μ-Economics

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December 27, 2010

1 Introduction to Economics

1.0.1 Economy

"the one who manages a household", in greek. Economics is the study of how sociey manages its scarce resources.

1.0.2 Scarcity

means that society has limited resources and therefore cannot produce all the goods and service people wish to have.

1.1 Ten principles of Economics

1. People Face Trade-Offs: there is no such things as a free lunch
2. The cost of Something is what you give up to get it: decisions require comparing costs and beefits of alternatives
3. Rational People Think at the Margin: marginal changes are small, incrmental adjustements to an existing plan of action: People make decisions by comparing costs and benefits at the margin.
4. People respond to Incentives
5. Trade can make everyone better off
6. Markets are usually a good way to organize Economic Activity
7. Governments can sometimes improve Market Outcome
8. An Economy's Standard of Living depends on its ability to produce Goods and Services
9. Prices rise when the governments prints too much Money
10. Society faces a short-run Trade-off between Inflation and Unemployment

1.2 Economic Models

1.2.1 The Circular flow diagram

The circular flow model is a visual model that shows ahow dollars and goods flow through markets among households and firms.

1.2.2 The production possibility frontier

This model is a graph that shows the combination of output that the economy can produce given the available factors of production and the available production technology.

1.3 Opportunity Cost

In a two-goods economy: the amount of good A you have to forego in order to get a certain amount of a special good B represents the **opportunity cost** of product B.

1.4 Real vs nominal price

1.4.1 Nominal Price

Absolute pric of a good; unadjusted for inflation

1.4.2 Real Price

Price of a good relative to an aggregate measure of prices; price adjusted for inflation

1.5 Macro- vs Microeconomics

1.5.1 Micro

Focuses on the individual parts of the economy

1.5.2 Macro

looks at the economy as a whole

1.6 Normative and Positive Economics

1.6.1 Normative

deals with ethical questions ? (bullshit)

1.6.2 Positive

describe the facts of an economy and its behavior

2 Supply and Demand: How Markets work

2.1 Market

The market is a collection of buyers and sellers, that through their actual or potential interactions determine the price of a product or set of products.

2.1.1 Competitive Market

market in which there are many buyers and sellers so that each ha s a negligible impact on the price.

Buyers and sellers are **price takers**.

2.1.2 Other market forms

1. Monopoly: one seller that control the price
2. Oligopoly: few sellers
3. Monopolistic Competition: many sellers, slightly differentiated products (e.g. magazines), each seller may set price for its own product

2.2 Supply and Demand

are the force that make the market economy work. They determine the quantity the quantity of each good to be produced and the price at which it is sold. Economists use the model of supply and demand to analyze competitive markets.

2.2.1 Demand

Law of demand states that quantity of good demanded falls when its price rises

$$\frac{dQ_d}{dP} \leq 0$$

2.2.2 Supply

law of supply states that the quantity of goods supplied rises when price rises.

$$\frac{dQ_s}{dP} \geq 0$$

2.2.3 Equilibrium Price

where the supply curve equals the demand curve

$$Q_d(P^*) = Q_s(P^*)$$

where P^* is the optimal price.

2.2.4 Surplus or excess supply

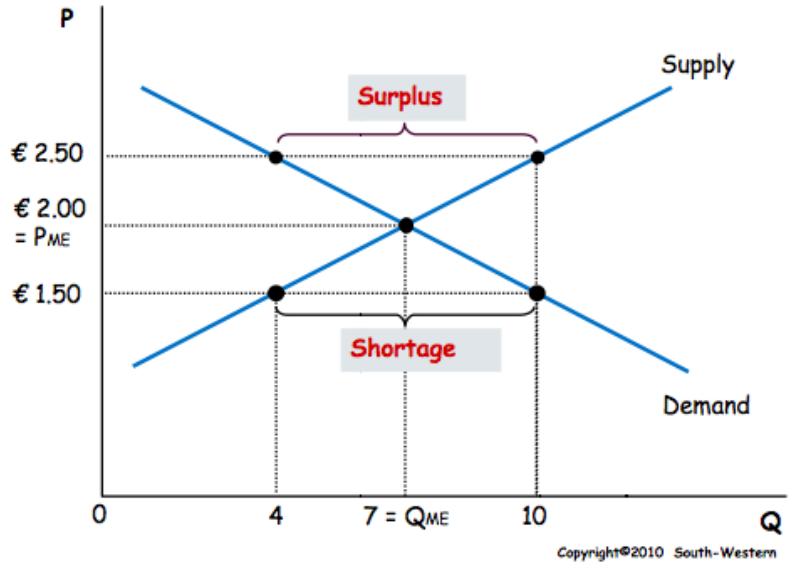

Figure 1: Surplus and shortage

$$P > P^* \Rightarrow Q_s > Q_d$$

Suppliers will lower the price to increase sales, thereby moving toward equilibrium.

