Official Cash Rate Compound Index and Realised NZONIA Methodology

December 2020

Overview

The Official Cash Rate (OCR) compound index simplifies the calculation of compound interest rates providing a standardised basis that is published by a recognised benchmark administrator. The OCR compound index is equivalent to a series of daily data representing the returns from a rolling unit of investment earning compound interest each day at the OCR. The change in the OCR Compound Index between any two dates can be used to calculate the interest rate payable over that period.

The interest rate payable over that period would be realised New Zealand Overnight Index Average (NZONIA) which is a term risk free rate. Realised NZONIA is a backward looking rate based on the OCR, compounded daily in arrears over the relevant period.

The OCR is one of the tools the Reserve Bank of New Zealand (RBNZ) uses to implement monetary policy and meet its statutory requirements in terms of the Policy Targets Agreement it signs with the New Zealand Government. The RBNZ reviews the OCR approximately six times a year and provides an advanced calendar of announcement dates. For more information on the OCR please see https://www.rbnz.govt.nz/monetary-policy/about-monetary-policy/what-is-the-official-cash-rate.

Rationale

Following recommendations from the Financial Stability Board (FSB) report in 2014 entitled "Reforming Major Interest Rate Benchmarks"[1], work has been ongoing to strengthen LIBOR[2] and to identify, and transition to, alternative reference rates. LIBORs have adjusted methodologies to make them more grounded in transactions, as well as strengthening regulatory frameworks and supervision. Despite these changes, the FSB members consider the transition away from LIBOR is required on the assumption that these LIBORs will not be sustainable.

As a result, Regulators have announced that they do not intend to compel participation in the LIBOR setting process post 2021. There has also been very clear directives that users of these LIBORs should prepare for discontinuation past this date. These countries have identified, and in some cases implemented, overnight risk free rates (RFR) as a fall-back benchmark rate (e.g. SOFR in the US and SONIA in the UK). ISDA protocols have been drafted to set out the terms of using these risk free fall-back rates should a current benchmark cease to exist. New transactions are being written against the new RFR benchmarks, and although volumes have been increasing they do remain relatively low at this stage, with the majority of market transactions continuing to be written against existing benchmarks.

Benchmark Administrators have also commenced calculating the compound index of the risk free rates and in some cases publish realised risk free rates, compounded in arrears, from the overnight risk free rates that have been implemented. Examples of this include the ASX's AONIA and the ICE's realised SOFR. Regulators, such as the FCA in England, have encouraged the use of these realised

[1] http://www.fsb.org/wp-content/uploads/r_140722.pdf.

[2] LIBOR is set daily in five currencies (USD, Euro, GBP, JPY & SWF) and represents the interest rate at which banks offer to lend funds to one another in the international interbank market for short-term loans.

risk free rates for pricing some financial market instruments now as they direct financial markets to transition away from the IBORs[3].

New Zealand Interest Rate Benchmarks

In the New Zealand context, the New Zealand Financial Markets Association (NZFMA), the Benchmark Administrator of New Zealand's interest rate benchmarks, continues to favour a multiple rate approach, similar to Australia, by retaining BKBM and implementing robust risk free benchmarks in line with international developments. As a result, the NZFMA has developed the OCR Compound Index and will calculate and publish the index each business day, via email, at 10.41am. Existing BKBM subscribers will receive the OCR Compound Index, via email, as part of their 2020/21 subscription package. The NZFMA will provide a history of the OCR Compound Index, back to 17 March 1999, on its website along with a calculator to determine a term risk free rate in arrears (NZONIA).

