Professional Development Course in Knowledge Enrichment for Senior Secondary Economics Teachers

Outline of Lecture 4 –

Microeconomics : Efficiency, Equity and the role of government

17 June 2009

Topics covered:

I.   Efficiency

II.   Equity

I.   Efficiency

(a)   Definition of <u>welfare economics</u>: the study of how the allocation of resources affects economic well-being.

(b)   **Consumer Surplus**

- Definition of <u>willingness to pay</u>: the maximum amount that a buyer will pay for a good.

- Definition of <u>consumer surplus</u>: a buyer's willingness to pay minus the amount the buyer actually pays.

<u>Consumer Surplus at Price P_1</u>
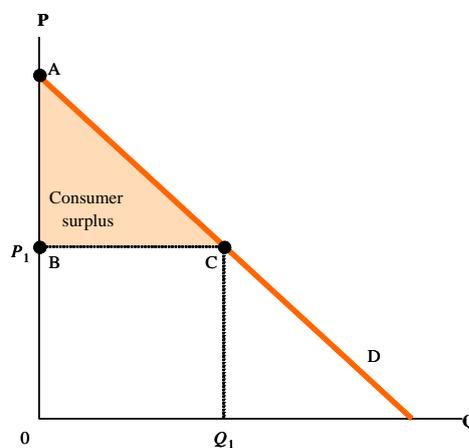
- How a Lower Price Raises Consumer Surplus

  As price falls, consumer surplus increases:

(i)   Those already buying the product will receive additional consumer surplus because they are paying less for the product than before.

(ii) Since the price is now lower, some new buyers will enter the market and receive consumer surplus on these additional units of output purchased.

- What Does Consumer Surplus Measure?

 It measures the benefit that consumers receive from the good as the buyers themselves perceive it.

(c) **Producer Surplus**

- Definition of <u>cost</u>: the value of everything a seller must give up to produce a good.

- Definition of <u>producer surplus</u>: the amount a seller is paid for a good minus the seller's cost.

- How a Higher Price Raises Producer Surplus:

<u>Producer Surplus at Price P_2</u>
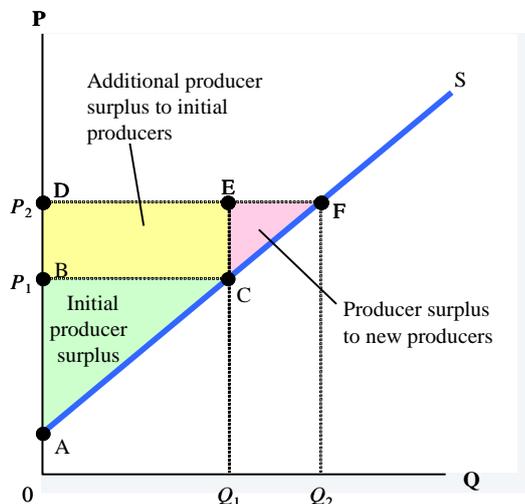
- When price rises, producer surplus increases:

(i) Those already selling the product will receive additional producer surplus because they are receiving more for the product than before (area BDEC on the graph).

(ii) Some new sellers will enter the market and receive producer surplus on these additional units of output sold (area CEF on the graph).

- Producer surplus is used to measure the economic well-being of producers.

(d) **Market Efficiency**

- The Planner

(i) The economic well-being of everyone in society can be measured by total surplus, which is the sum of consumer surplus and producer surplus:

Total Surplus = Consumer Surplus + Producer Surplus

Total Surplus = (Value to Buyers – Amount Paid by Buyers) +

(Amount Received by Sellers – Costs of Sellers)

Because the Amount Paid By Buyers = Amount Received by Sellers:

Total Surplus = Value to Buyers – Costs of sellers

(ii) Definition of <u>efficiency</u>: the property of a resource allocation of maximizing the total surplus received by all members of society.

