Reforming Australian Monetary Policy

How Nominal Income Targeting Can Help Get the Reserve Bank Back on Track

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Abstract

This paper makes the case for the adoption of nominal income targeting in the context of an improved governance and accountability framework for the Reserve Bank of Australia (RBA). The paper begins by outlining the existing governance and inflation targeting framework for Australian monetary policy. The RBA has increasingly underperformed its inflation and full employment mandates under this framework because of a combination of policy errors and policy choices. This left the Australian economy with a weak starting point going into the COVID-19 pandemic. The RBA's initial response to the pandemic was limited due to its reluctance to embrace large-scale asset purchases (LSAP). A nominal income target, supported by governance and accountability reforms, would improve monetary policy decision-making by alleviating the knowledge problems faced by policymakers. The paper also shows how public policy could support a nominal GDP (NGDP) futures market to better inform monetary policy decisions.

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Reforming Australian Monetary Policy:

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Stephen Kirchner

Low inflation is not that bad. Most people don't really care.

—Philip Lowe, Governor, Reserve Bank of Australia

Just because the governor says something, doesn't mean he's right. And if he's wrong, he needs to be told.

—Glenn Stevens, Governor (2006–2016), Reserve Bank of Australia

Introduction

At its February 2020 meeting, the Reserve Bank of Australia's (RBA) board decided to leave its target official cash rate unchanged at 0.75 percent. The headline consumer price index (CPI) inflation rate for the previous quarter was running at 1.8 percent, below the RBA's inflation target range of 2 to 3 percent. Inflation had been below target on most measures since the end of 2014 and was expected to remain so over the bank's two-year forecast period. The unemployment rate for December 2019 was 5.1 percent, virtually unchanged from a year earlier but above the RBA's estimate of the full employment rate of around 4.5 percent, having never returned to the lows of 4 percent seen before the 2008 financial crisis. RBA Governor Philip Lowe told parliament a few days later that "there is a risk that further cuts in interest rates could encourage further borrowing. If people borrow more, then perhaps down the track we have problems."[1]

The quotes in the epigraph are from Sam Fleming and Claire Jones, "Central Bankers Play Waiting Game with Low Inflation Here to Stay," *Financial Times*, June 20, 2018; and Gideon Haigh, "Why Glenn Stevens Is the Man Who Really Runs Australia," *Australian Financial Review*, August 4, 2012.

[1] Testimony before Standing Committee on Economics on the Reserve Bank of Australia Annual Report 2019, House of Representatives, February 7, 2020.

Within weeks, the Australian and world economy suffered the worst shock in 100 years as the COVID-19 virus became a global pandemic. Yet the RBA board's initial response was limited, reflecting its view that monetary policy had less to contribute when the official interest rate was near zero. Instead, the RBA called on the government to make greater use of fiscal policy. The Australian dollar (AUD) exchange rate started appreciating almost immediately on the back of a pandemic macro-policy response titled to fiscal over monetary policy and as other central banks implemented more aggressive policy responses as measured by the expansion of their balance sheets. As the Australian economy recorded its worst contraction on record, the RBA largely sat on its hands after its initial response in March, before adopting a program of large-scale asset purchases (LSAP) in November 2020, playing catch-up with other central banks. The RBA's two-year-ahead forecasts for inflation and unemployment remain inconsistent with its mandate, implying an inadequate policy response.

This paper attributes the RBA's poor performance to weaknesses in its governance and accountability framework, as well as the way in which the RBA changed its approach to inflation targeting to give greater weight to financial stability concerns. The paper begins by outlining the existing governance and inflation targeting framework for Australian monetary policy. It evaluates the RBA's recent performance against mandate and its response to the pandemic. It goes on to argue for the adoption of a nominal income target located within an improved governance and accountability framework to better focus monetary policy on stabilizing aggregate demand shocks. The properties of a historical Australian monetary policy rule that responds to deviations in NGDP from long-horizon conditional expectations are examined. I also show how public policy could support a NGDP futures market to better inform monetary policy decision-making.

The Reserve Bank's Statutory Mandate

The *Reserve Bank Act* 1959 carried over provisions from the earlier *Commonwealth Bank Act* 1945 mandating that the RBA board exercise its powers "in such a manner as, in the opinion of the Reserve Bank Board, will best contribute to: (a) the stability of the currency of Australia; (b) the maintenance of full employment in Australia; and (c) the economic prosperity and welfare of the people of Australia."[2]

The first part of the mandate is commonly interpreted as a price stability mandate, although it can also be read as a reference to the foreign exchange rate. The second element is generally interpreted in the same way that economists interpret "full employment"—that is, the level of employment that prevails when the economy is producing at its full potential. The RBA has traditionally been thought of as having a dual mandate for price stability and full employment. As Deputy Governor Guy Debelle notes, "the Reserve Bank Act 1959 states that monetary policy has both nominal and real objectives."[3]

The third element of the mandate is open-ended but can be interpreted as a direction to pursue the first and second elements in a way that is welfare enhancing. This was the shared understanding of the government and the Reserve Bank when they first agreed on a joint Statement on the Conduct of Monetary Policy in August 1996:

> The first two objectives lead to the third, and ultimate, objective of monetary policy and indeed economic policy as a whole.[4]

This formulation was used in every statement until the 2013 statement, which noted that price stability was a precondition for long-run economic growth and employment:

[2] Reserve Bank Act 1959, section 10, Federal Register of Legislation, Compilation No. 29, April 14, 2015.
[3] Guy Debelle, "Twenty-Five Years of Inflation Targeting in Australia," Reserve Bank of Australia, April 16, 2018.
[4] Australian Government and Reserve Bank of Australia, "Statement on the Conduct of Monetary Policy," August 14, 1996.

> These objectives allow the Reserve Bank Board to focus on price (currency) stability, which is a crucial precondition for long-term economic growth and employment, while taking account of the implications of monetary policy for activity and levels of employment in the short term.[5]

This formulation was reiterated in the September 2016 statement.

When the Reserve Bank Act was written, before the rational expectations revolution of the 1970s, stability of currency and full employment were thought to be in greater tension than is the case today. The third element of the mandate can also be interpreted as calling for any trade-off to be managed in a way that is conducive to overall prosperity and welfare. This interpretation is supported by H. C. Coombs, the first governor of the bank, who specifically discussed the origins of the third element in his autobiography.[6]

The statute gives the board the power to "determine the policy of the Bank in relation to any matter" and gives the RBA broad powers, including "to buy and sell securities issued by the Commonwealth and other securities (Section 8)." There are no legislative obstacles to the RBA engaging in outright purchases of public and private debt and other securities for monetary policy purposes.

The statute is otherwise silent on the type of monetary regime or policy the bank should implement. Since 1960, the Reserve Bank has operated a number of policy regimes and used a variety of instruments to give effect to its mandate. This included a period of money supply

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[5] Australian Government and Reserve Bank of Australia, "Statement on the Conduct of Monetary Policy," October 24, 2013.

[6] H. C. Coombs, *Trial Balance* (Melbourne: Macmillan Australia, 1981), 111–12. According to Coombs, "From the Keynesian stronghold of the Ministry of [Post-War] Reconstruction, I and my colleagues were urging that the Bank legislation should record the commitment of the objective of full employment. Treasury and the Bank argued that the concern of the Bank was essentially financial and that its primary objectives should be the stability and value of the currency in both its domestic and international contexts. In the event it was finally agreed that there was no profit to be gained from exploring legislatively the compatibility of these objectives or the nature of the trade-off between them which might be required. Accordingly, with varying degrees and styles of reluctance, we all accepted a 'Charter' for the Bank which committed it to both, balanced by a third which was so imprecise that it could be welcomed equally by those who saw the Bank as the instrument of the populist vision of 'The People's Bank' correcting the inherent inequalities of the capitalist system, and those who saw the interest of all being best served by the separate pursuit of their individual interests."

growth targeting from 1976 until 1985.[7] Australia had a fixed or managed exchange rate regime before 1983, which left relatively little scope for an independent monetary policy. After the exchange rate was floated in December 1983, monetary policy had greater scope but lacked a clear focus, leading to poor macroeconomic outcomes, including persistently high inflation. However, disinflation in the context of a recession in 1991 facilitated a move toward inflation targeting from approximately 1993.

Inflation Targeting

The RBA first began to publicly articulate an inflation target in March 1993, when then governor Bernie Fraser said:

> The appropriate degree of price stability to aim for is a matter of judgment. My own view is that if the rate of inflation in underlying terms could be held to an average of 2 to 3 per cent over a period of years, that would be a good outcome. Such a rate would be unlikely to materially affect business and consumer decisions, and it would avoid the unnecessary costs entailed in pursuing a lower rate.[8]

Following the election of a conservative government in 1996, the inflation target was formalized in a joint Statement on the Conduct of Monetary Policy, an agreement between the Australian treasurer and the RBA governor. This was the first of a series of agreements between the government and the Reserve Bank that are either reaffirmed or changed following a change in government or a change in governor. The first statement said:

> In pursuing the goal of medium-term price stability the Reserve Bank has adopted the objective of keeping underlying inflation between 2 and 3 per cent, on average, over the cycle. This formulation allows for the natural short run variation in underlying inflation over the cycle while preserving a clearly identifiable benchmark performance over time.[9]

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[7] Simon Guttmann, *The Rise and Fall of Monetary Targeting in Australia* (Melbourne: Australian Scholarly Publishing, 2005).
[8] Bernie Fraser, "Some Aspects of Monetary Policy" (speech to Australian Business Economists, Sydney, March 31, 1993).
[9] Australian Government and Reserve Bank of Australia, "Statement on the Conduct of Monetary Policy," August 14, 1996.

