support) OR (bill AND assistance) OR (bill AND help)
bill-problems	(bills AND hardship) OR (bills AND behind) OR (bills AND defer) OR (bill AND hardship) OR (bill AND behind) OR (bill AND defer)
cash-assistance	(cash AND assistance) OR (cash AND loan) OR (cash AND emergency) OR (cash AND help)
credit-problems	(credit AND default) OR (credit AND behind) OR (credit AND problems) OR (credit AND bad)
debt	debt
debt-assistance	(debt AND assistance) OR (debt AND support) OR (debt AND counselling) OR (debt AND relief)
debt-problems	(debt AND problems) OR (debt AND bad) OR (debt AND default) OR (debt AND behind) OR (debt AND defer)
electricity-assistance	(electricity AND support) OR (electricity AND assistance) OR (electricity AND help) OR (electricity AND relief)
electricity-problems	(electricity AND hardship) OR (electricity AND late) OR (electricity AND behind) OR (electricity AND defer)
eviction	eviction NOT brother NOT boss NOT factor
financial-assistance	(financial AND help) OR (financial AND assistance) OR (financial AND support) OR (financial AND counselling)
financial-problems	(financial AND problems) OR (financial AND difficulty) OR (financial AND hardship) OR (financial AND stress)
foodbank	foodbank OR (food AND bank)
loan-assistance	(loan AND support) OR (loan AND assistance) OR (loan AND relief)
loan-problems	(loan AND default) OR (loan AND behind) OR (loan AND bad) OR (loan AND defer)
mortgage-assistance	(mortgage AND help) OR (mortgage AND support) OR (mortgage AND assistance) OR (mortgage AND relief)
mortgage-problems	(mortgage AND default) OR (mortgage AND behind) OR (mortgage AND defer) OR (mortgage AND stress)
payment-assistance	(payment AND plan) OR (payment AND defer) OR (payment AND assistance) OR (payment AND relief)
rent-assistance	(rent AND help) OR (rent AND support) OR (rent AND assistance) OR (rent AND relief)
rent-problems	(rent AND problems) OR (rent AND bad) OR (rent AND behind) OR (rent AND arrears) OR (rent AND stress)

Source: Google; RBA

Table A.2: Constructing Google Searches for Business Stress

Query name	Query details (actual query submitted to the Google Trends API)
Topic:Cash flow	/m/0f29w
Topic:Debt consolidation	/m/01nny6
Topic:Insolvency	/m/04tmq2
Topic:Liquidation	/m/02ql2v
business-restructure	business AND restructure
business-shutdown	(business AND shut) OR (business AND shutdown) OR (business AND close) OR (business

Query name	Query details (actual query submitted to the Google Trends API)
	AND liquidate)
business-support	(business AND hardship) OR (business AND grant) OR (business AND support) OR (business AND assistance)
closing-down	'closing down'
insolvent	insolvency OR insolvent OR insolvent OR insolvency
layoff	layoff OR retrench
liquidate	liquidation OR liquidate
voluntary-administration	voluntary AND administration

Source: Google; RBA

Appendix B: Normalising Google Trends results

The frequency at which Google Trends provides data depends on the total length of the period searched (Table B.1). A given query can contain up to five keywords or topics, allowing the comparison of the relative volume of these queries over time. To obtain high-frequency data back to 2004 over a large number of keywords and topics, we run multiple overlapping queries – both over time and search terms. We then normalise the results to make the data comparable across all queries and time periods by scaling the raw results such that the mean values of the overlapping results match.

Let $Results_i(d, q)$ and $Results_{i+1}(d, q)$ be the relative search volumes of a query q on day d for overlapping time periods i and $i + 1$, with days in common $D = \{d_{i1}, \dots, d_{ik}\}$. Compute $\mu_{q,i} = \frac{1}{k} \sum_{j=1}^k Results_i(d_j, q)$ and $\mu_{q,i+1} = \frac{1}{k} \sum_{j=1}^k Results_{i+1}(d_j, q)$. Normalise $Results_{i+1}$ relative to $Results_i$ by letting $Results_{i+1} = \frac{\mu_{q,i}}{\mu_{q,i+1}} Results_{i+1}$.

Relative search volumes are returned as an integer between zero and 100. The discretization can lead to significant clipping of low-volume search terms if they are queried relative to a high-volume term. To mitigate this issue, we run an initial set of queries with the terms grouped into random, overlapping sets of five to get an overall estimate of the relative volume of the queries. We then sort them into new groups based on approximate relative volume and rerun the queries to get a more fine-grained estimate.

Table B.1: Google Trends Search Rules

Total length of query period	Frequency of returned data
< 7 days	hourly
7 days to < 9 months	daily
9 months to < 5 years	weekly
5 years +	monthly

Sources: Google; RBA

Appendix C: Extending the Loughran-McDonald dictionary

Dictionary-based approaches to sentiment classification are simple to apply and interpret. However, they do not take into account the context in which a word appears. Machine-learning-based sentiment classification addresses this issue but is computationally expensive and more difficult to interpret. To mitigate for the limitations of the dictionary approach, we identify words that frequently occur in conjunction with a sentiment word from the Loughran-McDonald dictionary and manually label the sentiment of the resulting phrases. We

also collect any phrases where the phrase sentiment differs to the underlying word sentiment – for example, ‘high’ is positive but ‘high-inflation’ is negative – and add these phrases to the dictionary.

To identify phrases, we estimate an approximate conditional probability ratio:

$$s_{ab} = \log \left(\frac{n \times n_{ab}}{n_a \times n_b} \right) = \log(n) + \log(n_{ab}) - \log(n_a) - \log(n_b)$$

Where:

- n is the total number of words in the news corpus
- n_a is the number of times word ‘a’ occurs
- n_b is the number of times word ‘b’ occurs
- n_{ab} is the number of times word ‘a’ occurs followed by word ‘b’.

Large scores indicate that observing word ‘a’ makes it significantly more likely that the next word will be ‘b’ than if words were randomly selected based on their overall frequency.

A computer-readable list of all the phrases we have extracted with their sentiment labels is available upon request.

Appendix D: Search terms for Twitter indicators

Table D.1: Twitter Searches for Stress

Tweets are included if they contain a **Businesses** or **Households** keyword, do not contain a **Government** keyword and contain any **negative connotation** word

Keyword				
Businesses	Households	Government (excluded)	Negative connotation	
cash flow	loan	government	arrears	strains
Insolvency	mortgage	morrison	bad	stresses
bankrupt	credit	treasury	behind	struggle
balance sheet	debt	leadership	concerns	suffered
budget	finances	nation	defaults	suffering
business loan	serviceability	national	deficits	tense
capital	repayment	public	doubts	tension
liability	repayments	political	endanger	tepid
credit risk	interest rate	politics	failed	threats
profit	interest rates	sovereign	failing	tough
equity	home loan		failures	troubled
asset	home equity		fallen	tumbling
subsidy	rent		faltering	turbulent
production			headwinds	turmoil
trade			impaired	unable
stock price			impairing	unrest
share price			inability	unstable
business			insolvent	volatile
liquidity			poorer	weakened

Keyword			
Businesses	Households	Government (excluded)	Negative connotation
market			problems weakening
business debt			riskier weaker
company debt			setbacks weakest
recruiting			severely worries
profitability			severity worrying
regulation			shortages
investment			
fixed cost			
sunk cost			
wage			
liquidation			

Endnotes

- [*] The authors are from Economic Research Department and would like to thank Cathie Close, Callan Windsor and John Simon for their feedback on this work.
- [1] See Johnson, Parker and Souleles (2006); Kaplan, Violante and Weidner (2014); Albuquerque and Green (2022); Murillo, Graham and Harvey (2010); Gómez (2019).
- [2] Figure 1 is adapted from Bullock (2018).
- [3] Statista Research Department (2022), Twitter usage in Australia in 2018 by generation.
- [4] For a discussion on the potential causes of this rise, see Kearns (2019).
- [5] We use a VAR model with the BIC criteria to select the number of lags to include and difference the data to deal with any non-stationarity.

