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Migration, taxation and educational incentives

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Abstract

Globalization may change migration incentives, and therefore many countries are concerned about preserving their investments in human capital. With lower barriers to migration it is possible to change educational subsidies and taxation to prevent emigration of skilled workers and still maintain educational incentives so that the human capital basis of the labour force remains unaffected. It is shown that this requires a lowering of taxes on (skilled) mobile workers and reduced educational subsidies, and (provided that initial migration is low) a higher taxation of (unskilled) less mobile workers, i.e. the policy shifts has detrimental distributional consequences for unskilled relative to skilled workers.

Keywords: Migration; Inequality; Taxation; Education

JEL classification: F15; J39; J50

1. Introduction

The globalization process affects information flows, cultural differences and language barriers etc. For this reason, policy makers are concerned that in particular the propensity of highly educated to migrate is likely to increase. If so, it has direct consequences not only for labour markets, but also for public finances to the extent that education is subsidized and high income earners pay high taxes (see OECD,

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2003).[1] The concern for the risk of losing human capital is underlined by the perception that globalization will increase the importance of having a well-educated labour force and the tendency to competition between countries over (highly) educated workers. Accordingly it is often suggested in policy debates that changes in policies should be made to attract educated immigration and prevent emigration of especially skilled and highly educated labour. Proposals have been made to lower taxation of highly educated workers to prevent out-migration (and eventually induce in-migration). However, the burden of such a change would fall on groups for which the migration option is less relevant. To counteract this, it is sometimes proposed that educational subsidies should be lowered, i.e. private contribution to education would have to go up. The question is whether there is a subsidy-cum-taxation policy shift, which will preserve educational incentives and prevent emigration in the wake of lower barriers to migration, as well as the consequences of such a policy shift for groups that are not in a position to exercise a migration option.

It is shown that a combination of lower taxation of skilled workers and reduced educational subsidies will maintain educational incentives without leading to more emigration when mobility costs become lower. If the initial migration level is low, taxation of unskilled workers will unambiguously have to increase, i.e. lower barriers to mobility will have detrimental distributional consequences for unskilled relative to skilled workers.

The paper is organised as follows: Section 2 presents a simple, overlapping generations model with educational choices and migration. For simplicity, the migration option is only assumed relevant for educated workers. Section 3 considers how lower barriers to migration can be countered by changes in educational subsidies and taxation as well as the distributional consequences for labour with different migration options. Section 4 offers a few concluding comments.

2. Skill acquisition and migration decisions

Consider two types of labour denoted skilled and unskilled. Becoming skilled requires education, which is associated with various forms of costs. Consider an overlapping generations framework in which education/skills can be acquired as young, and skilled workers therefore only work as "old", while unskilled work both as young and old. A stationary population (normalized to unity for simplicity) is assumed, and stationary equilibria are considered.

Agents can be characterized in terms of two characteristics (j, i) where j indexes attributes related to skill acquisition, and i indexes attributes related to the attitude towards migrating (see below). Let $j \in J \equiv [0, 1]$ and denote the density of the population across characteristics j by $f(j)$ (the i index is defined more precisely below).

The (semi-indirect) utility function of an individual type (i, j) is

$$U(i,j) = V(i,j) - \phi e(j) - \delta c(i)$$

where $V(i, j)$ is the present value of income (see below), $e(j)$ the utility costs of acquiring education ($\phi = 0$ if no education is acquired as young, and $\phi = 1$ if educated), and $c(i)$ the utility costs of migrating ($\delta = 0$ if non-migrant, and $\delta = 1$ if migrant).

[1] Public involvement in education has an implicit insurance element. The investment is made by the public sector, and agents pay back via their future tax payments, which are related to their labour market performance, see e.g. Eaton and Rosen (1980).

2.1. Labour demand

Denote by w_u and w_s the wages of unskilled and skilled workers, respectively, and let the demand for the two types of labour be given by

$$L^s(w^s, w^u, x) \qquad ;L^s_{w^s}<0 \tag{1}$$

$$L^u(w^s, w^u, x) \qquad ;L^u_{w^u}<0 \tag{2}$$

where x denotes other factors of importance for labour demand assumed constant here. Note that it is inconsequential to the issue considered here whether the two types of labour are substitutes or complements (see below).

The public sector taxes labour income to finance a given level of public consumption, education and educational subsidies, cf. below. The tax rate on unskilled is denoted τ_u and the tax rate for skilled τ_s, and allowing for $\tau_u \neq \tau_s$ is a simple way of capturing progression in the taxation system (i.e. $\tau_u<\tau_s$ if $w_u<w_s$).

