Forward Rate Agreement Explained

FRA

- A forward rate agreement (FRA) is a contract between two parties in which one party will pay a fixed rate while the other party will pay a floating interest rate equal to the underlying rate.
- FRA is very similar to a future contract. It is an agreement between two parties regarding the value or level of a financial instrument at a future date.
- The party paying the fixed rate is usually referred to as the buyer, while the party receiving the floating rate is referred to as the seller.
- Similar to a swap, a FRA has two legs associating with each party: a fixed leg and a floating leg. But each leg only has one cash flow.

FRA

- Unlike futures, FRA is not traded on an exchange and infinitely more flexible, as it can be structured to mature on any date.
- The buyer hedges against the risk of rising interest rate whereas the seller hedges against the risk of falling interest rates.
- The buyer locks in the interest rate to protect against the increase of interest rates while the seller protects against the possible decrease of interest rates.
- A speculator can also use FRAs to make bets on future directional changes in interest rates.

FRA

- From the seller perspective, the payoff at payment date T is given by

$$Payff_{seller} = N\tau(R - F) \qquad (1)$$

where

N- the notional;

τ – the accrual period in years (e.g., a 3 month period ≈ 3/12 = 0.25)

R – the fixed rate in simply compounding.

F – the realized floating rate in simply compounding

- From the payer perspective, the payoff at payment date T is given by

$$Payff_{buyer} = N\tau(F - R) \qquad (2)$$

FRA

- FRA does not involve any transfer of principal. It is settled at maturity in cash, representing the profit or loss resulting from the difference in the agreed rate and the settlement rate at maturity.
- Some people believe that a FRA is equivalent to a one-period vanilla swap, i.e., swaplet. That is not completely true from valuation perspective.
- A FRA is usually settled and paid at the end of a forwarding period, called settle in arrear, while a regular swaplet is settled at the beginning of the forward period and paid at the end.
- Strictly speaking, FRA valuation needs convexity adjustment. However, given FRA is such a simple product, the adjustment is very simple in the market.

FRA

- The present value of the fixed leg is given by

$$PV_{fixed} = RN\tau D/(1 + R\tau)$$

where

t – the valuation date

R – the fixed rate

N – the notational principal amount

T_1 – the end time of the forwarding period

T_0 – the start time of the forwarding period

$\tau = \tau(T_0, T_1)$ – the day count fraction of the period (T_0, T_1).

$D = D(t, T_1)$ – the discount factor

FRA

- The present value of the floating leg can be expressed as

$$PV_{floating} = (F + s)N\tau D/(1 + F\tau) \qquad (4)$$

where

$F = F(t; T_0, T_1)$ – the simply compounded forward rate

s - the floating spread

- The present value of the FRA can be expressed as
  - From the payer perspective, $PV = PV_{float} - PV_{fixed}$
  - From the receiver perspective, $PV = PV_{fixed} - PV_{float}$

Thanks!

Reference:

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