

Gender Discrimination in the Family

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Abstract

This chapter examines whether parents discriminate among their sons and daughters in ways that could have important and long-lasting effects. We begin by laying out the methodological challenges of measuring discriminatory treatment. We then review the empirical evidence for both the developed and developing world. The research for developed nations documents that daughters are more likely to grow up in larger families, in fatherless households, and in poverty. Child gender also affects parent's labor force participation and paternal involvement. Many of these same patterns, often magnified, are found in developing countries. There is evidence of sex selective abortions, differential investments in childhood health, and gender differences in household inputs such as educational investments, parental time, and food.

1. Introduction

Gender differences found in adulthood are in part a product of an individual's family environment during childhood. The leading difference studied by economists has been the gender wage gap. In both developed and developing countries alike, wages for female adults are significantly lower than their male counterparts (World Bank 2001, OECD 2008). One explanation is discrimination in the workplace. But part of the gap can also be explained by the different characteristics of women versus men, such as occupational choice and the decision to remain in the labor force (Altonji and Blank 1999). Are these differing characteristics a reflection of innate differences between men and women, or could they at least partly be consequences of differential treatment and allocation of resources within the family setting? A better understanding of the existence and magnitude of gender discrimination early in life is crucial for addressing the pervasive gender inequities which persist into adulthood. This chapter focuses on whether parents discriminate among their sons and daughters in ways that could have

important and long-lasting effects.

More attention has been paid to discrimination against young girls in developing countries than in richer industrialized nations. Yet, recent studies have shown that though the manifestation of gender discrimination differs in these two settings, there are small, but significant, gender differences in early childhood inputs in more developed countries as well. Critical factors such as marital stability, family size and sibling gender, labor force participation of parents, and parental involvement have been found to differ in both developed and developing countries. These inputs are significant factors in a child's upbringing. The fact that one's gender influences them suggests that the childhood environment of boys and girls differs even in developed countries, creating gender differences at very early ages in life. These documented differences may also be indicative of other ways in which parents treat sons and daughters unequally.

This chapter will review the literature which documents the existence of gender differences that occur early in life through the family. We will discuss the empirical evidence on how offspring gender influences parental decisions and how this may impact investments during childhood and later in life. Though most studies are able to document the existence of gender differences, an understanding of the reasons behind these differentials is limited. For this reason, this chapter is focused on documenting the existence and extent of discrimination, without much discussion on the possible mechanisms for why such differences might occur.

Before discussing the empirical evidence, we first lay out the methodological challenges of measuring discrimination. Following a description of methodological concerns and challenges to interpretation, we review the empirical evidence for gender differences early in life in the family context. We split the discussion into two parts. We first review research for developed western nations, where the added complication of sex-selected abortions is not an important consideration. We then turn to a review of the literature in the South Asian context, where gender differences are larger and sex-based abortion is prevalent (Das Gupta and Li 1999). Following the review of empirical evidence, we discuss possible interpretations, as well as directions for future research and policy implications.

2. Methodological Issues

Isolating the existence and estimating the extent of gender discrimination is a difficult task. One cannot simply conclude that differences between males and females are due to gender-based discrimination. Consider the setting of wage differentials between men and women. The fact that women earn less than men in the labor market could be attributed to discrimination in the workplace (e.g., women may have a harder time getting a job or being promoted). But as researchers have shown, part of the gap is also due to the differing characteristics of women versus men, including the choice of occupation, level of education, attachment to the labor market, and assertiveness (e.g., Altonji and Blank 1999). Some of these differences may be due to non-discriminatory differences between men and women, but they could also be influenced by gender discrimination earlier in life. For example, women could choose certain careers which pay less because they value the flexibility or nature of the jobs. But women could also earn less because of lower investments by parents in girls' education.¹

If the decision to enter the labor market is affected by gender, an additional complication occurs. A selection bias arises, because naïve estimates of labor market returns are based only on those who choose to enter the labor force. To see this, imagine that all men enter the labor force, but only low-skilled women are in the labor force. A comparison of wage differentials between men and women would reveal that women are paid substantially less than males. While it is accurate to say that women in the labor force are paid less than men on average, it is unclear whether this is due to discrimination in wages, discrimination in earlier investments by parents (and society), or simply a function of selection bias into the sample of labor force participants.

Analogous to the labor market example, this section provides a simple structured framework for outlining the various problems in pinpointing the occurrence of discrimination in families and correctly interpreting any observed differences between sons and daughters.

¹ Discrimination could also operate on a larger societal level due to societal norms on gender roles.

2.1 Identifying gender discrimination

A simple model for gender discrimination is given by the following equation:

$$(1) y_i = \alpha + \beta Female_i + \theta X_i + \varepsilon_i$$

where y is the outcome of interest (e.g. parental investment) for child i , $Female$ is an indicator that takes on the value 1 if the child is a girl, X is a vector of additional factors which influence the outcome, and ε is an error term. Since the variable $Female$ is binary, the coefficient β captures the average difference in the outcome between daughters and sons, controlling for the variables contained in X .

To begin, consider the case where having a son or a daughter is random. At first glance, this might seem plausible, since whether one has a boy versus a girl seems largely outside of parents' control. However, this is only the case if:

- (i) child gender is biologically unrelated to parental characteristics
- (ii) parents do not have sex-selective abortions
- (iii) parents do not base fertility decisions on the gender of previous children.

In the case where all three conditions are met, simple comparisons of mean differences between sons and daughters would capture the causal effect of being male versus female. In the context of equation (1), random assignment of the $Female$ variable implies that for consistent estimation of β , it is not necessary to control for any of the variables contained in X as these variables will be balanced on average across gender. The only reason to control for additional covariates is for efficiency, i.e., more precise estimates of β .

2.2 Strategies to deal with non-randomness

Estimation of equation (1) is complicated by the fact that the three conditions for randomness listed above do not always hold. To start, there is some evidence that child gender could be biologically related to parental characteristics. Biologically, older women and women of different races are slightly more likely to have daughters (Almond and Edlund 2007). Additionally, certain animal species appear to have adapted to regulate

offspring sex to adjust to prenatal conditions. Charnov et al. (1982) and Norberg (2004) argue that similar mechanisms might be present in humans. To account for observable biological differences, controls for characteristics such as maternal age and race can be added to the regression. In practice, these controls generally do little to alter estimates. However, it is more difficult to account for evolutionary biology explanations, and most researchers ignore this possibility.

Abortions also create a problem for identification of gender discrimination. As we will discuss later, parents of daughters are more likely to have abortions in many Asian and developing countries. This in and of itself is evidence of gender discrimination. Unfortunately, it complicates estimation for other outcomes, since what we observe is a non-random sample of sons and daughters. To understand the selection bias problem, suppose parents who have the most bias against daughters abort girls but that unbiased parents do not abort based on gender. When comparing later outcomes we are left with selected samples of sons versus daughters. By construction, the sample of children who are not aborted includes fewer daughters born to gender biased parents compared to the overall fraction of gender biased parents. Moreover, the characteristics of gender biased parents may be correlated with investments. For example, if gender biased families who abort daughters are poorer on average this will make it appear that sons receive fewer investments on average. Research looking at developing countries therefore controls extensively for as many parental characteristics as possible. Additionally, in the presence of sex-selective abortions, any estimated effect is often argued to represent a lower bound. This is because the parents most biased against girls are less likely to be observed having daughters and often more likely to have fewer resources.

