Determinants of Gender Inequality in Child Mortality in India: Does God(s) Matter?

Introduction

Around 100 million women are missing in the world due to gender inequality (Sen, 1990). Half a million girls a year are selectively aborted in India alone (Jha et al., 2006). These numbers are alarming. Why are women, and more specifically girls, more likely to die than boys compared to what should be expected based on biological differences? Why do certain societies seem to prefer investing in the health of boys while others seem to prefer investing in the health of girls? Many answers to these questions have been proposed in the literature, mainly in the context of South Central Asia; the female labour force participation (Kishor, 1993; Murthi et al., 1995; Rosenzweig and Schultz, 1982), the kinship system (Das Gupta et al., 2003; Kishor, 1993), religion (Borooah, 2004; Das Gupta, 1987; Kishor, 1993; Koolwal, 2005; Rosenzweig and Schulty, 1982) and wealth (Das Gupta, 1987; Kishor and Parasuraman, 1998; Murthi et al., 1995) are the principal explanations. Some researchers have also demonstrated that inequalities in mortality vary in response to birth order and the sex composition of siblings (Arnold et al., 1998; Das Gupta, 1987; Hallman, 2000; Kishor and Parasuraman, 1998; Simmons et al., 1982). Finally, it is also possible that parents discriminate between their children on the basis of gender simply because they have a taste for discrimination.

As we have just seen, many factors may explain why parents have a preference for sons. However, as parents can not always choose the exact number nor the exact gender composition of their family, they must sometimes rely on post-birth solutions (Simmons et al., 1982). Parents have three main ways to influence the size and the composition of their family. The most obvious method is infanticide. However, even in countries with a high level of gender inequality in child mortality, infanticide is a rare event and can explain only a very small share of child mortality (Basu, 1989; Bourne and Walker,

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1991). Chen et al. (1981) and Das Gupta (1987) argue that, rather than infanticide, it is inequality in food intake and access to health care that explains most gender inequality in child mortality.

This paper analyses the factors motivating parents to discriminate between their children with respect to five health-related variables; namely, if the child has survived until age one, the height-for-age z-score, the weight-for-age z-score, the number of vaccines received and whether or not parents have sought treatment or advice for diarrhoea in cases where the child has suffered from diarrhoea in the two weeks preceding the survey. The main focus of this article is on the role of religion in explaining these different measures of health inputs and outputs while controlling for a comprehensive set of explanatory variables that reflect other potential explanation for gender inequality.

Table 1 shows differences in son preference[1] across the different religious affiliations prevalent in India. The most prominent difference between religions is between Christianity, with the lowest level of son preference, and Sikhism, with the highest, while Buddhism, Hinduism and Islam have levels of son preference similar to each other. The sex-ratio of children less than six years old follows the same pattern. Christians have the most balanced sex-ratio, Sikhs have the worst, while Hindus and Muslims have sex-ratios between the Christians and the Sikhs. If we look at the relative rank of different religious affiliations by states, we notice that, on average, Christians occupy the second rank in terms of low level of sex-ratio while, again, Sikhs occupy the highest rank. Muslims, Hindus and Buddhists have sex-ratios similar to each other.

[1] Son preference is defined as the number of sons wanted as a proportion of the total number of children wanted by the mother. Data in Table 1 are averages for all mothers in the relevant religious group. The father's preference for sons is expected to also have an impact on gender inequality in child mortality. However, the DHS has not collected this information in India.

Table 1: Preference for Sons and Sex-ratio Average by Religious Affiliation

Religion	Preference for sons	Sex-ratio[2]	Rank by religion with the highest sex-ratio in different states
Christian	0.5346***	0.99	2
Muslim	0.5643***	1.07	5
Hindu	0.5695	1.07	5
Sikh	0.5818***	1.12	7.6
Buddhist	0.5535***	1.04	6
Atheist	0.5052***		

Even by looking simply at averages for states that are, either, predominantly Hindu, Muslim, Christian or Sikh, an ordering appears, even though in a slightly blurred way. Predominantly Christian states, with an average of 0.524, clearly have the lowest preference for sons, with the predominantly Muslim state, at 0.574, and the predominantly Sikh state, at 0.572 having the highest level, followed closely by predominantly Hindu states, at 0.561. The question I will try to answer is whether or not, holding all else constant, parents' religion has an impact on gender inequality faced by children. As I will discuss later, even though, at first sight, there is no major difference between religious groups in terms of gender inequality in health inputs and outputs of children under five years old, the difference in sex ratios between the different religious groups is marked and follows a similar pattern to the son preference expressed by the mother (see Table 1). This paper will try to determine whether or not religion has an impact on gender inequality in child mortality, nutritional outcomes and access to health care, henceforth referred to, generically, as gender inequality in child mortality. Furthermore, if the impact of religion is significant, I will measure the share of this difference that is due to difference in endowments between the religious groups and the share that is due to religion as such.

The originality of this paper relies on many aspects. First, this article studies the determinants of mortality by allowing each coefficient to vary according to the gender of

[2] Preference for sons is measured using DHS data while the sex-ratio is measured using the Indian Census of 2002. The sex-ratio is the ratio of boys to girls of less than six years old.

the child, through the use of interaction terms. Moreover, the size of the database used also allows me to control for a wider range of variables than is usually the case in the literature, in particular a wider range of cultural variables. In addition, different techniques, such as model-based versus design-based approach, Heckman and Blinder-Oaxaca decomposition techniques are investigated alongside the traditional OLS, Logit and Poisson models. Furthermore, contrary to what is usually done in the literature, an extended discussion of the different elements found in the holy books on gender inequality and the relative value of boys/girls is presented. This paper also includes extra control variables for Christianity, Sikhism and caste membership, rather than just Hinduism and Islam, the two prominent religious groups in India and, consequently, the two religions generally studied (Ahmed et al., 1998; Kishor, 1993; Rosenzweig and Schultz, 1982), as.

The remainder of this article is organized as follows. In section 2, I give an overview of the variables usually found in the literature explaining gender inequality in child mortality. In the third section, I summarize the main elements found on the worth of children, gender inequality and infanticide in Hinduism, Sikhism, Islam and Christianity. In the fourth section, I discuss the database used and present some descriptive statistics. In the fifth section, the empirical results are presented. Finally, in the last section, I conclude.

2. Background on Gender Inequality in Child Mortality, Nutritional Outcomes and Access to Health Care

Five main explanations have been proposed in the literature to explain gender inequality in child mortality. These explanations are the economic system, the cultural system, the resource constraints faced by parents, selective discrimination and son preference. In the following section, after reviewing the five dependent variables in more detail, the different categories of explanatory variables are presented one by one, starting with a short theoretical explanation and followed by some empirical evidence from the literature.

Dependent Variables

This paper focuses on infant mortality because, for biological reasons, boys are more likely than girls to die in infancy, while during childhood (one to five years old) both boys and girls face the same mortality risk. Given the difference in relative risk between boys and girls for these two age groups, analysing them separately is advisable for ease of interpretation. Moreover, given that the majority of child death occurs during the first year of life, focusing on infant mortality allows me to have more observations of children who did not survive.

In terms of nutritional outcomes, two measures have been chosen: the height-for-age z-score, a measure of long-term nutritional status (i.e. that which is not influenced by recent episodes of illness); and the weight-for-age z-score, a measure summarizing the height-for-age and the weight-for-height z-scores (the latter being a measure of short-term nutritional outcomes). The WHO reference group is used to calculate the height-for-age and weight-for-height z-scores (WHO, 2006). This reference group is preferable to the generally used USA reference group, found in the DHS database, as it includes children of different races.

Two measures of health care are used in this analysis. First, the number of vaccines received by a child. This sample is restricted to children between two and five years old, as all vaccines included in the questionnaire are supposed to be given before the age of two. Second, whether or not parents have sought treatment or advice for diarrhoea, if the child has suffered from diarrhoea in the two weeks preceding the survey. One drawback of this latter measure is that diarrhoea is often better treated at home with oral rehydration salts (ORS) than by seeking the help of a professional (Rao et al., 1998). However, as we are interested in the willingness to provide differential care by gender and not on the efficiency of care given, treatment for diarrhoea is still an appropriate measure to consider.

Economic System

As an economist, the first possible explanation that comes into mind to explain gender inequality in child mortality is the fact that girls, in some societies, are worth less in economic term than boys. The economic explanation is quite straightforward. If girls are not likely to work, either as adults or as children, and are not able to actively participate in home production, their economic return is less than that of boys. As a consequence, based only on economic criteria, it is rational to prefer to have sons only. In addition to controlling for variables directly measuring female labour force participation, the GDP per capita provides a more general measure of the importance of women in the labour force. The rational behind this variable is based on Boserup's analysis (1970). She states that as women are kept out of the labour market, the average wage increases to a higher level than if women were allowed to enter the market. In parallel, as the market economy system conditions households to depend more heavily on money, the pressure on women to enter the labour market keeps increasing. The government will also have incentives to provide more education and training activities for women in order to encourage them to enter the labour market. The participation of women in the labour market will in turn encourage them to seek more equality within households. In other words, after the economy reaches a certain threshold, economic development should foster more gender equality. Moreover, GDP per capita can also relieve the resource constraint faced by the household. This point will be discussed further later.[3]

The conclusions reached by the literature on the impact of the economic system on gender inequality in child mortality vary from one article to the other. For example, Das Gupta (1987) and Filmer et al. (1998) conclude that GDP per capita has no significant impact on gender inequality in health-related variables of children aged under five. However, when one focuses on the aspects of economic development that foster female emancipation (e.g., female labour force participation), instead of looking at general

[3] The variable used to measure the different economics systems are: the GSDP per capita (GDP, GDP2), the percentage of women working in a state (WORKREG), the relative wage of male and female prevalent in the state of residence (INDEXWAGE) and, an index of freedom of movement (INDEXMOB).

measures of economic development (GDP per capita), one generally concludes that it has a positive impact on gender equality faced by children less than five years old. For example, Rosenzweig and Schultz (1982), Kishor (1993) and Murthi et al. (1995) conclude that in India in 1981, increased female labour force participation reduces gender inequality in child mortality. However, this reduction in inequality is not due to an improvement in female child survival rates but, rather, due to a smaller increase in the relative odds of dying of girls compared to boys. This result is confirmed in a study by Kishor and Parasuraman (1998). This quotation from Murthi et al. summarizes well the conclusions reached by the literature:

> It is striking that, while the variables directly related to women's agency (specifically, the female literacy rate and female labor force participation) have a strong and statistically significant negative impact on female disadvantage, those relating to the society's general level of economic development and modernization (e.g., poverty, urbanization, male literacy, and medical facilities) do nothing to improve the relative survival chances of girls vis-à-vis boys. (Murthi et al., 1995: 770)

Cultural System

Children can provide non-economic, as well as economic, returns to their parents. Cultural and religious worth are certainly two of the most important returns of this kind. In the case of cultural worth, the kinship system has been documented to have an important impact on the relative worth of boys and girls. For example, the practice of endogamy [exogamy[4]] increases [decreases] girls' relative worth as they are more [less] likely to stay in the same house/village than their parents once adults. They are, consequently, more [less] likely to support their parents either financially or emotionally than their brothers (Kishor, 1993).

Although religious worth is often mentioned in the literature, no study has so far tried to discuss, in detail, why some religions might ascribe different worth to boys and girls. As

[4] Exogamy implies that the bride and the groom are not related to each other. For example, in this type of kinship system, cousin marriage is not allowed or, at least, is rare. The practice of exogamy implies that women [men] are "transitory components" of the lineage. As daughters [sons], they will leave their families after their marriage. As wives [husbands], they are an outside element of the family.

the main religions in India are Hinduism, Islam, Christianity and Sikhism, I will discuss in more detail these four religions in the following section.[5]

Very few empirical studies have been conducted on the impact of the cultural system on gender inequality in child mortality. Generally, these studies use cultural factors to explain the otherwise unexplained part of gender inequalities (e.g., Das Gupta et al., 2003). The only study that I am aware of that tests empirically, in a multivariate analysis, the impact of cultural systems on gender inequality in child mortality is by Kishor (1993). In this study, Kishor uses three different variables as proxies for kinship systems: the prevalence of exogamy,[6] the children/women ratio and an early marriage ratio.[7] The first two variables have the expected signs and are statistically significant, whereas the early marriage ratio is not statistically significant in explaining gender inequality in child mortality. Hence, there is a clear need in the literature for more research on the cultural aspect of gender inequality in child mortality. In addition to controlling for a wider range of variables than Kishor, this article looks at the individual probability of dying, while Kishor was interested at the sex-ratios at the district level.

Resource Constraints

Even if parents are not willing to discriminate against any of their children they might be constrained to do so given their limited resources. Financial resources are obviously necessary in order to provide child care. However, the time available for child care, the household environment, the level of access to medical care facilities, the parents' knowledge about childrearing and the scarring effect, i.e. the death of an older sibling

[5] In terms of the cultural system, the explanatory variables are: the prevalence of endogamy in the state of residence (ENDOGAMYREG) and an index of freedom from violence (INDEXVIOLENCE), the level of preference for son in the state of residence (PREFMOTREG), the mother's religion (MUSLIM, BUDDHIST, HINDU, OTHERREL and ATHEE), the child's caste (SCHCASTE, SCHTRIBE, BWDCASTE) and the religion of the majority in the state of residence (MUSLIMREG, HINDUREG, SIKHREG).

