Project on SFD500

1 Key Feature of SFD500

1.1 Basic Information

- Underlying stock ID: 002027.SZ;
- Valuation time: 2019-01-03;
- Start date: 2019-01-04;
- End date: 2019-12-27;
- Face value: 1.0;
- Initial stock price (on 2019-01-03): 5.10 (S_0);
- Up-and-out barrier level: 105% ($1.05S_0$, similarly hereinafter);
- Up-and-out barrier monitoring dates:

Index	Date
1	2019-02-01
2	2019-03-04
3	2019-03-29
4	2019-04-26
5	2019-05-31
6	2019-06-28
7	2019-07-26
8	2019-08-23
9	2019-09-20
10	2019-10-25
11	2019-11-22
12	2019-12-27

- Down-and-in barrier level: 68%;
- Down-and-in barrier monitoring dates: every trading days before expiry;
- Annualized coupon rate: $R = 28\%$;
- Strike price: 100%.

1.2 Barrier triggering events

- Up-and-out event: the underlying stock close prices larger than or equal to up-and-out barrier level ($1.05S_0$) at any monitoring date.
- Down-and-in event: the underlying stock close prices smaller than down-and-in barrier level ($0.68S_0$) at any trading day during the life of the product.

1.3 Payoff Scenarios

- If no barrier triggering events happen before or at the expiry, then the investor will receive the payoff equal to $N \times (1 + R \times \frac{357}{365})$ delivered on the next trading date after the expiry.
- If the up-and-out event happens before or at the expiry, the investor will receive the payoff equal to $N \times (1 + R \times \frac{T_{out}}{365})$ delivered on the next trading date after the up-and-out event, no matter whether the down-and-in event happens or not. [T_{out} is the number of days between the start date and the up-and-out event occurrence date (not included).]
- If the up-and-out even never happens and the down-and-in event happens before or at the expiry, the investor will receive the payoff equals to $N \times \min\{\frac{S_T}{S_0}, 100\%\}$ on the next trading date after the expiry.

(N: the amount of the structured revenue security the investor has bought.)

2 Project

- Price the product under the Black-Scholes world, using either the Monte-Carlo simulation approach or the binomial tree method (or the finite difference method);
- Present a hedging strategy as the issuer of the product under the Black-Scholes world, and examine the effect of the hedging strategy.
- At the initial date 03 Jan 2019, compute the median, mean, and standard deviation of an investor's return using Monte-Carlo simulation; Compare it with the real return; compute the expected survival time of the product, compared with the real survival time.