Chapter 55: equity in distribution of income (2.3)

Key concepts
- Definitions of equality and equity
- Failure of market system
- Lorenz curve and the Gini coefficient
- Causes and consequences of poverty
- Equity through taxes – redistribution of income
- Transfer payments and services in kind
- Evaluation of equity policies

HL extensions
- Calculating the marginal tax rate
- Calculating the average tax rate

| The meaning of equity in the distribution of income | Explain the difference between equity in the distribution of income and equality in the distribution of income
| | Explain that due to unequal ownership of factors of production, the market system may not result in an equitable distribution of income
| Indicators of income equality/inequality | Analyse data on relative income shares of given percentages of the population, including deciles and quintiles
| | Draw a Lorenz curve and explain its significance
| | Explain how the Gini coefficient is derived and interpreted
| Poverty | Distinguish between absolute poverty and relative poverty
| | Explain possible causes of poverty including low incomes, unemployment, lack of human capital
| | Explain possible consequences of poverty including low living standards, lack of access to health care, and lack of access to education
| The role of taxation in promoting equity | Distinguish between direct and indirect taxes, providing examples of each, and explain that direct taxes may be used as a mechanism to redistribute income
| | Distinguish between progressive, regressive and proportional taxation, providing examples of each
| Other measures to promote equity | Explain that governments undertake expenditures to provide directly, or to subsidize, a variety of socially desirable goods and services, including health care services, education and infrastructure that includes sanitation and clean water supplies, thereby making them available to those on low incomes
| | Explain the term transfer payments, providing examples including old age pensions, unemployment benefits and child allowances
| The relationship between equity and efficiency | Evaluate government policies to promote equity (taxation, government expenditure, and transfer payments) in terms of their potential positive or negative effects on efficiency in the allocation of resources
“The avoidance of taxes is the only intellectual pursuit that still carries any reward.” J. M. Keynes

- **Definitions of equity and equality**

  Equity in economics is a concept meaning ‘fairness’ and ‘justice’, for example, that everybody should have the same right to work, own property and start a company – regardless of gender, ethnicity etc. There would then be fairness in the distribution of output, e.g. a just proportion of wealth to each and every citizen. **Equality**, on the other hand, would mean that everyone would have the same ability to work, own property and start a company – all would get equal portions of the wealth created.

  ![Definition: “equity”](image)
  The concept of **equity** in economics deals with the highly normative concept of *fairness in the distribution* of wealth and income. Most countries have customs, laws and traditions aimed at giving disadvantaged members of society ‘fair shares’.

  ![Definition: “equality”](image)
  **Equality** deals with *spreading wealth and income equally*, regardless of position or income in society.

Economics must often deal with the questions of equity:

- Should the rich be taxed proportionately more than the poor and middle-classed? Should they pay more for university education?

- Is it better to tax consumption (value-added taxes, VAT, for example) or income (taxes on profits and dividends)?

- To what extent should the socially/economically disadvantaged be given additional resources at the expense of the economically advantaged – i.e. transfers of income and wealth aimed at evening-out income disparities?

- **Lorenz curve and the Gini coefficient**

  In *diagram 1 (figure 55.1)*, the Y-axis shows the cumulative (= collective, summed-up) percentage of total income and the X-axis shows the cumulative percentage of all wage earners. The 45 degree line is the line of perfect equality, i.e. a country where 1% of income goes to 1% of wage earners, 2% of income goes to 2% of wage earners and so forth along the line. The upward-sloping curve is a Lorenz curve, in this case showing that income distribution is rather uneven. The farther away the Lorenz curve is from the line of perfect equality, the more unequal the income distribution. In the example above, the bottom 20% (the first quintile) of wage earners accounts for just 2.8% of total income; the second quintile accounts for 6.4% of income (9.2% - 2.8%); and skipping the next two, the top quintile of wage earners accounts for 61.1% of all income.
Figure 55.1 I – III Lorenz curves

