# Determinants of the Australian Dollar Over Recent Years

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Photo: John White Photos, d3sign – Getty Images

## Abstract

The exchange rate is influenced by a number of domestic and international factors. Two key fundamental determinants of the exchange rate are the terms of trade and differences between interest rates in Australia and those in major advanced economies. Since the end of the mining boom, the decline in the terms of trade and easing in domestic monetary policy, including the recent introduction of quantitative easing measures, have contributed to the depreciation of the Australian dollar. On a shorter-term basis the Australian dollar has also moved closely with prices in other international financial markets in response to changes in global risk sentiment.

The Australian dollar has depreciated on a trade-weighted (TWI) basis from its peak in 2013 following the end of the mining boom.[1] Over the same period, monetary policy in Australia has been eased while interest rates in other advanced economies have remained low. As a result, the difference between interest rates in Australia and those in major advanced economies – the interest rate differential – has declined (Graph 1). Australia's terms of trade – the ratio of export to import prices – has also declined from its peak at the height of the mining boom despite some large swings in commodity prices over recent years. The Australian

dollar reached its lowest level since the early 2000s during the period of heightened market stress related to the COVID-19 outbreak in March 2020.[2] Since then the Australian dollar has appreciated as the prospects for a recovery in global growth have improved and commodity prices have increased, but it remains well below its 2013 peak.

The terms of trade and interest rate differentials are key determinants of the Australian dollar over the medium to longer run.[3] These determinants provide information about the expected demand for Australian dollars. For example, the interest rate differential captures expectations about returns on

Australian dollar assets relative to those on comparable assets elsewhere in the world, which influences the demand for Australian dollars. These relationships have been observed over long periods of time and feature prominently in the Reserve Bank's suite of exchange rate models, including the forward-looking model of the Australian dollar (Chapman, Jääskelä and Smith 2018). This model estimates the real TWI (RTWI) based on historical relationships with the Reserve Bank's forecasts for the terms of trade and information from different maturities across the (real) yield curve in Australia relative to the major advanced economies.

The level of the Australian dollar has typically been consistent with the model estimates implied by these fundamental determinants (Graph 2). However, the relationships do not hold precisely and the Australian dollar has deviated noticeably at times from what these determinants imply. This occurs periodically when shorter-term develop-ments in global financial markets, such as changes in investor attitudes to risk (or 'risk sentiment'), influence the behaviour of market participants. For example, during the period of heightened market stress related to the COVID-19 outbreak in March 2020 the RTWI depreciated by more than what the model suggested based on the longer-term determinants alone.

## The role of monetary policy and interest rates

The structure of interest rates – or the yield curve – in the Australian economy affects demand for Australian dollars and so the exchange rate. Yield curves typically capture information about expec-tations for the future path of monetary policy, inflation and economic activity. However, it is ultimately the interest rate differential between Australia and other advanced economies that matters for the exchange rate. For example, if interest rates in Australia decline relative to those of other advanced economies, returns on Australian dollar assets become less attractive for investors, putting downward pressure on the currency. In contrast, if interest rates in Australia and other economies declined by similar amounts, the interest rate differential would be little changed (other things being equal). In this case there would be little incentive for investors to shift the allocation of their portfolios across economies and little effect on the exchange rate.

### Trends in short-term interest rates

Policy rates in a number of major advanced economies fell sharply in the aftermath of the global financial crisis and short-term interest rates converged to around zero. In contrast, policy rates in Australia remained higher than in most other advanced economies for a number of years following the global financial crisis (Graph 3). This

**Graph 1**

**Australian Dollar**

Quarterly average
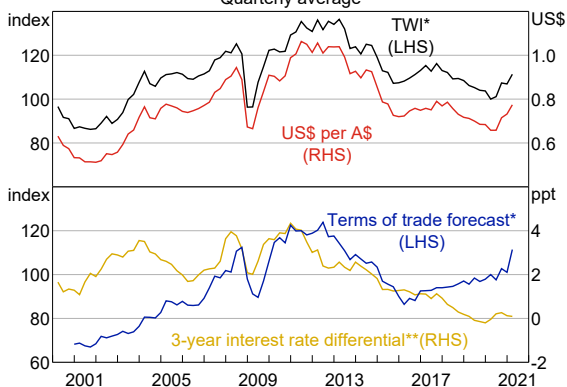


*     Indexed to March 2020
**    Spread to United States, Japan and Germany, weighted by GDP
Sources: Bloomberg; RBA

