

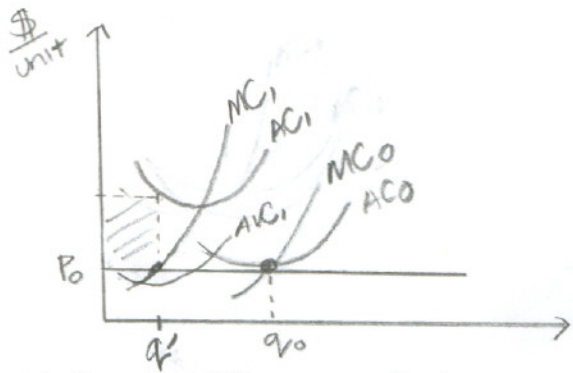
1. Perfect Competition (25 points)

Natural gas is a key variable factor of production for the plastics industry. Assume the industry is perfectly competitive.

a) (4 points) What are the assumptions required for perfect competition?

many buyers & sellers, no single seller/buyer can affect price
homogeneous good
perfect information
free entry & exit (productive resources mobile)

b) (10 points) Assume the industry is initially in long run equilibrium. Now, suppose there is a substantial increase in the price of natural gas. Using a graph, show the short run profit-maximizing output decision for an individual firm after the natural gas price increase. Explain.

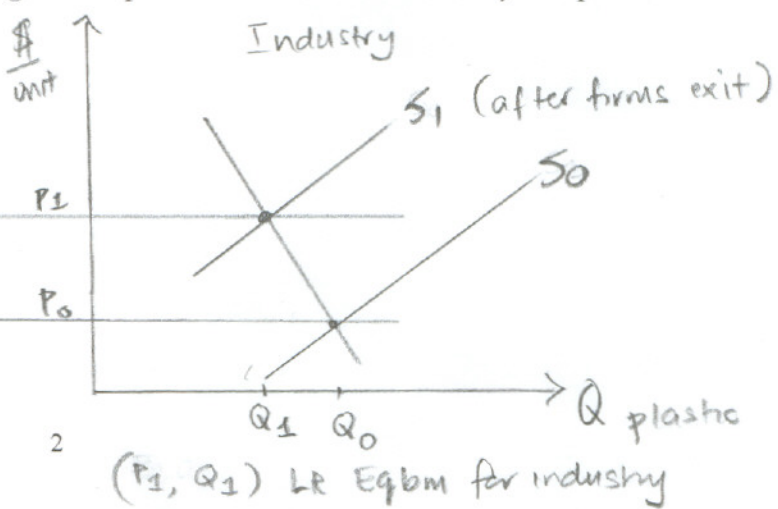
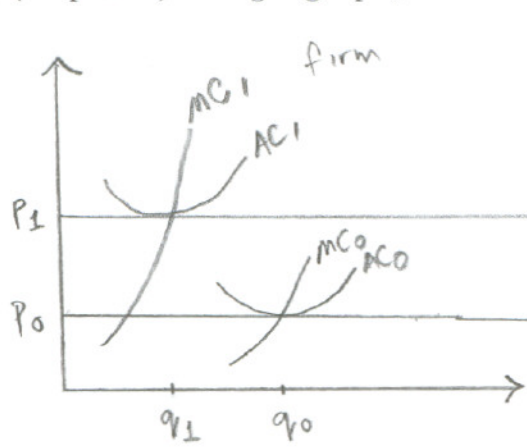


If $P_0 > \min AVC_1$, firm making loss operates in SR.
Profit max output where $P_0 = MC_1$
(AC_1 needs to be above AC_0 , MC_1 needs to cut P_0 , so losses exist. Doesn't matter if they show AC_1 to left, right, directly above AC_0)

b) (1 point) When a perfectly competitive firm makes economic loss in the short run, what does it do?

Operates if $P > \min AVC$. If it has SR losses, exit in LR.

c) (10 points) Using a graph, show long run equilibrium for the industry. Explain.



