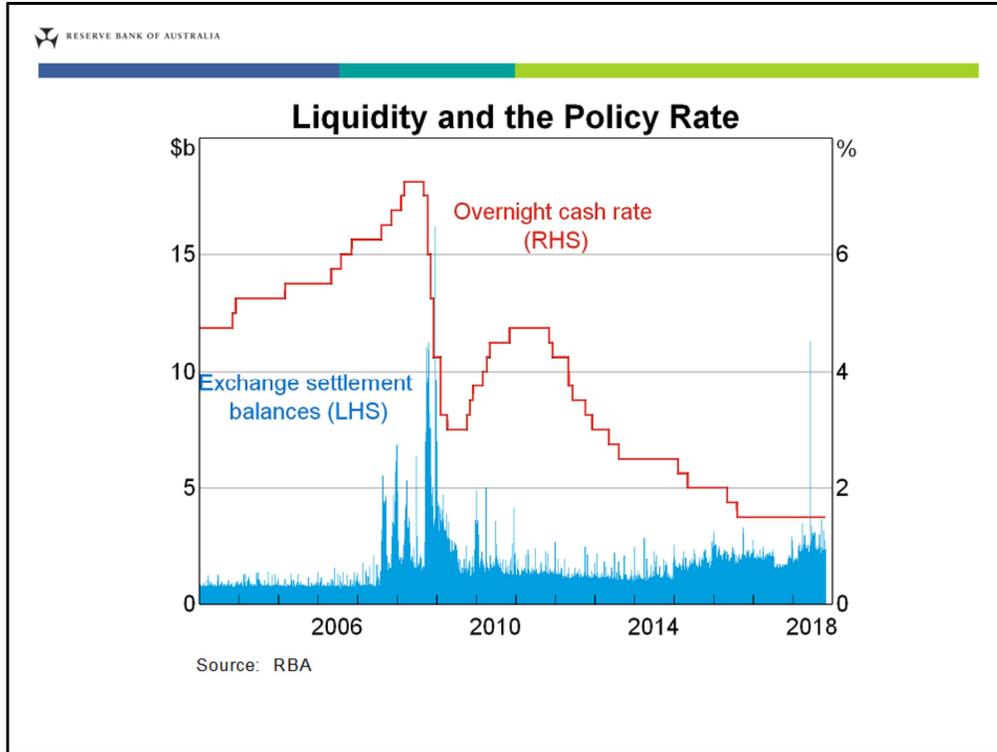


The Reserve Bank has been making concerted efforts in recent years to reach out to teachers and students with an interest in economics. This is not only to increase the understanding in the community about what the Reserve Bank does, but also more broadly in the interest of supporting the discipline of economics in Australia.

The operational aspects of how central banks implement their policies are not well understood by many economists. There are some important differences between the way that monetary policy is implemented and the day-to-day management of liquidity in exchange settlement cash balances. While these tasks are separate in terms of objectives and implementation, they are nonetheless managed carefully to be mutually consistent.

This presentation follows on from the earlier presentation on Monetary Policy Implementation on 3 August 2016, in which we explained the way the interest rate corridor guides the market to a new overnight cash rate, without requiring the Reserve Bank to conduct open market operations.



The Reserve Bank is responsible for implementing monetary policy by setting the overnight cash rate. Over the past two decades an interest rate corridor of +/- 0.25 percentage points around the cash rate target has operated in Australia. The incentives associated with the corridor guide market participants to almost always transact at the overnight cash rate target. No central bank transactions to alter the supply of exchange settlement cash balances are required to bring about a change in the cash rate.

Before the financial crisis cash balances were broadly steady for around a decade at \$0.8 billion per day; they were very variable during the financial crisis, then they were steady at around \$1 billion, before increasing gradually to around \$2 billion. As the cash rate steps down, exchange settlement cash balances do not have to increase, and when it steps up, they do not have to fall.