(Type 4 Smaller heading) Gini coefficient

If income were perfectly distributed then the Gini coefficient would be 0. If one wage earner accounted for 100% of income, the coefficient would be 1. The higher the Gini coefficient, the more unequally income is distributed. According to the World Bank in 2007, Brazil had a Gini coefficient of 0.57 while Switzerland had 0.33. The table in figure 55.2 shows these and a few other Gini coefficients for comparison.
**Figure 55.2 Gini coefficients, selected countries**

<table>
<thead>
<tr>
<th>Country [year of survey]</th>
<th>Gini coefficient</th>
<th>Lowest quintile (1)</th>
<th>Highest quintile (2)</th>
<th>Kuznets ratio [(2) / (1)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil [2004] (see diagram)</td>
<td>0.57</td>
<td>2.8%</td>
<td>61.1%</td>
<td>21.8</td>
</tr>
<tr>
<td>Honduras [2003]</td>
<td>0.56</td>
<td>3.4%</td>
<td>58.3%</td>
<td>17.1</td>
</tr>
<tr>
<td>Jamaica [2004]</td>
<td>0.38</td>
<td>5.3%</td>
<td>51.6%</td>
<td>9.7</td>
</tr>
<tr>
<td>Sweden [2000]</td>
<td>0.25</td>
<td>9.1%</td>
<td>36.6%</td>
<td>4.0</td>
</tr>
<tr>
<td>Switzerland [2000] (see diagram)</td>
<td>0.33</td>
<td>7.6%</td>
<td>41.3%</td>
<td>5.4</td>
</tr>
<tr>
<td>Luxembourg [2002]</td>
<td>0.27</td>
<td>9.4%</td>
<td>36.5%</td>
<td>3.9</td>
</tr>
</tbody>
</table>


**Definition: “absolute poverty”**
When people lack the basic resources required to meet basic needs such as food and clothing, one speaks of *absolute poverty*. The World Bank uses a basic metric for a cross-country definition; 1.25USD per day.

**Definition: “relative poverty”**
*Relative poverty* means having an income below a set median or average, say less than 50% of the median income. This normative concept varies between countries.

Perhaps the most obvious indicator of lack of development is *poverty*. The UN Millennium Goals of 2000¹ set down a number of development goals, and at the top of the list was to reduce the amount of people living on less than $US1 (at PPP) per day by 50% by the year 2015. There were close to 1.2 billion people living below this absolute poverty line at the time of the Millennium Summit, and many of them face a predicament known as the *poverty cycle* or *poverty trap*.²

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² See for example the *HDR 2003*, page 41
Low savings in developing countries results in…

- …scarcity of investment funds – the investment funds needed by firms to increase output and build infrastructure – and low investment,…
- …which is central to a country’s output potential, will hamper economic growth, e.g. result in low national income…
- …and since income provides the proportion used for savings, there will be low…

**Figure 55.5 The poverty cycle**

![The poverty cycle diagram](image)

The cycle is enhanced by two additional forces:

1. Firms’ investment plans are to a certain extent based on predicted consumption levels by households and investment by other firms. A low level of consumption will feed through to continued low investment levels.

2. Low investment (in both fixed and human capital) will stifle productivity gains in the economy and keep real wages low. This too will exert a negative force on incomes and consumption.

- **Equity through taxes – redistribution of income**

  Adam Smith laid down the ‘Canons (= standards, rules) of taxation’ in his magnum opus *The Wealth of Nations*. According to Smith, taxes should have four main characteristics:

  1) **Certainty** – those paying should know how much they are paying

  2) **Convenience** – they should be easy to collect

  3) **Economy** – they should be cheap to collect relative to their yield, i.e. ‘cost-efficient’

  4) **Equity** – the sacrifice should be equally felt by those being taxed. (Another issue is of course that the overall effects of taxation should not be counterproductive in terms of the goals of economic policies – see automatic stabilisers in Section 3.5. under ‘fiscal policy’.) Smith was referring to both efficiency and equity, where the cost of collecting the tax deals with efficiency and the ability to pay deals with equity.

