Formulas

**Interest calculation**

**Simple interest**

I = i.t.PV

FV = PV + I 🡺 PV\*(1+i\*t) ….. (no effect of previously paid interest, typically Money Market, securities with lifetime < 1 year)

**Commercial discount** (interest is payed ahead)

D = d\*t\*FV

PV = FV – D 🡺 FV\*(1-d\*t) (short time securities, T-bills, Promissory note)

i = d/(1+d) 🡺 d = i/(1-i)

**Compound** **interest**

PV for 1st year… = PV + I1

PV for 2nd year… = (PV + I1) + I2 ,… 🡺 PV\*(1+i)\*(1+i)

PV for 3rd year... =( (PV + I1) + I2) + I3

.

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PV for nth year… =PV\*(1+i)^n

*Interest period < 1 year* 🡺 PV\*(1+i/m)^m

**Effective interest rate**

ie = (1+i/m)^m-1

**Combined interest** (When the whole time is not integer)

FV = PV\*(1+i)^n\*(1+i\*R)

Where t = n + R, n ϵ Z and R < 1 Interest period

**Continues interest** *(Interest period is in every moment, if m within one year goes to infinity)*

FV=PV\*e^(f\*t) , … f = ln(ie+1), consequently = e^ f- 1

**Real interest**

… we consider the effect of inflation, then it must be true

PV\*(1+ir) = PV\*(1+in) /(1+π) 🡺 ir =\*(1+in) /(1+π) – 1

**Tax, FV after tax**

FV=PV\*(1+i\*(1-T))^n

*Note: The tax period is not always the same like the interest period! In most cases the tax period is one year.*

PV …………………………………………Present value

FV …………………………………………Future value

I …………………………………………Interest (Amount)

D …………………………………………Discount (Amount)

i …………………………………………Interest rate

d …………………………………………Commercial discount

n …………………………………………Number of Interest periods

t …………………………………………Time

R …………………………………………Remaining time

T …………………………………………Tax rate

f …………………………………………Interest intensity