



Volume 34, Issue 2

Affirmative action and empowerment: friends or foes?

Vidya Atal
Montclair State University

Ram Sewak Dubey
Montclair State University

Abstract

We consider effects of quota or "affirmative action" for women at work-places on the societal outcomes. A simple model of household decision making with production and endogenously determined female power is studied. We show that even under standard economic modeling specifications, as a result of affirmative action, it could turn out to be the case that female labor force participation and social welfare rise but at the cost of diminished female power and wider male-female wage-gap.

We are grateful to Kaushik Basu, an anonymous referee and the editor for extremely insightful comments.

Citation: Vidya Atal and Ram Sewak Dubey, (2014) "Affirmative action and empowerment: friends or foes?", *Economics Bulletin*, Vol. 34 No. 2 pp. 1012-1018.

Contact: Vidya Atal - atalv@mail.montclair.edu, Ram Sewak Dubey - dubeyr@mail.montclair.edu.

Submitted: March 24, 2014. **Published:** May 09, 2014.

1 Introduction

Women occupy a much smaller proportion of employed positions although they make almost half of the world population. In the year 2000, women held only 30% share of the total employed positions with the average hourly wage-rate of just three-quarters of that of men. Aiming at reducing the gender-inequality, various countries have been considering different policies, establishing affirmative action or reservation is one such policy. This paper is a contribution to the theoretical studies of affirmative action in the context of gender. This subject has been getting increasing attention in recent times¹. India has been practicing reservation of political posts for women since 1993, at least one-third of all the villages have to have women as their council-leaders. This has led to a significant increase in women's involvement in as well as impact on policy-making (see Chattopadhyay and Duflo, 2004). Various other countries have similar quota or "affirmative action" for women at work-places to encourage female labor force participation, reduce the wage-gap between men and women and thus empower women and raise social welfare.

In this paper, we focus on the *twin* objectives of increasing social welfare and female empowerment of establishing affirmative action. A positive outcome of both moving to the same direction, robust to diverse specifications of the model, would be reassuring to the policy makers. That it is *not* always the case, is shown by our analysis.

We consider a simple model of household decision making in an economy with production. To emphasize the point that the result is not driven by any "pathological feature" of the model, we assume that all agents in the model are endowed with standard features. Thus the firms producing output (consumption goods) are worker owned and they maximize profit using a standard production technology (Cobb-Douglas) with two inputs, namely the labor inputs provided by the male and female household members. Also, we simplify the labor supply decision for men by assuming it inelastic to focus on just female labor supply. Women can work outside or at home and the wage income from working outside not only increases the household income but also leads to enhance their power. The utility of the household is a weighted average of the utilities of the male and female members and the weights reflect the respective household member's power. The decision to participate in the workforce and the resultant power in the household decision making emerge out of the equilibrium conditions. We show that even under these simple specifications, it could turn out to be the case that as a result of affirmative action, despite working more hours, women experience diminished power even though social welfare rises. The wage-gap ends up widening as well.

Based on the results of this paper, it appears that policy makers should monitor not only the social welfare, but also other outcomes such as the wage gap while evaluating the success of the affirmative action policies.

2 Model

We consider the general equilibrium model of female labor supply from Atal (2014). There are N identical households who own N identical firms producing the consumption good x with equal share of profits. Each household consists of two adults: a male (m) and a

¹Recent literature includes Kalev et al. (2006), Holzer and Neumark (2000), Leonard (1989).

female (f). They have different utility functions, however, they take the household-decisions collectively. Their objective is to maximize a weighted average of the utility each of them gets from their collective decisions. The weights depend on the power distribution in the household. Let $\theta \in [0, 1]$ denote the power of the woman in the household. Hence $(1 - \theta)$ is the power of the man. Following the arguments of Agarwal (1997) and Basu (2006), we assume that this index of power is endogenously determined in the household. The woman may gain more power by earning money from an outside job and thus increasing the total household income; on the other hand, she can choose to do more of what she likes—outside job or household work—if she has more power. Let $e \in [0, 1]$ denote the woman's effort put to work outside home and $h \in [0, 1]$ be her effort on household work, $(e + h) \in [0, 1]$. Let α denote the woman's exhaustion from outside job in terms of household work, i.e., the exhaustion from working for one hour outside is equivalent to the exhaustion from working α hours in the household, $\alpha \in (1, 2)$.² Hence working one hour outside is equivalent to working α hours at home.