There is no evidence for widespread selection bias due to abortions within North America.² For this reason, the North American context is somewhat simpler to analyze. However, as we will discuss later, in both developing and developed countries fertility decisions are a function of the gender of previous children. To understand how this creates a selection bias, consider the stylized example depicted in Figure 1.

² Some subpopulations in the U.S., including first generation immigrants from Asian countries, show evidence for sex selective abortions (Almond et al. 2009, Abrevaya 2009).

Imagine that half of the couples in the population are gender neutral and want to have two children, regardless of the gender mix, while the other half of couples are gender biased and stop having children following the birth of a son or two children, whichever comes first. For simplicity, assume no sex-selective abortions. In our example, couples have a maximum of 1 unit of investment they can make in their children, which they can split among their children however they want. Parents can also choose not to invest in any of their children. Suppose gender neutral couples split the maximum investment equally between their two children regardless of gender (0.5 units of investment for each child), while those who are gender biased invest the maximum in their son but invest nothing in daughters (1 unit of investment in the son, and 0 units of investment in any daughters).

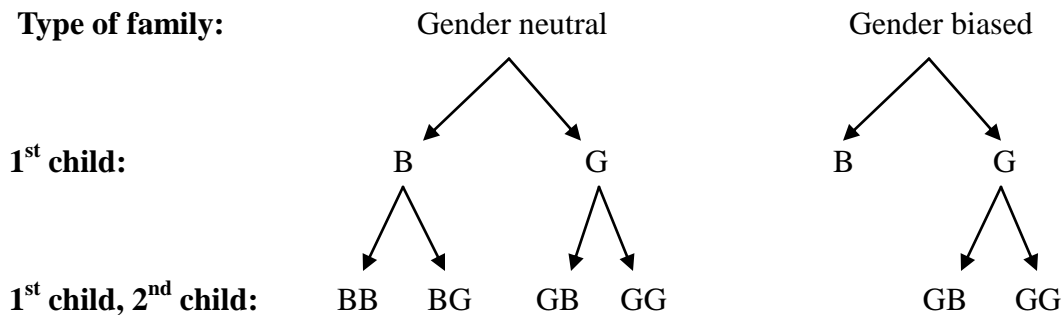


Figure 1: Hypothetical fertility patterns for gender neutral and biased parents.

Notes: B and G indicate boy and girl children, respectively. Gender neutral couples have two children, regardless of child gender, while the gender biased parents stop after they have a boy or two children, whichever comes first.

In this example, first-born females receive 0.25 units of investment on average and first-born boys receive 0.75 on average (i.e., $\beta = -0.5$). But if one were to compare all boys versus all girls in our sample, the estimate of β would be approximately -0.38, which is less than -0.5. This is because by including all children, we are oversampling unbiased couples relative to those who stop having children following a boy. While our population of parents is evenly split between each type of couple, the sample of children

shifts the weight towards those who are unbiased. Since these types of families do not discriminate, they push down the estimate of β .

The selection problem is readily seen by considering families with exactly two children. Those households that had a first born son and stopped having children are left out of the sample entirely. Thus, second born females receive an average investment of 0.33, while second born males receive an average investment of 0.67, leading to an estimated β of -0.33. While it would be accurate to state that second born females on average receive investments which are half as large as males, it does not accurately estimate the magnitude of gender discrimination.³ This is because the estimate is based on a selected sample, where the selection itself is related to the effect we are trying to estimate. This is particularly problematic for studies which attempt to condition on the number of children or gender mix in a family.

In addition to looking across families, another method is looking at differences within the family. This family fixed effects approach is identified by comparing siblings within a family. There are several drawbacks to this method. First, it fails to include families with no variation in child gender. Using the example depicted in Figure 1 above, households that stopped having children after a son (and families that have two sons or two daughters) would be excluded from the estimation. This means there will be twice as many gender neutral families with one boy and one girl compared to gender biased families in the sample. Thus the two family types are represented in the estimation sample at a proportion that is not representative of the overall population. Again, for the same reasons described above, this approach will underestimate gender discrimination in our sample, with β equal to -0.33 in our simple example.

One strategy to address this type of selection bias is to look at outcomes for first-born children only. This gets around the issue of endogenous fertility stopping rules. In the example described in Figure 1, the estimated effect would be consistently estimated

³ Of course the problem of selection due to son-based stopping rules is further exacerbated when considering higher order births of 3 or 4 children.

as -.5 because the gender of the first child is like a random coin flip.⁴

Gender based stopping rules can affect investment, even if gender biased couples split their investments equally among their children, regardless of gender. This is because larger families must share resources among more children. Gender biased couples that stop having children after a first-born boy will concentrate all of their investment on one child, rather than needing to split the investment among two children. It is important to recognize that gender based stopping rules do not affect the consistency of estimates for first-born children samples. Rather, the fact that first-child gender influences subsequent fertility is simply part of the mechanism through which differential treatment occurs.

The selection problems created by abortion and fertility stopping rules are similar in many respects. They both induce a bias in the estimated effect of being a girl versus a boy. In many cases, the estimate can be argued to plausibly represent a lower bound. One difference is that a mother's abortion history, and more importantly the gender of an aborted fetus, is rarely observed in datasets. Rather, one makes inferences about abortion and female infanticide by comparing infant sex ratios.

In the real world, the strategy to focus on first-born children works as long as biological determinants are not important factors and parents do not selectively abort. As discussed above, it is unclear how large a role evolutionary biology plays and difficult to account for such a mechanism. But at least in developed countries there is no evidence for sex-selective abortion, which makes the first-born child strategy especially attractive. Of course, for small datasets, sometimes researchers must use children of any parity to increase precision.

Our discussion of methodological issues is meant to highlight the difficulties in testing for gender discrimination due to the fact that child gender may not be random. In what follows, we focus on the main substantive findings found in the economics literature. We remind the reader upfront to remember the various issues created by biology, abortion, and fertility, as we will spend less time on these issues in what follows.

⁴ One limitation of studies looking at first-born children only is that they do not estimate effects for higher order births.

The lack of sex-selective abortion makes the North American context easier to analyze, so that is where we begin our discussion. We then turn to the South Asian context, where gender discrimination is more prevalent and has arguably more severe consequences.

3. Gender Differences in Developed Countries

We begin our discussion of gender preferences within families by looking at studies in developed countries, most of which use U.S. data. While our survey is broad, it is not comprehensive, but rather focuses on some of the recent research within economics.⁵

In the U.S. and other Western countries, the ratio of male versus female births is consistent with the naturally occurring ratio based on biology.⁶ This balanced gender ratio is taken as evidence that parents do not influence their child's gender through sex-selective abortions. When compared to the unbalanced gender ratios observed in many developing countries (which are indicative of either sex-selective abortions or female infanticide), gender discrimination in Western families is a much smaller concern. However, it would be a mistake to conclude that there are no differentials based on gender in developed countries. As we document in this section, differences based on a child's gender influence a variety of outcomes, including stated preferences; fertility and adoption decisions; marriage, divorce, and custody; time use in the labor market and with children; and educational investments.

