

Floating Rate Notes



Concepts and Buzzwords

- Floating Rate Notes
 - Cash flows
 - Valuation
 - Interest Rate Sensitivity
- floater, FRN, ARN, VRN, benchmark interest rate, index

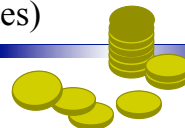
Reading

- Veronesi, Chapter 1
- Tuckman, Chapter 18



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)



Floating Rate Jargon

- Other terms used for floating-rate notes include
 - FRNs
 - Floaters and Inverse Floaters
 - Variable-rate notes (VRNs)
 - Adjustable-rate notes
- FRN usually refers to an instrument whose coupon is based on a short term rate (3-month T-bill, 6-month LIBOR)
- VRNs are based on longer-term rates
 - (1-year T-bill, 5-year T-bond)



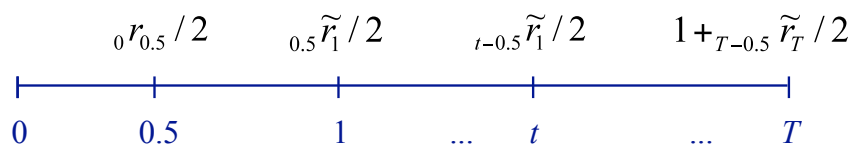
Cash Flow Rule for Plain Vanilla Semi-Annual Floater

- 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 ones are random.



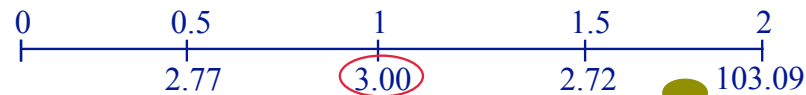
Example: Two-Year Semi-Annual Floater

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, suppose the future 6-month interest rates turn out as follows:



Floater Cash Flows:



$$100 \times 0.06/2$$

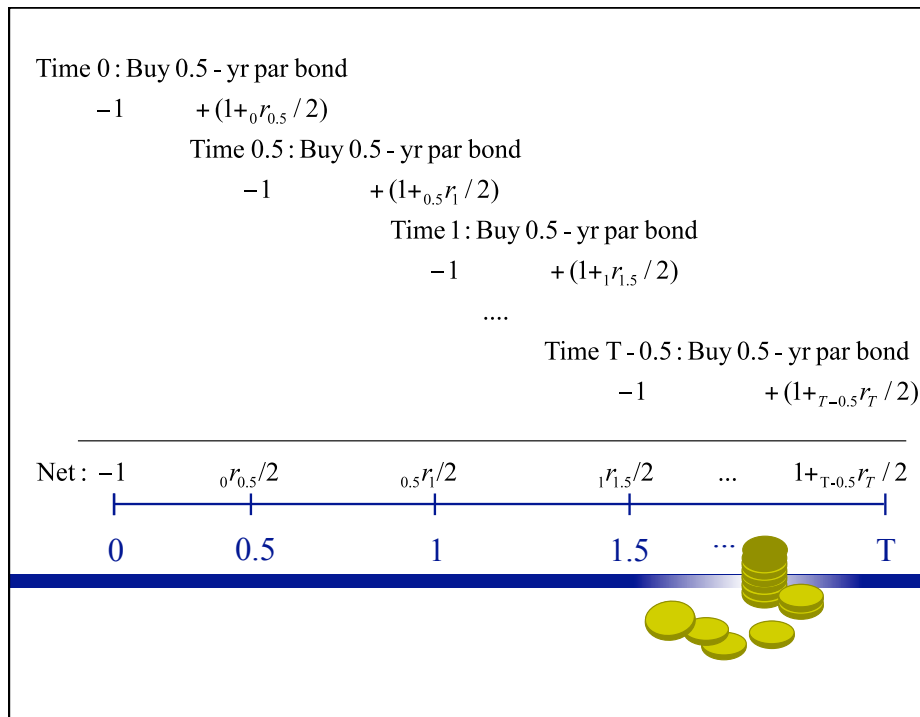


Replicating a T-Year Floater with 0.5-Year Par Bonds

Consider the following trading strategy:

- At time 0, buy a 0.5-year par bond: pay \$1.
- At time 0.5, buy another 0.5-year par bond:
collect $\$1 + r_{0.5}/2$, pay \$1 = collect $\$r_{0.5}/2$
- At time 1, buy another 0.5-year par bond:
collect $\$1 + r_{0.5}r_1/2$, pay \$1 = collect $\$r_{0.5}r_1/2$
- and so on, every six months until floater maturity date T
- At time T : collect $\$1 + r_{T-0.5}r_T/2$





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 floating-rate note?
- 2) What is the dollar duration of \$100 par of this note?
- 3) What is the convexity of this floater?
- 4) What is the dollar convexity?

