Affirmative Action and Economic Justice ♣

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Abstract

In this paper we aim to address the question of whether in a society that cares about equality both across population groups and within each population group (across skills), supplementing an *optimal* tax and transfer system with an affirmative action policy would enhance social welfare.

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1. Introduction

The civil rights struggle, which succeeded brilliantly in winning blacks the right to be free of discrimination, failed for the most part to secure national commitment toward eradicating the effects of discrimination which had already occurred (Loury, 1998). The black-white per-capita income ratio in the United States is in the 50-percent range, and the black-white wealth disparity is even greater (Darity and Frank, 2003). Antidiscrimination laws are not sufficient to assure racial equality because there is a significant gap in skills between blacks and whites, the outcome of more than two hundred years of discrimination (see, e.g., Loury, 1977; Arrow, 1998). Racial inequality today is mostly driven by the supply side of the labor market rather than the demand side (prejudice), thus calling for something more than only the prevention of discrimination.

Affirmative action policy regulates the allocation of scarce positions in education, employment, or business contracting so as to increase the representation in these positions of persons belonging to certain population subgroups (Fryer and Loury, 2005).

Affirmative action may serve an antidiscrimination purpose to the extent that it offsets existing discrimination that was not eliminated by formal antidiscrimination laws, being in essence an additional tool in the arsenal of antidiscrimination laws.[1] However, affirmative action can also promote redistributive goals, that is, can go beyond non-discrimination policy to compensate for past discrimination (see, e.g., Sunstein, 1994). This latter function of affirmative action is the focus of this paper.[2] We hence define affirmative action, for the purpose of this

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[1] Note that laws (e.g., Presidential Executive Orders, legislation, regulation and court-made law) that are formally identified with one policy may in essence belong to the other category. For example, employers who wish to avoid disparate impact discrimination claims (that is, comply with antidiscrimination law) will make sure that targeted group members are adequately represented among their hires, leading in essence to an affirmative action quota effect. Similarly, when discrimination is present, affirmative action is antidiscriminatory to the extent that it offsets the discrimination.

[2] Past discrimination causes income as well as wealth disparities between blacks and whites. We focus on the income disparities, that is, on compensating for the skills gap. In the long run, wealth equality may also be achieved.

paper, as a purely redistributive tool (promoting *vertical* equity), distinguishing it from antidiscrimination policy which is concerned with *horizontal* equity, namely, ensuring equal treatment of equals.

Affirmative action thus means treating individuals who differ in a relevant sense as being equals; and treating individuals who are identical in all respects other than their population group membership, as being different. For example, in the context of employment, affirmative action may require treating individuals with different skills as if their skills were identical, when the less skilled individual is a member of a targeted group. Similarly, affirmative action may require preferring an individual from a targeted group to an equally skilled individual from a non-targeted group.

Put differently, affirmative action "will generally lead to an equilibrium in which the targeted applicants of a given skill level enjoy wider job options, more bargaining power and, consequently, greater remuneration than comparable non-targeted applicants" (Fryer and Loury, 2005).[3]

Note that the primary tool for redistribution purposes today is the tax and transfer system. A policy of employing another redistributive tool, such as affirmative action, alongside the tax and transfer system begs the question of optimality. Whereas the income tax and transfer system is aimed at redistributing income from individuals with high earning ability to those with low earning ability, affirmative action is aimed at redistributing wages from majority group individuals to minorities and from men to women.[4]

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[3] See also Rubenfeld (1997) stating that "the admitted purpose of most affirmative action programs is to assist blacks and other minorities by granting them opportunities denied to whites" and justifying it as being similar to the case of redistributing towards the poor, the handicapped or the veteran that comes at the expense of the rich, the able-bodied and the civilian.

[4] Although affirmative action and the tax and transfer system have different redistributive goals - the former redistributes across population groups whereas the latter redistributes across skill levels - when there is a non zero correlation between skill and group affiliation, the two tools promote both redistributive goals.

In this paper we aim to address the question of whether in a society that cares about equality both across population groups and within each population group (across skills), supplementing an *optimal* tax and transfer system with an affirmative action policy would enhance social welfare.[5]

We present a standard labor market framework where individuals differ in their group affiliation as well as in their skill levels, and where one population group is on average less skilled (the disadvantaged group). We first study how wages are set in a market equilibrium under an affirmative action policy. We then demonstrate that the desirability of supplementing the tax and transfer system with an affirmative action policy that targets the disadvantaged group depends on two key factors: (i) productivity differences across skills, (ii) correlation between group affiliation and skill level. Based on our analysis we discuss the relevant policy implications.

The remainder of the paper proceeds as follows. In section 2 we present our model. In section 3 we examine the desirability of an affirmative action policy as a supplement to the tax and transfer system. Section 4 provides an illustrative example, and in section 5 we conclude.