[6] To measure the prevalence of exogamy, Kishor uses the fact that, in India, men migrate generally for economic reasons whereas females do so mainly for marriage (Premi, 1979, cited in Kishor, 1993; Libbee and Sopher, 1975, cited in Kishor, 1993). She then constructs the ratio of female migration/female non-migration to male migration/male non-migration.

[7] Another important aspect of gender-differentiated kinship systems is the high fertility level and the low age at marriage (Dyson and Moore, 1983, cited in Kishor, 1993). The two other measures of kinship systems used by Kishor are then: 1/ the children/women ratio: $Children_{0\text{-}10}/women_{15\text{-}35}$ and 2/ the early marriage ratio: $married\ females_{15\text{-}20}/unmarried\ females_{15\text{-}20}$.

during childhood, are all other important resources in "child production" (See for example: Arulampalam and Bhalotra, 2006; Jensen and Ahlburg, 2002; Kishor and Parasuraman, 1998; Maitra and Pal, 2007; Murthi *et al.*, 1995).

Two arguments may be used to explain the relationship between resource constraints and gender inequalities in child mortality, nutritional outcomes and access to health care. The first is certainly the most straightforward: people lacking resources are more likely to discriminate as their resource constraint is more binding. With limited resources, they must choose a limited number of children that will receive adequate care. They will then give priority to their favourite children (Das Gupta, 1987). However, some authors believe that a minimum level of resources is necessary before being able to discriminate against some children. For example, at low levels of economic development, parents do not have access to resources allowing them to increase their children's odds of survival or to educate them, and therefore cannot discriminate via the provision of these resources between their children (Jensen and Ahlburg, 1999). It may also be argued that, in certain societies, more resources allow the family to protect more heavily the family's honour by limiting women's mobility and, even, by secluding them (Chen, 1995, cited in World Bank, 2003). Seclusion may have two different impacts on gender inequality in child mortality. First, seclusion reduces women's worth as they are not allowed to participate actively in the labour market. Secondly, seclusion may limit their access to health care and increase their risk of infection.[8]

The empirical results, like the theory, do not reach any clear conclusions. Some articles conclude that resources decrease gender inequality (Financial: Preston, 1976, cited in Berik and Bilginsoy, 2000), have no impact (Financial: Kishor and Parasuman, 1998; Medical care: Sauerborn et al.; 1996; Education: Murthi et al., 1995; Simmons et al., 1982; Bourne and Walker, 1991), or increase gender inequality (Financial: Bairagi, 1986;

[8]A wide variety of variables measuring the resource constraints faced by parents are used in my model: a wealth index (Z_WEALTHINDEX), if a flood has happened in the state of residence during the first year of life of the child (FLOOD), if the household is living in a rural or an urban area (RURAL), the distance to a health facility (HEALTHFACI), the ratio of children of less than five years old to 'adult equivalent' (COMPET), dummy variables controlling for whether the mother is working at home (HOMEMOT2) or if she is working outside the home (HOMEMOT3), the mother's age at the birth of the index child (AGEATBIRTH), mother's education (EDUCMOT), father's education (EDUCFAT), if the mother has received prenatal care (PRENATCAR) and if an older sibling has died during childhood (SCARRING).

Medical care: Murthi et al., 1995; Chen et al., 1981; Education: Kishor and Parasuraman, 1998).

Selective Discrimination

Even if parents might be more willing to have sons than daughters, they may desire to have daughters as well, but to have fewer daughters than sons. Consequently, as first pointed out by Das Gupta (1987), parents may apply selective discrimination between their children, with some children of either gender more at risk of dying due to the sex composition of their older siblings. Once parents have achieved their optimal gender composition of children, extra children, or children not wanted at the time of birth, are likely to have less care taken of them.[9] The impact is, however, likely to be stronger for girls.

Das Gupta's theory is not challenged in the literature as most studies, if not all, confirm her results (e.g., Arnold et al., 1998; Hallman, 2000; Kishor and Parasuraman, 1998; Simmons et al., 1982)

Son Preference and Power Balance

Independent of the reasons previously mentioned, parents may simply have a preference for sons [daughters].

The literature generally concludes that both parents express, and are able to implement, their preference for a specific gender composition of their family. For example, Simmons et al. (1982), in a study on rural Uttar Pradesh, India, find that the preference expressed by parents for having another child of a specific sex has an impact on the likelihood of a child surviving. Their measure of preference has, however, an important limitation.[10]

[9] In terms of selective discrimination, the gender of the child is controlled for (FEMALE), as is the gender composition of siblings (NO_SON_ONE_DAU, ONE_SON_NO_DAU, NO_SON_TWO_DAU, ONE_SON_ONE_DAU, TWO_SON_NO_DAU, ONLY_SON, ONLY_DAU and ATLEAT_ONE_EACH), if the child was wanted at the time of the birth (NOTWANTED) and the total number of children wanted by the mother (NUMBCHILDMOT).

[10] Their measure of preference is based on a question about the desired number of children of each sex conditional on the number of children of each gender they already have: "How many additional children

Simmons et al. conclude that the impact of preference is more strongly felt by girls than by boys, i.e. that unwanted girls are more like to die than unwanted boys, everything else constant.

Independent of the reasons why parents might be willing to discriminate between their children, it is possible that mothers have different preferences from their husbands. If this is the case, the power balance inside the household will determine whose preferences are implemented.[11] Many studies have concluded that women display more altruistic behaviours than men. For example, if women control a higher amount of revenue, they will increase expenditure most benefiting the children, such as nutrition, health care and clothes more than men (e.g.: Duflo, 2003; Durrant and Sathar, 2000). Consequently, more power in women's hands is expected to have a positive impact on gender equality. The opposite might, however, be true as, in India, mothers might rely more heavily than fathers on their sons to enhance their status and to support them during old age. Unfortunately, the data do not allow me to test this latter hypothesis.

The literature points toward female empowerment having a positive impact on gender equality. For example, Kishor and Parasuraman (1998) find that children's odds of dying follow different patterns, conditional on their mother's type of work. When mothers are working at home, which is poorly empowering, their working status has a negative impact only on girls. Conversely, when mothers are working for cash outside the home their working status has a negative impact only on boys.

Hossain et al. (2000, cited in Durrant and Sather, 2000) find that, in rural Bangladesh, women's autonomy, decision-making authority and mobility outside the village, all reduce child mortality, especially for girls. Similar results are found by Kishor (1995, cited in Durrant and Sathar, 2000) in a study in Egypt. However, Jejeebhoy (1998, cited in Durrant and Sather, 2000) conclude that mother's mobility is not a significant determinant of the risk of dying before one year old, except in the case of Tamil Nadu.

(sons, daughters) do you want?". Consequently, parents do not have the possibility of choosing a smaller number of children of each sex than they already have.

[11] Preference for sons is controlled for (PREFMOT) alongside a variable measuring the capacity to implement these preferences, namely, the gender of the household head (SEXHEAD), the age difference between the father and the mother (FATMOTAGEDIF) and the mother's age at first birth (MOTAGE).

Finally, control variables taking into account the environmental and genetic endowment are included in all regressions.[12]

3. Background on Religion, Children's Worth, Gender Inequality and Infanticide

State of the Literature

As previously discussed, religion is often mentioned as a potential factor influencing gender inequality in child mortality. The literature, however, generally focuses on only two religions, Islam and Hinduism, and neglects justifying on theoretical grounds why these two religions are assumed to encourage parents to gender discriminate between their children. Moreover, the literature does not reach a clear conclusion on the impact of religion on gender inequality in child mortality.

For example, Koolwal (2005) includes Hinduism in his list of independent variables when explaining son preference in Nepal. However, he presents no justification for this inclusion. Moreover, most of the coefficients on his Hinduism dummy are not statistically significant. In the same way, Rosenzweigh and Schultz (1982) and Kishor (1993) find no difference in gender inequality in child mortality between Muslims and non-Muslims in India. Similarly Ahmed et al. (1998) conclude that there is no difference between Muslims and non-Muslims concerning the relative risk of neo-natal mortality between boys and girls in Bangladesh. It is, however, important to note that for these three studies the reference group is all other religions. Their results might consequently be blurred by such a generalisation.

Das Gupta (1987) goes further in her analysis. She argues that one of the explanations behind differences in the sex ratio between Indian states is the proportion of certain castes and religious groups in these states. Das Gupta points toward the Jats, i.e. the peasants, and the Rajputs, i.e. the landowners, two Indian castes, and the Sikhs, as groups discriminating the most against women. However, she limits her explanation of which

[12] I.e., age of the child (AGE), the weight at birth (WEIGHTBIRTH), child is a twin (TWIN), mother's BMI (BMIMOT), mother's height (MOTHEIGHT), mother had a terminated birth in the past (TERMINATED), mother has received tetanus injection (TETANUS), birth spacing (INTERV_BEF_12, INTERV_12_24) and access to a toilet or latrine (TOILET).

customs and beliefs serve as the basis for discriminating heavily against girls in the Jats community to the patrilineal and exogamous system prevailing in this group. She also emphasizes the fact that Jats' daughters are severely limited in their capacity to help their parents during old age as custom forces fathers and brothers to give to their daughters/sisters on specific occasions, but also forces them to refuse any gifts their daughters/sisters might offer them. Even if her argument appears convincing, she does not empirically test it. However, by focusing her analysis on castes, instead of Hinduism in general, she acknowledges the variety of beliefs found within Hinduism, a fact that is neglected by most studies I am aware of. One other interesting exception in the literature is Borooah (2004) who concludes that, in India in 1994, Dalits, i.e. the untouchable castes and the scheduled tribes, and Muslims have a higher level of gender inequality which respect to vaccination than Hindus.

It is odd that even though religion is often mentioned as an important determinant of women's status, there is very little published work explaining what its impact should be, on theoretical grounds, on gender inequality in child mortality. I will attempt to fill this gap in the literature in the following section.

Holy Books, Gender Inequality and Infanticide

As previously mentioned, the main religions practiced in India are: Hinduism (82.04%), Islam (12.58%), Christianity (2.54%) and Sikhism (1.60%). All these religions have expressed opinions or divine commands on the way children shall be treated, the relative worth of men and women and on infanticide per se. However, all these religions are composed of many sects or sub-groups, each having slightly different opinions about the meaning/interpretation of their respective scriptures. What will be presented in the following paragraphs is consequently a mere generalization and should be taken as such. I try, however, to point out both the 'positive' and 'negative' aspects of each of these religions on children's worth, gender equality and infanticide.

Hinduism

Hindu's scriptures are composed of, but are not limited to the Vedas and their commentaries, the Epics (the Mahabharata and the Ramayana), the Puranas and Manu (lawgiver). The influence of the Vedas on everyday life is relatively insignificant, being mainly used for some rituals, like marriage. Everyday life is, however, much more influenced by the Epics and the Puranas.

Contrary to the three monotheistic religions, which believe that God has no gender but in which the believers often picture God as a male, Hindus believe in gods and goddesses or, more precisely, in mainstream Hinduism, on God taking different forms, male and female. Interestingly, goddesses are generally considered to be nurturing and loving figures. However, they are mainly associated with Shiva, the destroyer. Even though Hindus believe in goddesses, men and women do not perform the same rites and do not have the same involvement in religious life, with women's religious duties related exclusively to the household.

As for all the religions we will discuss, the image of women varies from one text to another. In Hinduism, women are often seen as a danger to men. For example:

> It is the nature of women from the beginning of creation that they become attached to persons in affluence but leave them in adversity. In their attachments they are unstable like lightning, in snapping affection they are sharp as weapons, and in evil they are quick as the wind, or the winged bird. (Ramayana: 326)

However, Hindus also perceive women as something extremely valuable that need to be taken care of and offered gifts (e.g.: Manu: 47). In exchange for the gifts and care received, women's duty is to obey their father, brothers, husband and sons:

> The man to whom her father or, with her father's consent, her brother gives her away—she should obey him when he is alive and not to be unfaithful to him when he is dead. (…) Though he may be bereft of virtue, given to lust, and totally devoid of good qualities, a good woman shall always worship her husband like a god. For women, there is no independent sacrifice vow, or fast; a woman will be exalted in heaven by the mere fact that she has obediently served her husband. (…) Just like these celibates, a good woman, though she be sonless, will go to heaven when she steadfastly adheres to the celibate life after her husband's death. (Manu: 97)[13]

[13] Other e.g. are: Ramayana : 169 and Ramayana : 215

In a way, women are almost considered as their husbands' property: "Wife, son, and slave—all these three, tradition tells us, are without property. Whatever they may earn becomes the property of the man to whom they belong." (Manu: 153). Husbands also have the right to beat their wives (Manu: 145).