**Graph 2**

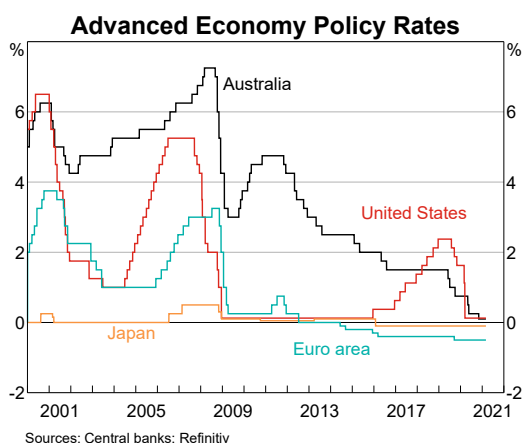**'Equilibrium' Real TWI**

March 2003 = 100
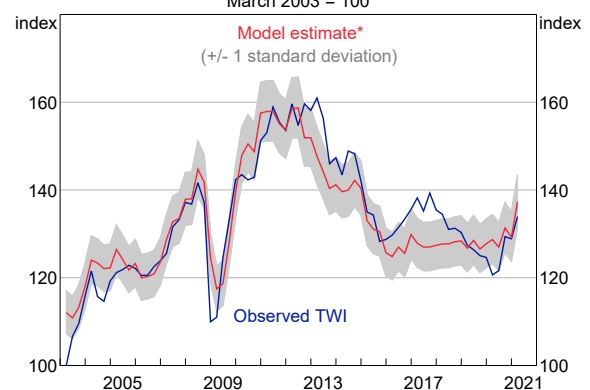


*     Using terms of trade forecast and Australia-G3 government bond yield
      differential over entire yield curve; standard deviation based on model
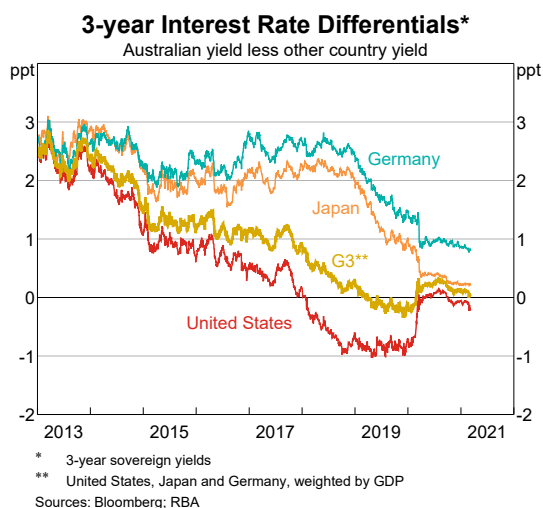      errors
Source:  RBA

reflected the relatively good performance of the Australian economy over this period, which was related to the resources boom and the associated high level of investment, as well as the relative absence of stresses in the domestic financial system.

Since 2013, the Reserve Bank has eased monetary policy, reducing the policy rate from 3 per cent to 0.1 per cent. The interest rate on 3-year Australian Government Securities (AGS) declined and the Reserve Bank introduced a 3-year yield target on AGS in March 2020 that was adjusted in November 2020 to be 0.1 per cent. Australia's 3-year interest rate differential with other major advanced economies has declined by more than 2 percentage points; this decline has been one of the main drivers behind the depreciation of the Australian dollar over this period (Graph 4).

**Graph 3**

**Advanced Economy Policy Rates**

Sources: Central banks; Refinitiv

**Graph 4**

**3-year Interest Rate Differentials***

Australian yield less other country yield

\* 3-year sovereign yields
\*\* United States, Japan and Germany, weighted by GDP
Sources: Bloomberg; RBA

## Unconventional policy measures and the exchange rate

As policy rates reached very low levels, a number of central banks introduced unconventional policies, such as quantitative easing measures, whereby central banks purchase government bonds in the secondary market with the aim of lowering longer-term interest rates. In doing so, these quantitative easing measures also affect the exchange rate. There are 2 widely discussed channels in the literature through which quantitative easing policies flow through to interest rates and the exchange rate:[4]

- The **signalling channel:** the announcement of quantitative easing serves as a commitment by the central bank to keep short-term policy rates at a low level for an extended period of time. The structure of interest rates is lowered as longer-term interest rates respond to expectations about the future path of short-term interest rates. The importance of this channel depends on the extent to which market participants would have otherwise expected a higher policy rate.