(e) **Evaluating the Market Equilibrium**

Consumer and Producer Surplus
in the Market Equilibrium
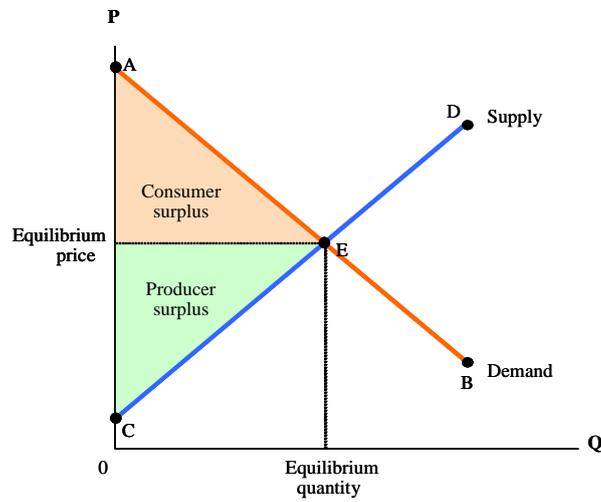
- At the market equilibrium price:

  ➢ The free market allocates the supply of a good to the buyers who value it most highly, as measured by their willingness to pay.

  ➢ The free market allocates the demand for goods to the sellers who can produce it at the lowest cost.

- Total surplus is maximized at the market equilibrium.

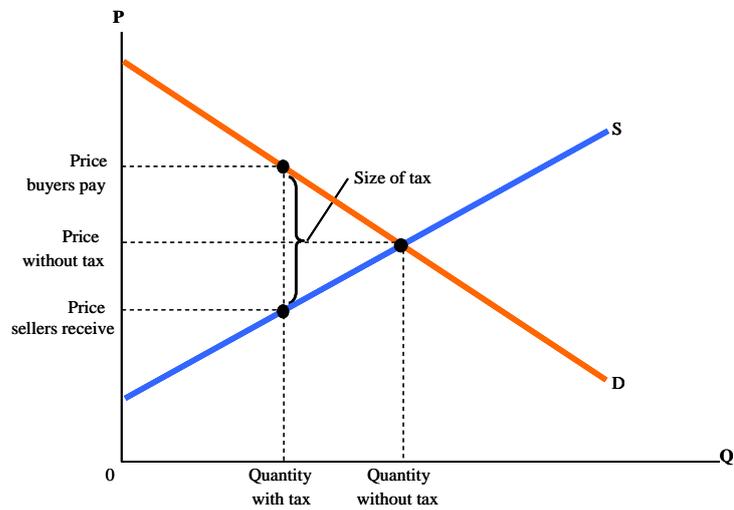The Efficiency of the Equilibrium Quantity

4
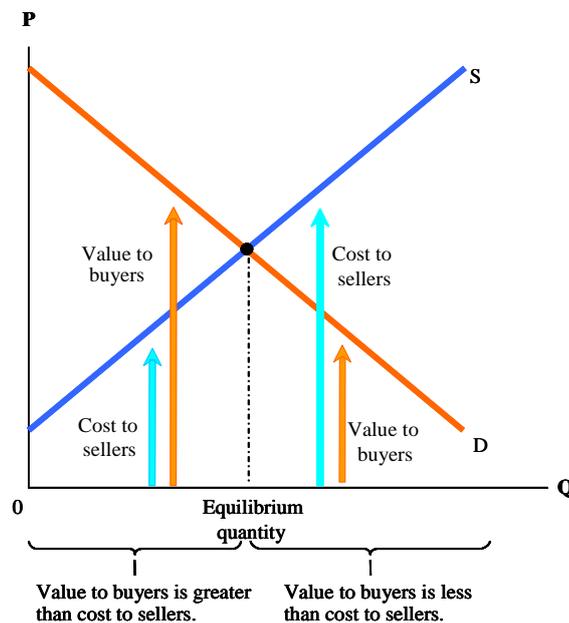
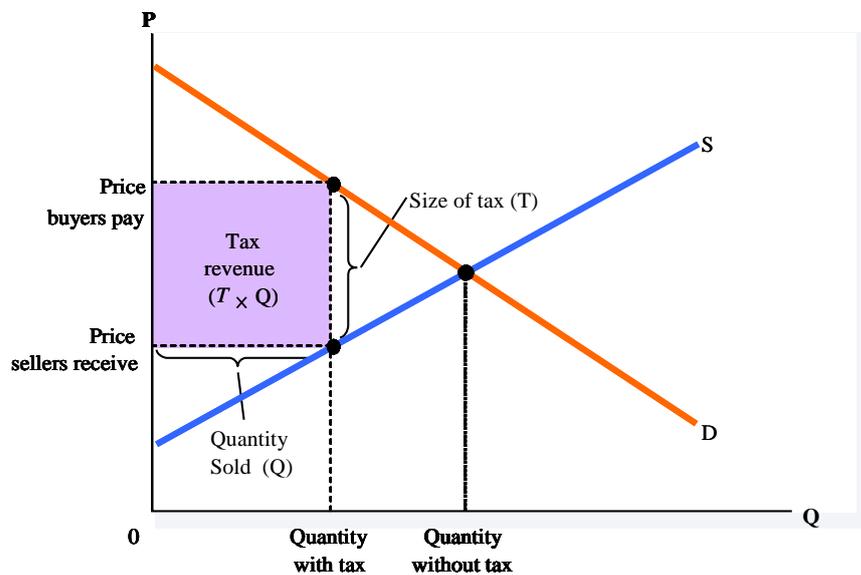(f)   **Deviation from Efficiency**

