
FOREST MANAGEMENT AND CERTIFICATION

Practice problem set 2

1. If you invest 2200€ in a stock that grows at 11% percent annually, how much would it be worth in 22 years?
2. If you expect a timber harvest to yield 10000€ in 25 years, and your minimum acceptable rate of return is 7%, what is this harvest worth to you today?
3. Using a 6% discount rate, what is the present value of 15 annual hunting lease revenues of 200€ each, the first due in one year?
4. At 8% interest, what is the present value of annual tax payments of 10€, beginning in one year and continuing in perpetuity?
5. In the previous question, what would be the present value be if the annual tax payments didn't start until 4 years from now?
6. Answer question 4 making the first tax payment now
7. Assume the following expected incomes and costs from an hectare of bare forestland:

125€	Initial reforestation cost today
50 €	Brush control cost in 5 years and every 5 thereafter
75€	Thinning cost in 10 years and every 10 thereafter
2€	Annual taxes in perpetuity, starting in one year
1.25€	Annual hunting revenues in perpetuity, starting in one year
200€	Pulpwood thinning revenue in 20 years
3000€	Final harvest every 40 years

If your $i=6\%$, whats the maximum you'll pay per hectare if you implement the previous prescription, in a 40 year time line?

8. If Rick bought a house for 90000€ in January 2008 and sold it for 192900€ in January 2016, what was his rate of return on the investment?
9. If an investment doubles over a 9 year period, what will be the rate of return?
10. Assume that it costs 250€/ha to successfully regenerate a blackberry stand, that the annual costs include 2€/ha in property taxes plus 1€/ha for management, and the stand produce 11 m³/ha, valued at 1000€/m³ and 13 of pulpwood, valued at 10€/ on an 80year rotation.
 - a. What is the present value at the beginning of the rotation, at 4% discount rate, of costs and revenues from one 80 year rotation in this stand?
 - b. What is the present value at the beginning of the rotation, at 5% discount rate, of costs and revenues from one 80 year rotation in this stand?
11. If you invest 1000€ in a bond that earns 12% every 2 years, how much would it be worth in 18 years?
12. If you invest the same 1000€ in stocks that earn 8% annually, how much will your investment be worth in 5 years?
13. Remember that forest with 4 stands in problem set 1, where you had to build the prescriptions for each stand? Now it's time to evaluate those prescriptions and find the best for each stand if the landowner objective is the maximization of NPV.

Management Unit	Area (ha)	Specie
1	5.3	Maritime pine
2	2.1	Bare land
3	0.5	Eucalyptus
4	1.3	Eucalyptus
Total	9.2	-

Assume that wood prices remain constant over time and are:

maritime pine wood 15.5€/m³

eucalyptus pulp wood is 12€/m³

and the discount rate is 3.5%.

The following tables gives you the thinned and harvested volumes for each specie at different ages:

Maritime pine

Age	Planting 1250		Planting 1400	
	Thinned volume (m ³ /ha)	Harvested volume (m ³ /ha)	Thinned volume (m ³ /ha)	Harvested volume (m ³ /ha)
20	50	-	55	-
25	45	-	49	-
30	35	-	42	-
35	30	-	35	-
40	28	103	30	110
45	25	140	28	155
50	24	154	26	180
55		200		210
60		220		240

Eucalyptus

Age	Harvested volume (m ³ /ha)
10	120
11	145
12	155

The following table refers to silvicultural operations costs:

Silvicultural operation	Cost (€/ha)
Maritime pine plantation (1250 plants)	250
Maritime pine plantation (1400 plants)	275
Eucalyptus plantation (1400 plants)	275
Stool thinning	100

The industry that will buy the maritime pine and eucalyptus wood negotiated with you the value of trees while they are standing, so the costs with thinning's and final harvest are supported by the buyer (so you don't need to take care of it for NPV calculations).

Please, calculate the net present value of each prescription, and find the best for each stand.

(solve this exercise using a spreadsheet, it will make your live easier)