Let w_f and w_m be the wages for female and male labor, respectively. To focus on the analysis of female labor supply, assume that the man always puts his entire effort 1 for outside work. Let us normalize the price of x to be 1.

Let $v(\cdot)$ denote the utility of a person from the household work done by the woman, where

$$v(h) = A \ln(1 + h), A > 0.$$

The utility increases at a decreasing rate. Let us denote the disutility caused by individual i 's effort on outside work by $c_i(\cdot)$, $i \in \{m, f\}$, where

$$c_i(h) = Bh^2, B > 0;$$

The disutility increases at an increasing rate. Now we can write down the utility functions for the female and the male in a household in the following form:

$$\begin{aligned} u_f(x, e, h) &= x + A \ln(1 + h) - B(h + \alpha e)^2, \\ u_m(x, h) &= x + A \ln(1 + h) - B. \end{aligned}$$

Assume that $A \geq 4B$ so that for all h , the woman's marginal utility from her work at home is more than her marginal disutility from that. This guarantees that the optimum choice of e and h by the household are such that $(e + h) = 1$, i.e., the woman puts her entire effort 1 on work—household and outside. Hence the household's objective is to choose (x, e) such that the weighted average of the utilities of the man and the woman, given by:

$$U(x, e) = \theta u_f(x, e, 1 - e) + (1 - \theta) u_m(x, 1 - e)$$

is maximized subject to the household's budget constraint:

$$x \leq [w_m + (1 - h)w_f] + \pi,$$

where π is the profit of each firm. Since the household's collective utility is strictly increasing in x , the budget constraint will hold with equality. Substituting for x from the budget

²Technically, α could be in $(0, 1)$ as well but that does not change our main argument qualitatively.

constraint, we can express the utility functions in terms of the woman's effort put in outside-work only. Hence we can re-define the household-utility function as follows:

$$\tilde{U}(e) = w_m + ew_f + \pi + A \ln(2 - e) - \theta B [1 - (1 - \alpha)e]^2 - (1 - \theta)B.$$

$\tilde{U}(e)$ is maximized w.r.t. $e \in [0, 1]$. Therefore, when the woman's power is θ and the market wage rate for her labor is w_f , the collective utility maximizing effort (e) by the woman for her outside job is given by the solution of the first order condition:³

$$w_f = \frac{A}{(2 - e)} + 2\theta B(\alpha - 1)[1 + (\alpha - 1)e].$$

Suppose the power of a woman (θ) as a function of $\left(e, \frac{w_f}{w_m}\right)$ is defined as follows:

$$\frac{\theta}{(1 - \theta)} = \left[\frac{(1 + e)}{2} \frac{w_f}{w_m} \right]^\gamma, \gamma > 0.$$

Now let us look at the producers' side. The production function is given by a Cobb-Douglas function with the productivity factor increasing in the respective individual's bargaining power:

$$F(L_f, L_m) = L_f^{\theta\beta} L_m^{(1-\theta\beta)},$$

where $\beta \in (0, 1)$. Each one of the N identical producers choose the amount of inputs (or the two kinds of labor) to maximize profit. Therefore we get the demand for both kinds of labor by each firm. Note that firms make zero profit because of constant returns to scale.