This formulation was retained, with minor variations, in subsequent agreements until September 2016. The inflation target suffers from a number of ambiguities. The "over the cycle" formulation, changed in 2016 to "over time," does not provide a clear definition of the cycle or time frame. "Underlying inflation" is also left undefined, but it was generally thought to reference the persistent component of inflation exclusive of one-off changes to the price level, such as tax changes or temporary supply shocks. The July 2003 and subsequent agreements referenced "consumer price inflation," which can be interpreted as the benchmark CPI published by the Australian Bureau of Statistics, but still did not formally identify a specific measure of inflation. The RBA has, over time, referenced a number of different measures of inflation when explaining its monetary policy actions.

In principle, a wide range of inflation outcomes are consistent with an average inflation rate of between 2 to 3 percent over time. But according to then Assistant Governor Guy Debelle:

> The averaging refers more to the distribution of inflation outcomes than to a strict average of CPI outcomes. That is, the intent is that over the course of the business cycle, the bulk of the distribution of year-ended inflation outcomes should lie between 2 and 3 per cent, not that the annualised average inflation rate from the start of the business cycle to the end should necessarily lie between 2 and 3.[10]

As Debelle notes, this rules out an interpretation of the inflation target as a price-level target, where the central bank attempts to correct for past inflation errors to maintain a stable 2 to 3 percent growth path for the price level. As former governor Stevens put it, "Bygones are, and should be, bygones."[11] This formulation allows policy mistakes to cancel out over time and so weakens accountability for inflation outcomes. This is a different interpretation of "average

[10] Guy Debelle, "The Australian Experience with Inflation Targeting" (speech at the Banco Central do Brasil XI Annual Seminar on Inflation Targeting, Rio de Janeiro, May 15, 2009).
[11] Glenn Stevens, "Six Years of Inflation Targeting" (speech to the Economic Society of Australia, Sydney, April 20, 1999).

inflation targeting" to that adopted by the US Federal Open Market Committee in August 2020 as a result of the Fed's public strategy review.[12]

These understandings of the inflation target have only been articulated in speeches by RBA officials. As Bruce Preston observes, "Currently there is no single public document that, over time, consistently describes the monetary policy framework and the evolution of thinking about key macroeconomic quantities."[13] More seriously, the current formulation prevents the RBA from building credibility:

> Institutions build credible reputations in the long-run by taking actions that are not in their short-run interest, that is, by demonstrating that they can take hard decisions. Taking credit when things are going well and blaming external factors when they are not going so well is antithetical to building credibility. And there will certainly be times when the RBA will want, and rightly so, to point to factors beyond their control, which influence inflation outcomes—but why should we believe them? If the RBA has no history of fulfilling past commitments, then claims of this kind risk being interpreted as policy error, rather than exceptional circumstance. . . . Because the narrative deployed by the RBA lacks clarity, there will be no track record of making credible commitments.[14]

Yet credibility is critical to the effective conduct of monetary policy. The public forms its expectations for inflation and interest rates based on the central bank's commitments and "forward guidance." The current formulation of the inflation target gives the RBA considerable flexibility in how it implements monetary policy, but it comes at the expense of accountability and building credibility. This is consistent with the predictions of public choice models of bureaucratic behavior, in which bureaucrats seek to minimize accountability and which well-designed governance and accountability frameworks should seek to mitigate.

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[12] Federal Open Market Committee, "Statement on Longer-Run Goals and Monetary Policy Strategy" (memo, Board of Governors of the Federal Reserve System, Washington, DC, August 27, 2020).
[13] Bruce Preston, "The Case for Reform of the Reserve Bank of Australia Policy and Communication Strategy," *Australian Economic Review* 53, no. 1 (2020): 98.
[14] Preston, "The Case for Reform," 98.

Financial Stability Mandate

Financial stability has long been a core function of central banks through their lender-of-last-resort function and their role in regulating the payments system and financial institutions.[15] Monetary policy also has a role in responding to financial instability, particularly where that instability spills over into the broader economy. The lender-of-last-resort function has rarely been exercised in Australia since 1900, and Australian depositors have not lost funds because of the failure of financial institutions.[16]

Since the financial crisis in 2008, there has been considerable debate internationally about how to frame the relationship between price stability and financial stability in the conduct of monetary policy. Price stability has often been viewed as a necessary, though not sufficient condition, for financial stability. This argues for subordinating financial stability to the price stability objective. Few would dispute that monetary policy should respond to the macroeconomic consequences of a financial shock. More controversial is the issue of whether monetary policy should take a more preemptive approach to financial stability risks by "leaning against the wind" in relation to growth in asset prices and credit aggregates, potentially at the expense of the inflation target, rather than responding to the economic consequences of instability after the fact. The debate is sometimes characterized as one between "leaners" versus "cleaners" or "poppers" versus "moppers."[17]

The Reserve Bank Act 1959 does not mention financial stability as an explicit objective. However, Governor Lowe has recently suggested that the RBA has a "triple mandate," including

[15] This section draws in part on Stephen Kirchner, "Money Too Tight to Mention: The Reserve Bank of Australia's Financial Stability Mandate and Low Inflation," *Economic Analysis and Policy* 60 (December 2018): 141–49.
[16] Bryan Fitz-Gibbon and Mariane Gyzicki, "A History of Last-Resort Lending and Other Support for Troubled Financial Institutions in Australia" (Research Discussion Paper, Reserve Bank of Australia, Sydney, October 2001).
[17] For a review of this debate, see Stephen Kirchner, "Bubble Poppers: Monetary Policy and the Myth of Bubbles in Asset Prices" (Policy Monograph 93, Centre for Independent Studies, Sydney, March 2009).

"the economic prosperity of the people of Australia" as a distinct objective.[18] Since financial instability can have adverse welfare implications, a financial stability mandate can be imputed into the act, although this is at odds with the more traditional interpretation of the third objective as flowing from meeting the other two.

The 1997 Wallis Financial System Inquiry removed prudential supervision of financial institutions from the Reserve Bank and placed this responsibility with a new, independent authority: the Australian Prudential Regulation Authority (APRA). There is a quasi-statutory basis for the Reserve Bank's financial stability mandate in the second reading speech to the *APRA Act* 1998, which set out the post-Wallis inquiry allocation of regulatory responsibilities among financial system regulators. The second reading speech reflects the government's intent. Treasurer Peter Costello said:

> There are three fundamental regulatory objectives for government intervention in the financial system. The first is the maintenance of financial stability, including through ensuring a safe and reliable payments system. This goal, which has close links with the price stability objective of monetary policy, is to be the regulatory focus of the Reserve Bank of Australia.[19]

Although these "close links" were not specified, a plausible interpretation of this statement is that price stability is a necessary condition for financial stability.

The evolution of the financial stability mandate can be traced through the Statements on the Conduct of Monetary Policy agreed between successive Reserve Bank governors and treasurers since 1996. In the first four statements (August 1996, July 2003, September 2006, and December 2007) the financial stability mandate is, from today's perspective, conspicuously absent. The fifth agreement in September 2010, the first to follow the financial crisis of 2008, included a new section on financial stability invoking the post-Wallis framework for financial

[18] Philip Lowe, "Remarks at Jackson Hole Symposium" (panel, Jackson Hole, Wyoming, USA, August 25, 2019).
[19] Peter Costello, MP, Treasurer, "Second Reading Speech on the Australian Prudential Regulation Authority Bill 1998," March 26, 1998, 3.

regulation while also making financial stability explicitly subordinate to the price stability objective:

> The stability of the financial system is critical to a stable macroeconomic environment. Financial stability is a longstanding responsibility of the Reserve Bank and its Board, and was reconfirmed at the time of significant changes made to Australia's financial regulatory structure in July 1998. . . .
>
> **Without compromising the price stability objective**, the Reserve Bank seeks to use its powers where appropriate to promote the stability of the Australian financial system [emphasis added].[20]

The October 2013 statement reiterated the 2010 statement in affirming the RBA's responsibility for financial stability, although on this occasion there was no statement about the relationship to the price stability mandate.

