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Preference based vs. market based discrimination: Implications for gender differentials in child labor and schooling ☆

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ABSTRACT

This paper studies the effects of *son-preference by parents* and *earnings function bias* on child labor and schooling in a model in which parents are altruistic. It finds that son-preference leads to gender differential in child labor with female children working more than male children. But it does not lead to gender differential in schooling, except when the bequest constraints are binding. On the other hand, the earnings function bias results in gender differential in both child labor and schooling. Dowry and marriage expenses can lead to inefficiently low level of schooling and high level of child labor. Son-preference magnifies gender differential in child labor and schooling in the presence of dowry and marriage expenses.

1. Introduction

Empirical evidence suggests that son-preference (parental gender bias in favor of sons) is wide-spread in many regions of the world, particularly in Asia and the Middle-East (Behrman, 1988; Boserup, 1970; Williamson, 1976). In recent years, especially due to the spread of sex-selection techniques, a large literature has emerged which studies the socio-economic determinants and consequences of this bias. Previous works on son-preference have studied its effects on fertility and sex-ratio (Ben-Porath and Welch, 1976), excess mortality among female infants (Sen, 1990), and differential access to health (Chen et al., 1982), nutrition (Behrman, 1988) and education (Alderman and King, 1998; Behrman et al., 1986; Davis and Zhang, 1995; Orazem and King, 2007).

Empirical evidence also suggests that both incidence and the intensity of child labor are higher for female children than male children. For example, Edmonds and Pavcnik (2005) using the UNICEF MICS (Multiple Indicator Cluster Survey) data find that the incidence of child labor among female children (72.1%) is much higher compared to male children (64.8%). They also find that female children are more likely to work long hours than male children.

In this paper, I develop a model to study the effects of two types of gender biases: *the son-preference by parents* and *the earnings function bias towards male* on child labor and schooling. The earnings function bias towards male is widely prevalent in both developing and developed countries (e.g. Meng, 1998; Oaxaca, 1973; Weichselbaumer and Winter-Ebmer, 2005).

In the model, there are two periods. A family consists of parents and two children — one male and one female. Parents are altruistic. Their utility depends not only on their own consumption, but also on the utility enjoyed by their children. The utility of children depends on their consumption and leisure. Children are endowed with one unit of time in the first period, which can be allocated among three activities: labor, schooling, and leisure. A higher level of schooling reduces leisure in the first period, but leads to higher earnings in the next period. While parents care about both children, they may put more weight on the utility of their male children.

I distinguish between two cases: *a pure son-preference case* and *a pure earnings function bias towards male case*. In the pure son-preference case, I assume that parents put more weight on the utility of male children, but the earnings functions are identical for both male

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and female adults. In the pure earnings function bias towards male case, parents care equally about both male and female children, but male adults have a superior earnings function.

In the model, I derive the following main results. Firstly, in the case of son-preference, when parents can give bequests, both male and female children receive an equal amount of schooling, but female children work more than male children. In the case of earnings function bias, male children not only work less, but also receive more schooling than female children. Secondly, when the bequest constraints are binding, son-preference leads to gender differential in schooling with female children receiving less schooling than male children. However, the binding bequest constraints reduce gender inequality in schooling in the case of earnings function bias. Thirdly, dowry and marriage expenses can result in an inefficiently low level of schooling and aggravate gender differential in schooling and child labor in the case of son-preference.

This paper most directly relates to Horowitz and Wang (2004) who analyze the effects of the earnings function bias on child labor and schooling. They do not analyze the effects of son-preference. In addition, in their model there is no labor–leisure choice and parents face a direct trade-off between schooling and child labor. The separation between schooling and child labor is more in accord with the large empirical literature which suggests that there is no direct trade-off between schooling and child labor (e.g. Bhalotra, 2003; de Janvry et al., 2006; Edmonds, 2007; Ravallion and Wodon, 2000).

The remainder of this paper is structured as follows. Section 2 presents the model. Section 3 analyzes the equilibrium outcomes. Section 4 concludes the paper.

2. Model

There are two periods, $t = 1, 2$. The economy consists of a large number of households and firms. Each household consists of parents and two children: one male (m) and one female (f). Parents and children live for both periods. Parents and firms discount future at the rate normalized to one. Parents are endowed with A units of labor in each period. Throughout the paper, I measure labor in efficiency units.

Firms are owned by other types of agents, who live for two periods and do not have children. Firms produce goods using labor. They hire labor in a competitive labor market. Assume that firms have linear technology. Linear technology and the competitive labor market imply that wages (or the marginal product of labor) per efficiency unit of labor are constant. I normalize wages per efficiency unit to one.