It is however interesting to note that, even if women are often perceived as being of little worth, Hindus venerate their mothers. For example: "The teacher is ten times greater than the tutor, the father is a hundred times greater than the teacher; but the mother is a thousand times greater than the father." (Manu: 34). Motherhood is such an important duty for women that a man is right to marry another wife if his wife does not fulfil her duty of bearing him sons:

> When a wife drinks liquor or is dishonest, cantankerous, sick, vicious, or wasteful, she may be superseded at any time by marriage to another wife. A barren wife may be superseded in the eighth year; a wife whose children die, in the tenth; a wife who bears girls, in the eleventh; but a foul-mouthed wife, at once. If a wife is sickly but affectionate and rich in virtue, he may marry a wife to supersede her with her consent; she should never be treated with disrespect. (Manu: 160)[14]

The main reason for this importance given to a son is that a son is necessary to ensure a good afterlife:

> Only after he has studied the Vedas according to rule, fathered sons in keeping with the Law, and offered sacrifices according to his ability, should a man set his mind on renunciation; if a twice-born seeks renunciation without studying the Vedas, without fathering sons, and without offering sacrifices, he will proceed downward. (Manu: 100-101)

However, daughters also have a role to play in their parents' religious achievements: "At an ancestral offering, three things confer purity: daughter's son, goat-wool blanket, and sesame seeds; and three things are commended: purification, absence of anger, and doing things unhurriedly." (Manu: 60). Moreover, different substitutes for the religious need to have a son exist: a daughter can become a female-son, a son can be adopted, and, finally, nephews and cowife's sons can serve as substitutes for sons (Manu: 164-165, 168)

In addition to the religious advantage/necessity of having a son, it is also financially advantageous to have a son. When someone reaches old age, his/her son will take care of him/her:

[14] Many other extracts state the importance of a son (e.g. Ramayana: 19; Ramayana: 26).

> When a twice-born man has followed the ten-point Law with a collected mind, learned the Vedanta according to rule, and freed himself from debt, he may retire. Casting off the inherent evil of rites by retiring from all ritual activities, being self-controlled, and reciting the Veda, he should live at ease under the care of his son. (Manu: 105)

One other reason why parents might prefer to have a son is the practice of dowry. Bride price is clearly forbidden by Hinduism (e.g.: Manu: 47) but dowry, of important worth, is seen as highly respectable. For example after marrying his daughters to Rama and Lakshmana, Janaka, a highly respected figure in the Ramayana, gives lavish dowries (Ramayana: 95).

Even if it seems clear that Hinduism increases the cost of having daughters, while also decreasing their worth relative to boys, infanticide is strictly forbidden by Hindu's scriptures: "One must not live together with people who have killed children, women, (…) even if they have been purified in accordance with the Law." (Manu: 205)

Sikhism

Sikhism is a Hinduist movement founded at the end of the 15th century. The main sources for this section will be the Adi Grant, considered as the Eternal Guru, and the Sikh Rahit-namas, the manuals explaining the Sikhs' duties.

The way Sikh scriptures portray women varies greatly over time but also within the same book. Women are sometimes seen as less valuable than men. For example, the Adi Granth says: "One who worships the Great Goddess Maya (i.e. the attraction toward the material life) will be reincarnated as a woman, and not a man." (Adi Granth: 874). However, in other extracts, women are perceived as the equal of men: "Women and men, all the men and women, all came from the One Primal Lord God." (Adi Granth: 983). Nonetheless, before the publication of the Sikh Rahit Maryada, the most recent Rahit-nama, Sikhism was clearly pro-male.

In terms of the relative worth of sons and daughters, it is often specified in the Rahit Namas that it is not acceptable for a Sikh to murder his daughter or to associate with someone committing this type of crime.[15] However, the importance given to this sin

[15] For e.g. Chaupa Singh Rahit-nama, 12, 286 and 359; Sikh Rahit Maryada, article 16.

varies from one Rahit Nama to another. For some, killing a daughter is one of the four major sins, alongside cutting someone's kes (hair), and will lead to terrible punishment after death.[16] However, for other Rahit Nama, killing a daughter is a minor sin that can be forgiven by giving 1¼ rupees (Daya Singh Rahit-nama).[17]

> If anyone has taken [khalsa] initiation and then engages in gambling, thieving, or drinking alcohol he too should receive a tanakhah of 25 rupees. (…)
> Those who undergo the tonsure ceremony (bhadani), killers of daughters, the followers of Dhir Mal, the masands, the followers of Ram Rai, or those who use colour prepared from red ochre or the kusumbha flower should all pay a tanakhah of a rupee and a quarter. (Daya Singh Rahit-name, 52 and 62, in McLeod, 2003, p. 317-319)

Even if a Sikh is not allowed to kill his daughter, the birth of a son is often seen as a happier event than the birth of a girl.[18] Exceptions, however, exist.[19]

It is however worth mentioning that Sikh scriptures state clearly that a son can be of more support to his aging parents than a daughter: "The mother nourishes the foetus in the womb, hoping for a son, who will grow and earn and give her money to enjoy herself." (Adi Granth, p.165-166). A son is also seen as important in some religious rituals. For example, even though, in Sikh Rahit Maryada, having a son is no longer absolutely required in the funeral ceremony, as other relatives and even friends can light the pyre, a son is still seen as the most likely to be in charge of this duty (Sikh Rahit Maryada, article XIX).

It is also interesting to contrast the relative cost of marrying a daughter for Hindus and for Sikhs. It is often believed that some of the most important reasons why Hindu parents are reluctant to have daughters are the difficulty and the cost of getting them married, in addition to the strict rules forbidding gifts from a married daughter to her parents. For Sikhs, as for Hindus, some specific rules on the caste from which a partner can be chosen govern Sikh weddings. Moreover, failing to marry a daughter in the appropriate way or accepting a bride price will lead the believer to end up in Hell (Tanakha-nama Attributed

[16] For e.g., Prahilad Rai Rahit-nama, Prahilad Rai Rahit-nama, 20, in McLeod, 2003; Daya Singh Rahit-nama, 28, in McLeod, 2003: 315.
[17] Desa Singh Rahit-nama, 8, in McLeod, 2003: 296; Guramat Prakash Bhag Sanskar, in McLeod, 2003, p.369; Sikh Rahit Marayada, in McLeod, 2003: 389.
[18] Desa Singh Rahit Nama, 57, in McLeod, 2003: 301.
[19] For e.g., Nirankari Hukam-nama, in McLeod, 2003: 348-349.

to Nand Lal, 19-20, in McLeod, 2003: 281)[20] However, in terms of dowry, it is clear that Sikhs should not give or receive a monetary dowry either for their son or their daughter (e.g. Sikh Rahit Marayada, article XVIII; Nirankari Hukam-nama, in McLeod, 2003: 348). However, non-monetary dowry is often allowed and can be of significant worth. Finally, in opposition to Hindu practice, a girl's parents can accept food from their daughter once married, opening the door to more exchanges between parents and their married daughters (Sikh Rahit Marayada, article XVIII).

Islam

Islam was founded by the Prophet Muhammad, in what is now Saudi Arabia, during the seventh century of this era. Islam's scriptures are composed of two main sources, namely, the Koran and the Hadiths. The Koran is the words of God as revealed to Muhammad. The Hadiths are the words and life of the Prophet Muhammad.

Most of the Koran is addressed to men. Women are generally mentioned as wives, widows or daughters but are seldom addressed as believers. For example, women do not have the obligation to pray on Friday (Awde, 2000). Moreover, women are generally considered to be inferior to men. In several places the Koran states that two women are worth only one man, for inheritance and as a witness (e.g. Koran, The Cow, 282: 63). However, the Koran also includes women as believers in some verses (e.g. Koran, The Believer, 40: 485). Moreover, in many exegeses, women are considered to be responsible for their own choices. For example, if they decide to be a nonbeliever, even having a rightful husband will not save them from hell (Stowasser, 1994).

Many of the women mentioned in the Koran are virtuous woman, generally mothers. Examples of them are: Zulaykha who bore many children to Joseph; Asya who adopted Moise as a son; Mary who bore Jesus; Khadija who bore all, save one, of Muhammad's children; and, finally, Fatima, Muhammad's daughter, who bore him two grand-sons (Stowasser, 1994). This extract from the Hadiths illustrates well that respect towards mothers is not limited only to the few characters I have just mentioned:

[20] The approved way is with a Sikh who is not cutting his kes. Yam means Hell.

"A man came to the Prophet and asked him: "Who is most entitled to the best of my companionship?"
"Your mother," came the reply.
"And then who?"
"Your mother," repeated the Prophet.
"And then who?"
"Your mother," said the Prophet for the third time.
"And then who?" persisted the man.
"Your father."(Awde, 2000, 8/2)

In terms of freedom of movement, the Koran encourages women to be secluded in the house which, in turn, limits their capacity to participate actively in economic and political life (Koran, The Clan, 33: 432; Stowasser, 1994) and, consequently, to offer financial support to their aging parents.

In Islam, the birth of a child is seen as a blessing from God. God is also the one deciding the gender of the child (Koran, Counsel, 49). Consequently, the Koran strongly disapproves of the practice of female infanticide, which was a widespread practice in Mecca at the time of the revelation.[21] The killing of young children is such an important issue in the Koran that women's and men's oaths of allegiance include an extract on infanticide as a sin (Koran, She that is to be examined, 12: 580-581).

It is also clearly stated in the Koran that the believer should not worry that one extra child will be a burden for the household as Allah promises to provide for them all (Koran, Surah Cattle, 152: 154). However, even though the birth of a child is considered to be a blessing from God, independent of gender, daughters seem to be less worthy than boys. For example,

And Allah hath given you wives of your own kind, and hath given you, from your wives, sons and grandsons, and hath made provision of good things for you. Is it then in vanity that they believe and in the grace of Allah that they disbelieve? (Koran, The Bee, 72:. 275)

Christianity

Christianity was founded by Jesus Christ at the beginning of the first century. Christianity relies on two holy books, the Old Testament and the New Testament.

[21] For e.g., *Koran, The Bee, 58-59: 273-274.*

In contrast to the religions we have previously discussed, the relative worth of children is rarely mentioned in the two holy books of Christianity. Indeed, Christianity is often believed to be a religion promoting equality between all human beings. Many extracts confirm this idea. For example, in Galatians, it is stated explicitly that there is no difference between males and females: "There is neither Jew nor Greek, there is neither bond nor free, there is neither male nor female: for ye are all one in Christ Jesus." (New Testament, Galatians, 4: 28). However, some elements in the two Testaments are clearly sexist, men being often considered as superior to women. The creation story (Old Testament, Genesis 2) is a good example, as well as the first sin story. Many other extracts relate similar ideas. For example, in Ephesians, the husband-wife relation is compared to the God-human relation:

> Wives, submit yourselves unto your own husbands, as unto the Lord.
> For the husband is the head of the wife, even as Christ is the head of the church: and he is the saviour of the body.
> Therefore as the church is the subject unto Christ, so let the wives be to their own husbands in every thing.
> Husbands, love your wives, even as Christ also loved the church, and gave himself for it;
> (New Testament, Ephesians 5, 22-25)

Moreover, virgins and married women are considered to be unable to take important decisions without the agreement of the man responsible for her, whether her father or her husband. Only widows are considered to have enough self-judgment to take an oath. (Old Testament, Numbers 30, 2-9)

Children, in general, are seen to be a blessing from God, in both the Old and the New Testaments. For example: "Thy wife shall be as a fruitful vine by the sides of thine house: thy children like olive plants round about thy table." (Old Testament, Psalms, 128, 3)

Quite often both male and female children are treated equally in Christian holy books. It is, however, not always the case. For example, in the case of impurity after giving birth, the Old Testament states clearly that the period of impurity is two times longer after the birth of a girl (Old Testament, Leviticus 12).

Finally, Christianity, as for all other religions we have discussed, is clearly against child sacrifice:[22]

> Ahaz was twenty years old when he began to reign, and he reigned sixteen years in Jerusalem: but he did not that which was right in the sight of the Lord, like David his father: For he walked in the ways of the kings of Israel, and made also molen images for Baalim. Moreover he burnt incense in the valley of the son of Himmom, and burnt his children in the fire, after the abominations of the heathen whom the Lord had cast out before the children of Israel. (Old Testament, II Chronicles, 28, 1-3).

Summary

As we have just seen, all the religions studied, Hinduism, Sikhism, Islam and Christianity, have positive and negative comments about women. All four religions also consider boys to be more valuable in some extracts but, in other extracts, consider girls to be equally valuable and as a gift from God(s). It is consequently difficult on theoretical grounds, based uniquely on the scriptures of these different religions, to order them in promoting more or less equal treatment of children by gender. There seem to be, however, more extracts decreasing the worth of daughters in Hinduism and in Sikhism than in Islam and in Christianity. It is also clear that all these religions are clearly against infanticide, but with Sikhism expressing at least in one extract a more tolerant view of infanticide than the other religion.

4. Data and Descriptive Statistics

Data

In order to test the model empirically, I mainly use data from the Demographic and Health Survey (DHS). The DHS is a USAID project promoting and developing knowledge on health issues in developing countries.[23] Other databases used are: the Directorate of Economics & Statistics of respective State Governments (2007), Census

[22] Other e.g. are Old Testament, II Chronicles, 33, 6; Old Testament, Jeremiah, 19,5; Old Testament, Psalm, 106, 37-38.
[23] Questionnaires specific to every country can be found on the Demographic and Health Survey web page at www.measuredhs.com.

India (2001) and Manghani (2004). A list of the variables used in this analysis is provided in Annex A.

The DHS interviewed 90,303 women in India between 1998 and 2000. These women provided information about 33,026 children aged under five years at the time of the survey. Every state of India was covered by the survey.

One of the important characteristic of this database is the use of a non-random technique to select the respondents. More precisely, strata, cluster and probability weights have been used and need to be accounted for in order to obtain representative statistics of the population. However, in the case of regression analysis, the decision as to whether to use probability weights or not will depend on the research question. I will discuss this issue in more detail in the estimation strategy section.

