

Renaissance
Capital

**Yield Curve construction for CIS currencies:
Theory and Practicalities**

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- **Why do we need a Yield Curve?**

- **Model vs. Market Implied: pros and contras.**

- **Choosing right building blocks:**
 - *Interbank Depos*
 - *Libor Fixings*
 - *FRAs*
 - *Forwards*
 - *IR Futures*
 - *Bond Futures*
 - *Treasury and Corporate Bonds*
 - *IR Swaps*

➤ Discount Factors extraction formulae:

Depos $DF(T) = \frac{1}{1+d(T)\alpha(0,T)}$

accrual factor $\alpha(t=0, t)$

depo rate $d(t)$

Futures $DF(T_2) = DF(T_1) \frac{1}{1+f(T_1, T_2)\alpha(T_1, T_2)}$

accrual factor $\alpha(t_1, t_2)$

future rate $f(t_1, t_2)$

Swaps $1 - DF(T_N) = S(T_N) \sum_{i=1}^N \alpha(T_{i-1}, T_i) DF(T_i)$

$$DF(T_N) = \frac{1 - S(T_N) \sum_{i=1}^{N-1} \alpha(T_{i-1}, T_i) DF(T_i)}{1 + \alpha(T_{N-1}, T_N) S(T_N)}$$

accrual factor $\alpha(t_i, t_j)$

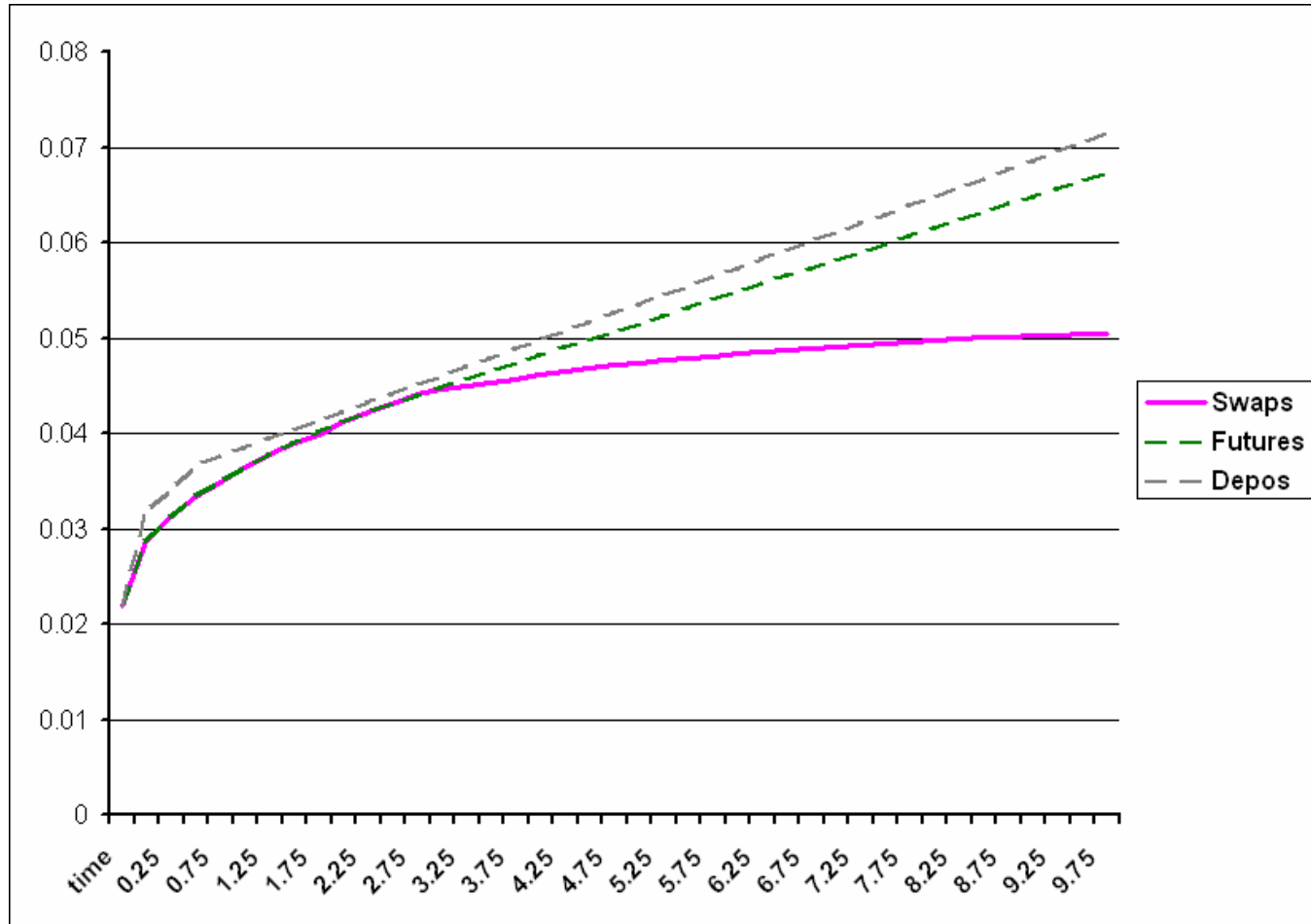
swap rate $S(t_j)$

➤ **USD Yield curve construction practicalities**

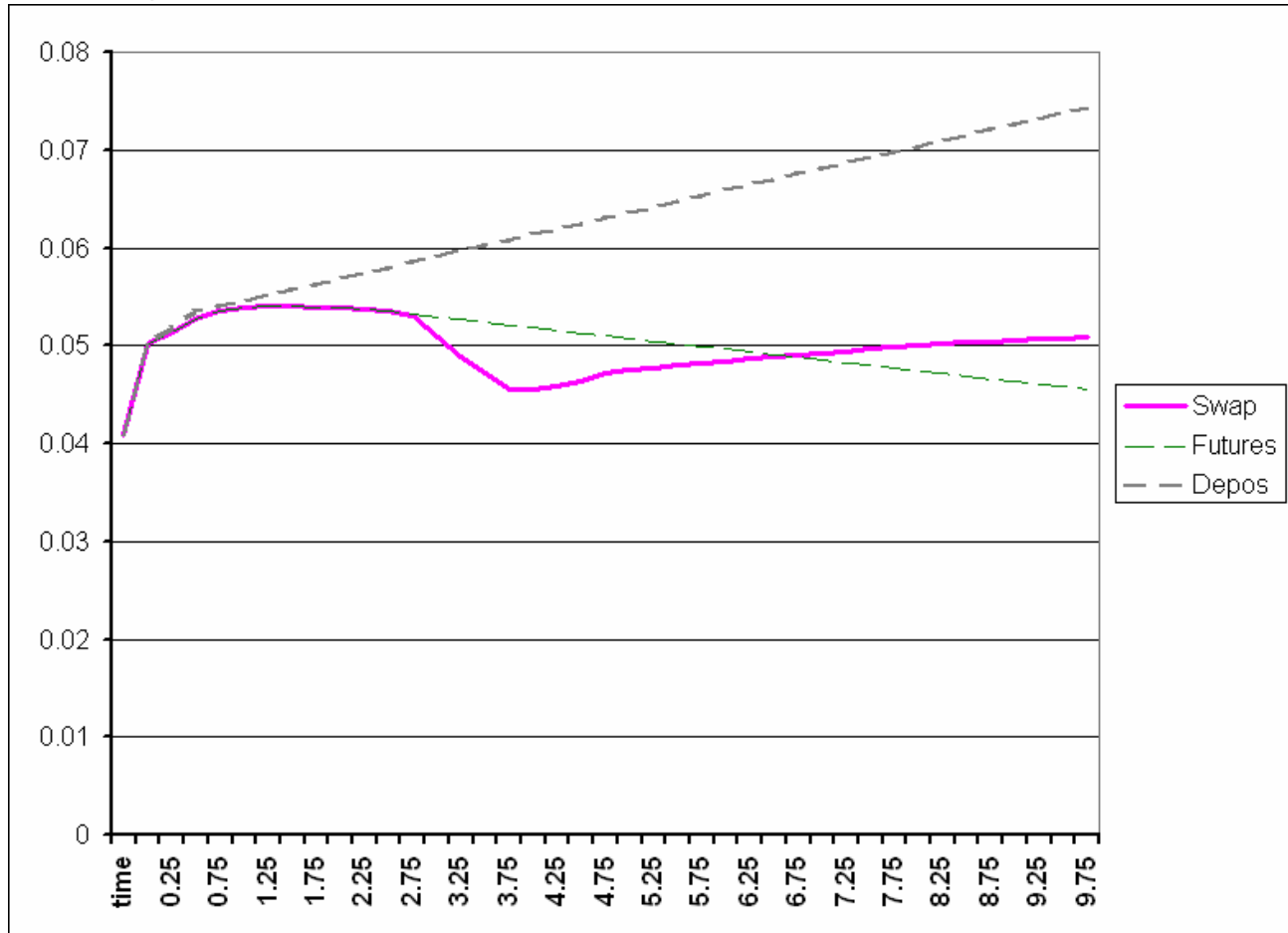
Issues:

