A background graphic featuring a teal gradient with a subtle grid pattern. In the upper left, there are silhouettes of several people standing in a row. A large, semi-transparent globe of the Earth is positioned in the lower left foreground, showing continents in dark green against a lighter blue ocean.

How to Construct Curves in FinPricing?

FinPricing

The term structure of interest rates, also known as yield curve, is defined as the relationship between the yield-to-maturity on a zero coupon bond and the bond's maturity. Zero yield curves play an essential role in the valuation of all financial products.

The current methodology in capital markets for marking to market securities and derivatives is to estimate and discount future cash flows using rates derived from the appropriate term structure. The yield term structure is increasingly used as the foundation for deriving relative term structures and as a benchmark for pricing and hedging.

Summary

- How to Construct Yield Curve in FinPricing?
- How to Construct FX Forward Curve in FinPricing?

How to Construct Yield Curve?

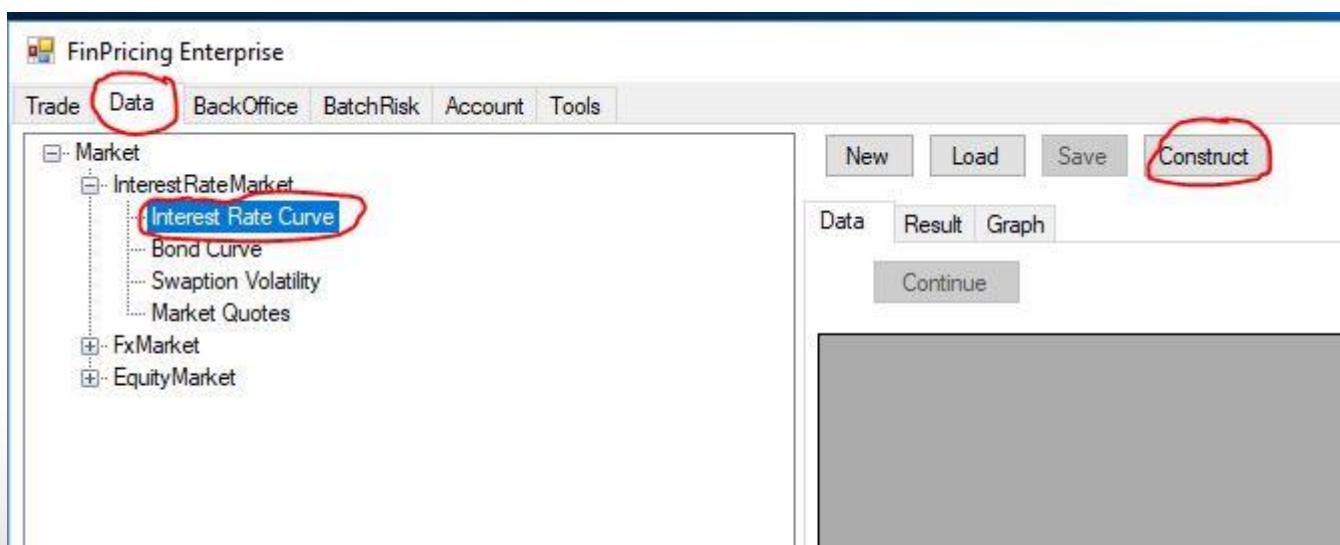
- Yield curves can be derived from government bonds or LIBOR/swap instruments. The LIBOR/swap term structure offers several advantages over government curves, and is a robust tool for pricing and hedging financial products. Correlations among governments and other fixed-income products have declined, making the swap term structure a more efficient hedging and pricing vehicle.
- With the supply of government issues declining, LIBOR/swap markets are more liquid and efficient than government debt markets. The term structure of zero rates is constructed from a set of market quotes of some liquid market instruments such as short term cash instruments, middle term futures or forward rate agreement (FRA), long term swaps and spreads. LIBOR curves have become the funding curves in the market. Among them, the 3 month LIBOR curve is the base yield curve.

