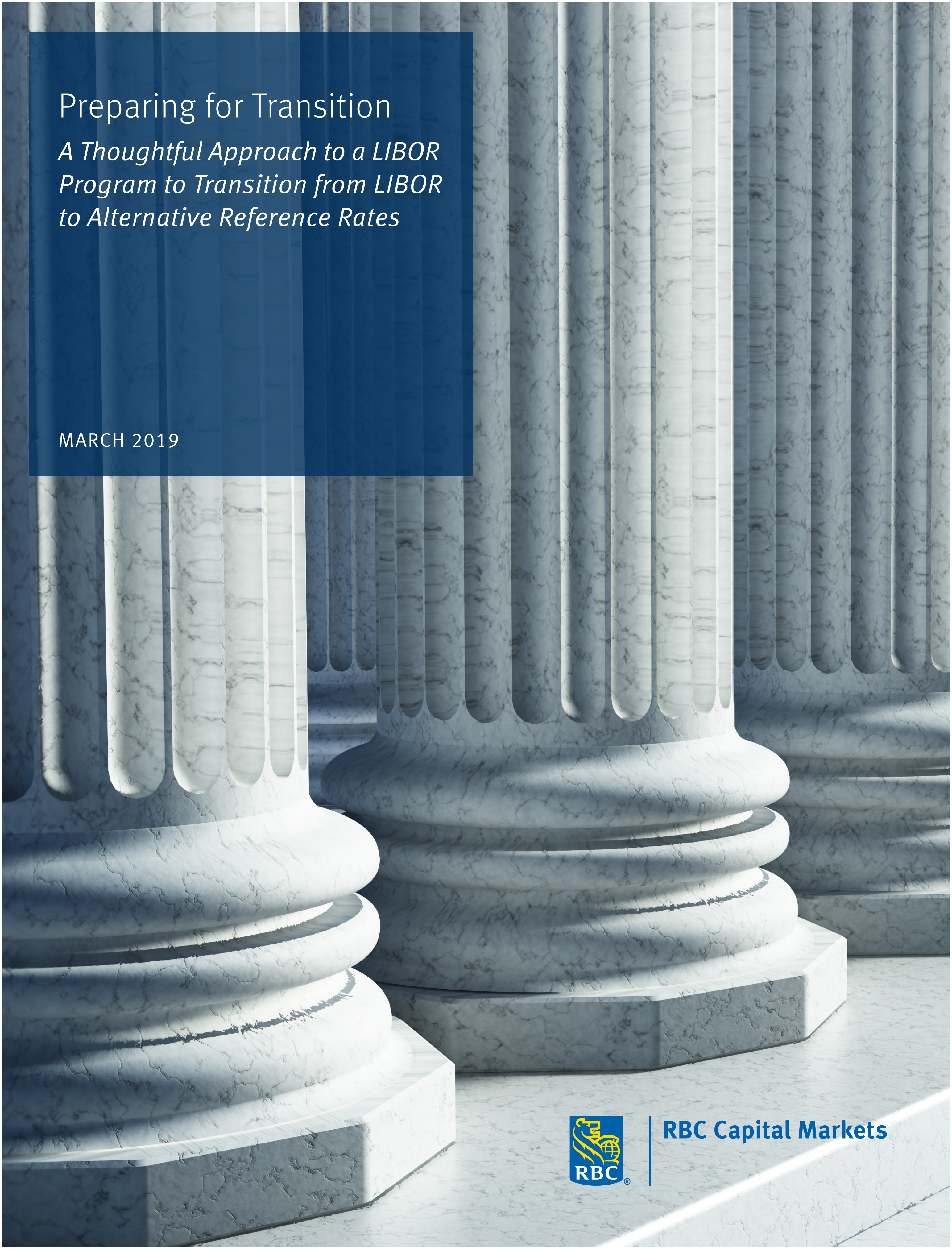
Preparing for Transition

A Thoughtful Approach to a LIBOR Program to Transition from LIBOR to Alternative Reference Rates

MARCH 2019



RBC Capital Markets

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SUMMARY

The calendar has turned, the year 2019 is here and we expect clients will begin preparing for life after LIBOR in earnest this year. We are less than three years away from the London Interbank Offered Rate (LIBOR) and other Interbank Offered Rates (IBORs) potentially being discontinued as global banks are only required to submit LIBOR until the end of 2021[1]. This report provides an update on the progress of the global interest rate benchmark reform since we published our inaugural report *Preparing for transition: Update on LIBOR and a Possible Shift to Alternative Reference Rates* in March 2018. In that report, we wrote about new replacement rates for LIBOR and other IBORs that are (nearly) risk-free (RFR) in certain major jurisdictions, including the Secured Overnight Funding Rate (SOFR) – the replacement rate for USD LIBOR and the Sterling Overnight Index Average (SONIA) – the replacement rate for GBP LIBOR. Since then, a Canadian working group composed of representatives from both the public and private sector has recommended the Enhanced Canadian Overnight Repo Rate Average (CORRA) as the RFR in Canada. In Europe, a similarly composed working group selected the Euro Short-Term Rate (ESTER) as the RFR in Europe.

Transitioning from IBORs to RFRs will cause a seismic shift in the financial markets and this transition is arguably the biggest challenge facing the financial markets today. IBORs form the plumbing in a wide range of financial instruments and are used to determine periodic interest payments for over USD$370 trillion globally in derivatives, futures, corporate bonds, loans, mortgages and other financial products. IBORs and their associated RFRs are not economically the same – contractual adjustments may need to be made to legacy contracts to make the cash flows (i.e. interest payments) as economically equivalent as possible after the transition. Additionally, new RFR products, including floating rate notes (FRNs), listed futures and other derivatives are entering the market in increasingly larger volumes.

Managing the transition will be complex. There is, however, some work that clients can consider doing today to ease the transition challenges. Clients may consider prioritizing the mobilization of an internal “IBOR Program” with pre-defined accountabilities and responsibilities to help prepare for the transition from IBORs to RFRs. This report provides an overview of an IBOR Program that clients may follow as a guide to help with their IBOR transition efforts. The IBOR Program’s mandate would include both the preparation to transition legacy IBOR positions to RFRs and the evaluation of new RFR products entering the market.

As liquidity in these products deepen, clients may consider evaluating whether RFR products would be appropriate for corporate financing needs and make the necessary data and technology investments to promote the use of RFR products.

Clients may wish to consider the following as part of their IBOR Program:

IBOR Exposure Assessment and Contract Inventory
Understand exposures to LIBOR and other IBORs in your portfolio, including exposures to derivatives, loans, bonds and other financial contracts

Review of Contractual Terms
Review and create an inventory of contracts referencing LIBOR or another IBOR

Contract Renegotiation
Prepare to re-negotiate impacted contracts, if necessary

IBOR Exposure Reduction Considerations
Consider reducing IBOR exposures by transitioning to RFR products

Infrastructure/Systems Changes
Investments to infrastructure, including technology and data systems may also be needed

Treasury Process Considerations
Consider issues related to tax, accounting (including hedge accounting) and corporate treasury issues (funds transfer pricing) particularly if valuation changes are anticipated as a result of the transition from IBORs to RFRs

