



# Methodology for calculating the Canadian Overnight Repo Rate Average (CORRA)

The Canadian Overnight Repo Rate Average (CORRA) is a measure of the cost of overnight general collateral funding in Canadian dollars using Government of Canada (GoC) treasury bills and bonds as collateral for repurchase transactions (repos).

The **CORRA methodology** took effect on June 15, 2020. The **CORRA Compounded Index** methodology took effect on April 6, 2021.

## Introduction

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The Bank of Canada took over the calculation and publication of CORRA from Refinitiv Benchmark Services (UK) Limited on June 15, 2020.<sup>1</sup> Users can access the CORRA data either **directly from the Bank** or from data distributors.

Using the methodology below, the Bank calculates CORRA based on transaction-level repo data that government securities distributors (GSDs), including primary dealers,<sup>2</sup> and the six largest federally regulated financial institutions in Canada (together, the submitters) submit to the Investment Industry Regulatory Organization of Canada (IIROC) through the Market Trade Reporting System (MTRS). This approach makes CORRA more robust, reliable and representative, similar to overnight risk-free reference rates published by other central banks. It also **aligns CORRA** with the **Principles for Financial Benchmarks** published by the International Organization of Securities Commissions.

The Bank provides CORRA, its corresponding statistics and historical data as a public good, at no cost to users and data distributors. Use and distribution of CORRA and CORRA Compounded Index do not require a licence agreement but are subject to important disclaimers, limitations and conditions.<sup>3</sup> The Bank accepts no responsibility or liability for the publication of the rates and statistics on its website.

The calculation methodology was developed under the guidance of the **Canadian Alternative Reference Rate Working Group (CARR)**, representing a wide range of market participants. It was also informed by CARR's **public consultations**, held February to April 2019, on the methodology enhancements.

## Illustrative historical time series

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### Disclaimer

In preparation for the transition to the new methodology, the Bank published an illustrative historical time series calculated using the new methodology. This time series is for informational purposes only. It does not replace previously published CORRAs and should not be used for purposes other than research and comparative analysis.

Data available as: **CSV**, **JSON** and **XML**

## Calculation methodology

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### Eligible repo transactions

- **Data source**—Daily transaction-level data on repo trades are submitted to the MTRS. These transactions account for the vast majority of Canadian-dollar overnight repo trades.<sup>4</sup> The Bank receives this repo data from IIROC, which operates MTRS. Repo data are reported in accordance with the **MTRS 2.0 User Guide** and IIROC **Rule 2800C**. The data cover all the overnight repos traded in Canada in which at least one counterparty is a submitter. Where the two counterparties are submitters and both submit the same transaction, the Bank uses matching algorithms to ensure the transaction is included only once in the CORRA calculation. Repos where neither counterparty is a submitter are not included in the calculation of CORRA.
- **Counterparty types**—Data include transactions in the interdealer, interbank and dealer-client repo markets. Only repo transactions conducted between unaffiliated counterparties<sup>5</sup> are included in the CORRA calculation.
- **Term and time to settlement**—Only repos with an overnight term for same-day settlement of the opening leg are included: that is, overnight trades that are agreed to and settled on the same day (T + 0).
- **Transaction type, securities and currency**—Only repos, reverse repos, buy-sellback and sell-buyback transactions where GoC treasury bills and bonds are posted as collateral and that are settled in Canadian dollars are included.
- **Exclusions**—Repos conducted with the Bank of Canada or as part of Receiver General cash auctions, transactions involving GoC strips and

residuals, open-term repos and tom-next repos<sup>6</sup> are excluded from the calculation.