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HILDA Disclaimer

Stablecoins: Market Developments, Risks and Regulation

Cameron Dark, Eleanor Rogerson, Nick Rowbotham and Peter Wallis^[*]



Photo: piranka – Getty Images

Abstract

Stablecoins – a type of crypto-asset designed to maintain a stable value – have grown in popularity over recent years. Market developments, however, have highlighted the risks stablecoins can pose to investors, particularly if they are not fully backed by high-quality liquid assets. Stablecoins currently pose limited risks to the broader Australian financial system, but this could change if they become more widely used in the future – for example, in payments and other financial services. As such, regulators across the world are seeking to bring greater clarity to the regulatory treatment of stablecoins, not only to manage risks but also to support innovation in the market. This article considers the rise of stablecoins, the risks they pose and the response of regulators so far.

Introduction

Stablecoins are a type of crypto-asset designed to maintain a stable value relative to a specified unit of account or store of value, such as a national currency (often the US dollar) or a commodity (e.g. gold). They aim to overcome some of the shortcomings of ‘unbacked crypto-assets’ (e.g. Bitcoin), particularly price volatility, potentially making them more attractive as a means of payment or store of value (Dark *et al* 2019).

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’ to facilitate trade between traditional currency and other crypto-assets or between different crypto-assets; this improves the functioning of crypto-asset markets. More than 75 per cent of trading on a selection of large crypto exchanges in 2022 has involved a stablecoin on one or both sides of the trade (Graph 1). Stablecoins also act as a safer store of value in the crypto ecosystem. Globally, the total value of stablecoins on issue

reached around US\$185 billion in April 2022, up from around US\$30 billion at the start of 2021. More recently, the value of stablecoins on issue has fallen to around US\$150 billion following the collapse of a large algorithmic stablecoin and associated widespread volatility in crypto-asset markets that occurred around May 2022.

Stablecoin issuers are increasingly considering use cases that extend beyond the crypto ecosystem and there is significant interest globally in the potential for well-regulated stablecoins to enhance the efficiency and functionality of a range of payment and other financial services. More widespread use of stablecoins for payments would generate similar risks for customers and merchants as other payment systems (e.g. credit, liquidity, operational and settlement risks), although the relatively new underlying technology could change the nature or severity of some of these risks. In light of this, the international regulatory community is focusing attention on ‘payment stablecoins’ – a subset of stablecoin arrangements with features that are specifically designed to facilitate their widespread use as a means of payment. Consistent with the international focus, the Council of Financial Regulators (CFR) in Australia is working on options to incorporate payment stablecoins into the regulatory framework for stored-value facilities.

This article considers the rise of stablecoins and their potential expansion into new use cases. It

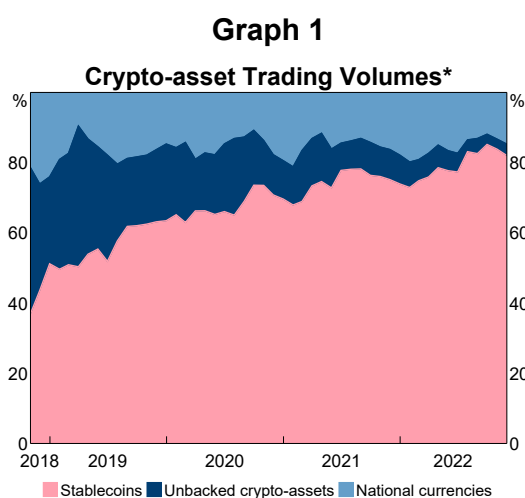
details some of the risks stablecoins could pose to investors and to financial stability, and how regulators are responding in both global and domestic contexts.

The rapid rise of the stablecoin market

The stablecoin market has grown considerably over the past few years, with activity concentrated in a few US dollar denominated stablecoins. These stablecoins are primarily being used to facilitate speculative trading in crypto-assets, where they are often used as a bridge between national currencies and other crypto-assets. Using stablecoins to transact in crypto-assets reduces the need for market participants to convert funds into and out of national currencies, which can incur higher fees and reduce the efficiency of trades. Stablecoins are also commonly used to facilitate trading, lending and borrowing activity in crypto-asset markets, including through decentralised finance (DeFi) platforms.^[1] For example, they can allow market participants to borrow funds to enable leveraged trading.

At the time of its announcement in mid-2019, Meta’s proposed Diem stablecoin was envisaged as a new global ‘cryptocurrency’ that would facilitate person-to-person payments through digital wallets. The project attracted close scrutiny from the international regulatory community due to its potential to grow rapidly – potentially to a size where it would have had systemic importance. Regulators in several jurisdictions indicated that Diem would not be permitted to launch until it had addressed all regulatory concerns. Following several changes to the structure and scope of the Diem project aimed at addressing regulators’ concerns, it was announced in early 2022 that the project was being wound down and the remaining assets sold to the owners of Silvergate Bank.

The two largest stablecoins on issue right now are Tether and USD Coin, which have market capitalisations of around US\$65 billion and US\$45 billion, respectively (Graph 2). Both are ‘asset-backed’ stablecoins – that is, the issuer holds (or claims to hold) assets that fully back the value of the coins on issue. These ‘reserve assets’ may include relatively safe and liquid assets (such as bank



* Share of monthly trade volumes on selected crypto exchanges involving stablecoins, unbacked crypto-assets or national currencies on at least one side of the trade. Exchanges included in calculation: Binance, Poloniex, Bifinex, Huobi, OKEx, Bittrex, Coinbase, Kraken, Bitstamp.

Sources: RBA; Theblock.co

deposits and US Treasury bills) that can be quickly liquidated in order to meet requests by holders of stablecoins to withdraw their funds on demand (i.e. redemption requests). However, the composition of reserve assets can differ substantially across stablecoins and there may not always be full transparency and oversight into the ability of issuers to return investor capital at par and on demand; in some cases, regulators have raised concerns about the liquidity, quality and valuation of the reserve assets held by stablecoin issuers (discussed below).

There are also so-called ‘algorithmic stablecoins’ that are not backed by high-quality liquid assets but instead attempt to maintain a stable value by adjusting the supply of the stablecoin on issue in response to changes in demand through various types of algorithms and incentive mechanisms. In early May 2022, the value of TerraUSD – at the time, one of the largest algorithmic stablecoins, with a market capitalisation of around US\$18 billion – collapsed when a failure to maintain its peg to the US dollar led to significant investor withdrawals and an apparent breakdown of its stabilisation mechanism (Graph 3). There was also considerable focus on Tether at the time, which faced selling pressure from a loss of investor confidence. Tether temporarily lost its peg to the US dollar, falling to a low of around US\$0.95. Investor uncertainty associated with these events spread to broader crypto-asset markets where there was heightened price volatility (RBA 2022a). In November, Tether again temporarily lost its peg to the US dollar, falling to a low of US\$0.98.

