



Childhood health and the wantedness of male and female children[☆]



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ABSTRACT

Maternal desire for children of a particular sex has important implications for the well-being of household members. A simple theoretical model predicts that when a child is born of their mother's preferred sex, parents will allocate more resources towards that child, resulting in healthier children. I test this prediction empirically using a longitudinal data set from Indonesia. Each mother's preferred sex, defined by whether she prefers for future children to be male or female, is matched to the observed sex of her subsequent child. Because this measure of maternal sex preference is established before conception, identification requires only that the sex at birth of the subsequent child is random. I find that children born of their mother's preferred sex are heavier, have a higher body mass index, and experience fewer illnesses in early childhood. I show that reductions in subsequent fertility can explain roughly half of the total effect.

1. Introduction

The allocation of parental time and market resources across children has important economic and social consequences. Children who receive more investment in the form of nutrition, parental time, or educational inputs perform better across a wide range of outcomes during childhood and as adults.¹ Though much of the variation in inputs and outcomes occurs across parental education and wealth categories (Currie, 2009), within household allocative inequalities are also highly predictive of a range of important differences across children (Jensen and Miller, 2011). As a result, explaining how and why parents allocate limited resources within the household is critical for understanding population-level distributions of health and well-being among adults.

When selecting optimal consumption and investment, parents may consider a number of different observable child characteristics. One dimension that has received substantial attention in the economics literature is how parental behavior varies with the sex² of children in the household. This research uncovers important male advantages in mortality and parental time (Jayachandran and Kuziemko, 2011; Barcellos et al., 2014), primarily through comparisons of population moments across females and males. These differences, notable in

magnitude as well as in breadth, imply uneven treatment of male and female children in a number of countries. However, even in those societies where son-preference is widespread, a non-trivial fraction of parents will desire a daughter at some point in their family formation. As a result, comparing mean outcomes across sex will average over births where parents truly preferred to have son before conception and some where parents actually preferred to have a daughter. Although the resulting treatment effects are accurate measures of the population-level average differences, they ignore potentially interesting and important heterogeneity in the size of the effect. Further, such estimates do not capture the effect of being born of the parent's preferred sex on the time and resources they devote to each child. In fact, without the ability to identify parent's more- and less-preferred gender before the birth of each child, studies in countries with a no dominant sex-preference—the majority of developing countries—will wrongly conclude that child outcomes and the allocation of parental time and resources do not systematically depend on gender.

Using a panel data set from Indonesia, a country with no immutable son-preference, this paper investigates how being born of a mother's pre-conception preferred sex impacts the resources children receive in early childhood. Repeated observation of the same households over a fifteen year period enables the linkage of maternal preference for

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¹ For example, see Maluccio et al. (2009), Almond and Currie (2011) and Baker and Milligan (2013).

² I use the terms gender and sex interchangeably throughout the paper.

children of a particular gender to the realized gender of the next child born to that mother and that child's anthropometry (BMI-for-age and weight-for-age) and general health outcomes several years later. By conditioning on the observed, pre-birth gender preference of the mother, identification comes from comparing children born of the preferred gender of the mother to children in observably similar households with mothers who have the same pre-birth gender preference who happen to be born of the less-preferred gender. Under the assumption that gender-at-birth is not manipulated by parents, this is a natural experiment with a treatment probability of one-half.³ To my knowledge, this paper is the first to match pre-conception maternal sex preferences to early childhood health outcomes to estimate the impact of children being born of their mother's preferred sex.

The results indicate that pre-birth maternal preferences over child gender have economically and statistically significant effects on the resources allocated to children. Being born of a mother's preferred gender leads to an increase in body mass index (BMI), weight-for-age, and mother reported general health, and a decrease in the number of days the child is sick during the past month, in the incidence of low weight-for-age, and in the incidence of thinness.⁴ Thus, maternal preferences have real and important effects on measures of acute nutritional status later in childhood. I find no effects on measures that reflect longer-term nutritional deprivation (i.e. height-for-age or stunting). By combining the estimates with previous work (Victoria et al., 2008) linking weight and body-mass index at two years of age to schooling, income, and health in adulthood, the results suggest that there will be sizable long-term consequences to these acute nutritional deficiencies.