The Case of Taxation
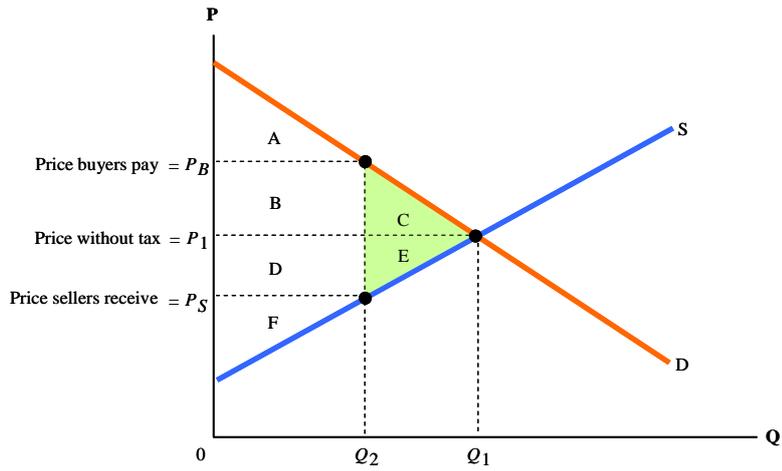
● The Deadweight Loss of Taxation

   If there is a tax on a product, the price that a buyer pays will be greater
   than the price the seller receives. Thus, there is a tax wedge between the
   two prices and the quantity sold will be smaller if there was no tax.

The Effects of a Tax

● How a Tax Affects Market Participants

The effect of a tax on welfare

	Welfare before tax	Welfare after tax	Change in welfare
Consumer surplus	**A + B + C**	**A**	**- (B + C)**
Producer surplus	**D + E + F**	**F**	**- (D + E)**
Tax revenue	**--**	**B + D**	**+ (B + D)**
Total surplus	**A + B + C + D + E + F**	**A + B + D + F**	**- (C + E)**

- Definition of <u>deadweight loss</u>: the fall in total surplus that results from a market distortion, such as a tax.

- Deadweight Losses and the Gains from Trade
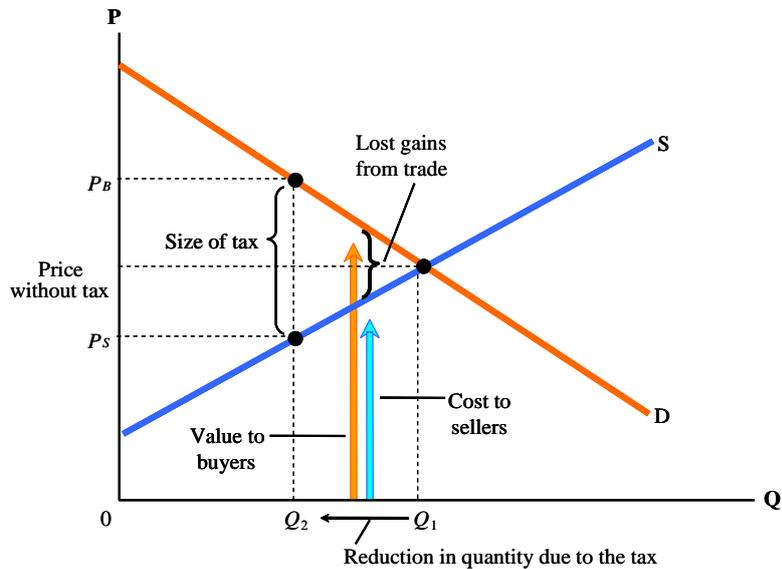
✧ Taxes cause deadweight losses because they prevent buyers and sellers from benefiting from trade.

✧ The deadweight loss is equal to areas C and E (the drop in total surplus).

✧ Note that output levels between the equilibrium quantity without the tax and the quantity with the tax will not be produced, yet the value of these units to consumers (represented by the demand curve) is larger than the cost of these units to producers (represented by the supply curve).