The latest agreement, adopted when Philip Lowe became governor of the Reserve Bank in September 2016, introduced a new formulation for both the inflation target ("over time" rather than "over the cycle") and the financial stability mandate:

> Both the Reserve Bank and the Government agree that a flexible medium-term inflation target is the appropriate framework for achieving medium-term price stability. They agree that an appropriate goal is to keep consumer price inflation between 2 and 3 per cent, on average, over time. This formulation allows for the natural short-run variation in inflation over the economic cycle and the medium-term focus provides the flexibility for the Reserve Bank to set its policy so as best to achieve its broad objectives, **including financial stability**. The 2–3 per cent medium-term goal provides a clearly identifiable performance benchmark over time [emphasis added].[21]

Whereas the 2010 agreement made financial stability explicitly subordinate to the price stability objective, the 2016 agreement is notable for specifically allowing flexibility in meeting the inflation target to pursue other objectives, including financial stability. This is a significant reinterpretation of the RBA's mandate compared to previous agreements. It is questionable whether the government, parliament, and the public have adequately debated or

[20] Australian Government and Reserve Bank of Australia, "Statement on the Conduct of Monetary Policy," September 30, 2010.
[21] Australian Government and Reserve Bank of Australia, "Statement on the Conduct of Monetary Policy," September 19, 2016.

understood its significance. Newspaper reports at the time of the new agreement referred to "minor tweaks," and Treasurer Scott Morrison said that "it is similar to previous statements."[22] Debelle notes that "the articulation of the financial stability objective" is "the most substantive change" to the statement, but he does not elaborate on what made this change substantive. As he notes elsewhere in the same speech, the appropriate relationship between price and financial stability mandates is still an open question in policy making circles. If this relationship is poorly understood, as Debelle maintains, it would seem very risky to then condition monetary policy on a trade-off with unknown (and possibly unknowable) parameters.[23]

Independence, Governance, Transparency, and Accountability

Since 1996, the government has formally upheld the independence of monetary policy, and the Reserve Bank Act has mechanisms for resolving disputes with the government over policy. While the government could invoke these provisions to override a decision of the RBA board, this has never occurred in practice, not least because it would be damaging for the credibility of both monetary policy and the government of the day.

The RBA has a nine-member board consisting of the governor, deputy governor, and head of the Treasury department as ex-officio members as well as six part-time external members, only one of whom is typically a trained or practicing economist. The others are typically businesspeople or drawn from the labor movement. Executives of deposit-taking banks are precluded under the law from serving on the board. The Reserve Bank Act says that the role of the board is to "determine the policy of the Bank in relation to any matter." In practice, this means setting monetary policy, with the board having no other substantive governance or

[22] Jacob Greber, "RBA to Stick with Inflation Target, Says Morrison," *Australian Financial Review*, September 19, 2016.
[23] Debelle, "Twenty-Five Years of Inflation Targeting in Australia."

oversight functions. The board seeks to make decisions by consensus. The contributions of individual board members are suppressed in the board minutes, which reduces transparency and accountability.

The presence and full participation of the head of the Treasury department on the board is unusual by international standards, where the fiscal authority is often precluded from monetary policy decision-making or assigned observer status only (as with the Bank of Japan). The Treasury head is potentially conflicted as a monetary policy decision maker, not least in being directly accountable to the government through the treasurer.

While a robust discussion is said to take place at board meetings, the part-time external board members do not typically have the expertise to adequately interrogate the monetary policy recommendations put to the board by the RBA. In practice, this means that monetary policy is set by the bank with little effective external scrutiny or input. The board minutes are bland and descriptive. According to one account, "among the personal effects of the late William Gunn, director from 1960 to 1977, were purportedly found 17 years of pristine board papers, still unopened."[24] The RBA's transparency has improved considerably since 2007, and monetary policy decisions are typically well anticipated by financial markets,[25] although the bank's articulation of its policy framework and strategy is still lacking, as noted in the previous section on inflation targeting.

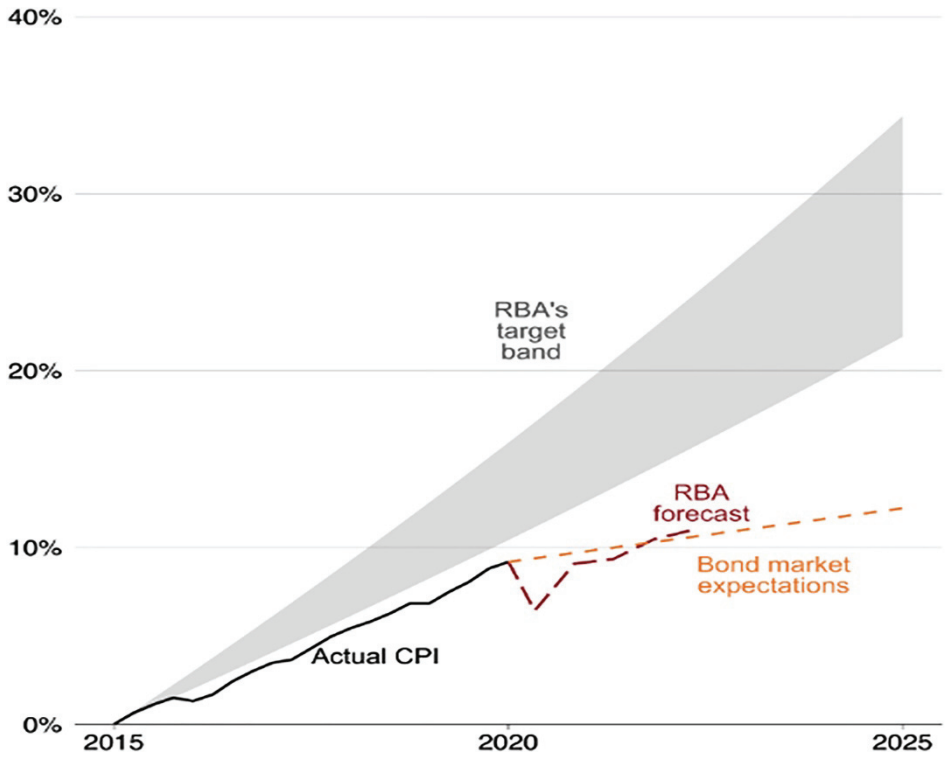
There are few existing mechanisms for holding the Reserve Bank accountable for its performance. The governor appears before a committee of the House of Representatives twice a year but is otherwise subject to little parliamentary oversight or scrutiny.

[24] Haigh, "Why Glenn Stevens Is the Man Who Really Runs Australia."
[25] Edda Claus and Mardi Dungey, "Can Monetary Policy Surprise the Market" (CAMA Working Paper 5/2015, Crawford School of Public Policy, Centre for Applied Macroeconomic Analysis, Canberra, February 2015).

Monetary Policy under Governor Lowe: Leaning against the Wind while Navigating with the Stars

The RBA has consistently undershot its inflation target since the end of 2014, with inflation on both headline and statistical core measures either at or below the bottom of the 2 to 3 percent target range. Inflation is not expected to return to the middle of the target range in the next two years based on the RBA's forecasts conditional on current policy settings. While the magnitude of the shortfall in any given quarter is not that economically significant, the multiyear duration of the undershoot represents a cumulative shortfall of aggregate demand. The nature of the underperformance against target is best illustrated relative to an implied target-consistent path for inflation over time (see figure 1).

Figure 1. Cumulative Total Inflation Relative to Target since March 2015



Source: J. Daley, D. Wood, B. Coates, S. Duckett, J. Sonnemann, M. Terrill, T. Wood, T. and K. Griffiths, *The Recovery Book: What Australian Governments Should Do Now* (Melbourne: Grattan Institute, 2020.) The figure is courtesy of Matt Cowgill.

Notes: Bond market expectations refers to the compound average rate over five years, calculated based on yields for Australian government securities. Yields at five-year maturity were imputed. Yields are current as of June 23, 2020.

The persistent undershooting of the inflation target since 2014 can be attributed to both a policy error and a policy choice. The policy error was to assume that inflation would accelerate over this period without further stimulus from monetary policy because the unemployment rate was falling, although still above a full employment or nonaccelerating inflation rate of unemployment (NAIRU). The RBA has since conceded that the NAIRU is likely around half a percentage point below its previous estimates.[26] The RBA's policy error was very similar to that made by the Fed over the same period and reflects a dominant central bank paradigm for thinking about inflation pressures largely in terms of labor market slack. However, rather than rethinking that paradigm, the RBA has simply adopted a new estimate of the NAIRU, without rethinking its underlying model of inflation. Conditioning monetary policy on assumed equilibrium values is sometimes called "navigating by the stars" because economists often denote equilibrium values for output, interest rates, and the unemployment rate with a superscript * symbol. But the metaphor is misleading because these variables are not directly observable and are easily misestimated.

The policy choice was a trade-off, explicitly setting achievement of the inflation target against apprehended financial stability risks. The 2016 statement had a discernible impact on the way in which the RBA explains its policy decisions—in particular, its decision to hold the official cash rate steady from September 2016 until June 2019 while inflation was below target. For most of this period, the RBA signaled the next move in interest rates was likely to be up, tightening monetary conditions through expectations for official interest rates.