To explore what changes in parental behavior drive the main results, I link all mothers in the sample to their detailed fertility histories. I begin by showing that mothers who have a child of their preferred gender are significantly less likely to continue having further children and have significantly fewer subsequent children. Next, making use of a Two Sample Two Stage Least Squares (TS2SLS) strategy (Angrist and Krueger, 1992), I combine estimates of the effect of the sex distribution of the first two children on family size with estimates of the effect of the sex distribution of the first two children on BMI and weight-for age. The results imply that reductions in subsequent fertility can explain roughly half of the total effect of being born of the mother's preferred gender on BMI and over one quarter of the effect for weight-for-age.

The remainder of the paper proceeds as follows. Section 2 provides background information on parental preferences over the sex of children and the discusses the importance of the anthropometric measures used as outcomes. Section 3 discusses the data and summary statistics. Section 4 and Section 5 present the empirical strategy and the results. Section 6 discusses potential mechanisms and Section 7 concludes.

2. Background

2.1. Background on maternal gender preference

To interpret the main results of this paper it is critical to understand what drives maternal gender preferences. For a child to be born of their mother's more preferred (or less preferred) sex it must be true that their mother desired children of one sex more than the other before that child's birth. Therefore, the effects estimated in this paper could not exist if mothers were always indifferent about which sex they desire for their next child. The literature on the determinants and

consequences of parental sex preference dates back to the 1970s. Ben-Porath and Welch (1976) provides a theoretical basis for why parents might prefer children of one sex. This work builds on the discussion of household fertility and resource allocation in Becker and Lewis (1973). Jayachandran (2014) offers a more recent exposition, targeted specifically towards developing countries. In general, the potential causes of sex preference discussed in the literature can be assigned to one of four categories: economic, cultural, institutional, or individual taste-based. Appendix C discusses each of these four categories and their potential relevance for Indonesia in more detail, but the subsequent treatment focuses on a fifth alternative—the time-varying preference for a son or daughter driven by the sex distribution of previous children—which I argue is a more likely cause of sex preference among mothers in Indonesia.

Mothers need not have permanently gender-biased utility functions to prefer that future children be of a particular sex at some point during their fertility. If the number of male children and the number of female children enter the mother's utility function as symmetric but separate arguments, then under standard preference convexity assumptions mothers who have had more boys will desire more future girls and those that have had more girls will desire more future boys, all else constant. This desire for a balanced sex ratio among children is well established and has been used as an instrument for total fertility by a number of previous authors, most notably to estimate the effect of family size on parental labor supply (Angrist and Evans, 1998; Cruces and Galiani, 2007) and to estimate the impact of family size on the distribution of child anthropometry (Millimet and Wang, 2011). Consistent with parental desire for a balanced sex ratio, in all four countries studied (the United States, Mexico, Argentina, and Indonesia) this research finds that parents who have at least two children are more likely to have a third child if the first two children were of the same sex.

The few papers that directly estimate whether past gender realizations, typically parameterized as the male ratio among existing children, have any effect on stated parental desire for future male and female children use data from countries where sex-selective abortion, infanticide, and differential resource allocation have led to problems of “missing women” (Pande and Astone, 2007). If, as seems likely, parental preferences are correlated with the likelihood of differential mortality then the estimated coefficient on the male ratio among existing children will be biased. However, in Indonesia, a setting with no contemporary gender gap in mortality (Kevane and Levine, 2003), I can test whether maternal demand for sons and daughters is influenced by the male ratio among existing children.

Appendix Section B uses data from Indonesia to check the relative importance of a number of different measurable characteristics including the male-ratio among existing children. The results shown in Table B1 suggest that the male ratio is highly predictive of the gender(s) mothers desire for their future children: relative to mothers with no existing male children, mothers who have only male children desire a substantially lower male ratio among future children. A simple bivariate regression of the desired male ratio on the existing male ratio yields an r-squared of 0.589; adding an extensive set of controls barely increases the r-squared (to 0.611) and has no effect whatsoever on the estimated relationship between the existing and desired male ratios. The data therefore suggest that maternal desire for male and female children is importantly affected by the male ratio among existing children, in a manner consistent with the theory that mothers desire balanced sex ratios.

2.2. Background on childhood body mass index and weight

To investigate whether being born of their mother's preferred sex affects the resources devoted to young children, I use two different categories of outcomes: anthropometric measures (BMI-for-age, Weight-for-age) and mother-reported measures of the incidence of

³ The average biological probability of having a boy is estimated to be 51.2%.

⁴ The WHO defines children 5–19 years of age as thin if they have a BMI-for-age Z-score below -2 . Though the children in my sample are between the ages of 0 and 8, I use the term to identify children with a BMI-for-age Z-score below -2 , regardless of their age, in order to simplify the exposition of the results.

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