July 17, 2018

INTRODUCTION

The mandate of CARR is to help identify and seek to develop a new term risk-free Canadian dollar interest rate benchmark, as well as reviewing and enhancing the existing overnight risk-free rate benchmark (Canadian Overnight Repo Rate Average or CORRA). To undertake this work, CARR created two initial subgroups:

The *scope subgroup* was tasked with estimating the size and scope of financial instruments or products that currently reference the existing Canadian benchmark rates, Canadian Dollar Offered Rate (CDOR) and CORRA. This work is under way.

The *alternative reference rates subgroup* (SG) was charged with identifying potential alternative options to CORRA. These options were then assessed against a set of objective selection criteria to determine their viability. Below is an update and recommendation based on that work.

POTENTIAL OPTIONS

The SG identified five potential options for an alternative overnight benchmark rate:

1. Bank of Canada target for the overnight rate**:** the interest rate at which major financial institutions borrow and lend one-day collateralized funds among themselves; the Bank of Canada sets a target level for this rate.

2. **Unsecured overnight rate:** the rate at which financial institutions borrow from and lend to each other for one day on an uncollateralized basis in the interbank market.

3. **FX-implied overnight rate:** the overnight rate derived from interest rate parity by converting the prevailing overnight rate in a foreign currency to a Canadian equivalent through the foreign exchange (FX) market.

4. **Enhanced CORRA:** the collateralized overnight rate, similar to CORRA, but based on additional repo transactions through either an expanded range of counterparties or collateral.

5. **Blended overnight rate:** a blended rate compiled from a wide range of overnight rates, including enhanced CORRA combined with the above market-based overnight rates (i.e. the FX-implied overnight rate and unsecured overnight rates).

SELECTION CRITERIA

As occurred with benchmark reform work in other jurisdictions, the SG identified several key overarching properties and characteristics that an overnight reference rate should exhibit to be considered a viable benchmark. These properties included the following:

(i) assessment against the IOSCO Principles for Financial Benchmarks, such as being based on transactions, transparent and sustainable;

(ii) suitability of the benchmark; and

(iii) other considerations for adoption and transition.

RECOMMENDATION

The SG recommends removing the unsecured overnight rate, the FX-implied rate and the blended overnight rate from consideration—either as the overnight benchmark rate or as part of a fallback process. As summarized in **Appendix 1**, these options suffer from significant shortcomings and are not considered viable alternative reference rates based on their complexity and lack of robustness in the underlying market. The target rate should also be removed from consideration as the overnight benchmark rate, given that it did not meet the selection criteria in several areas. However, since it fared well overall, it could be part of the fallback process.

Going forward, the subgroup recommends that CARR focus its efforts on developing an enhanced CORRA as the Canadian overnight risk-free rate benchmark. Additional work will be required to determine the exact specifications of the enhanced CORRA, including what additional trades should be included in the calculation either by expanding the range of counterparties and/or collateral. Next steps will also include identifying potential data sources and their suitability for use in calculating the benchmark. Finally, for these next steps, it is recommended that the subgroup be expanded to include a wider set of stakeholders.

BACKGROUND ASSESSMENT OF THE ALTERNATIVE RATE OPTIONS

Option #1: Bank of Canada target for the overnight rate

The Bank of Canada target for the overnight rate is the interest rate at which major financial institutions borrow and lend one-day collateralized funds among themselves. The Bank of Canada sets a target level for that rate and typically uses the rate on overnight general collateral[1] as its guide to conditions in the overnight market.

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[1] Most of the collateral in the Canadian overnight market consists of Government of Canada debt. The repo market does not typically differentiate between specific Government of Canada securities, collectively referring to them as

Through the assessment process, the SG identified several key advantages of using the target rate. Importantly, it was viewed as being transparent, easily calculated, robust against manipulation, and having appropriate controls and governance.

It also has clarity of definition and is readily accepted by market participants. The target rate is also used to help to determine the prime rate, which is used to set interest rates for consumer loans, mortgages and other forms of lending. Similarly, given that the target rate is currently the fallback rate for CORRA,[2] the transition would be relatively easy if it were chosen as the alternative overnight risk-free rate.

However, there are also several drawbacks to using the target rate as the overnight benchmark. The SG noted that it is not transaction-based and therefore may not be representative of actual funding costs. As well, the benchmark rate is dependent on the current monetary policy framework. Finally, it is not consistent with risk-free rates currently being developed or selected in other major jurisdictions.

