DISCOUNT FINANCIAL OPERATIONS

Simple Discount

Compound Discount

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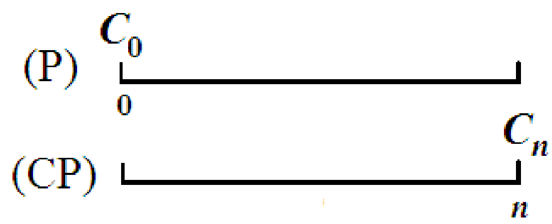

The objective is to anticipate the availability of a future sum of money , by means of the application a financial mechanism called discounting.

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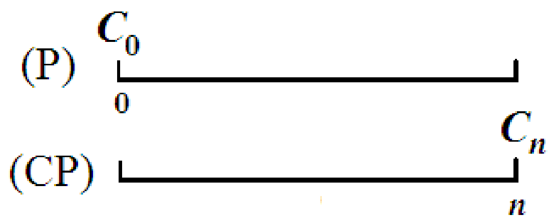


C_n = future value of C_0 ,or the accumulated value of C_0 , or the maturity value of C_0

C_0 = the principal , or the present value of C_n, or the discounted value of C_n

n = time

C_0 = f (C_n , n) *Relationship between C_0 and C_n by means of a mathematical function*

$D_{0,n} = C_n - C_0$ discounted amount of money (in monetary terms)