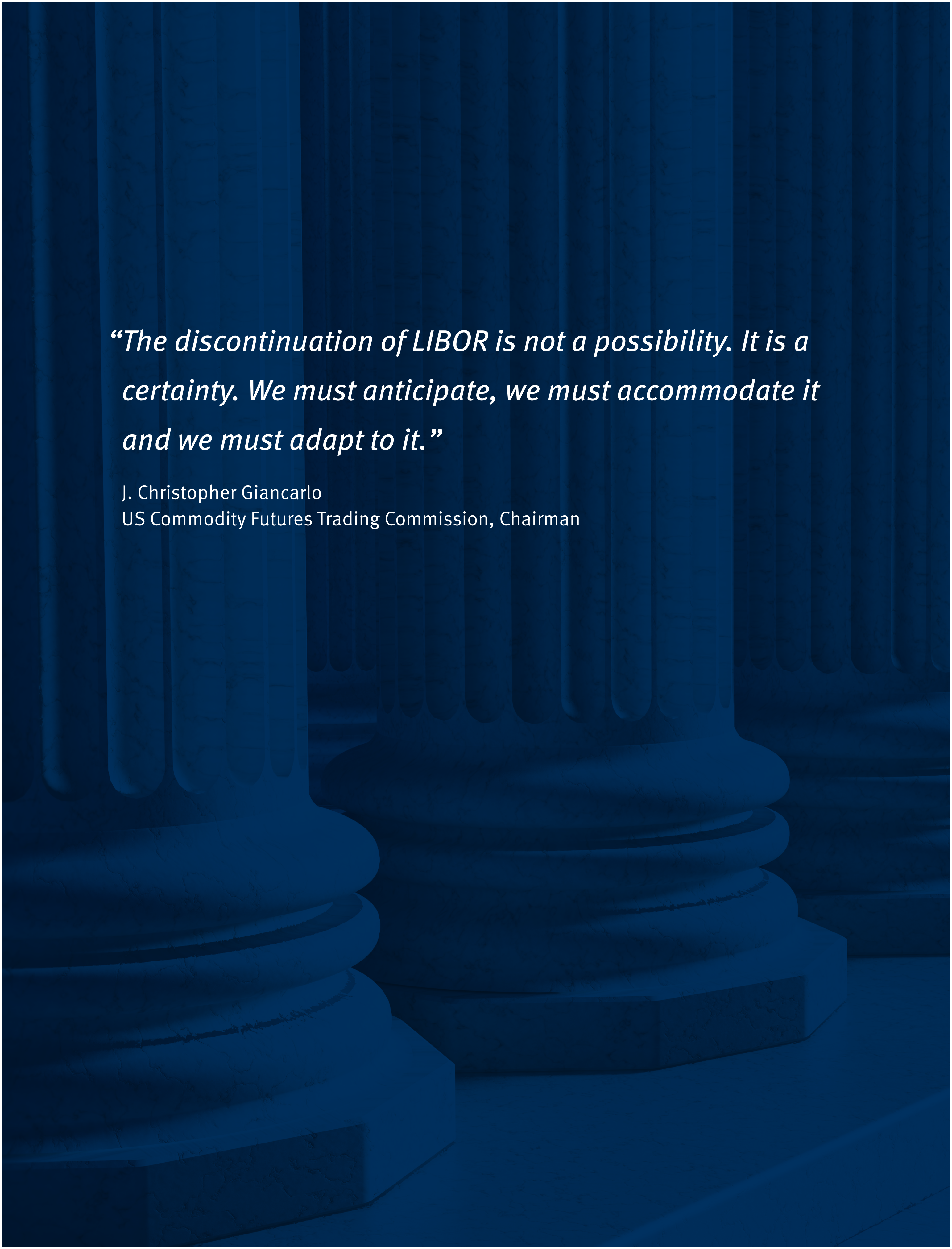
[1] Andrew Bailey, *The future of LIBOR* (July 2017): https://www.fca.org.uk/news/speeches/the-future-of-libor.

Leaving LIBOR behind will not be easy. After all, LIBOR has earned the right to be called the world's "most important number". In the US, the liquidity in SOFR derivatives materially lags behind USD LIBOR derivatives; for instance, in 2018 a paltry 52 SOFR-linked trades totalling USD$6 billion in notional value were traded compared to 600,000 USD LIBOR trades totalling ~ USD$110 trillion in notional value in the same period. The picture for RFRs derivatives trades in the UK is rosier as ~£8 trillion in SONIA-linked notional volume trades compares favourably with ~£9.8 trillion in GBP LIBOR-linked notional volume trades[2]. That SONIA products are more successful than SOFR products should be no surprise as SONIA has existed since 1997 while SOFR only began publishing last year. SONIA-linked FRNs have also emerged as the clear preference in the UK market for investors that want exposure to a floating interest rate since the market has developed the ability to model and process SONIA products. RBC has demonstrated strong market leadership in the UK and has been the #1 underwriter of SONIA linked bonds. RBC has lead/managed 20 separate SONIA transactions with a total notional size of £13.075 billion against the total issuance of £15.41 billion[3].

When we published our inaugural report on the IBOR transition there was much uncertainty. In the past year, however, a number of market and regulator-led working groups have solidified the foundation for a successful IBOR transition and the path forward is less foggy. RBC is truly committed to benchmark reform with a global staff that is solution oriented and prepared to assist clients in transitioning from IBORs to RFRs. We look forward to engaging with you in these efforts.

RBC HAS LEAD/MANAGED 20 SEPARATE SONIA TRANSACTIONS WITH A TOTAL NOTIONAL SIZE OF £13.075 BILLION AGAINST THE TOTAL ISSUANCE OF £15.41 BILLION.

[2] However, the GBP LIBOR-linked trade count is 10x the SONIA-linked trades. Source ISDA Swapinfo.
[3] Current as of February 1, 2019.



“The discontinuation of LIBOR is not a possibility. It is a certainty. We must anticipate, we must accommodate it and we must adapt to it.”

J. Christopher Giancarlo
US Commodity Futures Trading Commission, Chairman

BACKGROUND: IBORS AND RFRS

IBORs are interest rates at which banks can borrow in the interbank market on an unsecured basis from overnight to 12-months. The most widely used IBOR and the one that many of our clients will be familiar with is LIBOR, which is the IBOR for the London interbank market and is quoted in GBP, USD, EUR, Swiss Franc (CHF) and Japanese Yen (JPY)[4]. The 3-month LIBOR maturity, followed by the 6-month LIBOR maturity are the most widely referenced rates in all currencies by volume.

There has been a significant decline in the interbank unsecured funding markets in the last decade. Much of this decline can be attributed to changes in the banks' regulatory framework that have made it difficult for banks to borrow in the short-term unsecured markets and still satisfy global regulatory liquidity rules[5]. Since there is limited activity in the unsecured interbank market, the submissions from panel banks to set LIBOR are largely based on expert judgment (as opposed to actual transactions). For instance, in the US, the 3-month USD LIBOR (the most heavily referenced LIBOR tenor) had a median transaction volume of only USD$500 million per day in 2018[6]. These transactions underpin nearly USD$200 trillion in outstanding volumes of USD LIBOR contracts. In contrast, SOFR is estimated to be underpinned by approximately USD$750 billion in daily volumes. Similarly, in the UK during 2017, 3-month GBP LIBOR was underpinned by an average of only £ 187 million in deposits per day (3-month GBP LIBOR is the most widely used GBP tenor), whereas reformed SONIA had an average value of underlying transactions of £ 45 billion per day[7].

Because of these declining volumes, global regulators deemed that LIBOR and certain other IBORs were no longer "fit for purpose" to be the plumbing of the financial markets as some IBORs were not underpinned by sufficient volume of "actual transactions". A search for replacement rates for LIBOR and other IBORs began in 2014 through a number of regulator-led working groups in most major jurisdictions. In the US, the Alternative Reference Rate Committee (the ARRC), led by the US Federal Reserve selected SOFR as the replacement rate for USD LIBOR in 2018. In the UK, SONIA, a pre-existing rate was made more robust by increasing the underlying volumes of transactions to set the rate. In Europe, a Euro Short Term Rate (ESTER) was selected as the RFR for EUR, while in Canada, the Canadian Alternative Reference Rate (CARR) has recommended Enhanced CORRA as the RFR for Canada.