Descriptive statistics

As shown in Table 2, in India, boys are as likely as girls to die before reaching the age of one. However, for this age group, given biological differences only, boys are more likely to die. There is, consequently, some evidence that non-biological explanations reduce girls' relative likelihood of surviving beyond infancy compared to boys.

In terms of nutritional outcomes, girls are less likely than boys to have height-for-age or weight-for-age z-scores of less than two standard deviations below the reference group. However, in terms of access to health care, girls are less likely to receive vaccines and treatment for diarrhoea than are boys. These simple descriptive statistics seem to show that it is not so much inequality in nutritional inputs that drives gender inequality in child mortality but, rather, inequality in access to health care.

Table 2: Gender Inequality in Child Mortality, Nutritional Outcomes and Access to Health Care

	Boys	Girls	Ratio boys/girls
Infant mortality	5.7%	5.5%	1.036
Height-for-age<2 s.e.	49.9%	48.4%	1.031***
Weight-for-age <2s.e.	41.9%	40.2%	1.042**
Vaccination	5.87	5.66	1.037***
Treatment for diarrhoea	71.1%	68.6%	1.036**

Author's calculation based on DHS data. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

When the data are disaggregated by religious affiliation, no clear results emerge (table 3). All religions seem to discriminate against girls in terms of infant survival, with Muslim girls having slightly better prospects of survival until age one than other girls and Sikh girls having the worst prospects. Christian and Hindu girls are more likely to have better nutritional outcomes that the other religious groups. The former have higher weight-for-age and height-for-age z-scores than boys, while the latter have higher height-for-age z-score than boys. However, in terms of access to health care, Hindu girls are less likely to receive vaccinations than Hindu boys. Christian and Muslim girls are less likely to receive treatment for diarrhoea than boys of the same religious groups. The opposite is, however, true for Buddhist and atheist children. In other words, each religion, with the exception of Sikhism, is at least for one of these variables measuring health inputs and outputs, correlated with better prospects for girls than other religions. It is, however, also true that all these religions are also positively correlated with more gender inequality for at least one of these variables. To summarize, no clear results emerge when looking simply at percentages by religious groups.

It is, however, interesting to note that, while looking at both genders at the same time, some religious groups seem to perform much better with respect to health inputs and outputs for children aged under five years old than others. Christian, Sikh and Buddhist children are generally better off than Hindu, Muslim and atheist children. The only exception is for seeking advice/treatment for diarrhoea, for which Hindu, Muslim and Sikh children are the most likely to receive care. Given that diarrhoea is generally better treated at home with an ORS pack than by seeing a professional doctor, these latter

results seem to confirm that Christian, Sikh and Buddhist parents are more able/willing to provide appropriate care to their children.

Table 3: Health Inputs and Outputs by Religious Affiliations

	Religion	All (base: Hindu)	Boys	Girls	Ratio boys/girls
Infant survival	Christian	0.955***	0.956	0.954	1.002
	Muslim	0.951***	0.945	0.958	0.986**
	Hindu	0.941	0.94	0.942	0.998
	Buddhist	0.962***	0.969	0.952	1.018
	Sikh	0.956***	0.979	0.939	1.043***
	atheist	0.933***	0.932	0.934	0.998
Height-for-age<2 s.e.	Christian	0.381***	0.412	0.35	1.177**
	Muslim	0.512***	0.51	0.515	0.990
	Hindu	0.504	0.511	0.497	1.028**
	Buddhist	0.379***	0.37	0.391	0.946
	Sikh	0.430***	0.407	0.357	1.140
	Atheist	0.576***	0.652	0.501	1.301
Weight-for-age <2s.e.	Christian	0.224***	0.264	0.183	1.443***
	Muslim	0.421***	0.436	0.404	1.079
	Hindu	0.435	0.44	0.43	1.023
	Buddhist	0.264***	0.243	0.294	0.827
	Sikh	0.268***	0.223	0.248	0.899
	Atheist	0.356***	0.466	0.248	1.879
Vaccination	Christian	6.02	5.95	6.09	0.977
	Muslim	5.07***	5.18	4.96	1.044
	Hindu	5.85***	5.95	5.73	1.038**
	Buddhist	6.32***	6.26	6.41	0.977
	Sikh	7.33***	7.57	7.03	1.077***
	Atheist	3.13***	3.85	2.42	1.591
Treatment for diarrhoea	Christian	0.53***	0.564	0.482	1.170**
	Muslim	0.77***	0.804	0.74	1.086**
	Hindu	0.70	0.707	0.693	1.020
	Buddhist	0.48***	0.407	0.572	0.712*
	Sikh	0.94***	0.881	0.775	1.137
	Atheist	0.59***	0.436	0.833	0.523**

Author's calculation based on DHS data. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

As was the case for the individual impact of religion, the preference for sons is lower in Christian states than in Hindu, Muslim and Sikh states (Table 4). Moreover, Christian and Sikh states have better nutritional outcomes, irrespective of gender. The use of health care is, however, particularly high in Muslim and in Sikh states, as was the case for the individual data. In terms of gender inequality, Muslim states have the highest probability

ratio of infant mortality, given biological factors only, while Sikh states have a higher level of female mortality, which is in direct contrast to what would be expected without the prevalence of gender inequality. Hindu and Christian states are in the middle, with a more moderate gender inequality than Sikh state. Independent of the majority's religion, boys are always more likely to have poorer nutritional outcomes than girls, both in terms of height-for-age and weight-for-age. In terms of vaccination, it is only in the case of Christian states that girls are more likely to receive vaccines than boys. For all other states, boys are more likely than girls to receive vaccines. Finally, in terms of treatment for diarrhoea, Muslim boys are as likely as Muslim girls to receive treatment, while in Christian and in Hindu states, boys are more likely than girls to receive treatment. Finally, and surprisingly, in Sikh states, girls are more likely to receive treatment for diarrhoea than boys.

Table 4: Health Inputs and Outputs by Religion of the Majority in the State of Residence

	Religion of majority in State	All (base: Hindu)	Boys	Girls	Ratio
Mother's preference	Hindu states	0.574			
	Muslim states	0.576***			
	Christian states	0.524***			
	Sikh state	0.574***			
Infant survival	Hindu states	0.944	0.943	0.944	0.999***
	Muslim states	0.947***	0.938	0.959	0.978***
	Christian states	0.946***	0.945	0.946	0.999***
	Sikh state	0.951***	0.957	0.944	1.014***
Height-for-age<2 s.e.	Hindu states	0.5	0.506	0.492	1.028***
	Muslim states	0.448***	0.46	0.433	1.062***
	Christian states	0.42***	0.469	0.369	1.271***
	Sikh state	0.443***	0.455	0.429	1.061***
Weight-for-age <2s.e	Hindu states	0.429	0.434	0.422	1.028***
	Muslim states	0.304***	0.335	0.267	1.255***
	Christian states	0.24***	0.289	0.189	1.529***
	Sikh state	0.265***	0.269	0.261	1.031***
Vaccination	Hindu states	4.81	4.91	4.7	1.045***
	Muslim states	5.82***	6.06	5.52	1.098***
	Christian states	3.87***	3.83	3.91	0.980***
	Sikh state	5.96***	6.1	5.82	1.048***
Treatment for diarrhoea	Hindu states	0.699	0.71	0.688	1.032***
	Muslim states	0.874***	0.875	0.871	1.005
	Christian states	0.459***	0.494	0.418	1.182***
	Sikh state	0.916***	0.905	0.928	0.975***

Author's calculation based on DHS data. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

The difference in health outcomes between the religious groups may be divided into two sources; namely, a different impact of some variables on the outcome, and a difference in endowments between the two groups. For example, assume that the only important determinant of gender inequality is the mother's education level and that is true for all religious groups. Also suppose that Christian women have a much higher level of education than non-Christian women. If we observe that Christian girls suffer less from gender inequality than non-Christian girls, it might simply be due to the fact that their endowments are better than those of other girls. However, it is also possible that Christian women, for some reason, make better use of these endowments. Put another way, the

coefficient on mother's education is higher, which explains why Christian girls are better off. Blinder-Oaxaca decomposition is used to test this hypothesis. More details about this technique are given in the estimation strategy section. However, in the meantime, it is interesting to compare, between religious groups, some variables (endowments) that are believed to be important in explaining gender inequality in child mortality.

It is clear from Table 5 that many differences in endowments exist between the religious groups. The group that, from the previous analysis, seems to have the worst level of gender inequality, namely the Sikhs, is also the group with the highest level of female education and prenatal care. On the other hand, Sikhs have accumulated less wealth than Muslims and Hindus. However, given the ambiguous relationship between wealth and gender inequality, it is impossible to conclude beforehand whether or not wealth is a good endowment for girls. The only variable that clearly has a potentially negative impact on gender inequality, and that Sikh girls are less likely to have, is a mother willing to have a large family. A large family size limits the necessity of eliminating unwanted girls in order to achieve the wanted number of boys. Finally, even though we have seen that Christians, Muslims and Hindus have similar outcomes in terms of gender inequality in health inputs and outputs of the under-five year olds, they also have clear differences in endowments. Christian children are clearly poorer than Muslim and Hindu children. Christian children have better educated mothers than Muslim and Hindu children and they are also more likely to have received prenatal care. Moreover, Christian children have mothers willing to have more children than Hindu and Muslim mothers. To summarize, at first sight, there is no clear relation between endowments and the level of gender inequality in health-related inputs and outputs of the under-five year olds.

Table 5: Endowments by Religious Affiliations

Religion	z_wealthindex (base: Hindu)	Educmot (base: Hindu)	Prenatcar (base: Hindu)	Numbchildmot (base: Hindu)
Christian	-0.17***	5.76***	0.76***	3.79***
Muslim	-0.09***	2.70***	0.64***	3.14***
Hindu	-0.11	3.63	0.66	2.66
Sikh	-0.16***	5.85***	0.76***	2.20***
Buddhist	-0.15***	3.94***	0.65***	2.58***
Atheist	-0.17***	3.60***	0.64***	5.30***

Author's calculation based on DHS data. Significant at 0.10, ** significant at 0.05, *** significant at 0.01. Reference category: Hindu

5. Empirical Results

Estimation Strategy

Five dependent variables are used to measure gender inequality in health-related variables of children under five year olds. As previously discussed, these variables are: if a child has survived until age one (ALIVE0_1, dummy), [24] the height-for-age z-score, a measure of long-term nutritional status (H_A, continuous), the weight-for-age z-score, a measure summarizing both long and short-term nutritional status (W_A, continuous), the number of vaccines a child has received (VACCIN, count) and whether or not the parents sought treatment/advice in cases where the child suffered from diarrhoea in the two weeks preceding the survey (TREATDIARRHOEA, dummy). Given the nature of the variable, Logit estimation has been used for ALIVE0_1 and TREATDIARRHOEA, OLS has been used for H_A and for W_A and, finally, Poisson estimation has been used for VACCIN.

[24] As has been documented by Sullivan et al. (1990, UN 1998), respondents often have a tendency to report death at the closest year instead of at the exact age in months. By looking at the data for India, it is clear that such a misreporting of age at death plagues our data. As it is probable that parents more likely to misreport the age at death of their children are also more likely to make other mistakes in providing information, children reported to die at one year old have been excluded from the data.

The models estimated take the following form:

$$Y=\beta_0 + \beta_{econ}\, x_{econ} + \beta_{cult}\, x_{cult} + \beta_{ress}\, x_{ress} + \beta_{select}\, x_{select} + \beta_{pref}\, x_{pref} + \varepsilon$$

With:

- X_{econ}: GDP, GDP2, WORKREG, INDEXWAGE, INDEXMOB.
- X_{cult}: INDEXVIOLENCE, ENDOGAMY, PREFMOTREG, MUSLIMREG, HINDUREG, SIKHREG, MUSLIM, BUDDHIST, HINDU, SIKH, OTHERREL, ATHEE, SCHCASTE, SCHTRIBE, BWDCASTE.
- X_{ress}: Z_WEALTHINDEX, RURAL, FLOOD, HEALTHFACI, HEALTHFACI2, COMPET, HOMEMOT2, HOMEMOT3, AGEATBIRTH, EDUCMOT, EDUCFAT, SCARRING.
- X_{select}: FEMALE, NO_SON_ONE_DAU, ONE_SON_NO_DAU, NO_SON_TWO_DAU, ONE_SON_ONE_DAU, TWO_SON_NO_DAU, ONLY_SON, ONLY_DAU, ATLEAT_ONE_EACH.
- X_{pref}: PREFMOT, SEXHEAD, FATMOTAGEDIF, MOTAGE.
- X_{cont}: WEIGHTBIRTH, TWIN, INTERV_BEF_12, INTERV_BEF_24, TERMINATED, TETANUS, TOILET, AGE, MOTHEIGHT.

All these variables are also included as interacted multiplicatively with the dummy variable female. The only exceptions are for some of the control variables (X_{cont}). The control variables also vary from one equation to the other.