## Calculation

CORRA is computed as the daily trimmed volume-weighted median (trimmed median) of eligible repo transactions defined above, as reported by submitters before the MTRS submission deadline of 22:00 ET on the day transactions occurred. Any repo trades that meet the above criteria but that are submitted to IIROC after the deadline are not included in the CORRA calculation. The rate is published in the percentage format with the same precision as the underlying repo trades, which is currently two decimal places: that is, precision to one basis point (e.g., 1.75 percent).<sup>7, 8</sup>

Specifically, to calculate CORRA, the Bank:

- orders eligible repos from the lowest rate to the highest rate and then removes the 25 percent of the volume of repos with the lowest rates. This trimming aims to exclude transactions initiated to source a specific scarce security (“specials”) rather than general collateral funding.
- finds the volume-weighted median rate of the remaining repos; i.e., CORRA is a rate at which half of the remaining trading volume is above and half is below it.

In the very unlikely event where two rates satisfy the above condition, the average of the two middle rates will be calculated. That average rate will not be rounded and could have a precision of one additional decimal place compared with the underlying repo trades.<sup>9</sup>

## Contingency arrangements

### Minimum trading volume

If the trimmed volume is below Can\$3 billion, or if the Bank is not able to calculate the rate for technical reasons, CORRA will be set at the “fallback rate.” This minimum threshold ensures that CORRA represents broad conditions in the market for overnight general collateral funding in Canadian dollars for GoC securities.

### Fallback rate

The fallback rate is equal to the Bank of Canada target for the overnight rate for that day plus the mean spread over the previous five business days between CORRA and the Bank of Canada target on those days. The fallback rate is rounded to match the precision of the underlying repo trades, which currently have a precision of two decimal places. When the published CORRA rate for a given day is the fallback rate, this will be clearly identified on the website.

Example:

- Bank of Canada target for the overnight rate: 1.75 percent
- CORRA on day 1: 1.77 percent (spread of 0.02)
- CORRA on day 2: 1.75 percent (spread of 0.00)
- CORRA on day 3: 1.78 percent (spread of 0.03)
- CORRA on day 4: 1.77 percent (spread of 0.02)
- CORRA on day 5: 1.78 percent (spread of 0.03)
- CORRA on day 6: 1.77 percent (Fallback rate. The mean spread between CORRA and the Bank of Canada target is 0.02 over past five business days)

## Data quality

IIROC applies technical data checks to ensure that data are reported in compliance with the technical requirements of MTRS. The Bank applies data filters and checks the validity and plausibility of the data to identify possible reporting errors before calculating CORRA.

## Outliers

If an individual transaction's size or repo rate, relative to the Bank of Canada target rate, is above or below a pre-defined threshold, the Bank will seek to confirm the accuracy of the submission with the submitter before publishing CORRA. The Bank will only exclude a transaction from the calculation if the submitter confirms, before the publication deadline, that there has been an error. Without such confirmation, the Bank will not exclude any transaction from the calculation. The Bank also monitors daily changes in repo volumes and repo rates—for each submitter and in aggregate—for signs of possible reporting errors.

## Repo transactions between two submitters

A repo transaction between two submitters is reported by both entities.

- Where the dates, quantity, price, repo rate and securities pledged as collateral match between two submitters, the volume of repos is divided by two to avoid double counting.
- Repo transactions between two submitters that cannot be matched are considered erroneous and are removed from the set of eligible repo transactions for the CORRA calculation.

## Repo transactions conducted through interdealer bond brokers (IDBBs)

Repo transactions conducted through IDBBs are reported twice if both parties to the transaction are a submitter. The repo transaction is reported only once if the other party to the transaction is not a submitter (e.g., a foreign bank).

- Where submitted repo transactions with an IDBB as counterparty have matching dates, quantity, price, repo rate and securities pledged as collateral, the volume of repos is divided by two to avoid double counting.

- Repos with an IDBB that do not have a corresponding match to other submitted IDBB repos are considered to be done with a counterparty that is not a submitter, and their volume is included as is.

## Repo transactions with other counterparty types

Repos between a submitter and any counterparty that is not a submitter are reported once and are included in the calculation as is.