Hence the general equilibrium is given by the following system of four equations:

$$\begin{cases} w_f = \frac{A}{(2-e)} + 2\theta B(\alpha - 1)[1 + (\alpha - 1)e], \\ \frac{\theta}{(1-\theta)} = \left[\frac{(1+e)}{2} \frac{w_f}{w_m} \right]^\gamma, \\ e = \frac{\theta\beta}{(1-\theta\beta)} \frac{w_m}{w_f}, \\ e^{\theta\beta} = (w_m + ew_f). \end{cases} \quad (1)$$

3 Affirmative Action

Suppose, initially, the economy was at a general equilibrium as described in equation (1). Then suppose the government makes a law by which the ratio between the number of female employees to the number of male employees, at each of the N firms, has to be at least as large as the fraction $r \in (0, 1)$. As a result, the producer cannot always choose the profit-maximizing levels of both kinds of labor. When female wage-rate is high enough compared to the male wage-rate, then although profit-maximization requires the ratio between female labor and male labor to be strictly less than r , the producer cannot do that due to the quota

³If $w_f \leq \frac{A}{2} + 2\theta B(\alpha - 1)$, then $e = 0$ and if $w_f \geq A + 2\theta B\alpha(\alpha - 1)$, then $e = 1$. Let us consider the parameters in the range where we always get interior solution for household equilibrium.

and in that situation, he simply maintains the ratio exactly. Hence the ratio between the demands for the two kinds of labor will be:

$$\frac{L_f^D(w_f, w_m)}{L_m^D(w_f, w_m)} = \begin{cases} \frac{\theta\beta}{(1-\theta\beta)} \frac{w_m}{w_f}, & \text{if } \frac{w_m}{w_f} \geq \frac{(1-\theta\beta)}{\theta\beta} r \\ r & \text{otherwise.} \end{cases}$$

The resulting new general equilibrium conditions are:

$$\begin{cases} w_f = \frac{A}{(2-r)} + 2\theta B(\alpha - 1)[1 + (\alpha - 1)r], \\ \frac{\theta}{(1-\theta)} = \left[\frac{(1+r)}{2} \frac{w_f}{w_m} \right]^\gamma, \\ r^{\theta\beta} = (w_m + rw_f). \end{cases} \quad (2)$$

We compare the two general equilibrium systems given by equations (1) and (2). We implicitly differentiate (2) and evaluate it at the equilibrium given by (1), the analysis is shown in details in the appendix.

As a result of imposing reservation for women at work-places, we find that the female labor force participation and social welfare rise in equilibrium.⁴ However, the wage-gap between male and female labor ends up widening, and more importantly, women lose power and welfare. Reservation policies at work-places force the producers to choose female labor more than what they would have chosen while maximizing profits. They can do that only by giving lower relative wages to women. This leads to the loss of female power and their welfare in the society. The society still ends up getting better off because of the increased wages to men. This suggests that policy makers should monitor not only the social welfare, but also other outcomes such as the wage-gap and female empowerment while evaluating the success of the affirmative action policies.

4 Conclusion

“It is both unfair and unjustified that women should be paid less than men for doing equivalent jobs [...] at this rate, it will take at least another 21 years for management-level pay amongst men and women to be equalised.”

— Kate Green MP, Shadow Equalities Minister, UK Labour Party⁵

In this paper, we have demonstrated that even with strict affirmative action policies, societies might end up with wider wage-gap and less female power. We have considered a simple model of household decision making in an economy with production. We have shown that even with the standard assumptions in economic modeling, it can be concluded that affirmative action for women may increase social welfare at the cost of decreasing women’s power and their welfare, and widening the male-female wage gap. To emphasize the point that the result has not been driven by any “pathological feature” of the model, we assumed

⁴As a measure of social welfare function, we aggregate all the households’ utilities. One can argue that this is not the best measure for social welfare, but it is one of the most widely used measure in the literature.