How to Construct Yield Curve? (Cont'd)

- Prior to the 2007 financial crisis, financial institutions performed valuation and risk management of any interest rate derivative on a given currency using a single-curve approach. This approach consisted of building a unique curve and using it for both discounting and forecasting cash flows. However, after the financial crisis, basis swap spreads were no longer negligible and the market was characterized by a sort of segmentation. Consequently, market practitioners started to use a new valuation approach referred to as multicurve approach, which is characterized by a unique discounting curve and multiple forecasting curves

How to Construct Yield Curve? (Cont'd)

- Click the Data tab at the top-left corner of the application. Then, expend Market -> InterestRateMarket -> Interest Rate Curve and click the Construct button.





How to Construct Yield Curve? (Cont'd)

- A selection template is displayed in the main window. Select Discounting Approach (e.g., OIS), Curve Type (e.g., Base) and Basis Type (e.g., NA for base curve), fill Currency (e.g., USD), Curve Data (e.g., 2/8/2018) and then click the Continue button at the right of the row.

The screenshot shows the FinPricing Enterprise application window. The menu bar includes Trade, Data, BackOffice, BatchRisk, Account, and Tools. The main menu tree on the left shows Market, FxMarket, and EquityMarket. The central area has tabs for New, Load, Save, and Construct, with Construct being active. Below these are Data, Result, and Graph tabs, with Data selected. A Continue button is present. A table with columns Column0 through Column9 and a Continue Button is shown. The first column contains a dropdown menu with "Please make selecti..." highlighted. The second column has "OIS" selected. The third column has "USD" selected. The fourth column has "Base" selected. The fifth column has "M/d/yyyy" selected. The sixth column has "NA" selected. The Continue button is circled in red.

Column0	Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Continue Button
Please make selecti...	OIS	USD	Base	M/d/yyyy	NA	Continue				
*										



How to Construct Yield Curve? (Cont'd)

- Based on your selection, the system knows what kind of curves needed. So it loads the data in the main window if they are available, otherwise it generates new curve templates in the main window for you to fill. If you fill new curves, you need to click the Save button to save them

The screenshot shows the FinPricing Enterprise application window. The menu bar includes Trade, Data, BackOffice, BatchRisk, Account, and Tools. The left sidebar shows a tree view with Market selected, which further branches into Interest Rate Market (Interest Rate Curve, Bond Curve, Swaption Volatility, Market Quotes) and FxMarket, EquityMarket. The main area has tabs for Data, Result, and Graph, with the Data tab active. A 'Continue' button is highlighted with a red oval. Below it is a table with two rows of headers. The first row has columns: Column0, Column1, Column2, Column3, Column4, Column5, Column6, Column7, Column8, Column9. The second row has columns: USD_3M, Base Curve, Currency, ValuationDate, CurveName, QuoteName, InstrumentT..., Term, Value, USD_OIS, OIS Curve. The table body contains 15 rows of data for USD_3M curves from 02/08/2018 to 12/14/2020.

Column0	Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	
USD_3M	Base Curve	Currency	ValuationDate	CurveName	QuoteName	InstrumentT...	Term	Value	USD_OIS	OIS Curve
USD	02/08/2018	USD_3M	USD_STUB: ...	Cash		3/21/2018	0.0171232	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		03/16/2020	97.2826	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		03/18/2019	97.5445	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		03/19/2018	98.05	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		06/15/2020	97.257	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		06/17/2019	97.4659	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		06/18/2018	97.8551	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		09/14/2020	97.2374	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		09/16/2019	97.4076	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		09/17/2018	97.7353	USD	02/08/2018	USD_OIS
USD	02/08/2018	USD_3M	USD_STUB: ...	FUTURE		12/14/2020	97.1065	USD	02/08/2018	USD_OIS



How to Construct Yield Curve? (Cont'd)

- After filling/validating data, click the Continue button above the main window. FinPricing starts to construct the interest rate curve. The results are shown in the Result tab.