(g) **Deviation from Efficiency: The Case of Divergence between Private and Social Costs (Benefits)**

● Externality: the uncompensated impact of one person's actions on the well-being of a bystander.

➢ If the effect on the bystander is adverse, we say that there is a negative externality.

➢ If the effect on the bystander is beneficial, we say that there is a positive externality.

● Externalities and Market Inefficiency

(i) Negative Externalities
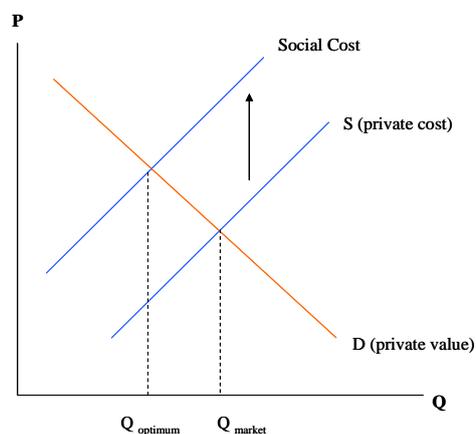
Example: a canned food factory emits pollution during production.

■ Social cost = the private cost to the firm of producing the canned food + the external costs to those bystanders affected by the pollution. Social cost - the private cost paid by producers = divergence between private and social costs.

■ Total surplus is equal to the value of canned food to consumers minus the cost (social cost) of producing it.

■ Because the supply curve does not reflect the true cost of producing aluminum, the market will produce more aluminum than is optimal.

■ This negative externality could be internalized by a tax on producers for each unit of aluminum sold.

■ Internalizing an externality: altering incentives so that people take account of the external effects of their actions.

(ii) Positive Externalities
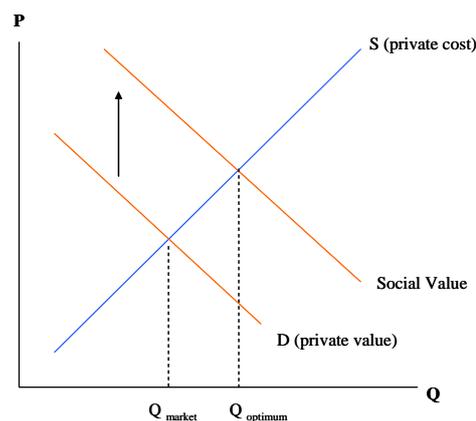
Example: education

■ Education yields positive externalities because a better educated population leads to a better government.

- In this case, the demand curve does not reflect the social value of a good.

- If there is a positive externality, the social value of the good is greater than the private value, and the optimum quantity will be greater than the quantity produced in the market.

- To internalize a positive externality, the government could again use a subsidy.

- Case Study: Technology Spillover and Industrial Policy
  - ➢ It is difficult to measure the amounts of technology spillover.
  - ➢ Patent protection is a type of technology policy of the government.

(iii) Private Solutions to Externalities

- The Types of Private Solutions:
  - Moral codes and social sanctions
  - Charities
  - The parties involved in this externality (either the seller and the bystander or the consumer and the bystander) can possibly enter into an agreement to correct the externality.
  - The Coase Theorem-private bargaining
    (*Note: The term Coase Theorem is not required*)
  - *Coase theorem*: the proposition that if private parties can bargain without cost over the allocation of resources, they can solve the problem of externalities on their own.

- *Whatever the initial distribution of rights, the parties involved in an externality can solve the problem themselves and reach an efficient outcome where both parties are better off.*

- Why Private Solutions Do Not Always Work

  - Transaction costs: the costs that parties incur in the process of agreeing and following through on a bargain.

  - Coordination of all of the interested parties may be difficult so that bargaining breaks down.   This is especially true when the number of interested parties is large.

(iv) Public Policies toward Externalities

- The government can respond in two ways:

  - Command and control policies regulate behavior directly.

  - Market-based policies provide incentives so that private decision makers will choose to solve the problem on their own.

- Regulation

  - Externalities can be corrected by making certain behaviors either required or forbidden.

- Pigouvian Taxes and Subsidies

  (*Note***: *The term Pigouvian taxes is not required.)*

  - Externalities can be internalized through the use of taxes and subsidies.

- Pigouvian tax: a tax enacted to correct the effects of a negative externality.

(1) These taxes are preferred by economists over regulation, because firms that can reduce pollution with the least cost are likely to do so (to avoid the tax) while firms that encounter high costs when reducing pollution will simply pay the tax.