3.1 Stated Preferences

The starting point for ascertaining whether gender preferences exist is to ask people directly about their preferences for sons versus daughters. From 1941 to the present, the Gallup organization has intermittently collected survey data on this topic. While the wording of the question has changed over time, respondents were asked a

⁵ For example, there is a large literature in sociology, including influential work by Philip Morgan and co-authors (1988, 2002, 2003).

⁶ Biologically, male births are slightly more likely than female births, but male offspring also have lower survival rates (Sen 1990).

question similar to “Suppose you could only have one child. Would you prefer that it be a boy or a girl?” There is a consistent pattern in responses over time in the data: Americans say they would prefer to have a son over a daughter. The time trend in survey responses is plotted in Figure 2.⁷ In 2011, the most recent survey year, 40 percent of respondents stated a preference for a boy compared to 28 percent of respondents who preferred girls (the remaining 32 percent either had no opinion or were unsure). These stated preferences are remarkably stable over time. In 1941, the first year Gallup polled individuals on this topic, 38 percent said they preferred boys compared to 24 percent who preferred girls, percentages which are not that different from those in 2011.

The most recent 2011 survey conducted by the Gallup Poll provides further insight into what types of individuals are most gender-biased. Men prefer sons over daughters by more than a two-to-one margin (49 percent boy to 22 percent girl), while women are evenly divided in their preferences (31 percent to 33 percent). Lower educational attainment is also associated with a strong preference for sons, with a big difference in stated preferences for those with no more than a high school degree (44 percent versus 25 percent), but essentially no difference for those with an advanced degree (32 percent versus 33 percent). Respondents who identify themselves as politically conservative express a strong preference for sons (41 percent to 25 percent), while self-identified liberals are evenly split in their preferences (36 percent to 37 percent). Interestingly, as individuals get older, they prefer boys less, perhaps indicating that life’s experiences (including raising girls) help temper any bias.

The survey results provide a preliminary indication that, at least on average, segments of the American population have a bias towards sons. However, whether and how people act on these stated preferences are arguably the more important questions. Indeed, economists have traditionally been more interested in studying revealed preferences instead of stated preferences. We therefore turn to a variety of choices made by parents to see if these stated preferences translate into different consequences for boys versus girls.

⁷ Surveys were conducted on nationally representative random samples of adults (18 years or older). The surveys typically have 1,000 or more completed interviews per year, which implies a conservative sampling error of plus or minus three percentage points.

3.2 Fertility and Adoption

While there is no evidence that parents in Western countries selectively abort based on gender, as we show in this section, a child's gender does affect parents' subsequent fertility decisions. These fertility decisions can have long lasting effects on all of the children in a family as it changes family composition and the amount of available resources.

If parents have a preference for sons, then we would expect to observe fertility stopping rules based on the gender of existing children. A simple example of this behavior was provided in Figure 1. The intuition for why a son-based stopping rule increases fertility is that parents who want a son, but have not yet had one, will be more likely to continue having additional children in the hopes of having a male child. Of course, some parents may also prefer daughters and have a daughter-based stopping rule. The point of looking at aggregate data is to see which family type dominates.⁸

Consistent with a son preference, Dahl and Moretti (2008) find that in the U.S. during the period 1960-2000, married women were more likely to have additional children if their first born was a daughter versus a son. They estimate that first born daughters caused approximately 5,500 more births per year. When the sample is restricted to women still in their first marriage, this effect on fertility following a first born daughter is even greater. Andersson et al. (2006) find that in Nordic countries, looking at all mothers (including cohabiting and single mothers), there is no effect on fertility as a function of the first child's gender, but that having two sons is more likely to lead to a third child relative to having two daughters in Denmark, Norway and Sweden (with the opposite being true in Finland). As discussed in the previous section, the effect of two children of the same gender on the decision to have more children is trickier to interpret since the fertility decision to have a second child may be a function of the gender of the first child.

Even with a fertility rule favoring boys within couples, Ichino et al. (2011)

⁸ Empirically, the most dominant preference seems to be for a mix of child gender among offspring (Angrist and Evans 1998).

illustrate that competing factors (such as divorce) may reduce the actual impact on fertility. When looking at all women regardless of marital status, Ichino et al. (2011) find that having a first born boy increases the probability of having more children relative to having a first born girl. They argue this is due to the increased marital stability caused by sons and the fact that average fertility is higher among married versus single women. We discuss the effect of child gender on marital stability in the next section. Their study uses data from the U.S., the U.K., Italy, and Sweden.

While the relationship between a child's gender and fertility is consistent with a son-based stopping rule, other interpretations are also plausible. For example, daughters may be less costly to raise or result in a more positive childrearing experience for parents. If children are normal goods, then relatively-inexpensive daughters could encourage higher fertility, even in the absence of gender preferences.

The finding of increased fertility for married women following the first birth of a daughter implies that these daughters are more likely to reside in larger families. Even if parents treat all of their children equally, family size may have its own negative effect on a child's upbringing. Becker (1981) theorizes that as families choose to have more children, each child receives less investment, resulting in a quality-quantity tradeoff. While a correlation exists between family size and lower educational outcomes (Black et al. 2005, Black et al. 2010, Deschênes 2007, Hanushek 1992, Mogstad and Wiswall 2010), studies attempting to show a causal link reach different conclusions. Mogstad and Wiswall (2010) estimate the marginal effect of additional siblings and find that education is lowered for children when they belong to larger families. Black et al. (2005), however, find the effect of family size disappears after controlling for birth order.

The adoption market, which accounts for 2.5 percent of all children within families in the U.S., provides an additional setting to examine revealed preferences. The adoption market is unique in that parents can choose the gender of their child. While the fertility evidence is broadly consistent with a preference for boys, Baccara et al. (2010) find that adoptions run counter to this finding. Potential parents seeking to adopt are more likely to apply for girl babies. When the authors convert this preference into a dollar amount, they conclude that parents are willing to pay approximately \$19,500 more in

adoption costs for a girl versus a boy baby. However, those who are interested in adoption are a select subset of individuals, making it unclear to what extent such preferences are present in the larger population.

3.3 Family Structure: Marriage, Divorce, and Custody Channels

Dahl and Moretti (2008) document that compared to first born sons, first-born daughters in the U.S. are 3.1 percent less likely to be living with their father, a gap that has persisted in every decade from 1960 to 2000. They estimate that approximately 52,000 more first-born daughters (and all their siblings) would have had a father living with them had they been first-born sons instead. Choi et al. (2008) find similar results in Germany, where a first-born son is 25 percent less likely to have a father leave the household compared to a first-born daughter.

The gender differential in having an absentee father can be decomposed into three factors: initial entry into marriage, divorce, and custody. We first explore each of these channels in this section. Then we review the literature which discusses why growing up without a father might negatively impact children.

Differences in marriage rates after the birth of a boy or a girl child is the first channel which could affect the chances a father is present in the household. Dahl and Moretti (2008) find that having a first born daughter increases the probability a woman never marries by 1.4 percent. Additional evidence for the U.S. and other countries confirms that mothers of daughters are less likely to ever have been married (Ananat and Michaels 2008, Choi et al. 2008, Lundberg and Rose 2003).