2. An analytical framework

Consider an economy with a population equally divided between 'tall' (j=T) and 'short' (j=S) individuals. We normalize the population of each type to unity. Each individual ('tall' or 'short') may be either high skilled (i=H) or low skilled (i=L). We assume that production technology exhibits constant returns to scale. We denote the productivity (hence the hourly wage rate in an unregulated competitive labor market) of a typical high-skilled individual by $\overline{w}$, and

[5] We assume that a 'color' sensitive tax system according to which blacks and women would be eligible for a transfer from the state, for example, through a refundable credit financed by a lump-sum tax, is infeasible politically. Affirmative action, on the other hand, is an existing policy tool, affecting a large number of employers and employees (see e.g., Epstein, 1992; Bloch, 1994; Edley, 1996).

that of a typical low-skilled individual by $\underline{w}$, where $\overline{w} > \underline{w} > 0$. We further denote by $\alpha_{i,j}$ the number of individuals of skill *i* and 'height' *j* in the population. Following the standard Mirrlees (1971) framework, we assume that the skill (ability) attribute is observed by both workers and employers, but unobserved by the government. Vacancies (new jobs) are costless to create. We assume that $0 < \alpha_{H,S} < \alpha_{H,T} < 1$, namely that the 'tall' population is on average more skilled, which may reflect poor early background for the 'short' population group members, possibly attributed to past discrimination driven by prejudice, or self-fulfilling negative stereotypes. Denote by K_T (K_H), an indicator function that takes the value 1 if an individual is a 'tall' (and respectively, high-skilled) and zero otherwise. Note that the coefficient of correlation between 'height' and skill is given by $r(K_T, K_H) = \frac{\alpha_{H,T} - \alpha_{H,S}}{\sqrt{\alpha_{H,T} + \alpha_{H,S}} \cdot \sqrt{2 - \alpha_{H,T} - \alpha_{H,S}}}$, and is positive by assumption. Note also that *r* is increasing with respect to $\alpha_{H,T}$ and decreasing with respect to $\alpha_{H,S}$. In particular, at the limits, when $\alpha_{H,T} = \alpha_{H,S}$, there is a zero correlation; whereas when $\alpha_{H,T} = 1$ and $\alpha_{H,S} = 0$, there is a perfect correlation between being high skilled and being 'tall'. The assumption regarding a positive correlation between 'height' and skill implies that in an unregulated labor market, 'short' individuals are over-represented (relative to their share in the general population) in low paying jobs.[6] All individuals share the same utility which for simplicity takes a quasi-linear functional form:

(1) $U = U(c,l) = c - h(l)$,

where *c* denotes consumption, *l* denotes labor and *h* is increasing and strictly convex. As is common in the optimal tax literature, we denote by *y* the labor income of an individual, so that $l = y/w$. Thus, we re-write the utility function of an individual with a wage rate of *w* as:

(2) $V(w,c,y) = U(c, y/w)$.

[6] If minimum wage were imposed, it would imply a higher unemployment incidence among the 'short' population.

In order to address the issue of inequality both between 'height' groups (providing a remedy for past discrimination against the 'short') and within each 'height' group (between skills), the social planner can consider several redistributive tools. We will examine two such redistributive tools: affirmative action and the tax and transfer system. We employ an *egalitarian* social welfare function as follows:

(3) $$W = \sum_j W_j^{\rho_1} / \rho_1,$$

where $W_j = \sum_i \alpha_{i,j} \cdot V_{i,j}^{\rho_2} / \rho_2$ denotes the aggregate welfare measure for population group *j*, and $\rho_1, \rho_2 < 1$.

In essence, we allow for two kinds of inequality aversion by society. One, indicated by ρ_1, measures the aversion to inequality across skills; whereas the second, indicated by ρ_2, measures the aversion to inequality across 'heights'. Note that a transfer of one dollar from a rich individual to a poor one of the same 'height' group increases social welfare. Similarly, a transfer of one dollar from a 'tall' individual to a 'short' one of similar skill also increases social welfare.[7]

2.1 Affirmative action

Consider the following simplified form of affirmative action legislation. The law would impose targets upon all employers to achieve mixing of 'tall' and 'short' in the workforce reflecting their share in the general population.[8] By virtue of the constant returns to scale

[7] Further note, that our specification of the social welfare function implies that a given level of wage inequality elicits more aversion by society when this inequality stems from difference in 'height' than difference in skill.

[8] What we have in mind is the following. One can define a standard job by a fixed number of working hours (say, per week) and require that the distribution of standard jobs would reflect the 'height' distribution in society. To simplify the notation, we normalize the number of hours per a standard job to one.

assumption, the number of firms is indeterminate, and we focus our discussion on a representative firm.