(2) Thus, this tax allows firms that face the highest cost of reducing pollution to continue to pollute while encouraging less pollution over all.

(3) Unlike other taxes, Pigouvian taxes do not cause a reduction in total surplus. In fact, they increase economic well-being by forcing decision makers to take into account the cost of all of the resources being used when making decisions.

- Tradable Pollution Permits
■ Tradable pollution permits and Pigouvian taxes are similar in effect. In both cases, firms must pay for the right to pollute.
  - **Tax:** the government basically sets the price of pollution and firms then choose the level of pollution (given the tax) that maximizes their profit.
  - **Tradable pollution permits:** the government chooses the level of pollution (in total, for all firms) and firms then decides what they are willing to pay for these permits.

II. Equity

(a) Measuring Income Inequality: Lorenz Curve and Gini Coefficient

(*Notes: The construction of Lorenz Curve and Gini Coefficient is not required. Students should concentrate on how to interpret the results of Lorenz Curve and Gini Coefficient.*)
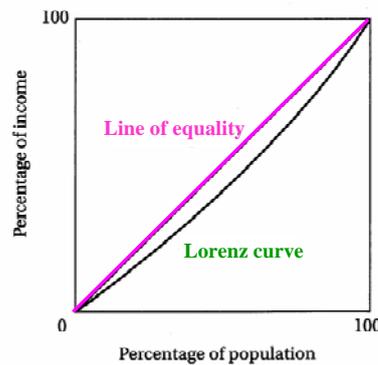
(i) Lorenz Curves

- **Lorenz curve** is a common measure of income disparity. The numbers of income recipients are plotted on the horizontal axis, not in absolute terms but in *cumulative percentages.* For example, at point 20, we have the lowest (poorest) 20% of the population; at point 60, we have the bottom 60%; and at the end of the axis, all 100% of the population has been accounted for.

- The vertical axis shows the share of total income received by each percentage of population. It is also cumulative up to 100%, meaning that both axes are the same length. The entire figure is enclosed in a square, and a diagonal line is drawn from the lower left corner (the origin) of the square to the upper right corner. At every point on that diagonal, the percentage of income received is exactly equal to the percentage of income recipients.

- The diagonal line in the figure is representative of "perfect equality" in size distribution of income. Each percentage group of income recipients is receiving that same percentage of the total income.
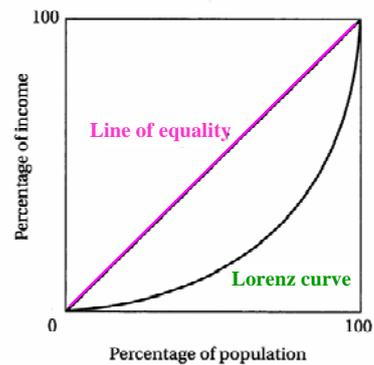
The Lorenz Curve
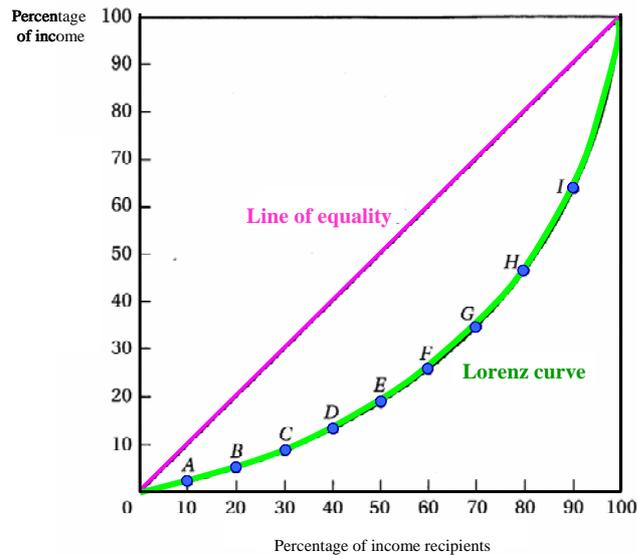
- The Lorenz curve shows the actual quantitative relationship between the percentage of income recipients and the percentage of the total income they did in fact receive during, say, a given year. Point A shows that the bottom 10% of the population receives only 1.8% of the total income, point B shows that the bottom 20% is receiving 5% of the total income, and so on.

