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Swaps – Part I
Interest Rate and Currency Swaps

Swaps are contracts in which two separate streams of cash flow are exchanged or 'swapped'. The streams could be two different kinds of interest amounts, two currencies or indeed any two differing streams of cash.

This chapter introduces the conceptual basis of swap contracts and then explains interest rate swaps and currency swaps. The next chapter deals with other types of swaps and some general issues relating to the swaps market.

Definition

A swap transaction is a contract by which two or more parties exchange (swap) one set of pre-determined payments for another.

Some important types of swap are the following:

- An interest rate swap is an agreement between two parties to exchange interest obligations or receipts in the same currency on an agreed amount of notional principal for an agreed period.
- A currency swap is an agreement between two parties to exchange payments or receipts in one currency for payments or receipts in another.
- An equity swap is an agreement between two parties to exchange dividends and/or capital returns on an underlying share with another equity flow or interest flow, in the same or different currencies.

Currency swaps slightly predated interest rate swaps, but the latter now predominate in volume. Equity swaps are more recent but growing fast. Swaps can also combine some of the features of interest rate and, say, currency swaps. Thus, a fixed rate payment in dollars might be swapped for a floating rate payment in yen. Such transactions are more complex.

A key feature of swaps is that they deal with a set of cash flows involving multiple periods, not a one-time cash flow. This is an important distinction between swaps and futures or options, both of which deal with a single expected cash flow at one specified time in the future. In a swap, invariably there are

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multiple dates involved where one or more income streams would need to exchange hands. Sometimes the two cash flows are paid gross to each other, while in some cases, the amount due is 'netted' and the net amount due from one party to another is transferred.

Interest rate swaps

If one went by just the above definition of swaps, it maybe unclear why the two parties to an interest rate swap would wish to enter into such an agreement. The purpose may be either to achieve mutually beneficial improvements in the cost of borrowing or lending, or to hedge an interest rate risk, or both.

To understand why an interest rate swap can be advantageous to both parties, consider the following example:

Example 8.1

Two companies both wish to borrow ten million pounds. Company A is a giant conglomerate with an excellent credit rating. Company B is a medium sized company of ten years standing with a lower credit rating. Both companies have the option of borrowing either at fixed rates or at floating rates. Company A would prefer a fixed rate obligation, while, Company B prefers a floating rate. The quoted rates of interest to the two companies are as follows:

Company	*Interest rate fixed (per cent)*	*Interest rate floating (per cent)*
A	*7.5 per cent*	*LIBOR + 0.5 per cent*
B	*9.0 per cent*	*LIBOR + 3.5 per cent*

Clearly, B's cost of funds is higher than A whether the loan is on fixed rate or on floating rate basis. However, in the fixed rate case, B's extra cost is 1.5 per cent (9.0 per cent — 7.5 per cent) while in the floating rate market the extra cost is 3 per cent. (In economic terms, A has an absolute advantage over B in both fixed and floating rate markets, but B has a comparative advantage in the fixed rate market[1]).

C Ltd, a broker, comes forward and arranges a swap. Under this arrangement, A actually borrows 10 million pounds from a bank at LIBOR[2] + 0.5 per cent and B borrows 10 million

1 Students of international economics will recognise the similarity with international trade theory.

2 LIBOR stands for the London Inter-Bank Offered Rate, which is the rate of interest charged by banks in London on short-term loans to each other. The rate changes from time to time. It is taken as a benchmark for market interest rate and non-bank floating rate borrowers are quoted a rate based on LIBOR plus a margin reflecting their creditworthiness. The more creditworthy the borrower, the lower the margin over LIBOR.

pounds from a bank at 9.0 per cent. As a separate transaction (which constitutes the swap) A, B and C agree as follows:

i. A will pay C a fixed rate of 7.0 per cent

ii. A will receive from C a floating rate of LIBOR + 0.5 per cent

iii. B will pay C a floating rate of LIBOR + 0.5 per cent

iv. B will receive from C a fixed rate of 6.5 per cent

The transactions (i) to (iv) constitute the 'swap'. It should be noted that the swap is independent of the borrowing initially undertaken by A and B and the banks which lent the funds to A and B are in no way concerned with the swap. A remains liable for all obligations to its bank and likewise B to its bank. The swap binds only A, B and C.

