MEMORANDUM

TO:	ISDA and Market Participants
FROM:	The Brattle Group
SUBJ:	Instructions on Using the Excel Model
DATE:	December 18, 2019

This memo provides basic instructions on how to use the Excel model provided by the Brattle Group to help market participants understand the implications of the different options and variations for the historical mean/median approach to the spread adjustment for fallbacks in derivatives referencing certain interbank offered rates (IBORs). The Excel model is designed to provide details on the calculations underpinning the historical mean/median approach to the spread adjustment for each tenor of each different IBOR pursuant to specific options selected by the user. This model is an update to the previous Excel model, published on September 18, 2019, to include support for EUR LIBOR and EURIBOR.

Use of the Excel model requires a Bloomberg terminal for input data. If you do not have access to a Bloomberg terminal, please contact a Bloomberg representative or fallbackconsult@isda.org.

I. General System and Excel Settings Requirements

This model was created in Microsoft Excel 2016 with dates in U.S. format. Opening this workbook in other regions or in a different version of Microsoft Excel may result in the model not functioning as originally intended. This model has not been tested in older versions of Excel.

Please follow the steps below to launch the Excel model on a Bloomberg terminal:

1. Open the Bloomberg application on a Bloomberg terminal.
2. Log in to the Bloomberg application.
3. Open the Excel model.
4. Turn on automatic formula updating through Formulas > Calculation Options > Select "Automatic".
5. Enable VBA through File > Options > Add-ins > Highlight "Analysis ToolPak - VBA" > Click "OK".

Please liaise with your IT department to enable VBA if you encounter any issues.

If you have questions, please contact fallbackconsult@isda.org and clearly indicate in the subject line and content that your email relates to the Excel model. ISDA staff will direct you to the relevant ISDA contact(s) at Bloomberg and/or The Brattle Group, as appropriate.

II. Instructions

A user of the Excel model can select values for four options related to a specific IBOR calculation. These options are found in the "Inputs & Key Outputs" tab, which is highlighted in yellow. Specifically, they are:

1. IBOR: AUD BBSW, CHF LIBOR, GBP LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR, USD LIBOR, CDOR, HIBOR, EUR LIBOR, and EURIBOR;
2. Mean or median spread: Mean, and median;
3. Tenor: 1 week, 1 month, 2 months, 3 months, 6 months, and 12 months (the available tenors may vary depending on the IBOR selected);
4. Lookback period: 3 months, 6 months, 1 year, 2 years, 5 years, and 10 years.

For example, a user that is interested in calculating the historical mean spread adjustment of a 6-month GBP LIBOR with a lookback period of 5 years would make the selections shown in Figure 1.

Figure 1: Parameters for Historical Mean Spread of a 6-month GBP LIBOR with a 5-year Lookback Period

IBOR	[1]	GBP LIBOR
Mean or median spread	[2]	Mean
Tenor	[3]	6 months
Lookback period	[4]	5 years

To operate the Excel model, begin by selecting the desired options as illustrated above. The Excel model will start calculating the historical spread adjustment based on the options selected by the user. Please note that the calculations may take up to a few minutes. The result will be displayed in row [15][1] at the bottom of the table in the "Inputs & Key Outputs" tab. Figure 2 shows the model output from the selected options outlined in Figure 1.

Figure 2: Example Output for Historical Mean Spread Adjustment of a 6-month GBP LIBOR with a 5-year Lookback Period

| Long-term spread | [15] | 24.3702 |
| Long-term spread based on available data | [16] | N/A |

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[1] This would be row [16] in the case of CHF LIBOR with a 10 year lookback period due to data availability issues.

The details of the spread adjustment calculations can be found in the "ARRf" and "Historical Spread" tabs. For a summary of all spread adjustment calculations for a specific IBOR and tenor supported by the Excel model, begin by selecting the desired IBOR and tenor in the "Inputs & Key Outputs" tab. Navigate to the "Historical spread summary" tab and click the "Update" button. The summary chart will update with the corresponding spread adjustments (this may take several minutes). For example, the output for 6-month GBP LIBOR is shown in Figure 3.