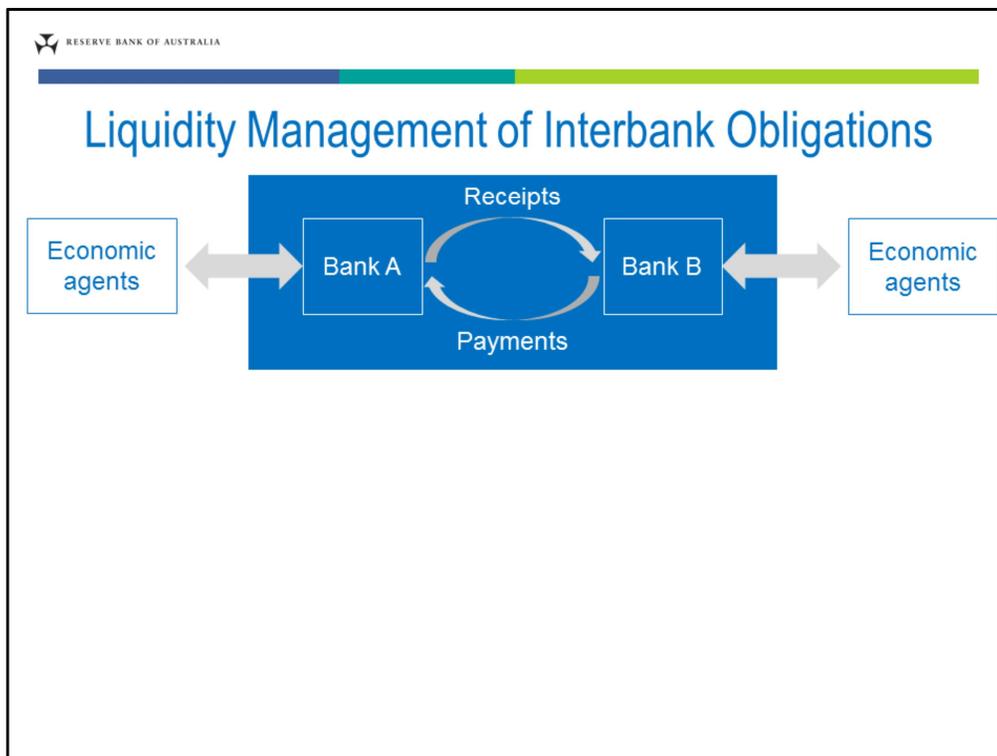
Reserve Bank Open Market Operations

What is the main purpose of the Reserve Bank's open market operations?

... liquidity management.

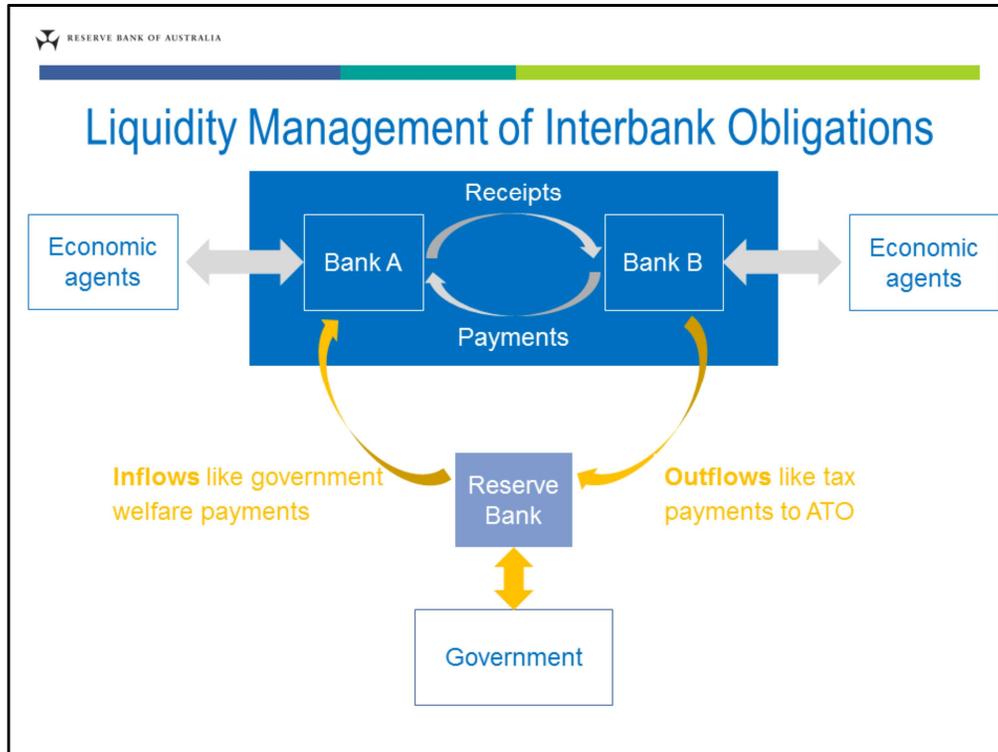
This raises the question: if the Reserve Bank does not transact to change the cash rate, what is the purpose of its daily open market operations?

