Assignment 3.

1. Case Study: P&L impacts for an IRS

a. Bank XX uses a non standard methodology in order to obtain discount factor curve. Let us consider market situation on the 15th of Feb 2008 at 10:45 a.m. CET. Let us suppose that using bank discount factor curve one obtains a 5y swap rate vs 3M equal to 4.06% (versus a mid market rate of 4.042%). Can we estimate the P&L for a trader that pays a 5y vs 3M at 4.045% (mkt conventions) for 100 Mln € at 10:45 of the 15th of Feb 2008? Can we say something on the quality of this estimation?
b. Why it is so important to obtain a discount factor curve that reproduces exactly liquid instruments?

2. Exercise: Asset Swap vs Floater

Given the discounting curve vs Euribor 3m on the 15 Feb 2008 at 10:45 C.E.T. and knowing that a 3y bond price for an issuer YY is 98 (i.e. 98% of the *face value*) with an annual coupon equal to 4.6% (*annual bond*) with coupons paid on corresponding IRS swap dates, compute the *Asset Swap Spread Over Euribor3m*. Compare with a 3y quarterly floater of YY that trades at par with a spol of 55 bps: in case you desire an exposure to YY at 3y which one would you buy, the ASW package or the floater?

3. Case Study: CDS Bootstrap

Given values for discounts on the case-study on curve bootstrap on the 15 Feb 2008 at 10:45 C.E.T. consider the obligor ISP with a recovery π equal to 30% and CDS spreads (annual bond): 1y 28 bps, 2y 31 bps, 3y 34 bps, 4y 37 bps, 5y 39 bps.

a. Build $\lambda(t)$ piecewise constant for the issuer, neglecting the "accrual" term.
b. Which is the impact of the "accrual" term? Show that this term is really negligible.
c. Consider Jarrow-Turnbull approximation (a constant λ and continuously paid CDS spread) and compare the result with the one previously obtained.

4. Exercise: Equivalence of ASW and CDS spreads.

Consider a 5y ASW on a fixed coupon bond of ISP and that ISP survival probability can be calibrated on the CDS market above. The discounted value of its NPV at time τ is $E_0[D(0,\tau)NPV(\tau)]$.
Let us suppose that $|E_0[D(0,\tau)NPV(\tau)]| \leq 4\%$ for every τ; do you think the term coming from the value of the ASW in case of default can be neglected in the valuation of the NPV of a portfolio of a 5y ASW package with the corresponding CDS on ISP? Why?

Function signatures
Spread=CalculateAssetSwapSpread(settlementDate, coupon, Bondprice, fixedLegPaymentDates, floatLegPaymentDates, dates, discounts).

Bondprice in percentage

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[datesCDS, survProbs, intensities]=
bootstrapCDS(datesDF, discounts, datesCDS, spreadsCDS, flag, recovery).

dates and discounts are the same outputs of bootstrap function; datesCDS do not include the settlement date; function outputs are vectors with the same length; flag = 1 (approx), 2 (exact) or 3 (JT).

All vectors are column vectors.

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