These regulator-led working groups are in various stages of developing "paced transition" plans to transition derivatives, listed futures, loans, floating rate notes (FRNs) and other financial contracts from LIBOR and other IBORs to RFRs. The first step in such paced transition plans is typically the development of RFR swaps, futures and other derivatives and deepening of liquidity in such products. Deep liquidity in listed futures is particularly important as such products can immediately be used to hedge interest rate risk and have hedging applications for repos and other short-term funding requirements. A medium-term step includes a plan to transition cash markets (loans, FRNs, securitization, etc.) products to RFRs. One of the final steps is the development of a forward-looking term rate for RFRs (similar to the current market convention for LIBOR) although there continues to be significant uncertainty if such a forward-looking term rate will materialize. Refer to Figure 1 for recent and upcoming milestones in IBOR reform and Appendix A for a broader transition timeline.

IBORS ARE UNSECURED RATES AT WHICH BANKS CAN BORROW FROM EACH OTHER IN THE INTERBANK MARKET.

[4] In addition to LIBOR, other IBORs include: the Hong Kong Interbank Offered Rate (HIBOR), the rate offered in the Hong Kong interbank market, the Tokyo Interbank Offered Rate (TIBOR), the rate offered in the Japan interbank market and the EUR Interbank Offered Rate (EURIBOR), the rate offered in the EUR interbank market.

[5] For instance, Basel Committee on Banking Supervision's (BCBS) liquidity rules such as the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) require banks to be funded by long-term debt (rather than short-term debt) and thus further reducing activity in the short-term interbank market.

[6] ARRC, *Second Report* (March 2018): https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2018/ARRC-Second-report.com at page 1. [Second ARRC Report]

[7] Working Group on Sterling Risk-Free Reference Rates, *Preparing for 2022: What you need to know about LIBOR Transition*: https://www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/what-you-need-to-know-about-libor-transition.pdf?la=en&hash=C1AF77CC308280CF84794D152005A3635546A850

RBC has been among the global banks at the forefront of this fundamental transition by providing leadership through active participation in a number of regulator and private sector working groups and committees whose mandate is to prepare the market for the transition from IBORs to RFRs.

In the next section of the report, we provide a framework that clients may wish to consider in establishing their own IBOR Program to prepare for the IBOR transition and an overview of new RFR products that have entered the markets that our clients may wish to use for their corporate financing and hedging needs. We will provide an update on the Canadian market, including an important public consultation that the Bank of Canada is conducting on the methodology for setting Enhanced CORRA.

We have also prepared a Companion Note that provides information on some of the more technical aspects of the transition, including details on the fallback triggers and methodologies for the cash and derivatives market that we think may be helpful for our clients.

Global regulators are aligned on the need for urgent action to prepare for the transition and have publicly stated that the pace of transition for the market from IBORs to RFRs has not been fast enough. RBC has mobilized staff and professionals from all lines of business to provide thought leadership and solutions to our clients. This report is a call to action to our clients as while there are considerable market challenges, there are also plenty of opportunities for clients to get ahead of the curve by preparing for the IBOR transition.

FIGURE 1: RECENT AND UPCOMING IBOR REFORM MILESTONES

		2019						
RFR and Region	**Past Milestones**	**Q1**	**Q2**	**Q3**	**Q4**	**2020**	**2021**	
SOFR	**Apr. '18** Publishing of SOFR begins **Jun. '18** First SOFR FRN issued **Jul./Oct. '18** London Clearing House (LCH)/ Chicago Mercantile Exchange (CME) begin trading SOFR swaps **Dec. '18** ARRC Consultation on fallback provisions for syndicated loans and FRNs	Start of cleared OIS trading using in SOFR as Price Alignment Interest (PAI) or discounting rate ARRC Consultation on fallback provisions for bilateral loans and securitizations	Additional ARRC consultations on derivatives fallbacks provisions for cash products and other benchmark transition issues. Publication of an "academic" term SOFR rate based on futures closes. It cannot be used in products.			**Q1** Central Clearing Counterparties (CCPs) such as LCH, CME to begin using SOFR for discounting	**Q2** CCPs to stop clearing swaps using Fed Funds as PAI or discounting rate Term Rate based on SOFR derivatives	**January 1, 2022 – LIBORs Could Discontinue**
Enhanced CORRA	**Sep. '18** Enhanced CORRA selected as Canadian RFR	CARR consultation on Enhanced CORRA methodology	CARR to publish final Enhanced CORRA methodology	Development of Transition Plan and Term Rate for Enhanced CORRA by CARR CARR to develop fallback language for use in new CDOR cash products				

FIGURE 1: RECENT AND UPCOMING IBOR REFORM MILESTONES (CONTINUED)

RFR and Region	Past Milestones	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020	2021	January 1, 2022 – LIBORs Could Discontinue
SONIA	**Apr. '18** Publishing of Reformed SONIA begins **Jun. '18** First SONIA FRN issuance; International Continental Exchange (ICE) and London Stock Exchange (LSE) begin trading SONIA futures **Oct. '18** Consultation on Term SONIA **Dec. '18** Banks submit IBOR transition risk mitigation plans to UK regulators			Expected Publication of Term SONIA Rate →				
ESTER	**Sep. '18** ESTER selected as EU RFR	EU RFR working group consultations on transitioning market form the Euro Overnight Index Average (EONIA) to ESTER and ESTER Term Rate			**Oct** Publication of ESTER			
Industry Wide	**Oct. '18** First ISDA consultation on fallback provisions for derivatives **Dec. '18** ICE consultation on SOFR discounting		Additional ISDA consultations on derivatives fallback provisions for additional benchmarks and currencies →		Publication of revised 2006 ISDA Definitions with new fallback provisions for derivatives referencing certain IBORs →			

"I hope it is already clear that the discontinuation of LIBOR should not be considered a remote probability 'black swan' event… Misplaced confidence is a risk to financial stability as well as to individual firms. The pace of that transition is not yet fast enough."

Andrew Bailey
Financial Conduct Authority, Chief Executive

THE PATH FORWARD: PRIORITIES TO CONSIDER FOR AN IBOR PROGRAM

As clients think through the IBOR transition challenges, clients may wish to consider prioritizing the mobilization of an IBOR Program with pre-defined accountabilities and responsibilities. While there continues to be considerable uncertainty on a number of issues related to transition efforts (some of which will be discussed elsewhere in this report), there is some work that can be done today to prepare your organization for the transition. The IBOR Program's mandate may include both the preparation to transition legacy IBOR referenced positions to RFRs and the evaluation of new RFR products entering the market. Additionally, considerable infrastructure development work may be required along with revisions to tax, accounting and other corporate treasury processes and systems. The IBOR Program could include the following priorities, which are not sequential nor exhaustive and can be solved for concurrently as the IBOR Program may have to iterate through various transition challenges.

IBOR PROGRAM PRIORITIES

IBOR Contract Inventory and Exposure Assessment
Understand **exposures** to LIBOR and other IBORs in your portfolio, including exposures to **derivatives, loans, bonds and other financial contracts**; review and create and inventory of contracts referencing LIBOR or another IBOR

Review of Contractual Terms
Review **contractual terms** to determine fallbacks if LIBOR or another IBOR temporarily or permanently discontinues

Contract Renegotiation
Prepare to **re-negotiate impacted contracts**, if necessary

IBOR Exposure Reduction Considerations
Consider **reducing** IBOR exposures by **transitioning** to RFR products

Infrastructure/Systems Changes
Investments to infrastructure, including **technology** and **data systems** may also be needed

Treasury Processes Considerations
Consider issues related to **tax, accounting** (including hedge accounting) and **corporate treasury issues** (funds transfer pricing) particularly if **valuation changes** are anticipated as a result of the transition from IBORs to RFRs

Refer to Appendix B for an illustrative example of the structure of an IBOR Program, which has been useful to RBC in mobilizing its own IBOR Program.

