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**An efficiency argument for affirmative action
in higher education**

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Abstract

In a dynamic framework in which generations are linked by educational background, we identify an intergenerational externality that is larger for disadvantaged groups. This provides an argument for affirmative action in higher education based on efficiency alone.

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An efficiency argument for affirmative action in higher education

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In a dynamic framework in which generations are linked by educational background, we identify an intergenerational externality that is larger for disadvantaged groups. This provides an argument for affirmative action in higher education based on efficiency alone.

Keywords: affirmative action, intergenerational externality

JEL Classification: H21, I28

1 Introduction

Affirmative action in higher education is often explained by colleges and universities valuing diversity of their student bodies (Chan and Eyster, 2003). However, it has been argued that such preferences may imply efficiency costs, as resources are transferred from higher ability students to lower ability students from disadvantaged groups.

In contrast, efficiency enhancing properties of affirmative action have also been suggested. De Fraja (2002) provides an efficiency argument for reverse discrimination based on asymmetric information. Holzer and Neumark (2000) mention the likely existence of community externalities and, in particular, of role-model effects (i.e., educated members of a community may have a positive effect on the education of future generations). This suggests the existence of a positive community-specific intergenerational externality that, to the best of our knowledge, has not been modeled before. Accounting for an externality of this type, and under the assumption that education levels the playing field for families of different background, we show that affirmative action can be justified exclusively on efficiency grounds.

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2 The Model

We consider two coexisting communities differentiated by race R (for instance, black B and white W). Within each community, individuals differ both in their ability to benefit from education and in their family educational background. Ability, denoted by a , is stochastically determined at birth. For simplicity, we consider that a is uniformly distributed between 0 and 1 in both communities. Educational background of an individual is represented by whether the parent is uneducated or educated: $e_{-1} = 0, 1$.

Individuals live for one period. First, they decide whether or not to acquire higher education. Studying entails a financial cost that depends on their race, their ability to benefit from education and on the education of their parents. We assume this cost to be $\gamma_{e_{-1}}^R C(a)$. Belonging to a disadvantaged group, black individuals have to surpass more obstacles, which increases the costs of acquiring higher education. However, we assume that education levels the playing field, so that children of educated parents of any race face identical costs.¹ Accordingly, we posit $\gamma_0^B > \gamma_0^W > \gamma_1^B = \gamma_1^W = 1$ to reflect the fact that education is more costly for children of uneducated parents, and this effect is larger for black children. $C(\cdot)$ is a decreasing and convex function of ability (i.e., $C' < 0, C'' > 0$).

Productivity, and thus wages, depend on education alone. Higher education has a positive effect on wages, so that educated individuals earn higher wages (h) than uneducated individuals (ℓ). Individuals inelastically supply one unit of labour.

The decision to become educated or not is made by comparing income with and without education. For each type, characterized by race R and educational background e_{-1} , it is possible to determine a threshold value of ability above which individuals will acquire higher education. We denote by $\hat{a}_{e_{-1}}^R$ this ability level.

$$\gamma_{e_{-1}}^R C(\hat{a}_{e_{-1}}^R) = h - \ell \quad R = B, W; \quad e_{-1} = 0, 1 \quad (1)$$

At the threshold ability level $\hat{a}_{e_{-1}}^R$, the cost of education equals the gain, in terms of earnings, of attaining higher education. Children with given R and e_{-1} whose ability is larger than $\hat{a}_{e_{-1}}^R$ will invest in higher education. Individuals of ability $a < \hat{a}_{e_{-1}}^R$ will not. From (1) and the assumptions made about $\gamma_{e_{-1}}^R$, $\hat{a}_1^W = \hat{a}_1^B < \hat{a}_0^W < \hat{a}_0^B$.

¹This assumption is made for simplicity of presentation. The weaker assumption $\gamma_1^B - \gamma_1^W < (\gamma_0^B - \gamma_0^W) \frac{\gamma_1^B \gamma_1^W}{\gamma_0^B \gamma_0^W}$ is sufficient, although not necessary, to yield the same qualitative results.

At the end of the period each individual gives birth to another one and dies. Population is thus constant. Given that a is uniformly distributed between 0 and 1, $\hat{a}_{e-1}^R$ denotes the probability of remaining uneducated depending on parental educational background and race. Under the assumptions made we can conclude that, children of educated parents are more likely to gain tertiary education than those of non-educated ones and, among children of uneducated parents, black children are less likely to gain tertiary education than white children of the same ability. The evolution over time of the proportions of educated and uneducated people of race R in this economy can be described by a Markov chain with the following transition matrix:

$$P^R = \begin{pmatrix} \hat{a}_0^R & 1 - \hat{a}_0^R \\ \hat{a}_1^R & 1 - \hat{a}_1^R \end{pmatrix}. \quad (2)$$