Ultimately, the SG felt that since the target rate is not transaction-based, not representative of actual funding rates and dependent on the current monetary policy framework, it is not an ideal choice for a benchmark overnight rate. However, considering that it is widely accepted by market participants and well understood, it could be used as part of the fallback process.

Option #2: Unsecured overnight rate

The unsecured overnight interest rate is the rate at which financial institutions borrow from and lend to each other for one day on an uncollateralized basis in the interbank market. The interbank market in Canada is used by smaller financial institutions without a broad domestic deposit base, as well as among participants in the Large Value Transfer System (LVTS) for end-of-day adjustment transactions[3].

The SG examined the unsecured overnight interest rate market in Canada to see if it was sufficiently robust to be used in the development or calculation of a benchmark overnight rate.

It was determined that most overnight unsecured lending in Canada is done late in the trading day, near the end of the LVTS payment cycle when LVTS members square their cash positions (i.e., those who are long cash lend to those LVTS members who are short cash). Since these transactions are done on an unsecured basis, they are not seen as a purely risk-free rate which

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general collateral; if a particular security is in demand, it can trade at a lower interest rate and is referred to as being on *special.*

[2] On days when interdealer volume does not exceed $500 million, CORRA sets at the Bank of Canada target rate.

[3] C. Reid, "The Canadian Overnight Market: Recent Evolution and Structural Changes", *Bank of Canada Review* (Spring 2007).

would potentially make the transition more difficult from the current CORRA which is a collateralized rate.

Examination of transaction data showed that unsecured trading at the end of the day is small, sporadic and dependent on the end-of-day cash positions of the various LVTS members. Moreover, the interest rate charged on overnight lending is often at the target rate as a matter of convention. Thus, this rate is more an administered rate than a market-derived rate.

The data analysis also showed that some unsecured overnight lending that took place throughout the rest of the day was very small and often done at levels below the target rate.

The SG felt that given the small size and administered nature of the unsecured market, it is not an acceptable choice for a Canadian overnight benchmark rate and would not be consistent with the IOSCO Principles for Financial Benchmarks.

Option #3: FX-implied overnight rate

An FX-implied overnight rate is derived from interest rate parity by converting the prevailing overnight rate in a foreign currency to a Canadian equivalent through the FX market.
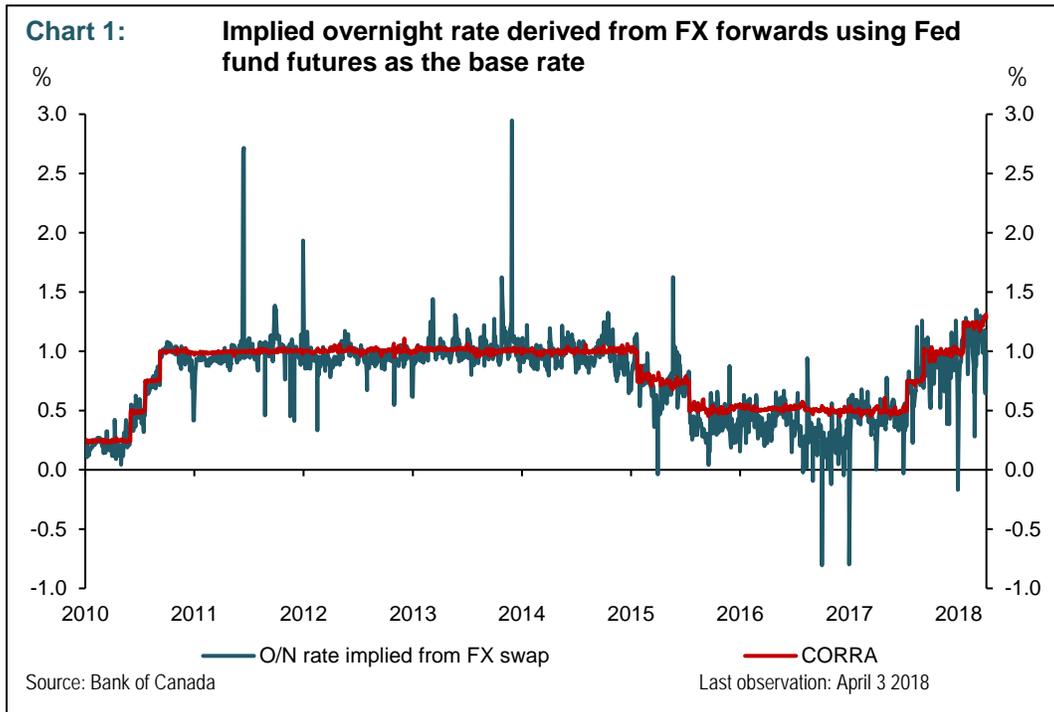
Such a rate derived from short-dated forward FX rates could have several beneficial properties as the benchmark rate. Most notably, it would be based on a significant amount of transactions, given the depth of the FX market. It could also be relatively easy to build a term rate, in light of the liquid term structure of the FX forwards market, if a robust foreign currency term rate was available.

