Manual for SOA Exam FM/CAS Exam 2.

Chapter 6. Variable interest rates and portfolio insurance.
Section 6.1. Inflation.

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Inflation

Inflation is the fall in the purchasing power of money over time. It is usually measured with reference to an index representing the cost of certain goods and services. One the most frequently used index is the **consumer index price**. The consumer index price is released by the Bureau of Labor Statistics monthly. The Bureau of Labor Statistics finds the consumer index price by averaging the changes of prices of a market basket of goods and services. Sometimes, it is convenient for all the calculations related with an investment to find the units of real purchasing power rather than units of ordinary currency.

Example 1

Peter uses his 450000 in his retirement fund to buy a perpetuity–immediate. The perpetuity is expected to pay dividends at the end of each year forever. The next payment (payable one year from now) is x, and is expected to increase at a rate of 3% per year. This increase is made to take in account for the inflation. The current annual effective rate of interest is 4.5%. Calculate x.

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Solution: The cashflow of payments is

Payments	x	$x(1.03)^1$	$x(1.03)^2$	$\cdots$
Time	1	2	3	$\cdots$

Using the formula for the present value of a geometric perpetuity, $450000 = \frac{x}{0.045 - 0.03}$ and $x = (450000)(0.045 - 0.03) = 6750$.

Example 2

Richard invests $10,000 at the end of each year for 10 years into an account earning an effective rate of interest is 6.5%. The annual rate of inflation is 3.5% over the 10 year period. Calculate the value at the end of 10 years of Richard's investment in today's dollars.

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Solution: The balance at the end of ten years is $(10000)s_{\overline{10}|6.5\%} = 134944.2254$. The value at the end of 10 years of Richard's investment in today's dollars is $134944.2254(1.035)^{-10} = 95664.50019$.