Selection Biases and Choices in Assisted Reproduction Markets

Today, one can go to the Internet, scan a list of sperm donors, drop a vial of sperm from a donor with specific characteristics into a "shopping cart" and have it delivered in twenty-four hours. Similarly, one can sift through profiles of egg donors, select eggs from a woman with desired characteristics and arrange an egg delivery. Before assisted reproduction technologies and genetic screening, parents typically chose the characteristics of their babies indirectly by choosing a partner or spouse in the marriage market. While preferences toward children play a role in partner choices, many other preferences are at play as well.

New reproductive technologies have changed the nature of this decision. Prospective parents can now be directly selective about the genetic characteristics of their children. Bioethical arguments about the use and commercialization of reproductive technologies, from genetic screening and pre-implantation genetic diagnosis to inheritable genetic modification, often concentrate on the ramifications of choice decisions (Becker, 2000; Green, 2007; Radin, 1996). A critical argument is about the possibility of genetic selection of socially valuable characteristics such as sex, eye color, height, and beauty or the selection of economically valuable characteristics such as having a Ph.D., a well paid occupations, or even winning the Nobel Prize. The popular manifestation of the argument is that parents seek 'designer babies'.[1]

In this work I analyze preferences for babies' characteristics when traditional reproduction is replaced by commercialized components and assess the 'value' of different characteristics. On what basis are donors chosen? Two simple alternative preference schemes form testable hypotheses about this question. One is that prospective parents choose donors by 'look and feel' genetics. An alternative is that donors with the characteristics that are valued by society are chosen instead. If prospective parents have the characteristics of the general population then sperm and egg donors should also have the characteristics of the general population if 'look and feel' genetics, rather than social value, drives the demand for sperm and egg donors. If sperm and egg donors have significantly different characteristics, how do those characteristics reflect social or economic value and which characteristics are most valued?

These choices can lead to different biases in the market. Three questions about biases are addressed in this paper relating to the three choice filters in these markets. First, sperm banks and egg agencies select among donor applicants on the basis of marketability. How are sperm and egg donors different from the general population of potential donors? Here we test hypotheses about preferences, juxtaposing 'look and feel' genetics with 'social or economic value' in terms of potential marketability. Second, from the sperm and egg donors, who gets chosen? What are the determinants of donor selection and how are selected donors different from the prospective parents who choose them for the genetic components for their child? Here we test hypotheses about preferences, juxtaposing 'look and feel' genetics with 'social or economic value' in terms of actual marketability. Third, how are the determinants of choice different for men and

[1] http://www.cnn.com/2008/TECH/science/10/30/designer.babies/index.html

women? Here we test whether gendered notions of value are reflected in choice on the basis of economic characteristics for men and physical characteristics for women.

While there is a sense that sperm and egg markets are useful to understand this issue, no one, to the author's knowledge, has undertaken a systematic data driven analysis of sperm or egg markets. Green (2007:69) noted the possibility of social value preference behavior "Although the matter has not been systematically studied, there is anecdotal evidence that parents, regardless of background, usually place good looks near the top of their list of qualities when choosing from among donor profiles". His anecdotal evidence was a PBS documentary.[2] Almeling (2007) used qualitative interview data from two sperm banks and two egg agencies to discuss how body comodification is based on sex and gender. But actual quantitative data about sperm and egg donors and parents' choices are available for dozens of sperm banks and egg agencies. The criteria that are used to select sperm and egg donors, and hence, the genetic material for babies, is the subject of this project.

This paper uses a large, loosely representative and quantitative data set of the population of donors in the United States.[3] The author has collected information on thousands of sperm and egg donors from more than 70 sperm banks and 90 egg agencies so that a direct quantitative analysis of reproductive choices could be made. On each donor is a wealth of information, including that on looks (such as height, weight, eye color, and hair color), health (diseases and medical history), intelligence and skills (education, degrees, test results, occupation, grade point averages etc). The selection status of each donor is also known.

Donors are young, generally well educated, and good looking. The age range of sperm donors is between 18 and 38 (average age 28) while the age range of egg donors is between 19 and 35 (average age 22). Most donors are white, but there is a high percentage of mixed race donors in both the egg and sperm donor population. Almost all sperm donors have a college education (or are college students) but there appears to be no educational filter for egg donors. Nearly one-quarter of both sperm donors and egg donors have green eyes. The percentage of people with green eyes in the general population is 13 percent (Kossoudji, 2005).