2.2.5 Shortage or excess demand

$$P < P^* \Rightarrow Q_d > Q_s$$

Suppliers will raise the price due to too many buyers chasing too few goods.

2.3 Elasticity

is a measure of how much buyers and sellers respond to changes in market conditions

2.3.1 Price elasticity of demand

$$E_d = \frac{\%\text{ change in quantity}}{\%\text{ change in price}} = \frac{dQ_d}{dP}\frac{P}{Q_d}$$

Total revenue: $TR = P \cdot Q$

$$\text{Income elasticity of demand} = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in income}}$$

$$\text{Cross-price elasticity of demand} = \frac{\%\text{ change in quantity demanded of good 1}}{\%\text{ change in the price of good 2}}$$

$$\text{Price elasticity of supply} = \frac{\%\text{ change in quantity supplied}}{\%\text{ change in price}}$$

2.4 Behavioral Economics

- People as well as their decisions aren't always rational!
- People do care about fairness (at least some ...)

3 Supply, Demand and Government Policies

3.1 Estimation of demand curve

Using empirical data and then **regression**

3.2 Controls o prices

- Price ceiling
- Price Floor

Price Ceiling If price is set above equilibrium: **not binding**, otherwise **binding**

Price floor If price floor is set above the equilibrium: **binding**, otherwise **not binding**.

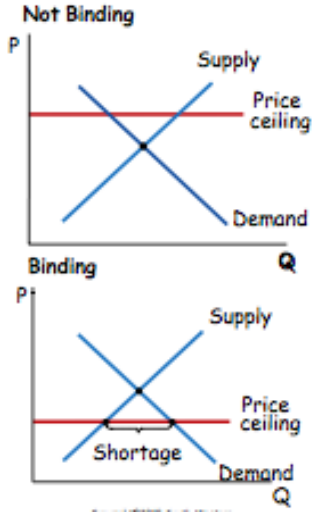

Figure 2: Price ceiling

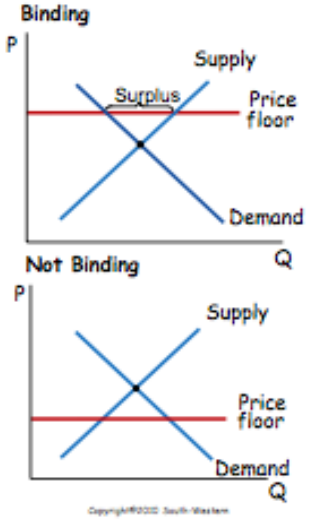

Figure 3: Price floor

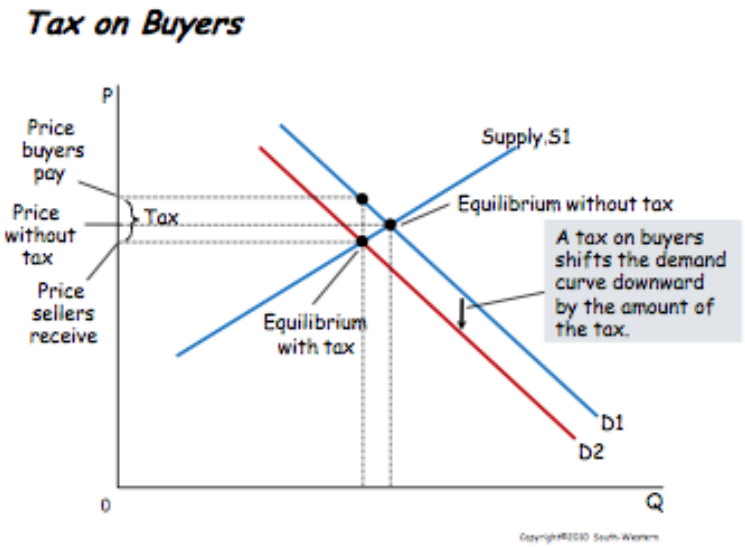

Figure 4: Tax on Buyers

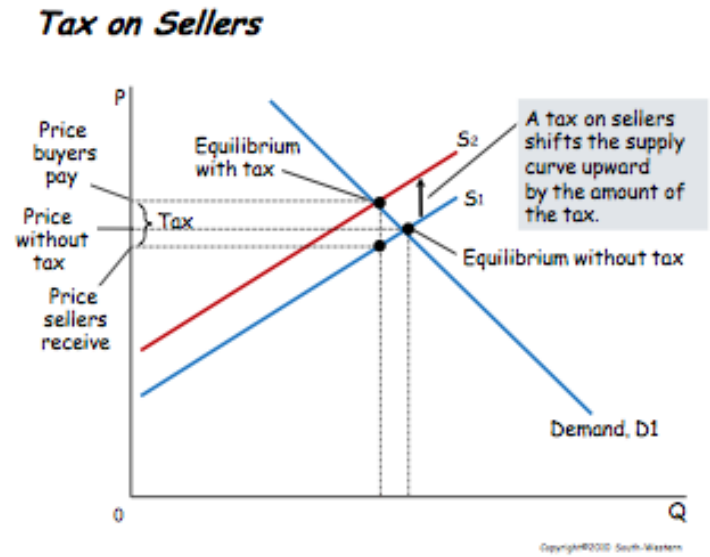

Figure 5: Tax on Sellers

3.3 Taxes

Taxes on Buyers

Taxes on sellers

Elasticity and Tax Incidence Depending on the elasticity of the demand and/or supply the burden of the tax is shared inequally.