However, the SG also identified significant drawbacks to using an overnight rate derived from FX forwards. Historically, this type of rate—as seen in **Chart 1**—has been very volatile relative to CORRA. As well, the FX-implied rate has tended to consistently trade below the current CORRA.

An FX-implied overnight rate is also susceptible to end-of-period distortions, where the implied rate could deviate significantly from CORRA as a result of either distortions in the FX forwards or in the foreign base rate chosen. The FX forward points could also be very volatile throughout the trading day, and there would need to be a clear process to capture the data, which is complicated by the fact that these FX forwards are traded globally.

Additionally, it would be necessary to select a base foreign currency overnight rate for the calculation, and it was considered somewhat problematic to be reliant on developments in another jurisdiction to determine a Canadian benchmark. The most likely candidate for this base rate was the recently introduced U.S. dollar Secured Overnight Financing Rate (SOFR).

The SG felt that the volatility of the FX-implied rate plus the reliance on a foreign benchmark outweighed any advantage that this transaction-based option would entail.

Chart 1: Implied overnight rate derived from FX forwards using Fed fund futures as the base rate

Source: Bank of Canada
Last observation: April 3 2018
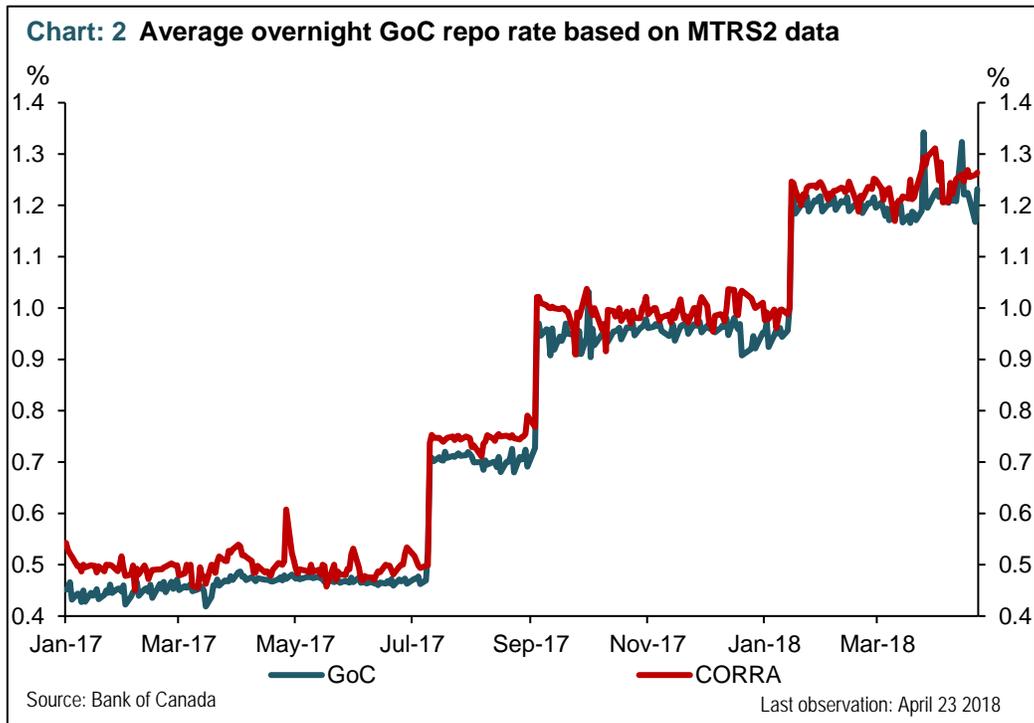
Option #4: Enhanced CORRA

The SG examined the option of enhancing the current version of CORRA with additional transactions, either by expanding the counterparties beyond dealer-to-dealer trades transacted through the three interdealer brokers and/or by expanding the collateral that is included in the calculation to incorporate a wider set of repo collateral.

