

## Swaps

### Definition (Swap)

A swap is a contract between two parties **to exchange (or: swap) future cashflows**. The size of these cashflows is determined by some formulae, decided upon at the initiation of the contract.

A swap contract has the following characteristics:

1. As we saw in the definition, a swap is an exchange and should not require (at least in principle) any additional payments at initialization. That means that the initial value of a swap is zero.
2. The contract needs to specify a swap rate to make the two swap parties willing to exchange cash flows.

The most widely used swap category is “Interest Rate swap”.

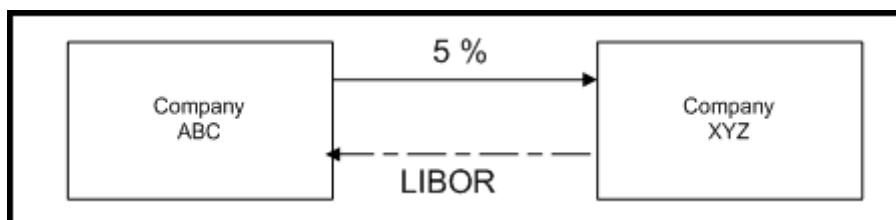
**A plain-vanilla interest rate swap** is an exchange of a **series of fixed interest payments for a series of floating interest payments**, fluctuating with LIBOR (London interbank Offer Rate). The fixed rate of interest is often quoted as a spread over the current US Treasury security of the desired maturity and is called the **swap rate**. Normally, the floating rate paid at the end of each period is based on LIBOR at the beginning of the period. The times at which the floating rates are established are called the “reset dates.” The two sides of the swap are called the “**fixed leg**” and “**floating leg**”; and the life of a swap is called its **tenor**. In this case, only the cash flows, not the principals, of the two types of debt are exchanged. So the size of the swap is measured by its notional principal.

Here is an example how a “Interest Rate Swap” (IRS) works:

### Example (IRS)

Company ABC enters into a 3-year swap (with semiannual interest payments) on the 14<sup>th</sup> of April, 2011. ABC pays to its counterparty, company XYZ a fixed rate of interest of 5 % on a notional amount of \$ 100 million. Company XYZ will pay us six-month LIBOR.

This scenario is shown in Exhibit S.1 below.



**Exhibit S.1:** The parties in the Interest Rate Swap

The first exchange of payments is made on the 14<sup>th</sup> of October, 2008, six-month after the contract is signed. Company ABC has to pay \$ 2,5 million to company XYZ. Company XYZ has to

pay six-month LIBOR as quoted six months previously, on the 14<sup>th</sup> of April, 2008. This is a very important point. The LIBOR is set six-months before it is paid, so that in the first exchange of payments the floating side is known. This makes the first exchange special.

The second exchange of payments is made on the 14<sup>th</sup> of April, 2009. Company ABC has to pay \$ 2.5 million to company XYZ, and XYZ has to pay LIBOR as quoted on the 14<sup>th</sup> of October, 2008.

Every six-months there is such an exchange of payments. The fixed leg is always being known (here: \$ 2.5 million) and the floating leg is being known six-month before it is exchanged. This continues until the 14<sup>th</sup> of April, 2011.

Date	LIBOR (%)	Cashflow fix (ABC → XYZ) (\$ million)	Cashflow floating (ABC ← XYZ) (\$ million)
14/04/2008	4.2		
14/10/2008	4.8	2.5	2.1
14/04/2009	5.3	2.5	2.4
14/10/2009	5.5	2.5	2.65
14/04/2010	5.6	2.5	2.75
14/10/2010	5.9	2.5	2.8
14/04/2011		2.5	2.95

**Exhibit S.2:** Cash Flows in \$ million in a 3-year IRS with notional amount of \$ 100 million. Fixed leg: 5 %, floating leg: LIBOR.

Practically any sequence of cash flows can be used to generate a swap, and the different features of exchanging cash flows can be grouped. By this we get different types of swaps. Here are listed a few:

*Equity Swaps:* An equity swap is the exchange of returns from an equity (or equity index), against the return of another asset, often again LIBOR based cash flows.

*Commodity Swaps:* A commodity swap is in principle a sequence of forward contracts on some commodities with different times to maturity and different prices.

*Currency Swap:* A currency swap is an exchange of interest payments in one currency for interest payments in another currency. The interest payments can both be fixed, both floating, or one of each. There is also an exchange of the principals (in both currencies) at the beginning of the contract and at the end.

A final word about credit risk of a swap: In general swaps don't have credit risk. In most swaps the underlying principal is not exchanged. And in the few cases principals are exchanged, principles equal in value changes hands. Therefore swaps are not exposed to credit risk.