Interestingly, differences in marital status based on child sex occur even before the baby is born. Using birth certificate data from California, Dahl and Moretti (2008) find that mothers who have an ultrasound during their pregnancy and have a daughter versus a son are less likely to be married at the time of birth. With high accuracy, ultrasounds reveal the gender of a fetus. Hence, they interpret their results as indicative that child gender matters for shotgun marriages. Their data comes from a period (1989–1994) when ultrasounds were not as common as today. There is no effect for women who do not have an ultrasound, suggesting that it is knowledge about the gender of the child

driving the results. Lundberg and Rose (2003) further find that having a son versus a daughter speeds the transition to marriage if biological parents are unmarried at the time of birth.

The second channel by which a daughter's chances of living with her father are reduced is through divorce. A number of sociologists find a positive correlation between having a daughter and divorce (Spanier and Glick 1981, Morgan, Lye and Condran 1988, Katzev, Warner and Acock 1994, Morgan and Pollard 2002). In contrast, another set of papers in sociology using data from a variety of countries finds no statistically significant difference in divorce based on child gender (Mauldon 1990, Devine and Forehand 1996, Wu and Penning 1997, Diekmann and Schmidheiny 2004). The main reason the second set of studies do not find a significant effect appears to be due to small sample sizes. For example, Diekmann and Schmidheiny find no divorce effect in eighteen countries, but their sample sizes are around 2,000 for each country and therefore they are unable to precisely identify small effects. Using large census samples, Dahl and Moretti (2008) find that first born daughters increase the probability of divorce by 1.3 percent over the period 1960-2000. The effects in the more recent years of their study, while statistically significant, are much smaller, pointing out the need for large datasets to identify these relatively small effects. In the economics literature, many other researchers have documented similar divorce effects with relatively large datasets (e.g., Ananat and Michaels 2008, Bedard and Deschenes 2005).

Higher paternal custody of sons is the third channel that causes boys to be more likely to live with their fathers. Dahl and Moretti (2008) and Mammen (2008) both find that boys in the U.S. are relatively more likely to live in single-fathered homes than daughters. While it is true that mothers are more likely to gain custody of their children after a marital dissolution, when fathers do obtain custody, they are almost 3 percent more likely to obtain custody of their sons versus daughters.

The relative importance of the marriage, divorce, and custody channels have changed over time (Dahl and Moretti 2008). While divorce was the biggest reason for the gender gap in having a resident father in 1960, by the year 2000 the custody channel accounted for the majority of the difference. Given the large secular changes in family

structure over time, it is difficult to compare the amount of gender bias through these various channels over time. But what one can conclude is that differential access to fathers for sons versus daughters has remained sizable over time.

3.3.1 Consequences of Growing Up in a Fatherless Household

This literature shows that girls are less likely to live with their fathers because of a lower probability of marriage, an increased probability of divorce, and a decreased probability of paternal custody. We now turn to the literature which documents that growing up without a father present in the household has a variety of negative consequences for children.

The first concern is that single-mother households have significantly less income than households with a male figure, implying that girls are disproportionately likely to be living in a low-income household. As Dahl and Moretti (2008) document, families with first-born daughters have higher poverty rates and less available family income. They find that family income is reduced by 50 percent and the odds of being in poverty increase by 34 percent due to the first-born daughter effect. Mamman (2008) shows that girls are 5 percent more likely to live in single family households, which have an average income that is significantly less than households with a father figure, whether or not the comparison is to single father households or married households.

While first born daughter households clearly have less income, whether the effect operates through the divorce channel is less clear. Ananat and Michaels (2008) and Bedard and Deschênes (2005) use a first born daughter indicator as an instrument for divorce. Using this instrumental variables strategy, they find that divorce has no effect on a woman's mean household income. Bedard and Deschênes (2005) find that, if anything, these households are slightly better off, with the women earning \$5,000 more annually as a result of increased work hours. Ananat and Michael (2008), however, find that while there is no difference in average income, a divorce due to a first born daughter does affect the probability of a woman having a very low or very high income. Of course, for these findings to be interpreted as causal, it must be that a first-born daughter does not have any other direct effects on household income.

In addition to lower household income, another area of concern for daughters living in single-mother households is the role of paternal involvement and child support. There is limited evidence that divorced and unmarried fathers discriminate against their daughters. Lundburg et al. (2007) find that sons born to unmarried parents are more likely than daughters to receive the father's surname, but that there is no difference in the father's monetary and time investments one year after birth for unmarried fathers. Mammen (2008) finds no support for the idea that mothers of sons are more likely to receive child support payments, whether or not the parents were never married or divorced.

More generally, related research documents that children in single-mother households are more likely to drop out of high school, become teenage parents, and experience unemployment (e.g., McLanahan and Sandefur 1994, Haveman and Wolfe 1994, Case and Paxson 2001).

3.4 Time Use: Labor Market Participation and Time Spent with Children

Do families with both parents present allocate time differently in response to a child's gender? Several studies have shown that both father's and mother's participation in the labor force depends on a child's gender. There is also some evidence that fathers, but not mothers, spend more time with their sons versus their daughters.

Studies in the U.S. and Germany find that fathers increase their labor supply more if they have a son versus a daughter (Lundberg and Rose 2002, Choi et al. 2008). Both of these studies find that having a child increases a man's hourly wage and hours of work, but that the increase is greater in response to having a son. For example, Lundberg and Rose (2002) find that men with a first born son had wages which were 5.3 percent higher for some cohorts and that fathers worked 63 more hours per year if they had a son for some cohorts. However, using time diaries in the U.S., Lundberg et al. (2007) fail to find an effect of father's labor supply in married couples when comparing families with boys versus girls. In related work, Pabilonia and Ward-Batts (2007) find that Asian fathers in the U.S. work fewer hours relative to white fathers if they have a son instead of a daughter, which the authors interpret as son preference. In these studies, education

appears to be a critical factor in determining a father's labor market response to having a son or daughter.

Lundberg and Rose (2002) find no difference for mother's labor supply in response to child gender. In contrast, Ichino et al. (2011) find that mothers in U.S., U.K., Italy, and Sweden with first born sons are less likely to work in a typical week and are more likely to work fewer hours. They attribute this to increased marital stability, and thus a reduced need for income and increased fertility. Their estimates suggest that in the U.S. 50,000 women (ages between 18 and 55) with at least one child do not work simply because their first born was a male. Lundberg (2005) finds that single mothers spend more time in market work and less time with their child if they have a son relative to a daughter.

A consistent finding in the literature is that fathers spent more of their non-work hours with sons compared to daughters (Yeung et al. 2001, Lundberg et al. 2007, Mammen 2008, Price 2008). Yeung et al. (2001) find that in intact families in the U.S., fathers spend 18 more minutes per weekend day in playtime and companionship with their sons relative to daughters. Lundberg et al. (2007) also find that fathers spend more time with sons when comparing families of similar size. They find the increased time spent with sons is compensated by a reduction in the father's leisure. Mammen (2008) observes that siblings benefit by having brothers since fathers spend approximately 23 more minutes in a two child family with at least one son, relative to two daughters. However, the increased time spent with daughters comes from an increase in watching television together and therefore may be of limited value.

