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An efficiency argument for affirmative action in higher education*

ELENA DEL REY
Universidad de Girona and FEDEA
MARÍA RACIONERO
Australian National University

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Abstract

We consider a dynamic framework in which generations are linked by educational background. In particular, individuals differ in ability to benefit from education, parental education and appurtenance to a group (either a disadvantaged minority or a non-minority). The individual decision to undertake education is inefficient because people fail to account for the fact that their getting education increases the chances that their children will also gain access to education. This intergenerational externality is higher for people from the disadvantaged minority, provided that the difference in expected utility for children of uneducated and educated individuals is larger within this group. This provides an argument for affirmative action in higher education, in the form of larger subsidies to individuals from the minority group, which is exclusively based on efficiency considerations.

Keywords: Affirmative action, intergenerational externality.

JEL Classification: H21, I28.

1. Introduction

In higher education, affirmative action, or preferential treatment to individuals that belong to minority groups, usually takes the form of predetermined admission quotas or specif-

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ic subsidies. Frequently justified on the grounds of equity, such policies are often seen as a compensation for past or present mistreatments. Holzer and Neumark (2000), for example, mention that, taking a very long view, it can be argued that women and minorities did not face a level playing field in higher education. This view is reinforced by evidence they provide on lower quality of elementary and secondary education for minorities in the US, which continues to disadvantage these groups in competition for admission to the better universities.

Chan and Eyster (2003) focus on a different rationale in favor of affirmative action in higher education: namely, colleges and universities that value diversity of their student bodies. Banning affirmative action in universities and colleges with these preferences, they argue, will only result in their trying to achieve diversity in less efficient ways.

Generally acknowledged as a successful measure to achieve these objectives, giving preferential treatment in higher education to individuals from disadvantaged groups is also deemed costly in terms of efficiency, as it involves transferring resources from higher ability students who do not belong to these groups to lower ability students who do.

De Fraja (2005) is the first contribution to provide an efficiency rationale for affirmative action in higher education in a utilitarian framework. In his model, individuals differ in the potential to benefit from education, which is private information, and the distribution of this potential differs across two groups: in particular, there is relatively less high-potential individuals in the disadvantaged group. The main result is that individuals from the disadvantaged group receive preferential treatment (i.e., pay a lower tuition fee and enroll to higher education levels) than otherwise identical individuals from the advantaged group. If the government did not have an informational disadvantage, individuals with the same potential in different groups would be treated identically. Preferential treatment then stems from the asymmetry of information regarding the individual's potential. The less favorable distribution in the disadvantaged group makes it less costly to prevent mimicking and, thus, plays a crucial role.

In this paper, we take a different approach and identify an intergenerational externality that, under certain conditions, is larger for individuals belonging to disadvantaged groups. The existence of intergenerational externalities that differ across groups has been proven by Borjas (1992). Holzer and Neumark (2000) also mention community externalities and, in particular, role-model effects through which educated members of a minority group have a positive effect on the education of future generations of that minority group[1].

Following these contributions, we assume that the decision of children to become educated depends, among other things, on parental education and on the quality of the group environment. 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 larger for people from the disadvantaged minority as long as the difference in expected utility between children of educated and uneducated individuals is larger within this group.

If education levels the playing field for families of different background, then the intergenerational externality is in fact larger within disadvantaged groups. As a result, larger subsidies for students that belong to disadvantaged groups can be justified on efficiency grounds alone.

Although most of the empirical analysis regarding misrepresentation of minority groups in higher education has traditionally concentrated on the US, the phenomenon is indeed present in many other countries. In Spain, only 1% of gypsies living in Andalucía attend higher education[2] and the problem of misrepresentation of minorities is likely to become more general and increasingly important given the current trends of immigration, particularly in the case of individuals with poor educational backgrounds. More generous subsidies allow to attract more students from these minority groups and increase the probability that their children gain access to higher education.

The paper is organized as follows. In section 2 we present the model and highlight the role of ability, parental education and appurtenance to a group in the decision of children to undertake higher education. In section 3 we analyze the first-best and show that the deviation from the optimum is larger for disadvantaged groups, owing to a larger intergenerational externality. In section 4 we investigate the role of differentiated subsidies in order to internalize the externality. We conclude in section 5.

2. The model

We consider an extension to Del Rey and Racionero (2002) in which a disadvantaged minority (M) and a non-minority (N) group coexist. Within each group $G=\{M,N\}$, individuals differ both in their ability to benefit from education and in their family educational background. Ability, denoted by α, is stochastically determined at birth. For simplicity, we consider that α is uniformly distributed between 0 and 1 in both groups. 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 cost that depends on the appurtenance to a given group, the individual ability to benefit from education and on parental education. We assume this cost to be $\gamma^G_{e_{-1}} C(\alpha)$, where the parameter $\gamma^G_{e_{-1}}$ represents the effect of parental education (e_{-1}) and the group environment (G) on the educational cost incurred by the individual.