**Figure 3: Example Summary Chart of Spread Adjustments for 6-month GBP LIBOR**

Lookback period	Historical mean	Historical median
3 months	26.382	28.427
6 months	22.441	19.909
1 year	20.380	19.524
2 years	19.048	19.062
5 years	24.370	25.385
10 years	41.265	29.342
Average of 2 and 10 years	30.156	24.202

III. Graphs and Charts

Graphical representations of the historical spot spread, historical mean/median, and frequency of spot spreads are available and displayed in three separate graphs with tab names starting with "G_".

The "G_Historical spot spread" tab plots the daily spot spread for the IBOR and tenor selected in the "Inputs & Key Outputs" tab. For example, the spot spreads between 6-month GBP LIBOR and adjusted RFR are shown in Figure 4.
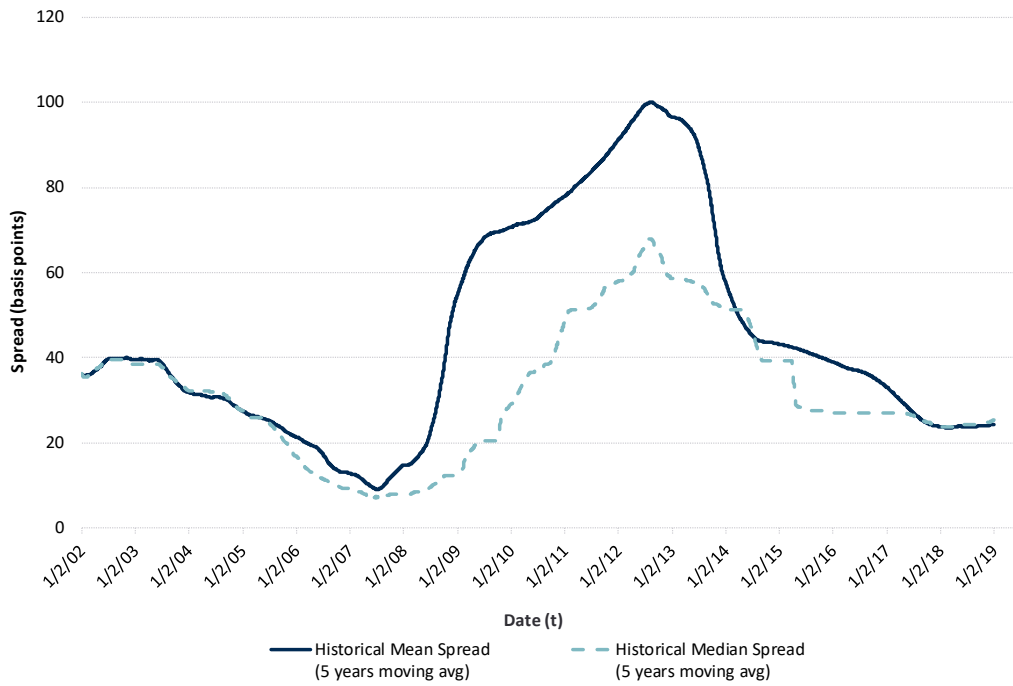
Figure 4: Historical Spot Spread Between 6-month GBP LIBOR and Adjusted RFR
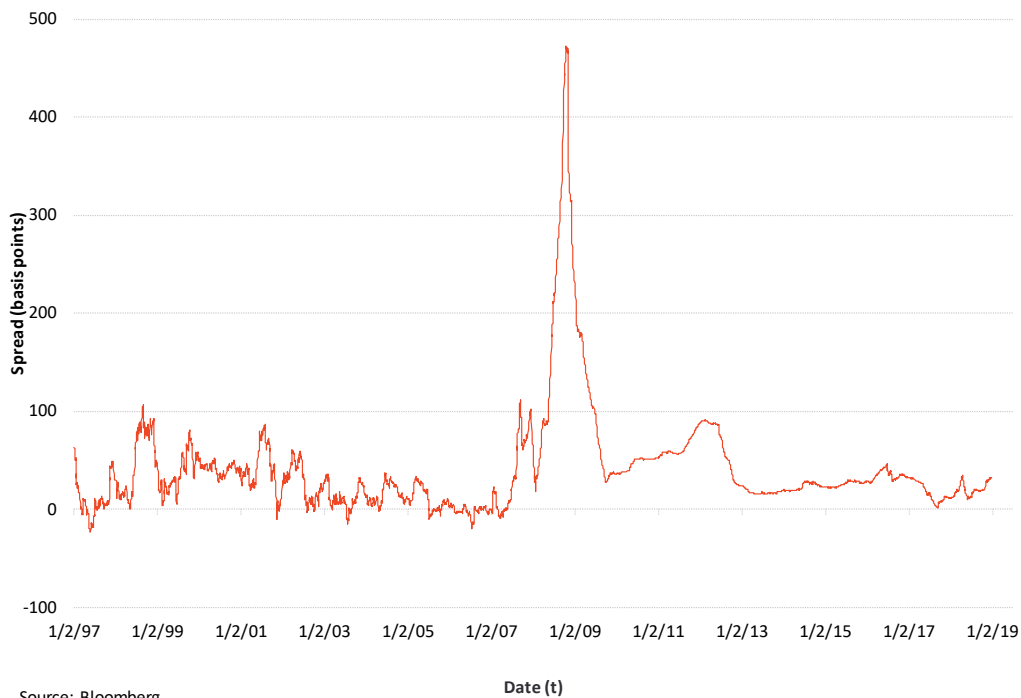
Source: Bloomberg.

