

Final Exam

Note: Chris Ragan created this exam for use with Lipsey/Ragan, *Microeconomics*, 10th Canadian Edition.

Instructions:

- 1. Answer questions in the space provided.**
- 2. This exam is out of 100 points.**
- 3. Dictionaries are allowed, calculators are NOT allowed.**

Part 1. Basic Concepts (40 points — 4 questions at 10 points each).

1. Consider the market for corn. Assume there are a large number of small consumers, and a large number of small producers. Assume also there are no externalities of any kind. Finally, assume that in all other markets, price equals marginal cost. Compare the allocative efficiency of two situations:
 - i) all corn producers behave as price takers
 - ii) all corn producers successfully collude to produce the monopoly level of output

Suggested answer

- (i) Consumers are price-takers in this market, and the product is homogeneous across all producers. If the producers all act as price takers, then we have a perfectly competitive market. Further, since there are no externalities, the competitive market outcome is such that price equals marginal cost. Finally, since $p = MC$ in all other markets, the economy as a whole will be allocatively efficient.
- (ii) If producers collude to produce the monopoly level of output, then the output of corn will be less than in (i) and less than what is allocatively efficient. The price of corn will exceed the MC. There will be a deadweight loss in this situation.

The diagrams that will help to illustrate this answer are a simple demand and supply diagram for part (i) and a monopoly diagram, showing the standard deadweight loss, in part (ii).

2. Explain what is meant by producer surplus. Provide a diagram to illustrate. How is it related to economic profits?

Suggested answer

Producer surplus on any individual unit of output is the difference between the price received for that unit and the lowest price that the producer would have been willing to accept for that unit, which is the marginal cost. Thus, in a simple demand and supply diagram, producer surplus is the area below the price line and above the supply (MC) curve.

Producer surplus is related to, but is not exactly equal to, economic profit. Economic profit is the firm's revenues minus its costs, including the opportunity cost of the owner's capital. The one significant category of cost that is NOT included in producer surplus is fixed cost, since producer surplus is based on the MC curve. Producer surplus minus all fixed costs equals economic profit.

3. Explain the difference between average total cost (ATC), average variable cost (AVC), average fixed cost (AFC), and marginal cost (MC). For a price-taking firm, explain the firm's supply curve, including the importance of the firm's shut-down price.

Suggested answer

ATC is total cost divided by the number of units produced. AVC is total variable cost divided by the number of units produced. AFC is total fixed cost divided by the number of units produced. MC is the change in total cost that occurs when output changes by one unit. It is also the change in total variable cost when output changes by one unit. ATC is equal to $AFC + AVC$.

A price-taking firm will maximize profits if it produces each unit for which price (which equals marginal revenue) exceed marginal cost. Thus, facing a given price, the firm will choose its output along the MC curve. The MC curve is thus the firm's supply curve.

But this is only true if the firm finds it more profitable to produce that quantity rather than shutting down. If the price is less than the minimum of AVC, then the firm is better off shutting down, since the revenues will not even cover the operating costs of the firm. So the firm's supply curve is the MC curve above the minimum point of AVC (which is the shutdown price for the firm).

4. Define the concepts of allocative and productive efficiency, and explain how they are related to a country's production possibilities frontier.

Suggested answer

- (i) Allocative efficiency occurs when every product in the economy is produced to the point where the marginal benefit to society from an extra unit produced is equal to the marginal cost to society of an extra unit produced.
- (ii) Productive efficiency (PE) is a narrow concept. At the level of the firm, PE means that the firm is using the least-cost method of producing its level of output. At the level of the industry, PE means that for the level of output being produced in the industry as a whole, it is being produced at least cost. This will be true if each firm is productively efficient and if MC is equated for all firms.
- (iii) All points on the production possibilities frontier are productively efficient -- the only way that more of X can be produced is if less of Y is produced. But generally only one point on the frontier is allocatively efficient.

Part 2. Problems (30 points — 2 questions at 15 points each).

5. Imagine the competitive market for steel ingots. Quantity of steel demanded (ingots per month) is given by $Q^D = a - bp$. Quantity of steel supplied (ingots per month) is given by $Q^S = c + dp$, where p is the market price (\$ per ingot) and a , b , c , and d are all positive parameters. Suppose that the production of each ingot of steel generates pollution which imposes a cost of $\$x$ on society.
- a) What are the precise free-market equilibrium price and quantity in the steel market? Provide a diagram to illustrate the free-market outcome (with as much precision as possible).

Suggested answer

It is necessary to solve the demand and supply system. In equilibrium, the quantity demanded must equal the quantity supplied. Therefore,

$$a - bp = c + dp \quad \text{which implies} \quad a - c = (b+d)p$$

and therefore the equilibrium p , p^* , is $p^* = (a-c)/(b+d)$

Substitute this value of p^* back into either the demand or supply curve to get the equilibrium quantity, Q^* :

$$Q^* = a - b((a-c)/(b+d)) \quad \text{or} \quad Q^* = (ad + bc)/(b+d)$$

The appropriate diagram is straightforward. Both S and D curves are linear. The demand curve has a slope of $-1/b$ and a horizontal intercept of a . The supply curve has a slope of $1/d$ and a horizontal intercept of c .