Issuance of Australian dollar denominated stablecoins has been relatively limited to date. TrueAUD, issued by US-based TrustToken, appears to be the largest with around A\$40 million on issue. However, Australian banks and payment service providers are showing increasing interest in issuing or supporting Australian dollar stablecoins.

Applications beyond the crypto ecosystem

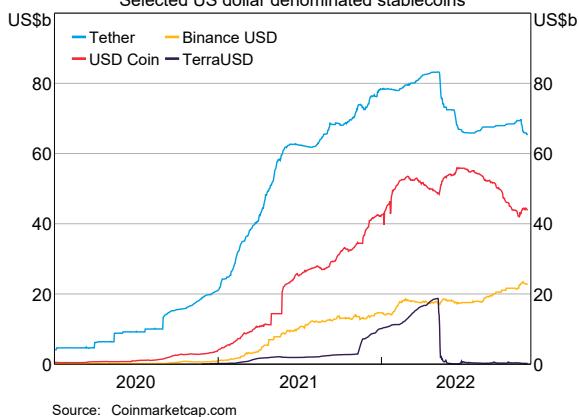
Stablecoin issuers are increasingly considering use cases for stablecoins that extend beyond the crypto ecosystem with a view to enhancing the efficiency and functionality of payments and other financial services. These use cases have tended to focus on stablecoins as a means of payment, including for person-to-person and cross-border payments, and as a settlement asset in transactions involving ‘tokenised’ or other types of digital assets. ‘Tokenisation’ refers to creating a digital representation of a physical asset or existing asset class on distributed ledger technology. This is an emerging area of research in financial markets, with participants exploring how these new forms of digital assets will be traded and what new markets may develop. It is possible that stablecoins could facilitate trading in these markets as a payment token and/or settlement asset.

Domestically, there have been a number of recent initiatives involving stablecoins – including pilots undertaken by ANZ, announcements of the launch of Australian dollar denominated stablecoins by several non-bank entities, and the launch of stablecoin-based investment products. One of the

Graph 2

Market Capitalisation

Selected US dollar denominated stablecoins



Graph 3

Stablecoin Prices

Selected US dollar denominated stablecoins

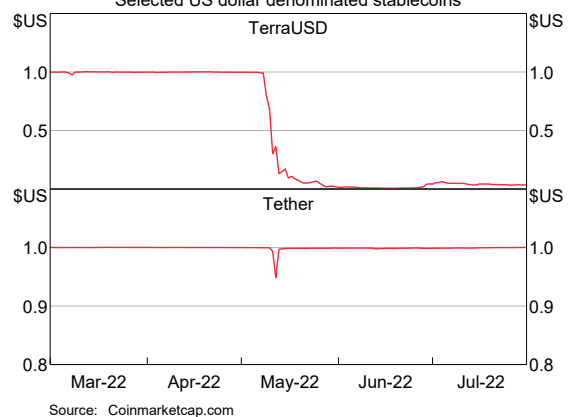


Table 1: Risks from Stablecoins

Risks to investors and users	
Market and liquidity risks	Redemption in full and on demand at par is not guaranteed due to the possibility of a ‘run’ (rapid withdrawal of funds with redemption compromised by illiquidity of assets). Algorithmic stablecoins not backed by financial assets are highly susceptible to runs. Reserves held by asset-backed stablecoins are subject to market, credit and liquidity risks.
Operational risks, including cyber-attacks and fraud	There are heightened risks due to unregulated issuers and service providers, opacity and complexity of the crypto ecosystem, and a lack of recourse for lost or stolen crypto-assets. There is also potential legal uncertainty around redemption rights and claims on issuer.
Future potential risks to financial stability	
Risks to banks and other important financial institutions	Deposits held on behalf of stablecoin issuers could be vulnerable to sudden outflows. Stablecoins held as investments or collateral could result in potential losses. There are legal, operational and reputational risks from provision of crypto services (e.g. custody). Banks issuing stablecoins face risks depending on the design and use case.
Funding markets	A run on a stablecoin could disrupt funding markets by triggering asset fire sales.
Future use in payments	Widespread use in payments would involve risks, depending on scale and design.
Climate risks	Continued or increased use of energy-intensive distributed ledger technologies could exacerbate energy and climate-related financial risks.

Source: RBA

ANZ pilots examined how Australian dollar stablecoins could improve compliance with Australian tax regulations by using distributed ledger technology and stablecoins to automate the payment of tax when a taxable event occurs. Another ANZ pilot explored how Australian dollar stablecoins could reduce frictions for Australian investors accessing crypto markets by removing the need to convert Australian dollars to US dollars in the foreign exchange market before purchasing US dollar stablecoins and other crypto-assets.

Current and emerging risks

Similar to other financial products, stablecoins carry risks for investors and users (Table 1). These risks depend on a range of factors, including the design of the stablecoin arrangement and its applications. Stablecoins that are fully backed by high-quality liquid assets carry substantially lower risks for investors and users than other stablecoins, particularly algorithmic stablecoins. Due to the relatively small size of the market and the limited use of stablecoins outside the crypto ecosystem,

stablecoins do not yet pose broader risks to financial stability. However, continued growth could see risks emerge in the future.

Risks to investors and users

Market and liquidity risks

Stablecoins can be vulnerable to runs, whereby a sudden spike in redemption requests – triggered by, for example, a price fall, rumours of instability or concerns about underlying asset quality – results in a ‘fire sale’ of the assets backing the stablecoin. This risks further outflows as investors become concerned that the issuer may be unable to meet future redemption requests in full. This vulnerability is similar to that of other investment products – and particularly certain money market funds (MMFs) that aim to maintain a stable net asset value – but may be magnified for some stablecoins due to incomplete regulation across the crypto ecosystem. The design of a stablecoin arrangement can limit its vulnerability to runs and other risks. For example, issuers can overcollateralise stablecoins with high-

quality liquid assets, such that full redemption may be possible even during periods of stress.

Transparent governance arrangements (such as regular independent audits) can provide investors with confidence in the issuer’s assertions regarding the value and liquidity of its reserve assets.

Stablecoin issuers can also provide investors with legal certainty around their redemption rights, including in the event of an issuer insolvency.

In practice, some large asset-backed stablecoins fall short of these standards. For example, Tether has faced scrutiny over claims that its stablecoin is ‘fully backed by US dollars’, which led to it being fined twice by US regulators in 2021. Tether continues to invest a portion of its reserves in risky and illiquid assets, and holds only a slim capital buffer to cover potential losses on these assets (Graph 4).^[2] Some large stablecoin issuers also impose restrictions on redemptions (such as high minimum redemption amounts) or make redemption conditional on the performance of reserve assets (Hermans *et al* 2022). The legal claims that stablecoin investors have on issuers under different scenarios can also be unclear, meaning that investors could have an unsecured credit exposure in some cases.

Algorithmic stablecoins, which are not backed by financial assets, are inherently fragile as the stability of the peg depends on investors’ confidence in the value of a related unbacked crypto-asset. The fragility of such stablecoins was recently highlighted by the collapse of TerraUSD.