  **(TYPE 3 MEDIUM HEADING) HORIZONTAL AND VERTICAL EQUITY**

  Equity in tax terms means ‘fairness’ of the taxes levied, i.e. that the sacrifice or burden should be felt equally amongst those paying. **Horizontal equity** is ‘treating equals equal’ – for example when IB students
get the same amount of time to complete their exams, or workers of equal experience and training are paid the same regardless of sex or age. This concept of ‘equality for equals’ would also apply in tax levies, where two people having the same income should pay the same tax.

**Vertical equity** involves ‘treating different people differently’ in order to enhance ‘fairness’. Continuing with the examples given above; a student with a writing disability can be granted the right to 15 extra minutes in exams and minority groups can be given preferential treatment in job applications. In both these examples, the different treatment of different people can help to even out inequities. In applying vertical equity to taxes, less tax would be paid by low income earners while more tax would be paid by high income households. You no doubt realise that any form of the term ‘equality’ applied to tax rates is highly normative in nature.

**(TYPE 3 MEDIUM HEADING) DIRECT TAXATION**

Direct taxes on income are associated with two main economic effects.

1) The first is the *redistribution effect*, whereby income tax is collected and then redistributed to other (less fortunate) members of society. Note that this is not only in the form of money (see ‘transfer payments’ below) but also in the form of health care, education and road networks (‘benefits in kind’ below).

2) The second effect is the possibility of a *disincentives effect*; when taxes on income increase at higher income levels, workers might not view additional working hours as worthwhile. It is also possible that an unemployed person gets a job and incurs a net loss of disposable income when income tax is paid at the same time as various social benefits disappear – this is a form of *poverty trap* for low income households. In addition, there is the possibility of a **black labour market** when increasing tax levels create an incentive for workers to avoid taxes by not reporting income to the tax office.

**(TYPE 3 MEDIUM HEADING) INDIRECT TAXATION**

Indirect taxes affect supply which implies that market equilibrium is negatively affected; the supply curve for the good shifts left. While the case is often that this causes a misallocation of resources (and deadweight loss), we have also seen that in fact taxes might serve to decrease negative externalities and therefore instead increase allocative efficiency.

**Definition: direct and indirect taxes**

*Direct taxes* are levied on economic agents’ income, wealth or property. Firms pay profit tax and labour tax. Households pay income tax, capital gains tax and property tax.

*Indirect taxes* are levied on consumption and expenditure. Value-added tax, excise duties (special taxes on tobacco and alcohol) and tariffs (taxes on imports) are examples of indirect taxes.

**(WARNING!** Many students confuse *tariffs* with *excise* duties. Perhaps it is because “duties” is so easily associated to “Duty free”! Whatever the origin of the confusion, an excise duty is a tax on “bads”, e.g. alcohol, tobacco and petrol. Oh, one of my American students informed me that there is often an excise duty on *gambling* in the US. I looked it up – he’s quite right.)

**(TYPE 3 MEDIUM HEADING) PROGRESSIVE TAX**
For example, say that income tax on the first €2,000 is zero but 15% on any income above this. Earning €3,000 would mean that income tax would be paid only on the additional €1,000 – the amount exceeding the threshold of €2,000. This is the marginal tax rate. Tax at an income of €3,000 would be €1,000 \times 0.15 = €150. (However – take heed! – the average tax on income is of course total tax paid over total income; €150 / €3,000 = 5%.)

The progressive taxation element in this method of income taxation is that higher income brackets will mean higher percentage tax paid. Continuing with the example, say that the tax rate progressively increases to 20% for income above €5,000 but below €10,000, and that a person’s income increases from €5,000 to €7,000. The marginal tax on the €2,000 above the €5,000 tax bracket is €400 while the average tax paid will be €3,000 \times 0.15 + €2,000 \times 0.2 = €850. The tax rate then increases at every higher income bracket. This is illustrated in the upward sloping – progressive – curve in figure 55.7, where the marginal tax rate is of course the slope of the curve.