IBOR Contract Inventory and Exposure Assessment

Understand exposures to LIBOR and other IBORs in your portfolio, including exposures to derivatives, loans, bonds and other financial contracts; review and create and inventory of contracts referencing LIBOR or another IBOR

IBORs are referenced in a wide range of financial instruments and are used to determine periodic interest payments for over USD$370 trillion globally in derivatives, futures, loans, corporate bonds, mortgages and other financial products. All contracts for these products should be reviewed if they reference an IBOR. See Figure 2 below for products that may reference an IBOR.

FIGURE 2: EXAMPLES OF PRODUCTS THAT MAY REFERENCE IBORS

Benchmarks by Currency		Products	Product Examples	Selected Market Participants
▪ Canadian Dollar Offered Rate (CDOR) ▪ USD LIBOR ▪ GBP LIBOR ▪ EUR LIBOR, EURIBOR ▪ CHF LIBOR ▪ JPY LIBOR, JPY Tokyo Interbank Offered Rate (TIBOR), EUROYEN TIBOR	Derivatives Markets	Over-the-counter (OTC) derivatives	Interest rate swaps, forward rate agreements (FRAs), cross-currency swaps	▪ Governments ▪ Asset managers ▪ Pension funds ▪ Hedge funds ▪ Regulated funds ▪ Insurance/reinsurance companies ▪ Investment banks ▪ Corporations
	Derivatives Markets	Exchange-traded derivatives (ETDs)	Interest rate options, interest rate futures	▪ Exchanges ▪ Central counterparties (CCPs) ▪ Investment banks
	Cash Markets	Loans	Syndicated and bilateral loans, business loans, mortgages, credit cards, auto loans, consumer loans, student loans	▪ Corporations ▪ Investment banks ▪ SSA issuers
	Cash Markets	Bonds and floating rate notes (FRNs)	Corporate, financial institution, SSA (Sovereign, Supranational, Agency) bonds, leases, trade finance	▪ Corporations ▪ Investment banks ▪ Governments
	Cash Markets	Short-term instruments	Repos, reverse repos, time deposits, commercial paper	▪ Asset managers ▪ Pension funds ▪ Hedge funds ▪ Investment banks

Review of Contractual Terms

Review contractual terms to determine fallbacks if LIBOR or another IBOR temporarily or permanently discontinues

A priority item for any IBOR Program should be to understand the fallback mechanisms in existing contracts for loans, securitization and derivative products and newly issued products that reference LIBOR or another IBOR. A fallback provision in a contract is a clause that is triggered when an IBOR is temporarily unavailable or permanently discontinued. Most existing contracts only consider temporary and/or short-term disruptions to an IBOR. Upon disruption to the publication of an IBOR, certain contracts typically require soliciting quotes from reference or major banks. Once IBORs are permanently discontinued, it is impractical for firms to continuously approach banks for the remaining life of the contract. Indeed, it is unlikely that banks will be even willing to continue to provide quotes indefinitely.

If quotes are not available, many syndicated loans fallback to a prime rate (which is often considerably higher than the relevant IBOR). Alternatively, some securities fallback to the last reported IBOR, thus converting a floating rate security to a fixed rate security if an IBOR is permanently discontinued. Most over-the-counter derivatives contracts currently do not yet provide for the possibility that IBOR quotes will not be available. Many contracts do not contemplate that an IBOR would discontinue at all which exacerbates market confusion. If the existing fallbacks to IBORs fail to provide parties with a rate and the parties fail to agree to an alternative rate, there is a risk that the contract may be frustrated or a court may intervene and imply a rate. Refer to Appendix C for a list of common existing fallback provisions for certain products.

Because of the above-noted concerns, it is important to understand typical components of a fallback provision.

Following this initial contract review, the IBOR Program should create an inventory of those impacted contracts. Clients may wish to consider renegotiating these contracts with the assistance of their own advisors (including tax, legal and financial), to the extent necessary.

TYPICAL COMPONENTS OF A FALLBACK PROVISION

Trigger	What **trigger event** causes the contract to transition from IBOR to another reference rate? At a minimum, a fallback clause should be triggered if an IBOR is temporarily or permanently discontinued.
Reference Rate	Once a fallback is triggered, what is the **new reference rate**? For instance, is USD LIBOR replaced with SOFR?
Term and Credit Spread Adjustments	Are there term and credit spread adjustments in the fallback to adjust for **differences** between the IBOR and the replacement rate?
Amendment Process	What is the **amendment process**? In cash markets, amendments can require votes from a majority of lenders in a syndicate. Amendments to OTC derivatives typically require the consent of both parties to the trade.

Contract Renegotiation

Prepare to re-negotiate impacted contracts, if necessary

IBORs and their replacement rates (i.e. RFRs) are not economically the same; contractual adjustments may need to be made to contracts to minimize value transfer from one party to another as a result of the transition.

First, while IBOR rates are published for multiple terms (with the most common tenors being 1-, 3-, and 6-months), RFRs are all overnight rates. Additionally, some of the RFRs are secured and therefore do not carry the bank credit risk premium that is embedded in LIBOR and many other IBORs. Finally, even for unsecured RFRs, the credit risk is very small because RFRs are overnight rates. By way of example, see Figure 3 for differences between USD LIBOR and SOFR.

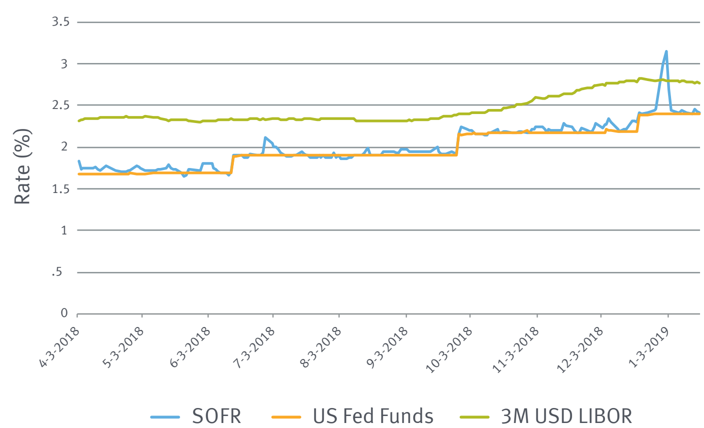
As a result of these fundamental structural differences, the market is developing methodologies to make both credit and term rate adjustments to the RFRs that have been selected as the fallbacks for certain IBORs. For instance, globally, ~34% of interest rate swaps that reference USD LIBOR will continue to exist after 2021[8].

These adjustments are needed so that the IBOR transition itself does not create winners or losers. For example, if a contract referencing 3-month USD LIBOR is transitioned to SOFR without any adjustments, the party paying the 3-month USD LIBOR will receive an unfair windfall as SOFR is several basis points (bps) lower than the 3-month USD LIBOR. Refer to Figure 4 for the spread between overnight SOFR, 3-month LIBOR and Fed Funds, as well as Appendix D for a list of RFRs in select jurisdictions.

FIGURE 3: STRUCTURAL DIFFERENCES BETWEEN USD LIBOR AND SOFR

USD LIBOR	SOFR
1. **Unsecured rate:** interest rate at which banks can borrow in the interbank market on an unsecured basis	1. **Secured rate:** measures the cost of borrowing cash overnight with US treasuries as collateral (also known as the repurchase rate)
2. **Multiple term rate:** available in 7 maturities from overnight to 12-months (with 3-months being the most widely used tenor)	2. **Overnight rate:** only available on an overnight basis
3. **Credit risk baked in:** the rate reflects the risk that the borrowing bank could default	3. **Minimal credit risk:** since the rate is secured and overnight, there is minimal credit risk
4. **Partially transaction based:** for tenors with limited trading volumes, quotes based on expert judgment are used	4. **Entirely transaction based:** rate is based on transactions in the repurchase market
5. **Privately administrated:** International Continental Exchange (ICE) acts as the administrator	5. **Publicly administrated:** the US Federal Reserve acts as the administrator
6. **Declining transaction volumes:** USD$500 million underlying transactions for 3-month USD LIBOR (the most widely used tenor)	6. **Robust transaction volumes:** USD$750 billion in underlying transactions

FIGURE 4: SPREAD BETWEEN SOFR, 3-MONTH USD LIBOR AND FED FUNDS[9]



[8] Second ARRC Report at page 2.
[9] Bloomberg, using daily data as of 10/12/2018. ICE LIBOR USD 3-Month (US0003M Index), United States SOFR Secured Overnight Financing Rate (SOFRRATE Index) and Federal Funds Target Rate Mid-Point of Range (FDTRMID Index).