Belonging to a disadvantaged group, individuals from the minority group have to overcome more obstacles, which increase the costs of acquiring higher education. In the case of Indigenous Australians, for instance, Hunter and Schwab (2003) identify a range of social environmental factors, which include poor quality housing and residence in a household where others have been arrested, which decrease the probability that a young person will be attending school. On the other hand the presence of household members with qualifications or who are attending school significantly increases the likelihood of school attendance.

Many of the negative factors arise from a prolonged history of cultural conflict and policies that failed to meet the distinctive needs of Indigenous students which have resulted in contemporary low secondary school retention rates and low participation rates in higher education.

However, we assume that education tends to level the playing field, so that the gap between children of educated parents belonging to different groups is smaller than the gap between children of uneducated parents. For simplicity of presentation, we adopt hereafter the extreme case in which children of educated parents of both groups face identical educational costs[3]. Accordingly, we posit $\gamma_0^M > \gamma_0^N > \gamma_1^M = \gamma_1^N = 1$ to reflect the fact that education is more costly for children of uneducated parents, and this effect is larger for children from the disadvantaged minority group, M . $C(.)$ is a decreasing and convex function of ability (i.e., $C'<0$, $C''>0$).

Productivity and, thus, wages are exogenously given and depend on education alone. Higher education has a positive effect on wages, so that educated individuals earn higher wages (w_h) than uneducated individuals (w_l). Individuals inelastically supply one unit of labour. It is worth highlighting that we do not consider wage discrimination[4].

Finally, let $u^G_{e_{-1},e}$ be the utility of an individual of group G, family education e_{-1} and education e. Thus, $u^G_{e_{-1},0} = w_l$ and $u^G_{e_{-1},1} = w_h - \gamma^G_{e_{-1}} C(\alpha)$. The decision to become educated or not is made by comparing utility with and without education. For each type, characterized by group G 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 $\bar{\alpha}^G_{e_{-1}}$ this ability level.

$$\gamma^G_{e_{-1}} C(\bar{\alpha}^G_{e_{-1}}) = w_h - w_l \quad G = \{M, N\}; \; e_{-1} = \{0,1\} \tag{1}$$

At the threshold ability level $\bar{\alpha}^G_{e_{-1}}$, the cost of education equals the gain, in terms of earnings, of attaining higher education. Children with given G and e_{-1} whose ability is larger than $\bar{\alpha}^G_{e_{-1}}$ will invest in higher education. Children of ability $\alpha < \bar{\alpha}^G_{e_{-1}}$ will not. From (1) and the assumptions made about $\gamma^G_{e_{-1}}$, $\bar{\alpha}^N_1 = \bar{\alpha}^M_1 < \bar{\alpha}^N_0 < \bar{\alpha}^M_0$.

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

$$P^G = \begin{pmatrix} \hat{\alpha}_0^G & 1-\hat{\alpha}_0^G \\ \hat{\alpha}_1^G & 1-\hat{\alpha}_1^G \end{pmatrix} \tag{2}$$

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

$$\pi_0^G = \frac{\hat{\alpha}_1^G}{1-\hat{\alpha}_0^G+\hat{\alpha}_1^G} \text{ and } \pi_1^G = \frac{1-\hat{\alpha}_0^G}{1-\hat{\alpha}_0^G+\hat{\alpha}_1^G} \tag{3}$$

We assume that costs associated to education are such that $\hat{\alpha}_{e_{-1}}^G$ is interior for all G and e_{-1}[5].

3. The first best

We define the first best proportions of educated and uneducated individuals of each group G, $\tilde{\alpha}_0^G$ and $\tilde{\alpha}_1^G$, as those that provide the highest expected utility. The government then maximizes expected utility at the steady state, $\pi_0^G Eu_0^G + \pi_1^G Eu_1^G$, where:

$$Eu_{e_{-1}}^G = \tilde{\alpha}_{e_{-1}}^G u_{e_{-1},0} + \int_{\tilde{\alpha}_{e_{-1}}^G}^{1} u_{e_{-1},1}^G(\alpha)d\alpha \tag{4}$$

stands for the expected utility of children of parental educational background e_{-1} and group environment G. After some rearrangements, the optimality condition for interior $\tilde{\alpha}_{e_{-1}}^G$ is:

$$\gamma_{e_{-1}}^G C(\tilde{\alpha}_{e_{-1}}^G) = w_h - w_l + \frac{Eu_1^G - Eu_0^G}{1-\tilde{\alpha}_0^G+\tilde{\alpha}_1^G} \tag{5}$$

At the new threshold ability level $\tilde{\alpha}_{e_{-1}}^G$, the cost of education equals the welfare gain it generates. This includes the gain in earnings as well as the gain in utility of future generations. Since C is decreasing, $\tilde{\alpha}_0^G > \tilde{\alpha}_1^G$. 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.

On the other hand, since, at the laissez-faire, the expected utility is larger for children of educated parents $(Eu_1^G > Eu_0^G)$, 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 the minority group *M* and the difference in the costs they face is also larger, $Eu_1^M - Eu_0^M > Eu_1^N - Eu_0^N$. Therefore, the difference between first best and decentralized threshold ability is larger for the minority group.