The Reserve Bank mainly conducts open market operations in the domestic money markets to manage the supply of exchange settlement cash balances available to financial institutions in Australia. This is done to manage the available liquidity in the cash balances that institutions require to meet their payments obligations.



In this simple representation of the payments system, economic agents make electronic payments to each other through their respective banks. To get payments from one bank to the other, no physical banknotes are exchanged. Instead, banks have electronic accounts at the Reserve Bank for the purpose of settling their payment obligations. These accounts are called Exchange Settlement Accounts and are a digital variation of cash backed by the central bank. The Reserve Bank facilitates the settlement of obligations between banks by debiting and crediting exchange settlement accounts of banks who are parties to a particular transaction. The sum of all the balances that banks have in their accounts can be referred to as the system's liquidity or system cash. It is the amount of exchange settlement cash that can freely move between banks to settle payment obligations. The total amount that banks can hold in their exchange settlement accounts is determined by the Reserve Bank. Exchange settlement cash balances in the system do not change when banks settle obligations between each other. It is redistributed between banks either because of their receipts and payments, or due to their market borrowing and lending.

The current arrangements of settling interbank obligations using a digital central bank liability (exchange settlement cash balances) have been in place in Australia since the late 1990s.



However, when economic agents make payments to the government accounts at the Reserve Bank (e.g., tax paid to the Australian Taxation Office) this cash flows out of the financial system. Conversely, when a government agency makes a payment from its account held at the Reserve Bank (e.g. welfare payments), cash flows into the financial system. These transactions between the Reserve Bank and banks change the amount of liquidity in the payments system.

Through its open market operation, the Reserve Bank manages the impact of these transactions in order to ensure that there is sufficient cash for institutions to meet their interbank payment obligations. Where cash is taken out of the system the Reserve Bank lends exchange settlement cash balances back into the system. If cash were not injected into the system, banks might not have sufficient means to settle the transactions their customers want to make. The Reserve Bank does the opposite to drain cash balances when the government makes payments.

The supply of cash is set to meet the settlement needs in the payments system. This is the process of liquidity management. But the central bank also ensures that the overnight cash rate (the interest rate on unsecured overnight loans between banks) remains close to target. The Reserve Bank does not flood the system with cash, nor does it want to make the availability of cash in the system so scarce that it restricts banks from settling their obligations. If there is insufficient cash in the system, banks might be forced to borrow at an interest rate higher than the cash rate set by the Reserve Bank. And if there is too much cash in the system, banks might lend out these excess balances at a rate that is lower than the cash rate. As a result, the process of liquidity management is always conducted bearing in mind that it has to remain consistent with maintaining the daily cash rate in line with the target decided by the RBA Board.