In the following section, we provide an overview of the contractual adjustments under consideration in the derivatives and cash markets.

Consensus is emerging in derivatives markets on triggers, term rate and credit spread adjustments

Through a market consensus driven approach, ISDA has settled on the fallback triggers and the term rate and credit spread adjustment methodologies for the relevant RFR fallbacks for GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and the Australian Bank Bill Swap Rate (BBSW) – see Figure 5. We expect that ISDA will do a follow-up consultation in Q2, 2019 for USD LIBOR, CDOR – the IBOR in Canada, and the Hong Kong Interbank Offered Rate (HIBOR) – the IBOR in Hong Kongand that the fallback methodology for these rates will be consistent with the rates covered in the initial consultation[10]. These new fallbacks will be included in amendments to the 2006 ISDA Definitions (expected timeframe is end of 2019) and will apply to OTC derivative transactions that incorporate the terms of such Definitions and are entered into after the effective date of such amendments.

ISDA anticipates publishing a protocol in 2019 that will include the amendments to the 2006 ISDA Definitions with the new fallbacks for certain IBORs in transactions referencing such IBORs that were entered into prior to the effective date of the amended 2006 Definitions. Both the amendments to the 2006 Definitions and the protocol are expected to be published at the same time.

Refer to the Companion Note for further technical details on the Compounded Setting in Arrears and Historical Mean/Median Approach methodologies.

Consensus is emerging on triggers and fallbacks in the cash markets (loans, FRNs, securitization products) in the US

In the US, the ARRC is consulting on market standard language for fallback triggers and adjustments for cash markets for USD LIBOR to transition such contracts to SOFR. Asset classes under consultation include bilateral and syndicated loans, FRNs and securitization products. In Canada, the CARR is expected to launch similar public consultations for CDOR cash products in the latter half of 2019 with the developments in the US market a helpful precedent for the direction of the Canadian market.

The US cash markets are also considering fallback triggers *in advance* of permanent discontinuance of USD LIBOR (a Pre-Cessation Trigger). For example, a Pre-Cessation Trigger could be triggered if the benchmark's administrator determines that the quality of submissions for USD LIBOR has declined materially. Such Pre-Cessation Triggers are not common in the derivatives markets.

Another difference between the derivatives and cash markets is that the US cash markets have a clear preference for a forward-looking term rate that is available at the beginning of the term (similar to how LIBOR and other IBORs currently behave) with such a forward-looking term rate being the primary fallback once triggered. Regulator-led working groups, including the ARRC and the CARR, as part of their paced transition plans, expect to begin work on developing such a forward-looking term rate in the

FIGURE 5: PROPOSED ISDA FALLBACK TRIGGERS, TERM RATE AND CREDIT SPREAD METHODOLOGIES

Trigger	▪ A public statement by the benchmark administrator's regulatory supervisor (for instance the Financial Conduct Authority for LIBOR), the benchmark's administrator (for instance, ICE for LIBOR), or other entity with jurisdictional, insolvency or resolution authority over the benchmark administrator (e.g., the central bank, insolvency official, resolution authority or court), that the benchmark will no longer be published ▪ Fallback is triggered only once the benchmark stops being published (which could follow the announcement) and following that date the derivatives contract will fallback to the respective RFR with adjustments made for term rate and credit spread
Term Rate	▪ A compounded setting in arrears methodology will be used to set the term rate – this is the relevant RFR observed over the applicable term (e.g. 3 months) and compounded daily during that period (the Adjusted RFR)
Credit Spread	▪ A historical mean/median approach methodology is used based on the mean or median spot spread between the IBOR and the Adjusted RFR calculated over a significant, static lookback period (e.g. 5 or 10 years) prior to the relevant announcement or publication triggering the fallback provisions; the lookback period has not yet been set in the market

[10] ISDA has launched a public consultation to select a vendor to define the term rate and credit spread adjustments.

second half of 2019. However, there are considerable challenges in developing such a rate and it is not yet clear if a forward-looking term rate will materialize[11].

One emerging issue to be aware of is that the adjustments made to derivatives products could be different than the adjustments made to cash products. If derivatives and cash markets diverge on the triggers and term rate adjustments, increased basis between the two products will develop where the derivatives may no longer provide effective hedges to loans or bonds.

The Companion Note provide detail on the triggers and fallbacks under consideration in the US cash markets and the risks of divergence between the cash and derivatives markets. The note also provides an overview of the methodologies under consideration to construct a forward-looking term rate.

IBOR Exposure Reduction Considerations

Consider reducing IBOR exposures by transitioning to RFR products

In parallel with the work noted above on legacy transactions, we encourage clients to keep up-to-date on product offerings with respect to RFR products.

- Monitor the liquidity of futures and other derivatives trading activity of SOFR, SONIA and other RFR products.
- Monitor the issuance of FRNs referencing SOFR, SONIA and other RFRs to better understand market conventions and spreads.
- As liquidity in RFR swaps and futures markets deepens, we encourage clients to consider RFR corporate loans and FRNs for corporate finance and hedging needs.

If you have any questions about RBC offerings in connection with any of the above-noted products, please do not hesitate to contact your RBC Relationship Manager.

Liquidity indicators of RFR derivatives should be closely monitored; limited swaps activity in SOFR thus far, SONIA swaps activity is more advanced

There has been limited demand in the US for interest rate swaps referencing SOFR thus far. In 2018, notional volumes of SOFR-referenced interest rate swaps was only USD$6 billion compared to notional volumes of over USD$110 trillion referencing USD LIBOR. In contrast, the UK market is more advanced as unlike SOFR (which began publishing only last year), SONIA has existed since 1997 and therefore the market for SONIA derivatives is more developed compared to SOFR. The notional amount of swaps referencing SONIA and GBP LIBOR is at approximately USD$8 trillion and USD$9.8 trillion, respectively[12]. See Figure 6 for a comparison in other currencies.

FIGURE 6: COMPARISON OF SWAPS TRADING VOLUMES FOR SELECT IBORS AND RFRS – AS OF DECEMBER 28, 2018

	Notional (USD$ billions)	Trade Count
USD LIBOR	111,391	632,433
SOFR	3.8	24
Basis Swaps: SOFR	2.5	28
GBP LIBOR	9,807	78,057
SONIA	7,844	7,398
Basis Swaps: SONIA	134	813
CHF LIBOR	474	6,767
SARON	2.5	16
Basis Swaps: SARON	0.0	0
JPY LIBOR	3,547	37,293
TIBOR/Euroyen TIBOR	2.0	76
TONA	102	339
Basis Swaps: TONA	2.0	8

[11] Unlike the derivatives market, the US cash markets expect to have a waterfall of fallbacks to the term rate.
[12] Source: ISDA SwapsInfo.

~USD$30 billion in SOFR and ~£7 billion SONIA FRN issued in 2018; volumes expected to grow in 2019 onwards; "New Product" premium for RFR FRNs expected to tighten

In the fixed income markets, there were a number of SONIA and SOFR bond offerings in the past year. The issuers are principally financial institutions and sovereigns, supranational and agencies (SSAs). In 2018, 23 issuers issued over USD$30 billion in SOFR FRNs. It is expected that the activity for SOFR issuances will pick up pace in 2019 and beyond. In the first two months of 2019, FRNs referencing SOFR is already at ~USD$23.5 billion.