4. Optimal subsidies

The government may subsidize education in order to internalize the externality. We assume that subsidies can be dependent on group 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

$$\sum_G \sum_{e_{-1}} \pi_{e_{-1}}^G \left(\hat{\alpha}_{e_{-1}}^G (w_l - T) + \int_{\hat{\alpha}_{e_{-1}}^G}^1 (w_h - \gamma_{e_{-1}}^G C(\alpha) + S^G - T) d\alpha\right) \tag{6}$$

subject to the budget constraint $2T = \Sigma_G \pi_1^G S^G$, where S^G, $G=\{M,N\}$, represents the subsidy.

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

$$\frac{\partial \pi_0^G}{\partial S^G}\left[Eu_0^G - Eu_1^G\right] + \pi_0^G \frac{\partial Eu_0^G}{\partial S^G} + \pi_1^G \frac{\partial Eu_1^G}{\partial S^G} - \left(\pi_1^G + S^G \frac{\partial \pi_1^G}{\partial S^G}\right) = 0 \tag{7}$$

After some manipulation, these conditions become

$$S^G = Eu_1^G - Eu_0^G \tag{8}$$

Since $Eu_1^M - Eu_0^M > Eu_1^N - Eu_0^N$, it follows that $S^M > S^N$. Hence, individuals from the disadvantaged group receive a larger Pigouvian subsidy.

In our model, an intergenerational externality implies inefficient individual educational choices. This externality depends on parental and group education, not directly on income. Subsidising the poor (who, in our model, are the uneducated in both the minority and the non-minority group), without allowing for different subsidies across groups, does not fully internalize the externality. Investment in education by the minority group would be inefficiently low if they received a subsidy of the size of the one that internalizes the intergenerational externality of the non-minority group.

5. Conclusions

In this paper, 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.

Notas

1. Holzer and Neumark actually acknowledge that affirmative action could enhance efficiency, although their focus is in arguing that efficiency costs are likely to be low (see also Fryer and Loury, 2005).

2. According to Asociación de Mujeres Universitarias Romís de Andalucía (Amuradi), Nevipens Romaní (Gypsy News), No 381, July 2004.

3. The weaker assumption $\gamma_1^M - \gamma_1^N < (\gamma_0^M - \gamma_0^N)\frac{\gamma_1^M \gamma_0^N}{\gamma_0^M \gamma_0^N}$ is sufficient to yield the same qualitative results. This condition can be used to determine an upper bound on γ_1^M in terms of the other three costs parameters. The sufficient condition, which corresponds to the limiting case in which $C(\alpha)$ is linear, remains stronger than what is needed if $C(\alpha)$ is convex. The upper bound on γ_1^M increases with the convexity of $C(\alpha)$ and can be large, relative to γ_0^N, if γ_0^M is large.

4. Holzer and Neumark (2000) argue that differences in educational attainment and cognitive skills account for large fractions of racial differences in wages. The question is then how much cannot be accounted for (and there is no great consensus) and whether the gap (which is often put at around 10%) could be explained by other differences among races or sexes that are difficult to measure (like, for instance, non-cognitive skills, etc.) but may have an effect on productivity, and that perhaps employers are better placed to know although they cannot easily document their choice.

5. If $\bar{\alpha}_1^G = 0$ (i.e. all children of educated parents of a given group undertake higher education), then $\pi_1^G = 1$ (i.e. all individuals of that group are educated at the steady state). If $\bar{\alpha}_0^G = 1$ (i.e. no child of uneducated parent of a given group attains higher education), then $\pi_1^G = 0$ (i.e. no individual of that group is educated in the steady state). If costs associated to education are low enough for the highest ability individual and high enough for the lowest ability individual of each parental background and group, all $\bar{\alpha}_0^G$ and $\bar{\alpha}_1^G$ will be interior and the steady state will be characterized by positive proportions of both educated and uneducated individuals. We are making this assumption when we assume that $\bar{\alpha}_{e_{-1}}^G$ is interior for all G and e_{-1}.

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Resumen

En este trabajo consideramos un marco dinámico en el que las generaciones se suceden vinculadas por el entorno educativo. En particular, los individuos difieren en habilidad para beneficiarse de la educación que reciben, en la educación de sus padres y en su pertenencia a un grupo (bien minoritario o desaventajado, bien no-minoritario). La decisión individual de invertir en educación es ineficiente porque el individuo ignora el hecho de que al adquirir educación aumenta la probabilidad de que sus propios hijos también inviertan en educación. Esta externalidad intergeneracional es mayor para individuos pertenecientes a la minoría desaventajada, siempre y cuando la diferencia de utilidad esperada entre los hijos de educados y los hijos de no educados sea mayor en el seno de este grupo. Esto proporciona un argumento a favor de la acción afirmativa, en forma de mayores subsidios educativos para los individuos del grupo minoritario, que está basado exclusivamente en consideraciones de eficiencia.

Palabras clave: acción afirmativa, externalidad intergeneracional.

Clasificación JEL: H21, I28.