Let π_0^R and π_1^R denote, respectively, the proportions of uneducated and educated people of race R in each generation. Once the steady state has been reached, the proportion of educated and uneducated people of each group replicates itself: $(\pi_0^R, \pi_1^R) = (\pi_0^R, \pi_1^R)P^R$. The vector of steady state probabilities is then:²

$$\pi_0^R = \frac{\hat{a}_1^R}{1 - \hat{a}_0^R + \hat{a}_1^R} \text{ and } \pi_1^R = \frac{1 - \hat{a}_0^R}{1 - \hat{a}_0^R + \hat{a}_1^R}. \quad (3)$$

3 The First Best

Let $y_{e-1,e}^R$ be the net income of an individual of race R , family education e_{-1} and education e . We define the first best proportions of educated and uneducated individuals of each race R , $\tilde{a}_0^R$ and $\tilde{a}_1^R$, as those which provide the highest aggregate net income. The government then maximizes $\pi_0^R E y_0^R + \pi_1^R E y_1^R$, where:

$$E y_{e-1}^R = \hat{a}_0^R y_{e-1,0} + \int_{\hat{a}_0^R}^1 y_{e-1,1}^R(a) da \quad (4)$$

stands for the expected utility of children of educational background e_{-1} and race R . After some rearrangements, the optimality condition for interior $\tilde{a}_{e-1}^R$ is:

$$\gamma_{e-1}^R C(\tilde{a}_{e-1}^R) = h - \ell + \frac{E y_1^R - E y_0^R}{1 - \tilde{a}_0^R + \tilde{a}_1^R} \quad (5)$$

Since C is decreasing, $\tilde{a}_0^R > \tilde{a}_1^R$. Thus, at the first best, a higher proportion of children of educated than of uneducated parents undertake higher education within each group. The reason for this result is that the education of the children of uneducated parents is more costly.

²We assume that costs associated to education are such that $\hat{a}_{e-1}^R$ is interior for all R and e_{-1} .

On the other hand, since, at the laissez-faire, the expected utility is larger for children of educated parents ($Ey_1^R > Ey_0^R$), all individuals who make their educational choice in the absence of government intervention end up consuming too little education.

Finally, since the difference in participation between children of educated and uneducated parents is larger for B and the difference in the costs they face is also larger, $Ey_1^B - Ey_0^B > Ey_1^W - Ey_0^W$. Therefore, the difference between first best and decentralized threshold ability is larger for black people.

In other words, the individual decision to undertake education is inefficient because people fail to account for the fact that their getting higher education increases the chances that their children also will gain access to higher education. This intergenerational externality is higher for black people, since the difference in expected income for children of uneducated and educated individuals is larger within this group.

4 Optimal subsidies

The government may subsidize education in order to internalize the externality. We assume that subsidies can be dependent on race or ethnicity but not on the education decision previously made by parents. To finance this policy, it levies a lump-sum tax T on all workers.

The objective of the government is to maximize

$$\sum_R \sum_{e-1} \pi_{e-1}^R \left(\hat{a}_{e-1}^R (\ell - T) + \int_{\hat{a}_{e-1}^R}^1 (h - \gamma_{e-1}^R C(a) + S^R - T) da \right)$$

subject to the budget constraint $2T = \sum_R \pi_1^R S^R$, where S^R , $R = B, W$, represents the subsidy.

The optimal policy is characterized by the first order conditions corresponding to the lump sum tax T and subsidies S^W and S^B . The optimality condition for T yields $\lambda = 1$ (i.e., the marginal cost of raising one unit is one since lump-sum taxes are non-distortionary). The optimality condition for each S^R is:

$$\frac{\partial \pi_0^R}{\partial S^R} [Ey_0^R - Ey_1^R] + \pi_0^R \frac{\partial Ey_0^R}{\partial S^R} + \pi_1^R \frac{\partial Ey_1^R}{\partial S^R} - \left(\pi_1^R + S^R \frac{\partial \pi_1^R}{\partial S^R} \right) = 0.$$

After some manipulation, these conditions become

$$S^R = Ey_1^R - Ey_0^R.$$

Since $Ey_1^B - Ey_0^B > Ey_1^W - Ey_0^W$, it follows that $S^B > S^W$. Hence, individuals from the disadvantaged community receive a larger Pigouvian subsidy.

5 Conclusions

In this note, we have considered a dynamic framework in which generations are linked by family background, which is determined both by family education and appurtenance or not to a disadvantaged group. We have identified an intergenerational externality that is larger for disadvantaged groups provided that education levels out the playing field (i.e., existing differences across groups are smaller for educated individuals). This externality can be internalized by means of Pigouvian subsidies, equal to the size of the externality in each case. Therefore, larger subsidies for students that belong to disadvantaged groups can be justified on efficiency grounds alone.

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