- The **portfolio balance channel:** when the central bank purchases government bonds with longer maturities, the prices of these assets rise and interest rates decline. This can induce investors to rebalance their portfolios away from government bonds towards other assets with higher returns. If investors rebalance their portfolios towards offshore assets, this is likely to result in a depreciation of the exchange rate.

A number of international studies have examined the effect of quantitative easing measures on macroeconomic and financial variables.[5] There is a broad consensus in the literature that asset purchase programs expand central banks' balance sheets, lower interest rates on government bonds, and contribute to the exchange rate being lower than otherwise, albeit by varying degrees (see below). In general, the effect of quantitative easing is conceptually comparable to the effect of an easing in conventional monetary policy, in that it lowers interest rates and this leads to a depreciation in the exchange rate, all else equal.

## The introduction of quantitative easing in Australia and the exchange rate

In November 2020, the Reserve Bank introduced a bond purchase program that complemented the package of measures that had been introduced earlier in 2020, including the 3-year yield target. The bond purchase program included purchasing $100 billion of AGS at maturities of around 5 to 10 years over a period of about 6 months. These measures have helped to lower interest rates in the Australian economy and has meant that the Australian dollar is lower than otherwise. One reason for introducing the bond purchase program was that longer-term interest rates in Australia were higher than those in other advanced economies because central banks abroad had introduced new or expanded asset purchase programs in response to the economic and financial disruptions associated with the pandemic (Graph 5).[6] Relatively high longer-term interest rates in Australia following the peak of the crisis in March 2020 contributed to upward pressure on the Australian dollar exchange rate.

In the months leading up to the announcement of the bond purchase program in November 2020, market participants anticipated further policy easing by the Reserve Bank. The interest rates on 3-year and 10-year AGS declined and the Australian dollar depreciated by around 5 per cent on a TWI basis over the period from early September to early November (Graph 6). Over the same period,

commodity prices were little changed, although other financial market developments may have also played a role in the depreciation of the exchange rate. For example, during the first half of September there was a decline in US equity prices that was associated with a decline in risk sentiment globally. These developments make it difficult to isolate the specific effect of the policy measures introduced in November. Despite the high degree of uncertainty around estimating the effect of the bond purchase program on the exchange rate, the decline in interest rate differentials that occurred over this period would typically suggest around a 1 to 2 per cent depreciation based on historical relationships. However, it is possible that a larger share of the observed depreciation could also be attributed to the decline in interest rates and the bond purchase program.

Since November 2020 the exchange rate has appreciated, consistent with the increase in commodity prices which has occurred against the backdrop of more positive sentiment about a recovery in global growth (see below). Then in February, the Reserve Bank announced that it would purchase an additional $100 billion of bonds when the current bond purchase program is completed. There was little additional effect on the exchange rate from this announcement, which suggests that it had already been largely anticipated by markets.

So while there is uncertainty around estimates of the effect, by lowering the structure of interest rates in the Australian economy, the Reserve Bank's policy measures have contributed to a noticeably lower exchange rate than otherwise.
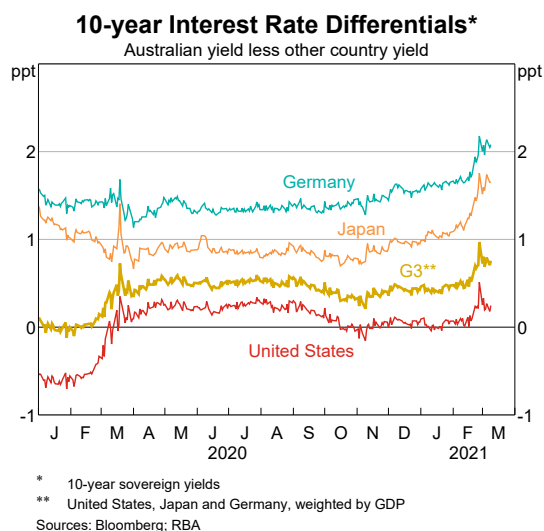
## Evidence on the relationship between interest rates and the exchange rate