- The more the Lorenz line curves away from the diagonal (perfect equality) or bows out towards the lower right corner, the greater the degree of inequality represented. The extreme case of perfect inequality (i.e., a situation in which one person receives all of the national income while everybody else receives nothing) would be represented by the congruence of the Lorenz curve with the bottom horizontal and right-hand vertical axes. The greater the degree of inequality, the greater the bend and the closer to the bottom horizontal axis the Lorenz curve will be.

13

■ Two representative distributions are shown in the following figures, one for a relatively equal distribution (Figure a) and the other for a more unequal distribution (Figure b).

■ The greater the curvature of the Lorenz Curve, the greater the relative degree of inequality

(a) A relatively equal distribution   (b) A relatively unequal distribution

(ii) Gini Coefficients

■ It can be obtained by calculating the ratio of the area between the diagonal and the Lorenz curve divided by the total area of the half-square in which the curve lies. In the figure below, this is the ratio of the shaded area A to the total area of the triangle BCD. This ratio is known as the Gini concentration ratio or Gini coefficient, named after the Italian statistician who first formulated it in 1912.

14
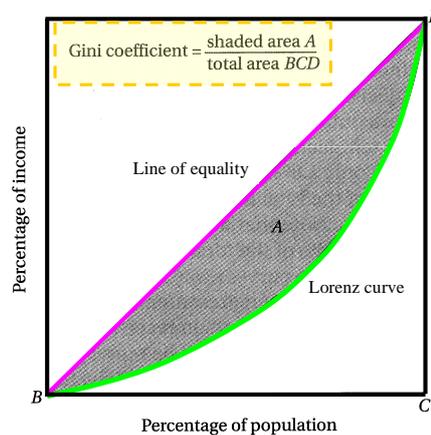
- Gini coefficients are aggregate inequality measures and can vary anywhere from 0 (perfect equality) to 1 (perfect inequality). In fact, the Gini coefficient for countries with highly unequal income distributions typically lies between 0.50 and 0.70, while for countries with relatively equitable distributions, it is on the order of 0.20 to 0.35.

- Four possible Lorenz curves might be found in international data are drawn in the following figure. In the "Lorenz criterion" of income distribution, whenever one Lorenz curve lies above another Lorenz curve, the economy corresponding to the upper Lorenz curve is more equal than that of the lower curve. Thus economy A may unambiguously be said to be more equal than economy D. Whenever two Lorenz curves cross, such as curves B and C, the Lorenz criterion states that we "need more information" or additional assumptions before we can determine which of the underlying economies is more equal. For example, we might argue on the grounds of the priority of addressing problems of poverty that curve B represents a more equal economy, since the poorest are richer, even though the richest are also richer (and hence the middle class is "squeezed"). But others might start with the assumption that an economy with a stronger middle class is inherently more equal, and that observer might select economy C.

Four Possible Lorenz Curves
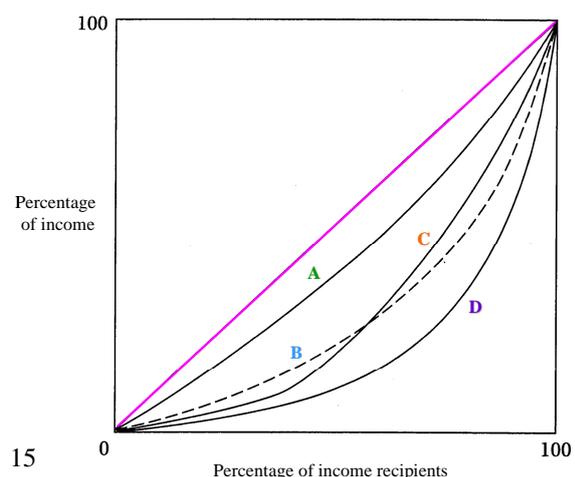
■ According to the Thematic Report: Household Income Distribution in Hong Kong by the Census and Statistics Department released in June 2007, Hong Kong's Gini coefficient rose from 0.518 in 1996 to 0.533 in 2006, indicating that Hong Kong has become one of the most unequal developed societies in the world.

■ However, a word of caution is needed here. As shown in the following table, Hong Kong's Gini Coefficient is smaller if post-tax monthly household income is used for calculation. The coefficient decline further by 0.058 percentage point if the calculation takes into account the post-tax post-social transfer household income. It is expected that it may go further downward if the calculation considers the effect of subsidized consumption items (e.g. government aided housing) on household income in real term. Therefore, the income disparity may be less severe than what we expect if we use the real disposable income (net of taxes and subsidies) for calculation.