4 Welfare Economics and Deadweight Loss

4.1 Welfare Economics

Do the equilibrium price and quantity of the allocated scarce resources maximize the total welfare of buyers and sellers?

Welfare economics is the study of how the allocation of resources affects economic well-being.

4.2 Consumer surplus (CS)

The total area below the demand curve and above the price is the sum of the consumer surplus of all buyers in the market for a good or service.

$$CS = \int_{P^*}^{P_{\max}} Q_D(P)dP \tag{1}$$

surplus.png

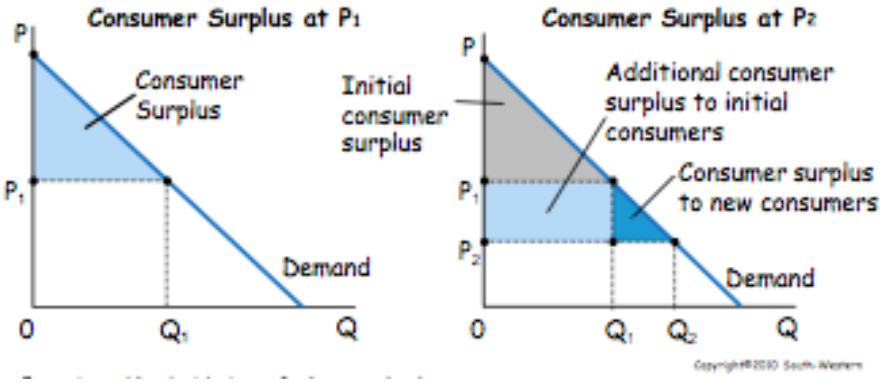

Figure 6: Consumer surplus

4.3 Producer Surplus (PS)

Measures economic welfare from the producer's side

$$PS = \int_{P_{\min}}^{P^*} Q_S(P)dP \tag{2}$$

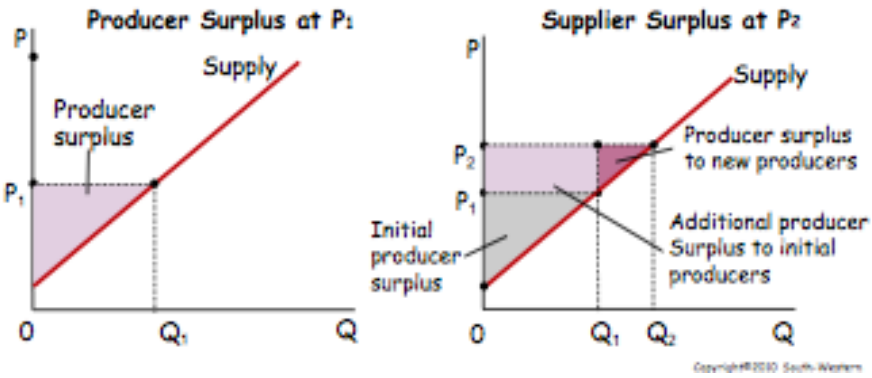

Figure 7: Producer's surplus

4.4 Total Surplus

$$\begin{aligned} \text{Total surplus} &= \text{Consumer surplus} + \text{Producer surplus} \\ &= \text{Value to buyers} + \text{Cost to sellers} \end{aligned}$$

4.5 Market Efficiency

Benevolent Social Planner (BSP) wants to maximize the economics well-being of everyone in society

1. **Efficiency**: the property of a resource allocation of maximizing the total surplus received by all members of the society
2. **Equity**: the fairness of the distribution of well-being among the buyers and sellers.