We turn to characterizing the equilibrium in a labor market regulated by affirmative action policy as described above.[9] We assume that the labor market is perfectly competitive. We first analyze the firm's behavior. Note that by virtue of affirmative action, there can potentially be four different wage rates, as individuals differ on two attributes: skill and 'height'. We denote by $w_{i,j}$ the equilibrium wage rate paid to a typical individual with skill *i* and 'height' *j*, where $i = H, L$ and $j = T, S$. The representative firm faced with the market wage rates, determines labor demand for each type of worker ($x_{i,j}$, measured in working hours/jobs) by maximizing:

$$(4) \qquad \pi \equiv \sum_i \sum_j x_{i,j} \cdot (z_i - w_{i,j}),$$

subject to the affirmative action constraint:

$$(5) \qquad \sum_i x_{i,T} = \sum_i x_{i,S} \; ;$$

where $z_H = \overline{w}$ and $z_L = \underline{w}$ denote, respectively, the productivity of a high-skilled (low-skilled) individual. The affirmative action constraint simply states that the aggregate number of standard jobs filled by the two 'height' groups is the same (recall that we assume that the two 'height' groups are of equal size). The maximization yields the firm's labor demand for each type of worker, $x_{i,j}(w_{H,S}, w_{L,S}, w_{H,T} w_{L,T}, z_H, z_L)$; $i = H, L$ and $j = T, S$. Note that the demand for each type of worker depends on all four wage rates and on the two productivity levels. We henceforth drop the arguments of the functions $x_{i,j}(\cdot)$ in order to abbreviate the notation.

Individuals determine their labor supply by maximizing the utility in (2) given the market wage rates. We denote by $l(w)$ the labor supply of an individual facing a wage rate of *w*. Note

[9] We confine our attention to equilibria with full employment.

that, by virtue of our assumptions on the utility function, the labor supply is upward sloping. Market clearance requires that demand equals supply for each type of worker, that is:

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(6)\qquad
\begin{aligned}
x_{H,T} &= \alpha_{H,T} \cdot l(w_{H,T}),\\
x_{H,S} &= \alpha_{H,S} \cdot l(w_{H,S}),\\
x_{L,T} &= (1-\alpha_{H,T}) \cdot l(w_{L,T}),\\
x_{L,S} &= (1-\alpha_{H,S}) \cdot l(w_{L,S}).
\end{aligned}
$$

We now turn to characterizing the equilibrium profile of wage rates. First, note that by virtue of the affirmative action constraint in (5), a necessary condition for equilibrium to exist would be the following:

$$(7)\qquad \overline{w} - w_{H,S} = \underline{w} - w_{L,S}\,.$$

To see this, note that the expression on the left side of equation (7) represents the net gain (for the firm) per hour (or job) worked by a high-skilled 'short' individual. Similarly, the expression on the right side of equation (7) represents the net gain per hour worked by a low-skilled 'short' individual. By way of contradiction, suppose that equilibrium exists where the equality in equation (7) is violated. With no loss of generality, let the net gain from an hour worked by a high-skilled 'short' worker be greater than the net gain derived from an hour worked by a low-skilled 'short' worker. In such a case, the firm can replace one working hour of a low-skilled 'short' worker with that of a high-skilled 'short' worker, increasing its profit without violating the affirmative action constraint. Thus, we obtain a contradiction to the presumed profit maximization. An analogous argument for the 'tall' individuals implies that in equilibrium:

$$(8)\qquad \overline{w} - w_{H,T} = \underline{w} - w_{L,T}\,.$$

Finally, a necessary condition for equilibrium to exist is that the following equality holds:

$$(9)\qquad (w_{H,S} + w_{H,T})/2 = \overline{w}\,.$$

Condition (9) requires that an increase (or decrease) in the number of hours worked by both a high-skilled 'tall' and a high-skilled 'short' worker (so that the affirmative action constraint is maintained) cannot affect the firm's profit. Otherwise, if the sign of (9) is positive (negative) the firm can increase its profits by increasing or decreasing, as the case may be, the number of working hours of both the high-skilled 'tall' and 'short' individuals. A similar condition holds for the low-skilled individuals:

(10) $(w_{L,S} + w_{L,T})/2 = \underline{w}$.

(Note, however, that one of the four conditions, (7)-(10), is redundant).

Substituting for the labor demands from the equations in (6) into the affirmative action constraint in (5), the equilibrium is given by the profile of wage rates ($w_{i,j}; i = H, L; j = T, S$) that solve equations (5), (7), (8) and (9). Employing equations (9) and (10), we set $w_{H,S} = \overline{w} + \varepsilon, w_{H,T} = \overline{w} - \varepsilon, w_{L,S} = \underline{w} + \delta$ and $w_{L,T} = \underline{w} - \delta$. Note that it follows from equation (7) that $\varepsilon = \delta$. It is also worth noting that the representative firm makes zero profits.[10]

We next show that equilibrium exists. Substituting the four labor demands into the affirmative action condition in (5) yields:

(11) $L_T(\varepsilon) \equiv \alpha_{H,T} \cdot l(\overline{w} - \varepsilon) + (1 - \alpha_{H,T}) \cdot l(\underline{w} - \varepsilon) = \alpha_{H,S} \cdot l(\overline{w} + \varepsilon) + (1 - \alpha_{H,S}) \cdot l(\underline{w} + \varepsilon) \equiv L_S(\varepsilon),$

where $L_j(\varepsilon)$ denotes the aggregate labor supply of individuals of 'height' *j=T,S*. It is straightforward to verify that in the absence of wage differences among individuals with the same skill (that is, $\varepsilon = 0$), the aggregate labor supply of the 'tall' individuals would exceed that of the 'short' individuals: $L_T(0) > L_S(0)$. Moreover, setting $\varepsilon = \underline{w}$, it follows that: $\lim_{\underline{w} \to \overline{w}} [L_T(\underline{w})] = 0 < \lim_{\underline{w} \to \overline{w}} [L_S(\underline{w})]$. Thus, when the productivity difference across skill levels is sufficiently small (namely, $\underline{w}$ is sufficiently large), $L_T(\underline{w}) < L_S(\underline{w})$, hence, by continuity considerations, a solution for ε (hence equilibrium) exists, where $0 < \varepsilon < \underline{w}$. Moreover, ε is

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[10] To see this, note that substituting the four wage rates into the profit function in (4), re-arranging terms, yields: $\pi = \varepsilon \cdot (x_{H,T} - x_{H,S}) - \delta \cdot (x_{L,S} - x_{L,T})$. Employing the affirmative action constraint in (5), one can re-write the profit function as follows: $\pi = x \cdot (\varepsilon - \delta)$, where $x \equiv x_{H,T} - x_{H,S} = x_{L,S} - x_{L,T}$. The result follows as $\varepsilon = \delta$.

unique because the labor supply function is strictly increasing. It is straightforward to verify that equation (8) is satisfied, thus all equilibrium conditions [(5), (7), (8), (9) and the zero profit condition] are satisfied. This concludes the characterization of the equilibrium in the labor market with affirmative action.

As expected, in order to induce higher participation of 'short' individuals in the labor market, employers offer them a higher wage rate relative to 'tall' individuals with the same skill.[11] The wage difference (for each skill level) is given by 2ε. By fully differentiating equation (11) with respect to $\alpha_{H,T}$, one can verify that the wage difference is increasing with respect to the proportion of high-skilled 'tall' individuals. Similarly, the wage difference is decreasing with respect to $\alpha_{H,S}$, the proportion of high-skilled 'short' individuals. Finally, it can be verified, by fully differentiating equation (11), taking the limit at $\underline{w} \to \overline{w}$, and noting that in this limiting case $\varepsilon \to 0$, that the wage difference is decreasing with respect to $\underline{w}$ when the productivity difference across skill levels is sufficiently small.

We next consider a re-distributive income tax and transfer system.

2.2 An income tax

Unlike the standard optimal income tax framework, where the source of inequality derives from unobserved variation in innate earning abilities, the 'height' characteristic is both observable and immutable. Thus, one could in principle implement a 'height' sensitive system. In such a case, each 'short' individual would be eligible for a transfer from the state, for example, through a refundable credit.[12] This transfer would be financed by a lump-sum tax. Such a policy would constitute a differential lump-sum system, and would entail no deadweight loss. This

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[11] Note that in a labor market with initial discrimination against the 'short', affirmative action would mitigate the wage difference across 'heights' for each skill level. In essence, affirmative action would then be a form of anti-discrimination policy.

[12] Alternatively, the tax subsidy could be given to the employers of 'short' individuals.

policy would suffice to eliminate any inequality between 'height' groups or even render preferential treatment to one group over the other. Furthermore, when $\alpha_{H,T} = 1$ and $\alpha_{H,S} = 0$, that is, when there is a perfect correlation between 'height' and skill, such a policy would attain full equality with no distortions entailed (the "first-best"). Note that whereas affirmative action would also attain full equality in the perfect correlation case,[13] it would do so at the cost of labor supply distortions, increasing the labor supply of 'short' individuals and decreasing the labor supply of 'tall' individuals. Hence a 'height' sensitive income tax system dominates affirmative action policy. However, a 'height' sensitive income tax system is assumed to be infeasible on political or other grounds.[14]

We thus turn to examining a second-best 'height-blind' income tax system. As is common in the income tax literature, we describe the tax system as a set of gross labor income-net labor income (consumption) bundles (*y*, *c*), where *c* denotes net labor income. A tax system has to satisfy the self-selection constraints, which state that each type of worker has no incentive to mimic the other type. Denote the (*y*, *c*)-bundle of the high-skilled individuals and that of the low-skilled individuals by $(\overline{y},\overline{c})$ and $(\underline{y},\underline{c})$, respectively. A high-skilled individual must be at least as well off with her bundle as with the bundle of the low-skilled individual. The self-selection constraints are therefore given as follows:

(12) $V(\overline{w},\overline{c},\overline{y}) \geq V(\overline{w},\underline{c},\underline{y})$,

(13) $V(\underline{w},\underline{c},\underline{y}) \geq V(\underline{w},\overline{c},\overline{y})$.