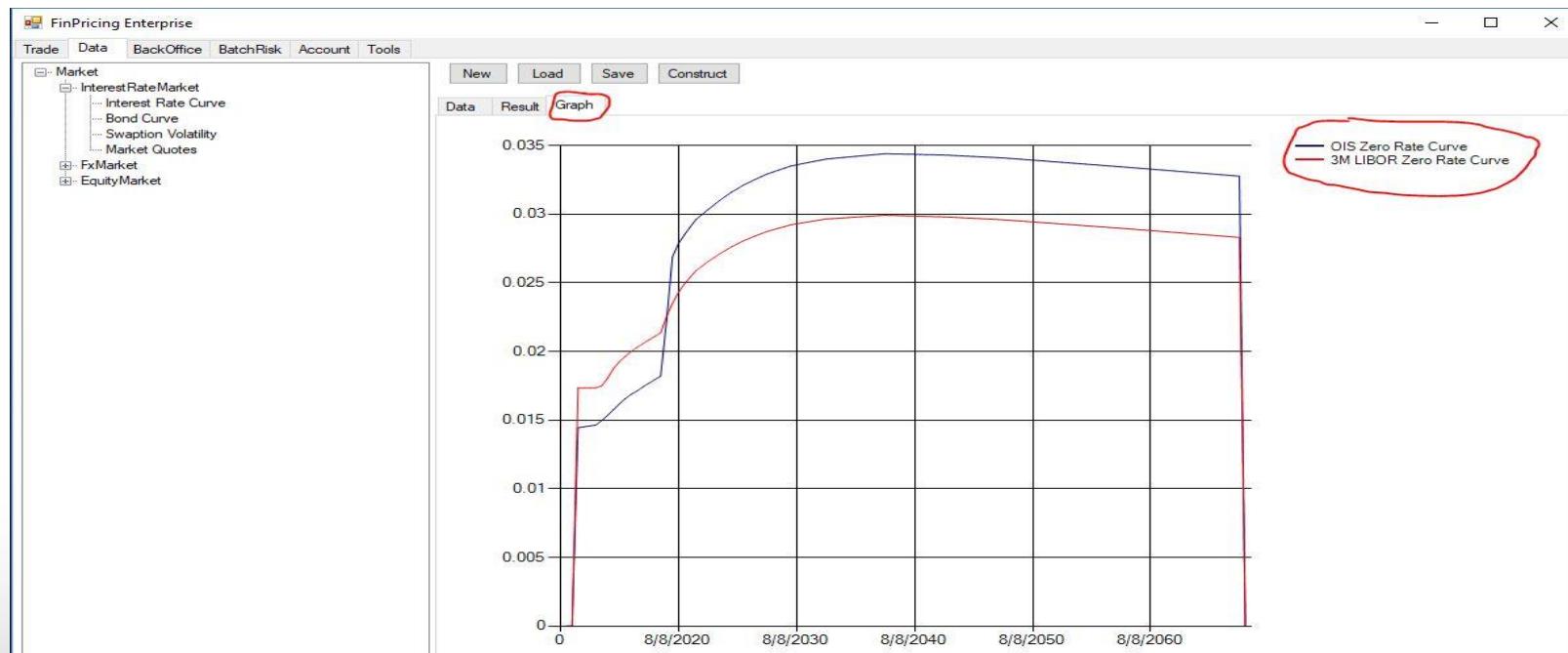
The screenshot shows the FinPricing Enterprise application window. The menu bar includes Trade, Data, BackOffice, BatchRisk, Account, and Tools. The left sidebar has a tree view with Market (selected), InterestRateMarket (selected), Interest Rate Curve, Bond Curve, Swaption Volatility, and Market Quotes. Below these are FxMarket and EquityMarket. The main area has buttons for New, Load, Save, and Construct. A tab bar at the top right has Data, Result (circled in red), and Graph. The Result tab displays a table with three columns: Column1, Column2, and Column3. The first row is labeled 'OIS Curve'. The second row is labeled 'Date' and contains '2/15/2018', 'OIS Zero Rate Curve' (circled in red), and '3M LIBOR Zero Rate Curve' (circled in red). Subsequent rows show dates from 2/22/2018 to 11/8/2018 with corresponding rates.

