Income Distribution

AP Microeconomics | Unit 6 | quintiles, the Lorenz curve, the Gini coefficient

1. Five equal groups

Line up all households from poorest to richest and cut the line into five equal groups (**quintiles**, 20% of households each). Then find each group's share of total income.

group of households	share of all income	cumulative share
poorest 20%	5%	5%
second 20%	10%	15%
middle 20%	15%	30%
fourth 20%	25%	55%
richest 20%	45%	100%

Cumulative is the running total: the poorest 40% together receive $5\% + 10\% = 15\%$.

2. The Lorenz curve

Lorenz curve

Horizontal axis: cumulative % of households. Vertical axis: cumulative % of income.

- The diagonal is the **line of equality** (20% of households have 20% of income).
- The Lorenz curve joins the cumulative points: here $(20, 5)$, $(40, 15)$, $(60, 30)$, $(80, 55)$, $(100, 100)$. It always runs from $(0, 0)$ to $(100, 100)$.
- **The further the curve sags below the line, the more unequal the distribution.**

3. The Gini coefficient

Let A be the area between the line of equality and the Lorenz curve, and B the area under the curve.

$$\text{Gini} = \frac{A}{A + B}$$

0 is perfect equality (the curve lies on the line); 1 is perfect inequality (one household has everything). *Example:* $A = 0.19$, $B = 0.31$, so Gini $= 0.19/0.50 = 0.38$.

If taxes and transfers move the Lorenz curve closer to the line, A shrinks and the Gini coefficient **falls**.

4. Why incomes differ, and what taxes do

Sources of inequality: human capital (education, training, experience), the demand for different skills, inherited wealth and ownership of capital, discrimination, market power, luck.

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tax as a share of income	$20,000	$100,000	effect on inequality
progressive (rate rises)	10%	30%	reduces it
proportional (same rate)	20%	20%	unchanged
regressive (rate falls)	10%	2%	increases it

A flat $2,000 from everyone is *regressive*: 10% of $20,000 but 2% of $100,000. Judge a tax by the percentage of income, not the dollars.

5. Tax rates, transfers, and one Gini

Marginal vs average rate. The marginal rate is the tax on the next dollar; the average rate is total tax divided by total income. With 10% on the first $40,000 and 30% above it: at $40,000 the tax is $4,000 (10% marginal and average); at $100,000 it is $0.10(40{,}000) + 0.30(60{,}000) = \$22{,}000$, a 30% marginal but 22% average rate. A tax is **progressive** when the *average* rate rises with income; raising the marginal rate only on very high incomes makes the system more progressive.

Targeted transfers. Income $100 billion split 5, 10, 15, 25, 45%; a $5 billion budget. Giving $1 billion to each fifth raises the poorest fifth's share to 5.7%; giving all $5 billion to the poorest fifth raises it to 9.5%. Means-tested or phased-out transfers pull the Lorenz curve closer to the line of equality and lower the Gini coefficient more than equal payments of the same cost.

One Gini, different curves. Cumulative shares 2, 12, 30, 60 and 8, 18, 30, 48 (at 20, 40, 60, 80%) give the same Gini, about 0.38, yet the curves cross: a single number cannot show where the inequality is.

Where students lose points

1. Plotting each group's own share: the Lorenz curve uses cumulative shares.
2. Reading a point wrong: $(40, 15)$ means the poorest 40% have 15% of income.
3. Reversing Gini: closer to 0 is more equal, closer to 1 is less equal.
4. Gini as A/B: it is $A/(A+B)$.
5. Judging a tax by dollars paid: progressive and regressive are about the rate.

Now practise it

Theory sticks once you use it. On **sad-academy.com** you'll find practice questions for this exact subtopic in the AP format, and an AI that grades your free-response answers against the scoring guidelines, the way an AP reader would.

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