The stabilisation mechanism for TerraUSD operated via a related unbacked crypto-asset known as TerraLuna. TerraLuna was designed to act as the counterbalance to TerraUSD, absorbing any price pressures on the stablecoin.^[3] The trigger for the recent disruption appears to have been a small number of large trades that included a sudden withdrawal of a large amount of TerraUSD from a decentralised stablecoin exchange on the Terra platform (Chainalysis 2022). This led to the initial de-pegging of TerraUSD, which appears to have prompted a broader loss of confidence in the Terra platform and an accelerated sell-off of TerraUSD and TerraLuna as holders of these tokens ‘ran’ to other assets. In an attempt to maintain the stabilisation mechanism, the smart contract issued increasing amounts of TerraLuna tokens, further depressing TerraLuna’s price and causing it to enter a ‘death spiral’. Algorithmic stablecoins typically do not offer a mechanism to redeem stablecoins from the issuer, meaning that investors needed to accept low prices on secondary crypto-asset markets if they wanted to exchange their TerraUSD or TerraLuna into national currency. The market value of TerraUSD has remained below US\$0.10 since the collapse.

Operational risks

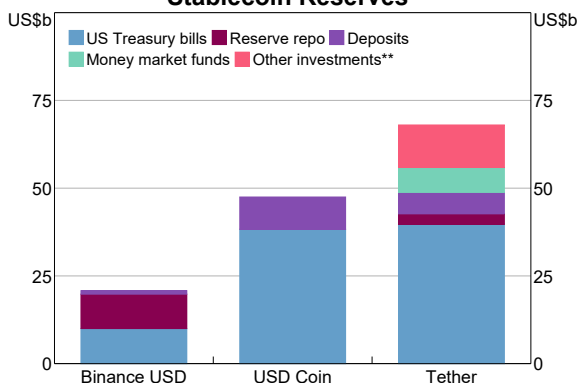
Stablecoins and other crypto-assets are also susceptible to operational risks, including fraud and cyber risks. These risks arise from a number of sources, including the opacity and complexity of the crypto ecosystem, the widespread use of third-party service providers such as exchanges and custody services, and a lack of recourse for lost or stolen crypto-assets. These issues are compounded by incomplete regulation across the crypto ecosystem, including with regards to the operational and financial resilience of stablecoin issuers and third-party service providers. Regulators are highly attentive to these risks and are in the process of developing regulatory frameworks for stablecoins, other crypto-assets, and crypto-asset service providers.

Financial stability risks

Stablecoins currently pose minimal risks to financial stability because of the small size of the market

Graph 4

Stablecoin Reserves*



* As at September 2022

** Includes commercial paper, certificates of deposit, secured loans, corporate bonds, investment funds, precious metals, crypto-assets and non-US government debt securities.

Source: Stablecoin issuer disclosures

relative to other asset classes and the limited use of stablecoins outside the crypto ecosystem (RBA 2022b). In this sense, stablecoins and other crypto-assets operate in what is still largely a self-referential system. However, continued growth and new use cases could introduce risks, including by strengthening the links between the crypto ecosystem and the ‘traditional’ financial system. Potential financial stability risks posed by asset-backed stablecoins are akin to those posed by financial products with similar features, including certain types of investment funds, bank deposits and payment instruments. Algorithmic stablecoins appear less likely to pose systemic risks as they do not invest in traditional financial assets and are less likely to become widely adopted by systemically important financial institutions (due to higher risks and consequently higher capital charges under proposed capital frameworks).

Increased bank exposure

Financial stability risks could emerge if stablecoins become more widely used by banks and other financial institutions. Exposures to stablecoins and other crypto-assets among advanced economy banks remain very small at present, although banks have been increasingly willing to provide crypto-related services and integrate crypto-assets into existing services over the past couple of years. Banks could face a number of risks from stablecoins, including:

- A run on a stablecoin could result in sharp deposit outflows from some banks or disruptions to other sources of bank funding (such as commercial paper), as stablecoin issuers typically hold a portion of their reserves in at-call bank deposits and/or short-term debt securities.
- Banks that have direct exposures to stablecoins – either by holding stablecoins directly or by accepting stablecoins as collateral – could face losses on those exposures in the event they declined in value.
- Banks may perform broking, trading or other services that involve little market exposure but carry legal, operational and reputational risks – for example, due to rules related to anti-money

laundering and counter-terrorism financing or sanctions enforcement, or if customers make large losses on crypto investments facilitated by the bank.

- Banks that issue their own stablecoins may face implications for their liquidity management and operational resilience, as well as for customer and payment systems, depending on factors such as the intended use case and the scale of the issuance. These risks are likely to be similar to those associated with equivalent types of bank deposits. As discussed above, banks have begun issuing stablecoins in experimental settings and issuance may become more widespread in the future.

Disruptions to funding markets

A run on a stablecoin could trigger fire sales of reserve assets, such as short-term government debt or commercial paper. This could cause or exacerbate dysfunction in important funding markets, particularly if such an event occurred during a period of broader market stress. Runs on MMFs, which invest in similar assets, have exacerbated disruptions in commercial paper markets during previous episodes of market-wide stress (including during 2008 and 2020) (Eren *et al* 2020). The three largest stablecoins are comparable in size to some US MMFs, although the total value of stablecoins on issue is much smaller than the MMF market (Graph 5). As a result, total holdings of reserve assets remain small relative to measures of market depth – such as turnover or issuance – limiting systemic risks for the time being.

Risks to the payments system

More widespread use of stablecoins for payments would generate similar risks for customers and merchants as other payment systems (e.g. credit, liquidity, operational and settlement risks). The extent of any resulting financial stability risks would depend on the scale and nature of the system and its use in critical financial services. Relative to existing payment systems, a stablecoin-based payment system could carry new or greater risks – for example, the underlying distributed ledger technology, which is relatively new, may have

unforeseen vulnerabilities. Conversely, a stablecoin-based payment system may reduce certain risks (e.g. by facilitating delivery versus payment for the settlement of digital assets).

Energy and climate-related impacts

Some existing stablecoin technologies rely on proof-of-work consensus mechanisms to validate transactions, which involve so-called ‘miners’ competing to solve complex cryptographic problems (Adachi *et al* 2022). Proof-of-work mechanisms are highly energy-intensive and therefore have the potential to contribute to climate change. Proof-of-work is also slower and less scalable than some less energy-intensive mechanisms such as proof-of-stake, which instead require validators to ‘stake’ capital in the form of crypto-assets to participate in validating transactions. As a result, more widespread adoption of stablecoins for applications such as payments may depend on issuers migrating to less energy-intensive technologies. Indeed, some stablecoin issuers are now using proof-of-stake or proof-of-history consensus mechanisms – including those on the Ethereum platform, which moved to proof-of-stake consensus in September 2022.

Emerging regulation of stablecoins

Regulators and international organisations have been consulting stakeholders and developing regulatory proposals to address risks arising from stablecoin activity. One focus is on identifying the

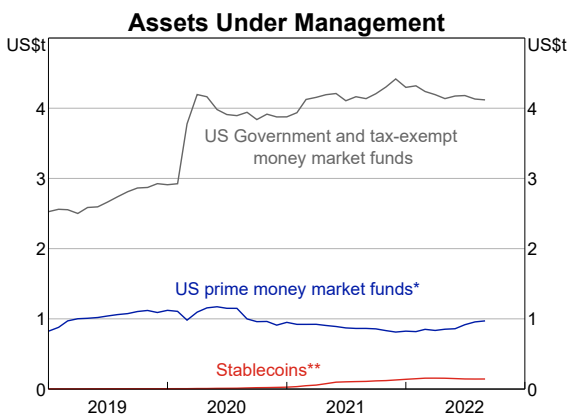
extent to which stablecoin arrangements share common features with the traditional financial system, with the goal of producing ‘technology neutral’ regulation (i.e. same activity, same risk, same regulation). A common theme emerging across jurisdictions is to consider regulatory requirements for payment-related stablecoins as a priority.