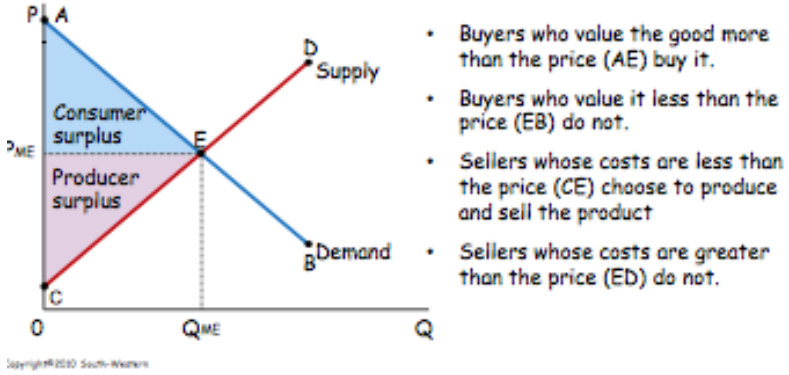

Figure 8: Market Efficiency

1. BSP should not alter market outcome
2. Byers and sellers are guided by an **invisible hand** (Adam Smith)

4.6 Deadweight Loss of Taxation

$$\text{Tax Revenue} = \underbrace{T}_{\text{Size of the tax}} \cdot \overbrace{Q}^{\text{Quantity of goods sold}}$$

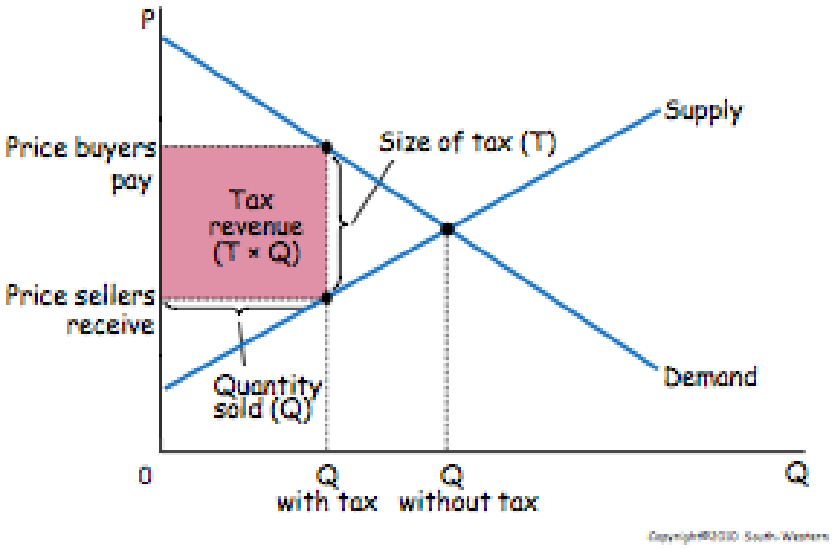

Figure 9: Tax Revenues

Tax Revenues

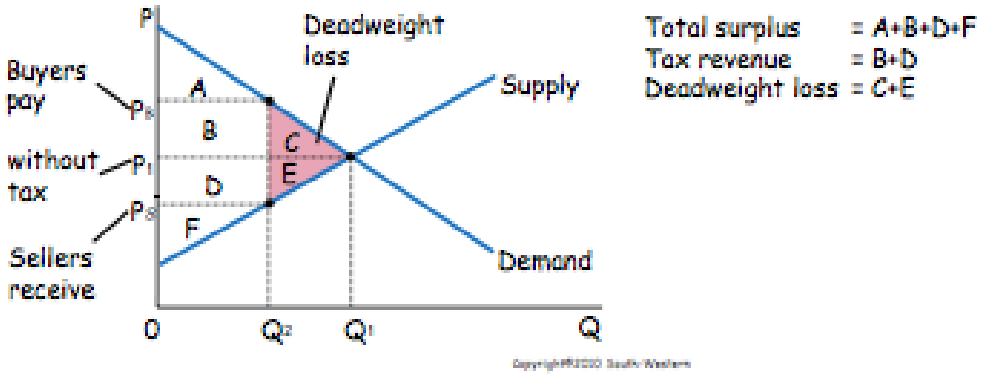

Figure 10: Deadweight Loss

Deadweight Loss

5 International Trade

5.1 Interdependance and the Gains from trade

Absolute Advantage if less inputs required required to produce same good

Comparative Advantage is when a producer requires a smaller **opportunity cost** to produce a good

- Gains from trade are based on comparative advantage, not absolute advantage
- Trade makes everyone better off, because it allows people to **specialize** in activities where they have a comparative advantage.

5.2 Determinants of Trade

The world price refers to the price that prevails in the world market for a good.

exporter If $P_{\text{domestic}} < P_{\text{world}}$ then the country is an exporter (comparative advantage)

importer If $P_{\text{domestic}} > P_{\text{world}}$ then the country is an importer (no comparative advantage)

