

1 A brief repetition

In last class, we showed how a welfare state could increase efficiency.

Assume that income of individuals is given by

$$Y = \theta_1 \theta_2 w - C + r\bar{K}.$$

where θ_1 reflects inborn characteristics and θ_2 characteristics that are developed later in life.

θ_1 and θ_2 cannot be privately insured.

If the government uses redistribution, then the income is equal to

$$Y = \theta_1 \theta_2 w(1 - \omega) - E(C) + T + r\bar{K}$$

The expected value is

$$E(Y) = w - E(C) + r\bar{K}.$$

Note that the tax level, T , is deterministic.

The standard deviation is

$$S(Y) = S(\theta_1\theta_2)w(1 - \omega).$$

The punchline is that more redistribution (a higher ω) reduces the standard deviation which increases utility for risk averse people.

In a model of open borders we showed that each country has incentive to undercut the taxes of the other countries.

The equilibrium condition was

$$w(\theta_1\theta_2 - \omega_i(\theta_1\theta_2 - 1)) = w(\theta_1\theta_2 - \omega_j(\theta_1\theta_2 - 1))$$

If country i reduces ω_i it will attract those who happened to get a high θ_1 and θ_2 .

This erosion of the welfare state is problematic because the inborn risk from θ_1 as well as risk that comes later θ_2 cannot be insured against privately.

In equilibrium, the standard deviation of the income is

$$S(Y) = S(\theta_1\theta_2)w$$

We also studied some recent empirical evidence, which shows that immigration from the east has not (yet) eroded the welfare states in Sweden and Ireland.

High migration costs could be a reason for this.

Here comes a model of the welfare state with endogenous migration costs.

2 Mobility and the Role of Education as a Commitment Device (Übelmesser and Thum, 2003)

- There are two countries i and j .
- In each country there is an old generation and a mobile young generation.
- Members of each generation are homogenous.
- Both countries compete for the young individuals by setting a proportional wage tax rate.
- These tax rates can be different for the domestic individuals a country wants to keep and the foreign individuals a country wants to attract.

- The tax rate that is levied on the young in country i is given by t_i .
- The tax rate in country j levied on the young who comes from country i is given by t_i^j .
- The old generation raises these taxes that have to be paid by the young generation.
- They can also decide the educational curriculum.
- So the state is completely gerontocratic (the state is governed by old people).
- The old guys are completely non-altruistic. That is they do not care at all about the young.

- The reason why the old care about the educational curriculum is that migration costs can be created.
- A way to increase migration costs would be to expand the number of university students in law. This education has a home bias.
- By focusing on subjects like foreign languages, the migration costs will be reduced.
- Production in country i is determined by

$$Y_i = F_i(L_i).$$

- The marginal productivity with respect to labor in country is given by

$$\frac{\partial F_i}{\partial L_i} = m_i.$$

Timing

- In the first stage, the old generation decides about the composition of the educational program, γ_i .
- A higher γ_i implies a more domestically oriented educational structure.
- At the second stage, each member of the young generation chooses the amount of education Z_i .
- The cost of education is given by $c(Z_i) = Z_i^2$.

- The amount of education multiplied by the part of the skills that increases domestic productivity γ_i can be interpreted as an investment in domestically valuable human capital, I_i .
- At the third stage, the old generation in country i sets the proportional wage tax, t_i . The old generation in country j sets the tax rate that young persons from country i has to pay if they emigrate, t_i^j .
- At the fourth stage, the members of the young generation decides whether to emigrate or to stay in the home country.

We solve the game by backward induction.

2.1 Stage 4: Migration decision

Each member in the young generation compares the wage in the home country i to the wage in a foreign country j .

The net wage at home is

$$w_i = m_i \gamma_i Z_i (1 - t_i)$$

The net wage for an individual from country i in country j is given by

$$w_i^j = m_j (1 - \gamma_i) Z_i (1 - t_i^j)$$

In equilibrium, the net return to human capital in the both countries has to be equal.

In order to keep the young of the home country or to attract the young from the other country respectively, the old generations in both countries engage in tax competition.

Concerning the young generation of country i , the old generation has an advantage by disposing of two instruments - the tax rate t_i and the structure of the human capital γ_i .

Given a sufficiently high γ_i , the domestic old generation can always force the foreign tax rate on the young people from the home country to zero.

So in equilibrium we have $t_i^j = 0$ where all young individuals from country i are staying in their home country.

So in equilibrium we have

$$m_i \gamma_i Z_i (1 - t_i) = m_j (1 - \gamma_i) Z_i$$

The net wage at home is equal to the net wage in the foreign country.

2.2 Stage 3: Tax decisions

The old generation sets the tax rate such that the young individuals stay at home.

So we solve for the tax rate, t_i , in the previous equation.

$$t_i^* = 1 - \frac{m_j(1 - \gamma_i)}{m_i\gamma_i}.$$

2.3 Stage 2: Education quantity decisions

At the second stage, each young individual decides on the amount of education by maximizing the wage net in country i taking into account the disutility of education.