Both conventional policy easing and quantitative easing measures lower the structure of interest rates in an economy and result in a depreciation of the exchange rate all else being equal. However, the maturities of interest rates that are affected will be different and there is a wide range of estimates around the size of the effect on the exchange rate. As a result, an important question that has emerged has been how changes in different parts of the yield

**Graph 5**

**10-year Interest Rate Differentials\***

Australian yield less other country yield

\*    10-year sovereign yields
\*\*   United States, Japan and Germany, weighted by GDP
Sources: Bloomberg; RBA

curve might affect the exchange rate. Event studies are a widely used method in the international literature for examining the effect of interest rates, and quantitative easing measures, on the exchange rate (see, for example, Ferrari, Kearns and Schrimpf (2017), Swanson (2020) and Gagnon (2016) for a survey of QE event studies). This type of study relies on high frequency data and focuses on a narrow window around central bank policy announcements to isolate the effect of these announcements on the exchange rate and other asset prices.

Changes in conventional policy are reflected in policy rates and shorter-term interest rates (maturities at around 2 to 3 years), which are typically found to have a larger effect on the exchange rate than changes in longer-term interest rates.[7] Nonetheless, quantitative easing measures that lower longer-term interest rates are also found to result in a depreciation of the exchange rate, all else equal. A range of international studies that analyse the effect of quantitative easing have shown that an announcement that reduces long-term bond yields by 100 basis points typically results in a 3–9 per cent depreciation of the exchange rate. However, there is not a clear consensus in the literature around the magnitude of the effect compared with conventional monetary policy.[8]

From an Australian perspective, the relationship between the structure of interest rates in the

economy and the exchange rate appears consistent with international evidence. Estimates from a range of exchange rate models, including Chapman *et al* (2018), and event studies around the Reserve Bank's policy announcements suggest that a decline in both shorter-term and longer-term AGS interest rates result in the exchange rate being lower than otherwise.[9] Changes in shorter-term interest rates are typically found to have a larger effect on the exchange rate, and some studies have highlighted that the sensitivity of the exchange rate to changes in interest rates has increased over time as policy rates have declined to low levels. However, similar to international studies there is a high degree of uncertainty around the estimated effects of quantitative easing measures in Australia, partly because unconventional policy measures have only recently been introduced here.

## Commodity prices and the terms of trade

Australia's terms of trade are another key fundamental determinant of the Australian dollar over the medium to longer term. Movements in the terms of trade are influenced by changes in commodity prices, reflecting the fact that commodities account for a large share of Australia's exports. Typically, an increase in commodity prices flows through to an increase in the terms of trade and this is associated with an appreciation of the exchange rate and similarly, a decline in the terms of trade is associated with a depreciation of the exchange rate. Estimates from the Chapman *et al* (2018) model suggests that, on average, a 10 per cent increase in the terms of trade forecast is associated with an appreciation of around 5–7 per cent in the Australian dollar real TWI (Graph 7).

One good example of the relationship between commodity prices and the exchange rate was during the resources boom over the decade from the early 2000s. Global commodity prices rose reflecting strong demand from China, so Australia's terms of trade increased significantly. These developments led to large inflows of foreign capital into Australia to help fund an expansion of capacity in the resources sector and a more positive outlook for the Australian economy more generally.[10] This

**Graph 6**
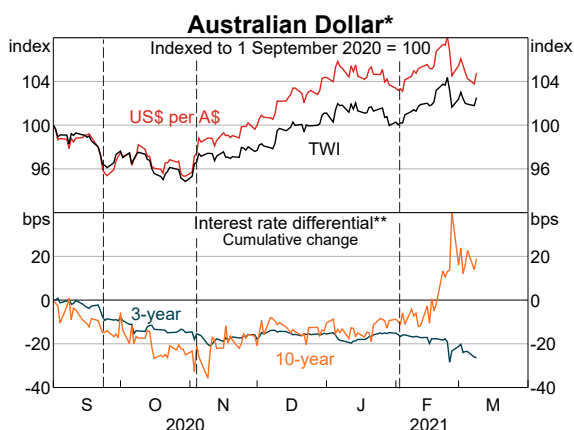
**Australian Dollar***



* Dashed lines at key news days for the bond purchase program: 22 September, 3 November and 2 February
** Spread to United States, Japan and Germany, weighted by GDP
Sources: Bloomberg; RBA

resulted in increased demand for the Australian dollar and it appreciated significantly through to around 2013.

