It says in the notes when estimating prior that a naive mean variance optimisation is not ideal, as part of black litterman you have to optimise, do you just mean by this that mean variance optimisation on it's own is not good enough?

Answer 4 Portfolio Topic (kinds of optimisation, multidimensional results)

from Richard Diamond to Everyone:

"multi-dimensional results"

from Richard Diamond to Everyone:

- different _kinds of optimisation_ (min Var, max SR)

from Richard Diamond to Everyone:

- different levels of risk aversion (three)

from Richard Diamond to Everyone:

table on 3 rows x 2 columns

from Richard Diamond to Everyone:

compare on the side: vs index (benchmark) allocations

from simon n to Everyone:

Thanks for all this One more! Sorry CVA people :), also might be a stupid question but just wanted to know how you get the volatility surface plots towards the end of your notes, how do you change the volatility to make the different portfolios?

Question & Answer 1 CVA Calculation (Forward LIBOR for IRS)

from Richard Diamond to Everyone:

How do we get multiple forward curves

from Richard Diamond to Everyone:

we simulate!

from Richard Diamond to Everyone:

either HJM (past rates data)

from Richard Diamond to Everyone:

or LMM ("forward looking" implied vols of caps)

from Richard Diamond to Everyone:

or r(t) model

from Richard Diamond to Everyone:

(calibrated to Z(0, 6M), Z(0 12M))

from Richard Diamond to Everyone:

Vasicek, HW

from Richard Diamond to Everyone:

forward curve built through the r(t) simulation

from Gustavo to Everyone:

In the HJM example the first volatility is parametrized by a constant, but if you re-do the working for today it looks like the best fit is 3degree polynomial. Is there a reason to use a constant?

from Martin to Everyone:

to calibrate model - acn we use (from Bank of England)

from Martin to Everyone:

GLC - Government liability curve ... for interest rate swap

from Martin to Everyone:

OIS from BOE for OIS discounting

from Richard Diamond to Everyone:

6M LIBOR use the column

from Richard Diamond to Everyone:

C

from Martin to Everyone:

can't we just set dt = 0.5 instead of 0.01 as we just need LIBOR 6M, in 0.5 steps... or does it need it to be continious (0.01)

from Richard Diamond to Everyone:

1000 simulations

from Richard Diamond to Everyone:

sample of 1000

throw out the rates below K

600 rates > K left

-- median to calculate EE (from CVA lecture)

why the median and not the mean?

-- 97.5, 99th percentile to calculate PFE

what strike in an ir swap?

meadian is more reliable

average is skewed by few large observations

for each point of the IRS

0, 6M, 12M, 18M and on

$L(t, 0,0,5)$

$L(t, 0.5, 1)$ -- Forward LIBOR in C62

a sample of 1000 --> cut rates

<K

$L(t, 1, 1.5)$ -- Forward LIBOR in C112

L(t, 1.5, 2) -- Forward LIBOR in C162

EACH of those will have a sample (therefore median, percentiles)

under Monte-Carlo

can you explain the notation you use in e.g. L(t, 1, 1.5)... why is t not fixed?

"Optimising HJM Monte-Carlo"

Q: can't we just set dt = 0.5 instead of 0.01 as we just need LIBOR 6M, in 0.5 steps... or does it need it to be continious (0.01)

A: cannot do because we evolve curve in continious time to satisfy the nature of modelling by SDE

ok... I understand! thx

just easier to program in python

calibrate curve on all tenors available

PCA on (0 to 25Y)

but simuate only for (0, 5Y)

our preference is that you do take the recent data

BOE data : GLC - Government liability curve, and OIS curve for discounting rates simulation

data input to HJM (covariance matrix for PCA)

de Gustavo para Todos:

In the HJM example the first volatility is parametrized by a constant, but if you re-do the working for today it looks like the best fit is 3degree polynomial. Is there a reason to use a constant?