⁵Check the following link for an extensive evidence on the male-female wage-gap: <http://www.wileyiwdresearch.com/closing-the-gender-pay-gap.html>

that all agents in the model were endowed with “standard” features like concave utility functions, convex cost functions and Cobb-Douglas production functions. We have considered the power of women to be endogenously determined by the society. Women could work outside and bargain for higher wages thus contributing more to the household income and enhance their power. With an increased power, they have more freedom to choose whether to work at home or outside. We have shown that as a result of affirmative action, despite working more hours, women experience diminished power and welfare, and worse male-female wage-gap. This happens because producers can hire more female labor only by paying them lower wages relative to men.

References

- [1] Agarwal, B. (1997) ““Bargaining” and Gender Relations: Within and beyond the Household” *Feminist Economics* **3(1)**, 1–51
- [2] Atal, V. (2014) “Say at Home, or Stay at Home? Few Policy Implications on Female Labor Supply and Empowerment” Working paper available at: <http://ssrn.com/abstract=1807045>
- [3] Basu, K. (2006) “Gender and Say: A Model of Household Behavior with Endogenously-Determined Balance of Power” *The Economic Journal* **116(4)**, 558-580
- [4] Chattopadhyay, R. and E. Duflo (2004) “Women as Policy Makers: Evidence from a Randomized Policy Experiment in India” *Econometrica* **72(5)**, 1409-1443
- [5] Holzer, H. and D. Neumark (2000) “Assessing Affirmative Action” *Journal of Economic Literature* **38(3)**, 483-568
- [6] Kalev, A., F. Dobbin and E. Kelly (2006) “Best Practices or Best Guesses? Assessing the Efficacy of Corporate Affirmative Action and Diversity Policies” *American Sociological Review* **71(4)**, 589-617
- [7] Leonard, J. (1989) “Women and Affirmative Action” *The Journal of Economic Perspectives* **3(1)**, 61-75

A Appendix

Differentiating the system of general equilibrium equations after reservation given by (2) with respect to r , we get:

$$\begin{bmatrix} -\frac{1}{\theta} \left(w_f - \frac{A}{(2-r)} \right) & 1 & 0 \\ \frac{1}{\gamma\theta(1-\theta)} & -\frac{1}{w_f} & \frac{1}{w_m} \\ -\beta r^{\theta\beta} \ln \frac{1}{r} & -r & -1 \end{bmatrix} \cdot \begin{pmatrix} \frac{\partial \theta}{\partial r} \\ \frac{\partial w_f}{\partial r} \\ \frac{\partial w_m}{\partial r} \end{pmatrix} = \begin{pmatrix} \left(\frac{A}{(2-r)^2} + 2\theta B (\alpha - 1)^2 \right) \\ \frac{1}{1+r} \\ w_f - \theta\beta r^{\theta\beta-1} \end{pmatrix}$$

The determinant of the 3×3 matrix above is:

$$\begin{aligned} D &= -\frac{1}{\theta} \left(w_f - \frac{A}{(2-r)} \right) \left(\frac{1}{w_f} + \frac{r}{w_m} \right) - \left(\frac{\beta r^{\theta\beta}}{w_m} \ln \frac{1}{r} - \frac{1}{\gamma\theta(1-\theta)} \right) \\ &= -\frac{1}{\theta} \frac{r^{\theta\beta}}{w_m} \left[\frac{1}{w_f} \left(w_f - \frac{A}{(2-r)} \right) + \theta\beta \ln \frac{1}{r} - \frac{1}{\gamma(1-\theta)} \frac{w_m}{(w_m + rw_f)} \right], \end{aligned}$$

which is negative for a backward bending female labor supply curve on its downward slope (which occurs when $\gamma(1-\theta) \left(w_f - \frac{A}{(2-r)} \right) > w_f$) and if A is small enough, then it is negative when female labor supply curve is increasing as well.⁶