Column1	Column2	Column3
OIS Curve		
Date	OIS Zero Rate Curve	3M LIBOR Zero Rate Curve
2/15/2018	0.0144446958649282	0.0173441159671608
2/22/2018	0.014509035938584	0.0173441159671611
3/1/2018	0.0145738182120647	0.0173441159671613
3/8/2018	0.0146387110354979	0.0173441159671601
4/8/2018	0.0149525775810282	0.0174924148582577
5/8/2018	0.0153440659472915	0.0180432128620182
6/8/2018	0.0157572797339464	0.0187486033483515
7/8/2018	0.0161757489824201	0.0192557542693167
8/8/2018	0.0165624313162406	0.0196316105318471
9/8/2018	0.0168709438162761	0.0199930934728389
10/8/2018	0.0171212056082124	0.0202920969366876
11/8/2018	0.0174237974774616	0.0205708814810946



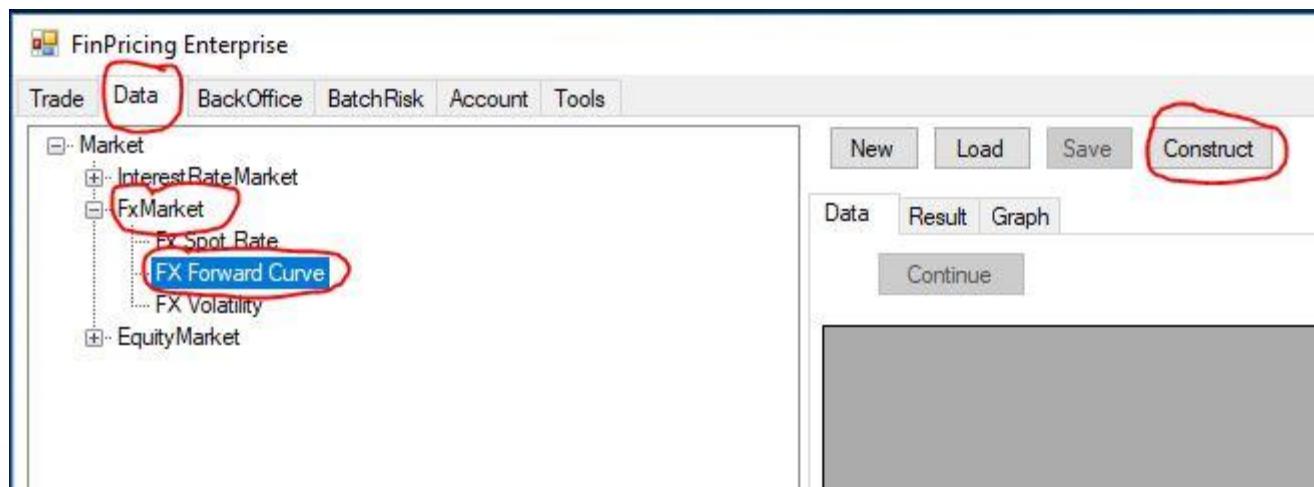
How to Construct Yield Curve? (Cont'd)

- Based on the results above, a more visually intuitive yield curve graph is provided in the Graph tab.



How to Construct FX Forward Curve?

- Click the Data tab at the top-left corner of the application. Then, expend Market -> FxMarket -> FX Forward Curve and click the Construct button.





How to Construct FX Forward Curve? (Cont'd)

- Click the Data tab at the top-left corner of the application. Then, expend Market -> FxMarket -> FX Forward Curve and click the Construct button.

The screenshot shows the FinPricing Enterprise application window. The menu bar includes Trade, Data, BackOffice, BatchRisk, Account, and Tools. The Data tab is selected. On the left, a tree view shows Market, InterestRateMarket, FxMarket (expanded to show Fx Spot Rate, FX Forward Curve, and FX Volatility), and EquityMarket. The FxForward Curve node is selected. At the top right, there are buttons for New, Load, Save, and Construct. Below these are tabs for Data, Result, and Graph, with the Data tab selected. A Continue button is visible. The main area contains a table with columns: Column0, Column1, Column2, Column3, Column4, Column5, and Continue Button. The first row has headers: CurrencyCurve, InputCurrency, Currency, InputCurrency, Date, InputDate, and Continue Button. The second row has data: Base Currency (highlighted with a red circle), USD, Underlying Currency (highlighted with a red circle), CAD, Curve Date (highlighted with a red circle), M/d/yyyy, and Continue. A blue bar is at the bottom of the table.

