Economics and Human Biology 22 (2016) 47–64

Contents lists available at ScienceDirect

Economics and Human Biology

journal homepage: http://www.elsevier.com/locate/ehb

Gender bias in nineteenth-century England: Evidence from factory children

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ARTICLE INFO

Article history:
Received 29 September 2015
Received in revised form 24 February 2016
Accepted 5 March 2016
Available online 17 March 2016

JEL classification:
I31
J16
N33

Keywords:
Gender bias
Heights
C19th England
Factory children

ABSTRACT

Gender bias against girls in nineteenth-century England has received much interest but establishing its existence has proved difficult. We utilise data on heights of 16,402 children working in northern textile factories in 1837 to examine whether gender bias was evident. Current interpretations argue against any difference. Here our comparisons with modern height standards reveal greater deprivation for girls than for boys. Discrimination is measured in girls' height-for-age score (HAZ) falling eight standard errors below boys' at ages 11, 11.5 and 12 years of age, capturing the very poor performance of factory girls. But this result cannot be taken at face value. We query whether modern standards require adjustment to account for the later timing of puberty in historical populations and develop an alternative. We also test the validity of the age data, considering whether parents were more prone to lie about the ages of their daughters, and question whether the supply of girls was fundamentally different from that of boys. We conclude that neither proposition is justified. Disadvantage to girls remains, although its absence amongst younger children precludes an indictment of culturally founded gender bias. The height data must remain mute on the source of this discrimination but we utilise additional information to examine some hypotheses: occupational sorting, differential susceptibility to disease, poorer nutrition for girls, disproportionate stunting from the effects of nutritional deprivation, and type and amount of work undertaken. Of these we suggest that girls had to do arduous physical labour in the home alongside their factory work. The only (unsubstantiated) alternative is that girls were more likely than boys to be put into factory work below the legal age limit. Both represent forms of gender bias.

1. Introduction

The existence of gender bias has been of interest to development economists and historians alike. While unequal treatment of girls is evident in a number of countries today, there is less certainty about whether it existed in the industrialising countries of the past. Evidence for nineteenth-century British households has been mixed. Reduced employment opportunities for women and girls over the course of industrialisation have been linked to poorer treatment within the household as a result of their diminishing contribution. Some findings point in this direction: declining opportunities to provide resources through agricultural labour, gleaning and common rights may have worsened women's nutritional intake in rural areas and was reflected in their declining heights (Humphries, 1990; Horrell and Humphries, 1997; Nicholas and Oxley, 1993); older women suffered higher

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http://dx.doi.org/10.1016/j.ehb.2016.03.006
1570-677X/

rates of mortality in rural areas (Humphries, 1991; McNay et al., 2005); and high rates of female mortality have been ascribed to the large incidence of tuberculosis brought about by malnourishment in low female employment areas of Cornwall (Ryan-Johansson, 1977). Differences in literacy too suggest bias against females in human capital acquisition. Nationwide while over 60 percent of men were able to sign their names in the Parish register on marriage in the nineteenth century, this was true for only 43 percent of women (Schofield, 1973, p. 453). But here the links with women's economic activity and ability to generate resources for the household are opaque, and may even be inverted; female illiteracy was particularly high in the industrial areas, where more women worked for wages (Sanderson, 1972; Laqueur, 1974). Indeed other evidence induces scepticism about the existence of overt discrimination. Female disadvantage has not been found among mediaeval and early modern children and the lack of differential mortality observable between girls and boys in more recent times refutes the idea of systematic gender bias (Harris, 1998, pp. 413–21; 2008, pp. 159–69). Closer examination of the possible existence of gender bias in nineteenth-century England is required.

We examine gender discrimination in this period using data on heights of 16,402 children working in factories in the northern textile districts of England collated by Leonard Horner, Inspector of Factories, in 1837, and reproduced in BPP, 1837 (99) *Factory Children*, pp. 6–11[2] These height data capture two important elements of welfare: nutrition and work effort.

Height captures cumulative net nutritional status from conception to maturity and reflects nutritional intake and demands on that intake from fighting off disease and physical work effort at a young age. Thus height measures food consumption, admittedly only one aspect of total consumption but probably the most important at this time.[3] Height also captures leisure as the corollary of work, another aspect of welfare in which we are interested. Height is particularly responsive to resources at young ages (conception to two years), and during the adolescent growth spurt, but remains plastic until adulthood. Prolonged catch-up growth can, however, lead adult height to understate disparities experienced in childhood. A more sensitive measure than terminal stature is children's height for age by gender. Happily, we have data for children aged 8–14 years old, with equal numbers of boys and girls. These boys and girls have already been compared with each other, and it has been argued that girls and boys were on par (Kirby, 2013, pp. 111–14). Instead we compare factory children's heights with modern standards to see whether girls and boys show equal degrees of stunting as a result of the deprivation experienced in this era and use this as an indicator of the existence of gender bias.

Additionally, Horner's height data are particularly suited for this task as they allow us to control for discrimination in economic opportunity when considering gender bias in treatment. Gender discrimination in access to economic opportunities may lead to observable inequality in outcomes, such as nutrition and longevity. However, it can be argued that this does not necessarily arise because parents endorse inequality; instead allocative decisions within the household can be seen as rational responses to the prevailing opportunities. Specifically, in a simple two-person model of the household that trades off work against leisure, if a boy is able to earn higher wages than a girl and/or contribute to the household income for a longer period of time then, ceteris paribus, the boy would put more hours into the labour market and, given the objective of achieving equal utility with his sister, would require higher material consumption to compensate for his loss of leisure.[4] Observed higher nutrition for boys, for example, would not necessarily imply higher overall welfare, nor overt discrimination within the household, but differential rewards for greater efforts. Gender bias, on the other hand, can be imputed if parents make allocative decisions within the household that irrationally (non-economically) disadvantage girls in either their consumption of goods or of leisure. To identify gender bias we need to observe the treatment of boys and girls in a setting where their economic opportunities are equivalent, so negating the impact of earning power on intrahousehold distributions. In nineteenth century Britain, rarely did boys and girls have the same economic opportunities but, as we will show below, work in the textile factories of North West England constitutes an exception.

Unfortunately Horner's data does not record the earnings of the children he surveyed so we have to turn to alternative sources to describe earning opportunities of factory children in Lancashire. These demonstrate the atypical similarity in earnings of girls and boys in these occupations. We also use additional sources to consider the economic worth of children to their families. Having established that there is no *prima facie* reason based on economic rationale to expect these girls to be treated differently to boys within their households, we then turn to Horner's height data to establish whether gender bias in outcomes was evident. The height data was collected against the backdrop of regulation of children's hours of work in factories. This legislation not only motivated Horner's survey but also has implications for observed heights at different ages because of changes in the ages for which hours were regulated over time. We thus discuss the provisions of the legislation to understand the potential impact before analysing the height data itself. The data does indeed demonstrate significant gender bias against girls. These nineteenth-century girls fell further behind modern height standards than comparable boys. However, the comparison of the data with modern height standards raises issues about the appropriate yardstick and the impact of gendered height trajectories, in particular changes over time in the onset of puberty and the

[2] We are grateful to Peter Kirby who has expanded and computerised Horner's tabulation of the frequency of each height observation by age. Peter Kirby, the Physical Stature of Children in Northern English Textile Districts 1837. UK Data Archive 2010 SN6426.

[3] Expenditures on, for instance, rent, fuel and maybe even clothing would be small and less likely to be differentiated by gender.

[4] See Horrell and Oxley (2013) for a formal statement.