To understand the benefits from the swap, consider the net cash flows of A, B and C, given in Table 8.1

***Table 8.1:** Illustration of a swap*

Party	*Outflow on loan from bank (1) per cent*	*Swap outflow (2) per cent*	*Swap Inflow (3) per cent*	*Total (4) [1+2+3] per cent*
A	*– (LIBOR + 0.5)*	*– 7.0*	*+ (LIBOR + 0.5)*	*– 7.0*
B	*– 9.0*	*– (LIBOR + 0.5)*	*+ 6.5*	*– (LIBOR + 3.0)*
C	*NIL*	*– (LIBOR + 0.5) – 6.5*	*+ (LIBOR + 0.5) + 7.0*	*0.5*

It may be seen that the net result is:

a. for A, a fixed rate obligation at 7 per cent (this is better than the 7.5 per cent which A would have paid if it had directly taken a fixed rate loan); –

b. for B, a floating rate obligation at LIBOR + 3.0 per cent (this is better than the LIBOR + 3.5 per cent which B would have paid if it had directly taken a floating rate loan);

d. for C, a profit of 0.5 per cent for arranging the transaction.

It was noted earlier that the interest differential on floating rate debt was 3 per cent while on fixed rate debt it was 1.5 per cent. The gap between the differentials was 3 per cent – 1.5 per cent = 1.5 per cent. This 1.5 per cent has been shared as gains by A, B and C, each getting 0.5 per cent.

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Terminology of interest rate swaps

The party which pays floating rate in the swap transaction is known as the *floating rate payer* or *seller of the swap*. The party which pays fixed rate in the swap transaction is known as the *fixed rate payer* or *buyer of the swap*.

It should be noted that the terms fixed or floating rate payer refer to the obligations in the swap itself and not the obligations to the original lenders. In Example 8.1, A is the buyer or fixed rate payer while B is the seller or floating rate payer.

The term 'index' is used to denote the benchmark rate of interest which acts as the reference point for the floating rate. LIBOR is the most commonly used index but there are many others.

Asset swap vs. liability swap

In Example 8.1, the parties swapped their interest obligations (i.e., liabilities). Therefore, it is an example of a liability swap. It is also possible to swap interest receipts (i.e., assets), as shown in Example 8.2 below:

Example 8.2

D Ltd is a recipient of floating rate interest through floating rate bonds carrying a coupon of LIBOR + 2 per cent. It apprehends a fall in interest rates and wishes to hedge against it. E Ltd holds fixed rate bonds with a coupon of 7per cent but expects a rise in interest rates and wishes to hedge this eventuality. (When interest rates rise, the value of fixed rate bonds falls.) At the time, LIBOR is at 5 per cent. D and E enter into a swap through a dealer C, on the following terms.

(i) D will pay C a floating rate of LIBOR + 2 per cent

(ii) D will receive from C a fixed rate of 6.5 per cent

(iii) E will pay C a fixed rate of 7.0 per cent

(iv) E will receive from C a floating rate of LIBOR + 2 per cent.

The net cash flows are as in Table 4.2.

Table 8.2: *Net cash flows*

Party	*Inflow on bond from bank (1) per cent*	*Swap outflow (2) per cent*	*Swap inflow (3) per cent*	*Total (4) per cent*
D	*+ (LIBOR + 2)*	*- (LIBOR + 2)*	*+ 6.5*	*+ 6.5*

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Party	*Inflow on bond from bank (1) per cent*	*Swap outflow (2) per cent*	*Swap inflow (3) per cent*	*Total (4) per cent*
E	*+ 7.0*	*- 7.0*	*+ (LIBOR + 2)*	*+(LIBOR + 2)*
C	*NIL*	*- (LIBOR + 2) – 6.5*	*+ (LIBOR + 2) + 7*	*+ 0.5*

After the swap, D is protected against falls in interest rate—it will now receive 6.5 per cent irrespective of the market rate. E is now protected against a fall in bond prices— if rates rise, E's portfolio is hedged because E will now receive the higher LIBOR rate + 2 per cent. To that extent, the loss in the value of bond is offset by the inflow from the swap arrangement.