(P_1, Q_1) LR Eqbm for industry

2. Welfare Analysis (25 points)

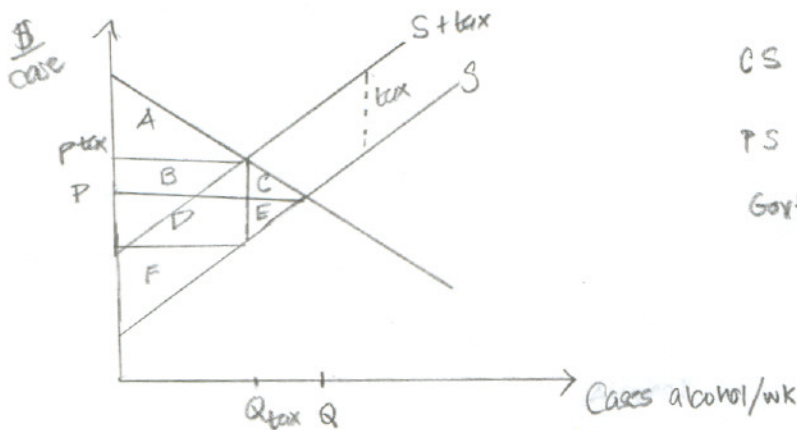
An advisory panel suggests that policy-makers consider two options to curb underage (teen) alcohol consumption.

Option 1: Unit tax t on alcohol

Option 2: Create law that reduces advertising targeting teenage consumers.

Assume there are no extra social costs caused by underage alcohol consumption. Assume alcohol markets are perfectly competitive.

- a) (15 points) Using a graph, assess the welfare effects of the unit tax on alcohol. Explain.



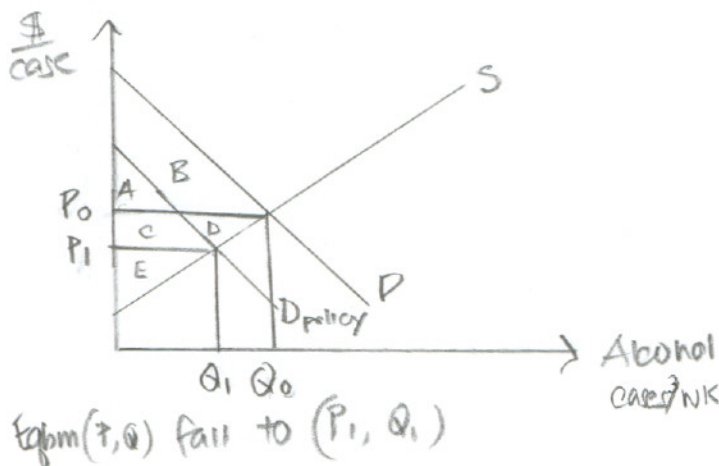
	Free	Tax
CS	A+B+C	A
PS	D+E+F	F
Govt	0	B+D
	A+...+F	A+F+B+D
Change = Tax-Free = -C-E		
C+E = DWL		

- b) (4 points) If the tax is implemented, will there be more distortion with relatively elastic or inelastic demand. What of more consumer tax burden? Explain.

More distortion with elastic demand. Means alcohol consumption falls more. Also more DWL with elastic demand.

Less burden of tax on consumer with elastic demand.

- c) (6 points) What would happen to equilibrium price and quantity with the advertising reduction policy? And, to economic surplus? Explain.



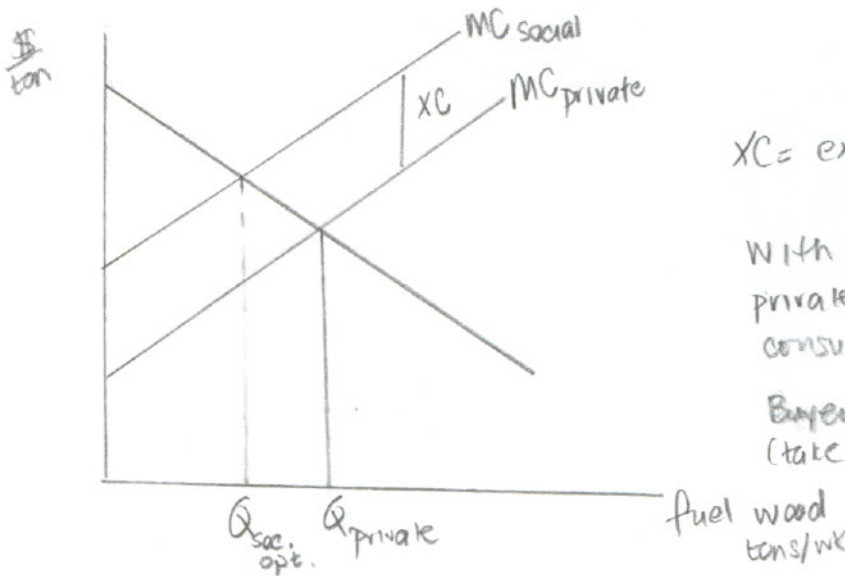
	Before	With New Law
CS	A+B	A+C
PS	C+D+E	E
	A+...+E	A+C+E

Change = -B-D
B+D fall in economic surplus
No DWL

3. Externality (15 points)

Burning wood for home heating results in particulate emissions into the atmosphere (i.e. pollution). These emissions can cause respiratory ailments. Assume fuel wood markets are perfectly competitive.

