**Bonus Target Forward**

**(P74)**

**產品規則:**

每月觀察匯率(EUR/USD)、觀察12個月。

預設值為

Strike price = 1.415

Barrier = 1.45

Leverage Ratio = 200%

Bonus Amount = 10000

在結算時若Fixing Rate <= Strike price

則投資人可獲得Bonus Amount

同時當期的Digital Value = 1

紀錄為P(i) = 1

若Fixing Rate > Barrier(1.45)

則投資人需賠 本金 \* 槓桿比率 \* (Fixing Rate – Barrier)的價差

各期的Digital Value的總和為4的時候將會提前出場

即CVP(n)=Sum(P(i)) from i = 1 to 12

此時若是 Fixing Rate <= Strike price

則則投資人可獲得Bonus Amount

**程式碼:**

clc; clear all;

%%%%%%%%% Contract Setting %%%%%%%%%%%%%%

P = 1000000; %% Notional Amount

Upfront\_Premium = 100000; %% Upfront Premium

L = 2; %% Leverage

K = 1.415; %% Strike Price

B = 1.45; %% Barrier

T = 1; %% Time to Maturity

n = 12; %% Number of Settlements

dt = T/n; %% Time Length of each period

Target\_count = 4; %% Target

pi = 0; %% P(i)

bonus\_amount = 10000; %% US 10000

%%%%%%%%% Market Parameter %%%%%%%%%%%%%%

X=1.375; %% Spot Reference

v=0.2; %% Volatility

rd=0.02; %% Domestic interest rate (US)

rf=0.01; %% Foreign Interest Rate (EUR)

%%%%%%%%% Simulation Parameter %%%%%%%%%%%%%%

N=1000; %% Simulation Paths

randn('seed',100); %% Control random numbers

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

Payoff\_Path=zeros(N,n); %% Payoff for each settlement date of each Path

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

for i = 1:N %% Path

Xt = X; %% Reset the Spot Exchange Rate

TC = 0; %% Target Acount

for t=1:n %% Settlement

XT = Xt\*exp((rd-rf-0.5\*v^2)\*dt+v\*sqrt(dt)\*normrnd(0,1,1,1));

if XT <= K

Payoff\_Path(i,t) = bonus\_amount\*exp(-rd\*t\*dt); %% Profit

TC = TC + 1; %% Knock out

if TC >= 4

break;

end

elseif XT > K

Payoff\_Path(i,t) = -L\*P\*(XT - K)\*exp(-rd\*t\*dt); %% Loss

end

Xt=XT; %% Reset inital exchnage rate

end

Period\_Path(i,1)=t;

end

Total\_Payoff\_Path = sum(Payoff\_Path,2)+ Upfront\_Premium;

Price = mean(Total\_Payoff\_Path)

se=std(Total\_Payoff\_Path)/sqrt(N)

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%%獲利分析

Win\_Path = Total\_Payoff\_Path >=0; %% Win=1, Loss=0

Win\_Probability = sum(Win\_Path) / N %出場獲利機率

Average\_Profit\_Win = mean( Total\_Payoff\_Path(Win\_Path) )%出場獲利平均金額

Average\_Period\_Win = mean( Period\_Path(Win\_Path) ) %出場獲利的平均期數

SORT= sort(Total\_Payoff\_Path); %小排至大

BIG5 = SORT(ceil(0.95\*N)) %最大排在第5%的金額

Average\_BIG5 = mean(SORT( ceil(0.95\*N):N )) %最大5%的平均

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%% 虧損分析

Loss\_Path = Total\_Payoff\_Path <0; %% Loss=1, Win=0

Loss\_Probability = sum(Loss\_Path) / N %出場虧損機率

Average\_Loss\_Loss = mean( Total\_Payoff\_Path(Loss\_Path))%出場虧損的平均金額

Average\_Period\_Loss = mean( Period\_Path(Loss\_Path) ) %出場虧損的平均期數

SORT= sort(Total\_Payoff\_Path); %小排至大

SMALL5 = SORT(floor(0.05\*N)) %最小排在第5%的金額

Average\_SMALL5 = mean(SORT( 1: floor(0.20\*N))) %最小5%的平均

**計算結果：**

現值：$-1093800

標準誤差：$7359

近一步分析：

獲利分析

勝率：0.5590

平均獲利時金額：$123170

獲利時平均出場期數：4.3524 months

最大收益前第5%的金額：$139830

前5%最大收益的平均：$139830

虧損分析

敗率：0.4410

平均虧損時金額：$-2636500

虧損時平均出場期數：10.2608 months（有考慮時間價值，因此不完全是12）

最大虧損前第5%的金額：$-6483000

前5%最大虧損的平均：$-5054700