- b) What can you say about allocative efficiency in part (a)? (You may assume that price equals marginal cost in all other markets.) Explain thoroughly.

Suggested answer

Since each unit of steel that is produced also imposes an $\$x$ pollution cost on society, there is a negative externality in this market. Therefore, even if the market is competitive (which it is), allocative efficiency is not achieved. There is too much steel being produced relative to what is socially optimal.

c) What government policy may restore efficiency in this case? Explain in detail and provide a diagram to illustrate.

Suggested answer

A policy to address this problem might include a tax on the production of steel. In fact, since we know that each unit of steel produced generates exactly an \$x cost on society, we can fully "internalize" the externality by taxing steel firms \$x per unit of steel that they produce. This will shift up their MC curves by exactly \$x, and will therefore shift the industry supply curve by \$x. The competitive equilibrium level of output will fall and the equilibrium price will rise. Allocative efficiency will be achieved since the new price will equal the MC to society of producing an extra unit of steel.

7. Provide and describe a model that can be used to explain why Canada imports coffee and exports newsprint. For your analysis, you may assume that there is only one type of coffee and only one type of newsprint. You may also assume that Canada is "small" in both world markets. Make sure you explain in the model how Canada's pattern of trade is related to the pattern of comparative advantage.

Suggested answer

The simple demand and supply model can be used to answer this question, with the modification being that the equilibrium prices of coffee and newsprint are set in world markets rather than in the Canadian market. This analysis involves the law of one price for internationally traded goods.

For the newsprint market, the world price is above the price that would exist in Canada if Canada were closed off from trading with the rest of the world -- that is, the world price is above Canada's autarkic price. Relative to the case of autarky, therefore, Canadian producers supply more newsprint and Canadian consumers consume less newsprint. The excess Canadian supply gets exported to the world.

For the coffee market, the world price is below the price that would exist in Canada if Canada were closed off from trading with the rest of the world -- that is, the world price is below Canada's autarkic price. Relative to the case of autarky, therefore, Canadian producers supply less coffee and Canadian consumers consume more coffee. The excess Canadian demand gets imported from the world.

Comparative advantage is about comparative opportunity costs across countries. But opportunity costs are reflected in the marginal costs of production, which in competitive markets are given by the market price. Thus we see that Canada exports newsprint because its autarkic price is lower than the world price -- that is, because its opportunity cost for newsprint is less than in the rest of the world. Conversely, Canada imports coffee because its autarkic price is above the world price -- that is, because its opportunity cost for coffee is higher than in the rest of the world.

So Canada exports the goods for which it has a comparative advantage and imports goods for which it has a comparative disadvantage.

Part 3. Choice of Essay (30 points)

Write ONLY ONE of the following three essays. You have less than four pages in which to provide your essay.

Essay A. Write a balanced essay outlining the defence of free markets. This essay should include a description of why markets work "well" (and what "well" means) and in which situations markets fail to work "well", including a discussion of which situations provide a potential role for government intervention.

A good essay should include the following points:

- **Describe the "informal defence" of free markets (see Chapter 16) and the "formal" defence of free markets (allocative efficiency).**
- **Explain what is meant by market failures, and why this provides a motivation for government intervention to increase overall welfare. Important examples include externalities, public goods, and monopoly.**
- **Describe some motivations for government intervention that are not based on market failures but instead are based on other concerns, such as a desire to reduce income inequality, patriotism, social responsibility, etc.**
- **Mention might also be made of "government failures". Ideal government intervention may be desirable, but realistic government intervention will, in some cases, make economic outcomes worse.**

Essay B. Write an essay describing the effects — in a small open economy — of placing a tariff on an imported product. Explain how the tariff influences the level of domestic production and consumption of the good, and who gains and who loses from the tariff. Also provide a discussion of the (allocative) efficiency implications of the tariff.

A good essay should include the following points:

- **Describe the supply and demand model in a small economy with internationally traded goods. Explain the law of price. Show how a small economy will import products for which the world price is less than their autarkic price.**
- **Explain how a tariff raises the domestic price of the imported good, while leaving the world price unaffected. This increases domestic production and reduces domestic consumption, thus reducing imports.**
- **Explain why domestic firms (and their workers) gain and why domestic consumers are made worse off. Explain also why there is some tariff revenue to the government.**
- **Show and explain the net efficiency cost (deadweight loss) of the tariff.**

Essay C. Write an essay describing a system of (tradable) quotas for the production and sale of milk. Include an explanation of how the quota system works, how it affects equilibrium quantities and prices, and who gains and who loses from the quota system. Explain also how the market value of a quota is determined, and why this matters.

A good essay should include the following points:

- **Start with a demand and supply model in the milk market. What is the equilibrium price and quantity?**
- **Now impose a quota of X units. Explain what this means, and why X would typically be chosen less than the free-market equilibrium quantity. You might assume that the quota is initially given away for free to existing farmers.**
- **Explain why existing dairy farmers are made better off. Explain why consumers are made worse off.**
- **Explain how the greater profitability of dairy farming gets reflected in the market price of quotas. Explain why this implies that NEW dairy farmers are not made better off by the quota system.**

End of Examination