The SG assessed the size of various repo markets in Canada to help determine what, if any, additional transactions could be included. Based on MTRS2[4] data, the total daily size of the overnight repo market against Government of Canada (GoC) collateral was estimated at roughly Can$50 billion.[5] This amount includes both specials and general collateral repo trades, as well as cleared[6] and non-cleared repo trades. Due to the inclusion of specials, the average rates on these transactions was 3 to 5 basis points (bps) below CORRA (**Chart 2**).

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[4] The Market Trade Reporting System (MTRS) contains a record of the trades conducted by the broker-dealers registered with the Investment Industry Regulatory Organization of Canada (IIROC). The data contain the date, time, price, quantity, security and counterparty type for each trade.
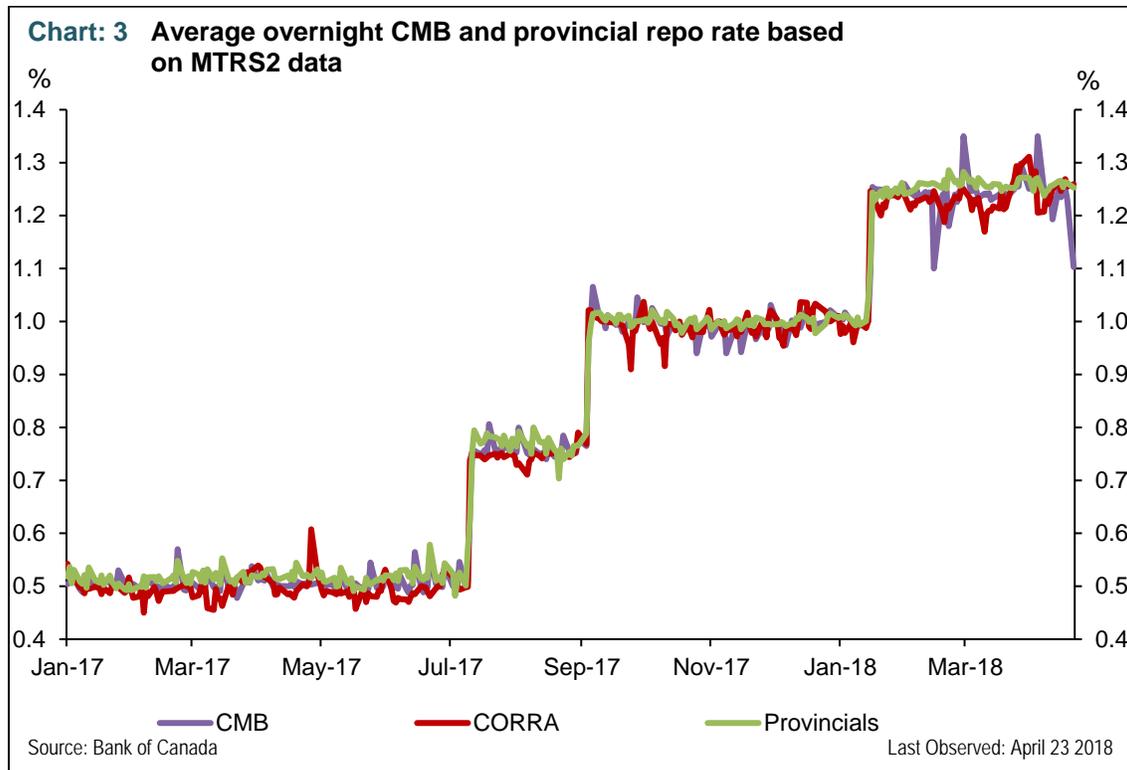
[5] The volume estimates are based on data from the beginning of 2017 and generally represent normal trading conditions.

[6] A repo trade intended for clearing is sent to the Canadian Derivatives Clearing Corporation (CDCC), where the original trade between the transacting counterparties is cancelled and replaced by two trades with the central

Chart: 2 Average overnight GoC repo rate based on MTRS2 data

Source: Bank of Canada

Last observation: April 23 2018

The SG also examined the size of the collateral market for overnight repos traded against Canada Mortgage Bond (CMB) collateral as well as provincial securities. Both markets were between Can$5 and Can$7 billion, with the average CMB repo rate being +0.5 to 1.0 bps above CORRA, while the rate for provincial collateral was +1.5 to 2 bps above (**Chart 3**).