To see how the hedge works, consider the following scenarios. (To keep the example simple and understandable, it is assumed that the long-term interest rate is identical to LIBOR; this assumption would not hold good in real life. Removing the assumption will not affect the nature of the outcome of the hedges.)

i. LIBOR rises from 5 per cent to 7 per cent

Effect on D:

D Ltd. will receive 9 per cent on his floating rate bonds. Thus, it gains in the cash market. In the swap, its inflow remains constant (6.5 per cent) as it is a fixed rate receiver. However, its outflow on the swap increases from 7 per cent to 9 per cent. The net cash flow on the swap is negative and neutralises the gain in the cash market. In essence, since D is hedged it has forgone the gain that would have accrued if it were unhedged.

Effect on E:

E Ltd. continues to receive the same amount of interest, but the value of its bonds has fallen. In the swap, its inflow increases from 7 per cent to 9 per cent while its outflow is unchanged. Thus, the swap has a positive cash flow. The capitalised value of this positive flow will compensate for the loss in value of the bonds.

ii. LIBOR falls from 5 per cent to 4 per cent

Effect on D:

D will receive 6 per cent instead of 7 per cent on its floating rate bonds, and thus loses in the cash market. In the swap, its inflow remains at 6.5 per cent. However, its outflow on the swap falls from 7 per cent to 6 per cent. This exactly compensates it for its cash market loss. Because of the swap, it has avoided the risk of fall in interest rate.

Effect on E:

E continues to receive the same amount of interest, but the value of its bonds appreciates. In the swap, however, its inflow falls from 7 per cent to 6 per cent with its outflow staying

unchanged at 7 per cent. The net cash flow on the swap is negative. The capitalised value of this loss neutralises the gain in the cash market. By hedging, it has forgone the possible gain in the cash market.

This is an illustration of an asset swap, since the parties end up by exchanging a floating rate asset for a fixed rate asset.

In Example 8.2, the asset swap was used as a hedging device. Earlier, a liability swap was shown where the purpose of the swap was to obtain an advantage in the cost of borrowing. Liability swaps can also be used to hedge existing liabilities (rather than achieve a lower borrowing cost).

Example 8.3

G Ltd has an existing fixed rate liability. It feels that interest rates are going to fall (which will raise the capitalised value of the debt) and wishes to hedge against this. H Ltd has an existing floating rate liability but expects the interest rate to rise, increasing its interest burden. It wishes to hedge against this. G and H enter into a swap through broker M whereby G becomes the floating rate payer and H the fixed rate payer in a swap.

Assume that the interest rate falls as anticipated by G. Its payment under the swap decreases as the floating rate falls, while its receipt remains unchanged. There is a positive cash flow which offsets the increase in the value of the fixed rate debt. As for H, the fall in rates reduces its receipt under the swap while leaving its payment unchanged. There is a negative cash flow in the swap, which offsets H's gain in the cash market.

On the other hand, if the interest rate rises (as anticipated by H), G's payment under the swap increases with its receipt unchanged. The resulting negative swap cash flow offsets the reduction in the value of the cash market liability. For H, the rise in interest rates means an increased receipt under the swap with unchanged payments. The resulting positive cash flow offsets H's loss in the cash market.

Currency swaps

As in the case of interest rate swaps, currency swaps may be entered into either for mutual benefit of two parties or in order to hedge currency risks, or both.

It was seen earlier that interest rate swaps can be mutually profitable if there is a comparative advantage for the two parties in one loan market over another. The rationale for currency swaps is similar: one party has a comparative advantage in borrowing in one currency while another has an advantage in the other.