2.2. Skill acquisition

An agent j chooses to undertake education when young if[2]

$$b + \frac{w_s(1-\tau_s)}{1+r} - e(j) \geq w_u(1-\tau_u) + \frac{w_u(1-\tau_u)}{1+r}$$

where b is a publicly financed grant to students, and e denotes utility costs of acquiring skills (effort, ability etc). Assume that agents are ordered such that $e(j)$ is increasing in j, i.e. the higher j, the larger the utility costs of acquiring education. The interest rate is denoted r, and it should be interpreted as the shadow price of borrowing in the capital market (could capture rationing as in Neary and Roberts, 1980).

It follows that the marginal person becoming educated $\tilde{j} \in J$ is defined by the condition

$$b + \frac{w_s(1-\tau_s)}{1+r} - e(\tilde{j}) = w_u(1-\tau_u) + \frac{w_u(1-\tau_u)}{1+r} \tag{3}$$

and hence a fraction of the population λ chooses education where

$$\lambda = \int_0^{\tilde{j}} f(j)\mathrm{d}j$$

and consequently a fraction $1-\lambda$ chooses not to acquire skills. It is assumed that we have an interior solution, i.e. $0<\lambda<1$, i.e. $0<\tilde{j}<1$. Note that it is assumed that there is no migration option for unskilled workers.

[2] It is assumed, cf. below, that the marginally educated is not the marginal migrant.

2.3. Migration

A skilled person chooses to stay at home provided

$$w_s(1-\tau_s) \geq w_s^*\left(1-\tau_s^*\right) - c(i,z)$$

where $w_s^*(1-\tau_s^*)$ gives the after tax income available in a foreign country.[3] The c-function gives the utility loss of moving (language adaptation, loss of friends etc.), where the variable z is an indicator for integration between countries. It is assumed that $c_z<0$, i.e. the higher z the more internationally integrated the country, and the utility costs of migration are assumed to be non-increasing in this indicator for all individuals. Denote by $h(i \mid j \leq j^*)$ the density for characteristics i conditional on the individual choosing to become educated ($j \leq j^*$). The marginally skilled person $\hat{i}$ staying at home is thus given by

$$w_s(1-\tau_s) = w_s^*\left(1-\tau_s^*\right) - c\left(\hat{i},z\right) \tag{4}$$

It is assumed that $i^*<j^*$ (i.e. the marginally educated is not the marginal migrant).[4]

Assume that $h(i \mid j \leq j^*)$ is increasing in i—it follows that a fraction ρ chooses to remain at home, where

$$\rho = \int_0^{\hat{i}} h\left(i|j \leq j^*\right) \mathrm{d}i \leq 1$$

2.4. Labour market equilibrium

The labour market equilibrium is given by (population size normalised to one)

$$L^s(w^s, w^u, x) = \rho\lambda$$

$$L^u(w^s, w^u, x) = 2(1-\lambda)$$

2.5. Public budget

The public budget constraint reads

$$\lambda\rho w_s\tau_s + 2(1-\lambda)w_u\tau_u = g + \lambda(b+s)$$

The LHS gives the revenue from taxing skilled and unskilled workers, respectively, and the RHS the expenditures to public consumption (exogenous), and the educational subsidies and the educational expenditures (s) for the fraction of the population becoming educated.

[3] It is assumed that $w_u(1-\tau_u) \geq w_u^*(1-\tau_u^*) - c(i, z)$ for all i, that is, there is no economic incentive for unskilled workers to migrate.

[4] This rules out the possibility that education is only worthwhile contingent on migrating after having been educated. Allowing for this possibility would imply that there always is a loss of skilled workers, and thus for society of investments in human capital. Allowing for this possibility would add a further cost element to the public budget constraint and would complicate the analysis, but not change the distributional conflict analysed.

3. Lower barriers to migration

Consider a given stationary equilibrium $\{w^s, w^u, \tau^s, \tau^u, \rho, \lambda\}$, where $0<\lambda<1$ and $0<\rho\leq 1$. Assume a change in z such that $dc=\frac{\partial c}{\partial z}dz\leq 0$, that is, costs of migration are non-increasing in international integration for all skilled persons (for the marginal person is sufficient). It is now considered which policy changes are needed to maintain unchanged migration (unchanged ρ) and unchanged educational incentives (unchanged λ). Observe that if migration flows are unaffected so will the supply of both skilled and unskilled workers, and therefore the wage rates will be unaffected.