The second methodological issue that needs to be resolved is whether or not the use of probability weights are necessary. We know that if we are interested in the finite population characteristics, i.e. if we assume that the population characteristics exist the way they are without having been generated by an underlying model, the design-based approach is the most suitable, and involves the use of probability weights. With this approach we assume that, if we had access to all elements of the population, there would be no uncertainty in our results (Nordberg, 1989). However, if we believe that an unknown model generates each observation in the population, and we try to find out what this model is, a model-based approach is necessary and the use of weights is not required most of the time. In this approach we assume that the model generating the observations in the population can be generalised to other populations as well. In the model-based approach, it is only when the dependent variable is related to the variables used to select the observations into the sample that the results should be significantly different between regressions controlling for probability weights and regressions not controlling for

weights, with the unweighted regressions producing biased coefficients (Lohr, 1999). If the dependent variable is not related to the variables used to select the sample, the use of weights will lead to inefficiency and should consequently be avoided. Finally, as regressions using weights are fairly robust to the problem of misspecification, a comparison between weighted and unweighted regressions can be used to test for misspecification (Lohr, 1999; Renaud, 2004). Some authors even argue that, as it is impossible to include all covariates in a model, the use of probability weights is always required (Renaud, 2004).

In summary, whether or not to use sampling weights in regression analysis is still controversial and depends on the underlying choice between a model-based and a design-based approach. The model-based approach seems to be the more appropriate in this case as I am looking for a model, true in every population, encouraging parents to discriminate or not between their children based on their gender. However, as I cannot be absolutely certain that the model is well specified, I compare the model with and without controls for the survey design, i.e. with controls for probability weight, strata and cluster in the former case and control for cluster only for the latter case.

Finally, the children for whom I have data on nutritional outcomes and access to health care are the children who are alive at the time of the survey. In other words, no data exist on children who are the most discriminated against, i.e. children who at the time of the survey have been aborted or are dead due to gender discrimination. If this selection bias is present, the coefficients are biased toward zero. In order to solve this problem, the Heckman technique is used.

Results

The results will be discussed by category of variables; namely, i/ economic system, ii/ cultural system, iii/ religions and castes, iv/ resource constraints, v/ gender composition of siblings and vi/ preference and power balance. The regression results for the relevant variables are presented in each section. The full regression table can be found in Annex B. The last section discusses the results from the Oaxaca-Blinder decomposition.

As there is no major difference between the results obtained using Logit and Probit for the dependent variables ALIVE0_1 and TREATDIARRHOEA, only the Logit results are presented as they are easier to interpret.

In the same way, no major difference is found between the estimations controlling for survey design (strata, cluster and probability weight) and those controlling only for cluster. Consequently, only the latter are presented here.

The Heckman technique has also been used to check if a selection bias is present in the database for the two variables reflecting access to health care (VACCIN and TREATDIARRHOEA). In order to apply the Heckman technique, one needs specify variables that are included in the selection equation, here mortality, but not in the equation of interest, here VACCIN AND TREATDIARRHOEA. The extra variables used in the selection equation are if the child was really small at birth (WEIGHTBIRTH), if the child is a twin (TWIN), the mother's BMI (BMIMOT) and the interval between the index child and the preceding birth, either less than 12 months (INTERV_BEF_12) or less than 24 months (INTERV_BEF_24). All these variables are believed to have an impact on mortality but not on the access to health care. The results show clearly that a selection bias does not exist in the data (results not shown).

As it is possible that this selection bias is significant only for the religious groups that are the most likely to discriminate against their daughters, I tested this hypothesis by dividing the sample into two categories, Hindus and Muslims. Given the limited sample size, the same exercise was not possible for Christians and Sikhs. Again, I conclude that selection bias is not a problem in the data (results not shown). However, the much smaller sample size, in addition to being unable to test for Sikhs, the religious group the most likely to have a selection bias problem, are two problems that prevent me from completely ruling out the risk of selection bias. Moreover, the Heckman technique could not be tested for nutritional outcomes as no variable has been found that has an impact on mortality but not on nutrition.

Economic System

The economic system is proxied by four variables, Gross State Domestic Product per capita (GDP) and the square of GSDP per capita to allow for non-linearity, female labour force participation (WORKREG), an index of the relative wage between men and women (INDEXWAGE) and, finally, an index of mobility (INDEXMOB). I discuss the main results for each of these variables in the following paragraphs.

An increase in GSDP per capita has, at first, a negative impact on children's likelihood of surviving until age one and of having appropriate height-for-age z-score. After GSDP per capita has reached 27925 Rupees and 29694 Rupees, respectively, an increase in GSDP per capita improves these two measures of health outcomes, other things equal. One possible explanation for this U-curve relationship is that, at first, higher incomes allow parents to reduce the number of miscarriages, resulting in more children born with poor genetic endowments. However, after reaching a threshold of approximately 29000 Rupees, higher income allows a higher percentage of these children, with poor genetic endowments, to survive.

In the case of access to health care, the two variables have an U-inverted relationship with GSDP per capita, with a turning point at approximately 32000 Rupees. As only two states have a GSDP higher than this threshold, I am only mildly confident about the robustness of this latter result.

In terms of gender inequality and GDP per capita, the results show that for both height-for-age and treatment for diarrhoea, parents in poorer states are more likely to discriminate against their daughters than parents in richer states. However, in terms of survival, weight-for-age and vaccinations, no significant relations between these variables and GDP per capita appear.

The two variables measuring female labour force participation, namely the percentage of women working in the state and the index of wage inequality, have a negative impact on children's likelihood of surviving until age one and on nutritional outcomes, with significant results for height-for-age and weight-for-age respectively. It is possible that in

states where women are more likely to work, they have less time to take care of their children. However, more equality in terms of potential wage has a significant positive impact on the likelihood of receiving vaccines and treatment for diarrhoea. In other words, as often found in the literature (Durrant and Sathar, 2000; Pitt and Khandker, 1998, cited in World Bank, 2003), increasing women's control over financial resources increases the use of these resources for children. Both boys and girls are affected equally by these two measures of women's involvement in the labour force.

Finally more mobility allows women to provide better care to their children at least in terms of height-for-age z-score and the number of vaccinations. The impact is especially strong for girls in terms of height-for-age.

Table 6: Regression Results: Economic System

	alive0_1		Length/height-for-age z-score		Weight-for-age z-score		vaccin		treatdiarrhoea	
gdp	**-0.0001069**	**(0.003)*** **	**-0.00003**	**(0.013)** **	-3.15E-06	(0.745)	**0.0000521**	**(0.000)*** **	**0.00024**	**(0.000)*** **
gdpf	-0.0000108	(0.857)	**-0.000039**	**(0.036)** **	9.41E-07	(0.953)	-2.37E-06	(0.726)	**-0.00012**	**(0.075)***
gdp2	**1.8E-09**	**(0.006)*** **	**6E-10**	**(0.012)** **	-1.33E-10	(0.413)	**-8E-10**	**(0.000)*** **	**-4E-09**	**(0.000)*** **
gdp2f	1.72E-10	(0.879)	**7E-10**	**(0.023)** **	9.84E-11	(0.718)	2.25E-11	(0.845)	**2.09E-09**	**(0.079)***
workreg	**-0.791**	**(0.057)***	-0.16	(0.34)	**-0.768**	**(0.000)*** **	**-0.118**	**(0.078)***	-0.673	(0.109)
workregf	0.598	(0.317)	0.172	(0.389)	0.006	(0.969)	0.001	(0.993)	-0.815	(0.180)
indexwage	**-1.476**	**(0.027)** **	**-0.53**	**(0.046)** **	-0.258	(0.175)	**0.247**	**(0.030)** **	**2.281**	**(0.001)*** **
indexwagef	1.217	(0.225)	-0.22	(0.543)	-0.127	(0.642)	0.019	(0.905)	-1.4	(0.194)
indexmob	-0.247	(0.755)	**0.622**	**(0.062)***	0.361	(0.129)	**0.161**	**(0.074)***	-0.922	(0.359)
Indexmobf	1.321	(0.251)	**1.052**	**(0.019)** **	0.18	(0.585)	0.033	(0.800)	1.814	(0.186)

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

Cultural System

As expected, children in states where domestic violence (INDEXVIOLENCE) is less prevalent are more likely to survive until age one. Similar results are found by Jejeebhoy (1998, cited in Durrant and Sathar, 2000). However, living in states with a low level of domestic violence decreases the expected height-for-age, vaccination and treatment for diarrhoea. These results might simply be due to the fact that in India, the states that allow the most freedom to women are also the states where domestic violence is the most prevalent. It is consequently possible that in states where women are more submissive to their partners, the latter do not have to rely on violence to make there wives obey. In

other words, our measure of domestic violence may also measure the level of female acceptance to male dominance.

The prevalence of endogamy (ENDOGAMYREG) has a positive significant impact on both measures of nutritional outcomes. However, it has a negative impact on treatment for diarrhoea. This latter result is not worrying as diarrhoea is often better taken care of at home and the knowledge about ORS might simply be more prevalent in states that practice endogamy. It is also possible that mothers are more willing to listen to their own mother than to their mother-in-law.

The prevalence of preference for sons in the state of residence (PREFMOTREG) has no impact on gender inequality. It has, however, a negative impact on the likelihood of surviving until age one and on weight-for-age z-score for both boys and girls. It is possible that our measure of preference for sons is also capturing the prevalence of backward ideas on parenting, which explains why both boys and girls suffer from living in states with strong preference for sons.

Table 7: Regression Results: Cultural System

	Alive0_1		Length/height-for-age z-score		Weight-for-age z-score		vaccin		treatdiarrhoea	
Indexviolenc	**2.307**	**(0.001)*** **	**-0.948**	**(0.001)*** **	0.354	(0.137)	**-0.772**	**(0.000)*** **	**-3.567**	**(0.000)*** **
Indexviolenc	-0.612	(0.611)	**0.835**	**(0.033)** **	0.157	(0.618)	0.116	(0.328)	1.571	(0.281)
Endogamyre	0.417	(0.419)	**0.641**	**(0.003)*** **	**0.574**	**(0.000)*** **	0.096	(0.181)	**-1.505**	**(0.009)*** **
Endogamyre	-0.479	(0.523)	-0.064	(0.812)	0.159	(0.434)	0.052	(0.586)	0.6	(0.477)
Prefmotreg	**-12.614**	**(0.000)*** **	-1.803	(0.120)	**-2.545**	**(0.010)** **	-0.393	(0.335)	3.42	(0.368)
Prefmotregf	5.188	(0.230)	-1.325	(0.399)	0.82	(0.525)	0.128	(0.816)	0.391	(0.942)

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

Religions and Castes

In India, 21 out of the 26 states have a majority of Hindus, three states have a majority of Christians and only one state has a majority of Sikhs and one state has a majority of Muslims. Given this variation between states, our data allow us to test if living in a state with a majority of a different religion has an impact on gender inequality.

Living in a state with a majority of Christians (CHRISTIANREG) affects negatively the life expectancy of a child. In other words, in India, in 1998, a child is better off in terms

of survival to live in a Hindu, Muslim or Sikh state (HINDUREG, MUSLIMREG, SIKHREG), everything else constant.

The same is also true in terms of height-for-age, a measure of long-term nutritional outcomes. In the shorter term, however, the religion of the majority has no significant impact on the nutritional outcome of the under five-year-olds, measured here by the weight-for-age z-score.

In terms of access to health care, only the number of vaccinations is significantly affected by the religion of the majority, with children living in Hindu and Muslim states performing better than children from Sikh and Christian states. There is, however, no impact on gender inequality of the religion of the majority.

In terms of the religion of the parents, children benefit from having Buddhist parents (BUDDHIST) in terms of nutritional outcomes. This is also true for Christian (CHRISTIAN) and atheist (ATHEIST) children, but to a smaller extent. In addition to scoring poorly in terms of nutritional outcomes, Hindu (HINDU) and Muslim (MUSLIM) children are less likely to receive vaccinations.

However, when we look at the impact of religion on gender inequality we realise that Hindu and Muslim girls are more likely to have a higher probability of surviving until age one in the case of Muslims and of having higher height-for-age z-score in the case of both Muslims and Hindus. These results are particularly interesting as these two religions are often believed to be more highly discriminatory against women. However, as we have previously discussed, based on their holy books such a 'demonization' of these religions is not justified.

In terms of castes/tribes, it is clear from the results obtained that children belonging to the lowest level of the caste system do not face the same opportunity as children of the highest castes. However, in terms of gender inequality, no significant difference exists between the different social groups. This is particularly interesting as the beliefs of Hindus vary from one caste to another. However, given the extremely general

classification of caste available in this database, it is possible that the results obtained are only due to the poor classification.