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counterparty (CCP) as the counterparty. See Canadian Repo Market Ecology for additional background information on the Canadian repo market.

Chart: 3 **Average overnight CMB and provincial repo rate based on MTRS2 data**

Source: Bank of Canada

Last Observed: April 23 2018

Given the size of these overnight repo markets, the SG felt that an enhanced CORRA could be sufficiently transaction-based to be consistent with the IOSCO Principles for Financial Benchmarks. Further work is needed to determine the composition of the collateral for the calculation, including the availability of timely data and the robustness of the data.

A repo rate across different collateral types would be inconsistent with benchmark rates in other jurisdictions, where most of the secured reference rates chosen have focused on a specific type of collateral. However, given the availability of different collateral types, it could be possible to construct multiple non-benchmark repo indexes, which would improve market transparency.

An enhanced CORRA would potentially be more costly and difficult to administer than the current one, since it would require additional data and calculations. A more complex calculation methodology might also need to be developed to exclude the impact of specials from the calculation.

Finally, an enhanced CORRA was the only option that did not record a "does not meet" selection in the criteria listed in Appendix 1.

Option #5: Blended overnight rate

The SG also examined the possibility of having a blended rate compiled from a wide range of overnight rates including the enhanced CORRA, and the other overnight rates, specifically FX-implied overnight rate and the unsecured overnight rate.

By having the calculation reference additional rates, the benchmark would benefit from being more representative of overall funding levels and more resilient to any potential changes in funding markets going forward.

However, this option would also have significant drawbacks. Most notably, it would inherit the various negative issues associated with the other overnight rates, such as the volatility of the FX-implied rate and the limited data set of the unsecured rate. It would also be the most difficult of all the options to calculate and administer, considering its complexity. A blended rate would not be as transparent, and it could be more difficult for users to interpret its movements or changes.

Finally, a blended rate would be inconsistent with overnight risk-free benchmark rates in other jurisdictions, where most of the reference rates chosen have focused on only one type of rate as opposed to the several rates referenced in the blended approach.

Appendix 1: Assessment of the various options against the selection criteria

Legend:
- **Meets criteria** (green)
- **Partially meets criteria** (yellow)
- **Does not meet criteria** (red)
- **Unclear at this stage** (grey)

	Target Rate	Unsecured Rate	FX Implied Rate	Enhanced CORRA	Blended Rate
1) Basic properties of potential benchmark					
a. Assessment against IOSCO principles					
Sufficient and reliable market data to produce benchmark (i.e. transaction based)	red	red	red	green	red
Minimal opportunities for market manipulation	green	red	red	yellow	red
Published and governed by an appropriate administrator	green	grey	grey	green	grey
Commercial sustainability for administrator and data contributors	green	grey	grey	green	grey
Appropriate controls and governance	green	grey	grey	green	grey
b. Transparency and sustainability					
Clarity of definition	green	yellow	yellow	green	yellow
Clarity of calculation and setting	green	red	yellow	yellow	red
Clarity of development in future market states	red	red	yellow	yellow	red
Does not constrain monetary policy	red	yellow	yellow	green	yellow
2. Suitability of benchmark					
Extent to which it reflects actual market funding rates	red	red	yellow	green	green
Benchmark behaves as expected during normal and stress periods	green	red	yellow	yellow **	yellow
Ability to develop futures contracts based on benchmark	yellow	red	yellow	yellow	red
3. Other considerations for adoption/and transition					
a. Canadian-dollar focused					
Ease and low cost of implementation	green	red	red	yellow	red
Ease of transition from CORRA, if necessary	green	red	red	green	red
Same-day availability (e.g., at close of business)	green	grey	grey	grey	grey
Ease of building a term curve extension	yellow	yellow	yellow	yellow	yellow
b. International considerations					
Consistent with risk-free rates chosen for other currencies	red	yellow	yellow	yellow	red
Accepted internationally	yellow	yellow	yellow	yellow	yellow

**For enhanced CORRA, the performance of the index during stress periods would depend on what collateral is included in the final calculation. A benchmark index based entirely on Government of Canada securities would likely meet this criteria but there is less clarity if a wider set of collateral is adopted.