Simple discount at a simple discount rate

The discounted amount is proportional to C_n and n

$$D_{0,n} = C_n - C_0 = d \cdot C_n \cdot n$$

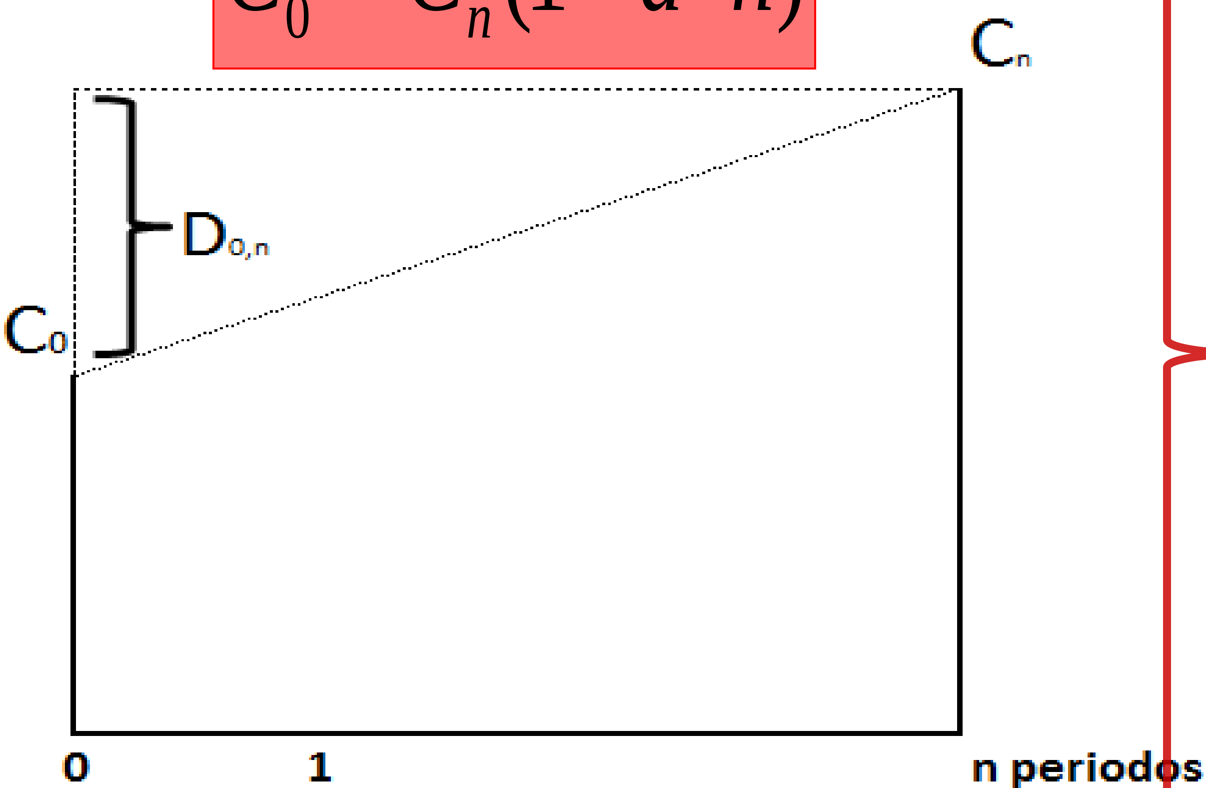
$$C_0 = C_n - C_n \cdot d \cdot n$$

$$\boxed{C_0 = C_n \left(1 - d \cdot n\right)}$$

It is called discounting at a simple discount rate

Simple discount at a discount rate

$$C_0 = C_n(1 - d \cdot n)$$



$$d$$

Simple discount rate

Simple discount at a discount rate

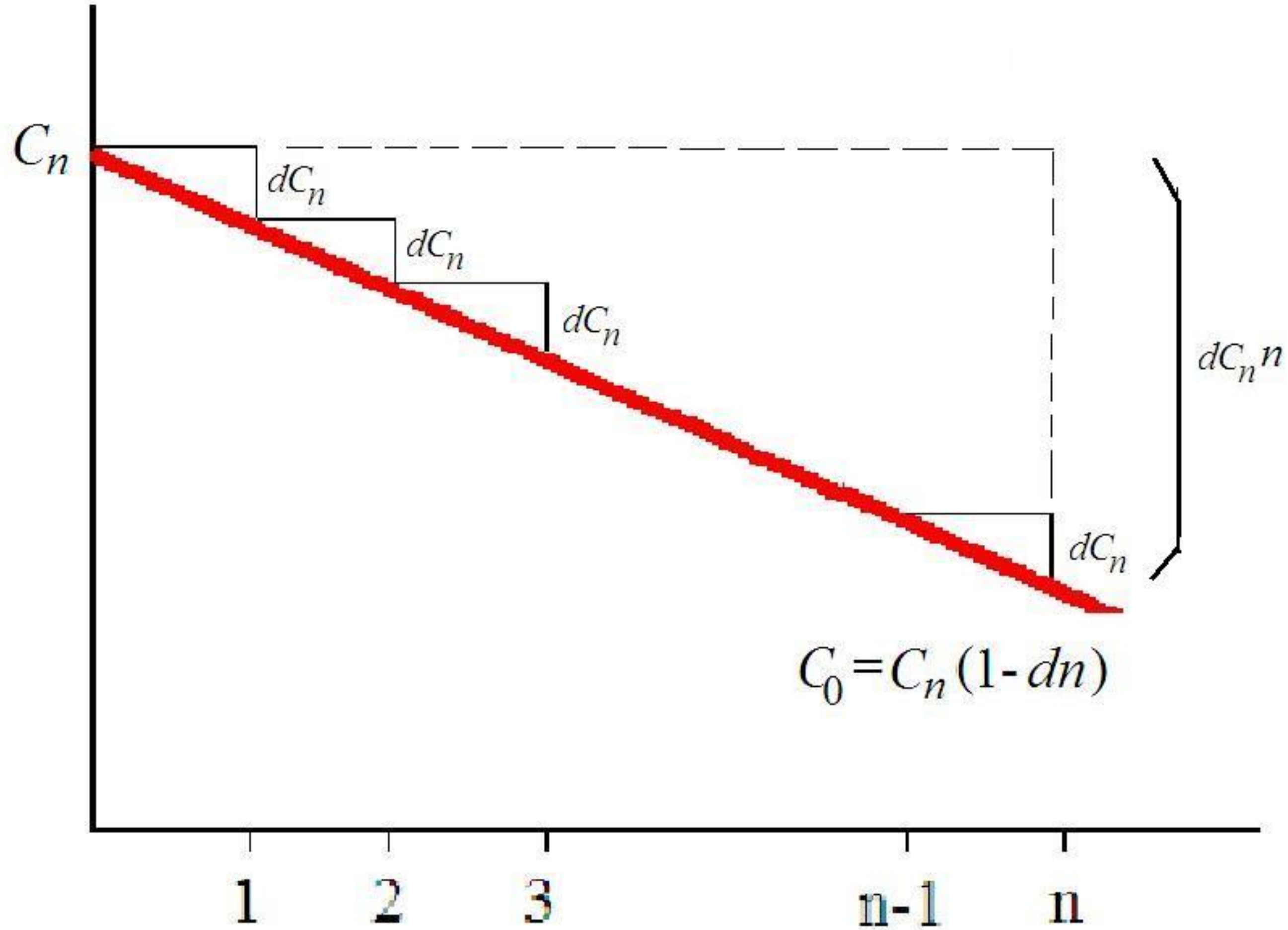
d is simple discount rate and represents the cost of anticipating each monetary unit from the nominal