Table 8: Regression Results: Religions and Castes

	Alive0_1		Length/height-for-age z-score		Weight-for-age z-score		vaccin		treatdiarrhoea	
muslimreg	**1.183**	**(0.005)*** **	**0.452**	**(0.012)** **	**0.328**	**(0.019)** **	**0.214**	**(0.003)*** **	0.267	(0.577)
muslimregf	0.199	(0.754)	0.045	(0.831)	0.056	(0.764)	0.041	(0.642)	**1.289**	**(0.060)***
hindureg	**0.939**	**(0.005)*** **	**0.278**	**(0.054)***	0.04	(0.722)	0.106	(0.106)	-0.008	(0.982)
hinduregf	0.109	(0.817)	-0.119	(0.476)	-0.103	(0.537)	0.049	(0.545)	0.567	(0.263)
sikhrelreg	**0.927**	**(0.043)** **	**0.462**	**(0.014)** **	**0.358**	**(0.023)** **	0.004	(0.960)	-0.578	(0.399)
sikhrelregf	0.388	(0.589)	-0.158	(0.456)	-0.105	(0.635)	0.038	(0.702)	1.459	(0.163)
muslim	0	(1.000)	**-0.255**	**(0.010)** **	**-0.383**	**(0.000)*** **	**-0.124**	**(0.001)*** **	0.392	(0.163)
muslimf	**0.74**	**(0.098)***	**0.266**	**(0.043)** **	0.051	(0.646)	-0.041	(0.413)	-0.393	(0.371)
buddhist	0.179	(0.685)	**0.299**	**(0.077)***	**0.206**	**(0.071)***	-0.026	(0.585)	**-1.292**	**(0.000)*** **
buddhistf	0.177	(0.801)	0.052	(0.831)	-0.064	(0.701)	0.048	(0.678)	0.652	(0.239)
hindu	-0.075	(0.790)	**-0.242**	**(0.009)*** **	**-0.3**	**(0.000)*** **	-0.045	(0.140)	-0.168	(0.518)
hinduf	0.45	(0.250)	**0.257**	**(0.031)** **	-0.004	(0.972)	-0.04	(0.378)	-0.046	(0.906)
sikh	**0.869**	**(0.090)***	-0.063	(0.710)	**-0.225**	**(0.035)** **	-0.048	(0.251)	1.74	(0.122)
sikhf	-1.092	(0.107)	-0.038	(0.869)	-0.161	(0.362)	-0.06	(0.403)	-2.071	(0.122)
otherrel	1.015	(0.182)	0.084	(0.684)	0.209	(0.218)	**-0.2**	**(0.017)** **	0.862	(0.142)
otherrelf	-0.409	(0.640)	0.342	(0.168)	0.116	(0.595)	0.084	(0.494)	-0.674	(0.431)
athee	0.265	(0.757)	-0.599	(0.172)	-0.175	(0.542)	-0.071	(0.682)	-0.139	(0.798)
atheef	-0.389	(0.539)	0.334	(0.573)	0.057	(0.896)	-0.521	(0.156)	**2.436**	**(0.055)***
schcaste	**-0.283**	**(0.030)** **	**-0.25**	**(0.000)*** **	**-0.146**	**(0.000)*** **	-0.012	(0.490)	0.174	(0.199)
schcastef	0.253	(0.163)	0.076	(0.273)	0.017	(0.765)	0.02	(0.455)	0.049	(0.798)
Schtribe	-0.007	(0.963)	**-0.138**	**(0.048)** **	**-0.17**	**(0.005)*** **	**-0.093**	**(0.005)*** **	**-0.253**	**(0.087)***
Schtribef	0.175	(0.409)	0.077	(0.423)	0.052	(0.502)	-0.034	(0.432)	-0.115	(0.543)
bwdcaste	-0.087	(0.436)	**-0.151**	**(0.001)*** **	**-0.141**	**(0.000)*** **	0.016	(0.272)	0.039	(0.739)
bwdcastef	-0.107	(0.474)	0.033	(0.572)	0.016	(0.755)	-0.026	(0.239)	0.245	(0.108)

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

Resource Constraints

In terms of resources available to parents, all our variables are either of the expected sign or are not significant, the only exception being for the level of competition, i.e. the ratio of children of under five years old on an 'adult equivalent' basis. More precisely, COMPET has a positive impact on the likelihood of surviving and on the height-for-age, which implies that parents living in households with many children might have more experience in taking care of children. However, at the same time, COMPET has a negative impact on vaccination and on treatment for diarrhoea, which implies that parents living in such households might have less time to provide health care to their children. In the case of diarrhoea, both effects might actually be in play, as most of the time, the best remedy to diarrhoea is ORS and not to seek advice or treatment from a health specialist.

In the case of the relationship between resources and gender inequality, the coefficients are generally not significant. However, when it is significant, resources are generally used to improve the level of gender equality in the household. There are only two exceptions. First, the father's level of education (EDUCFAT) has a smaller positive impact on girls' likelihood of surviving than on boys'. The second variable is whether or not the mother has received prenatal care (PRENATCAR), which has a negative impact on the girls' likelihood of receiving treatment for diarrhoea.

It is interesting to compare these results to what has been found for the variables measuring the average income in the state (GDP and GDP2), in which case, as we have previously discussed, an increase in income reduces gender inequality.

Table 9: Regression Results: Resource Constraints

	Alive0_1		Length/height-for-age z-score		Weight-for-age z-score		Vaccine		treatdiarrhoea	
z_wealthindex	-0.024	(0.748)	**0.091**	**(0.000)*** **	0.024	(0.172)				
z_wealthindexf	**83.11**	**(0.003)*** **	0.019	(0.493)	0.025	(0.285)				
rural							**-0.021**	**(0.084)***	**-0.25**	**(0.029)** **
rRuralf							0.013	(0.433)	0.025	(0.886)
flood					-0.027	(0.325)				
floodf					0.047	(0.239)				
healthfaci							-0.006	(0.225)		
healthfacif							0	(0.996)		
healthfaci2							0	(0.406)		
healthfaci2f							0	(0.209)		
compet	**6.263**	**(0.000)*** **	**0.231**	**(0.000)*** **	0.045	(0.392)	**-0.077**	**(0.001)*** **	**-0.568**	**(0.001)*** **
competf	-0.512	(0.402)	0.002	(0.981)	-0.068	(0.337)	0.042	(0.215)	**0.597**	**(0.017)** **
homemot2					-0.022	(0.683)			**-0.322**	**(0.091)***
homemot2f					-0.005	(0.949)			**0.519**	**(0.051)***
homemot3					**-0.082**	**(0.016)** **			0.121	(0.215)
homemot3f					0.04	(0.362)			0.08	(0.572)
ageatbirth	0.032	(0.108)	**0.041**	**(0.000)*** **	0.008	(0.176)				
ageatbirthf	0.081	**(0.002)*** **	-0.012	(0.290)	0.005	(0.594)				
educmot	0.034	**(0.012)** **	**0.03**	**(0.000)*** **	**0.03**	**(0.000)*** **	**0.004**	**(0.033)** **	0.018	(0.193)
educmotf	0.021	(0.281)	-0.002	(0.780)	-0.001	(0.887)	**0.004**	**(0.065)***	0.02	(0.328)
educfat	**0.045**	**(0.000)*** **	**0.013**	**(0.003)*** **	**0.019**	**(0.000)*** **	**0.011**	**(0.000)*** **	0.015	(0.185)
educfatf	**-0.033**	**(0.033)** **	0	(0.999)	-0.004	(0.388)	-0.001	(0.798)	0.004	(0.802)
prenatcar	**0.27**	**(0.026)** **					**0.105**	**(0.000)*** **	**0.294**	**(0.006)*** **
prenatcarf	-0.141	(0.421)					0.058	(0.130)	**-0.36**	**(0.035)** **
scarring	-0.078	(0.513)	**-0.099**	**(0.038)** **	-0.044	(0.219)	**-0.061**	**(0.003)*** **		
scarringf	**-0.352**	**(0.044)** **	0.072	(0.346)	-0.027	(0.603)	0.001	(0.970)		

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

Selective Discrimination

In terms of gender composition of siblings, some really interesting results emerge. First, for every child with at least one older sibling the height-for-age z-score is significantly

lower than for the first born and this applies irrespective of gender. Moreover, being a child with a 'bad' gender composition of siblings, i.e. being in excess of the ideal of two sons and one daughter, has either a negative impact or no impact on the different measures of health inputs and outputs. It, however, never has a significant positive impact. In the case of a 'good' gender composition of siblings the effect is always either significantly positive or non-significant. The only exception is for height-for-age z-score, as we have previously discussed.

These results seem to be confirmed by the fact that the more a mother wants children (NUMBCHILDMOT), the more likely are her daughters to survive until age one. These results are in line with the literature.

Finally, the variable FEMALE is significant only in the regression explaining mortality. However, while performing a joint significant test for all variables interacted with FEMALE, we conclude that girls are treated differently than boys for all our dependent variables.

Table 10: Regression Results: Selective Discrimination

	alive0_1		Length/height-for-age z-score		Weight-for-age z-score		Vaccine		treatdiarrhoea	
Female	**10.693**	**(0.069)***	0.189	(0.856)	-0.342	(0.687)	-0.217	(0.554)	-0.67	(0.850)
no_son_one_dau	-0.068	(0.656)	**-0.202**	**(0.000)*****	-0.032	(0.508)	**0.026**	**(0.090)***	0.106	(0.463)
no_son_one_dauf	**-0.69**	**(0.000)*****	0.003	(0.974)	-0.076	(0.255)	-0.038	(0.110)	-0.315	(0.138)
one_son_no_dau	-0.237	(0.140)	**-0.252**	**(0.000)*****	-0.047	(0.291)	0.011	(0.521)	0.022	(0.889)
one_son_no_dauf	-0.259	(0.231)	-0.036	(0.683)	-0.008	(0.901)	-0.012	(0.616)	-0.149	(0.503)
no_son_two_dau	0.224	(0.419)	**-0.252**	**(0.003)*****	0.015	(0.821)	**0.053**	**(0.021)****	0.014	(0.939)
no_son_two_dauf	**-1.116**	**(0.001)*****	-0.013	(0.921)	**-0.223**	**(0.024)****	-0.053	(0.211)	-0.43	(0.142)
one_son_one_dau	-0.124	(0.530)	**-0.392**	**(0.000)*****	-0.055	(0.375)	0.021	(0.364)	0.149	(0.330)
one_son_one_dauf	-0.384	(0.196)	0.053	(0.640)	-0.11	(0.213)	-0.008	(0.810)	-0.291	(0.164)
two_son_no_dau	-0.188	(0.424)	**-0.332**	**(0.001)*****	-0.048	(0.543)	-0.002	(0.954)	-0.111	(0.609)
two_son_no_dauf	-0.366	(0.316)	0.011	(0.940)	-0.174	(0.132)	0.011	(0.818)	0.147	(0.663)
only_dau	-0.15	(0.613)	**-0.492**	**(0.000)*****	-0.001	(0.989)	**0.09**	**(0.014)****	**0.433**	**(0.080)***
only_dauf	**-1.142**	**(0.011)****	0.281	(0.141)	-0.145	(0.302)	**-0.162**	**(0.023)****	**-0.934**	**(0.011)****
only_son	0.151	(0.803)	**-0.596**	**(0.000)*****	**-0.302**	**(0.010)*****	-0.098	(0.239)	0.065	(0.826)
only_sonf	-1.134	(0.111)	0.309	(0.159)	0.067	(0.697)	0.106	(0.374)		
atleast_one_each	0.294	(0.296)	**-0.529**	**(0.000)*****	-0.121	(0.130)	0.016	(0.546)	-0.07	(0.625)
atleast_one_eachf	**-1.425**	**(0.000)*****	0.069	(0.658)	-0.14	(0.229)	-0.041	(0.313)	0.096	(0.623)
notwanted	**0.329**	**(0.014)****	**-0.123**	**(0.005)*****	**-0.085**	**(0.010)*****	**-0.042**	**(0.018)****	0.117	(0.281)
notwantedf	-0.111	(0.522)	0.028	(0.631)	0.004	(0.938)	-0.006	(0.814)	**-0.289**	**(0.063)***
numbchildmot	-0.043	(0.348)	**-0.039**	**(0.051)***			**-0.034**	**(0.000)*****		
numbchildmotf	**0.125**	**(0.048)****	-0.005	(0.838)			0.002	(0.905)		

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

Preference and power balance inside the household

The preference for sons expressed by the mother (PREFMOT) has a significant negative impact on girls' likelihood of surviving. However, for all other measures of health-related inputs and outputs, preference for sons expressed by the mother is never significant and this is true for both boys and girls.

In contrast to what is often found in the literature, our three measures of power balance inside the household, namely female headed-household (SEXHEAD), mother's age at first birth (MOTAGE) and age difference between parents (FATMOTAGEDIF), do not significantly explain gender inequality in our variables measuring health-related inputs and outputs. The only exception is for MOTAGE, which reduces significantly the girls' odds of surviving. It is possible that women who start childbearing at an older age face more pressure to suppress unwanted girls as the number of years where they can bear a son is more limited than for younger mothers.

Table 11: Regression Results: Preference and Power Balance inside the Household

	alive0_1		Length/height-for-age z-score		Weight-for-age z-score		Vaccine		treatdiarrhoea	
prefmot	0.175	(0.529)			0.056	(0.531)	-0.017	(0.718)		
prefmotf	**-1.164**	**(0.008)*** **			-0.207	(0.126)	-0.1	(0.172)		
sexhead									**0.466**	**(0.022)** **
sexheadf									-0.307	(0.213)
fatmotagedif	**-0.017**	**(0.084)***	0.001	(0.906)	0	(0.897)	-0.002	(0.126)		
fatmotagedif	0.02	(0.163)	0.009	(0.131)	0.005	(0.281)	0.003	(0.235)		
motage	-0.017	(0.464)	**-0.027**	**(0.005)*** **	0.007	(0.245)	0.003	(0.101)		
motagef	**-0.073**	**(0.021)** **	0.016	(0.265)	-0.001	(0.893)	-0.002	(0.515)		

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01

Oaxaca-Blinder Decomposition

As we have previously discussed, the gender inequality we observe can be caused by two factors: difference in endowments, and discrimination per se. In order to weight the relative importance of these two factors, an Oaxaca-Blinder decomposition is performed.