Lundberg et al. (2007) suggests that if the increased paternal time with sons stems from sons requiring more parental time, then one would suspect that single mothers also spend more time with their sons relative to daughters. However, she finds the opposite; single mothers with only one child spend more time with daughters than sons. Unlike fathers, this increased time that single mothers spend with daughters stems from decreased labor market participation as opposed to leisure.

3.5 Additional Areas of Gender Differences

In addition to the empirical evidence on family structure and parental time, researchers have reviewed prenatal care, household activities, and bequests as areas of potential gender differences. Lhila and Simon (2008) find no difference by prenatal care by gender for U.S. parents who choose to go to full term, including for Indian and Chinese immigrants. Time diaries of older children suggest that household chores are more likely to be done by daughters, and that girls and boys are more likely to do chores that fit in traditional gender roles (e.g., cooking and cleaning as opposed to yard work) (Gager et al. 2009, Bianchi and Robinson 1997).

One final area which deserves brief mention is educational investments. At early ages in life, investments in human capital are a decision that is made by parents on behalf of their children. If households have a limited amount of resources and prefer to invest more in sons, we would expect that girls with brothers are worse off and brothers with sisters to be the most favored. However, Butcher and Case (1994) find conflicting results. Analyzing data in the U.S. from 1920–1965, they find that a daughter with a brother receives half a year more education than if she had a sister. Conley (2000) finds the opposite effect, where girls' educational attainment is lowered by the presence of brothers. These conflicting results could be the result of selection based on family size, or the way in which joint investments are made in a family. Focusing just on the arguably random gender of the first born child, Dahl and Moretti (2008) find that siblings with a first born sister have lower education on average compared to siblings with a first born brother.

4. Gender Differences in Developing Countries

Unlike in developed countries, the number of females relative to males is much lower in the developing world, implying that gender discrimination has larger effects on female mortality. Hence, health investments are an important dimension along which girls are discriminated against in the developing country setting. We first examine differences in health investments that might result in excess mortality among women. Later in this section, we examine gender differences in household inputs such as educational investments, parental time and food expenditures.

4.1 Differences in Health Investments: Excess Female Mortality

In 1990, Sen (1990) highlighted the incredibly low female to male ratios in countries like China (.94), India (.93) and Pakistan (.90) relative to the gender ratios seen in developed countries (1.05) and estimated that there were some 100,000 million missing women. At all ages, women's biological ability to survive is higher than men's (Sen 1990), indicating that women must be missing women due to social and cultural practices. Though a proper counterfactual is difficult to determine (due to such factors as countries' different life expectancies, incidences of illnesses, and genetic differences), the large differences in gender ratios suggest unnatural numbers of missing women in developing countries (Sen 1990, Anderson and Ray 2010). The potential negative consequences of missing females go beyond the individual disutility of the women directly affected. Ebenstein and Jennings (2009) discuss the lack of women in the Chinese setting and estimate that 10.4 percent of Chinese men born between 1980 and 2000 will never marry. Using historical and current trends, they argue that this could lead to potential lack of care for the elderly (in particular unmarried men who do not have offspring), increased crime, and increases in prostitution and sexually transmitted diseases. Using province level implementation of China's one child policy, Edlund et al. (2007) argue there exists a causal link between rising male ratios in China and the incidence of crime. Excess female mortality can occur via sex-selective abortions, which is prevalent in this setting, as well as through post natal discrimination in health investments. Below, we summarize the findings of papers that examine each.

4.1.1 Sex-Selective Abortions

The assumption that parents do not influence their child's gender is no longer innocuous in the developing country setting, especially in South Asia. Evidence from birth rates suggests a relatively high incidence of sex-selective abortions in Asia. Following the availability of prenatal sex diagnoses in these regions, the gender ratio at birth began to skew towards boys, especially for children in higher birth orders, suggesting sex-selective abortions that favor male children (Bhalotra and Cochrane 2010, Ebenstein et al. 2012, Arnold et al. 2002). Bhalotra and Cochrane (2010) estimate 480,000 girls were aborted in India over the decade 1995–2005. Their estimates run

counter to the popular belief that households desire at least one son, but find that families tend to favor two boys and a girl. Arnold et al. (2002) find that even within India, large regional variation exists. In northern states, (like Punjab, Haryana and Rajasthan, which are known for greater son preference), in the late 1990s when prenatal sex tests were becoming prevalent, couples who had a first born daughter were more likely to abort their next conception than if they had a first born son. Even though over 94 percent of women receiving an ultrasound do not report an abortion, they still estimate 106,107 as a lower bound for sex-selective abortions of female fetuses each year (this is despite the fact that revealing the sex of the fetus is illegal in India). They further find that the male to female ratio in northern states for couples after an abortion is 1.58 and for last born children is 1.88—much higher than the country average of 1.07—suggesting that many of these couples had an abortion in hopes that the next child would be a son.

Ebenstein (2010) documents the extent to which the one-child policy in China increased sex-selective abortions. He finds that in areas where the policy was more strictly enforced, male-female sex ratios are higher and is driven by an increase in the prevalence of sex selection within the first two births. He further finds that the interval between births is longer for sons than daughters, suggesting those couples who have a son had past failed pregnancies, and that the fraction of male children increases for higher order births. Ebenstein et al. (2012) further find that the diffusion of ultrasound access in China led to an increase of girls' death in the first four weeks following birth, suggesting gender differences in prenatal investments.

The phenomenon of sex-selective abortion makes the detection of gender discrimination even more difficult; we can no longer compare differences between girls and boys, even at birth, since gender is no longer a random variable. Still there are researchers who have argued that sex-selective abortion is rare for first born births in India, and hence the gender of the first born is still an exogenous variable and allows for valid comparisons., Bhalotra and Cochrane (2010) find that more educated and wealthier households are more likely to undergo sex selective abortions. This suggests that girls are more likely to be born into richer families This is likely to create an upward bias in the estimated gender discrimination against girls since there is a positive correlation between

education and wealth and sons. On the other hand, to the extent that we believe these households that perform sex-selective abortions would have discriminated more against girls relative to boys, our estimates may be underestimating discrimination.

Areas where sex-selective abortions are prevalent typically also exhibit son preference-based fertility stopping rules. In line with families practicing son preference based fertility stopping rules, Arnold et al. (2002) find that girls are more likely to live in larger families. Barcellos et al. (2012) show that while the youngest children in a family are 51 percent likely to be male when aged zero to five months, youngest children aged 54 to 59 months are 58 percent likely to be male, suggesting that the households decide to have another child if their previous child was a girl. This fertility stopping pattern has also been linked to a significant fraction of India's excess female mortality in the recent work of Rosenblum (2012). Many of the results in this chapter are suggestive of increased discrimination at higher birth orders, when the pressure of having a son is greater (e.g., Jayachandran and Kuziemko 2011).

4.1.2 Missing Women after Birth: Health and Shocks

While much attention is given to sex-selective abortions, the missing women phenomenon is not limited to sex ratios at birth. Anderson and Ray (2012) document missing women in India, China, and Sub-Saharan Africa (hereafter SSA) by comparing male-female death ratios at different age groups with those in developed countries and find that the majority of missing women occur at later ages as opposed to at birth.⁹ They show that unlike in developed countries, India and SSA have a male to female death ratio that is under one until women reach their mid-30s. Of the total missing women in 2000, less than 11 percent was due to prenatal factors in India (less than 40 percent in China). Though SSA does not appear to have missing women at birth, the region has a total of approximately 1.53 million missing women, making it comparable to the total missing women in India (1.71 million) and China (1.73 million).

