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# FOREST MANAGEMENT AND CERTIFICATION

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## Practice problem set 3

1. The CPI for 1976 was 38.8 and the CPI for 2016 is 218.1.
  - a. What was the average annual rate of inflation for consumer goods between 1976 and 2016?
  - b. A liter of gasoline sold for about 0.29€ in 1970. What did a liter of gasoline cost then in current (2016) euros?
  - c. Has the real price of a liter gone up or down since 1976?
  
2. Assume you invest 7500 € at a nominal rate of 8%.
  - a. What will be the nominal value of your investment after 20 years?
  - b. How much money will you need to place in the fund to ensure that a real value of 1000€ can be withdrawn each year?
  
3. A family has just inherited 20 acres of forestland. They don't really want to keep the land and they think they can get the most money from the land by clearcutting the timber and selling the bare land. The current inventory shows 9 mbf/acre of good oak timber which, at the going rate of \$450/mbf, should earn them \$4,050 per acre. A developer is interested in the land, and has offered to pay \$900/ac for the cleared land. You observe that the stand is still growing well, and, using your favorite growth simulator, you estimate that in ten years the yield should increase to 14 mbf/ac.
  - a. Assume constant real prices for both land and timber. If the family's real alternate rate of return is 7%, should they wait to sell the timber and the land?
  - b. Assume that oak sawtimber prices will increase at a real rate of 3% per year and that the bare land value will increase at a real rate of 5%. Under these assumptions, should the family wait to sell the timber and land?

Curiosity: 1 acre = 4046.85 m<sup>2</sup>

mbf (measure board foot) = 0.002360 m<sup>3</sup>

4. In 1980 the consumer price index was 89.8 and the stumpage price for pine sawtimber was 123 per mbf. In 1997 the CPI was 127.6 and stumpage price for pine saw timber was \$389/ mbf. What was the real rate if change in stumpage price for pine during this period?
5. Suppose you want to calculate the after tax net present value of a hunting lease over a 10-year period. The lease yields 20€ per ha per year and your yearly management costs are 3.75€ per ha. If your alternative rate of return is 6.5 % and your marginal tax rate is 30%, then what is your after tax net present value? What is your tax savings?
6. Suppose your company is studying a potential contract with the federal government to construct a three-mile road prior to harvesting timber on a public forest. You need to determine whether it is financially feasible to build this road prior to harvesting the public timber. If calculating a benefit/cost ratio is your company's primary tool for evaluating any contract, then what is the ratio if the expected present value of timber revenues is \$7,000,000 and the road building costs are \$1,000,000 per mile? What does the ratio tell you? Is the activity feasible? What if the expected yield from future timber harvest were only \$2,500,000 due to major errors in the precontract inventory? What does your benefit/cost ratio say? How does it compare to the first scenario?