



BANK NEGARA MALAYSIA
CENTRAL BANK OF MALAYSIA

**User Guide on the Compounded Averages and Index for the
Malaysia Overnight Rate (MYOR) and Malaysia Islamic Overnight
Rate (MYOR-i)**

1. Background

- 1.1. BNM introduced the Malaysia Overnight Rate (MYOR) in 2021 and Malaysia Islamic Overnight Rate (MYOR-i)¹ in 2022 as the new alternative reference rates (ARRs) for Malaysia amid global moves towards more robust financial benchmarks.
- 1.2. As MYOR / MYOR-i are overnight rates, financial products will typically reference an average of these rates (as opposed to a single day's reading) to capture the movement of interest rates and borrowing costs over a period. Among the averaging methods, a compounded average more accurately reflects the time value of money compared to a simple average.
- 1.3. Following broad public interest² and the launch of the national KLIBOR transition roadmap, BNM will calculate and publish the following compounded rates for MYOR / MYOR-i (in addition to the standard daily MYOR / MYOR-i), which are intended to expedite market education on the calculation and use of compounded overnight money market rates by serving as standardised references for the public:
 - i. 1-, 3- and 6-month Compounded MYOR / MYOR-i
 - ii. MYOR / MYOR-i Index
- 1.4. The 1-, 3- and 6-month Compounded MYOR / MYOR-i are compounded averages of MYOR / MYOR-i over rolling 1-, 3- and 6-month periods, while the MYOR / MYOR-i Index reflects the continual compounding of a unit of investment, beginning with an initial value of 1.0000000000 on the publication date of 24 September 2021 (MYOR) and 25 March 2022 (MYOR-i) respectively.
- 1.5. Interest will compound only on business days. On non-business days, simple interest will apply at the MYOR / MYOR-i rate from the last preceding business day. For example, during a typical weekend, Friday's MYOR / MYOR-i rate will be used for Friday, Saturday and Sunday i.e. multiplied by a day count of 3 and compounded once across the entire weekend. In line with broader MYR money market conventions, interest will be calculated based on the actual number of calendar days, assuming a 365-day year (fixed).

¹ MYOR / MYOR-i are the volume-weighted average rates of unsecured overnight MYR interbank placements in the conventional and Islamic money markets respectively. For more information, please refer to the Policy Document for [MYOR](#) and [MYOR-i](#).

² Based on feedback on the discussion paper "[Proposed Full Transition to MYOR / MYOR-i and Cessation of KLIBOR](#)"

2. Compounded MYOR / MYOR-i:

- 2.1. Compounded MYOR / MYOR-i for a period can be calculated from daily MYOR / MYOR-i rates using the following formula:

$$\left[\prod_{i=1}^{d_0} \left(1 + \frac{MYOR_i \times n_i}{365} \right) - 1 \right] \times \frac{365}{d}$$

where:

' d_0 ', for any calculation period, is the number of business days in the relevant calculation period;

' i ' is a series of whole numbers from one to d_0 , each representing the relevant business days in chronological order from, and including, the first business day in the calculation period;

' $MYOR_i$ ', for any day ' i ' in the relevant calculation period, is a reference rate equal to MYOR / MYOR-i in respect of that day as published at 10:00 a.m. and 12:00 noon Kuala Lumpur time respectively, on the following business day;

' n_i ' is the number of calendar days in the calculation period for which $MYOR_i$ applies; and

' d ' is the number of calendar days in the relevant calculation period.

- 2.2. For the published 1-, 3-, and 6-month Compounded MYOR / MYOR-i, the following conventions apply:
- i. **Start date determination:** Start dates are determined by referring to the dates exactly 1 month, 3 months and 6 months prior to the publication date. For example, for a publication date of 15 December, the start dates would be 15 November, 15 September and 15 June respectively.
 - ii. **Adjustment for non-existent calendar dates:** If a start date falls on a non-existent calendar date, it is adjusted to the last calendar day of that month. For example, since 31 November does not exist, the adjusted start date would be 30 November for the 1-month Compounded MYOR/MYOR-i published on 31 December.

- iii. **Adjustment for non-business days:** If the start date falls on a non-business day, the MYOR / MYOR-i rate from the preceding business day is applied to the start date with a day count to the next business day. For example, the Compounded MYOR / MYOR-i starting on 10 January 2026 (Saturday) will apply the MYOR / MYOR-i rate on 9 January 2026 (Friday) with a day count of 2 (from Saturday to Monday).
 - iv. **Rounding:** The final result is rounded to 5 decimal places.
- 2.3. The use of months (instead of fixed day counts) is aligned with existing MYR money market conventions. Accordingly, the Compounded MYOR / MYOR-i for a particular tenor may vary in the number of days in the calculation period depending on the publication date.