⁹ In general, creating the correct counterfactual for male-female death ratios is difficult and perhaps using developed countries as a comparison is not an exact counterfactual. Thus, while these numbers may not be wholly accurate due to ambiguous counterfactuals, they do provide strong evidence of a significant number and trends of missing women.

The reason for so many missing women in later ages can be due to a host of factors. While one mechanism may be direct discrimination (e.g., health care differences or violence against women), it is also possible that there are genetic gender differences in the incidence of illnesses, or cultural norms or poverty that lead to nuanced gender differences in illnesses and death. While it is clear that across all age groups the relative death rate of women to men is higher in developing countries (see Anderson and Ray, 2012), it is difficult to pin down the mechanism as to why this difference occurs and how much of the phenomenon can be attributed to gender discrimination.

Researchers have made progress towards understanding this phenomenon by examining shocks to income and testing for a gender specific response. Under equal treatment, barring any genetic pathways by which women might react differently to economic shocks, we should find that men and women are affected similarly by shocks to income. However, using data of rural Indian children born between 1961 and 1964, Rose (1999) shows the female-male survival ratio increases during times of favorable rain fall (i.e. when economic conditions are more favorable). Miguel (2005) looks at rainfall data in Tanzania in the 1990s and finds that in times of poor rainfall shocks, more “witches” (nearly all of whom are elderly women) are accused and killed. These studies suggest that when times are economically poor, discrimination against women is likely to be exacerbated.

Anderson and Ray (2012) decompose male-female death ratios in developing countries by disease, and find that at younger ages, infectious, nutritious and reproductive ailments cause excess female deaths, and at older ages, chronic and degenerative diseases dominate. Perhaps suggesting fairly high levels of discrimination is the simple statistic that in India, a significant number of excess female deaths occur from “injuries,” with approximately 30,000 extra female deaths due to intentional injuries. Observing infants, Khanna et al. (2003) estimates that in Delhi, India from 1997 to 2001 mean infant mortality was 1.3 times higher among females than among males. While twice as many infant girls less than a year old died from diarrhea (responsible for 22 percent of infant deaths overall), a relatively preventable illness, there were no significant gender differences in deaths that are less preventable (birth asphyxia, septicemia, prematurity,

and congenital anomalies).

While Khanna et al. (2003) provide suggestive evidence of parental discrimination by gender by comparing mortality on the basis of their preventability, others have attempted to estimate direct differences in health care investments for boys versus girls. Asfaw et al. (2010), using the 2004 Indian National Sample Survey, find that for children under nine, boys are much more likely to be hospitalized than girls, and that though families use similar amounts of income and savings in health expenditures, they are more willing to use drastic financial measures -- such as borrowing and selling of assets -- for boys' health expenditures. This gender gap in health care is higher for poorer families, where budget constraints are tighter. While this suggests families discriminate in health care by gender, alternative explanations are possible, including different incidences of illnesses by gender or different household composition for households with boys versus girls.

Bharadwaj and Nelson (2012) investigate the extent of differential health care treatment even before birth (for the subset of children who are born) in India using data from the 1990s and 2000s. They find that mothers who have sons are 1.8 percent more likely to receive prenatal care at least twice and significantly more likely to receive a tetanus shot. They estimate that the gender gap in receiving a tetanus shot accounts for between 4–10.5 percent of excess female neonatal mortality in India. In northern India, these differences are even greater, with women being 16 percent more likely to deliver their babies outside of their home when having a boy. Bharadwaj and Nelson (2012) find similar suggestive evidence in China, Bangladesh, and Pakistan.

Barcellos et al. (2012) examine children in 1992 in India (before sex selective technology became prevalent) at a young age (zero to 15 months), before parents have another child, as a way to overcome the endogenous fertility choice of parents based on previous children's gender. They find that boys are more likely to be breastfed longer, given vaccinations, and given vitamin supplements, although similar to other studies, they find no differences in anthropomorphic indicators (weight for height z scores) by gender. They find no evidence that these differences stem from differential gender needs of infants, and argue that these results are due to discrimination by parents based on child

gender. As none of the above studies directly control for sex-selective abortions, these estimates may be considered lower bounds, assuming that including such abortions would show higher levels of discrimination.

Jayachandran and Kuziemko (2011) find that girls in India are breastfed for approximately .37 months less than boys and argue that this is a response to son-preference fertility rules given the different patterns exhibited by birth order. Breastfeeding inhibits fertility, and so households that have not met their desired number of sons will stop breastfeeding children earlier in hopes that the next child will be a son. Breastfeeding is essential in these settings. They estimate that the reduced time spent breastfeeding could account for 8,000 to 21,000 missing girls in India each year, explaining approximately 9 percent of the gender gap in child mortality.

4.2 Differences in Other Inputs

While health is a major factor along which discrimination favors boys over girls in developing countries, there are other dimensions along which parents favor boys. Lack of data has made gender differences in household expenditure in developing countries a difficult task to document. In this section, we discuss education, food, and parental time as possible areas of gender discrimination in the family.

4.2.1 Education

Girls' education has historically been significantly lower than boys' education, though rapid advances have been made in the past two decades to reduce the gender gap. In the 1990s, a series of papers discussed the large gender gaps in educational enrollments (e.g., Filmer and Pritchett 1998) but as Figure 3 shows, drastic reductions have been made in the gender gap in school enrollment over time in developing countries, at least at the primary level. Though progress has been made to close the gender gap, school dropouts are still more likely to be girls, especially in secondary school (UNESCO 2012, ASER 2010). Azam and Kingdon (2011) use data from the 2005 India Human Development Survey and observe no evidence of gender bias in school expenditure or enrollment at the primary school level (age five to nine). However, they do find a difference in education expenditure by ages 10–14, and a difference in

enrollment (though not on expenditure conditional on enrollment) by ages 15 — 19. One of the reasons behind the different expenditures is that boys are more likely to be sent to private schools, which is generally considered to be of higher quality than free public schools.

An underlying reason for the different investments in education may be due to different requirements of boys and girls. Many have argued for gender specific policy proposals to attract female students, such as recruiting more female teachers, separate bathroom facilities for girls, or reducing distances to schools. However, evidence on whether reductions in such barriers disproportionately increase female educational attainment is sparse. Burde and Linden (2012) find that reducing the distance to schools in Afghanistan by building local village schools drastically increases older girls' enrollment rates and test scores, which they speculate is driven by increased safety for girls. Though both genders experienced increased enrollment and test scores, they find that girls are more sensitive to distance, leading to higher effects for girls to the point of virtually closing the gender gap and reducing the test score gap in enrollment by one third. However, a significant number of other papers have found little evidence of enrollment increases as a function of distance to school (Filmer 2007, Handa 2002). Muralidharan and Sheth (2012) find that girls with female teachers do experience a very small increase of approximately .025 standard deviations in test scores than when they matriculate with male teachers, but find limited evidence of increased attendance when taught by a female teacher, suggesting a limited role of parents reacting to female teachers. Thus, while there is some evidence that girls face differential requirements to succeed in schools, overall not much is known about the extent to which this drives observed differences in educational attainment and investment.

