# Taxation, Effective interest rate, Continuous interest, Real value of capital.

1. Calculate the future value of the capital after tax payment in 10 years. The amount of present value is 7,500.00 and the annual interest rate corresponds to 3.7 %. The tax rate is 15 %. Then consider the following scenarios:

   - The bank calculates the interest at the end of every year and the tax is paid once a year, as well.
   - The bank calculates the interest every month, i. e. twelve times in one year and the tax is paid in the annual period.
   - The bank calculates the interest once a year and you should pay the tax only once at the time: T = 10 years.

   *(10,222.17/10,275.7/10.292.86)*

2. Solve the previous example using the concept of continuous interest with the same impact on capital.

   *(☺)*

3. Calculate the annual nominal interest rate with four conversions $(r_4)$. Further, you know that the initial value of the capital is 500,000.00 and the future value after 8 years is 768,000.00. Please use the continuous interest for the calculation.

   *(f = 5.3648%, $r_e$ = 5.5113%, $r_4$ = 5.4009%)*

4. Use the previous example to calculate:

   - The annual effective discount rate, i. e. one conversion in a year $(d \dots$ used by interest calculated ahead, i. e. d$=\frac{r}{1+r})$.
   - The annual nominal discount rate with twelve conversions $(d_12)$.

   *($d_e$ = 5.2234%, $d_{12}$ = 5.3528%)*

5. Give the value of an annual discount rate and an annual interest rate, if you know that the PV of the considered capital was 50,000.00 and after 7 years the FV of the capital is 75,000.00.

$$(d = 5.6278\%,\ r = 5.9634\%)$$