**MF728 Problem Set # 3**

1. **Caplet Pricing in Different Models:**
2. The discount factor is about: ﻿**0.9844964370054085**
3. Price of the option on 1Y Libor under BS model is: ﻿**0.00018393250976716114**
4. The best σn is (F x σ ), which is about: **﻿0.001875**
5. The price under normal model is about: **﻿0.00018410496263719832**

These two prices are similar, both of them are around 0.000184. Also, the price. under normal model is higher, that’s because normal model allow the negative returns while log-normal model doesn’t.

1. The results are shown below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Strikes** | **Prices** | **Delta** | **Gamma** | **Vega** | **Theta** |
| **0.5%** | ﻿2.280744e-14 | ﻿-7.710340e-11 | ﻿2.606216e-07 | ﻿6.1083209e-12 | ﻿-4.581240e-13 |
| **0.75%** | ﻿3.024581e-08 | ﻿-6.158899e-05 | ﻿0.122619909 | ﻿2.873904e-06 | ﻿-2.155428e-07 |
| **1.0%** | ﻿1.241694e-05 | ﻿-0.01453869 | ﻿15.446653064 | ﻿0.0003620309 | ﻿-2.715231e-05 |
| **1.25%** | ﻿0.000183932 | ﻿-0.11570475 | ﻿52.220556771 | ﻿0.0012239193 | ﻿-9.179394e-05 |

0.5% has the highest delta and theta, 1.25% has the highest gamma and vega.

1. **Stripping Caplet Volatilities:**
2. Here’s the result of each cap:

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描述已自动生成

1. Here’re the plot of caps and caplets volatilities:

图表, 箱线图

描述已自动生成

From the shape we can conclude that, it seems that each cap’s volatility is about the average of former and later caplets volatilities.