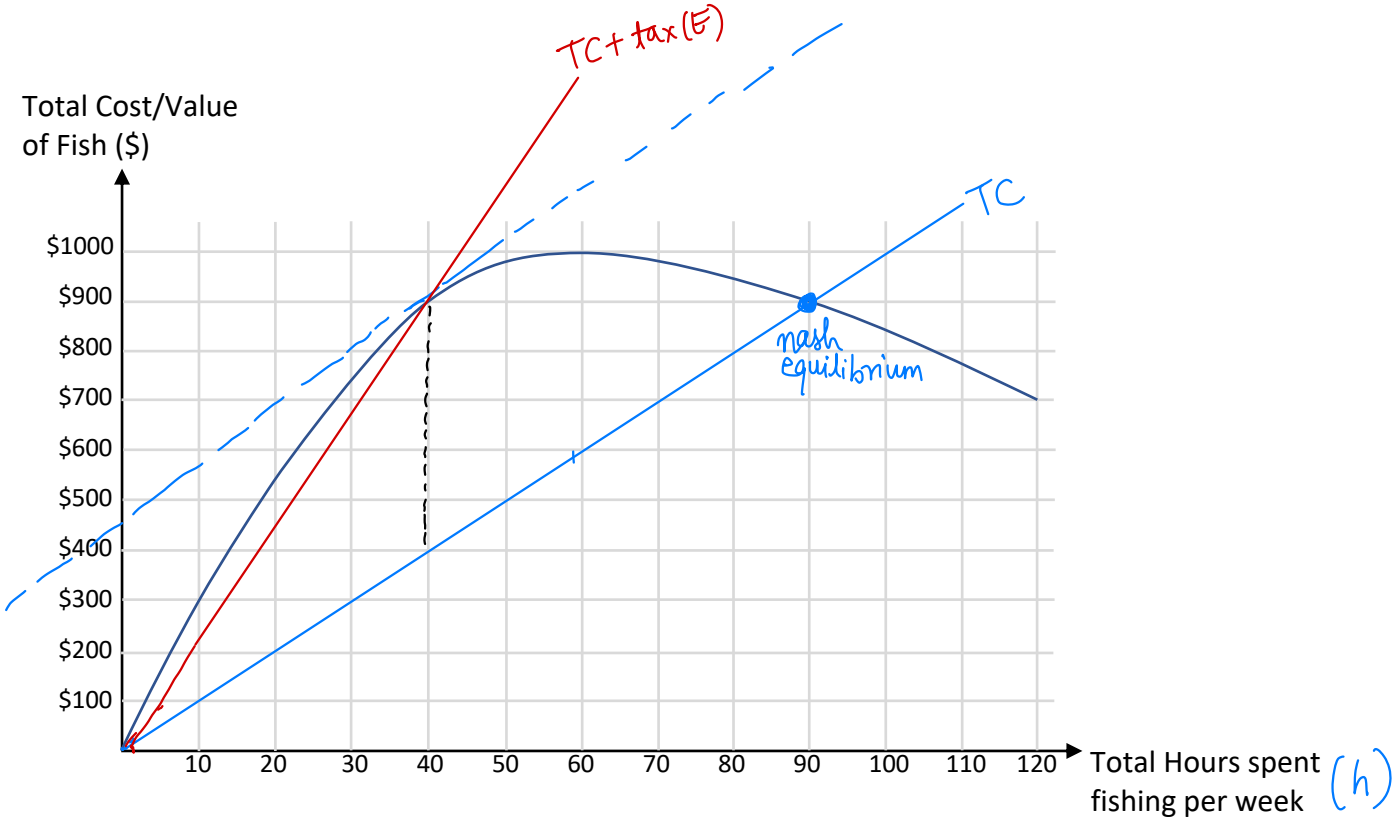
Economics 220, Jan 2022 **Your Name:** Dhyey Dharmendrakumar Mavani
Homework 4

Consider a lake located next to a fishing village. Villagers may choose to spend time fishing in the lake, or working in agriculture earning $10/hour. Fishing and agricultural labor are equally tiring and difficult, so their decision depends purely on which pays better. The total weekly value of the fish catch, as a function of the total number of hours spent fishing, is shown below.



(a) Draw a line to represent the opportunity cost of the time spent fishing. How many hours per week will the villagers spend fishing (in a Nash equilibrium) if each decides independently how much to fish?

90 hours

(b) How many hours per week should the villagers spend fishing if they can coordinate their activities and wish to achieve the optimal outcome (maximize total surplus)? What are the average hourly earnings from fishing (value of fish caught per hour) if they fish this amount?

40 hours || $\frac{900}{40} = 22.5\ \$/hr$

(c) Suppose the local government attempts to achieve this optimum by levying a tax on fishing. If the tax takes the form of hourly fee for each hour a villager spends fishing, what should the tax be (in $ per hour) ?