The Australian dollar has depreciated since its peak in 2013. While the depreciation was associated with the decline in the terms of trade as commodity prices fell, there have been periods where the relationship between commodity prices and the exchange rate has appeared less clear. One way to illustrate this is to consider a simple correlation of weekly changes between movements in the Australian dollar and RBA's index of commodity prices (ICP) (Graph 8).[11] Typically there is a positive correlation, but over the period from late 2017 through to 2019, the correlation declined to around zero.

**Graph 7**

**TWI, Terms of Trade and Commodity Prices**

March 2020 = 100



* Quarterly average
Sources: ABS; Bloomberg; RBA
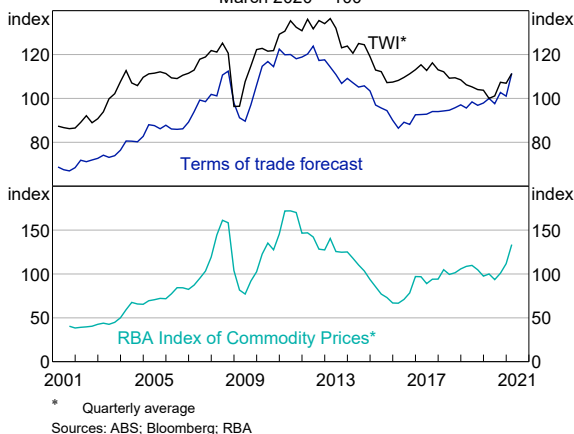
**Graph 8**

**TWI Correlation with RBA ICP\***

Weekly changes; one-year rolling window



* Index of Commodity Prices
Sources: Bloomberg; RBA

Movements in the Australian dollar and commodity prices appear more synchronised when commodity prices are driven by *persistent*, that is relatively long-lasting , shifts in demand and supply. These types of developments are more likely to flow through to investment decisions and the medium-term outlook for economic growth but also reflect a more positive outlook for the global economy. In contrast, commodity price movements related to *temporary* factors, such as supply disruptions, are less likely to influence the medium-term outlook and the exchange rate.

For example, the increase in the price of iron ore over much of 2019 was associated with temporary supply disruptions in Brazil and Australia. Because these price movements were expected to be short lived, they did not lead to large increases in capacity or production by Australian producers. In addition, the increase in mining profits from higher commodity prices did not boost domestic household incomes noticeably.[12] As a result, it is not surprising that the exchange rate did not move closely with commodity prices over this period.

However, since late 2020 commodity prices have been more closely associated with movements in the Australian dollar. Indeed, the appreciation of the Australian dollar since November 2020 has been broadly consistent with the increase in commodity prices. These developments have occurred against the backdrop of improving expectations for a recovery in global growth. Over this period, the price of iron ore increased significantly because of stronger Chinese demand for steel, and is around its highest level in a decade. In this environment, improved investor sentiment supported demand for a variety of 'risk-sensitive' assets, including equities, many commodities, and the Australian dollar.

The relative importance of supply and demand drivers for iron ore prices in early 2019 and late 2020 can be quantified by using econometric models, such as the commodity factor price model of Cunningham and Smith (2019). This model decomposes price movements into changes that are specific to iron ore, common to all bulk commodities, or common across all commodities (Graph 9). In early 2019, the increase in iron ore

prices was largely attributed to developments specific to the iron ore market as a result of temporary supply disruptions (the yellow bars in Graph 9). In late 2020, the iron ore price was mostly driven both by demand growth across all commodities, and bulks specifically (the blue and green bars in Graph 9). This comparison highlights that it is important to understand the nature of commodity price shocks when analysing the role that commodity prices play in driving exchange rate movements.

## Shorter-term factors and developments in other financial markets

Over time Australian financial markets, including the foreign exchange market, have become more closely integrated with the global financial system (Jacobs 2019). The Australian dollar is the fifth most traded currency globally, and the AUD/USD is the fourth most traded currency pair (Guo, Ranasinghe and Zhang 2019). Turnover of the Australian dollar has increased alongside global turnover of all currencies (in US dollar terms) over recent years, and most of the increase in turnover has been recorded in offshore markets. So although the fundamental determinants (discussed above) are important for understanding longer-term movements in the exchange rate, in the shorter term other factors can be important in influencing the behaviour of participants in foreign exchange markets and thus the exchange rate.