- a) (10 points) Using a graph, show how the private market for fuel wood fails to achieve a socially optimal outcome. Explain.

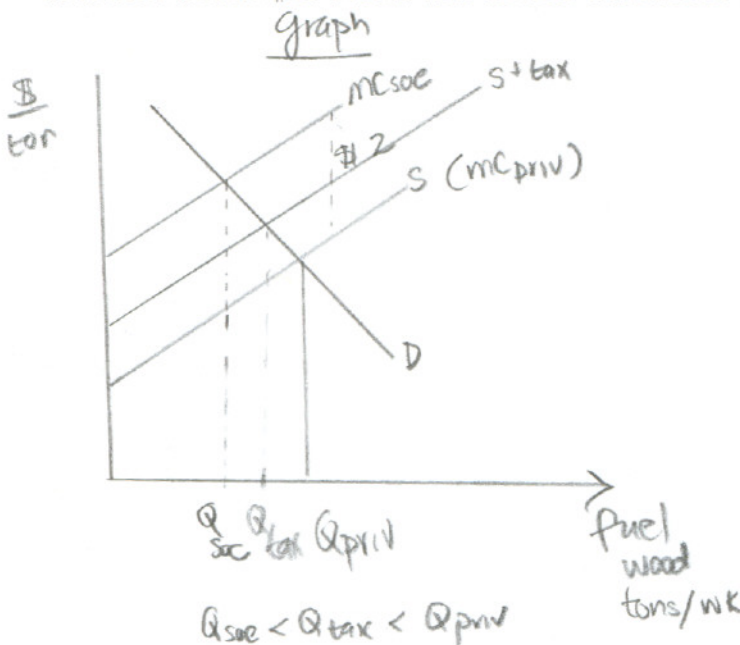


$XC =$ extra social cost per unit

With negative externality, private market leads to too much consumption at Q_{priv} .

Buyers & sellers do not internalize (take into account) extra social cost of their behavior

- b) (5 points) Scientist M.C. Brilliant has calculated that the extra social cost per unit of fuel wood consumption is \$2. The fuel wood industry and policy makers agree to a unit tax of \$1. What will be the outcome? Explain.



Graph and/or words ok.

Words

A \$2 per unit tax would get production & consumption to be Q_{soc} .

With a lower tax of \$1 get reduced output, but not to soc. opt. level

4. True/False/Definition/Explain (15 points)

Define the term in bold. State if the statement is true or false. Give an explanation using graphs, words and equations, as appropriate.

a) (5 points) Since Winnie can produce 100 lbs of pineapples or 200 bales of cotton per week, while Nelson can produce 50 lbs of pineapples or 150 bales of cotton per week in a two-worker Pineapple-Cotton economy, Nelson has a **comparative advantage** in cotton production.

One individual/nation has comparative advantage in production of a good/performance of task if his/its OC is lower than that of another individual/nation.

True.

$$OC_{\text{cotton}}^W = \frac{\text{pineapple/wk}}{\text{cotton/wk}} = \frac{100}{200} = \frac{1}{2} \quad OC_{\text{cotton}}^N = \frac{50}{150} = \frac{1}{3}$$

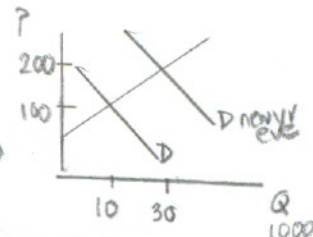
$OC_{\text{cotton}}^N < OC_{\text{cotton}}^W$ Nelson has C.A. in cotton

b) (5 points) If the price of champagne was \$100 per bottle with 10,000 bottles sold on December 30 and rose to \$200 per bottle with 30,000 bottles sold on New Year's Eve, December 31, then marketing sleuth Alastair Tweed III is correct to say that demand is inelastic since **price elasticity of demand** is $\frac{1}{2}$.

Price elasticity of demand is percent change in quantity demanded (along a D curve) that results from 1 percent change in price.

OR price elasticity of demand = $\frac{\% \Delta Q}{\% \Delta P}$

False. The above describes movement along S curve due to shift in demand.

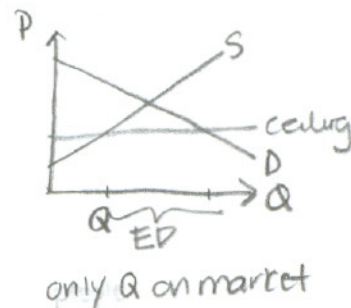


c) (5 points) All renters are happy with an apartment rent control policy because it is a **price ceiling** policy that ensures that renters get apartments at an affordable price.