5.3 Exporting Country

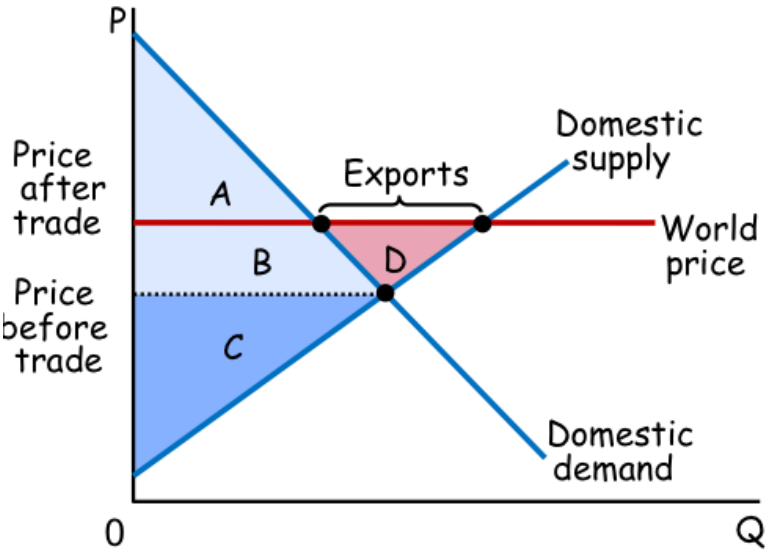

Figure 11: Exporting country

- Area D shows the increase in total surplus and represents the gain from trade
- Domestic producers of the good are better off, and domestic consumers of the good are worse off

5.4 Importing Country

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- Domestic consumers of the good are better off, and domestic producers of the good are worse off

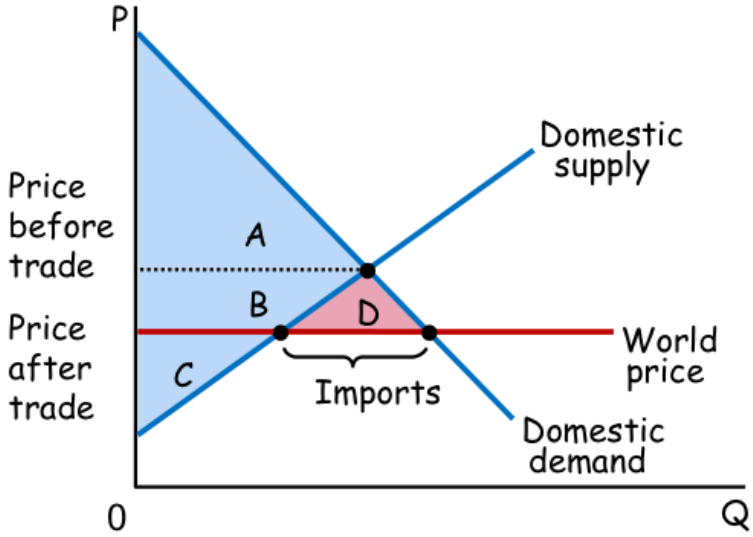

Figure 12: Importing Country

5.5 Trade Policies

Tariff is a tax on goods produced abroad and sol domestically ⇒ Tariffs raise the price of imported goods above the world price by the amount of the tariff (swiss farmers, milk producers). Note the area D and F are deadweight losses.

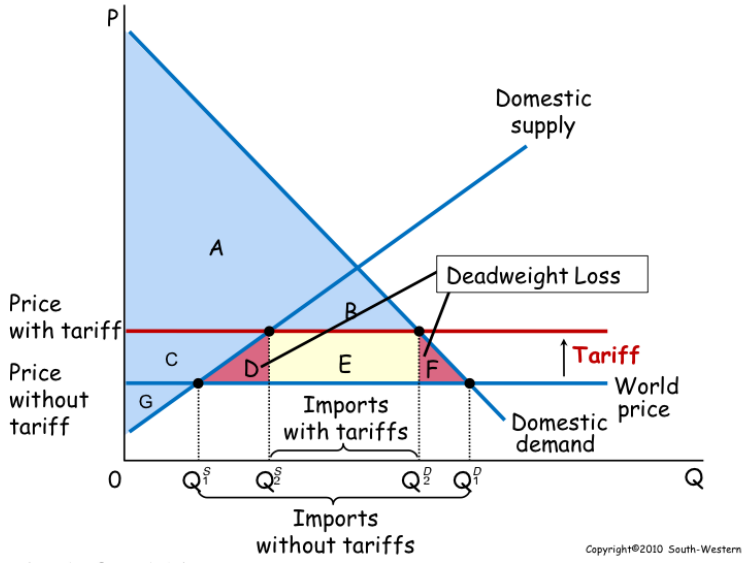

Figure 13: Tariff

Import Quota limit on the quantity of a good that can be produced abroad and sold domestically.