The government seeks to maximize the social welfare function given in (3), subject to the self-selection constraints (12) and (13) and a revenue constraint:

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[13] In such a case, by virtue of equation (11), all individuals will obtain an identical wage rate given by the average productivity $(\overline{w} + \underline{w})/2$.

[14] See, e.g., Darity and Frank (2003). See also related discussion of the legitimacy of using color-sensitive income tax to address racial issues in Bell (1992), Donohue (1998), Kull (1994), *cf.* Cooter (1994).

(16) $(\alpha_T + \alpha_S) \cdot (\bar{y} - \bar{c}) + (2 - \alpha_T - \alpha_S) \cdot (\underline{y} - \underline{c}) \geq 0$.

This specification assumes, with no loss in generality, that the government has no revenue needs. We now investigate whether supplementing a second-best 'height'-blind income tax system by affirmative action would enhance social welfare.[15]

3. A case for affirmative action

In order to examine the case for affirmative action, we compare it with a 'height'-blind income tax system. We first state the following result.

Lemma: When the degree of aversion towards inequality across population groups is large relative to the extent of aversion exhibited towards inequality across skill levels, affirmative action would dominate the tax and transfer system if either: (i) the difference in productivity across skill levels is sufficiently small; or (ii) the correlation between 'height' and skill is sufficiently small.

Proof: See the appendix. QED

The main lesson from the above lemma is that determining whether affirmative action is a superior redistributive tool relative to the tax and transfer system, is highly dependent on the level of earnings inequality across skills and the skill-'height' correlation. The rationale for the result is as follows. Consider first part (i) of the lemma. For simplicity, suppose that the correlation between 'height' and skill is perfect. Further assume that the government is highly averse towards inequality across population groups, hence, setting its objective to maximize the welfare of the least advantaged population group. Affirmative action forces equal wages for all workers. This causes inefficiency, but at the same time entails a benefit of achieving full equality.

[15] In the analysis that follows we implicitly assume that an affirmative action policy of the form described in section 2.1 plausibly satisfies the condition $W_T \geq W_S$; namely, the aggregate welfare measure of the 'tall' population group (weakly) exceeds that of the 'short' population group. Thus, affirmative action, while mitigating wage inequality between 'height' groups (possibly eliminating it) does not reverse group welfare ranking. The condition would be satisfied, for instance, when labor supply is sufficiently elastic.

As is established in the income tax literature [see, e.g, Sadka (1976) and Stiglitz (1982)], a ‘height’-blind income tax, on the other hand, causes no leisure-consumption distortion at the top (for the 'tall' and skilled worker), but can never achieve full equality due to the incentive compatibility constraint. Now, as the productivity difference across skill levels declines, the distortion caused by affirmative action policy decreases, as the equal wage rate paid to both the unskilled 'short' and to skilled 'tall' workers shifts closer to their respective productivity levels. At the same time, the leisure-consumption distortion of the income tax, which is confined to the bottom only (the 'short' unskilled worker), magnifies, as the productivity of the 'short' worker increases. As the differences in productivity become less and less pronounced, the egalitarian advantage of the affirmative action rule begins to dominate the efficiency advantage of the income tax system.

Consider next, part (ii) of the lemma. Affirmative action has the targeting advantage, as it is directed at the disadvantaged 'short' population, which is the primary goal of the redistributive system. However, as the correlation between 'height' and skill decreases, the distortion of an affirmative action policy, which is equivalent to a differential wage tax/subsidy system, for each skill level, declines (a reduced wage subsidy to the 'short' and a corresponding decreased wage tax levied on the 'tall') to ensure the appropriate representation in the labor market, that is, reflecting the groups’ relative shares in the general population. At the same time, the targeting of the tax and transfer system is weakened as more 'short' individuals become high-skilled and additional 'tall' individuals become low-skilled. Thus, the tax system is redistributing less from the 'tall' towards the 'short'. These two patterns render the comparative advantage of the affirmative action more pronounced as the correlation decreases. For small enough correlations, the affirmative action policy prevails.[16]

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[16] Put differently, when the correlation between 'height' and skill is high, the 'height'-blind income tax system serves as a tagging device (see Akerlof, 1978) for redistribution across 'height' groups. Although the government cannot directly

As the affirmative action dominates the tax and transfer system, it follows that affirmative action should be part of the optimal policy, alongside the tax and transfer system. We thus conclude:

Proposition: Under the assumptions of the lemma, supplementing the 'height'-blind income tax system by affirmative action enhances social welfare.[17]

Note that the range of parameters for which a 'height'-blind income tax supplemented by an affirmative action policy would dominate the 'height'-blind income tax system is in fact wider than that given by the above lemma. This derives from the fact that the income tax cum affirmative action policy attains a higher welfare level than that obtained by implementing an affirmative action policy alone, due to the additional gains from redistribution across skills.[18]

