

## **Midterm Review**

(February 24, 1998)

### **Bond Arithmetic**

1. Interest rates are a way of expressing the time value of money: the value now of known payments at future dates.
2. Prices of zeros, discount factors, and spot rates contain the same information.
3. We “replicate” an asset when we find a combination of other assets that has identical cash flows.
4. Example: coupon bonds are combinations of zeros.
5. The yield on a coupon bond is its internal rate of return.
6. The yield is not generally the return.
7. Day count conventions tell us how to compute the invoice price (what we pay) from the quoted price. They vary across markets.

### **Macrofoundations of Interest Rates**

1. Interest rates reflect supply and demand for capital.
2. They also reflect expectations of the future.
3. An example is future inflation.
4. One version is the expectations hypothesis: the shape of the forward rate curve reflects the expected path of the short rate.

## Quantifying Interest Rate Risk

1. Bond prices fall when yields rise. Prices of long bonds fall more.
2. DV01 and duration are measures of the sensitivity of price to yield changes.
3. The duration of a combination of assets is the value-weighted average of the durations of the individual assets.
4. Interest rate risk management can be approached in several ways: by matching the cash flows, by matching duration or DV01, or by minimizing statistical measures of risk.
5. Duration is “80-90% right.” It misses nonparallel shifts in the spot rate curve: unequal variability and imperfect correlation of spot rates.

## Floaters and Swaps

1. Floating rate notes have interest payments that are tied to market interest rates.
2. A standard FRN pays a short rate (commonly LIBOR) and trades at par on reset dates.
3. An inverse floater pays a rate that varies inversely with a market rate (LIBOR, for example). Its cash flows can often be replicated with combinations of fixed and floating rate notes.
4. A “plain vanilla” interest rate swap is equivalent to a long position in a note with fixed payments and a short position in a bond with floating payments — or the reverse.
5. Swap rates are par yields: the fixed rate that equates the value of the fixed leg to that of the floating leg, typically par (the notional principal).
6. Swaps are useful tools for managing interest rate risk. They can be used, for example, to modify the duration of existing positions.
7. Swaps are custom-made OTC products and come in many varieties.
8. Credit risk has been a concern with swaps and other OTC derivatives, but contract design and legal developments tend to minimize its effects.