表 7.9   一九九六年、二零零一年及二零零六年按住戶人數劃分的堅尼系數
Table 7.9   Gini Coefficient by Household Size, 1996, 2001 and 2006

住戶人數 Household Size	原本住戶每月收入 Original Monthly Household Income			除稅後住戶每月收入 Post-tax Monthly Household Income			除稅及福利轉移後住戶每月收入 Post-tax Post-social Transfer Monthly Household Income		
	1996	2001	2006	1996	2001	2006	1996	2001	2006
1	0.615	0.620	0.614	0.609	0.609	0.604	0.573	0.577	0.570
2	0.547	0.550	0.559	0.537	0.539	0.547	0.505	0.500	0.505
3	0.487	0.452	0.470	0.475	0.440	0.458	0.435	0.394	0.404
4	0.457	0.457	0.455	0.445	0.446	0.441	0.390	0.383	0.375
5+	0.482	0.512	0.514	0.469	0.501	0.499	0.405	0.431	0.426
合計 Overall	0.518	0.525	0.533	0.508	0.515	0.521	0.466	0.470	0.475

Source: 2006 Population By-census Thematic Report: Household Income Distribution in Hong Kong, Hong Kong Census and Statistics Department

■ Countries have Gini coefficients that range from 0.23 (Denmark) to 0.71 (Namibia). Poor countries have Gini coefficients that range from the lowest to the highest level, depending on their social system. Rich countries tend to have low to middle coefficients (below 0.40).

■ The lowest Gini coefficients are found in the Scandinavian and Eastern European countries and Japan. The US ratio, 0.47, is high for a developed country and is a current source of concern to many commentators in the US. Hong Kong's near neighbours in the rankings are Latin American countries like El Salvador, Columbia and Mexico. The only developed country higher on the list than Hong Kong is South Africa.

(b) Why some people earn more? Some determinants of equilibrium wages

    (i) Compensating Differentials

    Definition of <u>compensating differential</u>: a difference in wages that arises to offset the non-monetary characteristics of different jobs.

    (ii) Human Capital

    Definition of <u>human capital</u>: the accumulation of investments in people, such as education and on-the-job training.

    ■ *Case Study: The Increasing Value of Skills*

    ✓ Data in the US average earnings of college graduates with the average earnings of high school graduates with no additional education. There has been an increase in this difference over time.

✓ One possible reason that this has occurred is that international trade has changed the relative demand for skilled and unskilled labor.

✓ Another possible reason is that changes in technology have changed the relative demand for skilled and unskilled workers.

(iii) Ability, Effort, and Chance

■ Because of heredity and upbringing, people differ in their physical and mental attributes. This will affect their productivity level and therefore their wage.

■ People also differ in their level of effort. Those who work hard are more productive and earn a higher wage.

■ Chance also plays a role in determining wages.

■ *Case Study: The Benefits of Beauty*

✓ Daniel Hamermesh and Jeff Biddle found that in the U.S. & Canada, people who are considered to be more attractive than average earned 5% more than people of average looks. People of average looks earn 5% to 10% more than people considered to be less attractive than average.

✓ One possible reason for this is that good looks are important for workers who have close dealings with the public.

✓ Another possible reason is that a person who is successful in making him or herself attractive may be equally successful in other tasks.

✓ A third possible reason for this difference in the wages is discrimination.

(iv) The Superstar Phenomenon

■ Superstars arise in markets that have two characteristics.

■ Every customer in the market wants to enjoy the good supplied by the best producer.

■ The good is produced with a technology that makes it possible for the best producer to supply every customer at a low cost.

■ This is why we see superstars in some markets (entertainment, professional sports) and not in others (plumbing, carpentry).

(c) Policy Concerns: Some remarks

(i) Equity, fairness and income redistribution

■ Equity refers to an equal distribution of benefits (e.g. income and resources)

■ Equity entails the issue of fairness. Fairness cannot be adequately treated by economics. It requires a philosophical inquiry. However, economists try to categorize fairness into two approaches:

→ It's not fair if the *rules* aren't fair.

→ It's not fair if the *result* isn't fair.

■ The first approach, generally adopted by economists, is put forward by Robert Nozick, a Harvard philosopher, who states that fairness consists two conditions:

- The state must establish and enforce private property rights.

- Individuals are free to exchange property rights as they see appropriate. Put it another way, voluntary exchange is allowed to capture potential gains.