The RBA explicitly conditioned its decisions to keep the cash rate steady on developments in the housing market and household debt. Governor Lowe made the trade-off

[26] Luci Ellis, "Watching the Invisibles: The 2019 Freebairn Lecture in Public Policy" (speech, University of Melbourne, June 12, 2019).

between the Reserve Bank's objectives explicit in testimony before the House of Representatives Economics Committee:

> The Board has sought to strike a balance between these benefits of monetary stimulus and the medium-term risks associated with the increase in the already high level of household debt. We have sought to steer a middle course, promoting sustainable growth in the economy.[27]

The minutes of the September 2017 RBA board meeting also invoke this trade-off:

> Taking into account all of the available information, **and the need to balance the risks associated with high household debt in a low-inflation environment**, the Board judged that holding the stance of monetary policy unchanged would be consistent with sustainable growth in the economy and achieving the inflation target over time [emphasis added].[28]

Governor Lowe has also pointed to a trade-off between economic growth and financial stability:

> We would like the economy to grow a bit more. If we were to try to achieve that through monetary policy that would encourage people to borrow more and it would probably put upward pressure on housing prices. At the moment I don't think those two things are in the national interest.[29]

These statements imply that monetary policy was kept tighter at the margin than the outlook for inflation would otherwise warrant. This was the perception of financial market participants. According to one prominent private-sector economist:

> It's also worth noting that with underlying inflation expected to hold at or below the bottom of the RBA's 2–3 per cent target band for 2018 and 2019, that would make five consecutive years below the desired range, which arguably represents a structural fall in inflation that has not been addressed more aggressively with even lower rates due to concerns around housing markets.[30]

As recently as February 2020, Governor Lowe told a parliamentary committee:

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[27] Philip Lowe, "Opening Statement to the House of Representatives Standing Committee on Economics" (speech, Sydney, February 16, 2018).
[28] Reserve Bank of Australia, "Minutes of the Monetary Policy Meeting of the Reserve Bank Board," Brisbane, September 5, 2017.
[29] Jennifer Hewett, "Lowe Lays Down the Law to Politicians and Business," *Australian Financial Review*, February 22, 2017, http://www.afr.com/opinion/columnists/philip-lowe-lays-down-the-law-to-politicians-and-business-20170222-guir4q.
[30] Bill Evans, "US Stimulus Fans Volatility," *The Australian*, February 21, 2018.

> There is a risk that further cuts in interest rates could encourage further borrowing. If people borrow more, then perhaps down the track we have problems.[31]

The RBA made this trade-off even though, in its judgment, "the overall level of stress among mortgaged households remains relatively low. Furthermore, the banking system is strong and well capitalized and supported by prudent lending standards. The risks to financial stability from this source therefore remain low."[32] This suggests only limited benefits in terms of increased resilience to shocks compared to the costs of undershooting the inflation target.

If nominal stability is a necessary if not sufficient condition for financial stability, then failing to meet the inflation target could itself reduce resilience to shocks. For example, the Reserve Bank highlights the growth in income relative to household debt as a concern, yet undershooting the inflation target will tend to depress income growth and increase real debt burdens, potentially reducing the resilience of households and the financial system. Lars Svensson argues that a policy of "leaning against the wind" has an often-overlooked cost, which is to give the economy a weaker starting point if a financial or other shock, like the COVID-19 pandemic, does occur. Svensson's modeling shows why a policy of maintaining tighter monetary policy in response to financial stability risks is likely to incur larger costs than benefits.[33] Svensson's framework has been applied to Australia's recent experience with leaning against the wind, concluding that the costs are three to eight times larger than the benefit of avoiding financial crises.[34]

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[31] Testimony before Standing Committee on Economics, House of Representatives, February 7, 2020.
[32] Michelle Bullock, "Household Indebtedness and Mortgage Stress" (address to the Responsible Lending and Borrowing Summit, Sydney, February 20, 2018).
[33] Lars E. O. Svensson, "Cost-Benefit Analysis of Leaning against the Wind," *Journal of Monetary Economics* 90 (October 2017): 193–213.
[34] Trent Saunders and Peter Tulip, "Cost-Benefit Analysis of Leaning against the Wind" (Research Discussion Paper, Reserve Bank of Australia, Sydney, July 2019).

COVID-19 Pandemic Response, the Adoption of Yield Curve Control, and Large-Scale Asset Purchases

In two moves over the course of March 2020, the RBA's response to the pandemic shock was to lower the official cash rate target by 50 basis points to 0.25 percent, a rate it had previously argued was an effective lower bound (ELB) given the floor of the usual 25 basis point corridor around the cash rate target would then be zero percent.[35] The reduction in the target cash rate was accompanied by a commitment (or forward guidance) not to raise the target "until progress is being made" restoring full employment and returning inflation to target. This was little different from the RBA's previous guidance, which was already committed to keeping interest rates "low" for an extended period based on the same criteria. The "progress being made" commitment was ambiguous. Any improvement in the economy going forward could be interpreted as progress, with markets pricing in a premature increase in the official cash rate, even in the absence of a change in the cash rate.

The RBA reinforced this commitment by undertaking to intervene in the bond market to keep the three-year bond yield close to 0.25 percent, compared to a then-prevailing market yield of around 0.50 percent when the yield target was announced, an approach sometimes dubbed yield curve control (YCC) or yield curve targeting. By offering to buy government bonds at an implied target yield, the target effectively became the market yield, although Governor Lowe indicated the intervention would not be a strong peg like that normally applied to the cash rate target.

The aim of YCC is to hold down the front and middle parts of the yield curve that serve as the risk-free benchmark for most retail and wholesale lending rates in Australia. It was

[35] The RBA operates a "corridor" system for the official cash rate. The corridor is normally 0.25 percentage points to either side of the target. A target rate of 0.25 percent would place the bottom of the corridor at zero percent. As part of its response to the pandemic, the RBA introduced an asymmetric corridor, with a floor of 0.10 percent, so that financial institutions would earn a positive return on their exchange settlement balances held with the RBA. This rate on Exchange Settlement Account (ESA) balances was changed to zero percent in November 2020.

complemented by a Term Funding Facility (TFF) designed to ensure banks could borrow and lend at this rate. If the RBA's commitment to hold the cash rate at 0.25 percent "for some years" were fully credible, then intervention on the three-year bond would be unnecessary—and that has mostly proved to be the case. After some initial outright bond purchases, the RBA did not intervene in the secondary bond market between early May and early August 2020, when three-year yields rose modestly. Governor Lowe explicitly nominated three years as the likely time frame for keeping the cash rate at 0.25 percent, reinforcing the loose peg on the three-year bond while leaving longer-term interest rates to float and be largely market-determined.

The RBA's preference for YCC reflected its aversion to both negative interest rates and major balance sheet expansion using LSAP, the two main policy instruments that could have been employed in addition to forward guidance and instead of YCC. Governor Lowe all but ruled out both options in a speech in November 2019,[36] raising the reputational cost to reversing the RBA position during the pandemic. The RBA views monetary policy transmission largely in terms of the risk-free interest rate structure (and by extension, the exchange rate) rather than in terms of quantities such as real money balances, although its own research shows a correlation between broad money aggregates and NGDP.[37] Having lowered the cash rate to what it views as the ELB and committed to keeping short-term rates at this level for an extended period, the RBA viewed itself as having done enough, but these actions dramatically underestimated the possibilities for monetary policy, particularly in lowering the exchange rate, which appreciated under the March policy framework.

[36] Philip Lowe, "Unconventional Monetary Policy: Some Lessons from Overseas" (address given at the Australian Business Economists Dinner, Sydney, November 26, 2019).
[37] Emma Doherty, Ben Jackman, and Emily Perry, "Money in the Australian Economy," *RBA Bulletin*, September 20, 2018.

This left Australia's macroeconomic response to the pandemic heavily skewed toward fiscal policy, a shift the RBA actively encouraged.[38] This is suboptimal for a small open economy, with Australia's relatively high interest rates attracting foreign capital inflows, appreciating the exchange rate, and crowding-out net exports. The AUD exchange rate appreciated around 10 percent after the RBA introduced YCC.

