FLOATERS AND INVERSE FLOATERS

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A floater is a bond whose interest rate is variable and a function of interest rates.

Example:

Five-year floater

Coupon 1/2 the six-month T-bill rate set at beginning of period

Cash Flows

0	1	2	3	…
	$\frac{r_{01}(100)}{2}$	$\frac{r_{12}(100)}{2}$	$\frac{r_{23}(100)}{2}$	

Pricing (assume default-free)

Consider six months before horizon

9 **10**

$$100 + \frac{r_{9,10}}{2} 100$$

Present value at 9

$$PV_9 = \frac{100 \frac{r_{9,10}}{2} + 100}{1 + \frac{r_{9,10}}{2}} = 100$$

The same carries through at earlier dates:

8 **9**

$$100 + \frac{r_{8,9}}{2} 100$$

Present value at 8

$$PV_8 = \frac{100 + \frac{r_{8,9}}{2} 100}{1 + \frac{r_{8,9}}{2}} = 100$$

Thus at reset dates, floaters should sell at par.

NOTE:

1. **Duration same as six-month bond.**

2. **Default risk would need to offer premium over default free rate.**

3. **If default premium stayed constant, would expect to reset at par.**

However, probably will vary over time since default premium changes and corporation risk may change.

INVERSE FLOATER

As rates rise, coupon falls

Example:

Five-year inverse floater

Semi-annual interest

Interest rate 10% minus six-month rate prevailing at beginning of the period

Six-month rate	Inverse floater pays
4	6
5	5
6	4
7	3

Pricing an inverse floater:

	Cash Flows per $100		
Six-month rates	**Floater**	**Inverse Floater**	**Sum**
4%	4	6	10
5%	5	5	10
6%	6	4	10
7%	7	3	10
8%	8	2	10

Note: Cash flows of floater plus inverse floater same as two 5% coupon bonds

By law of one price

Price Floater	**+**	**Price Inverse Floater**	**= Price of 2 5% coupon Bonds**

$$P_f + P_I = 2P_5$$

$$P_I = 2P_5 - P_f$$

For most models duration is additive

$$Duration\ of\ P_5 \cong 3\ periods$$

$$Duration\ of\ P_f = \frac{1}{2}\ period$$

Thus, duration of inverse floater =

$$5\frac{1}{2} = 6 - \frac{1}{2}$$

or longer than corresponding five-year coupon bond

Why? When rates increase inverse floater receives double hit:

A. **Present value of future cash flow less**

B. **Coupons less**

I. Terms

   a. Floater

   b. Inverse floater

II. Concepts

   a. Floaters sells at par at reset dates

   b. Duration of inverse floater exceeds maturity

III. Calculations

   a. Value of inverse floater

   b. Duration or convexity of inverse floater