Assignment 2.

1. Case study (Bootstrap for Euribor 3M Interbank curve):

Considering the interbank market on the 15th of February 2008 at 10:45 C.E.T. write a Matlab code that realizes the bootstrap for the Discount Factors' curve (with a single-curve model). Output values should be on settlement date and expiries of quoted underlyings.

Q: Bootstrap is not the only technique in order to Discount Factors (DFs) from quoted rates. Why is it so relevant the bootstrap of DFs in finance?

Hints: include in the datesSet of the bootstrap only end dates of underlying contracts.

2. Exercise: DV01 for an IRS, Modified duration for a coupon bond

With the discount curve obtained above compute (the absolute value of the quantities specified below) for a portfolio composed only by one single swap, a 5y plain vanilla IR swap *vs* Eurbibor 3m with a fixed rate 4.032% and a Notional of €100 Mln:
i) DV01-parallel shift;
ii) $DV01^{(z)}$-parallel shift;
iii) BPV of the 5y IRS;
and for "I.B. coupon bond" with same expiry, fixed rate & reset dates of the IRS, and face value equal to IRS Notional:
iv) its Macaulay Duration.
Comment the results.

3. Theoretical Exercise
Price a 5y “I.B. coupon bond” with coupon rate equal to the corresponding mid-market 5y swap rate. Assume for the coupons same day count and frequency of swap’s fixed leg.

Function signatures

a. [dates, discounts]=bootstrap(datesSet, ratesSet);
b. zRates = zeroRates(dates, discounts); (in percentage unit, e.g. 2.13 stands for 2.13%)
c. [DV01, BPV, DV01_z] = sensSwap(setDate, fixedLegPaymentDates, fixedRate, dates, discounts);
d. MacD = sensCouponBond(setDate, couponPaymentDates, fixedRate, dates, discounts);

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