

EXERCISE 4: Taxation

1. In 1988 income tax rates in the USA were:

Taxable Income	Marginal Income Tax
$0 \leq w \leq 17,850$	15%
$17,850 \leq y \leq 43,150$	28%
$43,150 \leq y \leq 89,560$	33%
$y \geq 89,560$	28%

Is this system progressive with respect to the marginal tax rate? Is it progressive with respect to the average tax rate?

2. Consider a monopolist seller facing a downward sloping market demand

$$x(p) = 100 - 5p$$

and a constant returns to scale technology with the cost function

$$c(x) = 2x$$

(all prices are in francs)

- a) find the profit maximizing level of monopolist's sales and price
- b) what unit (specific) tax has to be imposed on the monopolist's sales for the government to collect the revenue of 10 francs. How many units of the good would be sold if this tax is imposed?
- c) suppose the same revenue has to be collected using the ad valorem tax. How many units of the good will be sold in this case?

3. An electricity company operates in two markets, A and B. The electricity demand in A (in kWt) is

$$x(p_a) = \frac{100}{\sqrt{p_a}}$$

and in B it is

$$x(p_b) = \frac{100}{\sqrt[3]{p_b}}$$

The markets are completely independent from one another (in particular, the demand in each market is independent of the price in the other). You may assume that all buyers have quasi-linear preferences, so that the compensated and uncompensated demands are the same.

If the firm produces x kWt of electricity (which it can sell in either market) its total production costs are given by

$$c(x) = 2 + cx$$

- a) what are the elasticities of demand in both markets?
- b) interpreting the marginal cost function as the supply, what is its elasticity?
- c) suppose the company is the monopolist in both markets but the government regulates the company so that the total profits of the company are equal to zero, what should be the prices p_a and p_b the company should be allowed to charge in each market? *Hint:* think Ramsey rule.