In 2018, in the UK, 10 issuers issued £6.8 billion in SONIA FRNs. SONIA-referenced FRNs products have emerged as the clear preference in the UK market for investors who want exposure to a floating interest rate with the market having developed the ability to model and process SONIA products. Additionally, the UK market so far has been comfortable with a compounded in arrears term rate (same as derivatives markets) to calculate coupon payments for FRNs.

Finally, the lower initial liquidity of SONIA and SOFR issuances initially led to a "new product" premium for a number of transactions; however, this premium has become largely negligible for SONIA issuances relative to GBP LIBOR issuances and is nearing flat for SOFR issuances relative to USD LIBOR issuances.

Trading of Listed Futures Activity is Picking Up; Over 1 million contracts referencing SOFR have traded at CME

A key liquidity metrics we encourage clients to closely monitor are the open interest and trading volumes for SONIA, SOFR and other RFR futures. The evolution of a liquid futures market is critical for the broad adoption of RFRs in the market as listed futures products have immediate uses for investing, risk management, and hedging applications for repos and other short-term funding requirements.

CME offers 1- and 3-month futures contract for SOFR; average daily volumes and open interest have both steadily increased since these products were first launch in May 2018.[13] The latest data from CME shows that open interest of SOFR futures surpassed 100,000 contracts in February, 2019 and ~USD$3.3 trillion notional amount has been traded. CME, ICE and LSE all launched SONIA futures in 2018.

RBC HAS THE LARGEST MARKET SHARE OF SONIA FRN ISSUANCES TO DATE AND HAS DEMONSTRATED MARKET LEADERSHIP IN HELPING THE UK MARKET TRANSITION FROM GBP LIBOR TO SONIA.

[13] CME, *February 2019 Rates Recap* (February 2019).

Infrastructure/Systems Changes

> Investments to infrastructure, including technology and data systems may also be needed

As we stated earlier, IBORs and their replacement rates, the RFRs, are not economically equivalent and as a result market participants may be required to make changes to their plumbing and infrastructure, including technology and data infrastructure. While the full range of required infrastructure changes will vary by organization, we encourage clients to take a thoughtful approach towards infrastructure and analytics, processing of RFR products, treasury and risk management systems to identify what changes or updates may be required – see Figure 7.

FIGURE 7: INFRASTRUCTURE CONSIDERATIONS

Infrastructure Information and Analytics	▪ Analytics on RFR bonds, loans, repos, swaps etc. ▪ Broker screen or third-party-provided data source for all RFR products (e.g. data sources could include historical data, trends and comparisons of IBORs vs. RFRs)
Process of FRNs, loans and derivatives	▪ Updates to systems including payment and clearing systems, financial reporting systems and trading platforms ▪ Ability to buy and sell RFR products ▪ Ability for settlement, accounting, reporting, and profit and loss analysis
Treasury and Asset Liability Management System	▪ System and accounting ability to use RFRs for fund transfer pricing, interest-rate risk, and forecast cash flows
Risk Management	▪ System changes to include the impact on pricing and risk management models including RFR curve construction, discount curves and pricing implications for RFR products such as discounting and valuations at Central Clearing Counterparties (CCPs)

Treasury Processes Considerations

Consider issues related to tax, accounting (including hedge accounting) and corporate treasury issues (funds transfer pricing) particularly if valuation changes are anticipated as a result of the transition from IBORs to RFRs

IBOR programs may have to manage a number of financial challenges and risks with respect to the transition from IBORs to RFRs. From a finance perspective, some of the key challenges are set out in Figure 8.

The Bank of Canada has launched a public consultation on the methodology for developing Enhanced CORRA

In Canada, the CARR was formed in March 2018 to review and enhance the existing Canadian overnight RFR benchmark, CORRA, and identify and develop a Canadian dollar term RFR benchmark.[14]

In July, CARR recommended Enhanced CORRA be used as the CAD RFR. The rationale was that revising an existing Canadian RFR, rather than introducing a new rate, is expected to ease the Canadian markets' transition to Enhanced CORRA and support its use, similar to what we have observed in the UK. In CARR's view, the following attributes of Enhanced CORRA as the RFR are attractive; Enhanced CORRA (i) is risk-free; (ii) represents overnight, general collateral funding; (ii) will be derived from more transaction volume than existing CORRA; and (iv) is simple and easy to understand.

Enhanced CORRA will be underpinned by more transaction volume than existing CORRA; Enhanced CORRA trading volumes expected to be CAD$10-20 billion per day

Based on the above noted objectives, the methodology set out in Figure 9 has been recommended by CARR.

The Bank of Canada is conducting a public consultation to solicit the public's views on the CARR's recommended approach to an Enhanced CORRA methodology. We encourage all clients to review this important Consultation Paper and provide responses to CORRAConsultation@bank-banque-canada.ca by April 30, 2019.

CDOR expected to continue alongside Enhanced CORRA

Canada is a dual rate market. CDOR is used for derivatives, FRNs and loans and, as of January 2018, was referenced by approximately CAD$11 trillion in financial instruments.[15]

FIGURE 8: KEY FINANCIAL CHALLENGES

Financial and Balance Sheet	▪ Analysis of the impact to balance sheet and risk exposures resulting from the transition is required
Accounting	▪ Changes to policy, processes and systems may be needed to apply the RFRs to current fair value measurement and hedge accounting frameworks
Tax	▪ Downstream impact assessment on revaluation of tax assets and liabilities is required
Funding	▪ Transfer pricing and funding that currently reference IBORs may need to be updated to align with the new RFRs
Corporate Treasury	▪ Loan and debt issuance programs will have to create a new market for RFR-linked FRNs, model redevelopment and validation, and related infrastructure changes

[14] RBC is a contributing member to CARR.
[15] Bank of Canada, *CDOR & CORRA in Financial Markets – Size and Scope* (September 2018): https://www.bankofcanada.ca/wp-content/uploads/2018/10/CDOR-CORRA-in-Financial-Markets-%E2%80%93Size-and-Scope.pdf.

By way of background, while CDOR, like LIBOR, is based on submissions from a panel of banks, there are significant differences between CDOR and LIBOR. LIBOR is a borrowing rate based on estimates of the cost of unsecured borrowing transactions between banks. However, CDOR is a bank lending rate at which banks commit to lend to their clients using an existing Bankers' Acceptance (BA) facility referencing CDOR. Therefore, unlike LIBOR, CDOR does not reflect the creditworthiness of the submitting bank. Since 2014, CDOR has been strengthened in a number of ways including the addition of an oversight committee that regularly reviews CDOR's definition, scope and methodology. Further, the Office of the Superintendent of Financial Institutions (OSFI) supervises the governance and risk controls surrounding the submission processes of the panel of banks, including RBC.

While we expect that CDOR will continue alongside Enhanced CORRA in the near to medium term, it is questionable if Canada has the depth of liquidity to support both CDOR and Enhanced CORRA in the long term. Additionally, as the rest of the world moves primarily to RFR swaps and FRNs, that will also put pressure on the Canadian market participants to use Enhanced CORRA products instead of CDOR products. For example, when Canadian banks and other market participants go offshore to raise funding, the foreign investors may demand a RFR product. In order to repatriate foreign funds back into Canada through cross-currency swaps, it would make commercial sense and reduce transactions costs if both legs were RFR swaps. Thus, the demand for CDOR products may be negatively impacted.