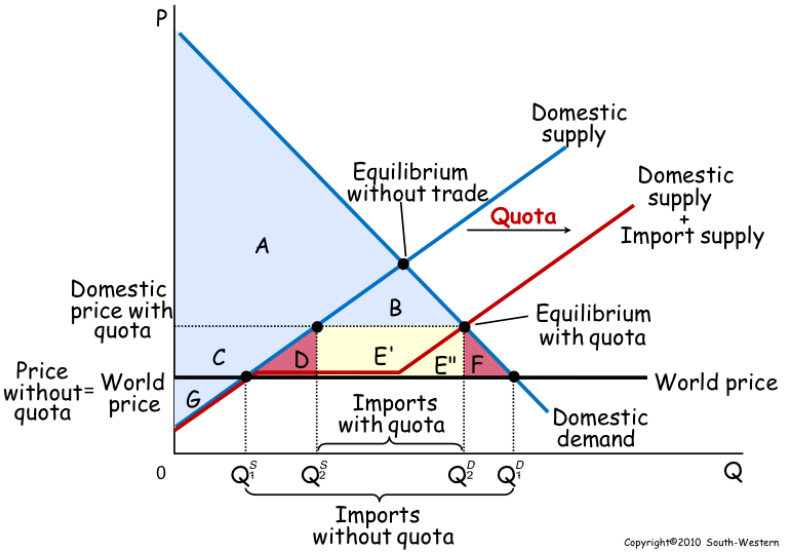

Figure 14: Import quota

5.6 Arguments for restricting Trade

- Jobs
- National Security
- Infant Industry
- Unfair Competition
- Protection as a bargaining Chip

5.7 Trade Agreements and The WTO

Unilateral when a country removes its trade restrictions on its own

Multilateral a country reduced its trade restrictions while other countries do the same.

6 Market Failure & Common Resources

todo

7 Public Sector and the tax System

7.1 Government spendings

Government spending includes all transfer payments, the purchase of public goods and services and general public policy program.

Can be measured as %of GDP.

Transfer payments are government payments not made in exchange for a good or a service, e.g. pensions or unemployment benefits.

7.2 Sources of Government Revenues

Public revenues are defined as tghe sum of financial resources accruing the public sector in order to finance **national expenditure** and th **subsidies for the economy**. It comes from

1. sales and leasing of goods and ervices
2. Taxes ad fees
3. Loans

Average tax rate is total tax paid divided by total income.

Marginal tax rate is the extra tax paid on an additonal pound of income.

Lump-sum Tax is a tax that is the same amount for every person, regardless of earnings or any actions that the person might take

Budget deficit When government spends more than it has

National debt is the value of accumulated net borrowing by that state and other public authorities from the economic system and foreign countries.

Financing of public deficit can be done in a **monetary way** (printing banknotes → inflation) or in a **non-monetary** way (issuing fixed-income bonds)

7.3 Taxes and efficiency

Efficient tax system tries to minimize the costs to taxprayers and the governments.
Costs are

- tax payment itself
- deadweight loss
- Administrative burden

7.4 Taxes and Equity

Equity How should the burden of taxes be divided among the population

Benefits principle is the idea people should pay taxes based on the benefits they receive from government services. (those who use car pay petrol tax)

Ability to pay prinicple is the idea that tax should be levied on a person according to how well that person can shoulder the burden.

- **Vertical Equity** taxpayers with greater ability to pay taxes pay more
  - Proportional tax
  - Regressive tax
  - Degressive tax
- **Horizontal equity** idea that taxpayers with same ability to pay taxes pay the same amount.

7.5 Tax Incidence and Tax Equity

Tax equity and efficiency are the two most important goals of the tax system.

Tax incidence is the study of who shares the burden of the tax

8 The Cost Of Production

8.1 Introduction

Behind the supply curve

- Production function
- Cost function

8.2 Production theory

Production Technology Combination of inputs in order to produce finished goods and services

Cobb Douglas Production Function

$$Q = zC^{\alpha}L^{\beta} \tag{3}$$

if CRS, constant return to scale, (see system dynamics), $\alpha + \beta = 1$, IRS and DRS also exist

8.3 Costs

$$\text{Profit} = \text{Total revenue} - \text{Total cost} \tag{4}$$

Economic profit the total revenue minus total cost, including both explicit and implicit costs.

Accounting profit total revenue - total explicit cost

Production Function reltionship between quantity of inputs used and the quantity of output

Marginal product Increase in output that arise from an additional unit of input

Diminishing marginal product When the derivative of the marginal product is negative, the double derivtaive of the production function is negative...

Fixed Costs FC Costs that do not vary with the quantity of output produced

Variable costs VC Costs that DO vary with amount of output produced

Total Costs TC

$$TC = FC + VC + \dots \tag{5}$$

Average Total Cost AVC

$$AVC = \frac{VC}{Q} \tag{6}$$

The curve is usually U-shaped

Marginal cost MC

$$MC = \frac{dTC}{dQ} \tag{7}$$

Efficient scale quantity of output that minimizes average total cost

8.4 Costs in the short and long run

in the short run, some costs are fixed, in the long run, fixed become variable costs.