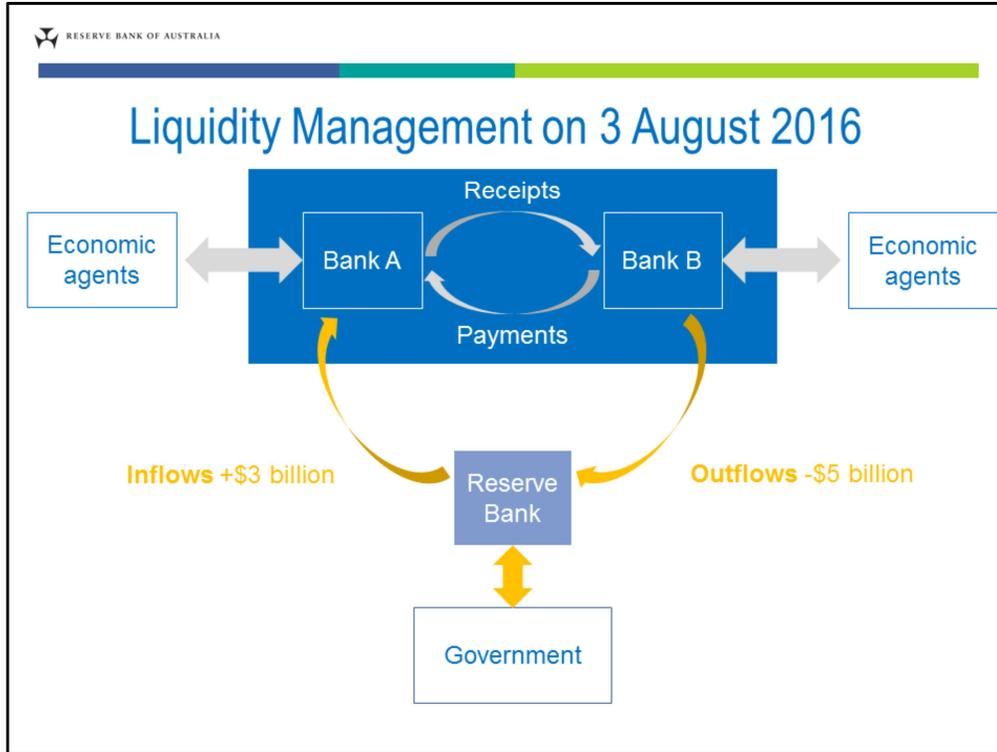
Liquidity Management Illustration

What did the Reserve Bank do in open market operations on a day the target cash rate was changed?

... 3 August 2016

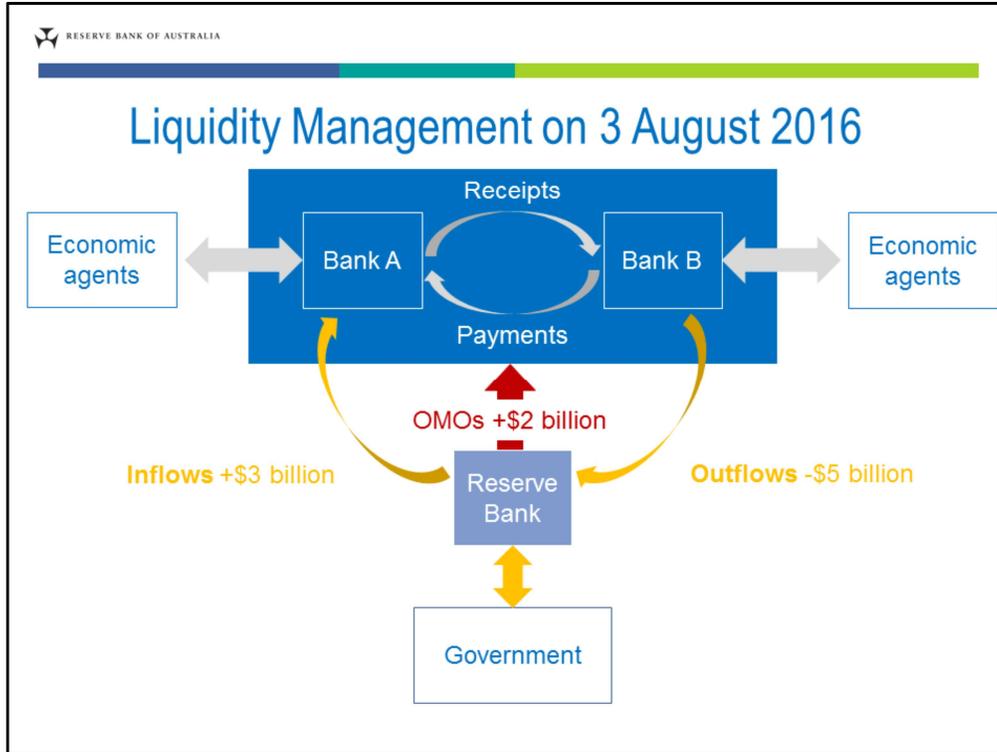
One useful way to illustrate how the Reserve Bank's open market operations are directed at liquidity management, and not for targeting the cash rate, is to explain the process of what happened when the Reserve Bank changed the cash rate. This illustration complements the one used in the presentation for Monetary Policy Implementation on 3 August 2016.

On Tuesday 2 August 2016, it was announced that the following day the cash rate target would be lowered by 0.25 percentage points from 1.75 per cent to 1.50 per cent. The following slides show what the Reserve Bank did in its open market operations on the next day the new cash rate became effective. We also explain why these operations were conducted using the actual data (where this does not conflict with confidentiality requirements).



As was the case on the previous day, the Reserve Bank judged that an appropriate value for exchange settlement cash in the system would be around \$1.7 billion. There was no need to change this target balance because lowering the cash rate from 1.75 per cent to 1.50 per cent occurred automatically in line with the new rates announced for the interest rate corridor.