One leading theory for why son preferences exist is that the household rate of return for boys is higher than for girls. Differences in educational attainment may be one factor behind the lower rates of returns to girls, though it is difficult to disentangle the direction of causality. Differences in educational investment may *stem* from different rates of return to human capital by gender, or difference in educational investments may *lead* to different rates of return by gender.

Jensen (2012) finds that increasing awareness of employment opportunities for women resulted in increased enrollment and body mass index of younger school-aged girls (ages 5–15), suggesting that parents are willing to invest in girls more when the potential of their future returns are improved. The study finds that recruiters advertising employment opportunities for females in rural India closed 60 percent of the baseline gender gap in enrollment and 15–20 percent in BMI for girls aged 5–15, and increased the household budget share for girls' schooling for girls aged 5 – 15. Munshi and Rosenzweig (2006) find that increasing returns to English combined with caste-based networks are at the heart of increased school enrollment and investment for girls in cities in India. The idea in their paper is that while boys' occupation should conform to caste norms due to network effects, girls' occupation choices are not similarly constrained. Hence, when returns to English language skills increased in India, so did girls' educational investments. Jayachandran and Lleras-Muney (2010) show in a different context (Sri Lanka) that when female adult mortality declines (specifically through reductions in maternal mortality), schooling of girls increases, since increased life expectancy increases the returns to education. Their study suggests that increasing returns to education for women impacts educational investments.

4.2.2 Household Expenditures

Identifying gender differences in food purchases or other expenditure has been challenging due to lack of detailed data on consumption or expenditures within the household. Some of the earlier studies resort to creative ways of empirically documenting whether resource allocation within the household is driven by gender discrimination. A classic early study in this fashion is by Deaton (1989), who finds that in Thailand there is a small, though statistically insignificant bias in favor of boys in household expenditure. Deaton (1989) does this by inferring that for a given level of income, adults in families with children will spend less on goods for themselves (“adult” goods) in order to purchase things that matter more for children (“children’s” goods). Discrimination can be detected if for a given family size, families with boys make smaller expenditures on adult goods than families with girls.

However, even having individual level data on expenditure and consumption does

not solve the problem of inferring whether gender discrimination occurs. If men and women have different caloric needs, then gender differences in food expenditure and consumption can occur due to such needs rather than due to discrimination. In order to solve these issues, researchers in the past have opted to proxy for these caloric needs by using a measure of “health endowment”. After accounting for this proxy, however, any remaining differences in allocation could be attributable to discrimination. Pitt et al. (1990) find that boys (age 12 and older) consume more food than girls (30 percent more) in Bangladesh. They find that the households are generally averse to inequality and it is the different caloric needs of men versus females that drive the results. This result is supported by a lack of difference in mean calories consumed for children ages seven to 11 (since presumably for younger children, caloric needs across boy and girls could be quite similar), though under age six, boys do receive more calories.

A different approach to this problem is to examine whether the allocation of income within the household (to the mother or the father) affects nutrients or expenditures on girls versus boys. Thomas (1994) finds suggestive evidence that parental gender matters for resource allocation within the household. Using data from three different countries, Thomas finds that resources are better allocated to girls when mothers have better bargaining power within the household. This better resource allocation is reflected by girls having better health outcomes, as proxied by height. Duflo (2000) finds similar results in South Africa using exogenous variation in female pension incomes. She finds that pensions that go to grandmothers raise the anthropometrics of young girls in the household. No such effect is found for boys.

Another aspect of household expenditure is the opportunity cost of time of the parents. Since parental investments are important for determining later life outcomes, researchers have examined whether parental time inputs vary by the gender of the child. Barcellos et al. (2012) look at young children before son preference fertility stopping rules result in additional children and find that parents spend significantly more time with boy children in the first year of life than with girls. They find that boys have approximately 30 minutes more a day than girls (14 percent more time), and that the quality of care for boys is higher. While lacking direct data on time spent with children,

Rose (2000) finds similar evidence by examining labor market choices of women after the birth of a boy compared to labor market choices after the birth of a girl. She finds that in credit constrained households, women work more after giving birth to daughters. Since this increase in labor market hours occurs when the child is quite young, we can presume that this implies less parental time spent with the child during her formative years.

4.3 South Asians in North America: Cultural Persistence of Son Preference

While gender discrimination exists in all parts of the world, the extent of discrimination is arguably much greater in developing regions. To what extent are the increased gender gaps we see in developing countries a function of living in a lower income society? Do gender gaps in immigrant families disappear when they move to developed countries and live in a more prosperous economic climate, or is the preference for a son deeply entrenched in cultural and social norms that persist despite changes in living standards? When observing immigrants in developed countries, there is suggestive evidence of stronger sex preferences than non-immigrant populations in the country. Higher male-female birth ratios, particularly for higher birth orders, suggest gender bias among Asian immigrants in the U.S. and Canada (Almond and Edlund 2008, Almond et al. 2009, Abrevaya 2009, Lhila and Simon 2008). In particular, Almond et al. (2009) find that fertility stopping rules drive the sex composition for first generation Asian families, while sex-selective abortions are the more predominant method for second generation Asian families in Canada. Abrevaya (2009) estimates over 2,000 “missing” Chinese and Asian Indian baby girls in the U.S. between 1991 and 2004.

In addition to fertility and abortion choices, Pablonia and Ward-Batts (2007) find that for married parents with an only child less than two years old, Asian men in the US work less relative to white men when they have a son rather than a daughter. One explanation is that there is an increase in Asian men’s greater desire to spend more time with sons, especially young sons. These studies suggest that even when removed from a developing country context, cultural norms are persistent and son preference is evident. Though the effects of son preference tend not to be as large as in China and India, this could be because of a selection bias in the type of person who chooses to immigrate, as opposed to a reduction in gender preference

5. Conclusion

Our paper summarizes recent economic work that documents the existence of gender discrimination along various dimensions, and in particular differential outcomes during early childhood in developed and developing countries. Our assessment of the literature suggests that girls everywhere experience lower levels of parental investments when they are younger, be this via family structure, health investments, parental time or educational investments. While we think this plays a part in the differences in mortality (in the developing country case) or labor market consequences we see between adult men and women, the extent to which these differences are a causal factor in that process is difficult to determine.

Most importantly, our chapter says very little about *why* discrimination, defined as differential treatment based on gender, occurs in the first place. Why is there a preference for sons? Research on this important question is rather sparse. Understanding the reasons underlying preferential treatment of sons is key for crafting effective policy aimed at reducing the gender gap in investments. Numerous competing explanations have been posited to explain the gender preferences we observe. Theories include gender differences in actual taste-based preferences, parents having a comparative advantage in raising a child of their own gender, monetary returns to inputs which vary by gender (e.g., education), needs and requirements related to gender (e.g. increased security, nutritional requirements, old age insurance), and costs (e.g., dowries). Though researchers have been able to document variety of gender differences, little progress has been made in deciphering the possible mechanisms behind the observed gender gaps.