8.5 Economies and diseconomies of scale

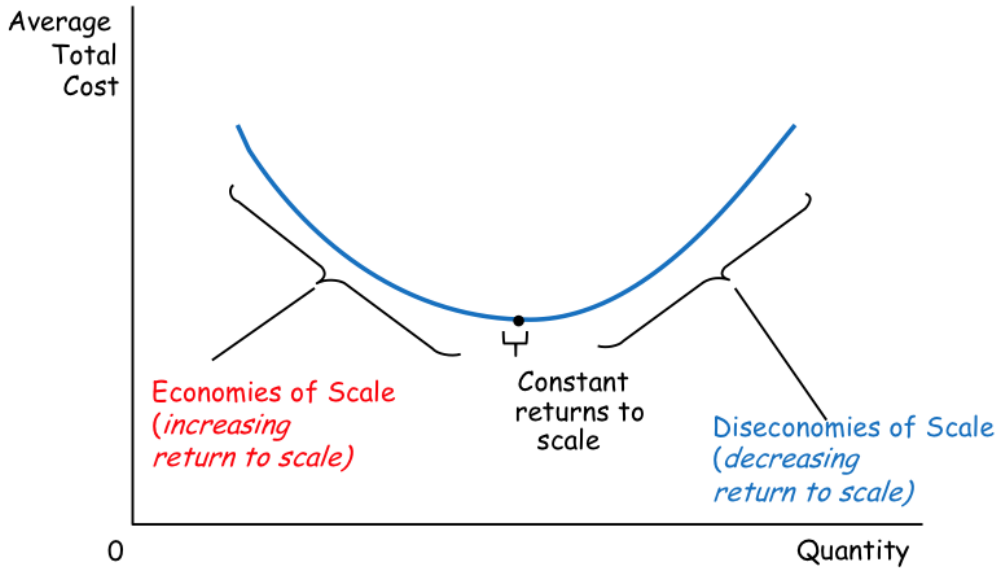

Figure 15: Economy of scale

Economies of Scope If the joint output of a single firm is greater than the output that could be achieved by two different firms when each produces a single product, we speak of economies of scope.

Learning Curve A firm's production cost may fall over time as managers and workers become more experienced and more effective at using the available plant and equipment. The learning curve shows the extent to which hours of labor needed per unit of output fall as the cumulative output increases.

9 Firms in Competitive Markets

Competitive Market a market with many buyers and sellers that are *price takers*

Average revenue

$$AR = \frac{TR}{Q} \tag{8}$$

where $TR = P \cdot Q$ is the total revenue and Q the quantity sold.

Marginal revenue

$$MR = \frac{\mathrm{d}\, TR}{\mathrm{d}\, Q} \tag{9}$$

For a competitive firm the following holds

$$P = AR = MR \tag{10}$$

Profit maximization a firm maximizes its profit when the "marginal profit" is zero, that is

$$\text{"marginal profit"} = \frac{\mathrm{d}(TR - TC)}{dQ} = \frac{dTR}{dQ} - \frac{dTC}{dQ} = 0 \tag{11}$$

Firm's decision to shutdown

$$\begin{aligned} \text{shutdown if} \quad & TR < VC \\ & TR/Q < VC/Q \\ & P < AVC \end{aligned}$$

Firm 's decision to quit in the long run

$$\begin{aligned} \text{exit if} \quad & TR < TC \\ & TR/Q < TC/Q \\ & P < ATC \end{aligned}$$

reciprocally

$$\text{enter if} \quad P > ATC$$

Sunk cost a cost that has already been committed and cannot be recovered

Measuring profit for the competitive firms

$$\begin{aligned} \text{Profit} &= TR - TC \\ &= (TR/Q - TC/Q) \cdot Q \\ &= (P - ATC) \cdot Q \end{aligned}$$

Zero Profit In the long runy, competitive firms make a zero profit. (however this is not an accountant profit, it includes implicit costs)

10 Monopoly

A firm that is the sole seller of a product without close substitutes

11 Monopolistic Competition

11.1 Monopolistic Competitions

a market structure in which many firms sell products that are similar but not identical.

11.2 Monopolisitic Competition in the Short Run

11.3 Monopolistic Competition in the Long Run

Monopolistic competition is one of the four market structure. Examples: gasoline, cars.
Attributes

- many sellers
- product differentiation
- free entry and exit

In the short run a monopoly market and monopolistic competitive market are identical (choose quantity as well as price).