Further, the characteristics of sperm and egg donors are radically different from the general population. The following tables, using the preliminary sperm and egg data set and NHANESIII data show that comparing height for men (Figure 1) and weight for women (Figure 2) reveal that the differences between donors and the potential donating population appear to be substantial (no tests of differences were conducted for these graphs). Reflecting a height bias for men, sperm donors are more than two inches taller

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[2] The documentary was Frozen Angels, Umbrella Films, 2005.

[3] This is not a representative data set drawn from a random sample, so it lacks rigorous representation. This data set will extensively survey the population, and it is hoped that because of its large sample size relative to the population, and the fact that there are no known biases (other that the possibilities mentioned above), will imply a commonly representative data set. The author and others have used this approach when data about a particular population are difficult to acquire.

than the general population in the first seven deciles of height. After that, the two groups gradually merge. Short men do not make marketable sperm donors. Similarly, reflecting a weight bias for women, egg donors weigh much less than the potential donor population and the difference in weight grows over the deciles. Heavy women do not make marketable egg donors. A more complete picture of the difference between sperm donors and men and egg donors and women will be completed in this paper.

Figure 1: Height Deciles for Sperm Donors and men (Age 19-38) in NHANES sample

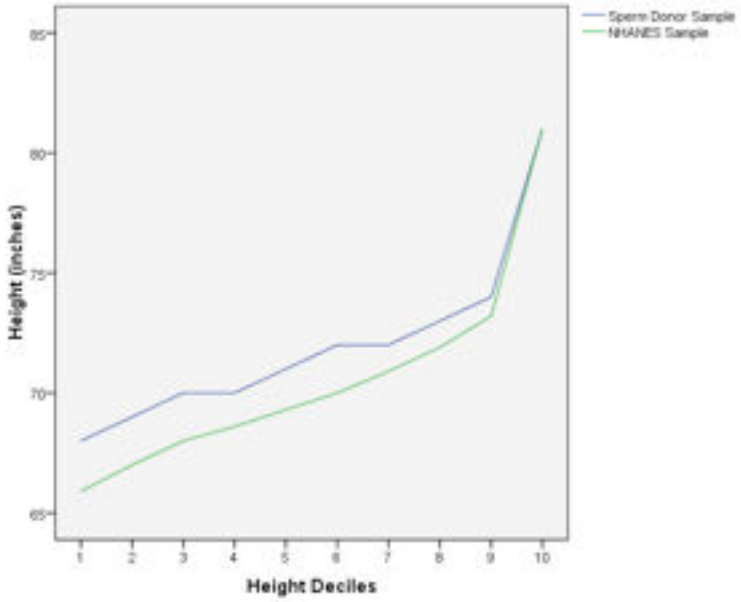
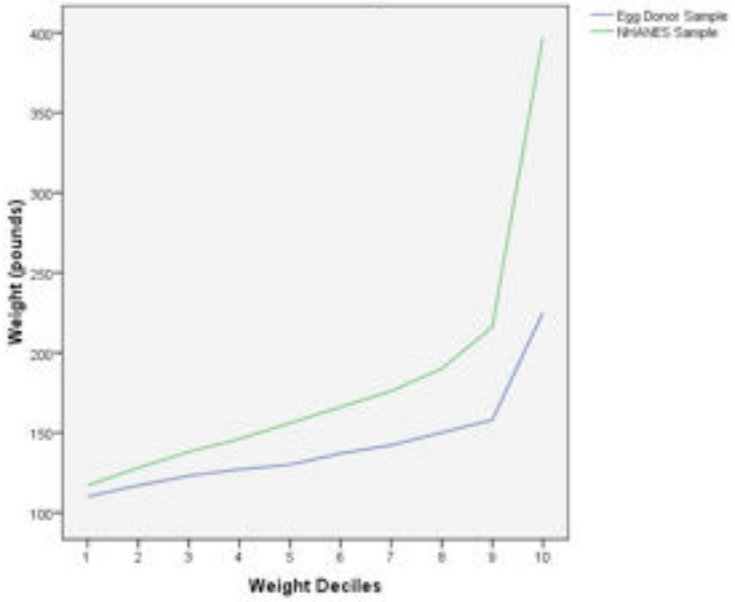


Figure 2: Weight Deciles for Egg Donors and Women (AGE 19-38) in NHANES Sample



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