International regulation: Developing a consistent approach

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. In particular, international bodies are leading work to develop a consistent and comprehensive regulatory approach for ‘global stablecoins’ – that is, stablecoins with a potential reach and use across multiple jurisdictions, which could become systemically important in and across one or many jurisdictions. Regulatory initiatives in this area include the following:

- The Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions recently published guidance confirming that if a stablecoin arrangement facilitates the transfer of value and is determined to be systemically important, it is expected to observe the Principles for Financial Market Infrastructures, which are the international standards for the design and operation of financial market infrastructures to mitigate financial stability risks (CPMI-IOSCO 2022).
- The Financial Stability Board is currently consulting on revisions to a set of 10 high-level recommendations for regulating global stablecoins and stablecoins with the potential to become global stablecoins (FSB 2022). The recommendations aim to promote consistent and effective regulation, supervision and oversight of global stablecoins to address financial stability risks, while supporting innovation.
- The Basel Committee on Banking Supervision has proposed standards for the prudential

Graph 5



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

treatment of bank exposures to crypto-assets, including stablecoins (BCBS 2022). Under this proposed framework, exposures to asset-backed stablecoins that satisfy certain requirements relating to the composition of their reserve assets and price stability would typically carry a lower capital charge than exposures to other stablecoins and unbacked crypto-assets.

Australian regulation: CFR focusing on payment stablecoins

Work on a regulatory framework for crypto-assets in Australia is being led by the Treasury with support from CFR agencies and other regulators. Consistent with the international focus, the CFR has agreed that developing a framework for regulating 'payment stablecoins' is a priority in the near term, given the potential for these arrangements to become widely used as a means of payment and a store of value (CFR 2022).

Payment stablecoins are a subset of stablecoin arrangements with features that are specifically designed to facilitate their widespread use as a means of payment in the economy (i.e. to function as a form of 'money') – in particular, the ability (or implied promise) for customers to be able to withdraw their funds on demand and 'at par' (full value) in national currency. The CFR has noted that the risks posed to users of payment stablecoins can be similar to those posed by certain stored-value

facilities, including the risk of user losses due to failure of the issuer to meet their obligations (e.g. because of a failure to appropriately safeguard customer funds, illiquidity and/or insolvency). Accordingly, the CFR is working on options for incorporating payment stablecoins into the proposed regulatory framework for stored-value facilities. This is one element of broader reforms to the payments regulatory framework following the Treasury Review of the Australian Payments System.

Conclusion

Stablecoins have the potential to enhance the efficiency and functionality of a range of payment and other financial services, but they also carry risks for investors, users and potentially the broader financial system. These risks depend on a range of factors, including the design of the stablecoin and its links with the traditional financial system. Interest in Australian dollar stablecoins is growing, albeit from a low base, and the market could develop rapidly as use cases emerge – in particular, as a means of payment or settlement asset. Regulators are undertaking significant work to understand how stablecoins can support innovation while providing appropriate safeguards for investors and users, consistent with the overall stability of the financial system. ✎

Endnotes

[*] Cameron Dark and Nick Rowbotham are from Payments Policy Department; Eleanor Rogerson and Peter Wallis are from Financial Stability Department. This article draws on work completed with Chay Fisher, Chris Thompson and Shayan Omid.

[1] DeFi describes a range of automated financial services such as insurance, lending and borrowing, which do not rely on financial intermediaries and operate peer-to-peer through decentralised exchanges.

[2] For example, Tether's September 2022 Consolidated Reserves Report stated that the value of its assets was US\$68.1 billion, relative to stablecoins on issue of US\$67.8 billion. Tether's Reserves Reports are reviewed by an independent auditor but do not attest to the value or

composition of Tether's reserves outside of end-of-quarter reporting dates.

[3] Through a smart contract, one TerraUSD token was always exchangeable for US\$1 of TerraLuna tokens. This was intended to create the incentives for arbitrage trading that would keep TerraUSD at its peg. For example, if the price of TerraUSD fell below US\$1 due to reduced demand, investors would (in theory) be incentivised to 'burn' their TerraUSD and 'mint' TerraLuna (at 1 TerraUSD for US\$1 worth of TerraLuna) via the smart contract and thereby earn an arbitrage profit. This would reduce the supply of TerraUSD, putting upward pressure on its price until it regained its peg.

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The RBA and AOFM Securities Lending Facilities

Ahmet Aziz and Ben Jackman^[*]



Photo: jayk7 – Getty Images

Abstract

Australian Government Securities (AGS) play an important role in the transmission of monetary policy given that yields on these securities provide a benchmark for other interest rates across the economy. The Bank has a large amount of AGS and ‘semi-government’ bonds issued by state and territory borrowing authorities (semis) on its balance sheet as a result of purchases to support the economy through the COVID-19 pandemic. To support the efficient functioning of these markets, the Bank operates a securities lending facility (SLF) from which eligible counterparties can borrow AGS and semis; the Bank also operates an SLF on behalf of the Australia Office of Financial Management (AOFM). The use of these SLFs picked up noticeably following the end of the Bank’s yield target and bond purchase program. This article discusses these facilities in detail, including why market participants might use them and the recent increase in borrowing.

Introduction

The Reserve Bank currently holds a large amount of Australian Government Securities (AGS) and semi-government bonds issued by state and territory borrowing authorities (semis) on its balance sheet as a result of its monetary policy measures adopted during the COVID-19 pandemic. From March 2020 to February 2022, the Bank purchased a total of \$361 billion worth of bonds, including \$293 billion of AGS and \$68 billion of semis –

substantially more than the issuance of AGS and semis over this period. Initially, these purchases helped to address dysfunction in AGS markets at the onset of the pandemic as well as in support of the Bank’s yield target. Later, sizeable purchases were undertaken as part of the bond purchase program (BPP). These purchases supported the Board’s monetary policy objectives at that time (RBA 2020). As at February 2022, the Bank’s holdings amounted to around 36 per cent of AGS outstanding, and 16 per cent of semis outstanding;

since then, issuance into these markets and maturities of some of the Bank's holdings have reduced those shares slightly.

The Bank operates a securities lending facility (SLF) from which eligible counterparties can borrow from the Bank's holding of bonds (RBA SLF). The facility works in conjunction with an SLF from the Australian Office of Financial Management (AOFM), which is operated by the Bank on the AOFM's behalf (AOFM SLF). The Bank and AOFM offer these facilities to support the efficient functioning of the AGS and semis markets.

As bond dealers do not hold a selection of every bond outstanding (there are around 160 unique AGS and semis in total), dealers need to be able to sell bonds that they do not own in order to 'make a market' in bonds. They do this by borrowing those bonds for a short period of time, and work to cover their resulting 'short' position quickly. If they were not able to borrow bonds, they would either have to stop quoting offers to sell some bonds, or be prepared to fail to deliver the bonds they have promised to sell. As a result, securities lending enhances the efficiency and liquidity of the bond market by helping dealers to provide prices to both sell and buy bonds to clients on a wider selection of bonds (i.e. two-way pricing).

The importance of the RBA and AOFM SLFs is heightened in the current environment, where the Bank owns a large amount of AGS and semis, including large shares of particular bond lines. Without these SLFs, bond market functioning may have been less effective, which would have increased the cost of government borrowing and reduced the transmission of monetary policy.

