Mikro II - HO5

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1 Take Home 5

The demand function for terabytes per month is given by: $D(p) = 45 - \frac{p}{2}$. The marginal cost for Yousee servicing x amount of traffic is given by: $MC(x) = 30 + 2x$. The inverse demand function is giving by the following.

$$P_d(x) = 90 - 2x$$

a) Knowing Yousee is the sole provider on the market implies the MR-curve is given as $MR(x) = 90 - 4x$. Double the slope of the demand curve. Therefore will the quantity produced by the monopolist equal $MR = MC$

$$90 - 4x = 30 + 2x \Leftrightarrow$$

$$60 = 6x \Leftrightarrow$$

$$x^\star = 10$$

Inserting this into the demand function computes the optimal price for the monopolist.

$$P_d(10) = 90 - 2 * 10 \Leftrightarrow$$

$$P_d(10) = 70$$

Therefore, optimal quantity and price of the monopolist is as given: $(x, p) = (10, 70)$

b) In the social optimum, without a monopolist, the quantity demanded and price given should equal $MC = D$. Supply equal demand. We remember in a competitive market that $P = MC$ Therefore, we set $P_d(x) = MC(x)$

$$90 - 2x = 30 + 2x \Leftrightarrow$$

$$60 = 4x \Leftrightarrow$$

$$x^c = 15$$

Inserting this into the demand function gives:

$$P_d(15) = 90 - 2 * 15 \Leftrightarrow$$

$$P_d(15) = 60$$

Therefore, in a competitive market, the efficient quantity and price is given as: $(x, p) = (15, 60)$. Adding 5 more units and lowering the price by 10.

c) To reach the optimal amount produced by the monopolist we introduce a subsidy, s. To find the right amount of the subsidy, we find the difference in Total Welfare between the social optimum and the production of the monopolist. Therefore, we remember $x = 15$ and we compute:

$$MR(15) + s = MC(15) \Leftrightarrow$$

$$90 - 4 * 15 + s = 30 + 2 * 15 \Leftrightarrow$$

$$30 + s = 60 \Leftrightarrow$$

$$s = 30$$

Hereby we conclude the optimal subsidy, which incentives larger production by the monopolist, is $s = 30$. This will raise the produced amount from 10 to 15 units produced and sold.

d) Deriving the price paid for traffic by the consumer. From **c)** we know, the government has introduced a subsidy, $s = 30$. Adding this to the marginal revenue function and assuming the parameters for further production is included in the subsidy, we can compute:

$$120 - 4x = 30 + 2x \Leftrightarrow$$

$$90 = 6x \Leftrightarrow$$

$$x = 15$$

. Inserting this into our demand function, we arrive at the price:

$$P_d(15) = 90 - 2 * 15 \Leftrightarrow$$

$$P_d(15) = 60$$

Which is the price the consumers in Frederiksskov will pay for traffic. We can conclude, that the consumer price falls by 10, while the subsidy given to the monopolist is 30. This allows the firm to produce 5 units more, totaling 15 produced units. Therefore, by dividing the subsidy by units produced, we wind up with subsidy giving 2 per unit produced.

Furthermore, we can add, that the monopolist has the steepest slope(MR), consequently must it be the most inelastic side of the market, thus must get most of the subsidy.

"Du må meget gerne kommentere på anden del af **d)**, da jeg skyder med løse hagl her"