- a) *Pinpointing exact expiry dates : accounting for weekends and holidays*
- b) *Jumping from one building block instrument to another*
- c) *Choosing right interpolation method : Yield interpolation vs DFs interpolation*
- d) *Adding convexity adjustment for futures*
- e) *Extrapolation issue*

- USD yield curve spot 18 June 08 (cubic spline interpolation)



• EUR yield curve spot 18 June 08 (cubic spline interpolation)



➤ **RUR Yield curve construction practicalities.**

Issues:

a) DEPOs, FRAs, NDFs, OFZs, OFZ futures, IR Swaps, CCY swaps, Mosprime futures?

b) What spot price to use ?

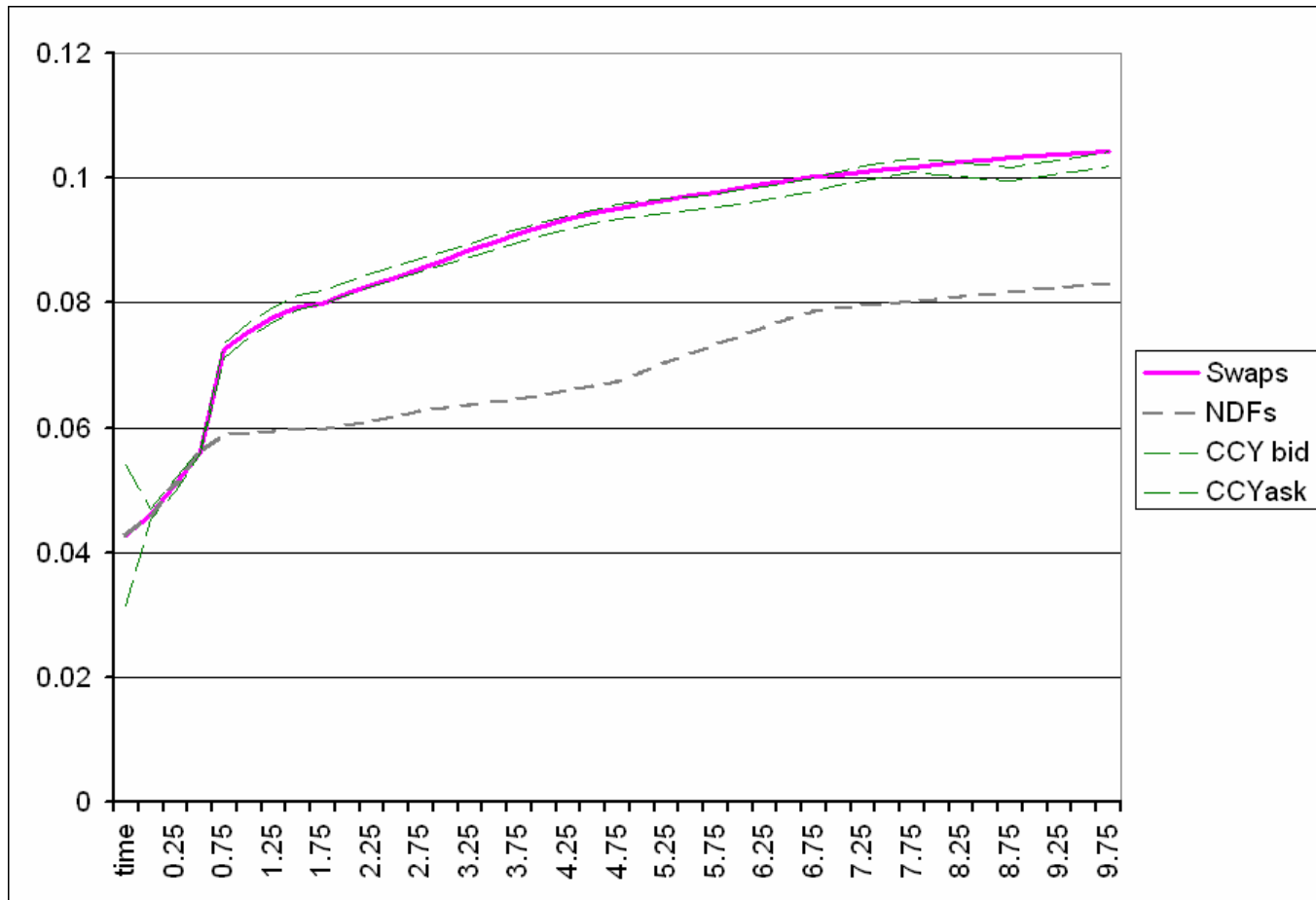
c) Spot date mismatch curve adjustment

d) Bid Offer spread problem

e) NDF vs Swaps basis

f) Holidays mismatch

- RUR yield curve spot 18 June 08 (cubic spline interpolation)



➤ UAH and KZH yield curve construction

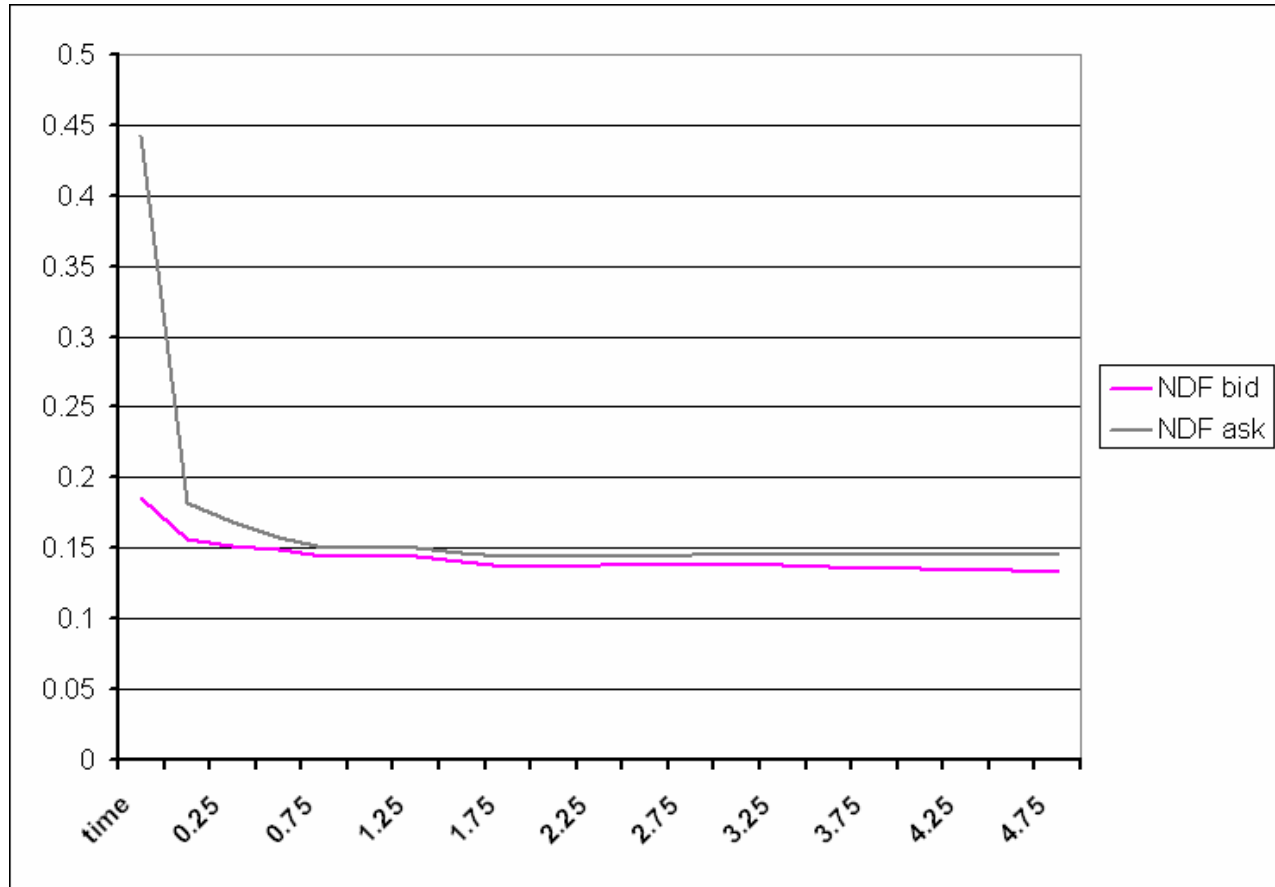
Issues:

a) *NDF based*

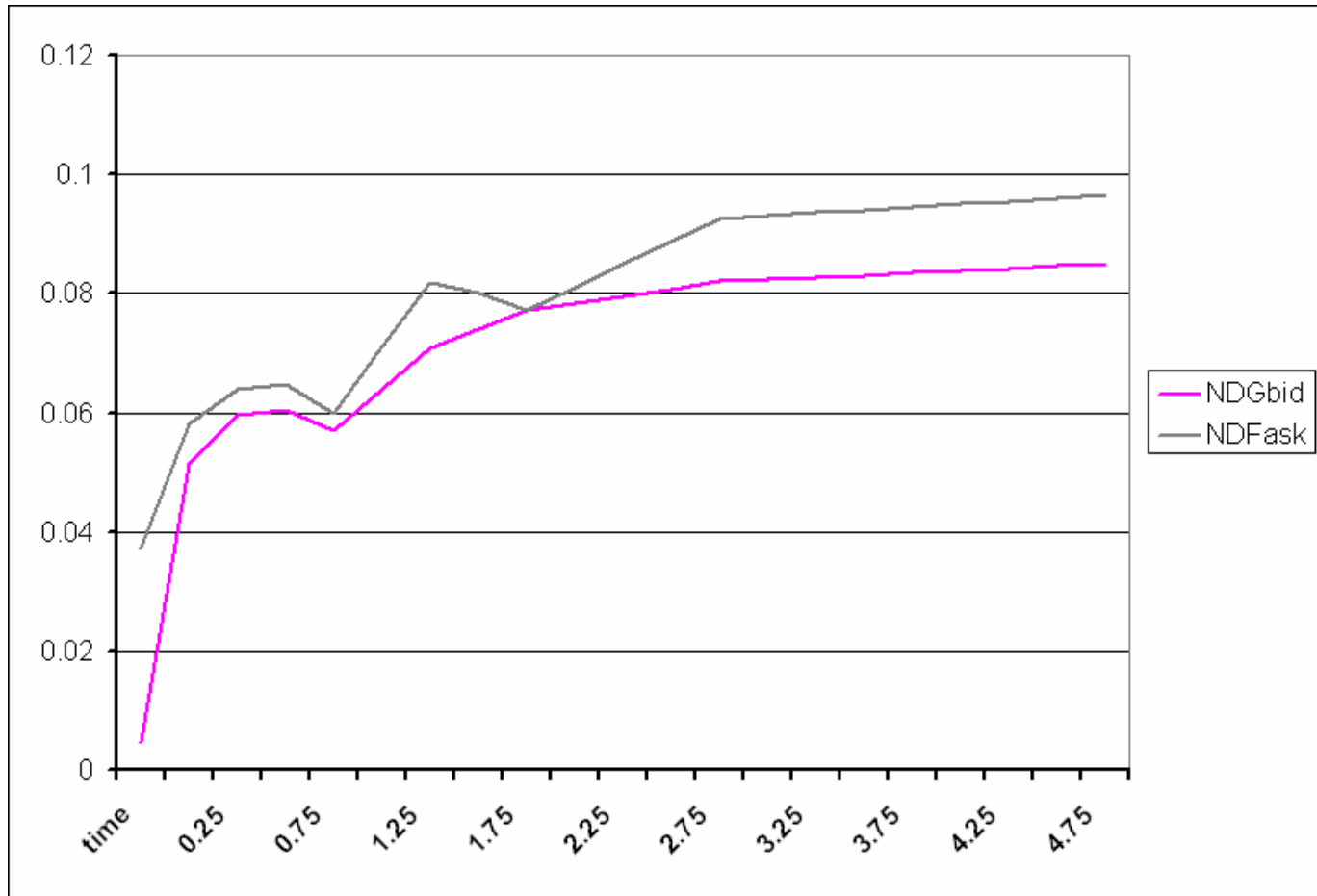
b) *Quality of data problem*

c) *Interpolation*

- UAH yield curve spot 18 June 08 (cubic spline interpolation)



- KZT yield curve spot 18 June 08 (bid - linear, ask -cubic spline interpolation)



➤ **Extending NDF based Yield curve beyond NDF price data**

a) CCY based ?

b) CDS based ?

c) IR model based ?

d) Hybrid model?

➤ Questions?

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