$$C_0 = C_n(1 - d \cdot n) \quad \Rightarrow \quad \boxed{d = \frac{C_n - C_0}{C_n \cdot n}}$$

d is the discounted amount for each monetary unit during a period of time

Note: a temporary correspondence must exist between n and d, as both must be expressed using the same units (time)

Simple discount at a discount rate



Simple equivalent discount rates

Equivalent discount rates

Two types of discount rates are said to be equivalent or indifferent using whichever chosen : they will produce the same discounted value of the same future value for the same period of time

Simple equivalent discount rates

In simple discount the equivalent interest rates are proportional

$$d = d_m \cdot m \quad \Rightarrow \quad d_m = \frac{d}{m}$$

Simple discount at a discount rate

- ***Commercial year (ordinary interest)***
- *The year is taken as 360 days*
- *The fraction of the year is expressed by* $n = k/360$

$$C_0 = C_n\left(1 - d \cdot \frac{k}{360}\right)$$

- ***Civil year (exact interest)***
- The year is taken as 365 days (leap year or not)
- The fraction of the year is expressed by $n = k/365$

$$C_0 = C_n\left(1 - d \cdot \frac{k}{365}\right)$$

Examples

1. Determine the simple discount, at 8% (annual discount rate) of a simple loan with the following characteristics: principal: 450.000€; maturity within 2 years.

2. Mary has a promissory note with a matutity of 3 years. Taking into account that, the discounted amount of money at an annnual discount rate was 353.40€ at 7% simple annual discount rate. What was its face value?

3. 122.215,81 € is the discounted value of a 120-day note at a simple annual discount rate of 9,5% . What was the face value? (ordinary interest)

4. A 80,000€ loan has been reduced in 1,200€ when it was discounted at 9% annual discount rate. How many months in advance was this loan paid off ?

5. A 175,000€ loan has been reduced to 173,359,37 by means of paying it off 45 days in advance. What was the discount rate applied? (ordinary interest)

EXAMPLES

6. A debtor reduced his debt to 271,269 €, by means of discounting a loan at annual discount rate of 9% two months before maturity. What was the future value?

7. Susan has a note with a face value of 9,785.74€ and the note is due in 3 months time. Supposing that a quarterly discount rate of 2% is applied. What will be the principal? (ordinary interest)

8. John has a note for 8,000 € and this note is due in 2 months. John has two options to discount the note:

a. Discounting inmediately the note at a Bank A, charging an annual discount rate of 10% plus a commision of 2% over the future Value.(Simple Discount)

b. Bank B charges an annual discount rate of 9 % (Compound Discount) and a commision of 3% over the future value.

Which option is a better option and why?