FIGURE 9: CARR RECOMMENDED ENHANCED CORRA METHODOLOGY

Eligible Transactions	Derived from repo transactions with the following attributes:
Counterparties	▪ Any two counterparties where data can be sourced (includes both interdealer and client-to-dealer trades)
Term and time to settlement	▪ Overnight term for settlement same-day (i.e. trades which are agreed to and settled on T+0)
Securities and currency	▪ Government of Canada (GoC) bonds or GoC Treasury Bills settled in Canadian dollars
Rate Calculation	▪ CORRA will be computed as the daily trimmed volume-weighted mean (trimmed median) of daily eligible transactions ▪ The trimmed median is computed after removing the lower volume-weighted 25th percentile by repo rate from the set of eligible repo transactions (additionally, transactions that aim to source a specific scarce security, "specials"[16], rather than funding will also be excluded)

CANADIAN DEVELOPMENTS; ENHANCED CORRA WILL BE THE RFR IN CANADA – THE METHODOLOGY FOR SELECTING ENHANCED CORRA IS UNDER PUBLIC CONSULTATION

[16] "Specials" are repo transactions that are motivated by the need to source specific securities rather than to source cash (for example, to source a security to close out a short position.)

CONCLUSION

Significant progress was made in 2018 to set a foundation to transition from IBORs to the RFRs. More work still lies ahead as the market has less than three years until LIBOR is at risk of discontinuance. We encourage clients to begin, ramp-up or accelerate benchmark transition efforts this year and we hope that this report and the framework provided can assist in these efforts. We anticipate increased regulatory and market pressure over the coming months and years to ensure we are all doing our part to support the IBOR transition. RBC has top-to-bottom organizational commitment across business lines to assist our clients in navigating the challenges ahead – we look forward to engaging with clients in these efforts.

APPENDIX A – IBOR REFORM TIMELINE

2013

July 2013
International Organization of Securities Commissions (IOSCO) published the *Principles for Financial Benchmarks*

2014

July 2014
The Financial Stability Board (FSB) published *Reforming Major Interest Rate Benchmarks*

September 2014
Enhanced Canadian Dollar Offered Rate (CDOR) benchmark-setting submissions guidelines published by Office of the Superintendent of Financial Institutions (OSFI)

November 2014
Alternative Reference Rate Committee (ARRC) established to identify the USD alternative Risk Free Rate (RFR)

2015

March 2015
The Working Group on Sterling RFRs was established to identify the GBP RFR

April 2015
The Study Group on Risk-Free Reference Rate was established to identify the JPY RFR

2016

December 2016
Tokyo Overnight Average Rate (TONA) was selected as the JPY RFR

2017

April 2017
Reformed Sterling Overnight Index Average (SONIA) was selected as the GBP RFR

June 2017
The Secured Overnight Financing Rate (SOFR) was selected as the USD RFR

July 2017
Andrew Bailey, Chief Executive of the Financial Conduct Authority (FCA), announced that the FCA would not use its influence or legal powers to persuade or compel panel banks to make LIBOR submissions after the end of 2021

September 2017
Working Group on EUR Risk-Free Rates established to identify the EUR RFR

2018

March 2018
Canadian Alternative Reference Rate (CARR) working group was established to identify the CAD RFR

April 2018
SOFR began to be published

Reformed SONIA began to be published

May 2018
New Bank Bill Swap Rate (BBSW) calculation introduced using weighted average price methodology

June 2018
First SONIA Floating Rate Note (FRN) Issued

SONIA futures begin trading

July 2018
Andrew Bailey calls on firms to ramp up their efforts to transition to the RFRs

First SOFR FRN issued

SOFR swaps begin trading

September 2018
Enhanced Canadian Overnight Repo Rate Average (CORRA) selected as CAD RFR

EUR Short Term Rate (ESTER) selected as EUR RFR

October 2018
Working Group on Sterling RFRs held consultations on Term SONIA

International Swaps And Derivatives Association (ISDA) held consultations on derivatives fallback provisions

December 2018
ARRC held consultations on fallback provisions for syndicated loans and FRNs

UK banks submitted IBOR transition risk mitigation plans to UK regulators

Intercontinental Exchange (ICE) held consultations on SOFR discounting

2019

Q1 2019
CARR published consultation on Enhanced CORRA methodology

ARRC holds consultations on fallback provisions for bilateral loans and securitizations

Cleared OIS trading to start using SOFR as Price Alignment Interest (PAI) or the discounting rate

EUR RFR working group holds consultations on EONIA transition and ESTER term rate

Q2 2019
CARR to publish final Enhanced CORRA methodology

CARR to develop fallback language for use in new CDOR cash products

H2 2019
Development of Transition Plan and Term Rate for Enhanced CORRA

ARRC to publish an "academic" term SOFR rate based on futures

ARRC consultations on fallback provisions for cash products and other benchmark transition issues

Publication of Term SONIA

Publication of ESTER

ISDA consultations on derivatives fallback provisions for additional benchmarks and currencies

2020

Q1 2020
EU Benchmark Regulation transition period ends, EONIA at risk of being discontinued

Central counterparties (CCPs) to begin using SOFR for discounting

Publication of revised 2006 ISDA Definitions with new fallback provisions for OTC derivatives products

2021

Q2 2021
CCPs to stop clearing swaps using US Fed Funds as PAI or discounting rate

Q4 2021
Term SOFR rate developed based on SOFR derivatives

End 2021
LIBOR at risk of being discontinued

APPENDIX B – SAMPLE IBOR PROGRAM FRAMEWORK

IBOR Transition Office:
Identify and nominate a senior executive – IBOR Transition office executive

Impact and Exposure Management	Legal and Documentation	Business Process and Technology	Industry Engagement and Stakeholder Communication
▪ Primary focus is on understanding the impact of the IBOR transition to the organization ▪ Outcome of the impact assessment(s) can then be used to drive the organization's strategy to how it will handle / manage the transition, including when it will cease purchasing IBOR-referenced products and focus on purchasing new RFR-based products	▪ Keep updated and aware of industry developments, including with respect to proposed triggers and fallback language, eg., ISDA consultations on new fallback provisions for certain IBORs ▪ Review and analyze proposed language from industry working groups, such as ISDA, LTSA and ARRC to determine most appropriate organizational response ▪ Update / renegotiate contracts and documents as required	▪ Identify processes, models, systems that reference and / or use IBORs that will need to be updated to reference the RFRs ▪ Implement changes / updates to process, models, systems as required ▪ Identify potential financial implications and manage the associated changes, i.e., tax, accounting policy, hedge accounting, etc.	▪ Develop a comprehensive communication strategy to ensure internal awareness of the transition and the response of the organization ▪ Engage with industry working groups / peers as appropriate ▪ Follow industry developments to ensure organizational response keeps pace

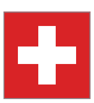
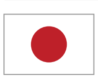
APPENDIX C – SAMPLE OF EXISTING FALLBACK PROVISIONS FOR VARIOUS ASSET CLASSES IN THE EVENT THE IBOR REFERENCE RATE IS DISCONTINUED

Product Type	Fallback Provisions[17, 18]
DERIVATIVES	▪ Under the current 2006 ISDA Definitions, if the specified rate source for USD LIBOR is not available, the calculation agent will request quotes from four banks in the London interbank market. If less than two quotes are given, the calculation agent will solicit quotes from major New York-based banks. The rate will be the arithmetic mean of the quotes given.
MORTGAGES AND CONSUMER LOANS	▪ For mortgages, the mortgagee typically has ultimate authority to name a successor rate. Consumer loans are more varied, but provide similar flexibility to the lender.
FLOATING RATE NOTES (FRN)	▪ Calculation agent appointed under the documentation must first poll a sample of banks for a fallback rate (first the European banks, and if no quotes are available, followed by the US banks). If quotes are not received, the note will convert to fixed-rate at the last published value of LIBOR. ▪ Most FRNs require unanimous consent of the noteholders to adjust these terms.
SECURITIZATIONS	▪ Fallback provisions typically require a poll of banks for a fallback rate. If quotes are not received, the security will convert to a fixed-rate at the last published value of LIBOR or the prime rate.
Agency Mortgage Backed Security (AMBS)	▪ Agencies have the contractual right to name a successor rate.
Commercial Mortgage Backed Security (CMBS)	▪ The CMBS can revert to the prime rate, but this could present basis risk. Changes to the reference rate require unanimous consent from investors.
Collateralized Loan Obligation (CLO)	▪ CLO indentures are a particularly difficult set of contracts to amend as many such indentures require 100% vote of each class and the majority of equity holders.
CORPORATE LOANS	
Bilateral Loans	▪ Bilateral loans may have the flexibility to be renegotiated by the borrower and the lender to include fallback provisions in case of permanent discontinuation of LIBOR.
Syndicated Loans	▪ Syndicated loans typically require unanimous lender consent to amend their RATS (rate, amortization, term, and security/collateral) terms. However, syndicated loans are amended frequently and they are expected to have an easier transition than CLOs to the RFR.

