

5 Problem Set 4.ii

Advanced Financing

Problem 1

You make a deposit of 4250€ in a financial institution that uses compounding.

1. Calculate the balance after 2 years if the entity offers a 5% nominal APR with semestral compounding for the first 2 semester, and a 4% nominal APR with quarterly compounding thereafter.
2. Calculate the average effective rate of the transaction
3. Suppose the deposit includes the expenditures listed below. Compute the real effective return for the client and the real effective return for the bank. The expenditures are:
 - (a) The client pays initially 6€ to the institution and at the end pays 4€ to a third party
 - (b) The institution has an initial cost of 3€ payable to a third party

Problem 2

We wish to purchase a new car and its cash price is 16.500€. In order to ease the financing of the purchase the car dealer offers the following payment option:

- At the time of the sale we can hand in our used car, which is valued by the dealer at 4.500€
- You commit to making two equal payments, one due in 3 months and the other in 6 months

You know that the effective APR on the transaction is 6% and you are asked to:

1. The amount of the each of the two future payments
2. We are given a second payment option which involves giving up our used car (same value) and agreeing to a single future payment, due in 8 months. This second option involves two additional payments: an initial one of 35€ and a final one of 50€, both to the car dealer. The car dealer will also incur costs if you select this option: 25€ initially, payable to a third party. Knowing that the effective APR of the (pure) loan is 5.5%, you are asked to determine:
 - (a) The size of the payment, 8 months from today
 - (b) The cost and return of the transaction for the client and the dealer, respectively

Problem 3

Suppose you have 12,000€ in your bank account. The branch manager calls you to offer you several investment options. But, you are really not interested as you know you will be withdrawing the money in 3 months' time, and maybe even earlier. The manager then offers you the following: a 4% nominal APR with monthly capitalization and free access to the money. After 3 months you need to make a payment of 2,000€ so you take out all the money. Determine:

- The official effective interest rate (TAE) that the bank has to announce (for a one year deposit), and the effective APR
- The effective annual interest rate you have received if you have to pay an additional 0.5% fee (on balance)

Problem 4

You borrow 12000€ from the bank. You pay 10€ for a report on your credit status to another company (now). In 6 months you cancel the debt and you have to pay 450€ in interest and a cancellation fee of 120€—the loan is for one year (with no penalty at the end).

Determine:

- The official effective interest rate (TAE) that the bank has to announce (for a one year loan, without cancellation), and the effective APR (of the raw transaction)
- The effective annual interest rate you have paid

Past Exam Questions

Problem 5 (ex 2013)

Choose between the following two investment options for a three year investment (and explain your choice)

1. Growing deposit: 4% in the first year, 5% in the second year and 6% in the third year. All are nominal APR with monthly compounding
2. Constant deposit: 5% nominal APR with monthly compounding

Problem 6 (ex 2014)

In order to finance recently acquired machinery, your firm obtains quotes from three different financial institutions.

1. Bank A offers 4.45% nominal APR with payments every 6 months
2. Bank B offers monthly payments with a 4.42% nominal APR
3. Bank C offers yearly payments with a 4.60% nominal APR

None of these charge any commissions. Which offers the best effective APR?

Problem 7 (ex 2017/18)

You see an advertisement for a T.V. with a price of 600€. When you go to the store to buy the store owner offers two payment options

- Pay in cash now with a 2% cash discount
- Pay “without interest” in 3 months. To take this offer you also have to pay 10€ as a loan-processing fee

Determine the effective APR of taking the payment in 3 months instead of the cash discount

Problem 8 (ex 2014)

Determine the annual effective rate of a five year investment with

1. an 8% nominal APR with monthly capitalization and no commissions
2. an 8.3% nominal APR with monthly capitalization and no commissions
3. an 9% nominal APR with monthly capitalization and a 2% account opening fee

Problem 9 (ex 2014)

Marta has two IOUs from Mercanada S.A.: one with a face value of 1500€, due in 35 days. Another of 2100€ due in 65 days. El Cobrador del Pingüino, a financing firm, offers to discount them like a bank with a 4,5% interest and a study fee of 0,5% of the nominal amount, payable now.

1. Determine the amount of cash you would receive from this firm
2. Determine the effective APR of the (single) equivalent IOU