## Publication

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### Use

The Bank provides CORRA and its corresponding statistics and historical data as a public good, at no cost to users and data distributors. Use and distribution of CORRA do not require a licence agreement but are subject to important disclaimers, limitations and conditions.<sup>10</sup> The Bank calculates CORRA based on the data submitted to IIROC by submitters. The Bank accepts no responsibility or liability for the publication of the rates and statistics on its website.

### Publication schedule

CORRA is published each day that Schedule I banks under the *Bank Act* (Canada) are open for business in Toronto, Ontario, Canada. The rate for a given day is published on the Bank of Canada's **CORRA webpage** at around 09:00 ET on the following business day.

### Delays

If technical issues prevent the calculation or publication of CORRA on schedule, the Bank may postpone publication until 11:00 ET. If the publication is postponed, a message will be displayed on the CORRA webpage. If technical issues persist, preventing the Bank from calculating and publishing CORRA using the standard methodology by 11:00 ET, CORRA will be set at the fallback rate.

### Republication

The Bank will republish CORRA and the corresponding statistics by 11:00 ET if it becomes aware before that time of significant errors that would impact the already-published CORRA for that day by at least one basis point. Revisions will be marked as such on the website. The Bank will republish CORRA only once on a given day. After the republication deadline of 11:00 ET has passed, no amendments will be made to CORRA or the corresponding statistics either on the day of publication or at any later date, even if the republication would result in a CORRA rate that deviated by more than one basis point.

## Published statistics

In addition to CORRA, the Bank publishes the following corresponding statistics daily:

- the number of submitters before trimming
- the total nominal value of transactions before and after trimming the bottom 25 percent (referred to as trimmed volume)
- the rate at which the bottom 25 percent of volume was trimmed
- the rates at the 5<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup> and 95<sup>th</sup> volume-weighted percentiles of trimmed volume

If the fallback rate is published, the Bank publishes only the trimmed volume and number of submitters. If such data are not available by the publication time, the Bank publishes only the fallback rate.

## Transparency policy

To support the transparency of implementing this methodology, the Bank regularly discloses the summary information on the calculation, publication and reporting of errors that are detected after publication.



**Access a summary of errors detected after publication.**

## CORRA Compounded Index

### Calculation methodology

The CORRA Compounded Index is a measure of the cumulative impact of CORRA compounding over time, starting from a base value of 100 on June 12, 2020. The index can be used to calculate CORRA compounded rate between any two dates. Each day, the CORRA index would be set as follows:

$$\text{CORRA Compounded Index}_i = \text{CORRA Compounded Index}_{i-1} \times \left( 1 + \frac{\text{CORRA}_{i-1} \times d_{i-1}}{365} \right)$$

Where:

- *CORRA Compounded Index<sub>i</sub>* = the CORRA Compounded Index for business day *i*
- *CORRA<sub>i-1</sub>* = CORRA for business day *i - 1*, which is published on business day *i*
- *d<sub>i-1</sub>* = number of calendar days for which *CORRA<sub>i-1</sub>* is compounded (*d* = 1, 2, ...)

- $i$  = series of ordinal numbers since the base date ( $i = 1, 2, \dots$ )

CORRA Compounded Index is published to eight decimal places (i.e., XXX.XXXX XXXX).

If a contract accumulated interest between two dates,  $x$  and  $y$ , parties to the contract could apply the following formula to get the aggregate compounding between these dates:

$$\left( \frac{\text{CORRA Compounded Index}_y}{\text{CORRA Compounded Index}_x} - 1 \right) \times \left( \frac{365}{d} \right)$$

Where:

- $\text{CORRA Compounded Index}_x$  = CORRA Index on start date of calculation period
- $\text{CORRA Compounded Index}_y$  = CORRA Index on end date of calculation period
- $d$  = number of calendar days in the calculation period



For illustrative examples of the compounding methodology and sample use of CORRA Compounded Index, see the [consultation paper](#).