Put simply, an Oaxaca-Blinder decomposition is, for example, the difference in the average probability of a boy and a girl receiving vaccination:

$P(vac)_b - P(vac)_g = [P(X^g_i, \beta^b) - P(X^g_i, \beta^g)] + [P(X^b_i, \beta^b) - P(X^g_i, \beta^b)]$

Or: $P(vac)_b - P(vac)_g = [P(X^b_i, \beta^b) - P(X^b_i, \beta^g)] + [P(X^b_i, \beta^g) - P(X^g_i, \beta^g)]$

The first term in the bracket represents the discrimination effect, while the second bracket measures the endowment effect.

In order to be able to perform an Oaxaca-Blinder decomposition, it is necessary to have variation in the explained variable between the two groups. Because in the case of infant mortality no difference is synonymous with gender inequality, I could not perform the decomposition for this variable. In the case of nutritional outcomes, boys are more likely than girls to be undernourished, implying that if gender inequality exists, it is against boys. As the focus of this paper is on gender inequality against girls, our two variables of nutritional outcomes have been discarded. Finally, the number of observations for treatment for diarrhoea is too limited to be reliable. Consequently, the only variable left is, the number of vaccines received.

On average, in India, girls are less likely to receive vaccinations than boys. Around 49% of this difference is due to difference in endowments, with the remainder being due to discrimination as such. When we disaggregate by religious groups we conclude that neither Muslims nor Christians discriminate between their children in terms of vaccination. However, Hindus and, even more importantly, Sikhs discriminate against girls. For Hindus, approximately 0.61% of the difference observed between boys and girls is due to discrimination. For Sikhs, the result is even stronger. Given their endowments, girl should receive 53% more vaccines than what we actually observe. In other words, the raw data show less gender discrimination than the discrimination actually faced by Sikh girls, everything else constant.

Table 12: Oaxaca-Blinder Decomposition

	Coef.	Coef.	P>z	% explained by endowments
All	difference	**0.202**	0.002	**0.486475**
	endowments	0.098	0.030	
	coefficients	0.084	0.098	
	interaction	0.020	0.299	
Hindus	difference	**0.211**	0.004	**0.387775**
	endowments	0.082	0.119	
	coefficients	0.088	0.120	
	interaction	0.041	0.060	
Muslims	difference	**0.158**	0.419	**0.598615**
	endowments	0.095	0.493	
	coefficients	0.121	0.446	
	interaction	-0.058	0.543	
Christians	difference	**-0.113**	0.688	**0.204524**
	endowments	-0.023	0.924	
	coefficients	0.054	0.825	
	interaction	-0.144	0.533	
Sikhs	difference	**0.672**	0.042	**-0.52789**
	endowments	-0.355	0.408	
	coefficients	0.837	0.009	
	interaction	0.190	0.653	

6. Conclusion

Girls in India are clearly more at risk of dying relative to boys than they should be based only on biological difference. As boys have worse nutritional outcomes than girls, it seems that the difference in mortality between boys and girls might be due to differences in health care, as shown by the smaller average number of vaccines received by girls and the lower probability of receiving treatment for diarrhoea for girls.

After controlling for the economic system, the kinship system, the resource constraints faced by parents, the selective discrimination and the preference for sons of the mother, we conclude that religion has still an impact, with being a Muslim girl increasing the probability of surviving and being a Hindu or a Muslim girl increasing the height-for-age z-score. These results are interesting as these two religions are often demonized. The only religious group that seems to clearly discriminate against girls is Sikhism, with Sikh girls

having an almost significant lower chance of surviving than boys and of having a lower likelihood of receiving treatment for diarrhoea. The non-significance is probably only due to the small sample size for Sikhs (p-value of 0.107 and 0.122, respectively).[25] This conclusion is confirmed through the used of the Blinder-Oaxaca decomposition techniques that show that after controlling for endowments, Sikh girls are clearly discriminated against in terms of vaccination. The same is also true for Hindus, but the level of discrimination faced by girls is much lower.

The main drawback of this study is the use of wide religious affiliation instead of focusing on more clearly defined religious groups. Even if we conclude that Hindus, Muslims and Christians do not seem to have particularly high levels of gender inequality compared to the other groups, it is possible that within these religions some sub-groups behave differently from others. The limited information available in the data is the reason why more precise information has not been used. There is a clear need for more research in this area.

[25] 616 observations are used to measure Sikhs likelihood of surviving and only, 73 observations are used to measure their likelihood of receiving treatment for diarrhoea.

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Annex A: Variables' definition

Variable name	Definition	Type of Variable	Source	Min.	Max
Dependent variables					
ALIVE0_1	Child is alive (1) or not (0).	Dummy	DHS	0	1
H_A	Height-for-age z-score. The z-score is: (observed value- median value of the reference population)/ standard deviation of reference population.	Continuous	DHS	-6	6
W_A	Weight-for-age z-score. The z-score is: (observed value- median value of the reference population)/ standard deviation of reference population.	Continuous	DHS	-5.99	4.93
VACCIN	Number of vaccines received in the list of vaccines included in the questionnaire.	Count	DHS	0	9
TREATDIARRHOEA	Conditional on the child suffering from diarrhoea in the two weeks preceding the survey, does the parents have sought any type of treatment/advice.	Dummy	DHS	0	1
Independent variables					
Economic development, domestic productivity and labour participa tion					
GDP, GDP2	Gross State domestic Product at constant price (1999-2000) and total population per state (2001), Squared GDP.	Continuous	Directorate of Economics & Statistics of respective State Governments and Census India 2001	6048	46970
WORKREG	The percentage of women working in a state.	Continuous	DHS	0.09	0.70
INDEXWAGE**	Weighted female wage as a proportion of weighted male wage (the higher the index, the more equality).	Continuous	Manghani (2004)	0.52	0.85
RURAL	Household is living in rural area (1) or urban area (0).	Dummy	DHS	0	1
Cultural and Institutional Systems					
ENDOGAMYREG*	Percentage of women who the last time they have moved was at a different time than her marriage (more or less one year).	Continuous	DHS	0.15	0.93
INDEXMOB**	Percentage of ever married women who do not require permission to go to the market and/or visit friends and relative (the higher the index, the more equality).	Continuous	Manghani (2004)	0.28	0.63
INDEXVIOLENCE**	Percentage of women who have been victims of domestic physical violence (the higher the index, the more equality).	Continuous	Manghani (2004)	0.06	0.94
PREFMOTREG*	Prefmot at the state level.	Continuous	DHS	0.51	0.61
Religion					
MUSLIM, BUDDHIST, HINDU, OTHERREL, ATHEE	Mother's religion, the reference category being Christian.	Set of dummy variables	DHS	0	1
SCHCASTE, SCHTRIBE, BWDCASTE	Caste membership, the reference category being caste other than scheduled caste or tribe and backward caste.	Set of dummy variables	DHS	0	1
MUSLIMREG, HINDUREG, SIKHREG*	Main religion in the state, the reference category being Christian.	Set of dummy variables	DHS	0	1
Resource constraints					
Z_WEALTHINDEX	Z-score of a wealth index (observed value-mean)/standard deviation.	Continuous	DHS	-0.18	5.72
FLOOD	Flood has happened in the state of residence during the first year of life of the child (1), otherwise (0).	Dummy	DHS	0	1
HEALTHFACI	Distance to the closest health facility of the following: sub-centre, primary health centre government dispensary, government hospital.	Continuous	DHS	0	90
COMPET	Number of children of less than five years old divided by the number of 'adult equivalents'.	Continuous	DHS	0	3
HOMEMOT2, HOMEMOT3	HOMEMOT2: the mother is working at home (1), otherwise (0) Homemot3: the mother is working outside of home (1), otherwise (0).	Set of dummy variables	DHS	0	1
AGEATBIRTH	Mother's age at the birth of the index child.	Continuous	DHS	13	49
EDUCMOT	Mother's education.	Continuous	DHS	0	22
EDUCFAT	Father's education.	Continuous	DHS	0	22
PRENATCAR	Mother has received prenatal care by a trained professional before the birth of the index child (1), otherwise (0). Missing answers are hypothesised to mean that no prenatal care has been received.	Dummy	DHS	0	1
SCARRING	At least one of the older sibling of the index child died before reaching 5 years old (1), otherwise (0).	Dummy	DHS	0	1

Variable name	Definition	Type of Variable	Source	Min.	Max
Selective discrimination					
FEMALE	The child is a girl (1), otherwise (0).	Dummy	DHS	0	1
NO_SON_ONE_DAU, ONE_SON_NO_DAU, NO_SON_TWO_DAU, ONE_SON_ONE_DAU, TWO_SON_NO_DAU, ONLY_SON, ONLY_DAU, ATLEAT_ONE_EACH	Gender composition of older siblings still alive at the time of the survey. The reference category is firstchild.	Set of dummy variables	DHS	0	1
NOTWANTED	Child was wanted (0) or unwanted/wanted later (1) by the mother at the time of the birth.	Dummy	DHS	0	1
NUMBCHILDMOT	Number of child desired by the mother.	Dummy	DHS	0	1
Preference					
PREFMOT	Index of son preference: number of sons wanted/total number of children wanted.	Continuous	DHS	0	1
SEXHEAD	Male-headed household (0) female-headed household (1).	Dummy	DHS	0	1
FATMOTAGEDIF	Difference in age between the father and the mother.	Continuous	DHS	-15	57
MOTAGE	Mother's age at birth of the first child.	Continuous	DHS	10	42
Control variables					
WEIGHTBIRTH	The size of the index child at birth was "very small" (1), otherwise (0).	Dummy	DHS	0	1
TWIN	The index child has a twin (1), otherwise (0).	Dummy	DHS	0	1
BMIMOT	Mother's BMI (does not adjust for pregnant women).	Continuous	DHS	12.19	59.56
TERMINATED	Mother had at least one terminated birth.	Dummy	DHS	0	1
TETANUS	Mother has received at least one tetanus injection before the birth of the index child.	Dummy	DHS	0	1
INTERV_BEF_12, INTERV_BEF_24	Birth spacing, older sibling is born less than 12 months before index child, between 12 and 24 months, or after 24 months. Children without any older siblings are in the last category. Reference category, interv_bef_more.	Set of dummy variables	DHS	0	1
TOILET	Access to toilet or latrine (1), otherwise (0).	Dummy	DHS	0	1
MOTHEIGHT	Mother's height.	Continuous	DHS	101	200
AGE	Child's age, child's age squared.	Continuous	DHS	0	59