So a young in country i solves

$$\max_{Z_i} m_i \gamma_i Z_i (1 - t_i^i) - Z_i^2$$

The first-order condition is

$$m_i \gamma_i (1 - t_i^i) - 2Z_i = 0,$$

and the optimal amount of education is

$$Z_i^* = \frac{m_i \gamma_i (1 - t_i^i)}{2}.$$

Not surprisingly, the higher the tax rate the lower is the level of education.

Using the tax rate from stage 2 into the expression for Z_i^* , we get

$$Z_i^* = \frac{m_i \gamma_i (1 - (1 - \frac{m_j (1 - \gamma_i)}{m_i \gamma_i}))}{2}$$

or

$$Z_i^* = \frac{1}{2} m_j (1 - \gamma_i)$$

What happens to the level of education when the skill composition parameter, γ_i , is increased?

A higher value of γ_i , i.e., a more domestically oriented educational structure (more law) decreases the outside option of the young generation.

This allows the old generation to extract a larger part of the gain through taxes without having to fear emigration.

The prospects of higher future taxes, however, decreases the incentives for the young generation to invest in Z_i .

We note that even though the old are very powerful in this model, they cannot influence the amount of education directly, only the structure of γ_i .

2.4 Stage 1: Education structure decision

In the first stage, the old generation maximizes its income from the tax revenue by choosing the educational structure γ_i .

Remember that the old do not care about the young.

So an old guy solves

$$\max_{\gamma_i} m_i \gamma_i Z_i^* t_i^*.$$

Using the expressions for Z_i^* and t_i^* this can be rewritten as

$$\max_{\gamma_i} m_i \gamma_i \frac{1}{2} m_j (1 - \gamma_i) \left(\frac{m_i \gamma_i - m_j (1 - \gamma_i)}{m_i \gamma_i} \right)$$

The first-order condition is

$$\frac{m_i \gamma_i}{2} \left[(1 - 2\gamma_i) \left(\frac{m_i \gamma_i - m_j (1 - \gamma_i)}{m_i \gamma_i} \right) + (1 - \gamma_i) \gamma_i \frac{m_j}{m_i \gamma_i^2} \right] = 0$$

We can finally solve for

$$\gamma_i^* = \frac{m_i + 2m_j}{2(m_i + m_j)}.$$

Here comes intuition for the results.

First of all, because it is assumed that the old are powerful and can decide on the educational curriculum in addition to taxes, they can always make migration costs sufficiently large such that young people stay.

Hence, in this model the welfare state will survive!

However, the old generation does not adopt a curriculum completely based on home skills. ($\gamma_i^* < 1$).

To see this let's study the inequality

$$t_i^* = \frac{m_i + 2m_j}{2(m_i + m_j)} < 1.$$

This holds when

$$m_i + 2m_j < 2m_i + 2m_j,$$

which is always true.

The reason is that old generation selects a combination of the curriculum and taxes on young in the home country such that they stay.

With a higher tax than this the profit to the old generation is equal to zero (they are so old so they cannot work, only rule).

Remember that $Z_i^* = \frac{1}{2}m_j(1 - \gamma_i)$.

Setting $\gamma_i^* = 1$ can never be optimal because in this case the young generation selects no education at all.

The young generation knows that it will then be completely exploited and does not invest in education.

In other words, the old generation therefore gives the young some language classes to stimulate education in order to commit themselves not to take out a too high tax rate in the future.

But they only get language courses to the extent that they still stay in the home country.

Let's finally use the optimal curriculum into the optimal tax rate and level of education.

We get

$$t_i^* = 1 - \frac{m_j \left(1 - \frac{m_i + 2m_j}{2(m_i + m_j)}\right)}{m_i \frac{m_i + 2m_j}{2(m_i + m_j)}},$$

which is equal to

$$t_i^* = \frac{m_i + m_j}{m_i + 2m_j}.$$

A higher productivity of labor in the home country increases the tax rate on the young in the home country.

A higher productivity in the foreign country reduces the tax rate on the young in the home country because the outside option has improved.

As for the level of education we have

$$Z_i^* = \frac{1}{2}m_j \left(1 - \frac{m_i + 2m_j}{2(m_i + m_j)} \right),$$

or

$$Z_i^* = \frac{1}{4} \frac{m_i m_j}{m_i + m_j}.$$

Increasing the productivity of labor in either of the country increases the level of education.

In the home country, this leads to a curriculum more based on foreign markets (because the net wage should be the same in both countries in equilibrium), which boosts education.

When the productivity in the foreign country is increased, then the tax rate in the home country must be reduced, which boosts education.

An implication of the model is that as the outside option of the young generation is increased, the old generation will reduce the tax level in order to make the young stay.

It is argued that this can explain why the higher integration within the European union has not translated into more immigration to Germany from other countries.

This model relies on some strong assumptions.

Do we live in a gerontocratic society? The median age of a German voter is 45.

The basic idea that the old uses the educational system to generate migration costs is a bit exotic.

It is assumed that the old can use one tax rate for the young from the home country another tax rate for the young from the foreign country.

We do not see this. We may see some public goods or subsidies directed to young from the home country though.

It is important that the curriculum decision comes before the tax decision.

This could be motivated by the fact that the curriculum is changed very rarely whereas the tax rate can be adjusted more easily.