



Cash Rate Futures

A MARKET EXPECTATION OF INTEREST RATE CHANGES

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ECONOMICS TEAM

Cash Rate Futures: A Market Expectation of Interest Rate Changes

The ASX 30-day Interbank Cash Rate Futures is an indicator of market expectations of a change in the official cash rate set by the Reserve Bank of Australia (RBA). While there are other financial instruments that gauge the market's expectations of cash rate movements, such as the Overnight Indexed Swap, we'll focus on the Futures as we believe it's the easiest to understand. The indicator calculates a percentage probability of a RBA interest rate change based on the market determined prices in the Cash Rate Futures.

The contract is based on the interbank overnight cash rate published by the RBA and allows users to hedge against fluctuations in the overnight cash rate and better manage their daily cash exposures.

According to the ASX, the Cash Rate Futures are also used for the following purposes:

- Managing interest rate risk at the short end of the yield curve
- Managing balance sheet mismatches
- Hedging against anticipated fluctuations in the overnight cash rate
- Outright trading on anticipated changes or lack of changes in the official cash rate
- Trading on anticipated changes in the yield curve shape
- Income enhancement opportunities for portfolio with cash exposures
- Spread trading against 90-day bank bill futures and options

Before discussing how the probability of rate changes are calculated and how the cash rate futures are used for hedging, we'll discuss with a simple example what a futures contract is.

What is a futures contract?

Let's say I want to buy a pizza from Little Tony's at the street market. The pizza is an asset (often called a financial instrument), like a stock or bond, and the street market is the futures & swaps market on the ASX, a place to buy and sell forward contracts these kinds of instruments, which are called derivatives.

However, I don't want to buy this pizza now. I want to buy it in the future, say in 90 days from now. Tony and I write up a contract saying that I will buy this pizza, in 90 days for a certain price. By writing up this forward contract, I am able to secure myself a pizza and he is able to secure an income and both of us reduce our risk by doing so. Circumstances may change over time, for example, the cost of making a pizza could increase or decrease. This is why we want to secure the contract now because conditions are acceptable to both of us.

Now let's step this up another notch by adding short term interest rates to the mix. Simply put, these are the rates paid on top of the initial amount invested (the price of a pizza) that are paid upon maturation of the contract (the day I finally get my pizza). Unfortunately, daily interest rates (the overnight cash rate) may change if the central bank, the Reserve Bank of Australia (RBA), decides to loosen or tighten monetary policy.

This contract is a Cash Rate Futures contract, where two parties reduce risk by taking an offsetting position on an investment (i.e., buying the pizza in the future). If either of us decide to sell this forward contract, we do so in the futures market. Although, Cash Rate Futures are always standardised and can be far more complex than this example.

How are Cash Rate Futures Used for Hedging?

The business model of banks and other financial institutions is typically to 'gap the yield curve', that is to profitably expand its balance sheet by issuing credit at lower interest rates (bonds and deposits) and creating credit at higher interest rates (loans and mortgages). This creates an exposure to short term interest rates for these institutions. Higher short-term rates, given a long- term rate will erode profit margins. Short term debt is closely correlated to the cash rate (overnight interest rate) because it is relatively substitutable and is used for the same reason, namely liquidity. Thus, any major discrepancies above a sensible term premium (higher yield for longer maturity) will be arbitrated away, which is why yields on short-term debt (below a year), 30-day, 60-day, 90-day, 180-day, will closely follow the cash rate plus a term spread (premium).

So, banks and financial institutions who hold reserves to settle payments between each other (exchange settlement funds in Australia), have exposures to changes in the cash rate. Furthermore, not only financial institutions, but other corporations who issue short-term debt have this exposure too, as the cash rate will influence short term debt yields via arbitrage as discussed above.

The Cash Rate Futures is an instrument to hedge (or insure/protect), from this risk/exposure. The futures provide a right to buy the cash rate on a notional \$3 million at the end of the month. Likewise, selling, or going short, gives you a right to sell cash rate on a notional \$3 million at the end of the month. So if the RBA increases the cash rate and short-term yields rise, if an entity holds a short position in a Cash Rate Futures contract, the value of the contract will increase and this will help to offset their interest rate exposure (higher interest rates on their existing outstanding short-term debt).

