

Problem set 6

Government

1. (10 points). Explain why the example of North and South Korea was used to illustrate the importance of regime for economic growth.

The starting point for both countries was in 1953, when both were devastated after the war, had similar natural resources and similar levels of education. So **the main difference between the two countries was the regime**. By the year 2000 South Korea had GDP/cap 16 times higher than that of North Korea.

2. (10 points). List 3 types of market failure in which government intervention might be justified.

The 3 types mentioned in the text are: (1) public goods, (2) externalities, and (3) monopolies. There are other types of market failure, for example “asymmetric information”.

Remark: Notice that when market failure exists this does not mean that the government **must** intervene, but rather government intervention **might be justified**. Also, it is important to realize that there are many kinds of government intervention and we need to study economics in order to understand the consequences of each type of intervention.

3. (10 points). Why do some economists oppose government intervention in markets, even when there is evidence of market failure?

When government intervenes in the market activity, the original market failure is often replaced by **government failure**, which in many cases much worse than the original problem.

Example. Suppose that there are externalities present in a market and economic theory says that **corrective taxation** can resolve the problem. Often times when a government agency is established to monitor the industry, calculate the necessary taxation and collect the taxes, the waste of the government agency itself exceeds the cost of the negative externality.

4. (10 points). List 3 reasons why governments sometimes do things that are bad for growth.

Three reasons:

- i. Governments have goals other than promoting growth (strong military, income equality).
- ii. Kleptocracy (rule by thieves). The government officials have incentives to do things that would increase their own wealth.
- iii. Self preservation. New ideas and new technologies are often perceived as a threat to the existing regime.

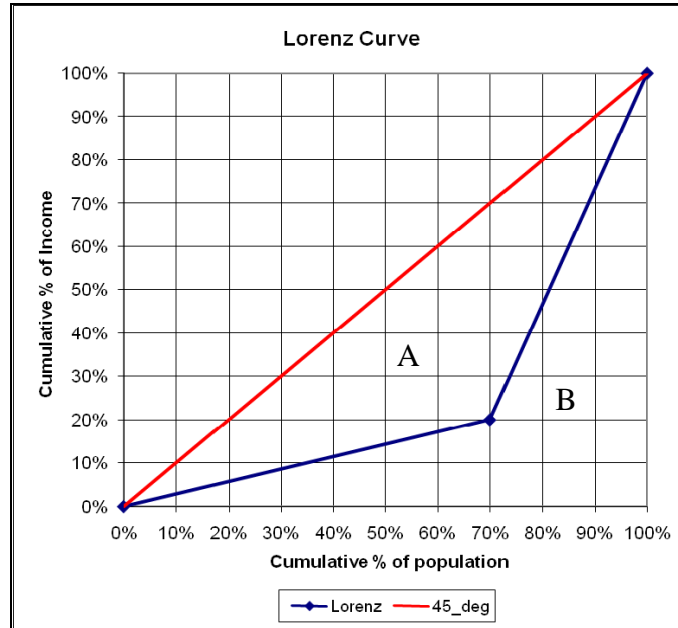
5. (10 points). Give an example of a dictator who promoted growth and innovation. Emperor Meiji (1868 – 1912), turned Japan into a world power during his 45 years of ruling.

Income Inequality

6. (20 points). Suppose that in some country the poorest 70% of the population is earning \$40 in total, and the top 30% of the population is earning \$160 in total.
 a. (10 points). Draw the Lorenz curve for this country.

Notice that the poorest 70% of the population are earning $\frac{40}{40+160} = 20\%$ of the income in the economy. The richest 30% therefore, are earning 80% of the income in the economy.

The Lorenz curve is:



- b. (10 points). Compute the Gini coefficient for this country.

$$B = 0.2 \cdot 0.7 \cdot 0.5 + 0.2 \cdot 0.3 + 0.3 \cdot 0.8 \cdot 0.5 = 0.07 + 0.06 + 0.12 = 0.25$$

$$A = 0.5 - 0.25 = 0.25$$

$$Gini = \frac{A}{A+B} = \frac{0.25}{0.5} = 0.5$$

7. (20 points). Suppose that your utility from income is $u(w) = \sqrt{w}$. With probability 0.5 people are born rich and have income of \$1000, and with probability 0.5 people are born poor and have income of \$100. Before birth, people do not know if they will be born rich or poor.

