

## Product Briefing - Swaps

### Interest rate swaps

In its most basic form an interest rate swap consists of a periodic exchange of cash flows with one referenced to a fixed rate while the other is referenced to floating rate of interest such as a particular maturity of the London Inter-Bank Offered Rate (LIBOR) (figure 1).

Swaps are traded on a notional amount basis, which is usually fixed. The notional amount of a swap is merely a reference value and does not represent an actual cash flow. It will simply determine the magnitude of any cash flow that is subsequently exchanged. Swaps are typically long term with maturities that may extend out to 30 or 50 years.

Although the deals have a long term maturity the exchange of cash flows will take place on a more frequent basis. The cash flows are calculated on a simple interest basis and are paid in arrears. Each market has adopted its own conventions as to the frequency of these payments. For example in the USD market the convention is a semi-annual payment of fixed for a quarterly payment of LIBOR.

Where the payment dates coincide it is market convention for the cash flows to be netted. However, since the transaction is over the counter all of the terms and conditions are negotiable and so there are many different variations over the simple vanilla "fixed - float" structure.

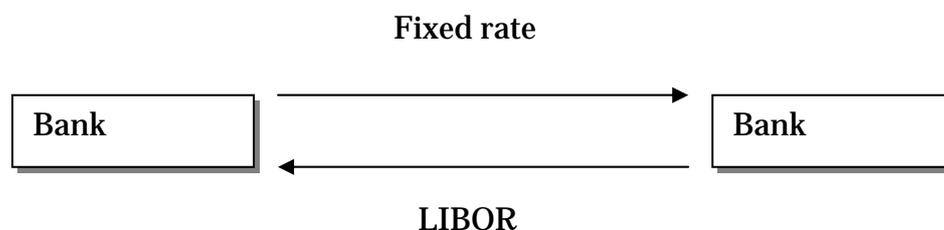


Figure 1: Illustration of fixed vs. floating interest rate swap

To illustrate the principles involved, let us assume that both fixed and floating are paid semi-annually, with the rates for the period being 5.00% and 4.50% respectively. We will assume that the cash flows are denominated in GBP, the notional amount is £10 million and that in the six month period there are 182 days. The fixed cash flows will therefore be:

$$£10,000,000 \times 5.00\% \times 182 / 365 = £249,315.07$$

The floating cash flows will be:

$$£10,000,000 \times 4.50\% \times 182 / 365 = £224,383.56$$

Since the two payments coincide there will be a net payment of £24,931.51 in favour of the receiver of fixed.

Swaps are quoted on a bid - offer basis. So if we were to analyse a typical quote from the perspective of a market maker, (i.e. the institution giving the quote) it may look as follows:

Bid	Offer
4.5050%	4.5450%
Pay fixed	Receive fixed
Receive LIBOR	Pay LIBOR

A market user, (i.e. the institution requesting the quote) would interpret the same values in the opposite manner. The key learning point from this is that the quotation is given in terms of the fixed rate. Since many investment banks will be running 'matched positions' (i.e. they will try and structure their portfolio such that they will have a mix of pay and receive positions which are profitable overall), the LIBOR cash flows are assumed to cancel out.

Some practitioners will also say that they are 'long' or 'short' the swap. This is somewhat ambiguous terminology but for the sake of completeness we include a short explanation. At the bid price the market maker is said to be 'long' the swap - it is a 'buying' position. However, the convention assumes that the market maker is buying a stream of LIBOR cash flows, for which they will pay a single fixed rate. By the same logic, the offer price represents a short or 'selling' swap position, in that the market maker is delivering a stream of LIBOR cash flows, for which their compensation is a single fixed price.

The author recalls one swaps class where an experienced swaps dealer disagreed vehemently with these definitions, stating the entire swap market making community defined 'long' and 'short' in the opposite way. After a flurry of phone calls, which yielded no consensus, he realised that he had been arguing at cross purposes with the participant. It would seem that some market makers reasonably viewed the offer side of the market as similar to buying a bond. The buyer receives a fixed coupon and finances the purchase at a LIBOR cash flow. Hence at the offer side of the quote, perhaps it would be more helpful to describe a market maker as being long the market (as opposed to the swap) and being short the market at the bid price. It is no shame to use the terms 'pay and receive fixed' to describe ones intention and will ensure no costly mistakes are made!

It is also worth mentioning one other aspect of swap quotes. The customer may well end up paying more or receiving less than the quoted inter-bank rates as many banks will apply a dealing margin. There are two main factors that will impact the margin, which comprise the liquidity and credit charge. The liquidity charge is the 'cost' of hedging the interest rate risk of entering into a single swap. It may not be possible for the bank to immediately offset the risk of a new swap by entering into an equal and opposite position.

Alternatively, if the swap transaction is executed on a large notional amount, it may be difficult to hedge the entire position with one transaction. The credit charge has become more important in recent years and has recently become termed the 'credit value adjustment'. In simple terms, if there is a greater risk of a client defaulting, this will have to be reflected in the price that they pay. Most inter-bank and hedge fund clients will have cash collateral agreements and so the credit charge may be fairly small. But if the collateral they provide is of lower quality or less liquid there will still be a credit charge but this will be less than that applied to unsecured accounts.