Column0	Column1	Column2	Column3	Column4	Column5	Continue Button
CurrencyCurve	InputCurrency	Currency	InputCurrency	Date	InputDate	Continue
Base Currency	USD	Underlying Currency	CAD	Curve Date	M/d/yyyy	Continue
**						Continue



How to Construct FX Forward Curve? (Cont'd)

- Based on your fillings, the system knows what kind of curves needed. So it loads the curve data in the main window if they are available, otherwise it generates new curve templates in the main window for you to fill. If you fill new curves, you need to click the Save button to save them.

FinPricing Enterprise

Trade Data BackOffice BatchRisk Account Tools

New Load Save Construct

Data Result Graph Continue

Market

- InterestRateMarket
- FxMarket
 - Fx Spot Rate
 - FX Forward Curve
 - FX Volatility
- EquityMarket

Column0	Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13
USD_3M	Base Curve						FxCurve						
Currency	ValuationDate	CurveName	QuoteName	Instrument...	Term	Value	Currency	ValuationDate	CurveName	Instrument	Tenor	Type	Value
USD	02/08/2018	USD_3M	USD_STUB: CASH	Cash	3/21/2018	0.0171232	CAD	02/08/2018	USD/CAD	CAD.Dp.18...	18M ...	Dp ...	-76
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	03/16/2020	97.2826	CAD	02/08/2018	USD/CAD	CAD.Dp.1M ...	1M ...	Dp ...	-3.75
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	03/18/2019	97.5445	CAD	02/08/2018	USD/CAD	CAD.Dp.1Y ...	1Y ...	Dp ...	-0.99
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	03/19/2018	98.05	CAD	02/08/2018	USD/CAD	CAD.Dp.1Y ...	1Y ...	Dp ...	-53.9
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	06/15/2020	97.257	CAD	02/08/2018	USD/CAD	CAD.Dp.2M ...	2M ...	Dp ...	-9.65
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	06/17/2019	97.4659	CAD	02/08/2018	USD/CAD	CAD.Dp.2Y ...	2Y ...	Dp ...	-96.5
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	06/18/2018	97.8551	CAD	02/08/2018	USD/CAD	CAD.Dp.3M ...	3M ...	Dp ...	-14.25
USD	02/08/2018	USD_3M	USD_STUB: FU...	FUTURE	09/14/2020	97.2374	CAD	02/08/2018	USD/CAD	CAD.Dp.3Y ...	3Y ...	Dp ...	-128.5



How to Construct FX Forward Curve? (Cont'd)

- After filling/validating data, click the Continue button above the main window. FinPricing starts to construct the FX forward curve. The results are shown in the Result tab.