Annex B: Regression Results

	alive0_1		Length/height-for-age z-score		Weight-for-age z-score		vaccin		treatdiarrhoea	
ECONOMIC SYSTEM										
gdp	**-0.0001069**	**(0.003)*** **	**-0.00003**	**(0.013)** **	-3.15E-06	(0.745)	**0.0000521**	**(0.000)*** **	**0.00024**	**(0.000)*** **
gdpf	-0.0000108	(0.857)	**-0.000039**	**(0.036)** **	9.41E-07	(0.953)	-2.37E-06	(0.726)	**-0.00012**	**(0.075)***
gdp2	**1.8E-09**	**(0.006)*** **	**6E-10**	**(0.012)** **	-1.33E-10	(0.413)	**-8E-10**	**(0.000)*** **	**-4E-09**	**(0.000)*** **
gdp2f	1.72E-10	(0.879)	**7E-10**	**(0.023)** **	9.84E-11	(0.718)	2.25E-11	(0.845)	**2.09E-09**	**(0.079)***
vorkreg	**-0.791**	**(0.057)***	-0.16	(0.340)	**-0.768**	**(0.000)*** **	**-0.118**	**(0.078)***	-0.673	(0.109)
vorkregf	0.598	(0.317)	0.172	(0.389)	0.006	(0.969)	0.001	(0.993)	-0.815	(0.180)
ndexwage	**-1.476**	**(0.027)** **	**-0.53**	**(0.046)** **	-0.258	(0.175)	**0.247**	**(0.030)** **	**2.281**	**(0.001)*** **
ndexwagef	1.217	(0.225)	-0.22	(0.543)	-0.127	(0.642)	0.019	(0.905)	-1.4	(0.194)
ndexmob	-0.247	(0.755)	**0.622**	**(0.062)***	0.361	(0.129)	**0.161**	**(0.074)***	-0.922	(0.359)
ndexmobf	1.321	(0.251)	**1.052**	**(0.019)** **	0.18	(0.585)	0.033	(0.800)	1.814	(0.186)
CULTURAL SYSTEM										
ndexviolenc	**2.307**	**(0.001)*** **	**-0.948**	**(0.001)*** **	0.354	(0.137)	**-0.772**	**(0.000)*** **	**-3.567**	**(0.000)*** **
ndexviolenc	-0.612	(0.611)	**0.835**	**(0.033)** **	0.157	(0.618)	0.116	(0.328)	1.571	(0.281)
ndogamyre	0.417	(0.419)	**0.641**	**(0.003)*** **	**0.574**	**(0.000)*** **	0.096	(0.181)	**-1.505**	**(0.009)*** **
ndogamyre	-0.479	(0.523)	-0.064	(0.812)	0.159	(0.434)	0.052	(0.586)	0.6	(0.477)
refmotreg	**-12.614**	**(0.000)*** **	-1.803	(0.120)	**-2.545**	**(0.010)** **	-0.393	(0.335)	3.42	(0.368)
refmotregf	5.188	(0.230)	-1.325	(0.399)	0.82	(0.525)	0.128	(0.816)	0.391	(0.942)
RELIGIONS AND CASTES										
nuslimreg	**1.183**	**(0.005)*** **	**0.452**	**(0.012)** **	**0.328**	**(0.019)** **	**0.214**	**(0.003)*** **	0.267	(0.577)
nuslimregf	0.199	(0.754)	0.045	(0.831)	0.056	(0.764)	0.041	(0.642)	**1.289**	**(0.060)***
indureg	**0.939**	**(0.005)*** **	**0.278**	**(0.054)***	0.04	(0.722)	0.106	(0.106)	-0.008	(0.982)
induregf	0.109	(0.817)	-0.119	(0.476)	-0.103	(0.537)	0.049	(0.545)	0.567	(0.263)
ikhrelreg	**0.927**	**(0.043)** **	**0.462**	**(0.014)** **	**0.358**	**(0.023)** **	0.004	(0.960)	-0.578	(0.399)
Sikhrelregf	0.388	(0.589)	-0.158	(0.456)	-0.105	(0.635)	0.038	(0.702)	1.459	(0.163)
nuslim	0	(1.000)	**-0.255**	**(0.010)** **	**-0.383**	**(0.000)*** **	**-0.124**	**(0.001)*** **	0.392	(0.163)
nuslimf	**0.74**	**(0.098)***	**0.266**	**(0.043)** **	0.051	(0.646)	-0.041	(0.413)	-0.393	(0.371)
buddhist	0.179	(0.685)	**0.299**	**(0.077)***	**0.206**	**(0.071)***	-0.026	(0.585)	**-1.292**	**(0.000)*** **
buddhistf	0.177	(0.801)	0.052	(0.831)	-0.064	(0.701)	0.048	(0.678)	0.652	(0.239)
indu	-0.075	(0.790)	**-0.242**	**(0.009)*** **	**-0.3**	**(0.000)*** **	-0.045	(0.140)	-0.168	(0.518)
induf	0.45	(0.250)	**0.257**	**(0.031)** **	-0.004	(0.972)	-0.04	(0.378)	-0.046	(0.906)
Sikh	**0.869**	**(0.090)***	-0.063	(0.710)	**-0.225**	**(0.035)** **	-0.048	(0.251)	1.74	(0.122)
ikhf	-1.092	(0.107)	-0.038	(0.869)	-0.161	(0.362)	-0.06	(0.403)	-2.071	(0.122)
therrel	1.015	(0.182)	0.084	(0.684)	0.209	(0.218)	**-0.2**	**(0.017)** **	0.862	(0.142)
therrelf	-0.409	(0.640)	0.342	(0.168)	0.116	(0.595)	0.084	(0.494)	-0.674	(0.431)
thee	0.265	(0.757)	-0.599	(0.172)	-0.175	(0.542)	-0.071	(0.682)	-0.139	(0.798)
theef	-0.389	(0.539)	0.334	(0.573)	0.057	(0.896)	-0.521	(0.156)	**2.436**	**(0.055)***
chcaste	**-0.283**	**(0.030)** **	**-0.25**	**(0.000)*** **	**-0.146**	**(0.000)*** **	-0.012	(0.490)	0.174	(0.199)
chcastef	0.253	(0.163)	0.076	(0.273)	0.017	(0.765)	0.02	(0.455)	0.049	(0.798)
chtribe	-0.007	(0.963)	**-0.138**	**(0.048)** **	**-0.17**	**(0.005)*** **	**-0.093**	**(0.005)*** **	**-0.253**	**(0.087)***
chtribef	0.175	(0.409)	0.077	(0.423)	0.052	(0.502)	-0.034	(0.432)	-0.115	(0.543)
wdcaste	-0.087	(0.436)	**-0.151**	**(0.001)*** **	**-0.141**	**(0.000)*** **	0.016	(0.272)	0.039	(0.739)
wdcastef	-0.107	(0.474)	0.033	(0.572)	0.016	(0.755)	-0.026	(0.239)	0.245	(0.108)
RESSOURCES CONSTRAINT										
_wealthinde	-0.024	(0.748)	**0.091**	**(0.000)*** **	0.024	(0.172)				
_wealthinde	**83.11**	**(0.003)*** **	0.019	(0.493)	0.025	(0.285)				
ural							**-0.021**	**(0.084)***	**-0.25**	**(0.029)** **
uralf							0.013	(0.433)	0.025	(0.886)
lood					-0.027	(0.325)				
loodf					0.047	(0.239)				
ealthfaci							-0.006	(0.225)		
ealthfacif							0	(0.996)		
ealthfaci2							0	(0.406)		
ealthfaci2f							0	(0.209)		
ompet	**6.263**	**(0.000)*** **	**0.231**	**(0.000)*** **	0.045	(0.392)	**-0.077**	**(0.001)*** **	**-0.568**	**(0.001)*** **
ompetf	-0.512	(0.402)	0.002	(0.981)	-0.068	(0.337)	0.042	(0.215)	**0.597**	**(0.017)** **
omemot2					-0.022	(0.683)			**-0.322**	**(0.091)***
omemot2f					-0.005	(0.949)			**0.519**	**(0.051)***
omemot3					**-0.082**	**(0.016)** **			0.121	(0.215)
omemot3f					0.04	(0.362)			0.08	(0.572)
geatbirth	0.032	(0.108)	**0.041**	**(0.000)*** **	0.008	(0.176)				
geatbirthf	0.081	**(0.002)*** **	-0.012	(0.290)	0.005	(0.594)				
	alive0_1		Length/height-for-age z-score		Weight-for-age z-score		vaccin		treatdiarrhoea	

educmot	0.034	**(0.012)****	**0.03**	**(0.000)*****	**0.03**	**(0.000)*****	**0.004**	**(0.033)****	0.018	(0.193)
educmotf	0.021	(0.281)	-0.002	(0.780)	-0.001	(0.887)	**0.004**	**(0.065)***	0.02	(0.328)
educfat	**0.045**	**(0.000)*****	**0.013**	**(0.003)*****	**0.019**	**(0.000)*****	**0.011**	**(0.000)*****	0.015	(0.185)
educfatf	**-0.033**	**(0.033)****	0	(0.999)	-0.004	(0.388)	-0.001	(0.798)	0.004	(0.802)
prenatcar	**0.27**	**(0.026)****					**0.105**	**(0.000)*****	**0.294**	**(0.006)*****
prenatcarf	-0.141	(0.421)					0.058	(0.130)	**-0.36**	**(0.035)****
carring	-0.078	(0.513)	**-0.099**	**(0.038)****	-0.044	(0.219)	**-0.061**	**(0.003)*****		
carringf	**-0.352**	**(0.044)****	0.072	(0.346)	-0.027	(0.603)	0.001	(0.970)		
SELECTIVE DISCRIMINATION										
female	**10.693**	**(0.069)***	0.189	(0.856)	-0.342	(0.687)	-0.217	(0.554)	-0.67	(0.850)
no_son_one_	-0.068	(0.656)	**-0.202**	**(0.000)*****	-0.032	(0.508)	**0.026**	**(0.090)***	0.106	(0.463)
no_son_one	**-0.69**	**(0.000)*****	0.003	(0.974)	-0.076	(0.255)	-0.038	(0.110)	-0.315	(0.138)
one_son_no	-0.237	(0.140)	**-0.252**	**(0.000)*****	-0.047	(0.291)	0.011	(0.521)	0.022	(0.889)
one_son_no_	-0.259	(0.231)	-0.036	(0.683)	-0.008	(0.901)	-0.012	(0.616)	-0.149	(0.503)
no_son_two_	0.224	(0.419)	**-0.252**	**(0.003)*****	0.015	(0.821)	**0.053**	**(0.021)****	0.014	(0.939)
no_son_two_	**-1.116**	**(0.001)*****	-0.013	(0.921)	**-0.223**	**(0.024)****	-0.053	(0.211)	-0.43	(0.142)
one_son_one	-0.124	(0.530)	**-0.392**	**(0.000)*****	-0.055	(0.375)	0.021	(0.364)	0.149	(0.330)
one_son_one	-0.384	(0.196)	0.053	(0.640)	-0.11	(0.213)	-0.008	(0.810)	-0.291	(0.164)
wo_son_no_	-0.188	(0.424)	**-0.332**	**(0.001)*****	-0.048	(0.543)	-0.002	(0.954)	-0.111	(0.609)
wo_son_no_	-0.366	(0.316)	0.011	(0.940)	-0.174	(0.132)	0.011	(0.818)	0.147	(0.663)
nly_dau	-0.15	(0.613)	**-0.492**	**(0.000)*****	-0.001	(0.989)	**0.09**	**(0.014)****	**0.433**	**(0.080)***
nly_dauf	**-1.142**	**(0.011)****	0.281	(0.141)	-0.145	(0.302)	**-0.162**	**(0.023)****	**-0.934**	**(0.011)****
nly_son	0.151	(0.803)	**-0.596**	**(0.000)*****	**-0.302**	**(0.010)*****	-0.098	(0.239)	0.065	(0.826)
nly_sonf	-1.134	(0.111)	0.309	(0.159)	0.067	(0.697)	0.106	(0.374)		
tleast_one_	0.294	(0.296)	**-0.529**	**(0.000)*****	-0.121	(0.130)	0.016	(0.546)	-0.07	(0.625)
tleast_one_	**-1.425**	**(0.000)*****	0.069	(0.658)	-0.14	(0.229)	-0.041	(0.313)	0.096	(0.623)
notwanted	**0.329**	**(0.014)****	**-0.123**	**(0.005)*****	**-0.085**	**(0.010)*****	**-0.042**	**(0.018)****	0.117	(0.281)
notwantedf	-0.111	(0.522)	0.028	(0.631)	0.004	(0.938)	-0.006	(0.814)	**-0.289**	**(0.063)***
umbchildm	-0.043	(0.348)	**-0.039**	**(0.051)***			**-0.034**	**(0.000)*****		
umbchildm	**0.125**	**(0.048)****	-0.005	(0.838)			0.002	(0.905)		
PREFERENCE AND POWER BALANCE										
prefmot	0.175	(0.529)			0.056	(0.531)	-0.017	(0.718)		
prefmotf	**-1.164**	**(0.008)*****			-0.207	(0.126)	-0.1	(0.172)		
exhead									**0.466**	**(0.022)****
exheadf									-0.307	(0.213)
atmotagedif	**-0.017**	**(0.084)***	0.001	(0.906)	0	(0.897)	-0.002	(0.126)		
atmotagedif	0.02	(0.163)	0.009	(0.131)	0.005	(0.281)	0.003	(0.235)		
motage	-0.017	(0.464)	**-0.027**	**(0.005)*****	0.007	(0.245)	0.003	(0.101)		
motagef	**-0.073**	**(0.021)****	0.016	(0.265)	-0.001	(0.893)	-0.002	(0.515)		
CONTROLS										
veightbirth	**-1.011**	**(0.000)*****	**-0.237**	**(0.004)*****	**-0.406**	**(0.000)*****				
veightbirthf	0.239	(0.191)	-0.178	(0.105)	-0.114	(0.222)				
win	**-2.631**	**(0.000)*****	**-0.612**	**(0.002)*****	**-0.677**	**(0.000)*****				
winf	**0.594**	**(0.090)***	-0.21	(0.454)	-0.081	(0.715)				
mimot	**-0.04**	**(0.000)*****								
nterv_bef_1	**-1.918**	**(0.000)*****	0.004	(0.987)	-0.035	(0.821)				
nterv_bef_1	0.6	(0.177)	-0.206	(0.529)	-0.124	(0.612)				
nterv_bef_2	**-0.952**	**(0.000)*****	**-0.168**	**(0.001)*****	**-0.111**	**(0.002)*****				
nterv_bef_2	0.104	(0.549)	0.029	(0.702)	0.022	(0.690)				
erminated			-0.032	(0.452)	**0.069**	**(0.033)****				
erminatedf			**0.138**	**(0.040)****	0.041	(0.382)				
etanus	**0.326**	**(0.007)*****	**0.172**	**(0.000)*****	**0.076**	**(0.023)****	**0.441**	**(0.000)*****	0.127	(0.281)
etanusf	0.008	(0.961)	-0.099	(0.163)	-0.03	(0.572)	0.021	(0.659)	0.221	(0.170)
umbchildm	-0.043	(0.348)	**-0.039**	**(0.051)***			**-0.034**	**(0.000)*****		
umbchildm	**0.125**	**(0.048)****	-0.005	(0.838)			0.002	(0.905)		
oilet			**0.199**	**(0.000)*****	**0.267**	**(0.000)*****				
ge			**-0.046**	**(0.000)*****	**-0.017**	**(0.000)*****				
gef			-0.004	(0.102)	**-0.005**	**(0.007)*****				
notheight			**0.049**	**(0.000)*****	**0.036**	**(0.000)*****				
Constant	**7.924**	**(0.000)*****	**-6.963**	**(0.000)*****	**-5.828**	**(0.000)*****	**1.313**	**(0.000)*****	-1.217	(0.643)
Observations	27551	27551	23716	23716	24718	24718	8605	8605	5949	5949
R-squared			0.161	0.161	0.159	0.159				

P-value in parentheses. Significant at 0.10, ** significant at 0.05, *** significant at 0.01