This article details the workings of the RBA and AOFM SLFs and considers why their use has increased recently.

Parameters of the SLFs

Market participants can borrow any of the Bank's AGS and semis from the RBA SLF, for a fee of 20 basis points for up to seven days, secured either against cash or other bonds.^[1] Subject to the provision of that collateral, lending from the RBA

SLF is only limited by the amount of each bond the Bank holds on an outright basis.

By contrast, market participants in aggregate can borrow up to \$5 billion of AGS from the AOFM SLF, for a fee of 25 basis points, and on an open term. For some time this borrowing could only be secured against government or government-guaranteed bonds, but recently the AOFM SLF has also begun accepting cash as collateral.^[2]

The current pricing of the RBA and AOFM SLFs is different from that which applied during the pre-pandemic period. Previously, for the AOFM SLF, bond dealers paid the lessor of 25 basis points below the cash rate target or 300 basis points; for the RBA SLF, bond dealers paid a fee aligned with prevailing market rates, which could vary across different bonds. In the current environment of elevated Bank holdings, however, a smaller flat fee for all bonds is more appropriate. This is the case for two reasons: it supports bond market functioning; and, as the Bank's bond holdings affect market pricing for securities lending, determining an independent market rate for securities lending is not feasible. Nevertheless, the parameters of these facilities remain at the discretion of the Bank and the AOFM, and can be changed if needed.

Recent borrowing

The RBA and AOFM facilities have been available to counterparties for at least two decades, but borrowing from the RBA SLF has increased since mid-2021 and even more notably from November 2021 (Graph 1). Both the value and number of transactions has increased, with more counterparties using the facility and generally seeking larger amounts of bonds.

Borrowing from the AOFM SLF has remained low by comparison. This is likely to reflect the fact that the RBA facility is slightly cheaper. Also, the AOFM did not until recently accept cash as collateral and most demand for current borrowing is focused in bonds available in the Bank's portfolio.

The preference of some borrowers to use cash as collateral partly reflects the high levels of cash held by commercial banks in their Exchange Settlement accounts at the Reserve Bank, as a result of the

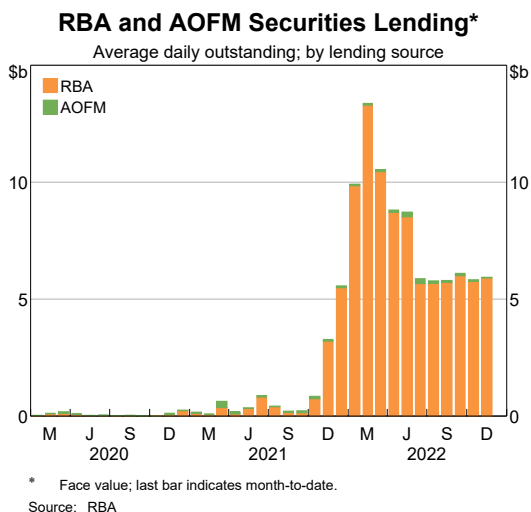
Bank’s policy measures implemented in response to the COVID-19 pandemic (RBA 2022a). The lower ‘free float’ of bonds (i.e. bonds on issue less RBA holdings) available to post as collateral is also likely to have played a role.

Although system liquidity is high, the resulting cash balances are not distributed evenly. Some market makers, such as large foreign banks and non-banks, tend to have lower Australian dollar balances than large domestic banks. These market makers are therefore more likely to secure their SLF borrowings using other bonds as collateral instead of cash. In recent months, around two-thirds of borrowing by value from the RBA SLF has been against cash, and one-third against bonds (Graph 2).

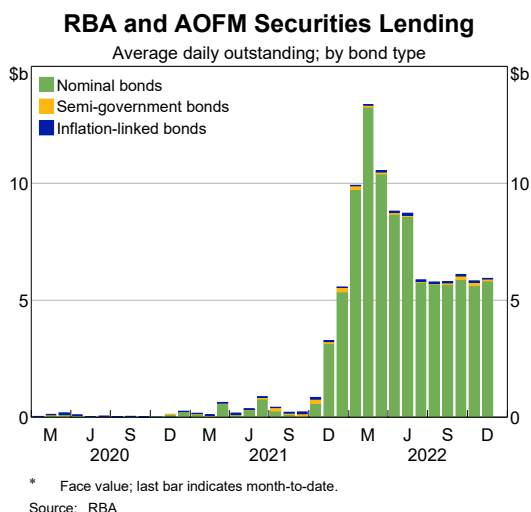
By bond type, the overwhelming majority of bonds borrowed are nominal AGS, with the remaining borrowing made up of semis from the RBA SLF and inflation-linked AGS from the AOFM SLF (Graph 3).

By tenor, most borrowing from these facilities is short term, with the overwhelming majority borrowed for one or two business days (Graph 4). A smaller but still material amount of borrowing is for five business days (a calendar week), the maximum tenor offered by the facilities. These are mostly borrowings that market makers roll each week to support their own longer term positions or the positions of their clients. An example of such a long-term position – a bonds-futures basis trade – is discussed below.

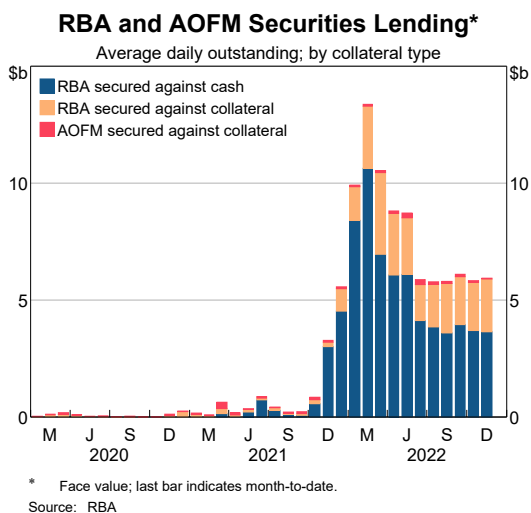
Graph 1



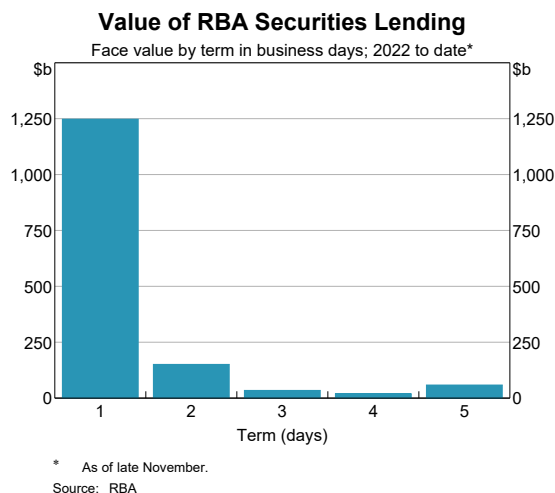
Graph 3



Graph 2



Graph 4



Drivers of the recent increase in borrowing

Shortages of bonds

Securities lending increased significantly towards the end of 2021, peaked in February 2022, and has remained elevated since. The large increase in securities lending coincided with the Bank owning an increasingly large share of AGS outstanding as a result of bond purchases to support the yield target and under the BPP (Graph 5). The Board has said that it currently intends to hold these bonds until maturity, and so Bank holdings reduce the free float of bonds available to market participants – shown here as AGS on issue less Bank holdings (Graph 6).