- Short run economic profit encourage new firms to enter the market
- Short run economic loss encourage firms to exit the market

Firms will enter and exit the market until firms are making zero profit.
Two characterstics

- As in a **monopoly**, price exceeds marginal cost
- As in a **competitive market**, price equals average total cost

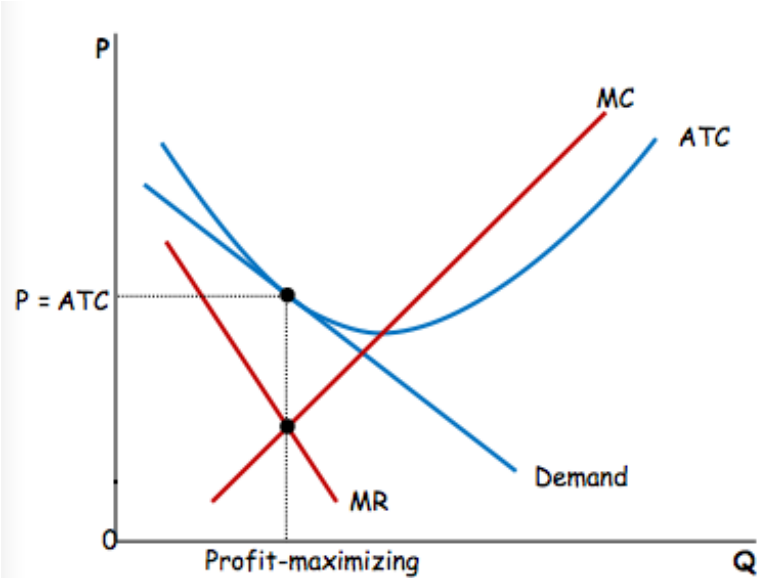

Figure 16: Monopolistic Competition in the Long Run

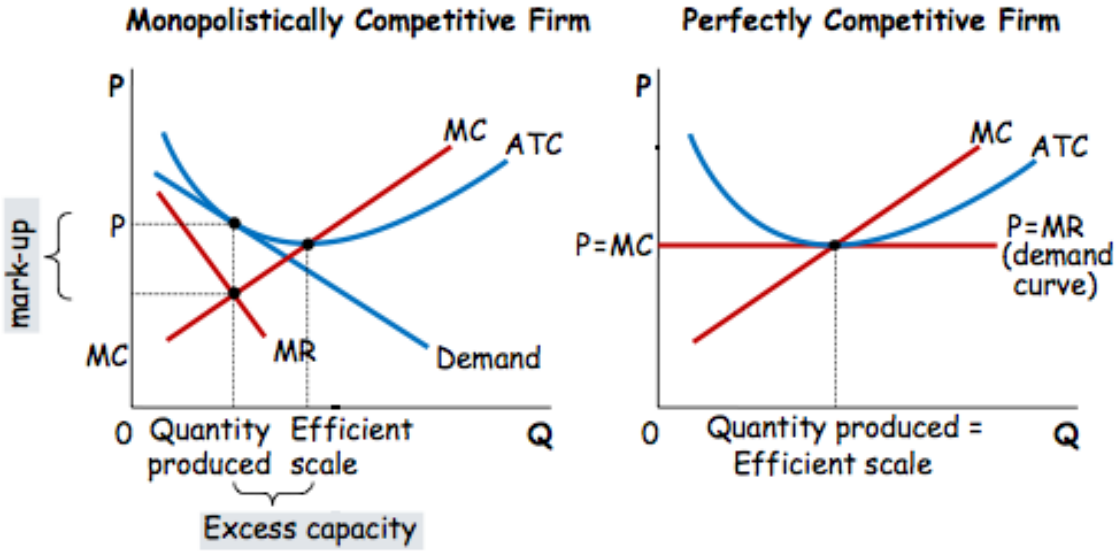

Figure 17: Monopolistic vs perfect competition

11.4 Comparison of different Market Structures

11.4.1 Mark up over original cost

- for a competitive firm marginal cost equals price
- for a monopolisticalls competitive firm, price exceeds marginal cost
- because price exceed marginal cost, an extra unit sold at the posted price means more profit for the monopolistically competitive firm

11.4.2 Excess capacity

- Free entry results in competitive firms producing at the point where average total cost is minimized, which is the efficient scale of the firm.
- In monopolistic competition, output is less than the efficient scale of perfect competition.

11.5 Monopolistic Competition and Welfare

Monopolistic does not have all the desirable properties of perfect competition.

- Normal deadweight loss, caused by mark-up of price over marginal cost
- Number of firms is not "ideal"

... but the administrative burden of regulating the different would be overwhelming.

11.6 Advertising

When firms sell differentiated products and charge prices above marginal cost, each firm has an incentive to advertise in order to attract more buyers. Typically between 10 and 20% of revenue.

11.7 Brand Names

- − consumers perceive changes that do not exist
- + ensure consumers buy a product of high quality

11.8 Introduction to Oligopoly and Game theory

11.8.1 Game theory

Dominance A strategy is dominant if it outperforms all other choices no matter what opposing players do.

Rationalizable strategies are the sets of all strategies that are not strictly dominated.

11.9 Monopoly and its Causes

Why Monopolies Arise There are generally three causes

- A key resource is owned by a single firm
- Government created monopolies: patent and copyright
- Natural monopoly: a monopoly that arises because a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms.

Price Discrimination the business practice of selling the same good at two different prices.

12 Oligopoly