To compare the equilibrium values pre and post reservation policy, we evaluate these derivatives at $r = r^* = \frac{\theta^*\beta}{(1-\theta^*\beta)} \frac{w_m^*}{w_f^*}$, dropping the stars. Hence, we have:

$$\begin{bmatrix} -\frac{1}{\theta} \left(w_f - \frac{A}{(2-r)} \right) & 1 & 0 \\ \frac{1}{\gamma\theta(1-\theta)} & -\frac{1}{w_f} & \frac{1}{w_m} \\ -\frac{r w_f}{\theta} \ln \frac{1}{r} & -\frac{\theta\beta}{(1-\theta\beta)} \frac{w_m}{w_f} & -1 \end{bmatrix} \cdot \begin{pmatrix} \frac{\partial\theta}{\partial r} \\ \frac{\partial w_f}{\partial r} \\ \frac{\partial w_m}{\partial r} \end{pmatrix} = \begin{pmatrix} \frac{A}{(2-r)^2} + 2\theta B(\alpha-1)^2 \\ \frac{1}{1+r} \\ 0 \end{pmatrix}$$

Applying Cramer's rule to compute the partial derivatives at $r = r^*$, we get:

$$\begin{aligned} \frac{\partial\theta}{\partial r} &= \frac{1}{D} \left[\frac{1}{w_f(1-\theta\beta)} \left(\frac{A}{(2-r)^2} + 2\theta B(\alpha-1)^2 \right) + \frac{1}{1+r} \right] < 0, \\ \frac{\partial w_m}{\partial r} &= -\frac{r}{\theta D} \left[\left(w_f - \frac{A}{(2-r)} \right) \frac{1}{1+r} + \frac{w_f}{1+r} \ln \frac{1}{r} \right. \\ &\quad \left. + \left(\frac{A}{(2-r)^2} + 2\theta B(\alpha-1)^2 \right) \left(\frac{1}{\gamma(1-\theta)} + \ln \frac{1}{r} \right) \right] > 0, \\ \frac{\partial w_f}{\partial r} &= \frac{1}{\theta D} \left[\left(w_f - \frac{A}{(2-r)} \right) \frac{1}{1+r} \right. \\ &\quad \left. - \left(\frac{A}{(2-r)^2} + 2\theta B(\alpha-1)^2 \right) \left(\frac{r w_f}{w_m} \ln \frac{1}{r} - \frac{1}{\gamma(1-\theta)} \right) \right]. \end{aligned}$$

To find the effect on wage-gap, we differentiate the relative wages:

$$\begin{aligned} \frac{\partial \left(\frac{w_m}{w_f} \right)}{\partial r} &= \frac{1}{w_f} \left(\frac{\partial w_m}{\partial r} - \frac{w_m}{w_f} \frac{\partial w_f}{\partial r} \right) \\ &= -\frac{r}{\theta^2 \beta w_f D} \left[\frac{1}{\gamma(1-\theta)} \left(\frac{A}{(2-r)^2} + 2\theta B(\alpha-1)^2 \right) \right. \\ &\quad \left. + \frac{1}{1+r} \left(w_f - \frac{A}{(2-r)} \right) + \frac{w_f}{1+r} \theta\beta \ln \frac{1}{r} \right] > 0. \end{aligned}$$

Finally, differentiating the social welfare $W = N(\tilde{U} + \pi) = N\tilde{U}$ at $r = r^*$, we get:

$$\frac{\partial W}{\partial r} = -Nr \left(\frac{w_f}{\theta} \ln \frac{1}{r} + B(\alpha-1)[2+r(\alpha-1)] \right) \frac{\partial\theta}{\partial r} > 0$$

and

$$\frac{\partial u_f}{\partial r} = \left(\frac{\partial w_m}{\partial r} + r \frac{\partial w_f}{\partial r} \right) + w_f - \frac{A}{2-r} - 2B(\alpha-1)[1+(\alpha-1)r] < 0.$$

⁶For example, if $\alpha = 1.5, \beta = .5, \gamma = 1, A = 1, B = .25$, then at equilibrium, the female labor supply curve is increasing and $D < 0$.