2-3 years

ok... thanks

BLC -- built from LIBOR linked instruments to model HJM and obtain Forward LIBORs

single curve discounting -- take DF from the same HJM calibration

dual curve discounting --

 OIS curve data -- calbrate separate HJM

evolve OIS forward curve separately! on different spreadsheet

But LIBOR and OIS move mostly in parallel

OIS curve today + add spread = DF

dual curve discounting -- simple version:

is it possible to simulate LIBOR-OIS spread (which will have small volatility), rather than simulate OIS curve?

use constant DFs implied by today's forward OIS curve

and then take the spread from the libor simulation Column B??

from Richard Diamond to Everyone:

 LIBOR-OIS spread -- if using this assume constant

from Richard Diamond to Everyone:

OIS rates are overnight -- "to make it compatible with 6M LIBOR)

from Richard Diamond to Everyone:

DF from value which is OIS rate + spread

from Richard Diamond to Everyone:

DF from OIS rate

from Richard Diamond to Everyone:

DF (6M, 12M, 18M) for each point of the swap

from Tanya to Everyone:

how do we calculate the spread?

from Richard Diamond to Everyone:

for the purposes of the project you do not need to adjust the DF by OIS-LIBOR spread

from Tanya to Everyone:

ok, thx

from Richard Diamond to Everyone:

in practice, the adjustment is done but typically only by adding a constant (spread) to the OIS spot rate

Answers CVA Calculation Evaluation & Report -- Answered verbally

from Tanya to Everyone:

from Gustavo to Everyone:

About CVA component, do we have to include it in the report? or just implement it?

from Martin to Everyone:

how many marks (%) is the CVA component of the final project?

from Richard Diamond to Everyone:

80/20 to 40/60 [allocation of effort]

About CVA component, do we have to include it in the report? or just implement it?

ok

CVA component -- yes, please reflect in the report

3-4 pages

Answers on updating HJM for CVA calculation

input data, OIS discounting (if used), HJM simulation, CVA calculation itself -- to be covered in the lectures to come

so we could also use existing eigenvectors/parameters (from HJM spreadsheet), but use current rates - or is it expected that we calibrate new vectors based on recnet data

we take recent data

use existing spreadsheets (including the PCA)

using recent data, 1st vol's shape is different. we are using a constant to parametrize it

should we keep this way? is there a reason for that?

One option is to use HJM PCA spreadsheet to get principlal components = volatility functions

and then just re-code HJM SDE Monte-Carlo in Python, VBA etc

if you do PCA on recent data -- you will discover that there more randomness and less systematic movement in the yield curve

can the principal components left as discrete functions?

might be a stupid question but just wanted to know how you get the volatility surface plots towards the end of your notes, how do you change the volatility to make the different portfolios?

for portfolio construction

can the principal components left as discrete functions?

we need to fit them

because we need an analytical function to do the integration over

should we assume a certain fixed rate ? like current 5 YR rate ?

a discrete function can be numerically integrated over

now, our integration is numerical method -- done for flexibility

…

You can assume any rate for the fixed leg of the IRS

usually, it is set to equal to the LIBOR (t, 0, 0.5) today so that you have no cashflow

in the first period

AND

what if you have a forward-starting IRS

Forward LIBOR (estimation) for the time of the start as fixed leg's rate

from Stig to Richard Diamond (privately):

or maybe pick the par-swap rate so MV of swap will be 0 to begin with?

from Richard Diamond to Everyone:

Answers on Covariance Matrix (Portfolio Topic vs. Credit Topic)

from Pavel to Richard Diamond (privately):

I have a question regarding covariance matrix between terms in credit curve.

Should we check on robustness(stability) and make some adjustments in process of matrix estimation for make it more stable?

from Tanya to Everyone:

ok, thx

from Stig to Richard Diamond (privately):

fiexed rate on the swap we are pricing

from Richard Diamond to Everyone:

for the Credit Topic -- rank correlation estimation for correlation matrix

from Richard Diamond to Everyone:

for the Portfolio Topic -- rank correlations matrix plus GARCH-smoothed variances for each asset individually

END OF WORKSHOP

from Richard Diamond to Everyone:

17:00 GMT -- LMM Q&A for advanced interest rate discussion (could be quite fragmented!)