For example, suppose an Indian company (say, Sundaram Finance) wants to raise funds in the USA. At the same time, an American company, say, Jacobs Engineering wants to borrow in Indian rupees for a project in India. Sundaram,

though reputed in India, may not be as well regarded in the US debt market and would therefore have to pay a higher rate of interest than its credentials would otherwise warrant. Similarly, Jacobs Engineering may not receive a rate of interest in India that truly reflects its creditworthiness because of the obscurity of the 'name' in India. It would be beneficial to both companies if Sundaram borrows in rupees, Jacobs in dollars and the two then swap the liabilities.

Sometimes, comparative advantage could run in the opposite direction. A British company might have already borrowed heavily in the sterling bond market. As a result, the market may demand a premium on further borrowings, as they would not prefer a concentration of holdings in one company. On the other hand, say because it is a well-known multinational, it may be able to raise funds relatively cheaply in the Indian rupee debt market because it has no previous exposure.

Example 8.4

S, an Indian company and J, an American company are both contemplating raising of funds. J, by virtue of its larger size, greater diversification etc. has a better credit rating than S in both markets. The rates at which the companies can borrow are as follows:

Company	*Quoted interest rate*	
	₹ (per cent)	*$ (per cent)*
S	*9*	*7*
J	*8*	*4*

S needs dollars, while J needs rupees. The differential in cost of borrowing is 1 per cent in India but 3 per cent in America. Both parties stand to gain by the following arrangement through M, a middleman. (Assume ₹55 = $1)

a. S will borrow in India, a sum of ₹55 crore at 9 per cent

b. J will borrow $10 million in the USA at 4 per cent

c. Both parties enter into a swap on the following terms:

i. The principal sums are exchanged, i.e., S pays J ₹55 crore and receives $10 million

ii. S will pay M dollar interest at 6.5 per cent and receive rupee interest at 9 per cent

iii. J will pay M rupee interest at 7.5 per cent and receive from M dollar interest at 4 per cent.

The cash flows are shown in Table 8.3.

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Table 8.3: *Cash flows*

Party	*Interest outflow on loan (per cent) (1)*	*Swap outflow (per cent) (2)*	*Swap inflow (per cent) (3)*	*Net flow (per cent) (4)= (1+2+3)*
S	*₹ –9*	*$ –6.5*	*₹ +9*	*$ –6.5*
J	*$ –4*	*₹ –7.5*	*$ +4*	*₹ –7.5*
M	–	*₹ –9* *$ –4*	*+ ₹ 7.5* *$ + 6.5*	*₹ –1.5* *$ + 2.5*

S and J have both achieved a lower cost of capital than if they had borrowed directly in the other currency. M gains 2.5 per cent in dollars and loses 1.5 per cent in rupees, producing a net gain of 1 per cent. (However, it should be noted that M bears an exchange rate risk. It is possible to arrange the payments differently with the swap parties bearing some or all of the risk.)

The differential in rates was 3per cent in USA and 1 per cent in India; this left a gap of 2 per cent to be shared as gains by the parties to the swap transaction. In the above transaction, S gains 0.5 per cent (by effectively borrowing at 6.5 per cent instead of 7 per cent), J gains 0.5 per cent (by borrowing at an effective rate of 7.5 per cent instead of 8per cent) and M gains 1 per cent (+ 2.5 per cent in dollars, – 1.5 per cent in rupees).

Terminology of currency swaps

In Example 8.4, a fixed interest obligation in one currency was exchanged for a fixed interest obligation in another currency. This is known as a fixed-to-fixed currency swap.

Another type of currency swap involves exchange of a fixed rate obligation in one currency for a floating rate obligation in another currency. This is known as a 'fixed-to-floating currency swap' or a 'circus swap' or 'currency coupon swap'.

Hedging through currency swaps

Just as interest rate swaps can be used to hedge interest exposures, currency swaps can be used to hedge exchange rate risk. Suppose an Indian company has a dollar debt liability. If the dollar appreciates, it suffers exchange losses. If it becomes the rupee payer (dollar receiver) in a rupee-dollar currency swap, whenever the dollar rises, there will be a profit on the swap position which will offset the loss on the initial (cash market) liability.

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