- a. Calculate the expected utility of an individual before birth.

$$E[u(w)] = 0.5\sqrt{100} + 0.5\sqrt{1000} = 20.81$$

- b. Suppose that the government introduces a progressive tax system, which taxes rich at 40%, and transfers to the poor. Calculate the expected utility of an individual before birth, with this tax system.

Now the poor's after-tax income is \$500, and rich after-tax income is \$600. The expected pre-birth utility is:

$$E[u(w)] = 0.5\sqrt{500} + 0.5\sqrt{600} = 23.428$$

- c. Prove that in the economy described in this question, expected pre-birth utility is maximized when the tax rate on the rich is 45%.

$$\max_t E[u(w)] = 0.5\sqrt{100 + 1000 \cdot t} + 0.5\sqrt{1000(1-t)}$$

$$\frac{dE[u(w)]}{dt} = 0.5 \cdot \frac{1}{2} \cdot (100 + 1000t)^{-\frac{1}{2}} \cdot 1000 - 0.5 \cdot \frac{1}{2} \cdot (1000(1-t))^{-\frac{1}{2}} \cdot 1000 = 0$$

$$100 + 1000t = 1000(1-t)$$

$$100 + 1000t = 1000 - 1000t$$

$$2000t = 900$$

$$t = \frac{9}{20} = 0.45 = 45\%$$

Notice that the after-tax income of poor and rich is the same: \$550.

- d. What is the key assumption in this model that leads to the result that perfect equality of income is optimal?

The assumption that the **only** source of income inequality is luck. There is no doubt that luck determines to some degree whether a person becomes rich or poor. However, other factors are important as well. For example hard work, wise decisions/choices, sacrifice. With these other factors, perfect income redistribution reduces the incentives to work hard, make wise choices, and sacrifice for success.

8. (20 points). Suppose that people derive utility not only from their own consumption, but also from their **relative** position to the average consumption. In particular, individual i 's utility function is:

$$u\left(x_i, \frac{x_i}{\bar{x}}\right) = \ln\left(x_i \cdot \left(\frac{x_i}{\bar{x}}\right)^e\right)$$

Here $e \geq 0$ is the envy parameter.

- a. Suppose that the average income had goes up by 5% and at the same time the income of individual i had gone up by 2%. Is individual i better off when the envy parameter is $e = 0.25$?

Let $\gamma = 0.02$ be the individual i income growth, and $g = 0.05$ be the average income growth. We showed in class that individual i is better off if

$$\gamma \geq \frac{e}{1+e} g$$

In this case, $e = 0.25$, we have

$$\frac{e}{1+e} g = \frac{0.25}{1+0.25} 0.05 = 0.2 \cdot 0.05 = 0.01$$

Since $\gamma = 0.02 \geq 0.01$ individual i is better off.

- b. Is individual i better off when the envy parameter is $e = 1$?

If the envy is $e = 1$, we have

$$\frac{e}{1+e} g = \frac{1}{1+1} 0.05 = \frac{1}{2} \cdot 0.05 = 0.025$$

Since $\gamma = 0.02 < 0.025$ individual i is NOT better off.

Discussion. The point of this question is to demonstrate that when individual income is growing, that does not mean that the individual is better off. When individuals care not only about their own income, but also about their relative position with respect to the average, then they might be worse off despite an increase in their own income. In this example, the parameter e (“envy”), captures the degree to which the individuals care about their relative income. In part a, the envy was small ($e = 0.25$), and individual i was better off after the growth. In part b, envy was larger ($e = 1$), and individual was not better off after the growth. This model can explain in part why low income people, say the bottom 20%, might not be unhappy despite a positive growth in their income – when the richer quintiles’ income is growing much faster than theirs. This model therefore presents an explanation for the “**Occupy Movement**” protests.