

*Calculation of the Pension Fund Return **

The mandatory pension fund return and the voluntary pension fund return are calculated according to the same method, in nominal terms and in real terms. The calculation is done at the end of June and December of each year for the 7 - year period i.e. for 84 months in which case the calculation period is 84 months.

If the pension fund exists less than 84 months, but longer than 12 months, the return is calculated at the end of June or December, for the period from the first June or December after establishment of the fund until the end of June or December when the calculation is done. In that case the calculation period is 78, 72, 66, 60, 54, 48, 42, 36, 30, 24, 18 or 12 months.

In both cases the return is converted in equivalent annual rate of return.

Rate of return in nominal terms is equal to the change (growth) in the value of the accounting unit at the last day of valuation of calculation period in respect to the value of the accounting unit at the last day in the month which precedes the first month in the calculation period, converted in equivalent annual rate of return in nominal terms. The rate of return in nominal terms is expressed in percents with two decimal places. The formula is as follows:

$$R_{nom} = \left(\frac{SE_t}{SE_0} \right)^{\frac{365}{t}} - 1,$$

where,

R_{nom} is the pension fund rate of return in nominal terms for the calculation period,

SE_t is the accounting unit value at the last day of the calculation period,

SE_0 is the accounting unit value at the last day of the month which precedes the first month in the calculation period and

t is the number of the days in the calculation period.

*Until the adoption of the amendments on the Law on Mandatory Fully Funded Pension Insurance and on the Law on Voluntary Fully Funded Pension Insurance, in January 2013, the pension fund rate of return was calculated for a period of 3 years, on annual basis. Now it is calculated for a period of 7 years on annual basis. Also, according to these amendments, besides publishing the pension fund rate of return in nominal terms, publishing of rate of return in real terms is introduced.

Rate of return in real terms for every calculation period converted in equivalent annual rate of return in real terms, is calculated based on the pension fund rate of return in nominal terms and the changes of the consumer prices in the calculation period on annual basis. The formula is as follows:

$$R_{real} = \frac{1 + R_{nom}}{\left(\prod_k \left(1 + \frac{i_k - 100}{100} \right) \right)^{\frac{365}{t}}} - 1,$$

where,

R_{real} is the pension fund rate of return in real terms for the calculation period,
 R_{nom} is the pension fund rate of return in nominal terms for the calculation period,

t is the number of the days in the calculation period and

i_k is consumer price index published by the State Statistical Office of Republic of Macedonia, at the end of June or December of each year compared to June or December of the previous year, starting from the year of calculation going back for all years in the calculation period and for the last half of the year in calculation period in case the calculation period is 78, 66, 54, 42, 30 or 18 months.

Example 1

Pension fund A started with its operations on 01.01.2005 and it has been operating for 8 years until the day of calculation - 31.12.2012. In this case the calculation period is 84 months. The accounting unit value of pension fund A at 31.12.2012 is 146 denars and the accounting unit value of the pension fund A at 31.12.2005 is 103 denars.

i) The equivalent annual rate of return in nominal terms of pension fund A is calculated for the calculation period of 84 months at 31.12.2012.

It means:

$SE_0 = 103$; $SE_t = 146$ and $t = 2557$ (the total number of days from 31.12.2005 until 31.12.2012)

$$R_{nom} = \left(\frac{SE_t}{SE_0} \right)^{\frac{365}{t}} - 1 = \left(\frac{146}{103} \right)^{\frac{365}{2557}} - 1 = 5.11\%$$

ii) The equivalent annual rate of return in real terms of pension fund A is calculated for the calculation period of 84 months at 31.12.2012.

It means:

$$R_{nom} = 5.11\% ; t = 2557$$

<i>Consumer price index</i>	
consumer price index in December 2012 compared to December 2011	$i_1 = 104.75$
consumer price index in December 2011 compared to December 2010	$i_2 = 102.79$
consumer price index in December 2010 compared to December 2009	$i_3 = 103.08$
consumer price index in December 2009 compared to December 2008	$i_4 = 98.35$
consumer price index in December 2008 compared to December 2007	$i_5 = 105.11$
consumer price index in December 2007 compared to December 2006	$i_6 = 105.59$
consumer price index in December 2006 compared to December 2005	$i_7 = 103.08$

$$R_{real} = \frac{1 + 5.11\%}{\left(\left(1 + \frac{104.75 - 100}{100}\right) \left(1 + \frac{102.79 - 100}{100}\right) \left(1 + \frac{103.08 - 100}{100}\right) \left(1 + \frac{98.35 - 100}{100}\right) \left(1 + \frac{105.11 - 100}{100}\right) \left(1 + \frac{105.59 - 100}{100}\right) \left(1 + \frac{103.08 - 100}{100}\right) \right)^{\frac{365}{2557}} - 1}$$

$$R_{real} = \frac{1.0511}{1.0333} - 1 = 1.72\%$$

Example 2

Pension fund A started with its operations on 01.09.2006 and it has been operating for 5 years and 10 months until the day of calculation 30.06.2012. In this case the calculation period is 66 months. The accounting unit value of pension fund A at 30.06.2012 is 129 denars, and the accounting unit value of the pension fund A at 31.12.2006 is 102 denars.

i) The equivalent annual rate of return in nominal terms of pension fund A is calculated for the calculation period of 66 months at 30.06.2012.

It means:

$SE_0 = 102 ; SE_t = 129$ и $t = 2008$ (the total number of days from 31.12.2006 until 30.06.2012)

$$R_{nom} = \left(\frac{SE_t}{SE_0} \right)^{\frac{365}{t}} - 1 = \left(\frac{129}{102} \right)^{\frac{365}{2008}} - 1 = 4.36\%$$

ii) The equivalent annual rate of return in real terms of pension fund A is calculated for the calculation period of 66 months at 30.06.2012.

It means:

$$R_{nom} = 4.36\% ; t = 2008$$

<i>Consumer price index</i>	
consumer price index in June 2012 compared to June 2011	$i_1 = 102.32$
consumer price index in June 2011 compared to June 2010	$i_2 = 104.24$
consumer price index in June 2010 compared to June 2009	$i_3 = 101.69$
consumer price index in June 2009 compared to June 2008	$i_4 = 98.44$
consumer price index in June 2008 compared to June 2007	$i_5 = 109.71$
consumer price index in June 2007 compared to December 2006	$i_6 = 101.25$

$$R_{real} = \frac{1 + 4.36\%}{\left(\left(1 + \frac{102.32 - 100}{100} \right) \left(1 + \frac{104.24 - 100}{100} \right) \left(1 + \frac{101.69 - 100}{100} \right) \left(1 + \frac{98.44 - 100}{100} \right) \left(1 + \frac{109.71 - 100}{100} \right) \left(1 + \frac{101.25 - 100}{100} \right) \right)^{\frac{365}{2008}} - 1$$

$$R_{real} = \frac{1.0436}{1.0315} - 1 = 1.17\%$$