Volatility Curve Instruction Manual

Exponentially Weighted Moving Average Volatilities

Exponentially Weighted Moving Average Volatilities

Date:

Decay factor 0.9

i →

		1m	3m	6m	1yr	2yr	3yr	4yr	5yr	7yr	9yr	10yr	15yr	20yr	30yr
Yield Volatility	(%)	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i	B_i
Current Yield	(%)	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i	A_i
Price Volatility	(%)	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i	C_i
Correlation Matrix	1m	1													
	3m		1												
	6m			1											
	1yr				1										
	2yr					1			$D_{i,j}$						
	3yr						1								
j ↓	4yr							1							
	5yr								1						
	7yr									1					
	9yr										1				
	10yr											1			
	15yr												1		
	20yr													1	
	30yr														1

A_i : Daily Cubic B-Spline Model Zero Coupon Rate

B_i : $B_i = \sqrt{\sigma_i^2 \times 250}$

$$\sigma_i^2 = \lambda\,\sigma_{i,-1}^2 + (1-\lambda) r_i^2$$

$$r_i = \ln \frac{A_i}{A_{i,-1}}$$

λ =Decay factor(0.90,0.91,0.92,……0.99)

C_i : $C_i = \sqrt{S_i^2 \times 250}$

$$S_i^2 = \lambda\,S_{i,-1}^2 + (1-\lambda) R_i^2$$

$$R_i = (-i) \times \ln\left(\frac{1+A_i}{1+A_{i,-1}}\right) ,\ i = 1m, 3m, 6m, \ldots\ldots, 30Yr$$

λ =Decay factor(0.90,0.91,0.92,……0.99)

$D_{i,j}$: $D_{i,j} = \frac{S_{ij}}{S_i \times S_j}$

$$S_{i,j} = \lambda\,S_{i,j,-1} + (1-\lambda) R_i \cdot R_j$$

Equally Weighted Moving Average Volatilities

Equally Weighted Moving Average Volatilities

Date:2007/4/17

Days of historical data 62

i →

		1m	3m	6m	1yr	2yr	3yr	4yr	5yr	7yr	9yr	10yr	15yr	20yr	30yr
Yield Volatility	(%)	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j	b_j
Current Yield	(%)	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j	a_j
Price Volatility	(%)	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j	c_j
Correlation Matrix	1m	1													
	3m		1												
	6m			1											
	1yr				1										
	2yr					1			d_j						
	3yr						1								
j ↓	4yr							1							
	5yr								1						
	7yr									1					
	9yr										1				
	10yr											1			
	15yr												1		
	20yr													1	
	30yr														1

A_j : Daily Cubic B-Spline Model Zero Coupon Rate

b_j : $b_i = \sqrt{\sigma_i^2 \times 250}$

$$\sigma_i^2 = \frac{1}{\mathrm{T}} \sum_{n=0}^{T\text{-}1} r_{i,-n}^2$$

$$r_{i,-n} = \ln \frac{a_{i,-n}}{a_{i,-n-1}}$$

T=Days of historical data (62 or 125 or 250)

c_j : $\mathrm{c}_i = \sqrt{\mathrm{S}_i^2 \times 250}$

$$S_i^2 = \frac{1}{\mathrm{T}} \sum_{n=0}^{T\text{-}1} R_{i,-n}^2$$

$$\mathrm{R}_{i,-n} = (-i) \times \ln\left(\frac{1+a_{i,-n}}{1+a_{i,-n-1}}\right) \qquad , i = 1m, 3m, 6m, \ldots\ldots, 30Yr$$

T=Days of historical data (62 or 125 or 250)

d_j : $\mathrm{d}_{\mathrm{i,j}} = \dfrac{\mathrm{S}_{ij}}{\mathrm{S}_i \times \mathrm{S}_j}$

$$S_{ij} = \frac{1}{\mathrm{T}} \sum_{n=0}^{T\text{-}1} (\mathrm{R}_{i,-n} \times R_{j,-n})$$

T=Days of historical data (62 or 125 or 250)