The free float of bonds available at the specific maturities shown in Graph 6 can still decrease even after the Bank’s purchases have concluded. As a bond’s residual maturity reduces over time, it will fall out of a maturity ‘basket’ (like the Nov-24 bond shown in Graph 5, which was previously a three-year bond) and could be replaced by longer dated bonds with higher Bank holdings (such as the Apr-26 and Sep-26 bonds in Graph 5).

Estimates by market participants of the ‘circulating’ free float (after also excluding bond holdings of other long-term ‘buy-and-hold’ investors) are lower still.^[3] These estimates put the share of some individual bond lines available in circulation as low as 10 per cent, with the lowest shares generally for bonds with a remaining term to maturity of three

years or less. Both the share of total bond lines outstanding, as well as the absolute dollar value, are likely to be relevant to effective market functioning.

The reduction in the free float has made it more difficult for market makers and other participants to source the bonds they need in the market to engage in trades, hedge trading positions or deliver bonds to clients. Market liaison has suggested significant shortages in some bonds since late 2021, most notably the AGS bonds maturing in 2024 and 2025 (including the final yield curve target bond, the April 2024 bond). However, the availability of the RBA and AOFM SLFs means that participants can reliably source these bonds for the purposes of market making. Consistent with this, most borrowing from these facilities has been in bonds with a remaining term to maturity of three years or less (Graph 7).

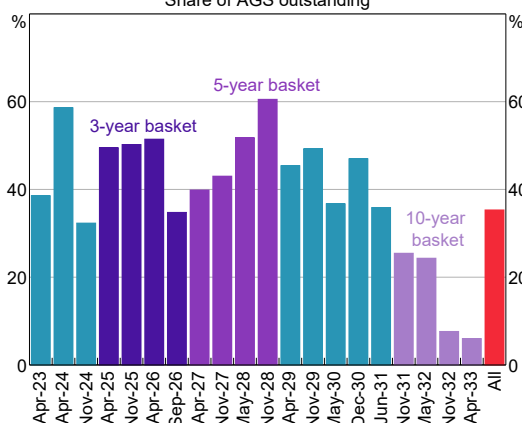
The three-year bonds-futures basis trade

While the direct effect of fewer bonds in circulation has contributed to more securities lending, it is unlikely to explain all of the very large increase in securities lending through late 2021 and early 2022. A sizeable portion of this additional borrowing was driven by an arbitrage opportunity in the bond market that the Bank’s purchases helped to create.

The Bank’s significant purchases of three-year bonds contributed to these bonds being more expensive (i.e. lower yielding) than the equivalent three-year futures contract.^[4] (By contrast, prior to the pandemic, bonds were generally a little cheaper

Graph 5

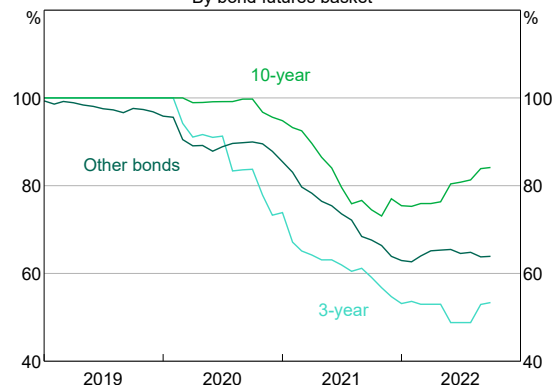
RBA AGS Holdings*
Share of AGS outstanding



* Excludes holdings under repo; excludes inflation-linked bonds; baskets based on the December 2022 futures contract.
Sources: AOFM; ASX; RBA

Graph 6

Free Float of AGS*
By bond futures basket



* Proportion of Treasury bonds outstanding less RBA holdings.
Sources: AOFM; ASX; RBA

than equivalent futures contracts.) That bonds are a little more expensive than futures currently reflects the relative scarcity of ‘physical’ three-year bonds as a result of the low free float, highlighted above. No such scarcity exists in futures, as they are a derivative product.^[5] This difference in price (or in yield) is referred to as a ‘basis’, and by market convention, when bonds are more expensive, the basis is negative.

Market participants can take advantage of this arbitrage opportunity via a ‘bonds-futures basis trade’. Although the prices of the bonds and futures contract are different now, market participants have certainty that their prices will be the same in future, because the price of the futures contract at its maturity is defined as equal to the price of the bonds.^[6] As a result, a negative basis implies that the price of futures must rise relative to bonds over time, which is information a market participant can use to trade.

To engage in this trade, a market participant borrows some amount of bonds and then immediately sells them (going ‘short’ the expensive physical bonds), and simultaneously buys an equivalent value of futures contracts (going ‘long’ the cheaper futures). Towards the futures expiry, the value of the futures contracts rises relative to that of the bonds. At the futures maturity, the market participant receives the value of the futures contract in cash, and uses these funds to buy back the bonds to repay their original borrowings.

Because the basis was originally negative, the payout from the futures contract will be more than the final purchase price of the bonds, creating a low risk return for the market participant. For more detail on the mechanics of this trade, see Appendix A.

Like with any arbitrage, market participants engaging in this trade also helps bring the prices of the bonds and futures closer together (although medium-term factors, particularly the low free float of three-year bonds, may keep the basis negative for some time).

Market contacts reported very large demand from their clients to borrow bonds from the Bank’s facility to engage in this trade through late 2021 and into early 2022, supporting the significant increase in borrowing from the RBA SLF over the same period.

Although the three-year basis has been persistently negative for much of the pandemic period, securities lending only increased materially in late 2021. Market liaison suggests that some market participants were engaged in this arbitrage earlier in 2021, but at a smaller scale, with this arbitrage facilitated by borrowing in the private securities lending market.

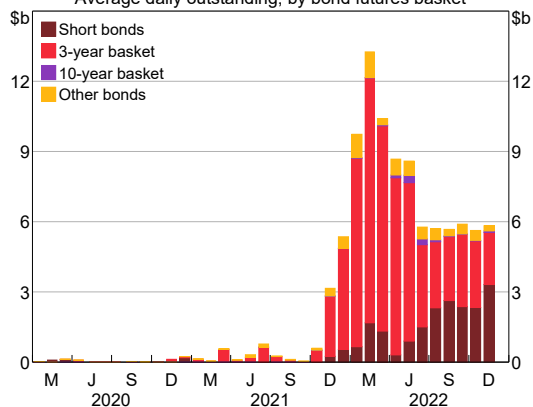
The change in activity may also be explained by the increased RBA and AOFM SLF fee for yield target bonds during parts of the yield target policy period (the fee was temporarily increased on several occasions, making it unattractive to short the bond and cover the position by borrowing it). The basis became most negative following the discontinuation of the Bank’s yield target policy in November 2021, due to substantial movements in yields and high volatility (Graph 8). This basis then returned closer to fair value in following months, in part due to very large bonds-futures basis arbitrage trades.

The arbitrage opportunity could underpin high level of stock lending for a time, as market participants who engage in this trade typically roll their positions for a few months until the quarterly futures contract matures (or even further, if arbitrage remains possible in the subsequent futures contract).

Graph 7

RBA and AOFM Securities Lending*

Average daily outstanding; by bond futures basket



* Face value; does not include semi-government or inflation-linked bonds; last bar indicates month-to-date.