As the pandemic downturn deepened and the exchange rate appreciated, the RBA board publicly canvassed its options for doing more. It adapted its forward guidance in October 2020 to say that the official cash rate would be increased only if actual inflation was in the target range (rather than just being forecast to be in the range) and the unemployment rate was consistent with inflation remaining within that range, which the RBA had previously identified as a rate around 4.5 percent. It also argued that its financial stability concerns had shifted to mitigating the effects of the downturn in the economy for the financial system. Oddly, this significant change in the RBA's forward guidance was made at the end of a speech delivered to an investment bank conference rather than as a statement after a board meeting.[39]

At its November 2020 meeting, the RBA board announced a further lowering in the official cash rate to 0.10 percent. The TFF rate and three-year bond yield target were also lowered to 0.10 percent, while the rate on Exchange Settlement Account (ESA) balances held by banks with the RBA, was lowered to zero percent, presumably with a view to encouraging financial institutions to increase lending or purchase other assets with these balances. At the same time, the RBA announced an additional $100 billion bond-buying program over the next six months. The program was explicitly designed to exploit quantitative channels of monetary

[38] Matthew Cranston, "Australia's Rescue Package the World's Biggest, Bar One," *Australian Financial Review*, May 6, 2020, Economy.
[39] Philip Lowe, "The Recovery from a Very Uneven Recession" (speech at Citi's 12th Annual Australia and New Zealand Investment Conference, Sydney, October 15, 2020).

policy transmission, recognizing that expansion of the RBA's balance sheet had lagged other central banks and that this had put upward pressure on the exchange rate. The RBA argued that the reason it had not acted earlier was that pandemic lockdowns would have reduced the traction from monetary policy over the economy, although this concern had not previously been mentioned by the RBA as a constraint of the effectiveness of monetary policy.[40]

Together with the October change in forward guidance, the RBA's actions in November 2020 were welcome recognition that its earlier pandemic response had been inadequate. It also demonstrated that 0.25 percent was not an ELB for either the official or effective cash rates and the contribution of monetary policy. However, the RBA was still forecasting inflation and unemployment rates over the next two years that fell short of its objectives, implying that the monetary policy response was inadequate.

Monetary Policy Performance against Mandate by Governor

The performance of Australian monetary policy under successive governors can be benchmarked against the inflation target and minimizing the output gap, although there is more certainty around the former benchmark than the latter. It should be noted that macroeconomic performance is not simply a function of monetary policy. An economy is subject to a variety of nominal and real shocks over time, not all of which are amenable to stabilization by monetary policy. However, nominal variables can be viewed as fully determined by monetary policy in the long run. It should also be noted that macroeconomic outcomes should not be entirely attributed to individual governors. Monetary policy is decided by the RBA board, with changing membership over time. Monetary policy decision-making can be constrained in numerous ways. Monetary policy also operates with a lag, such that individual governors

[40] Philip Lowe, "Today's Monetary Policy Decision" (speech to the Reserve Bank of Australia, November 3, 2020).

effectively inherit policy settings and macroeconomic conditions left by their predecessors, and they in turn pass on policy settings and economic conditions to their successors. The terms of individual governors nonetheless provide a convenient lens through which to consider macroeconomic performance, not least because these terms typically cover a decade, straddle the economic cycle, and are exogenous to these cycles.

Inflation performance is straightforward to measure. In terms of average inflation, governors Ian Macfarlane and Glenn Stevens are right in the middle of the target range at around 2.5 percent, while Philip Lowe is on average below at 1.8 percent (see table 1). Based on Debelle's criterion of time spent within the target range, Macfarlane has the best performance, with annual inflation outside the range 41 percent of the time, compared to 59 percent for Stevens and 92 percent for Lowe. Stevens has more symmetrical deviations from the target range as measured by the ratio of undershooting to overshooting, whereas Lowe's performance is completely biased in favor of undershooting.

The output gap requires a methodology to decompose real output into trend and cyclical components. The methodology used here is based on Kamber, Morely, and Wong's[41] (KMW's) modified Beveridge-Nelson filter and is described in appendix 1. As discussed below, the output gap can only be estimated rather than directly observed, so this is at best an indicative measure of performance, but one that is consistent with the New Keynesian approach to macroeconomic modeling and monetary policy rules favored by the RBA and against which it measures itself. I do not attempt to measure performance against the financial stability mandate, for which there are no commonly agreed metrics, except to note that there has not been a significant domestic financial crisis in recent Australian history.

[41] Güneş Kamber, James Morley, and Benjamin Wong, "Intuitive and Reliable Estimates of the Output Gap from a Beveridge-Nelson Filter," *Review of Economics and Statistics* 100, no. 3 (June 18, 2017): 550–66.

Table 1. Monetary Policy Performance against Mandate by Governor

Governor/Indicator	Macfarlane Q3 1996–Q3 2006	Stevens Q3 2006–Q3 2016	Lowe Q3 2016–Q4 2019
Average inflation rate (%)	2.4	2.5	1.8
Outside target range (% of time)	41	59	92
Above target (% of time)	15	26	0
Below target (% of time)	26	33	92
Average welfare loss	0.4	0.6	0.5

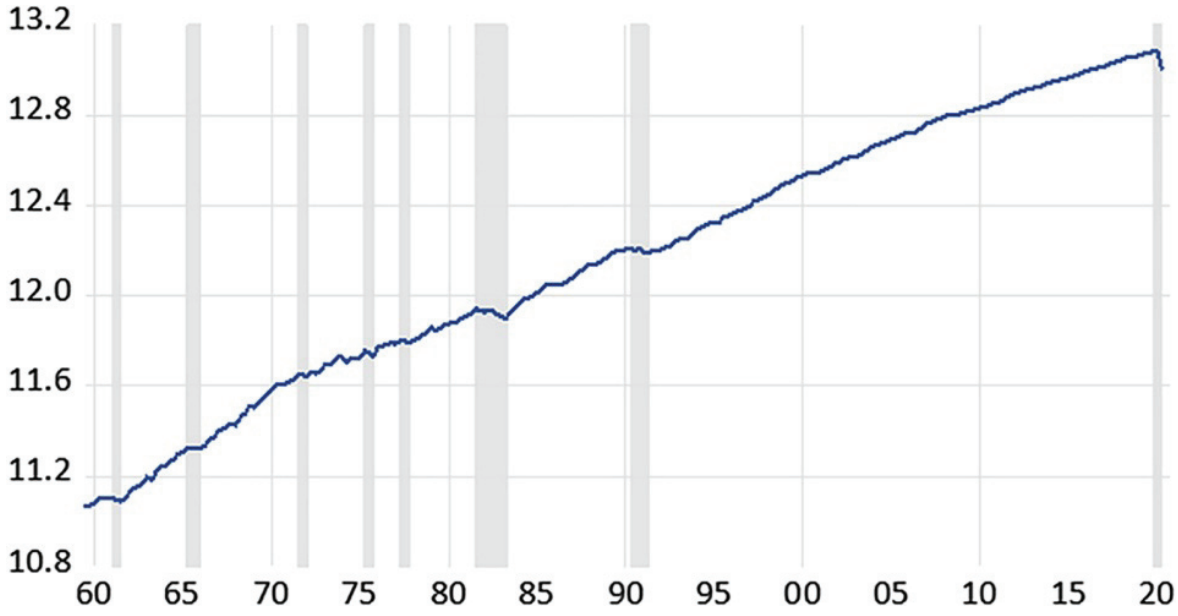
Notes: Average inflation is measured as the CPI, all groups, excluding interest and tax changes of 1999–2000, on a year-ended percent change basis. The average welfare loss is based on a standard loss function $L = (\pi - \pi^*)^2 + (y - y^*)^2$ where π^* is the inflation target, assumed equal to 2.5 percent, and $y - y^*$ is the real output gap as described in appendix 1. The loss function assumes an equal weight on inflation and output stabilization consistent with the RBA's dual mandate. Each governor's sample period begins the quarter after the governor assumes office and ends in the quarter a successor assumes office. Lowe's sample ends in Q4 2019 to exclude the effects of the pandemic beginning in Q1 2020.

Based on a standard loss function, there is little difference between the governors on average. Because we have excluded the pandemic from Lowe's time as governor, only Stevens faces a major shock in the form of the global financial crisis, although Macfarlane also faced a significant foreign shock in the form of the Asian/emerging markets crisis of 1997–1998. This accounts for Stevens's marginally worse average performance. Lowe's deviations in inflation from target are modest in any given quarter but highly persistent in duration. Including the prospective effects of the pandemic will likely see Lowe's performance deteriorate significantly. For example, the economy fell into outright deflation in the second quarter of 2020. But even before the pandemic, Australian monetary policy was yielding inflation outcomes that were outside the target range and with a downside bias.

It should be noted that before the pandemic, the Australian economy had enjoyed a continuous expansion since 1991. Employing the same business cycle dating algorithm used by

the National Bureau of Economic Research (NBER) Business Cycle Dating Committee,[42] Australia enjoyed an internationally remarkable run of recession-free growth, coincident with its embrace of inflation targeting from 1993 (see figure 2).

Figure 2. Australian Real GDP (Log Level) and Business Cycle Reference Dates, 1960–2020



Source: Australian Bureau of Statistics; author's calculations.
Note: Shaded areas = NBER-type "recessions."

A New Target for the Reserve Bank

Australia's inflation targeting regime could be improved by refocusing monetary policy on the inflation target and resubordinating the financial stability mandate to the inflation and full employment mandates, as provided for in the 2010 Statement on the Conduct of Monetary Policy. I outline this approach in an earlier paper.[43] A stronger governance and accountability framework could be implemented through changes to the Statement on the Conduct of Monetary Policy to improve the incentives for the RBA to meet its inflation and full employment objectives.

[42] Don Harding and Adrian Pagan, "Dissecting the Cycle: A Methodological Investigation," *Journal of Monetary Economics* 49, no. 2 (March 2002): 365–81.
[43] Kirchner, "Money Too Tight to Mention."