4. An illustrative example

In order to demonstrate the proposition and gain some further insights, we present a simple example where preferences are assumed to take a quadratic functional form, $U(c,l) = c - l^2/2$. Solving numerically for the equilibrium under an optimal tax policy and an alternative affirmative action regime, we examine the sensitivity of the optimal policy to the two key parameters: the correlation between 'height' and ability, and the difference in productivity across skills. We assume that $\alpha_T = 1 - \alpha_S = p$>0.5, thus the degree of correlation is given by

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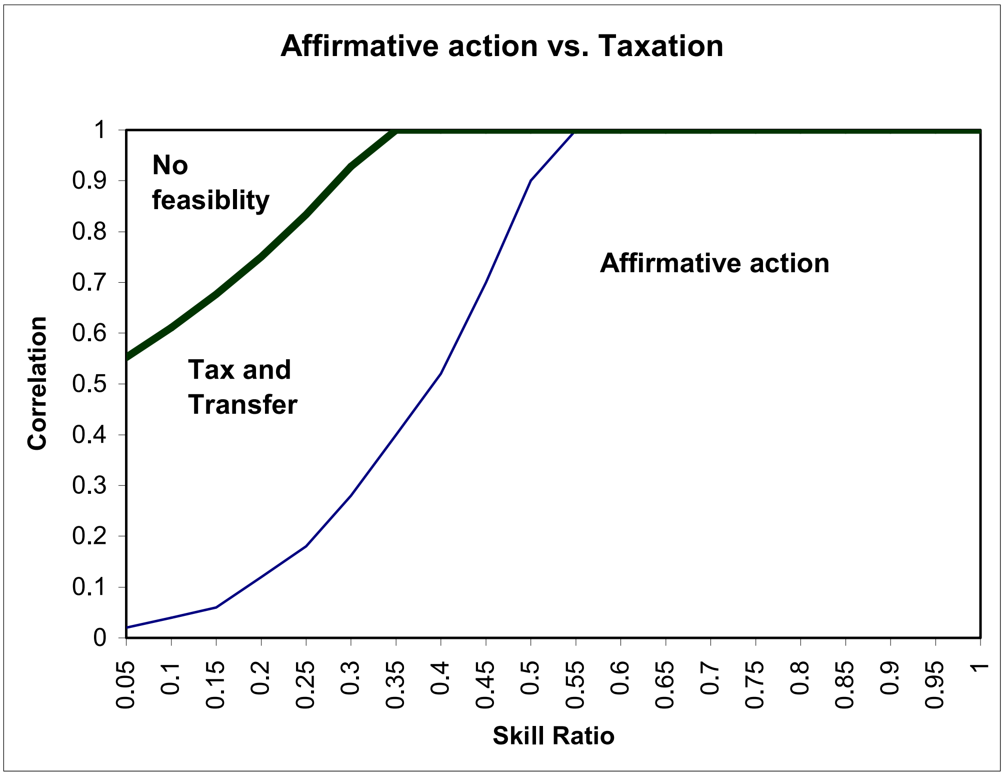
provide transfers to the 'short' individuals, it can do so indirectly by subsidizing low-skilled individuals who are more likely to be 'short'. When the correlation drops, the tagging quality of the 'height'-blind income tax system is hampered.

[17] The proposition provides sufficient conditions for affirmative action to be part of the optimal re-distributive policy. Needless to say, under other assumptions affirmative action may well be harmful. This could happen when there are a highly positive correlation between 'height' and skill and a large wage difference across skill levels, for in this case the efficiency cost entailed by affirmative action is particularly high. This observation calls into attention the possibility of using milder forms of affirmative action, promoting higher representation of the targeted group in the labor market, but not necessarily mirroring their relative share in general population. This would clearly mitigate the entailed distortions associated with affirmative action, but is likely to be controversial on social grounds.

[18] This would be the case as long as the correlation between group affiliation and skill is less than one. Note that in the latter (knife-edge) case, the income tax is redundant, as affirmative action fully eliminates all wage differences.

$r = (2p-1)$. We further assume that $\rho_1 \to -\infty$ and $\rho_2 = 1$. Thus, by virtue of the utility specification, the only purpose of redistribution is to mitigate inequality across population groups. The simulation results are demonstrated in Figure 1 below.