Recent research from developing countries however, provides some evidence that economic factors play an important role in the formation of son preference. Such research could be translated into policy aimed at reducing gender gaps. In recent work, Qian (2008) finds that increasing the return to female labor income while holding male income constant increases female child survival in China. The work of Lleras-Muney and Jayachandran (2010) also suggests that increasing the rate of return to female education increases investments in girls. The previously discussed work of Jensen (2012) is another example of how gender gaps in investments could potentially be reduced by simply

providing families with relevant information on the rate of return to education. All of these studies have direct policy relevance in that they suggest that changing economic opportunities for women would potentially reduce discrimination against girls when they are young. However, more work needs to be done in establishing whether such policies indeed translate into better childhood investments for girls.

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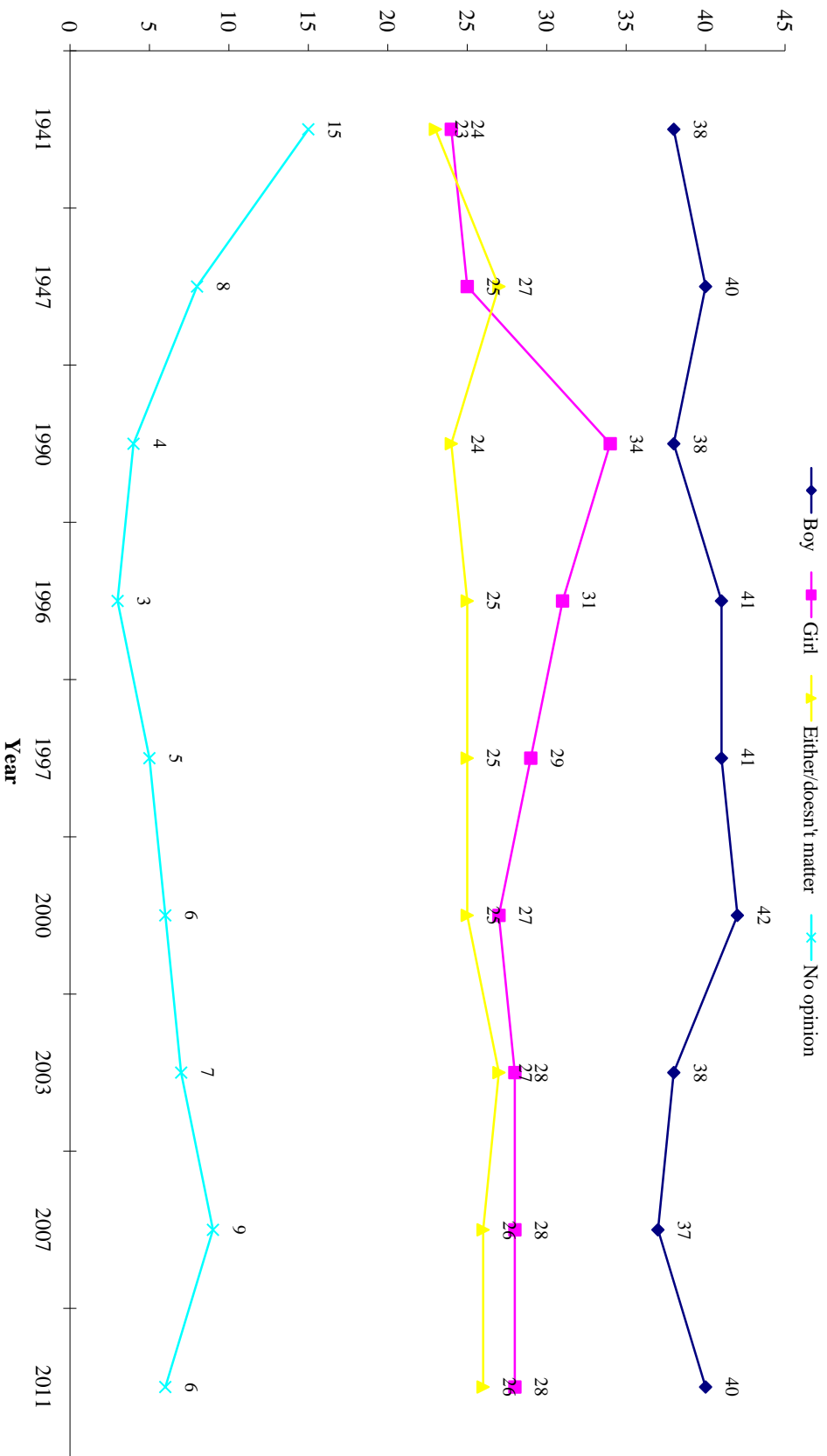
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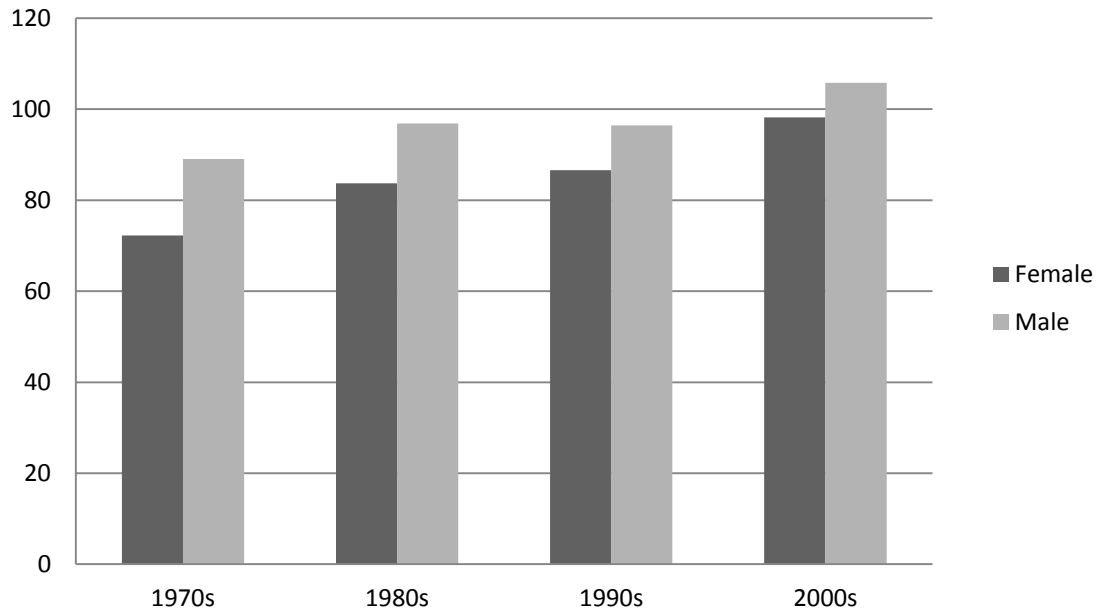
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Figure 2. Trend in Preferences for Sons versus Daughters in the U.S., Gallup Poll Data, 1941-2011.



Questions: 2000, 2003, 2007, 2011: Suppose you could only have one child. Would you prefer that it be a boy or a girl?
 1996, 1997: If you were to have a child right now, would you rather have a boy or a girl?
 1947, 1990: If you had another child would you rather have a boy or a girl?
 1941: If you could have only one (one more) child, which would you prefer to have--a boy, or a girl?

Figure 3. Gross Enrollment Rates in Primary School by Gender in Developing Countries.



Calculations based on 92 countries from Africa, Asia, and Latin America. Averages are taken over decade per each country, and then averaged over the countries. Source: UNESCO Institute for Statistics.