The RBA could also revise its inflation targeting strategy to adopt a makeup approach similar to that of the Federal Reserve, so that the inflation target more closely resembles a flexible price-level target.

An alternative approach to reform is to replace the current inflation target with a target path for the level of nominal spending on final goods and services or NGDP. An NGDP-level target differs from the current inflation target in that it seeks to correct for deviations from the target path, whereas inflation targeting as practiced by the RBA treats deviations from target as bygones. Whereas the RBA will effectively write off its six-year undershoot of the inflation target and the associated costs, an NGDP-level target would require corrective policy action. An undershoot of the target would require more expansionary policy under an NGDP targeting regime than an inflation targeting regime, which would in turn speed up the return to target.

Nominal income targeting has a number of theoretical and practical advantages over inflation targeting. David Beckworth outlines the general case for NGDP targeting, as well as addressing commonly raised objections.[44] Most notably, nominal income targeting does not require the central bank to make assumptions about unobservable variables such as the neutral interest rate or the NAIRU.

A nominal income target also does not require the central bank to distinguish between supply and demand shocks. Since supply shocks that raise prices also lower output, a NGDP target naturally accommodates these shocks. More generally, shocks that lower output automatically raise the upper bound on inflation while still limiting inflation to a band determined by the fall in output, so that the inflation rate is still predictable.[45]

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[44] David Beckworth, "Facts, Fears, and Functionality of NGDP Level Targeting" (Mercatus Special Study, Mercatus Center at George Mason University, Arlington, VA, September 12, 2019).
[45] Warwick McKibbin and Augustus Panton, "25 Years of Inflation Targeting in Australia: Are There Better Alternatives for the Next 25 Years?" (CAMA Working Paper 19/2018, Centre for Applied Macroeconomic Analysis, Australian National University, May 2018).

Permanent productivity shocks that affect the economy's long-run growth potential may require an adjustment in the target path in order to keep the price level and inflation predictable, but such changes can be incorporated into a nominal income targeting framework. There is likely to be more confidence around the long-run trend growth rate for the economy than in short-run deviations in output from potential. Nominal income stabilization is also consistent with promoting financial stability, although like inflation targeting, it does not preclude the possibility of financial shocks or crises.

There is a growing empirical literature on the advantages of NGDP targeting relative to inflation targeting and other policy rules, especially when allowance is made for the knowledge problem facing central banks in calibrating monetary policy to variables that are not directly observable. In particular, a NGDP targeting regime is shown to better minimize the welfare loss from deviations in inflation and output from their target values, mainly by reducing the information burden on monetary policy decision makers.[46]

A nominal income target can be implemented through changes to the Statement on the Conduct of Monetary Policy agreed between the treasurer and the Reserve Bank governor. Since it is consistent with the RBA's existing statutory mandate, it does not require legislative change to implement. The statement can also serve as a vehicle for additional accountability and transparency requirements to be imposed on the Reserve Bank.

Since Q1 1993, coincident with the onset of inflation targeting in Australia, NGDP has grown at an annual rate of 5.6 percent on average, with a standard deviation of 2.2 percent. Assuming long-run growth in prices averaging 2.5 percent (the mean annual growth rate for the

[46] David Beckworth and Joshua R. Hendrickson, "Nominal GDP Targeting and the Taylor Rule on an Even Playing Field," *Journal of Money, Credit and Banking* 52, no. 1 (2020): 269–86; Julio Garín, Robert Lester, and Eric Sims, "On the Desirability of Nominal GDP Targeting," *Journal of Economic Dynamics and Control* 69 (August 2016): 21–44; Jonathan Benchimol and André Fourçans, "Central Bank Losses and Monetary Policy Rules: A DSGE Investigation," *International Review of Economics & Finance* 61 (May 2019): 289–303.

GDP implicit price deflator since Q1 1993), this would leave trend real output growth at around 3 percent, which is close to the current official estimates of the economy's prepandemic growth potential and accommodates what is widely assumed to be a trend slowing in potential output relative to earlier decades. A target path for nominal income based on a 5.5 percent annual growth rate is well calibrated to the historical performance of the Australian economy.

The Statement on the Conduct of Monetary Policy agreed with the government should require that the Reserve Bank publish a multiyear target path for the level of NGDP consistent with a 5.5 percent annual growth rate. The RBA would then explain policy decisions with reference to that target path.[47] The performance of monetary policy over time can then be evaluated with reference to deviations from the target path. Such a target path does not preclude the publication of implied growth rates for inflation and real output and monetary policy instruments such as the official cash rate, all of which improve monetary policy transparency.

It is sometimes objected that Australia's terms of trade results in volatility in NGDP and that it would be undesirable for monetary policy to respond to that volatility. However, the free-floating Australian dollar exchange rate serves to moderate fluctuations in the terms of trade and its implications for the economy, alleviating monetary policy of some of the burden of stabilizing nominal income in the presence of terms of trade shocks. It should also be noted that the standard deviation of the NGDP gap in Australia since Q1 1993 is 1.1 percent, little different from the United States at 0.9 percent (see appendix 1). A NGDP targeting regime is concerned with long-horizon forecasts for NGDP rather than actual outcomes for any given quarter. Monetary policy would have the flexibility to look through short-run variation in NGDP because of temporary

[47] A similar approach is suggested for the United States by Peter Ireland, "The Time Is Right for Nominal GDP Level Targeting" (position paper prepared for the meeting of the Shadow Open Market Committee, June 2020).

terms of trade shocks. Alternatively, a subaggregate less exposed to volatility from the terms of trade, such as gross national expenditure or domestic final demand, could be targeted instead.

Another common objection is that a NGDP target would be difficult to explain to the public relative to inflation targeting. James Morley suggests that it fails the test of explicability to his mother-in-law.[48] But a nominal income target can be made intuitive. If price stability is already understood by the public as stability around a target inflation rate, then stability of average incomes around a target growth path is no more difficult a concept, even if the public's understanding of both concepts is imperfect.

Reforming the Role of the RBA Board

The minimalist approach to the adoption of nominal income targeting outlined above requires only agreement between the Reserve Bank governor and treasurer. However, it would be desirable to change the role of the board. Monetary policy decision-making should instead be devolved to a Monetary Policy Committee (MPC) consisting of the governor, deputy governor, the assistant governor (economic), and four full-time external board members with expertise in monetary policy derived from experience in academia or financial markets. The Treasury secretary should not be a member of the committee. The bank's position on monetary policy would need the support of at least one external member, although there is no reason, in principle, why the internal executive board members should vote the same way. The votes of the individual members of the MPC should be made public along with the minutes of the meeting to ensure accountability for decision-making. Meetings of the MPC could be held on a six-week schedule rather than the current monthly schedule.

[48] James Morley, "The RBA Should Stick to Inflation Targeting," *John Menadue—Pearls and Irritations*, August 4, 2020, https://johnmenadue.com/james-morley-the-rba-should-stick-to-inflation-targeting/.

The role of the RBA board—in particular, the nonexecutive members—should be governance of the Reserve Bank and oversight of the performance of the governor and the (MPC). This could include the appointment of external MPC members, adding a degree of separation between government-appointed board members and monetary policy decision-making, making appointments to the MPC less political than appointments to the board. The nonexecutive board members should be given the job of oversight on whether monetary policy is being conducted in a way consistent with the RBA'a statute and any policy agreement with the government. An extension of that oversight responsibility could be the power to recommend to the treasurer the dismissal of the governor for nonperformance against mandate or to recommend against reappointment for another term. This would be a powerful accountability mechanism and, for that reason, would rarely, if ever, be used. Its existence should be sufficient to prevent that outcome, just as the existing statutory override provisions for resolving conflict with the government have never been invoked.

Does the RBA Already Follow an Implicit, Forward-Looking NGDP Targeting Rule?

In considering the merits of a nominal income targeting rule for Australia, it is worth considering whether such a rule is already a good description of the RBA's monetary policy reaction function. The RBA has been shown to follow a forward-looking Taylor rule similar to the rules estimated for the US Federal Reserve and other central banks.[49] Others estimate forward-looking rules of this type for the RBA and find a weight on inflation of around 2.3 and on the output gap of between 0.7 and 0.98.[50] As Barry Hughes once suggested, the RBA

[49] R. Clarida, J. Gali, and M. Gertler, "Monetary Policy Rules in Practice: Some International Evidence," *European Economic Review* 42, no. 6 (1998): 1033–67.
[50] G. de Brouwer and J. O'Regan, "Evaluating Simple Monetary Policy Rules for Australia," in *Monetary Policy and Inflation Targeting*, ed. Stephen Grenville and Philip Lowe (Sydney: Reserve Bank of Australia, 1997).

"behaved throughout the period since 1984 as sadistically as any Taylor rule would have demanded."[51]

A nominal income targeting rule can be thought of as simply a reweighted Taylor rule, with a single weight on the combination of inflation (as measured by the GDP deflator) and output. While the RBA traditionally thinks of itself as implementing something like a Taylor rule in a New Keynesian model of the economy, that does not mean its reaction function is inconsistent with nominal income targeting.