OCR Compound Index calculation methodology and conventions

Component	Detail
Data input	The Reserve Bank of New Zealand Official Cash Rate as published on Refinitiv page RBNZ02 and Bloomberg page <RBNM3> each business day at 9.00am. The rate is applicable to the current business day (T+0). The index will have a base of 100 as at 17 March 1999.
Tenors	The OCR Compound Index is calculated and published, via email, each business day and is an overnight index. Term risk free compound rates in-arrears can be calculated for any period using the calculator provided in the daily email or on the NZFMA website.
Business day	A 'good' business day is defined as a day on which banks in New Zealand are generally open for business, or a day other than one on which banks in New Zealand are obliged or permitted to close - specifically excluding Saturday and Sunday. Essentially, good business days are weekdays (Monday to Friday) other than public holidays. Wellington and Auckland Anniversary days are considered public holidays as per NZFMA OIS conventions.
Day count	Actual/365
Start date	The start date for the OCR compound Index will be the previous 'good' business day.
End date	The day on which OCR compound index is calculated and published. The end date will always be a good business day.
Settlement convention	The settlement convention will be T+0.
Rounding	OCR Compound Index is rounded to 12 decimal places.
Publication	OCR Compound Index will be published at 10.41am NZST/NZDT via email to existing BKBM subscribers from 01 December 2020. The OCR Compound Index will be free to air with a 24 hour delay on the NZFMA's website.

[3] https://www.fca.org.uk/news/speeches/libor-preparing-end

OCR Compound Index methodology

The OCR Compound Index will be calculated as:

$$OCR\ Compound\ Index_i = OCR\ Compound\ Index_{i-1} \times \left(1 + \frac{OCR_i \times a_{i-1}}{365}\right)$$

Where:

$OCR\ Compound\ Index_i$	=	*The index for the date i, calculated and published on date 1, published to 12 decimal places ($OCR\ Compound\ Index_i$ =100.000000000000 on 17 March 1999)*
$OCR\ Compound\ Index_{i-1}$	=	*The OCR Compound Index for the business day i-1, calculated on business day i-1, rounded to 12 decimal places*
a_{i-1}		*= The number of calendar days for which OCR_i applies. This is equal to the number of calendar days between business day i and business day i-1*

Calculating compounded term OCR rates in arrears (NZONIA) from the index

The NZFMA has chosen, at this point, not to publish tenor based NZONIA rates, preferring instead to provide a calculator that can be used to calculate NZONIA in-arrears across any user defined tenor.

To calculate the compounded OCR in arrears rate for any tenor, the following formula should be used:

$$Compounded\ OCR\ rate\ between\ x\ and\ y = \left(\frac{OCR\ Compound\ Index_y}{OCR\ Compound\ Index_x} - 1\right) \times \frac{365}{d}$$

Where:

x = start day of the reference period
y = end day of the reference period
d = the number of days in the calendar period

This calculation methodology can also be used to calculate a lookback using observation shift should it be required. The index does not support simple lookback calculations.

Worked examples:

OCR value date	OCR rate	OCR Compound Index
Mon 20 July 2020	0.25%	242.262243793520
Tues 21 July 2020	0.25%	242.263903123957
Weds 22 July 2020	0.25%	242.265562465759
Thurs 23 July 2020	0.25%	242.267221818926
Fri 24 July 2020	0.25%	242.268881183459
Mon 27 July 2020	0.25%	242.273859311154
Tues 28 July 2020	0.25%	242.275518721149
Weds 29 July 2020	0.25%	242.277178142510
Thurs 30 July 2020	0.25%	242.278837575237

Example one – start and end date for the period 23 July 2020 to 30 July:

$$\text{NZONIA} = \left(\frac{OCR\ Compound\ Index_y}{OCR\ Compound\ Index_x} - 1\right) x \frac{365}{d}$$

$$= \left(\frac{242.278837575237}{242.267221818926} - 1\right) \text{x} \frac{365}{7}$$

$$= 0.2500044031\%$$

Example two – start and end date for the period 23 July 2020 to 30 July with a two day observation shift (21 July to 28 July):

$$\text{NZONIA} = \left(\frac{OCR\ Compound\ Index_y}{OCR\ Compound\ Index_x} - 1\right) \text{x} \frac{365}{d}$$

$$= \left(\frac{242.275518721149}{242.263903123957} - 1\right) x \frac{365}{7}$$

$$= 0.2500044031\%$$