Ensuring unchanged migration incentives requires a reduction in taxation of skilled workers, cf. Eq. (4)[5]

$$\frac{\partial \tau_s}{\partial z}=\frac{1}{w_s}\frac{\partial c}{\partial z}<0$$

Unchanged educational incentives requires cf. Eq. (3)

$$\frac{\partial b}{\partial z}-\frac{w_s}{1+r}\frac{\partial \tau_s}{\partial z}=-\frac{(2+r)w_u}{1+r}\frac{\partial \tau_u}{\partial z} \tag{5}$$

and budget balance requires

$$\lambda\rho w_s\frac{\partial \tau_s}{\partial z}+2(1-\lambda)w_u\frac{\partial \tau_u}{\partial z}=\lambda\frac{\partial b}{\partial z} \tag{6}$$

Hence combining Eqs. (5) and (6), we find

$$\lambda\rho\frac{\partial \tau_s}{\partial z}+2(1-\lambda)w_u\frac{\partial \tau_u}{\partial z}=\lambda\left[-\frac{(2+r)w_u}{1+r}\frac{\partial \tau_u}{\partial z}+\frac{1}{1+r}\frac{\partial \tau_s}{\partial z}\right]$$

$$\left[2(1-\lambda)+\lambda\frac{(2+r)}{1+r}\right]w_u\frac{\partial \tau_u}{\partial z}=\lambda\left[-\rho+\frac{1}{1+r}\right]\frac{\partial c}{\partial z}\lesseqgtr 0$$

It follows that

$$sign\left(\frac{\partial \tau_u}{\partial z}\right)=sign\left(-\rho+\frac{1}{1+r}\right)$$

Hence if $\rho\geq\underline{\rho}\equiv 1/(1+r)$ implying that the initial level of migration is not too large, then lower barriers to migration imply that the tax rate on unskilled has to go up.

It is seen that the lower $1/(1+r)$ (the higher r), the higher b has to be (for given wage differences etc.) to ensure unchanged educational incentives. Therefore the lower $1/(1+r)$ the less does the education subsidy have to be reduced to maintain educational subsidies, and therefore the more likely it is that $\frac{\partial \tau_u}{\partial z}>0$. To put it differently, the more costly it is to acquire education (the higher r), the worse will the effects of improved migration possibilities for the skilled be for the unskilled workers.

[5] Note that this would also ensure that immigration is unchanged in the case of symmetric countries.

It follows that the educational subsidy unambiguously has to be lowered, i.e.

$$\frac{\partial b}{\partial z} = \frac{1}{1+r}\frac{\partial c}{\partial z} - \frac{(2+r)w_u}{1+r}\frac{\partial \tau_u}{\partial z} = \left[\frac{2(1-\lambda)+\lambda\rho(2+r)}{2(1-\lambda)+\lambda\dfrac{2+r}{1+r}}\right]\frac{1}{1+r}\frac{\partial c}{\partial z} < 0$$

Turning to the distributional consequences of the abovementioned policy change, consider the lifetime incomes of skilled (non-migrants) and unskilled, which are given as, respectively

$$V_s = b + \frac{w_s(1-\tau_s)}{1+r}$$

$$V_u = w_u(1-\tau_u) + \frac{w_u(1-\tau_u)}{1+r}$$

It follows straightforward that

$$\frac{\partial V_s}{\partial z} = \frac{\partial b}{\partial z} - \frac{w_s}{1+r}\frac{\partial \tau_s}{\partial z} = \left[\frac{\lambda(2+r)\left[\rho - \dfrac{1}{1+r}\right]}{2(1-\lambda)+\lambda\dfrac{2+r}{1+r}}\right]\frac{1}{1+r}\frac{\partial c}{\partial z}$$

$$\frac{\partial V_u}{\partial z} = -(2+r)\frac{w_u}{1+r}\frac{\partial \tau_u}{\partial z}$$

Hence, the distributional consequences are a zero sum game[6]

$$sign\frac{\partial V_s}{\partial z} = sign\left[\rho - \frac{1}{1+r}\right] = -sign\frac{\partial V_u}{\partial z}$$

i.e. increased mobility will inevitably have distributional consequences. If the change benefits skilled workers, it will unambiguously be to the disadvantage of unskilled workers.

4. Concluding remarks

In the wake of further globalization, it is likely that the barriers to migration may be lower. This raises an important policy question in relation to maintaining educational incentives and preventing emigration of educated workers. It has been shown that it is possible to balance these considerations by lowering taxes on skilled workers (high income) (e.g. less progression in the income tax system) and lowering educational subsidies (larger element of private financing). But this is likely to be accompanied by adverse distributional costs in the sense that taxes levied on unskilled workers have to go up. Measured in terms of lifetime income, skilled workers with a migration option will be better off, and unskilled workers without this option will be worse off.

[6] It is easily shown by use of the public sector budget constraint that the policy change leaves aggregate disposable private income $\lambda\rho w_s(1-\tau_s)+2(1-\lambda)w_s(1-\tau_s)+\lambda b$ unchanged.

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