## Publication

The Bank will publish CORRA Compounded Index at 11:30 ET after the CORRA setting has been finalized. The index is published on business days using the same holiday convention as CORRA. Note that CORRA Compounded Index for a given business day is published on that day whereas CORRA is published one business day following its value date.

## Governance

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The CORRA methodology and production is overseen by the Bank of Canada internal CORRA Oversight Committee and informed by an industry CORRA Advisory Group. In addition, the Bank's Internal Audit Department reviews the control framework on an annual basis.

## CORRA Oversight Committee

The Bank of Canada internal CORRA Oversight Committee is composed of senior Bank officers across the various functional areas, including the Chief Risk Officer and a senior representative of the Bank's Internal Audit Department. The committee meets quarterly and monitors the various processes on an ongoing basis to ensure they remain appropriate and satisfy high-quality standards. The committee also subjects the rate production process to regular independent and impartial reviews.

## CORRA Advisory Group

The **CORRA Advisory Group** consists of members representing a wide range of market participants with expertise in the Canadian repo market and CORRA-related financial instruments. The advisory group aims to include representation from buy- and sell-side firms, exchanges or clearing houses, and IIROC. The advisory group meets semi-annually. Its main role is to advise the Bank's CORRA Oversight Committee on changes in repo market functioning and emerging methodology issues, as well as on methodology or production changes undertaken as part of methodology reviews. Membership and the Chair rotate among institutions. **CARR** or one of its subgroups serves as the CORRA Advisory Group. The advisory group's terms of reference and list of members as well as agenda, minutes of meetings and documents of the advisory group are published on the CORRA Advisory Group website.

## Review of methodology

The Bank monitors the methodology for calculating CORRA on an ongoing basis to ensure it remains appropriate in light of any major changes to the structure of the Canadian repo market.

In addition, formal review of the methodology is undertaken by the CORRA Oversight Committee in consultation with the CORRA Advisory Group. These reviews take place under two distinct scenarios.

1. **Sunset provision:** A mandatory review of the CORRA methodology is undertaken every five years to ensure:
  - it remains representative of the market it measures, and
  - the data source and the data providers remain optimal for the calculation of the benchmark.

The depth of the review depends on the degree of any changes in the Canadian repo market.

### **Next mandatory review: 2025**

2. **Ad hoc review:** The CORRA Oversight Committee can request a change in methodology:
  - if its monitoring suggests the methodology no longer reflects practices in the domestic repo market, or
  - on the advice of the CORRA Advisory Group.

Any changes to the CORRA methodology are subject to public consultations.



Summary of reviews, results and changes to methodology will be published on the Bank of Canada website.

## Inquiries

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For any issues, complaints or inquiries about CORRA and its methodology, please **contact us**.

### Footnotes

1. Since CORRA publishes on the next business day, the Bank's first publication of CORRA was for Friday, June 12, 2020.[←]
2. The Bank's website provides a **list of GSDs and primary dealers**.[←]
3. See the **Terms of Use and Disclaimers**, which allow users to freely use, copy, distribute and transmit the rates and statistics published on the Bank's website, subject to the terms specified therein.[←]
4. For more details on the repo market share of GSDs and major banks, see C. Garriott and K. Gray, "**Canadian Repo Market Ecology**," Bank of Canada Staff Discussion Paper No. 2016-8 (March 2016).[←]
5. Affiliation is defined by the **IIROC Dealer Member Rules**.[←]
6. A tom-next repo is a repo that is executed today where the opening transaction settles tomorrow and the closing transaction closes the following day.[←]
7. Because CORRA is calculated as a median, the number of decimal points will be the same as the number of decimal points of the underlying repo trades in the data source.[←]
8. Even though daily CORRA is published to only two decimal places, "in arrears" and period-average calculations could be set to any number of decimal points by the users of CORRA.[←]
9. For example, if half the volume has a rate of 1.75 percent and the other half a rate of 1.76 percent, then the median and CORRA will be 1.755 percent.[←]
10. See the **Terms of Use and Disclaimers**.[←]