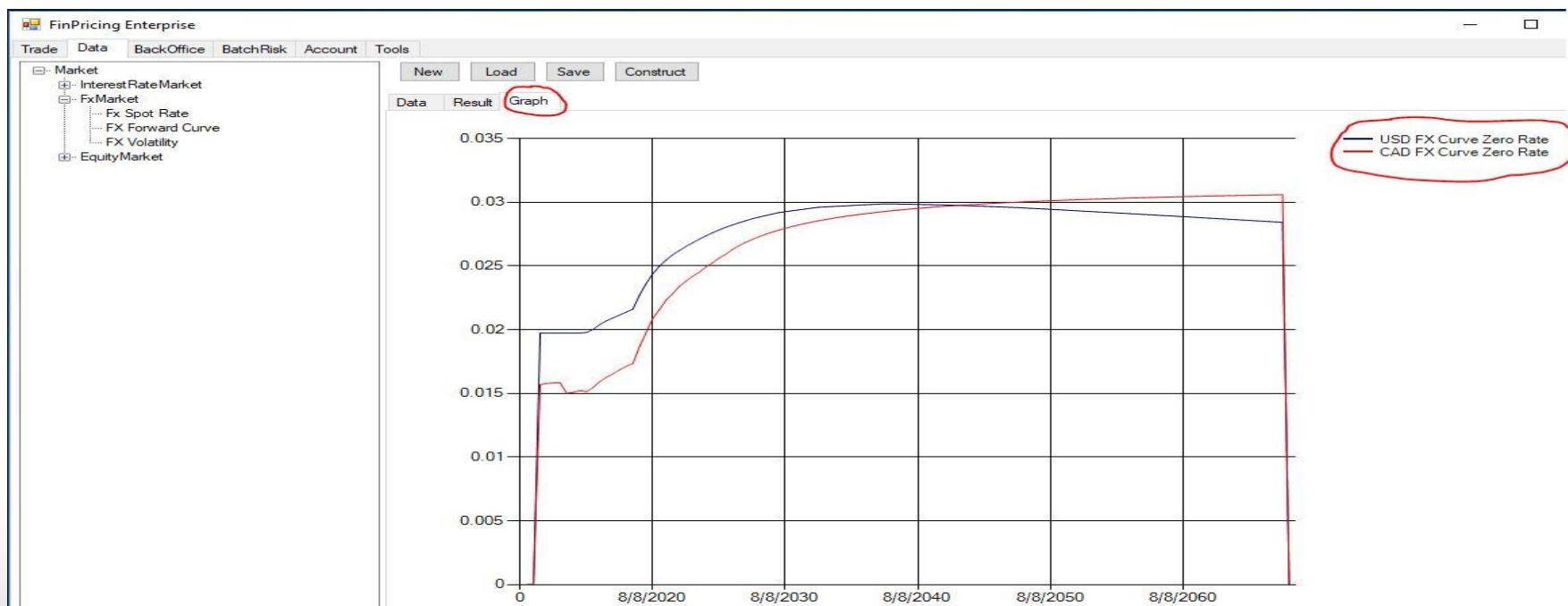
The screenshot shows the FinPricing Enterprise application window. The menu bar includes File, Trade, Data, BackOffice, BatchRisk, Account, and Tools. Below the menu is a toolbar with New, Load, Save, and Construct buttons. A navigation pane on the left lists Market (Interest Rate Market, FxMarket - Fx Spot Rate, FX Forward Curve, FX Volatility), EquityMarket, and a summary section. The main area has tabs for Data, Result (which is selected and highlighted with a red circle), and Graph. A table displays the FX Forward Curve data, with the first row labeled 'FX Forward Curve'. The columns are Column1, Column2, and Column3. The table shows dates from 2/15/2018 to 10/2/2018, and rates for USD FX Curve Zero Rate and CAD FX Curve Zero Rate. The 'Result' tab is circled in red.

	Column1	Column2	Column3
►	FX Forward Curve		
Date	USD FX Curve Zero Rate	CAD FX Curve Zero Rate	
2/15/2018	0.0197217340580845	0.0156894124493822	
2/22/2018	0.0197217340580848	0.015781339343474	
3/1/2018	0.0197217340580866	0.0158246016209078	
3/8/2018	0.0197217340580875	0.0158450193301923	
4/8/2018	0.0197217340580888	0.0150100387311001	
5/8/2018	0.019721734058087	0.0150862583651021	
6/8/2018	0.0197217340580874	0.0152241366701769	
7/8/2018	0.0197742942244542	0.0151363158440825	
8/8/2018	0.0200233832888533	0.015459628159313	
9/8/2018	0.0203976224149791	0.0159241945389144	
10/2/2018	0.020600000000000002	0.016000000000000002	



How to Construct FX Forward Curve? (Cont'd)

- Based on the results above, a more visually intuitive currency forward curve graph is provided in the Graph tab..





Thank You

You can find more details at
<https://finpricing.com/lib/EqRainbow.html>