3. MYOR / MYOR-i Index:

- 3.1. The MYOR / MYOR-i Index reflects the cumulative compounding of MYOR / MYOR-i since inception and aims to simplify the calculation of compounded averages for custom periods. The Index is calculated according to the following formula:

$$MYOR\ Index_i = MYOR\ Index_{i-1} \times \left(1 + \frac{MYOR_{i-1} \times n_{i-1}}{365} \right)$$

where:

' $MYOR\ Index_i$ ' is the index for business day i , rounded to 10 decimal places ($MYOR\ Index = 1.0000000000$ on 24 September 2021; $MYOR-i\ Index = 1.0000000000$ on 25 March 2022)

' $MYOR_{i-1}$ ' is the MYOR / MYOR-i rate for business day $i - 1$; and

' n_{i-1} ' is the number of calendar days for which ' $MYOR_{i-1}$ ' applies. This is equal to the number of calendar days between business day $i - 1$ and business day i .

- 3.2. Compounded MYOR / MYOR-i for custom periods may be calculated directly from the MYOR / MYOR-i index by using the following formula:

$$\left(\frac{MYOR\ Index\ y}{MYOR\ Index\ x} \right) - 1 \times \frac{365}{d}$$

where:

'*MYOR Index y*' is the MYOR / MYOR-i Index corresponding to the end date of the calculation period;

'*MYOR Index x*' is the MYOR / MYOR-i Index corresponding to the start date of the calculation period; and

'*d*' is the number of calendar days in the calculation period.

4. Publication and republication

- 4.1. Similar to MYOR / MYOR-i, Compounded MYOR / MYOR-i and MYOR / MYOR-i Index will be published at 10:00 a.m. / 12:00 p.m. (noon) respectively on each business day.
- 4.2. The Compounded MYOR / MYOR-i and MYOR / MYOR-i Index will be republished in the event of a republication of MYOR / MYOR-i or errors in the calculation of the Compounded MYOR / MYOR-i and MYOR / MYOR-i Index. Any republication will be done by 4:00 p.m. on the same day, after which no further amendments will be made.

5. Disclaimer

- 5.1. The compounded MYOR / MYOR-i and MYOR / MYOR-i index are provided on an 'as is' basis without warranties of any kind. BNM shall not be liable for any damage or loss that may arise from reliance on the data obtained from BNM's website.

Appendix – Sample calculations for MYOR / MYOR-i Index and Compounded MYOR / MYOR-i

The illustrations below are intended to guide users on how to calculate the MYOR / MYOR-i Index and Compounded MYOR / MYOR-i (for custom periods, using the standard compounding formula for MYOR / MYOR-i or directly from the MYOR/MYOR-i Index):

Reference date	Publication date	MYOR rate (%)	Calendar days applicable	MYOR Index
Friday 24/6/2022	Monday 27/6/2022	1.99	3	1.0135875142
Monday 27/6/2022	Tuesday 28/6/2022	1.99	1	1.0136427755
Tuesday 28/6/2022	Wednesday 29/6/2022	2.00	1	1.0136983176
Wednesday 29/6/2022	Thursday 30/6/2022	2.00	1	1.0137538627
Thursday 30/6/2022	Friday 1/7/2022	1.96	1	1.0138082999
Friday 1/7/2022	Monday 4/7/2022	2.00	3	1.0139749533

I. Calculation of MYOR Index for Tuesday, 28 June 2022

$$MYOR\ Index_i = MYOR\ Index_{i-1} \times \left(1 + \frac{MYOR_{i-1} \times n_{i-1}}{365} \right)$$

$$MYOR\ Index = 1.0135875142 \times \left(1 + \frac{1.99\% \times 1}{365} \right) = 1.0136427755$$

II. Calculation of compounded MYOR / MYOR-i from Monday, 27 June 2022 to next Monday, 4 July 2022.

a. Using the standard compounding formula for MYOR / MYOR-i:

$$\begin{aligned}\text{Compounded MYOR / MYOR-i} &= \left[\prod_{i=1}^{d_0} \left(1 + \frac{\text{MYOR}_i \times n_i}{365} \right) - 1 \right] \times \frac{365}{d} \\ &= \left[\left\{ \left(1 + \frac{1.99\% \times 1}{365} \right) \times \left(1 + \frac{2.00\% \times 1}{365} \right) \times \right. \right. \\ &\quad \left. \left(1 + \frac{2.00\% \times 1}{365} \right) \times \left(1 + \frac{1.96\% \times 1}{365} \right) \times \right. \\ &\quad \left. \left. \left(1 + \frac{2.00\% \times 3}{365} \right) \right\} - 1 \right] \times \frac{365}{7} \\ &= 1.99314\%\end{aligned}$$

b. Using the MYOR / MYOR-i Index:

$$\begin{aligned}\text{Compounded MYOR / MYOR-i from date x to y} &= \left(\frac{\text{MYOR Index } y}{\text{MYOR Index } x} - 1 \right) \times \frac{365}{d} \\ &= \left(\frac{1.0139749533}{1.0135875142} - 1 \right) \times \frac{365}{7} \\ &= 1.99314\%\end{aligned}$$