[17] The above fallback provisions are provided for illustrative purposes only and are not comprehensive of all the possibilities in legal documentation. Please review your own documentation to fully understand your legal position if LIBOR and other IBORs are permanently discontinued.

[18] These provisions take effect in the event the reference rate is discontinued. Much of this information was taken from ARRC's analysis of fallback provisions, as presented at the November 2, 2017 ARRC roundtable. Materials are available at: https://www.newyorkfed.org/arrc/meetings-events.

APPENDIX D – RFRS IN SELECT JURISDICTIONS

Currency	Working Groups	RFRs	RFR Regulator	RFR Publication Date
	Canadian Alternative Reference Rate	▪ **Canadian Overnight Repo Rate Average (CORRA)** is secured, overnight, and transaction-based. It is a measure of the average cost of overnight collateralized funding and covers the overnight repo market ▪ The Canadian Alternative Reference Rate (CARR) Working Group has recommended that Enhanced CORRA should be the Canadian RFR	Bank of Canada	Already being published
	Alternative Reference Rate Committee	▪ **Secured Overnight Financing Rate (SOFR)** is secured, overnight, and transaction-based. SOFR encompasses multiple repo market segments ▪ Each business day, SOFR is published by the New York Fed at approximately 8am and will reflect data for the prior business day	Federal Reserve Bank of New York	Already being published
	Working Group on Sterling Risk-free Reference Rate	▪ **Reformed Sterling Overnight Index Average (SONIA)** is unsecured, overnight, and transaction-based ▪ Each London business day SONIA is published by the Bank of England at 9am and will reflect data for the prior business day	Bank of England	Already being published
	Working Group on Euro Risk-free Rates	▪ **European Short Term Rate (ESTER)** is unsecured, overnight, and transaction-based	European Central Bank (ECB), the Financial Services and Markets Authority (FSMA), the European Securities and Markets Authority (ESMA) and the European Commission (EC)	Expected to be published in October, 2019
	The National Working Group on CHF Reference Rates	▪ **Swiss Average Rate Overnight (SARON)** is a secured overnight rate that reflects interest paid on interbank overnight repo transactions ▪ **The entire CHF Tomorrow Overnight Indexed Swap (TOIS)** market was transitioned to SARON on December 29, 2017 upon the TOIS rate's discontinuation	Swiss National Bank	Already being published
	Study Group on Risk-free Reference Rates	▪ **Tokyo Overnight Average Rate (TONA)** is unsecured, overnight, and transaction-based. It reflects the uncollateralized overnight call rate market	Bank of Japan	Already being published

GLOSSARY

Alternate Reference Rate Committee (ARRC)	ARRC is a US Federal Reserve led working group whose mandate includes preparing the US market to transition from USD LIBOR to SOFR.
Bank Bill Swap Rate (BBSW)	BBSW, published by the Australian Securities Exchange, is the reference rate based on the average interest rate at which banks can borrow on an unsecured basis in Australian interbank market.
Basel Committee on Banking Supervision (BCBS)	A forum for regulatory cooperation on banking supervisory matters. Its objective is to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide.
Bank of Canada	The central bank of Canada; its role is to formulate the country’s monetary policy and to promote the economic and financial well-being of Canada.
Bank of England	The central bank of the United Kingdom (UK); its role is to regulate and supervise financial firms in the UK, as well as set monetary policy and maintain financial stability.
Canadian Alternative Reference Rate (CARR) Working Group	CARR is a Bank of Canada led working group whose mandate includes selecting a CAD RFR and preparing the Canadian market for the transition to that rate.
Canadian Dollar Offered Rate (CDOR)	CDOR, published by Thomson Reuters, is the average rate at which banks are willing to lend funds against issuance of bankers’ acceptances (BAs) in the Canadian market. CDOR is a committed (i.e. executable) lending rate.
Canadian Overnight Repo Rate Average (CORRA)	CORRA is a secured, overnight and transaction-based rate. CORRA is a measure of the average cost of overnight collateralized funding.
Euro Interbank Offered Rate (EURIBOR)	EURIBOR, published by the European Money Markets Institute, is the reference rate based on the average interest rate at which banks can borrow on an unsecured basis in the Euro interbank market. EURIBOR is quoted in eight maturities ranging from one week to 12 months.
Fallback	Contractual terms that take effect when the referenced benchmark is discontinued or another trigger event has occurred. The fallback could determine the successor rate, the term structure methodology and the applicable credit spread.
Financial Conduct Authority (FCA)	The financial conduct regulator in the UK; it regulates financial firms that provide services to consumers, including banks, mutual societies and financial advisers.
Financial Stability Board (FSB)	An international body that monitors and makes recommendations about the global financial system. Its mandate is to promote international financial stability.
Interbank Offered Rates (IBORs)	IBORs are interest rates at which banks can borrow in the interbank market. IBORs have a term rate ranging from overnight to 12 months. IBOR rates are determined based on quotes submitted by a panel of banks. The major IBORs include CDOR, LIBOR, EURIBOR and TIBOR.

International Organization of Securities Commissions (IOSCO)	The international body that brings together the world's securities regulators and is recognized as the global standard setter for the securities sector. IOSCO develops, implements and promotes adherence to internationally recognized standards for securities regulation.
International Swaps and Derivatives Association (ISDA)	A trade organization that represents participants in the market for over-the-counter derivatives. It represents over 875 members from 68 countries. ISDA's membership comprises a broad range of derivatives market participants that include banks, corporations, investment managers and governments.
London Interbank Offered Rate (LIBOR)	LIBOR, published by the ICE Benchmark Administration, is the reference rate based on the average interest rate at which banks can borrow on an unsecured basis in the London interbank market. LIBOR is the most widely used IBOR. LIBOR is quoted in five currencies: British Pound Sterling (GBP), US Dollar (USD), Euro (EUR), Swiss Franc (CHF) and Japanese Yen (JPY). LIBOR is quoted in fifteen maturities ranging from overnight to 12 months.
Risk Free Rates (RFRs)	The RFRs are alternative interest rate benchmarks that have been selected to replace IBORs. These rates are based on actual transaction data, instead of quotes from a panel of banks. The characteristics of individual RFRs vary from jurisdiction to jurisdiction.
Secured Overnight Financing Rate (SOFR)	The RFR selected by the US to replace USD LIBOR. SOFR is a secured, overnight, and transaction-based rate.
Sterling Overnight Index Average (SONIA)	The RFR selected by the UK to replace GBP LIBOR. SONIA is an unsecured, overnight, and transaction-based rate.
Tokyo Interbank Offered Rate (TIBOR)	TIBOR, published by the Japanese Bankers Association, is the reference rate based on the average interest rate at which banks can borrow on an unsecured basis in the Japan interbank market. TIBOR is quoted in six maturities ranging from one week to 12 months. There are two forms of TIBOR rates: Japanese Yen TIBOR rate (reflecting rates in the unsecured call market) and Euroyen TIBOR rate (reflecting rates in the offshore market).
Tokyo Overnight Average Rate (TONA)	The RFR selected by Japan to replace TIBOR and JPY LIBOR. TONA is an unsecured, overnight, and transaction-based rate. It reflects the uncollateralized overnight call rate market.

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