A nominal income targeting rule can be written as

$$i_t = (1 - \rho)\alpha + (1 - \rho)\beta ngdpgap_{t+n} + \rho i_{t-1} + \varepsilon_{t,} \quad (1)$$

where i_t is the target official cash rate, α is a constant term, β is the elasticity of the official cash rate target to deviations in NGDP from its expected value at time $t + n$, and ρ is an interest rate smoothing parameter designed to capture hedging behavior or inertia on the part of monetary policy. ε_t is an error term, although it can also be interpreted as the exogenous component of monetary policy.

I use the NGDP gap estimated in appendix 1. The assumed target path for NGDP is only implied by the gap. Implicitly, we are assuming the public forms an expectation of NGDP based on the same methodology. This is only one of many ways we could potentially measure deviations in actual NGDP from expectations, but it serves to illustrate the general approach. The forecast horizon of two quarters reflects a general-to-specific modeling procedure in which insignificant leads were removed.

[51] Barry Hughes, "Discussion—The Evolution of Monetary Policy: From Money Targets to Inflation Targets," in *Monetary Policy and Inflation Targeting*, ed. Stephen Grenville and Philip Lowe (Sydney: Reserve Bank of Australia, 1997).

I estimate equation (1) using the generalized method of moments (GMM) with a two-quarter forecast horizon on the NGDP gap. The instruments used for estimation are lags of NGDP gap (–1), the official cash rate (–2), the log first-difference of the AUD-USD exchange rate (–1, –2), and the US effective Fed funds rate (–1, –2).

I consider four sample periods, covering the terms of Governor Macfarlane; Governor Stevens; Macfarlane and Stevens combined; and Macfarlane, Stevens, and Lowe combined. Lowe has been in office for only four years and left the cash rate target unchanged during the first three, making it difficult to estimate a separate reaction function for his time in office. The estimated parameters for each sample period are shown in table 2.

Table 2. An Empirical Forward-Looking NGDP Gap Targeting Rule for the RBA

			Governor(s)	
	Macfarlane	**Stevens**	**Mac-Stevens**	**All Governors**
Exp. Variable	**Q396–Q306**	**Q306–Q316**	**Q396–Q316**	**Q396–Q219**
Constant	0.04***	0.04***	0.04***	0.04***
	(0.01)	(0.00)	(0.00)	(0.00)
$ngdpgap_{t+2}$	1.37	1.75***	1.69***	2.58***
	(0.87)	(0.42)	(0.37)	(0.61)
i_{t-1}	0.79***	0.81***	0.77***	0.85***
	(0.05)	(0.10)	(0.07)	(0.06)
J-statistic	3.14	1.98	2.76	1.45
p-value	0.53	0.74	0.60	0.84
Adj. R^2	0.80	0.95	0.93	0.96
SE	0.28	0.39	0.36	0.35

Notes: GMM estimates with covariance weights based on a quadratic spectral kernel and bandwidth based on Andrews (1991). Instruments are as described in the text. J-statistic and associated *p*-value test the null hypothesis that the over-identifying restrictions are satisfied. Numbers in parentheses () are heteroskedasticity and autocorrelation consistent robust standard errors. ***,**,* denote the 1, 5, and 10 percent significance levels, respectively.

Looking at the estimates by governor, we find the long-run response to the NGDP gap under Governor Macfarlane is 1.37, although this is not statistically significant. However, the

model has the lowest standard error under Governor Macfarlane, suggesting his term otherwise has slightly greater adherence to a NGDP gap targeting norm. Stevens has a larger response to the NGDP gap of 1.75, which is statistically significant. Combining the terms of Macfarlane and Stevens (Mac-Stevens), the response is very similar at 1.69.

Adding Governor Lowe's term to his two predecessors sees a rise in the interest rate smoothing parameter as Lowe puts the official cash rate target into a nearly three-year coma. De Brouwer and Gilbert observed that Australian monetary policy is characterized by "deep stasis."[52] This rather mechanically raises the long-run response to the NGDP gap, but this is more a reflection of the increased inertia of monetary policy, making a given change in the cash rate highly persistent. The J-statistic and associated *p*-value accept the null hypothesis that the over-identifying restrictions are satisfied for each sample period.

These reduced-form estimates can only be viewed as representative of the RBA's preferences under the governor(s) if the structure of the economy is unchanged or the instruments adequately account for the endogeneity of any structural change. We can assume the terms of individual RBA governors are exogenous to economic conditions. Otherwise, the estimates can be interpreted as a change in the response of monetary policy to a change in the structure of the economy. It could be that monetary policy has had to work harder to stabilize NGDP over time; this is reflected in the cash rate's increased response to the NGDP gap. But the coefficient on the NGDP gap appears remarkably stable under Macfarlane and Stevens.

It could also be the case that the estimated forward-looking NGDP targeting rule is simply recovering an embedded forward-looking Taylor rule. This is a familiar problem in the literature on estimated monetary policy rules. In any event, a forward-looking NGDP targeting rule is still a good empirical description of Australian monetary policy for the period since the

[52] De Brouwer and O'Regan, "Evaluating Simple Monetary Policy Rules for Australia."

inflation target was formalized in 1996, suggesting that a shift to NGDP targeting is not a radical departure from past practice but may offer operational advantages over an inflation and output gap targeting Taylor rule in yielding better macroeconomic outcomes. The RBA has already enjoyed some success in stabilizing NGDP around a model-based expected growth path. However, a formal NGDP target could be expected to improve this performance on economically significant margins.

NGDP Futures Markets

In addition to the reforms outlined above, it would be desirable to institute a NGDP futures market to help inform monetary policy decision-making. As Scott Sumner has argued, monetary policy changes should be tied to changes in the price of NGDP futures, which will in turn react to monetary and other policy changes, informing policymakers of the expected effect of their decisions.[53] These contracts could also serve as useful hedging instruments for financial institutions and corporations whose top-line revenues are closely tied to growth in NGDP. Macro futures and prediction markets have a limited record of success internationally but also lack active support from public policy. With explicit backing from the Reserve Bank and financial system regulators, a NGDP futures market could be made a success.

The Council of Financial Regulators should run a tender for a securities exchange to list NGDP futures contracts. The successful tenderer should be given relief from regulatory cost recovery on public interest grounds, which is provided for in Australia's regulatory cost recovery framework. This would remove a significant barrier to innovation in this area. The Reserve Bank

[53] Scott Sumner, "A Market-Driven Nominal GDP Targeting Regime" (Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, July 24, 2013). A reviewer suggests this could give rise to an indeterminacy problem, although this would arise only under a restrictive set of assumptions.

should act as a market-maker in the market for NGDP futures to help underpin liquidity and price formation, although this role could be wound back once the market became established.

Financial market participants should also be required to transact minimum monthly volumes in the market for NGDP futures as part of their financial market license conditions. This framework could be extended to include other macro futures markets, including those for house prices, to allow better management of financial stability risks.

To complement traditional exchange-traded futures markets, the Australian Securities and Investments Commission should develop a permissive regulatory framework for public interest prediction markets, including unlisted NGDP derivatives based on distributed ledger technology. Public interest prediction markets should be exempt from regulatory cost recovery. US NGDP futures have already been implemented on the Augur blockchain.[54] Eric Falkenstein has also developed Ethereum-based derivatives contracts.[55] These contracts could provide competitive alternatives to listed securities on existing exchanges and require little or no public support, while still yielding useful information about monetary policy and the economy.

Using Put Options to Reinforce the Credibility of Monetary Policy at the Effective Lower Bound

To reinforce the credibility of yield curve control at the ELB, the RBA could sell put options, giving purchasers the right to sell government bonds to the RBA at a price consistent with a targeted interest rate. The RBA can issue such derivative instruments at little upfront cost and with few changes to existing market infrastructure. The targeted interest rate would be one thought to be consistent with the RBA's macroeconomic objectives. The expiration date of the

[54] Basil Halperin, "NGDP Futures via Blockchain: Market Monetarism Meets Cryptocurrency (And: How to Set Up a Prediction Market on Augur)," July 22, 2018.
[55] See OracleSwap, a site tied to a specific suite of Ethereum swap contracts (http://oracleswap.co/).

options could be tied to the realization of a NGDP target or realizations on inflation and unemployment rates. If interest rates were raised before the expiry of the options, the holders of the put options could sell them to the RBA at a price higher than their acquisition price. Market participants could thus buy insurance against a premature RBA tightening, lowering risk premia and interest rates, including for securities that are close substitutes for the targeted security.

The financial incentive for the RBA to avoid the loss from premature tightening is probably less of a motivating factor than the potential political embarrassment of imposing a cost on the taxpayer via the RBA dividend—a cost politicians could be expected to dramatize. An internal Federal Reserve document outlining this approach to policy was prepared in 2010 but only released by the Federal Open Market Committee Secretariat in 2016. The document suggested that the prospect of the Fed writing large checks to hedge funds at taxpayers' expense could cause them grief with Congress.[56] But from the public's perspective, this is exactly the sort of discipline we should want to impose on the central bank.