However, on the day there was an expectation that there would be outflows from the system including large tax (and other receipts) into accounts held at the Reserve Bank to the value of around -\$5 billion. On the other hand, there was also an expectation that inflows into the system resulting from government welfare and other payments from Reserve Bank accounts would amount to around +\$3 billion. As a result, the available pool of exchange settlement cash balances of \$1.7 billion would have been more than fully depleted by net flows to the RBA of \$2 billion (i.e., -\$5 billion +\$3 billion).



To ensure that sufficient exchange settlement cash balances would be available for the smooth functioning of the payments system, and to avoid upward pressure on the overnight cash rate, the Reserve Bank conducted open market operations to ensure that the pool of cash would remain at its target value of \$1.7 billion.

In other words, net flows out of the system to the Reserve Bank of \$2 billion needed to be offset to ensure that sufficient liquidity was available. In order to inject the required amount, the Reserve Bank conducted a competitive auction in the morning to lend cash through its open market operations. This amount was entirely calibrated on the need to replenish exchange settlement balances for payments system needs and had no direct link to the drop in the cash rate target on that day. In fact, the Reserve Bank tends to lend around \$2 billion of cash on almost all days to meet the requirements of the payments system, irrespective of whether the cash rate falls, stays unchanged, or rises.

OMO Announcement on 3 August 2016

3 August 2016		22:20 GMT 2-Aug-16
Previous Day		
Closing Total ES Balances	\$24,310 MILLION	
Closing Surplus ES Balances	\$ 1,707 MILLION	
Estimated Cash Position	A DEFICIT OF \$2,180 MILLION	
1st Round Open Market Operations		
Reserve Bank Proposing	TO BUY SECURITIES UNDER REVERSE REPO AND OUTRIGHT	
Intended Size of Operation	\$2,170 MILLION	
Preferred Term(s)	12	
(days)	65	
Approach Deadline	09:45 AEST	

On 3 August 2016, the Reserve Bank's open market operations began with an announcement at 9:30am on Reuters and Bloomberg. In the announcement, the Reserve Bank reported the closing surplus exchange settlement balances at the end of the previous day, which was in line with the target pool of liquidity of around \$1,700 million. It also provided an estimate of the cash deficit for the day, \$2,180 million. This estimate is based on the expected net outflows and inflows for the system of around \$2 billion described earlier. The auction parameters for open market operations are detailed in the announcement. This includes what the Reserve Bank will accept in the auction – repurchase (repo) agreements or outright purchases, the total size of the operation which was around \$2,000 million and the preferred terms (second legs) for the repo unwinds which were for 12 days and 65 days (more detail on this later).

Banks that wanted to participate in the auction had until 9:45am to call the Reserve Bank's market operations area in the dealing room with their approach bids for cash.

Note: in November 2017 the auction window for open market operations was brought forward by 10 minutes. The announcement is now made at 9:20am, participants have until 9:35am to make their approaches and results are typically published by around 9:45am.

Allocation Screen

RBA Proposing TO BUY SECURITIES UNDER REVERSE REPO AND OUTRIGHT \$2,170 million

Rank	Type	Counterparty	Term in Days	Unwind Date	Bid / Yield (%)	Overnight indexed swap (OIS) (%)	Spread To OIS (BPS)	Amount (\$m)	Accept Bid (\$m)	Cumulative Auction (\$m)
1	Reverse Repo	Bank 1	12 or 65	15-Aug or 7-Oct	1.66	1,500	16	1,000	<input checked="" type="checkbox"/>	1,000
2	Reverse Repo	Bank 2	12 or 65	15-Aug or 7-Oct	1.65	1,500	15	200	<input checked="" type="checkbox"/>	1,200
3	Reverse Repo	Bank 3	12 or 65	15-Aug or 7-Oct	1.65	1,500	15	200	<input checked="" type="checkbox"/>	1,400
4	Reverse Repo	Bank 4	12 or 65	15-Aug or 7-Oct	1.64	1,500	14	200	<input checked="" type="checkbox"/>	1,600
5	Reverse Repo	Bank 5	12 or 65	15-Aug or 7-Oct	1.63	1,500	13	200	<input checked="" type="checkbox"/>	1,800
6	Reverse Repo	Bank 6	12 or 65	15-Aug or 7-Oct	1.62	1,500	12	200	<input checked="" type="checkbox"/>	2,000
6	Reverse Repo	Bank 7	12 or 65	15-Aug or 7-Oct	1.61	1,500	11	170	<input checked="" type="checkbox"/>	2,170
7	Reverse Repo	Bank 8	12 or 65	15-Aug or 7-Oct	1.60	1,500	10	500	<input type="checkbox"/>	2,670
7	Reverse Repo	Bank 9	12 or 65	15-Aug or 7-Oct	1.60	1,500	10	400	<input type="checkbox"/>	3,070
8	Reverse Repo	Bank 10	12 or 65	15-Aug or 7-Oct	1.59	1,500	9	300	<input type="checkbox"/>	3,370
9	Reverse Repo	Bank 11	12 or 65	15-Aug or 7-Oct	1.58	1,500	8	200	<input type="checkbox"/>	3,570
10	Reverse Repo	Bank 12	12 or 65	15-Aug or 7-Oct	1.57	1,500	7	100	<input type="checkbox"/>	3,670

