OIS Curve Construction Explained

- In the past, LIBOR curve was used for discounting cashflows. However, LIBOR curve has the relative credit risk between lending money versus funding money.

- The spread between three month US LIBOR and three month US treasury rate cannot be ignored.

- Market started to use overnight index swaps (OIS) for discounting.

- OIS curves became the market standard for discounting collateralized cashflows. This curve represents the market expectations of the Federal Reserve daily target for the overnight lending rate.

- The reason using the OIS rate as the discount rate is that it is derived from the fed funds rate and the fed funds rate is the interest rate usually paid on collateral.

- Many banks now consider that OIS rates should be used for discounting when collateralized portfolios are valued.

- LIBOR should be used for discounting when portfolios are not collateralized.

- The most liquid instruments that can be used to build OIS curve are Fed Fund Futures and OIS swaps that pay at the daily compounded Fed Fund rate.

- In the past Market uses the single curve for both forward projection and discounting.

- Now swaps are quoted using OIS discounting. This means that in order to generate a forward Libor curve from Libor swap quotes, the two curves must be generated simultaneously.

- The key idea of curve construction under OIS discounting is to bootstrap multiple curves simultaneously.

- One needs two term structure inputs: a term structure of OIS instruments and a term structure of LIBOR/swaps.

- This method proceeds as follows:

  - From the underlying instruments, determine which define a point on the OIS curve and which define a point on the Libor curve.

  - All missing values have to be interpolated using linear interpolation on rates.

OIS

- Create these two sets of unknown curve points and make an initial guess for their values.

- Price all of the given instruments using the initial guess of the two curves.

- Compare the prices with the market quotes and adjust the initial guess accordingly. This would be performed by the same numerical optimization routine.

- Repeat the pricing and adjustment until the error reaches acceptable levels.

Thank You

You can find more details at

https://finpricing.com/lib/EqConvertible.html