**Graph 9**
**Iron Ore Price**
Cumulative Change



● Total  ■ Iron ore*  ■ Bulks*  ■ All commodities*

\* Price changes are categorised as either specific to iron ore, common across bulk commodities, or common across all commodities

Sources: Bloomberg; RBA; World Bank

One of these additional factors is the attitudes of market participants towards risk (or 'risk sentiment'). While risk sentiment is not directly observable, changes in risk sentiment are typically associated with asset price changes across a range of financial markets. The Australian dollar is historically more volatile than most other advanced economy currencies, and market commentators often link movements in the exchange rate with developments in the outlook for global growth. Indeed, the Australian dollar is typically considered a 'risk-sensitive' currency.

One way to highlight the role that risk sentiment plays in influencing the Australian dollar is through its correlation with prices of risk-sensitive assets, such as US equities. Price movements in these markets are typically considered to capture information about changes in the outlook for risks and global growth. Each episode of risk aversion can have different underlying drivers and occur amid different macroeconomic circumstances, but usually the Australian dollar depreciates. Movements in the Australian dollar have been highly correlated with movements in US equities at different points in time over the past decade. This was particularly evident over 2020 when movements in the Australian dollar broadly followed those in US equity markets – depreciating during the height of financial market stress in March before appreciating alongside the rise in equity prices as conditions in global financial markets improved and the outlook for global growth became more positive (Graph 10). Similar co-movement between the Australian dollar and US equities was observed during the global financial crisis.

The high correlation between movements in the Australian dollar and US equities during periods of heightened financial market volatility can also reflect dynamic hedging practices by Australian asset managers. Asset managers, such as superannuation funds, often maintain a pre-set hedging ratio on their foreign asset portfolios to reduce exchange rate risk.[13] When there is a sharp decline in US equity prices, the value of assets denominated in foreign currencies declines and the share of the portfolio that is hedged increases
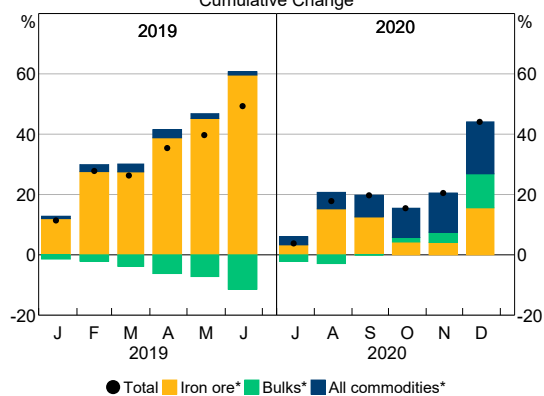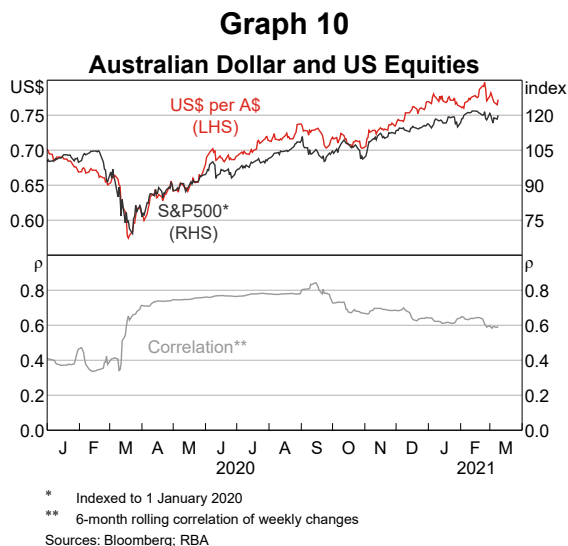
above the targeted ratio. Asset managers sell Australian dollars to reduce the value of their currency hedge in maintaining their pre-set hedging ratios.