Sources: ASX; RBA

Outlook

Although the amount of securities lending through the RBA and AOFM SLFs has been relatively stable in recent months, market contacts generally expect borrowing activity to decline over the medium term, although the timing of this is uncertain.

The increase in borrowing (and short-selling of physical bonds) has contributed to the return of the basis back towards zero from its widest levels in late 2021. This has made the arbitrage less profitable, and in turn reduces the demand to borrow bonds. The AOFM has also issued some of the most in-demand bonds, which has reduced their relative scarcity and therefore the demand to borrow these bonds (and also supported the return of the basis back towards zero).

Nonetheless, securities lending levels could stay elevated for some time. The three-year basis remains negative, and some market participants continue to report difficulty finding certain bonds of this tenor. Lending will also fluctuate with general market conditions. Finally, counterparties are also now much more familiar with the RBA and AOFM SLFs so they may continue to use them more than otherwise. Together, these factors could underpin demand for securities lending from both SLFs for some time.

Conclusion

To help support government bond market functioning, the Bank operates facilities to lend

bonds to market participants. Demand to borrow from these securities lending facilities increased from mid-2021 and has remained elevated. The large amount of bonds the Bank owns leaves fewer bonds in circulation, and the relative scarcity of some physical bonds has resulted in an arbitrage opportunity between bonds and futures. This demand should decrease over time as the AOFM continues issuance, bonds in the Bank's portfolio mature, and arbitrage opportunities are closed by trades from market participants. ✎

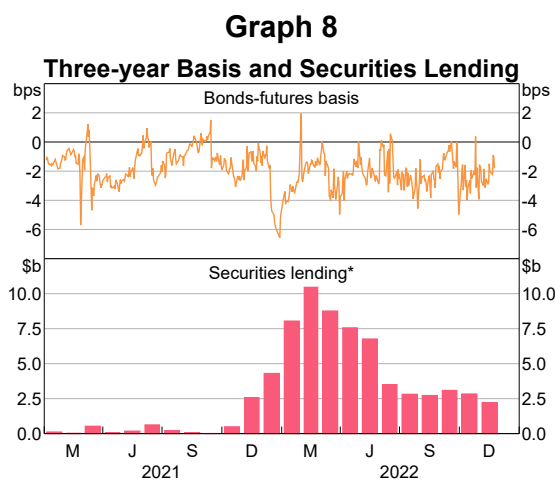
Appendix A: Mechanics of an AGS bonds-futures basis trade

The payoff of a bond futures contract is linked to the average yield on a basket of underlying AGS, and so bond futures can be used to hedge (or take on) the interest rate risk associated with government bonds. While the value of a futures contract is tied to that of the underlying basket of bonds at the futures' expiry, there is no automatic mechanism to keep futures prices in line with bond prices prior to expiry. Instead, this similarity of prices results from investors acting on any arbitrage opportunities that emerge due to prices being misaligned, and trading to remove these (and make a profit in the process). If a negative bonds-futures basis arises (i.e. bonds are more expensive than equivalent futures), a market participant could engage in a bonds-futures basis trade to arbitrage this differential.

Opening the trade

- A **market participant** identifies a negative basis between bonds and futures large enough to profitably trade on.
- The **market participant** borrows the bonds referenced by the futures contract and sells them, and at the same time enters a long futures position. These three trades (borrowing bonds, selling bonds, buying futures) could be done either separately or as part of a single linked trade with a **market maker**; for simplicity, we assume that they occur as part of a single linked trade. The **market participant** is now short the physical bonds, and long futures.

The **market maker** engages in this activity for profit; charging a 'bid-ask' spread for the sale of



* Face value; daily average bonds outstanding based on the three-year futures contract.

Sources: RBA; Yieldbroker

bonds, and charging a fee for lending bonds (likely a mark-up over the RBA SLF fee). The **market maker** also seeks to maintain its relationship with the **market participant** for future profitable transactions.

- The **market maker** may have enough of these bonds in its portfolio to lend; alternatively, it

may need to borrow these bonds from the RBA SLF. In the latter case, the **market maker** approaches the **RBA** to borrow the bonds, rolling this borrowing until the expiry of the futures contract (or participant's trade), and paying a fee.^[7]

Figure 1: Opening the Bonds-futures Basis Trade

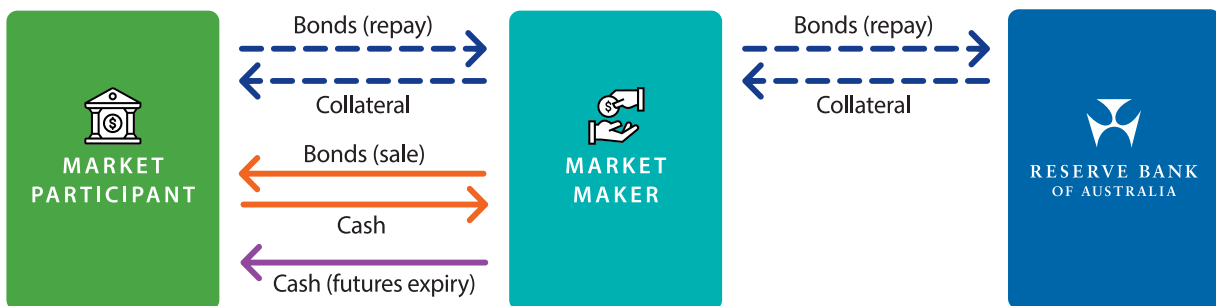


Closing the trade

- As the expiry of the futures contract approaches, the value of the futures contract increases towards the value of the underlying bonds.
- The **market participant** holds the futures contracts to expiry and receives a payout linked to the yield on the bonds underlying the futures contract.^[8] At the same time, the **market participant** purchases the relevant bonds in the market and delivers them to the **market maker** to close its short bond position; for simplicity, we assume all these transactions are

- conducted by the market participant through the market maker.
- The **market maker** closes its short position with the RBA SLF.
- The **market participant's** profit from the trade – being the change in value of the futures contracts *less* the change in value of the underlying bonds *less* net fees and charges – should be positive.

Figure 2: Closing the Bonds-futures Basis Trade



Endnotes

- [*] The authors are from Domestic Markets Department.
- [1] For securities lending against bonds, the Bank accepts AFMA's General Collateral Basket 2 (GC2) (AFMA 2022). Haircuts are applied to this collateral in line with the Bank's Eligible Securities framework to provide a buffer for potential declines in the market value of the collateral. Positions are margined daily. See RBA (2022b).
- [2] The \$5 billion figure is a limit set in legislation. For detail, see AOFM (2022b).
- [3] These buy-and-hold investors typically include domestic banks holding AGS for high-quality liquid asset purposes, and offshore investors making long-term Australian dollar investments.
- [4] There are also five-year and 10-year bond futures contracts. The basis for these two contracts have been largely flat. The five-year part of the AGS curve is much less actively traded; while the 10-year part of the AGS curve is more traded, the Bank owns a lower share of 10-year bonds.
- [5] For more information on physicals and bond futures, see Cheung (2014).
- [6] At expiry, the futures price is defined as equal to 100 less the average yield on the relevant bonds, so a non-zero basis (accounting for any costs involved in putting on the trade) represents an arbitrage opportunity.
- [7] In Australia, futures trades are executed via an exchange, but the market maker can facilitate that trade through the exchange.
- [8] The futures contract will be margined daily through the exchange, so cash flows associated with changes in the value of the futures will occur throughout the period where the trade is open. We omit these flows in the figures for the sake of simplicity.

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