Price ceiling is a maximum price policy stipulated in law.

False

There is excess demand at price ceiling. Some people don't get cheap apartments.



5. Game Theory (10 points)

Consider the following game between two rival firms, TornJeans and RipJeans. Lowering price can increase sales and profit. But, price decisions by one firm affect profits of the other firm, and vice versa. Payoffs (in \$1000s) for the two price strategies (Low and High) are as follows.

		TornJeans	
		Low	High
RipJeans	Low	100 each *	50 for Torn 300 for Rip
	High	300 for Torn 50 for Rip	200 each

- a) (6 points) Find the equilibrium outcome of the game. Explain.

Equil strategy is (Low, Low)

Equil outcome is each player sets Low price and earns \$100,000 each

When Torn plays Low, Rip prefers Low, since $100 > 50$

When Torn plays High, Rip prefers Low, since $300 > 200$

Similar for Rip.

- b) (4 points) Define **Prisoner's Dilemma**. What aspect of payoffs makes this a Prisoner's Dilemma game?

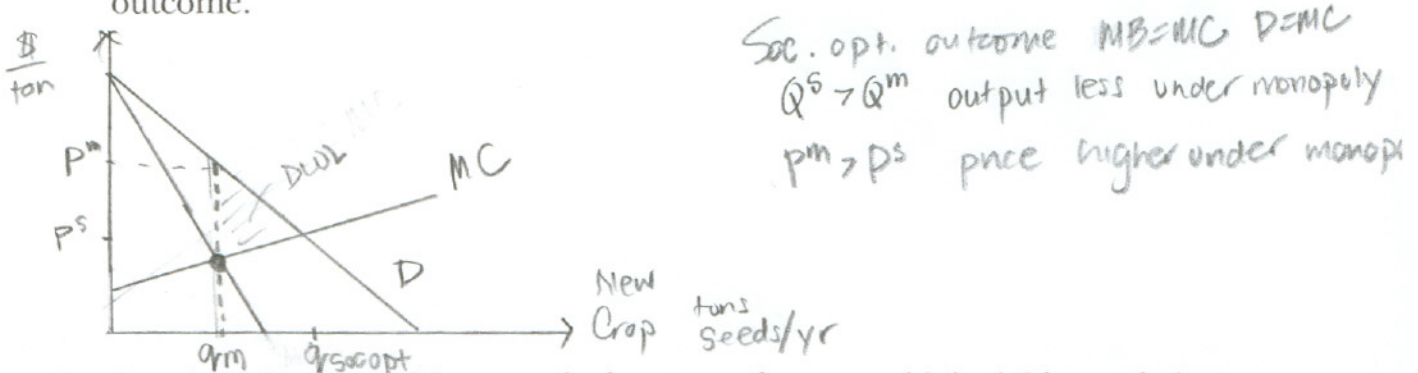
Prisoner's Dilemma is game in which each player has dominant strategy (a strategy it prefers to play no matter other's behavior) but which brings it lower payoff than if both played other (dominated) strategy

\$200,000 payoff for each is socially (jointly) optimal but \$100,000 received by each in equilibrium. $200K > 100K$.

6. Monopoly (10 points)

New rules on patents for high yield crop seeds may allow patents to expire sooner for humanitarian purposes. Malnutrition and hunger in developing countries could be decreased if this new crop technology was affordable for these countries.

- 1) (6 points) Biotech firms with such patents have monopoly power. Show how the monopolist's profit maximizing outcome differs from the socially efficient outcome.



- 2) (2 points) How would removal of a patent for a new high yield crop help a developing country?

① Price would fall. ② Developing countries have lower WTP (res. price) (Removing patent makes new high yield crop affordable)

- 3) (2 points) What is one advantage of allowing firms & university researchers to have patents? What is one disadvantage?

Advantage: give firm/university researcher incentive to innovate
Disadvantage: Price high under patent. DWL assoc. w/monopoly

Extra Credit Questions (5 points)

- 1) (2 points) A Public Good is to a high degree characterized by being both non rival and non excludable.

- 2) (1 point) The Free Rider problem states that individuals have an incentive to understate their true value (willingness to pay) for public goods. As a result, there may be under-provision of such goods.

- 3) (2 points) Pudge Buffet Junior can earn \$40,000 from farming, with variable and fixed costs equal to \$11,000. His next best option is to work as a commodities broker for \$30,000. Junior's economic profit from farming is -1000. Junior should work as a broker.

You're Done! Great work!