Source: RBA

Once the window for approaches and bids in the auction closes, the Reserve Bank ranks each bank's willingness to pay for the loan of cash from the highest interest rate offered to the lowest. This is a simple way of impartially determining which bank has the highest demand for the loan of cash. The highest bid is therefore most likely to be successful in securing a loan of cash from the Reserve Bank at the auction.

In this example we show a fictitious illustration of what approaches might have looked like (but do not reveal any counterparty confidential information). Banks 1 to 12 offer to borrow different amounts of cash from the Reserve Bank under reverse repo for 12 or 65 days by bidding an interest rate ranging from 1.66 per cent to 1.57 per cent. The Reserve Bank accepts these ranked approaches from highest to lowest until it reaches the desired amount of cash that it wants to inject into the system. On the day this was \$2,170 million, as announced in the auction parameters. Only the highlighted approaches, which are the most competitive, are accepted.

Notification of Results

22:42 GMT

2-Aug-16

Page 1 of 1

OPEN MARKET OPERATIONS
Results

3 August 2016
1st Round

Transaction	Term (Days)	Value Dealt (\$m)	Weighted Avg (%)	Cut-off Rate (%)
Reverse Repo	12	880	1.614	1.60
	65	1298	1.640	1.62

Total (\$m)	2178
Outright Transactions (\$m)	NIL
Same Day FX Swaps (\$m)	NIL
Total Amount Dealt (\$m)	2178

Participants are notified of their individual results – successful or not, the amount that was allocated to the bank, and the interest rate at which the loan of cash is contracted is confirmed. The aggregated results from the auction are published as soon as possible on Reuters and Bloomberg, as well as the Reserve Bank website.

Repurchase Agreement

First Leg: 3 August 2016



In the auction on 3 August 2016 all trades were contracted under repo and there were no outright purchase of government bonds. This was a fairly standard day as the Reserve Bank mainly uses repurchases agreements in its daily open market operations. It does not tend to purchase government bonds for this purpose as suggested by some textbooks.

A repo is best characterised as a loan of cash balances that is secured by bonds that are provided as a guarantee or security against default (i.e. collateral). In the first leg (or part) of the transaction, cash is lent and the security is delivered to the central bank as collateral. The transaction is 'secured' in the sense that the Reserve Bank could sell the bond if the borrower does not repay the loan. This way taxpayer money is not at risk of default by a bank.

Note: We refer to these transactions as 'repo' for simplicity and to avoid having to explain that they are actually 'reverse repos'.

Repurchase Agreement

First Leg: 3 August 2016



Second Leg: 15 Aug and 7 Oct



At the end of the repo term, the flow is reversed and the banks repay the cash loan and the central bank returns the collateral. This is also known as the 'second leg' of the repo.

As there were two terms on the 3 August, the unwinding of the repo happens on two different days.

Repos are very similar to a home loan. Your bank gives you the cash to buy the home but holds onto the title until the loan is fully repaid. If you default on your home loan, the bank sells your house and gets its money back. If you repay as agreed, at the end of the loan term the bank gives you the title to the house.

The advantage of this type of operation for the Reserve Bank is that with one transaction it is able to manage liquidity on two days at the same time: inject/increase cash on the first day and drain/decrease cash on the second day. It also avoids the central bank holding a large stock of bonds issued by the government, which under some circumstances could interfere with the efficient operation of the bond market in Australia.

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