Figure 1



As can be observed from the figure, there are two upward sloping curves, which divide the space into three distinct regions. The uppermost region represents combinations of skill ratio and correlation for which affirmative action equilibrium does not exist. Solving (11) to obtain an explicit solution for ε, employing the quadratic specification, yields $\varepsilon = (2p-1)\cdot(\overline{w} - \underline{w})/2$.[19] The feasibility constraint implies $\underline{w} > \varepsilon \Leftrightarrow \underline{w}/\overline{w} > (2p-1)/(2p+1)$. Thus, as observed from the

[19] Note that the comparative static results derived for the general framework hold, as $\partial\varepsilon/\partial p > 0$ and $\partial\varepsilon/\partial\underline{w} < 0$.

figure, the weaker the correlation (smaller *p*), the less binding the feasibility constraint becomes. The intermediate region (labeled 'tax and transfer') represents points in the skill ratio correlation space, for which the tax and transfer dominates affirmative action; whereas for points within the rightmost region (labeled 'affirmative action'), affirmative action policy prevails. Note that the figure is consistent with the lemma, as affirmative action tends to dominate the tax and transfer system when either the 'height'-skill correlation is low or the productivity difference across skills is moderate.

We have considered two policy tools where each tool is implemented separately. More plausibly, affirmative action will be used alongside the tax and transfer system to accommodate both forms of inequality, that is, within and across groups. In the example above, however, where the government is assumed to have no taste for redistribution within groups ($\rho_2 = 1$) and individuals' preferences are quasi-linear, there are no further redistributive concerns when affirmative action policy is in place.[20] In general, the tax and transfer system will be part of the optimal policy (we will have a region where both tools are used) to address inequality across skills. There may possibly still be a region where the tax system is the only redistributive tool, deriving from the fact that when there is a strong correlation between height and skill, and the wage differences are significant, the tax system is close to attaining a differential lump-sum tax and subsidy system which constitutes the first-best.

To sum up, a plausible further integration of minorities in the labor market, captured by a decrease in the correlation between 'height' and skill over time, strengthens the case for

[20] In general, even when the income tax has no redistributive role across skills, it may well serve as a tagging device to enhance redistribution across 'height' groups (see note 15 above). However, one can verify, that due to the quadratic specification, the welfare aggregate of the two population groups is equalized by affirmative action. Thus, although being an artifact of the example's parametric restrictions, it is worth noting that the figure fully describes the optimal policy which consists of *either* the tax and transfer system *or* affirmative action, but never a hybrid of the two.

affirmative action.[21] On the other hand, assuming that the trend of rising productivity differences across skill levels will sustain over time, the case for affirmative action is weakened. The social desirability of employing affirmative action, as a redistributive tool, thus depends on which of the two counteracting trends would prevail.

5. Conclusion

We constructed a model of wage setting under affirmative action. We showed that affirmative action policy could play a useful redistributive role by supplementing a non-discriminatory income tax system. Affirmative action becomes more important in enhancing social welfare when the productivity differences across skills are less pronounced and the correlation between skill level and affiliation with the advantaged (non-targeted) group is weaker. Similarly, in circumstances of very large differences in productivity across skills, and very high concentration of skilled individuals in the advantaged group and of unskilled individuals in the disadvantaged (targeted) group, affirmative action may be harmful for social welfare.

Two final remarks are in order. First, redistribution is not the only plausible rationale for employing affirmative action. Two other major justifications, often discussed in the literature, are offsetting discrimination (prejudice-driven or statistical) and internalizing externalities.[22] Second, affirmative action is a highly controversial policy. The non-disadvantaged may find affirmative

[21] When the correlation between 'height' and skill is sufficiently small, affirmative action is more efficient than the tax system in redistributing across groups. It is, however, less appealing from a 'moral' perspective, as the effects of past discrimination against the 'short', the reason for enacting affirmative action to begin with, were fully captured by this correlation. This could be captured by a corresponding decrease in the parameter ρ_1, which measures the degree of aversion towards inequality across population groups. In a more general setting, where differences across population groups are not confined to labor market skills but also take into account differences in inherited wealth, affirmative action could be justified on moral grounds even when the 'short' population fully integrates into the labor market. In this paper, we focused on affirmative action as a redistributive tool that corrects for differences in skills (including social skills) across population groups that are the result of past discrimination.

[22] For an extensive discussion of the efficiency case for affirmative action, see Holzer and Neumark (2000) and the references therein.

action to be discriminatory, thereby leading to the use of a less efficient form of affirmative action, which is color-blind.[23] Hence, assessing the social desirability of affirmative action calls for balancing not only the equity considerations, discussed in this paper, but also efficiency and political feasibility aspects.

[23] For example, public university systems in California, Florida and Texas base their admission decisions on social traits that are merely correlated with race instead of taking race explicitly into account. See, e.g., Chan and Eyster (2003); Fryer, Loury and Yuret (2004).

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Appendix

Proof of the lemma

We will prove the result for the extreme case where $\rho_1 = -\infty$ and $\rho_2 = 1$. The proof of the lemma then follows by continuity considerations.