(TYPE 3 MEDIUM HEADING) PROPORTIONAL TAXES

A proportional tax is exactly what it sounds like; a percentage of income paid in tax. Since the percentage is unchanged at higher income levels, there is no marginal tax effect and any rise in income will add to total tax payment at a constant rate, so average tax rate is unchanged. In other words, the proportional tax curve will have a constant slope, as illustrated in figure 55.7. Capital gains, corporate profits and dividends are types of income which are frequently taxed on a proportional basis.

(TYPE 3 MEDIUM HEADING) REGRESSIVE TAXES

Just as indirect taxes can be ‘flat rate’ – such as unit taxes on wine – direct taxation can consist of a fixed sum which does not change as income rises, which means that average taxes paid fall as income rises. A regressive tax means that the average proportion of tax paid on income or profit falls as income/profit increases. For example, a yearly business registration tax of £1,000 for a small corner shop with £20,000 in profit means 5% average tax. For Imperial Tobacco Group PLC, the £423 million in profit in 2002 would mean that the registration tax is on average 0.00023%. Since the average tax payment as a proportion of income is falling, the regressive tax curve will become successively shallower, shown below in figure 55.7.

Figure 55.7 Progressive, proportional and regressive taxes

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3 Annual report Imperial Tobacco PLC at http://www.imperial-tobacco.com
Transfer payments and services in kind

Evaluation of equity policies

For example, a unit tax of €2 per litre of alcoholic beverage will have a far greater real income effect on Otto Normalverbraucher⁴ purchasing a €3 six-pack of beer than it will have on Countess Antoinette du la Monet⁵ buying a €150 bottle of 1966 Chateau Neuf du Pape. In effect, a flat-rate tax expenditure tax will have strong regressive tax effects on poorer groups.

As for income taxes, where is it written that higher income must lead to higher proportion of tax – when in

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⁴ German for ‘Joe Average’
⁵ Pronounced ‘de Money’
fact a proportional tax already means that higher income leads to more tax payments?! The argument for progressive income taxes (‘higher income = higher percentage tax’) is highly normative, in that there is an evening-out effect of incomes which is ‘fair’ to society in general.

**HL extensions**

- **Calculating the average tax rate**

  The table in *figure 55.8* outlines three income brackets of between £10,000 and £200,000. Assume that taxes are levied at a regressive, proportional or progressive rate. The flat rate and proportional taxes should be no problem filling in.

*Figure 55.8 Summary of income taxes*

<table>
<thead>
<tr>
<th>Tax payments on a gross income of:</th>
<th>£10,000 – 20,000</th>
<th>£20,001 – 40,000</th>
<th>£40,001 -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regressive tax (flat rate £1,500)</td>
<td>£1,500 xx%</td>
<td>£1,500 xx%</td>
<td>£1,500 xx%</td>
</tr>
<tr>
<td>Proportional tax (15%)</td>
<td>£xxx 15%</td>
<td>£xxx 15%</td>
<td>£xxx 15%</td>
</tr>
<tr>
<td>Progressive tax (rates of 15%, 30%, 40%)</td>
<td>£xxx 15%</td>
<td>£xxx 20%</td>
<td>£xxx 30%</td>
</tr>
</tbody>
</table>

Using the *progressive* income tax tiers, calculate the total income tax paid by Bob (gross income of £19,000), Lisa (£35,000) and Leslie (£75,000).

- **Calculating the marginal tax rate**

  Progressive taxes mean a higher percentage tax paid on higher incomes. (In Sweden we say ‘the tax on the last SEK100 earned’ if this helps.) Thus, for incomes up to £20,000 the tax is 15% but any income in the next two tiers will have a higher average tax rate. The marginal rate is calculated by taking the change in total tax paid divided by the change in income, times 100; \((\Delta T/\Delta y) \times 100\). Note that the marginal rate will stay the same moving from £12,000 to £14,000 within the same tax tier (15% on the additional £2,000) but will be higher when moving into the next tier.

