

Floating Rate Notes



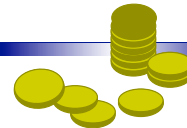
Introduction to Floating-Rate Notes

- A floating rate note is a bond with a coupon that is indexed to a benchmark interest rate.
- Possible benchmark rates include US Treasury rates, LIBOR, prime rate, municipal and mortgage interest rate indexes.
- Examples of floating-rate notes
 - Corporate (especially financial institutions)
 - Adjustable-rate mortgages (ARMs)
 - Governments (inflation-indexed notes)
- Chinese structured deposits



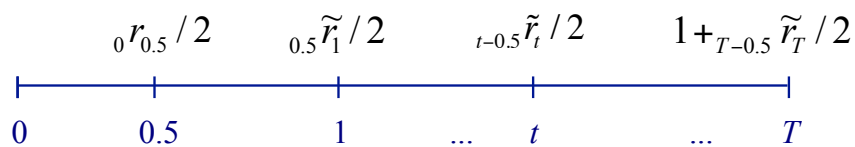
Cash Flow Rule for Plain Vanilla Semi-Annual Floater

- The basic semi-annual coupon floating rate note has the coupon indexed to the 6-month interest rate.
- Each coupon date, the coupon is equal to the par value of the note times one-half the 6-month rate quoted 6 months earlier, at the beginning of the coupon period. In other words, the time t coupon payment as percent of par is ${}_{t-0.5}r_t$.
- The note pays par value at maturity.



Floating Rate Note Cash Flows

- Each coupon is based on the previous 0.5-year rate.
- Only the next coupon is known at the current date.
- The later coupons depend on future interest rates.



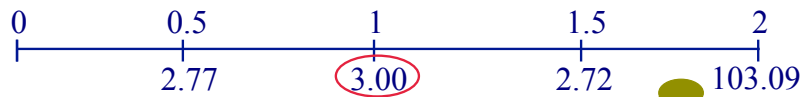
Example: Two-Year Semi-Annual Floater

What are the cash flows from \$100 par of the note in this scenario?

- The first coupon on the bond is $100 \times 0.0554/2 = 2.77$.
- Later coupons set by the future 6-month interest rates.
- For example, consider the following scenario for future 6-month rates:



Floater Cash Flows:



$$100 \times 0.06/2$$



A T-Year Floater Can Be Replicated by Buying 0.5-Year Par Bonds Until Time T and Collecting the Coupons Along the Way

Time 0: Buy 0.5 -yr par bond

$$+(1 + {}_0r_{0.5}/2)$$

Time 0.5: Buy 0.5 -yr par bond

$$-1 \quad + (1 + {}_{0.5}r_1/2)$$

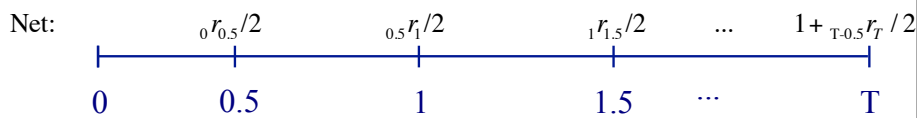
Time 1: Buy 0.5 -yr par bond

$$-1 \quad + (1 + {}_1r_{1.5}/2)$$

...

Time T-0.5: Buy 0.5 -yr par bond

$$-1 \quad + (1 + {}_{T-0.5}r_T/2)$$



A Semi-Annual-Coupon Floater is Equivalent to a 0.5-Year Par Bond

- A dynamic strategy of rolling six-month par bonds until floater maturity, collecting the coupons along the way, replicates the cash flows of a floater.
- So as semi-annual coupon floater is equivalent to the six-month par bond in its replicating trading strategy.
- Like its replicating trading strategy, a floater is always worth par on the next coupon date with certainty.
- Its coupon is set to make it worth par today.
- The duration of the floater is therefore equal to the duration of a six-month par bond.
- Their convexities are the same too.



Class Problems

Assume the 0.5-year rate is 5.54%.

- 1) What is the duration of a semi-annual paying floater?
- 2) What is the dollar duration of \$100 par of this note?