Probability of Cash Rate Change Calculation

Pricing of Cash Rate Futures

Unlike normal future contracts on standard assets such as stocks or commodities, Interbank Cash Rate Futures are quoted based on their implied yield per annum. This is represented by subtracting the yield from 100, so a rate of 2.500% would have its price quoted as 97.500, with it being quoted to the nearest 0.005. Because these contracts are payable on a notional sum of \$3,000,000, each basis point (0.01%) movement corresponds to a change in value of \$24.666. When it comes to settling these contracts, the Cash Settlement Price used is simply the average of the daily yields for that contract month = 100 – the average overnight cash rate for the month.

Predicting Movements

As mentioned above, the price contains an implied yield per annum, and can therefore be used to 'predict' movements in the cash rate. On a very basic level, if the current price of Interbank Cash Rate Futures is 97.500 and the current overnight cash rate is only 1.500%, one can infer that the market expects the RBA to increase the overnight cash rate by a percentage point to 2.500%. While not necessarily predicting the cash rate, Interbank Cash Rate Futures can act as a substitute for future interest rates, as it reflects the prevailing predictions of participants in the financial markets.

Probability of a Rate Change

The current yield can also be used to gauge the market's forecast of the likelihood of rate changes.

$$X = r_t * n_b + (r_{t+1} * p + r_t(1-p)) * n_a$$

From here, we rearrange the equation to solve for p, where:

p = probability of rate change

X = current yield on 30 Day Interbank Cash Rate Futures

r_t = current known Target Cash Rate (%)

r_(t+1) = expected new Target Cash Rate (%)

n_b = fraction of month where target rate is known (ie: before RBA official rate announcement), eg: 2/31 for December 2003

n_a = fraction of month where target rate is unknown (ie: after RBA official rate announcement), eg: 29/31 for December 2003

The graph below, is ASX 30-day Interbank Cash Rate Futures implied yield curve, as of market close 4th of April 2018. As you can see in the table below, these are the current probabilities of a cash rate increase being priced in by market participants (0.25% increase from 1.5% to 1.75%).