Options prices could then be expected to give a reliable read on the RBA's commitment to keep interest rates low until its macroeconomic objectives are realized. The value of the option would depend on the credibility of the interest rate commitment and would provide early warning of a premature tightening. For example, if the RBA board were to tighten monetary policy in response to rising house prices before the RBA had meet its inflation and full employment thresholds as defined in the options contract, the RBA would incur losses while alerting the public and politicians to impending policy failure and breach of mandate.

[56] Federal Open Market Committee, "Strategies for Targeting Interest Rates Out the Yield Curve" (memo, FOMC Secretariat, Washington, DC, October 13, 2010).

Conclusion

The RBA has engaged in more or less explicit inflation targeting for 27 years, roughly coincident with a continuous 29-year economic expansion until the onset of the pandemic. For most of that time, inflation targeting has served Australia well. However, the RBA has increasingly underperformed against its statutory mandate and its agreement with the government on inflation. Inflation has been at or below the bottom end of the 2 to 3 percent target range since 2014, and based on the RBA's current forecasts, it is expected to remain below target until the end of 2022. Inflation is expected to be below target for almost the entirety of the current governor's seven-year term in office.

The undershooting of the inflation target can be attributed to the combined effects of a policy error and a policy choice. The policy error was to overestimate the equilibrium unemployment rate consistent with the inflation target. The policy choice was to overly condition monetary policy on apprehended financial stability risks at the expense of the inflation target. These two factors left the Australian economy with a weak starting point going into the pandemic shock of 2020. The RBA's singular focus on the risk-free rate structure as the main instrument and transmission mechanism of monetary policy limited the RBA's initial response to the pandemic, increased the burden on fiscal policy, and led to a significant exchange rate appreciation even as the bank was supposedly easing monetary policy. The RBA subsequently changed its forward guidance and embraced LSAP as it became apparent the initial response was inadequate.

A nominal income target has important theoretical and practical advantages over inflation targeting in focusing monetary policy on stabilizing aggregate demand shocks. By embedding

such a target in a stronger governance and accountability framework, monetary policy and macroeconomic outcomes could be improved.

A nominal income target could be adopted within the existing statutory framework for the Reserve Bank, as it is consistent with the existing mandate. As this paper has shown, the RBA already follows an implicit forward-looking nominal income targeting rule to some extent, but formalizing the target could still be expected to have significant operational benefits and yield improved macroeconomic outcomes on economically significant margins. All that would be required is a change to the Statement on the Conduct of Monetary Policy between the treasurer and RBA governor that currently requires the RBA to target the inflation rate.

However, it is also desirable to reform the governance and accountability framework for the Reserve Bank to ensure there are stronger incentives to meet the new target and to improve the quality of monetary policy decision-making. In particular, monetary policy decision-making should be the responsibility of a MPC made up of RBA executives and external appointees with academic or practical expertise in monetary policy. The role of the board should be to appoint MPC members; oversee the Reserve Bank, the governor, and the MPC; and report to the treasurer and parliament on the Reserve Bank's performance against mandate. The nonexecutive board members should have the statutory authority to make a recommendation to the treasurer to dismiss the governor for nonperformance against mandate or to recommend against reappointment for another term on grounds of poor performance.

Monetary policy decision-making could be improved by removing regulatory impediments to a market for NGDP futures that would allow policymakers to assess in real time the effects of their decisions and economic shocks on the future path of nominal income. The writing of put options on targeted securities could also be used to improve the credibility of

monetary policy at the ELB. While macro futures and prediction markets have a limited track record of success internationally, they have often lacked support from public policy. Public policy could support such a market at little cost to the budget by waiving regulatory cost recovery, having the RBA act as a market-maker and mandating minimum transactions volumes as a license condition for market participants. The Australian Securities and Investments Commission should create a regulatory framework for public interest prediction markets, with a particular focus on enabling low-cost derivative financial instruments based on distributed ledger technology that could provide alternative platforms for NGDP futures, in addition to traditional exchange-traded futures markets.

Appendix 1. Estimating the Nominal GDP Gap

This paper employs measures of the deviation of nominal and real GDP from estimated equilibrium values, which requires a methodology for identifying the cyclical and trend components of these two series. A wide range of methodologies can potentially be used for this purpose. The Mercatus Center has promoted a NGDP gap concept based on the deviation of NGDP from the long-term expectations of professional forecasters.[57]

I take a different approach based on the KMW modified Beveridge-Nelson filter.[58] Despite the different methodology, the underlying concept is similar in trying to measure deviations in the level of NGDP from a long-horizon conditional expectation.

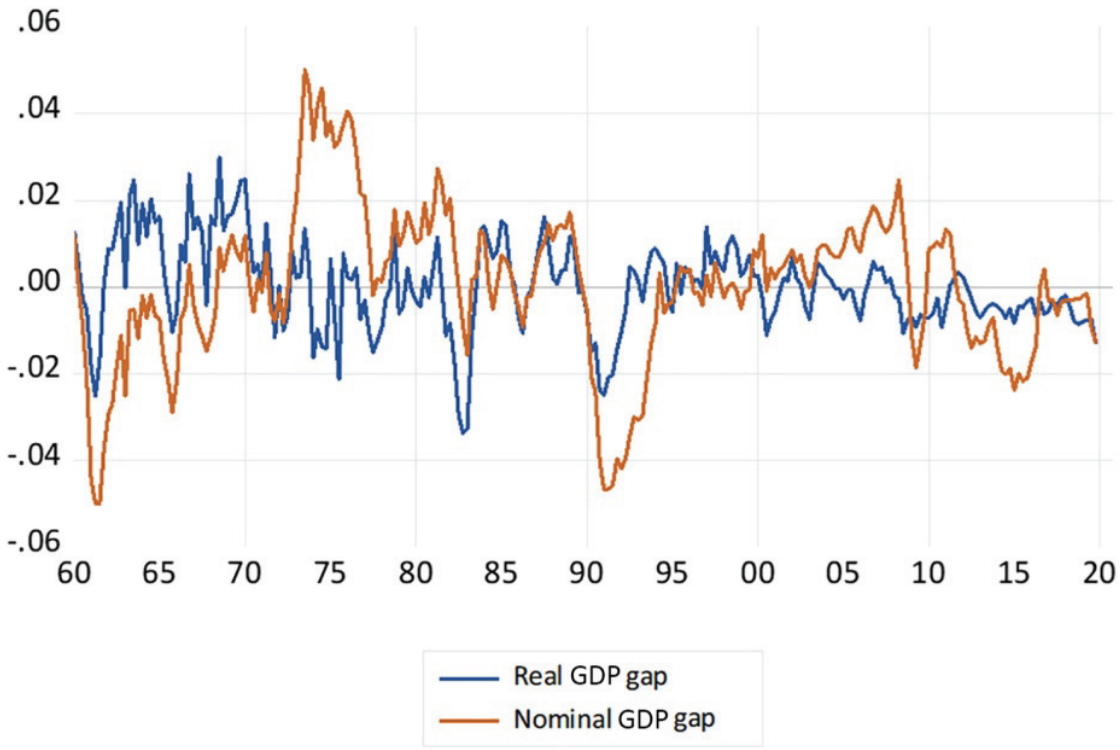
The real output gap used to calculate the central bank loss function in table 1 follows KMW by imposing a signal-to-noise parameter (δ) to trade off the fit and amplitude of the cycle equal to 0.11, implying that around 11 percent of the real output shocks to the Australian economy are permanent. The output gap used for table 1 yields an Okun's law coefficient of 1.0 when compared to an unemployment gap using the same methodology, consistent with KWM's results.

For the NGDP gap, the δ parameter is estimated to be 0.28, implying 28 percent of the shocks to Australian NGDP are permanent. The economic intuition for the larger value compared to real output is that a larger share of price-level shocks are permanent compared to real shocks. I impose a structural break at Q1 1993 to reflect the onset of inflation targeting in Australia. Both gaps are estimated with a sample beginning in Q1 1960 and ending in Q4 2019, before the onset of the pandemic in Q1 2020.

[57] David Beckworth, "The Neutral Level of NGDP and the NGDP Gap: Q1 2020" (Mercatus Policy Briefs, Mercatus Center at George Mason University, Arlington, VA, May 14, 2020).
[58] Kamber, Morley, and Wong, "Intuitive and Reliable Estimates of the Output Gap from a Beveridge-Nelson Filter."

By way of comparison, the estimated δ for US NGDP is 0.32. This is consistent with the expectation that small, open economies should experience more transitory shocks, but the United States and Australia do not look dramatically different on this measure. The real GDP gap for the United States has an estimated δ of 0.24 based on KMW. Australia differs from the United States more in terms of temporary real than nominal shocks. Note that changes in the terms of trade can be viewed as real income shocks. The nominal and real GDP gaps for Australia are shown in figure A1.

Figure A1. Nominal and Real GDP Gaps: Australia (Log-Level Deviation from Trend)



Source: Australian Bureau of Statistics; author's calculations.