The recent COVID-19 episode also highlighted that during periods of heightened financial market volatility and risk aversion short-term Australian dollar movements can be very sharp. The Australian dollar typically depreciates during these episodes as demand for 'safe-haven' currencies such as the US dollar increases. Also, during periods of financial market volatility unwinding of 'carry trades' can exacerbate a depreciation in the exchange rate. A carry trade generally involves borrowing money in a low-yielding currency (such as the Japanese yen) and investing in a high-yielding currency (such as

the Australian dollar). Historically, carry trades have been an important driver of the Australian dollar, at least periodically, but as interest rates have converged they may have become a less important driver because even a small depreciation can make the trade unprofitable.[14]

## Conclusion

Australia is a small trade-exposed economy and is closely integrated with global capital markets. The flexible exchange rate allows the Reserve Bank to set monetary policy in a way that responds to domestic economic conditions to achieve its objectives. It also means the Australian dollar is influenced by international developments. The terms of trade and interest rate differentials are key fundamental determinants of the Australian dollar over the medium to long term. The decline in the terms of trade since the end of the mining boom and the decline in interest rate differentials over a number of years have been important drivers of the depreciation of the Australian dollar on a trade-weighted basis since its peak in 2013. The easing of domestic monetary policy over a number of years, including the recent introduction of quantitative easing measures, have contributed to a lower structure of interest rates in Australia and the exchange rate being lower than it would otherwise have been. ✗

**Graph 10**
**Australian Dollar and US Equities**



*    Indexed to 1 January 2020
**   6-month rolling correlation of weekly changes
Sources: Bloomberg; RBA

## Footnotes

[*] The authors are from International Department and would like to thank Nicole Adams, Anthony Brassil, Jason Griffin, Rochelle Guttmann, Fred Hanmer, Alex Heath and David Jacobs for contributions to work that has benefited this article, and for their thoughtful advice and suggestions.

[1] The Australian dollar TWI peaked in 2013, while the Australian dollar peaked against the US dollar in 2011.

[2] For more information on developments in foreign exchange markets around the height of the COVID-19 pandemic, see RBA (2020a).

[3] There is also an RBA Explainer on the 'Drivers of the Australian Dollar Exchange Rate'.

[4] The literature highlights other channels that may vary in importance over time depending on conditions in financial markets. For example, during periods of stress when demand for liquidity is high, central banks can support market functioning by purchasing bonds.

[5] See CGFS (2019), Swanson (2020), Dedola *et al* (2020), Inoue and Rossi (2019) and Beck, Duca and Strassa (2019) for a review of the literature on quantitative easing and its effects on different financial markets and the economy.

[6] See Vallence and Wallis (2020) for more information about the response by central banks in advanced economies to COVID-19.

[7] The 3-year yield on Australian Government Securities (AGS) influences funding rates across much of the Australian economy and is also important for financial markets, including foreign exchange markets. For more information see Lowe (2020).

[8] For example Neely (2011) finds that quantitative easing measures have a smaller effect than would be expected by a change in yields of a similar magnitude from conventional policy, while Glick and Leduc (2018) find the opposite.

[9] Ferrari *et al* (2017) provide estimates of the exchange rate effect from a change in central bank policy decisions using an event study methodology for a range of advanced economies, including Australia. (See also Curcuru (2017) for estimates related to the US dollar.) The estimates indicate that a 100 basis point increase in 2-year and 10-year yields corresponded to an exchange rate appreciation of around 5½ per cent and 4½ per cent respectively. Estimating a similar model with more recent data and a slightly longer time window around the policy announcements suggests a somewhat lower sensitivity of the Australian dollar to interest rate changes. The difference in estimates highlights that there is a high degree of uncertainty. However, the updated estimates also suggest that the sensitivity of the Australian dollar to yields appears to have increased over time, which is consistent with Ferrari *et al* (2017).

[10] For more information on the resources boom and the Australian dollar see Kent (2014).

[11] The ICP is an index of Australian commodity export prices, weighted by share of annual export value. Iron ore accounts for 30 per cent of the ICP. See: https://www.rba.gov.au/statistics/frequency/commodity-prices/2020/weights-icp-20200401.html

[12] For more information on the 2019 increase in iron ore prices and the implications for the Australian economy, see RBA (2019a)

[13] Australian investors, such as superannuation funds, hedge the currency risk on offshore assets by using forward foreign exchange contracts, where the investor enters into a forward contract to convert foreign currency back into Australian dollars. This practice contrasts with that of offshore investors investing in Australia who tend to implement lower hedging ratios.

[14] For more information on the 'carry trade', see RBA (2019b) and D'Arcy and Zurawski (2009).

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