25 bps increase by July 2018: 0%

25 bps increase by September 2018: 6.9%

25 bps increase by December 2018: 34.6%

25 bps increase by June 2019: 100%

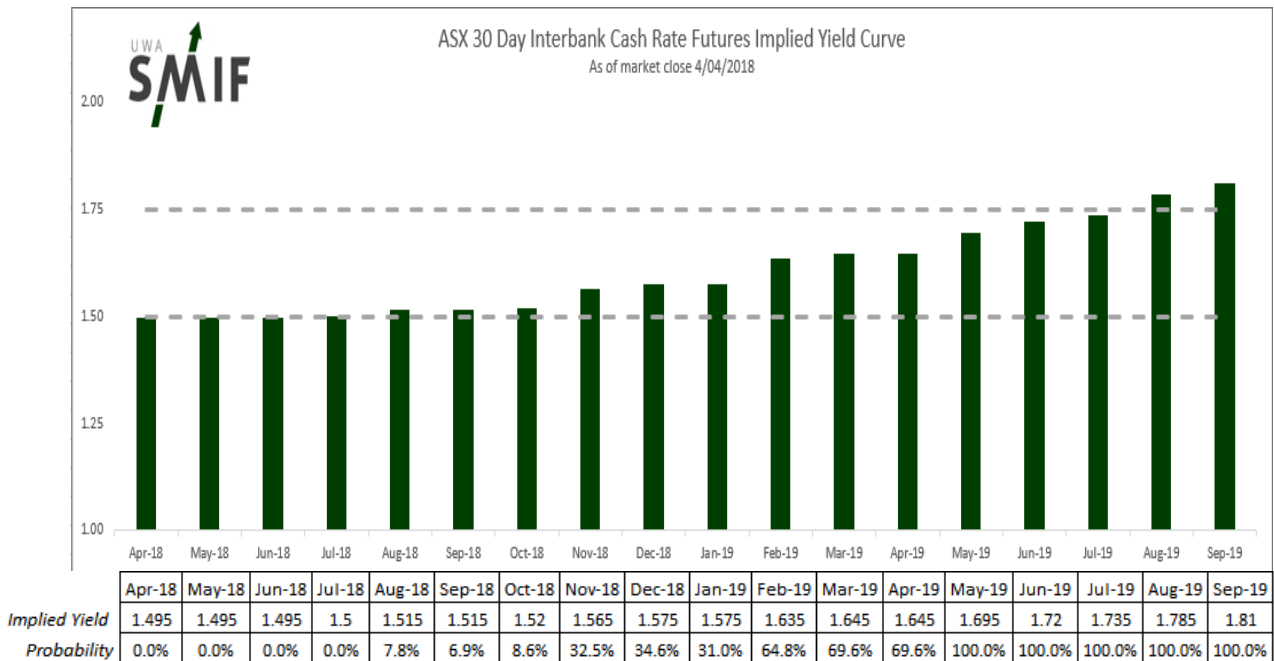


Figure 1 Cash Rate Futures Implied Yield Curve 4/4/2018

Data Source: Bloomberg

Below is a chart of the Cash Rate Futures implied yield curve in January 2018. Despite the cash rate being at kept on hold unprecedently, since the beginning of the year the Cash Rate Futures curve has flattened, meaning the market believes the Reserve Bank will delay increasing interest rates longer than initially expected. As you can see in both graphs, in January the market priced in a 100% probability that there would be a rate hike (1.5% to 1.75%) by January 2019. Currently however, the curve now implies that the 100% probability has been delayed until May 2019.

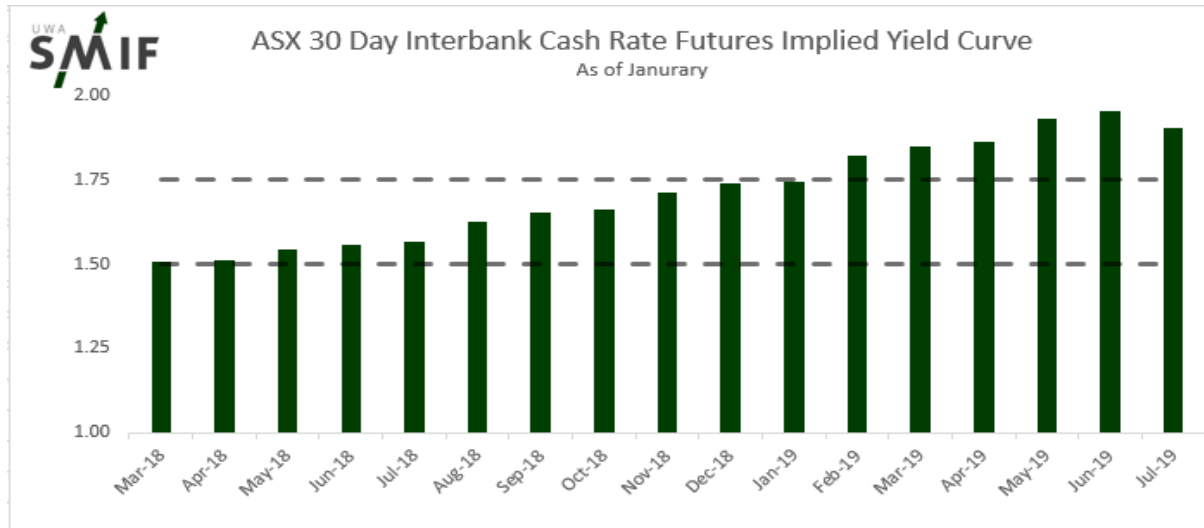


Figure 2 ASX 30 Day Interbank Cash Rate Futures Implied Yield Curve
Data Source: Bloomberg

Additional Information

For those more experienced with futures and derivatives, below we have included the specific contract details of the ASX 30-day Interbank Cash Rate Futures for those who are interested.

- Contract Unit: Average monthly interbank overnight cash rate payable on notional 3 mill AUD, monthly contracts available up to 18 months forward. Minimum price increment of 0.005 per cent (0.5 basis points). A one basis point move is equal to AUD 24.66.
- Cash settled against the monthly average of the interbank overnight cash rate as published by the RBA for that contract month.
- Official market makers provide two-way quotes in all 18 months.