In both periods, parents supply their labor inelastically. In the first period, children are endowed with one unit of time, which can be used for work, schooling, and leisure. Schooling in the first period increases the human capital or the earnings of children next period.

Let l^m and l^f be the labor supplied by male and female children respectively. The earnings (human capital) function of the *ith* child is given by, $h^i(s^i)$ for $i = m, f$, where s^i is the time spent in schooling. The earnings function is an increasing and concave function of s^i and $h^i(0) > 0$.

Parents are altruistic. Parental utility depends not only on their own consumption but also on the utility of children. Though parents care about both male and female children, they may prefer male children over female children. The parental utility function is given by

$$W^p = U(c_1^p) + U(c_2^p) + \delta^m W^m + \delta^f W^f \tag{2.1}$$

where function $U(\,)$ is the period utility function and W^m and W^f are the utility functions of male and female child respectively defined below. $U(\,)$ is a twice continuously differentiable, strictly increasing, and concave function of consumption. c_t^p is the consumption of parents in period $t = 1, 2$. Parameters $0 < \delta^i < 1$ for $i = m, f$ measure the degree of parental altruism.

The utility of children depends on their leisure in the first period and consumption in the second period. Let $V(l^i + \mu s^i)$ be the disutility incurred from the loss of leisure due to child labor and schooling by the *ith* child in the first period, where $\mu > 0$. μ determines the disutility incurred from schooling relative to child labor and allows for the possibility that the disutility from schooling and child labor can be different. $V(\,)$ is assumed to be a twice continuously differentiable, strictly increasing, and convex function. The utility function of the *ith* child is as follows:

$$W^i = U\left(c^i\right) - V\left(l^i + \mu s^i\right), \text{for } i = m, f \tag{2.2}$$

where c^i is the consumption of the *ith* child in the second period.

Parents choose child labor, time spent in schooling, and bequests for children and their own consumption and savings. I normalize the rate of return on savings to one. Parents give bequests, $b^i \geq 0$ for $i = m, f$, to their children in the second period.

Let k be the savings in the first period. The budget constraints faced by parents and children are

$$c_1^p + k = A + l^m + l^f; \tag{2.3}$$

$$c_2^p + b^m + b^f = A + k \;\&\tag{2.4}$$

$$c^i = b^i + h^i\left(s^i\right), \text{for } i = m, f. \tag{2.5}$$

I distinguish between two cases: *the pure son-preference case* and *the pure earnings function bias towards male case*. In the *pure son-preference case*, I assume that parents care more about the welfare of male children than female children, $\delta^m > \delta^f$, but the earnings functions are identical, $h^m(\,) \equiv h^f(\,) \equiv h(\,)$. In the *pure earnings function bias towards male case*, I assume that there is no son-preference, $\delta^m \equiv \delta^f \equiv \delta$, but the earnings functions are heterogeneous $h^m(s^m) \neq h^f(s^f)$. This is the case which is similar to one analyzed by Horowitz and Wang (2004). In particular, I assume that male children have a superior earnings function. For any $s^m = s^f$, $h^m(s^m) > h^f(s^f)$ and $h_s^m(s^m) > h_s^f(s^f)$.[1] Thus male children have a higher total as well as marginal return from the time spent in schooling.

3. Equilibrium

The parental optimization problem is

$$\max_{c_1^p, c_2^p, l^m, l^f, s^m, s^f, b^m, b^f, k} \sum_{t=1}^{2} U(c_t^p) + \sum_{i=m,f} \delta^i \left[U\left(c^i\right) - V\left(l^i + \mu s^i\right)\right]$$

subject to the budget constraints (Eqs. (2.3)–(2.5)). In the rest of the paper, I assume an interior solution for child labor and schooling, i.e. $0 < l^m, l^f, s^m, s^f < 1$. The first order conditions associated with the optimal choices are

$$l^i: \; U_c(c_1^p) = \delta^i V_l\left(l^i + \mu s^i\right), \text{for } i = m, f; \tag{3.1}$$

$$s^i: \; U_c\left(c^i\right) h_s^i\left(s^i\right) = V_s\left(l^i + \mu s^i\right), \text{for } i = m, f; \tag{3.2}$$

$$b^i: U_c(c_2^p) = \delta^i U_c\left(c^i\right), \text{if } b^i > 0, \text{for } i = m, f; \tag{3.3}$$

$$b^i: U_c(c_2^p) > \delta^i U_c\left(c^i\right), \text{if } b^i = 0, \text{for } i = m, f \;\& \tag{3.4}$$

[1] Throughout the paper, for any function $F(x)$, $F_x(x)$ and $F_{xx}(x)$ denote the first and the second derivatives respectively.