Denote the welfare measures for the optimal tax system and the affirmative action rule, respectively, by W^{Tax} and W^{Aff}. Maintaining the notation used in the text, it follows that:

(A1) $$W^{Tax} = \alpha_{H,S} \cdot V(\overline{w}, \overline{c}, \overline{y}) + (1-\alpha_{H,S}) \cdot V(\underline{w}, \underline{c}, \underline{y}),$$

(A2) $$W^{Aff} = \alpha_{H,S} \cdot V(\overline{w} + \varepsilon, y_{H,S}, y_{H,S}) + (1-\alpha_{H,S}) \cdot V(\underline{w} + \varepsilon, y_{L,S}, y_{L,S}),$$

where $y_{i,S}$ denotes income (and consumption level) chosen by a 'short' individual of skill *i*, under an affirmative action regime. We first turn to prove part (i) of the proposition.

Note that when $\underline{w} = \overline{w}$, it follows that $\varepsilon = 0$, hence $y_{H,S} = y_{L,S} = \underline{y} = \overline{y}$ and, obviously, $W^{Tax} = W^{Aff}$, as there is no inequality to begin with. Differentiating the two welfare measures associated with the optimal tax system and the affirmative action rule with respect to $\underline{w}$, and evaluating the derivatives at $\underline{w} = \overline{w}$, using the envelope theorem and noting the fact that the self-selection constraint for the 'short' type is non-binding, it follows that:

(A3)
$$\left.\frac{dW^{Tax}}{d\underline{w}}\right|_{\underline{w}=\overline{w}} = (1-\alpha_{H,S}) \cdot U_c(\overline{c}, \overline{y}/\overline{w}) \cdot \frac{\overline{y}}{\overline{w}},$$
$$\left.\frac{dW^{Aff}}{d\underline{w}}\right|_{\underline{w}=\overline{w}} = \alpha_{H,S} \cdot U_c(\overline{c}, \overline{y}/\overline{w}) \cdot \frac{\overline{y}}{\overline{w}} \cdot \frac{\partial \varepsilon}{\partial \underline{w}} + (1-\alpha_{H,S}) \cdot U_c(\overline{c}, \overline{y}/\overline{w}) \cdot \frac{\overline{y}}{\overline{w}} \cdot \left[1 + \frac{\partial \varepsilon}{\partial \underline{w}}\right].$$

where U_c=1 denotes the partial derivative of *U* with respect to its first argument. Employing the fact that $\partial\varepsilon / \partial\underline{w} < 0$, it follows that $\left.\frac{dW^{Aff}}{d\underline{w}}\right|_{\underline{w}=\overline{w}} < \left.\frac{dW^{Tax}}{d\underline{w}}\right|_{\underline{w}=\overline{w}} > 0$. Thus, it follows, by virtue of a first-order approximation, that for $\underline{w}$ close enough to $\overline{w}$, the affirmative action rule attains a higher level of welfare than the optimal tax system. This completes the proof of part (i).

We next turn to part (ii). First observe that for $\alpha_{H,S} = \alpha_{H,T}$, by virtue of the *quasi-linearity* of the utility function and the fact that $\rho_2 = 1$, there is no scope for redistribution (across and/or within population groups). Thus, it follows that $W^{Tax} = W^{Aff}$. Differentiating the two welfare measures associated with the optimal tax system and the affirmative action rule with respect to $\alpha_{H,S}$, and evaluating the derivatives at $\alpha_{H,S} = \alpha_{H,T}$, using the envelope theorem, and the fact that the government revenue constraint is binding in the optimal tax system, yields:

$$\left.\frac{dW^{Tax}}{d\alpha_{H,S}}\right|_{\alpha_{H,S}=\alpha_{H,T}} = V(\overline{w},\overline{c},\overline{y}) - V(\underline{w},\underline{c},\underline{y}),$$

(A4)
$$\left.\frac{dW^{Aff}}{d\alpha_{H,S}}\right|_{\alpha_{H,S}=\alpha_{H,T}} = V(\overline{w},\overline{c},\overline{y}) + \alpha_{H,S}\cdot U_c(\overline{c},\overline{y}/\overline{w})\cdot\frac{\overline{y}}{\overline{w}}\cdot\frac{\partial\varepsilon}{\partial\alpha_{H,S}} - V(\underline{w},\underline{c},\underline{y})$$
$$+(1-\alpha_{H,S})\cdot U_c(\underline{c},\underline{y}/\underline{w})\cdot\frac{\underline{y}}{\underline{w}}\cdot\frac{\partial\varepsilon}{\partial\alpha_{H,S}},$$

Employing the fact that $\partial\varepsilon/\partial\alpha_S < 0$, it follows that $\left.\frac{dW^{Aff}}{d\alpha_{H,S}}\right|_{\alpha_{H,S}=\alpha_{H,T}} < \left.\frac{dW^{Tax}}{d\alpha_{H,S}}\right|_{\alpha_{H,S}=\alpha_{H,T}} > 0$. Thus, it follows, by virtue of a first-order approximation, that for $\alpha_{H,S}$ close enough to $\alpha_{H,T}$, the affirmative action rule attains a higher level of welfare than the optimal tax system. This completes the proof of part (ii). QED