

Let suppose the bond works on rules like follow:

- Person gives 300'000 GBP to bank and take that bond;
- Every year money become cheaper therefore person is got yield as compensation. Let amount of compensation reimburse calculates next:

$$z \rightarrow z \cdot (1 + r_i),$$

where  $z$  – start amount (money on the end of  $\{i - 1\}^{th}$  year),  $r_i$  – interest year on  $\{i\}^{th}$

- Every year interest rate could be different. (There are few factories for it in project)
- Bond can be sold to another person. In that case its price is less then start amount. It calculates as

$$z \rightarrow (1 - discount) \cdot z,$$

where **discount** is value which was given by seller site.

- At the expiration date ( = start date + maturity years ) the amount has to be return to its current owner.

#### Given:

Amount =  $z$ ;

StartDate – bond start date;

ExpirationDate – bond expiration date ( = start date + maturity years )

ReBuyingDate – bond re-Owning date;

Discount;

Some way to get interest rate for every year during bond existence period (IRateFactory)

#### Solution:

$$Profit1 = (-z + z \cdot (1 - discount)) + YieldForFirst14Years$$

$$YieldForFirst14Years = z \cdot (1 + r_1) \cdot (1 + r_2) \cdot \dots \cdot (1 + r_{14}) - z$$

$$Profit2 = (z \cdot (1 - discount) - z) + YieldsForLast16Years$$

$$YieldsForLast16Years = YieldsForFirst30Years - YieldForFirst14Years$$

$$YieldsForFirst30Years = z \cdot (1 + r_1) \cdot (1 + r_2) \cdot \dots \cdot (1 + r_{30}) - z$$