

Cap. Floor. Collar. Swaption

Cap

A cap transaction is a series of interest options. The buyer of the cap pays an option premium and receives the positive difference between the floating rate and the strike, or cap rate, times the fraction of the year, times the notional principal. The premium is usually quoted as a percentage of notional principal and paid at the origination of the agreement. Settlement can be either in advance or in arrears.

Caps are referred to as “calls on floating rate” or put options on an underlying time deposit. The holder “exercises” the option if current floating rate exceeds the cap rate or “selling” the relatively low interest rate deposit.

Floor

A floor transaction is also a series of interest options. The buyer of the floor receives settlement payments only when the floating rate is below the floor rate.

Floors are referred to as “puts on floating rate” or call options on an underlying time deposit. The holder “exercises” the option if current floating rate is below the floor rate or “buying” the relatively high interest rate deposit.

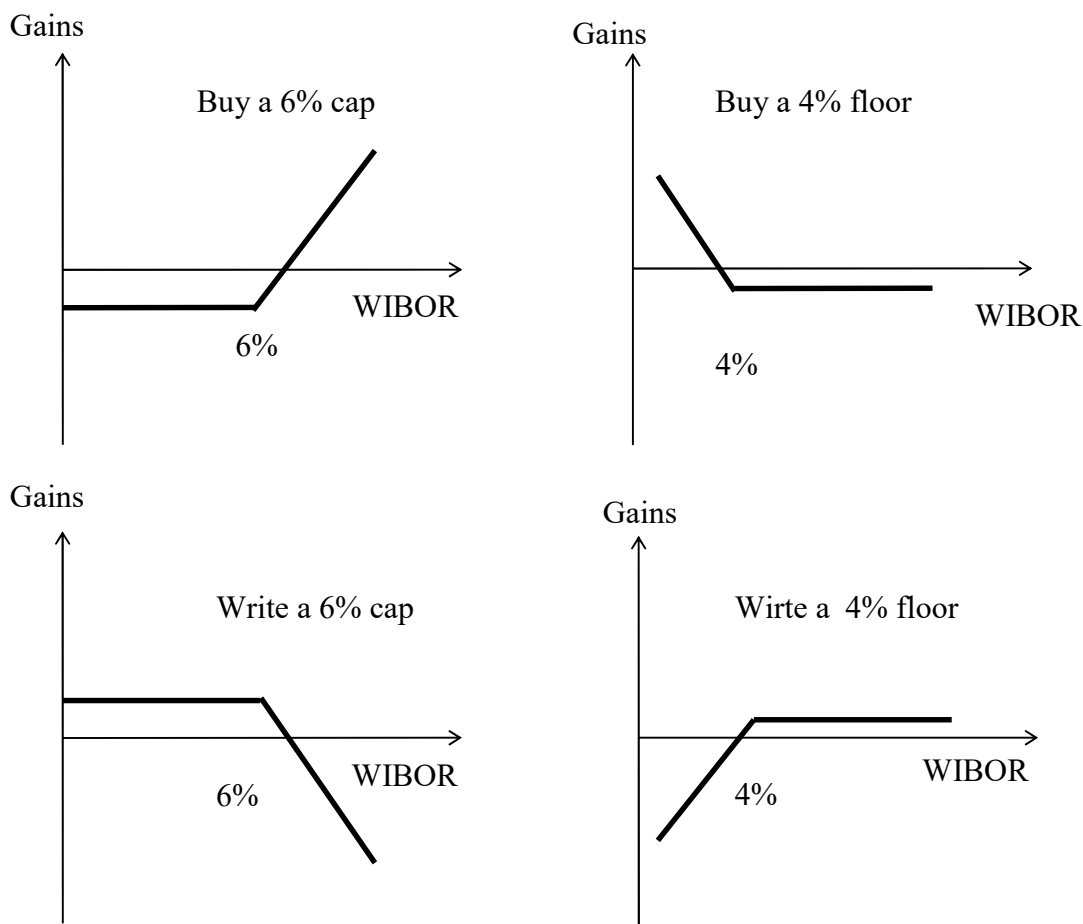
Collar

An interest collar is combination of a cap and a floor, a long position in one and the short position in the other.

To buy a 4-6 percent collar on WIBOR is to buy a 6 percent cap and to sell a 4 percent floor. The premium from writing a floor offsets the premium for buying a cap. The buyer will receive payments when WIBOR exceeds 6 percent and make payments when WIBOR is below 4 percent, and neither receive nor pay if WIBOR is at or between 4 percent and 6 percent. A “zero-cost” or “zero-premium” collar occurs when both premiums are equal.

Buying a cap and writing a floor is equivalent in terms of cashflows to an IRS paying a fixed rate and receiving a floating rate.

The payoff relationships for caps and floors can be shown using option style diagrams.



Swaptions

A swaption is an option on swap. The buyer of a call swaption has the right to buy a swap by paying the exercise price (*payer swaption*). The seller of a call is obliged to sell the swap for the exercise price. The buyer of a put swaption has the right to sell a swap for the exercise price (*receiver swaption*). The seller of a call is obliged to buy the swap by paying the exercise price.

The purchaser of an option will pay a premium at the origination of the transaction. The exercise price is a specified fixed rate.

Swaptions are known as entry and exit options on swaps. They give the holder the right, but not the obligation, to get either into or out of a swap.

Problem 1. CAP

A counterparty X buys a cap. The transaction has the following terms:

Option premium	120 basis points
Origination date:	2000-01-15
Maturity date:	2005-01-15
Notional principal:	10 000 000
The buyer of the cap	Counterparty X
The cap rate (strike)	10,00%
Convention:	365
The writer of the cap	Dealer
Floating rate:	6M WIBOR
Convention:	360
Settlement dates:	January 15th and July 15th of each year
WIBOR determination:	Determined in advance, paid in arrears

Calculate the swap cash flows assuming the 6M WIBOR path shown in the following table.

Settlement Date	WIBOR
2000-01-15	10,4%
2000-07-15	10,6%
2001-01-15	9,1%
2001-07-15	8,1%
2002-01-15	7,6%
2002-07-15	9,1%
2003-01-15	10,1%
2003-07-15	10,5%
2004-01-15	10,6%
2004-07-15	8,4%
2005-01-15	10,2%

Solution

Settlement Date	Number of Days	6M WIBOR	Floating Rate Receipt	Fixed Rate Payment	Counterparty X Net Receipt (Payment)
15-sty-00	-	10,4%	-	-	-120 000
15-lip-00	182,00	10,6%	525 778	498 630	27 148
15-sty-01	184,00	9,1%	541 778	504 110	37 668
15-lip-01	181,00	8,1%	457 528	495 890	0
15-sty-02	184,00	7,6%	414 000	504 110	0
15-lip-02	181,00	9,1%	382 111	495 890	0
15-sty-03	184,00	10,1%	465 111	504 110	0
15-lip-03	181,00	10,5%	507 806	495 890	11 915
15-sty-04	184,00	10,6%	536 667	504 110	32 557
15-lip-04	182,00	8,4%	535 889	498 630	37 259
15-sty-05	184,00	10,2%	429 333	504 110	0
			4 796 000	5 005 479	26 547