The "G_Historical mean median" tab plots the historical moving mean and median spreads for the IBOR, tenor, and lookback period selected in the "Inputs & Key Outputs" tab. For example, the historical mean and median spreads between 6-month GBP LIBOR and adjusted RFR with a 5-year lookback period are shown in Figure 5.
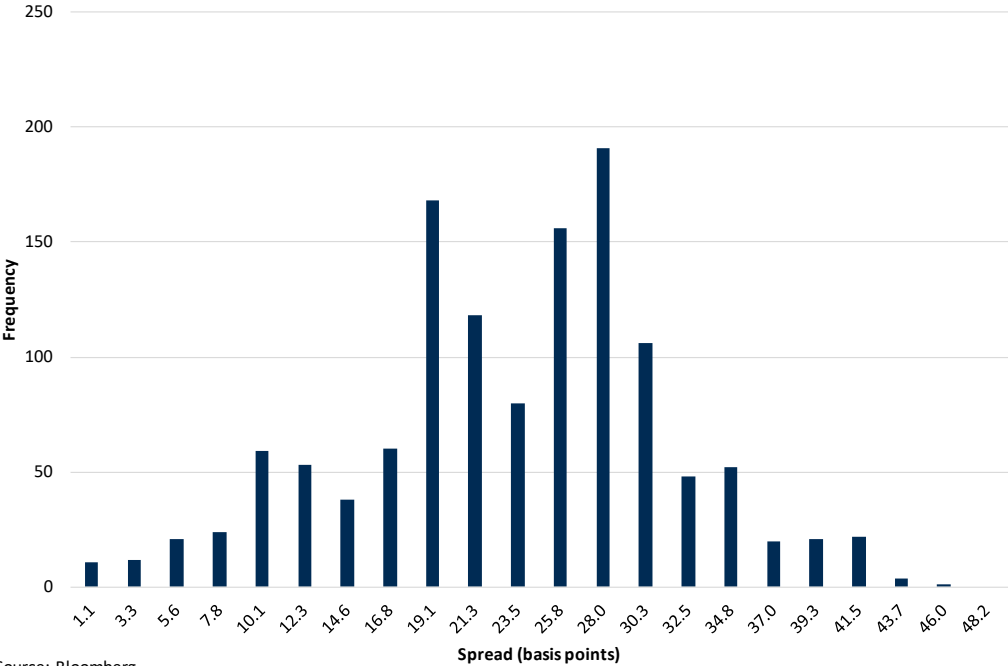
Figure 5: Historical Mean and Median Spread Between 6-month GBP LIBOR and Adjusted RFR with a 5-year Lookback Period

Source: Bloomberg.

The "G_Frequency of spot spreads" tab plots the distribution of the historical spot spreads for the IBOR and tenor selected in the "Inputs & Key Outputs" tab. For example, the frequency of spot spreads between 6-month GBP LIBOR and adjusted RFR is shown in Figure 6.

Figure 6: Frequency of Spot Spreads Between 6-month GBP LIBOR and Adjusted RFR

Source: Bloomberg.