Product Briefing – Interest Rate Options

The two most common types of option within the interest rate world are cap / floor structures and swaptions. A cap structure is a strip of OTC interest rate call options on a series of forward rate, all traded with a single strike. The cap gives the buyer protection against an agreed index or reference rate such as LIBOR of a stated maturity rising above a pre-agreed strike rate. The term 'cap' is the collective name for the component options, which are individually referred to as caplets. The premium payable on a cap structure is simply the sum of the individual caplet premia. It can be paid as a lump sum upfront or amortised over the life of the transaction.

Suppose that a company has taken in USD 100m for a period of two years on which three month USD LIBOR is payable. The Treasurer decides to insure himself against the possibility of an unfavourable rise in rates and so buys a two year cap referenced to three month LIBOR. Although the underlying transaction covers eight, three month periods, there are by convention 'n-1' options i.e. seven caplets. This is because LIBOR interest rates are always set at the start of the period to which they apply but any associated payment is made at the end. As a result it would be impossible to buy protection against a known interest rate for the first period of the cap structure.

The payoff on a cap for any single period is:

Max (Reference rate – strike rate x notional x days / day basis, 0)

If we were to assume that the previously mentioned borrower agreed a strike rate of 5.00% and that in the second period, 3 month LIBOR fixed at 5.25% then assuming a 92 period and a 360 day year they would receive a sum equal to:

USD 100 m x 0.25% x 92 / 360 = USD 63,888.89

This could be used to offset the cost of the underlying borrowing which would now incur an interest charge of 5.25%. Similar to the underlying loan the payout on the cap would be known at the start of the quarter but payable in arrears. The net cash flows received under the cap combined with the payment on the underlying loan would result in a net interest cost of 5.00% - equal to the strike on the option. If the value of LIBOR had been equal or less than the 5.00% strike rate then there would be no receipt under the terms of the option. The borrower would let the option lapse and enjoy the benefits of borrowing at a lower rate.

A floor gives the holder the protection again an agreed reference rate of interest falling below a preagreed strike. Again, a floor is a collective name for the component options which individually are referred to as floorlets. The mechanics of the floor are the same as the cap but the payoff to a holder would only occur if the reference interest rate was less than the strike rate.

Swaptions

A swaption is an option that gives the holder the right but not the obligation to enter into an interest rate swap. A payer swaption allows the holder to pay fixed in a swap of a predefined maturity and so the buyer of a payer swaption would benefit if rates were to rise. A receiver swaption allows the holder to receive fixed in an interest rate swap and would benefit if rates were to fall. If one were to draw the 'hockey stick' at maturity payoffs for these options (see the 'options' product briefing available on the website) the purchase of a payer swaption would resemble a long call, while the purchase of a receiver swaption would resemble a long put option.

Although there are exceptions the majority of swaptions are cash-settled at expiry. So rather than enter into an actual interest rate swap the buyer will receive the current market value of an interest rate swap with a fixed rate equal to the strike of the swaption. Swaptions are quoted in terms of the option maturity followed by the tenor of the swap. For example, an option to enter into a 5 year swap, one year in the future would be written as a 1y x 5y or '1 into 5'.