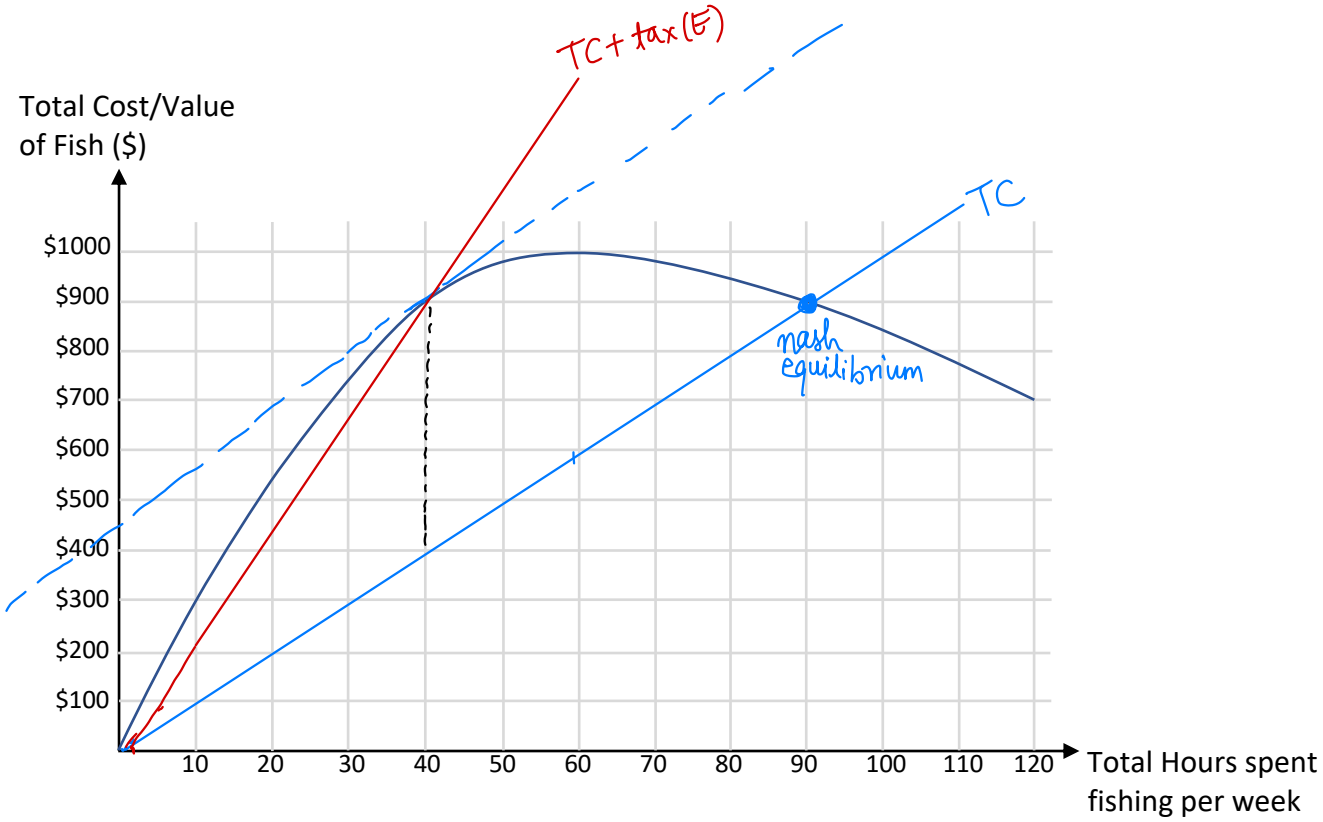
$TC = 10h$

$TC + tax(E)$: $10h + (tax)h = 900$ (40, 40)

$\Rightarrow \frac{500}{40} = tax$

$tax = 12.5\ \$/hr$

Below, show how this tax would affect the Nash equilibrium of this game.



(d) A policy analyst argues that the proposed tax would reduce overall welfare since taxation causes deadweight losses. Do you agree? If so, how large is the deadweight loss? If not, why not?

There will be no deadweight loss because the surplus is essentially relocated to the government in terms of revenue.

(e) Suppose the fishers cannot enforce agreements to coordinate their level of fishing effort. However, an entrepreneur offers to pay each of them each a fixed weekly lump sum in exchange for a monopoly on fishing rightson the lake, and then to hire them as wage laborers for $10/hour (equal to their opportunity cost).

If they agree to this arrangement, how many hours of labor will the entrepreneur hire per week?

Entrepreneur will hire the workers for 40 hours/week as that maximizes total surplus.

(g) If there is competitive bidding among entrepreneurs for the lease, how much (in total) will the villagers end up receiving per week as a lump sum? Would the fishermen be better or worse off as a result of this arrangement, compared to your answers in part (a) and (b)? Explain.

Then the entrepreneurs will try to auction/bid all the surplus away, and this will theoretically make the fishermen not worse off because in perfectly competitive market the economic profits should be zero. They would be actually better off as the entirety of surplus will get redistributed among the workers as a lumpsum.

2. Bueno y Sano and La Veracruzana are duopolists in the Amherst market for burritos. Each month, they decide whether to set high prices or low prices. Setting low prices will increase their market share at the expense of the other firm. The payoffs are as follows *[as usual, the first payoff in each cell is to the 'row' player, in this case, Bueno y Sano]:*

		La Veracruzana: High	La Veracruzana: Low
Bueno y Sano	High	100, 100	50, 130
	Low	130, 50	60, 60

For what values of the monthly discount rate, δ, can the two firms sustain a 'cartel' in which they both set high prices each month?

$\Pi_{\text{cartel or collab}} = 100 + 100\delta + 100\delta^2 + \dots = \left(\frac{100}{1-\delta}\right)$

$\Pi_{\text{cheat}_1} = 130 + 60\delta + 60\delta^2 + \dots = 130 + \left(\frac{60\delta}{1-\delta}\right)$

To maintain the "cartel" $\left[\Pi_{\text{cartel or collab}} > \Pi_{\text{cheat}_1}\right]$: $\frac{100}{1-\delta} > 130 + \frac{60\delta}{1-\delta}$

$\Rightarrow \frac{10-6\delta}{1-\delta} > 13$

$\Rightarrow 10 - 6\delta > 13 - 13\delta$

$\Rightarrow 7\delta > 3$

$\Rightarrow \boxed{\delta > \frac{3}{7}}$ Ans