- If both conditions are applied to all, there is **equality in opportunity.** Everyone is free to use their resources and human skills to create goods and services valued by themselves and others and to exchange with others to yield potential benefits.

- Nozick's conception is that the outcome will be fair, though the distribution may be very uneven, provided that all people are treated with the same rules set above.

- The second approach focus on the distribution of benefits. If the distribution is 'too unequal', it is unfair. For example, both a bank teller and a bank president work very hard, but the latter earns more than ten times of the former. However, it is hard to determine how much is 'too unequal' in economics.

- Most people and social scientists, nevertheless, regard huge income disparity (i.e. Gini Coefficient larger than 0.5) as undesirable and income redistribution, mainly through taxation, is justifiable because:

- Severe income disparity can cause social unrest;

- High income concentration on a small proportion of people may hamper overall consumption; and

- One dollar transferred from the rich to the poor can increase the marginal value of the transferred income, which is efficiency enhancing.

■ However, the following considerations may make income redistribution less desirable:

- Tradeoff between equity and efficiency: higher marginal tax rate reduce the opportunity cost of leisure. People tend to work less because of substitution effect.

- A dollar taken away from the rich to the poor does not necessarily mean that the poor can receive one dollar. Some of the dollar is spent by administrative and tax departments and the amount received by the poor will be substantially reduced.

- When a marginal tax rate is too high, businessmen may cut their operation. In this case, it is possible that people with low income will lose more than what they gain by receiving transfer payment.

(ii) Policies to enhance equality in opportunity

■ Establish an effective legal system to enforce the private property rights

■ Establish institutions to protect equal opportunities (e.g. Equal Opportunities Commission)

■ Free (Subsidized) Education

- No one will be deprived of the right of receiving education because of lack means.

- Countries that developed successfully, in general, are those countries make education available broadly to the population.

■   Subsidized Health Care System

- The system can be in the form of a national health system (e.g. HK and the UK) or a health insurance scheme (e.g. the US and Canada)

- Like education, the general principle is that no one should be denied adequate medical treatment because of lack of means.

(iii) Policies to reduce income disparity

■   Minimum-Wage Laws

- For workers with low levels of skill and experience, a high minimum wage forces the wage above equilibrium.

- This leads to higher unemployment among those groups of workers affected by the minimum wage.

- Although those workers who remain employed benefit from a higher wage, those who might have been employed at a lower wage are worse off.

- Critics of the minimum wage also point out that many teenagers earning the minimum wage are from middle-class families, so that a high minimum wage does a bad job of targeting the poor.

■   Welfare

- Definition of <u>welfare</u>: government programs that supplement the incomes of the needy.

- A common criticism of these programs is that they create incentives for people to become needy.

- These programs may encourage families to break up, because many families qualify only if the father is absent.

- These programs may also encourage illegitimate births, because many poor, single women qualify only if they have children.

- Some economists propose that low income family should be supplemented by negative income tax (i.e. subsidies for families if their income cannot reach the minimum benchmark).

■ In-Kind Transfers

- The government provides the poor with food stamps and medical service coupons.

- Advocates of in-kind transfers argue that these make sure that the poor receive what they need most.

- Advocates of cash payments argue that the government cannot know what goods and services the poor need the most.

- Anti-Poverty Programs and Work Incentives

- Many policies for the poor have the unintended effect of discouraging work.

- A person discouraged from working loses the on-the-job training that a job might offer.

- Children will not get to see their parents with a full-time job and this may impair their own ability to find and hold a job when they get older.

- One possible solution would be to gradually phase out the benefits gradually as the family's income level rises.   However, this would raise the costs of these programs substantially.

- In 1996, the US government passed a welfare-reform law that limits the amount of time that any person can collect welfare. After the passage of this law, welfare rolls decreased. In addition, there was a large increase in the employment levels among those groups traditionally on welfare.

References:

1. Census and Statistics Department (2007), *2006 By-census Thematic Report: Household Income Distribution in Hong Kong*

2. Mankiw, N G (2006), *Principles of Economics*, 4th edition, Thomson, South-Western. Chapter 7, 19, 20

3. Parkin, Michael. (2009), *Foundations of Economics*, 4th edition, Pearson, Chapter 6

4. Todaro, M. P. and Smith, S.C. (2009), *Economic Development*, Harlow: Addison Wesley, pp. 210-6.

5. 'Inequality in Hong Kong' http://www.hkdf.org/pr.asp?func=show&pr=169 (Access on 9 June 2009).