- Bob’s gross income increases from £19,000 to £21,000. Calculate the marginal tax rate on the additional £2,000. (See footnote for some help.)
- Calculate Lisa’s marginal tax when her gross income increases from £35,000 to £44,000.

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6 Bob is initially paying 15% on £19,000; £2,850. At £21,000 he will pay 15% on £20,000 and 30% on the £1,000 in the higher tax bracket. Add these two values and you get the *new average tax* paid. Deduct original average tax paid (£2,850) and you have the numerator in the marginal tax formula. Stick in the denominator (change in income of £2,000) and multiply by 100.
12,000 is 1,800 and 14,000 is 2,100. Increase in tax is 300 and increase in \( y \) is 2,000; this is a 15\% tax. \( \Delta y = 2,000 \)\ldots new tax is \((20,000 \times 0.15 + 1,000 \times 0.3) = £3,300\)

- Old tax is 2,850
- \( \Delta T; 3,300 - 2,850 = 450 \)
- \((450 / 2,000) \times 100 = 22.5\% \)
Summary and revision

1. **Equity** is the normative concept of “fairness” in the distribution of wealth and income.
   a. **Horizontal equity** means ‘treating everyone the same’ – everyone over 18 gets a vote and nobody can be denied entrance to university based on sex or income.
   b. **Vertical equity** is treating some individuals differently to create ‘fairness’ – such as a parliamentary quota system for women (50% of MPs in Norway must be women) and preferential university entrance for minority groups.

2. **Equality** means equal shares of wealth and income.

3. Income inequity is often seen as a **failure of the market system**.

4. The **Lorenz curve** measures inequality of income distribution by plotting out the cumulative percentages of income and cumulative percentages of households. The line of perfect equality means that 1% of households receive 1% of income, 5% of households receive 5% of income…etc. The further away from the line of perfect equality a country’s Lorenz curve is, the more unequal the distribution of income.

5. The **Gini coefficient** is based on the Lorenz curve. It measures the area between the Lorenz curve and the line of perfect equality as a proportion of the total area under the line of perfect equality. Values can range from 0 to 1 where the higher the value the worse the distribution of income.

6. **Poverty** has many causes – primarily the effects of low incomes. Low savings rates and investment lead to low income (poverty trap) which perpetuates low levels of governments spending on merit goods and infrastructure…and thus low incomes.

7. **Effects of poverty** are low standards of living and lack of opportunities. This means malnourishment, poor education, low paying jobs, poor health, low life expectancy and destruction of natural resources.

8. **Direct taxes** are taxes going directly to government from the taxpayer, for example income tax, profit (corporate) tax and capital gains tax (tax on profits made selling shares or a house).
9. **Indirect taxes** are taxes based on a *transaction* and go from taxpayers (e.g. consumers) via firms to government – expenditure taxes such as ad valorem (value-added) taxes and excise duties are indirect taxers.

10. A **progressive** tax means that the average *proportion of tax paid increases* as income rises. **Proportional** tax has the *same percentage* average tax at every level of income. **Regressive** tax means that the *average tax decreases* as a percentage of income decreases as income rises.

11. Governments commonly intervene in markets to **increase equity** via various forms of *income re-distribution*. Common methods are *taxes on luxury goods; subsidies* for basic necessities such as milk and rice; hugely *differentiated property taxes; marginal tax rates;* various forms of *transfer payments* (social benefits and housing allowances for example); and *services in kind* (public and merit goods whose benefits are highly regressive – lower income groups benefit proportionally more than higher income groups).

**HL extension**

12. The **average tax rate** is calculated as the average tax paid divided by total income times 100 (*Rory; what the hell is the Anglo version in math-speak for “average”?! We always used Ø but this is wrong in English.*) \([\frac{ØT}{y}] \times 100\)

13. The **marginal tax rate** is calculated by dividing the change in tax paid by the change income times 100 \([\frac{∆T}{∆y}] \times 100\)