Christianity and Girl Child Health in India

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Abstract:
This paper studies child health focusing on differences in anthropometric outcomes between Christians and non-Christians in India. The non-Christian group includes Hindus and Muslims. Estimates indicate that young Christian children (ages 0-59 months) are less likely to be stunted as compared to similar aged children of Hindu and Muslim identities. The Christian relative advantage is particularly pronounced for girls. Using representative data on child health outcomes and information on the location of Protestant and Catholic missions, differences in the relative timing of establishment of missions in the same area, political crises that mission-establishing countries were engaged in during India's colonial history, and historical information from the 1901 Census, we find that Christian girls are significantly less likely to be stunted as compared to similarly aged non-Christian girls. We find no relative stunting advantage for Christian boys, which we attribute to son preference and patriarchy among Hindus in particular. An analysis of explanatory mechanisms indicates that elementary and higher education schools, as well as hospitals, pharmacies and print shops associated with the advent of Christianity improved the relative human capital of women with subsequent long-term implications for young Christian girls in India today. Our results survive a series of robustness and specification checks.

JEL Classification Codes: O12, O15, I12, I14, I15, Z12

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I. Motivation

Indian children are among the most undernourished in the world (Deaton and Dreze 2009; Jayachandran and Pande 2017). High malnutrition rates have persisted in India despite impressive gains in economic growth that followed the liberalization of the early 1990s. This paper investigates why child development has remained insulated from these gains by focusing on one particular channel – religious affiliation. Such affiliation is likely to provide information on the likely dietary restrictions encountered by a child in his or her early years, on possible differences in women's control over household resources, and on identity-specific impacts such as a child's exposure to fasting *in utero* during the Muslim holy month of Ramadan. Unlike previous work that has considered Hindu versus Muslim differences in infant and child health (Bhalotra *et al.* 2010, Borooah 2012, Brainerd and Menon 2015) however, the focus of this study is the relatively improved health status of Christian children, which we argue is tied to historical antecedents of Christian influence and the egalitarian ideas it propagated.

Christians in general have higher human capital measures than other religious groups, especially in the southern states where Christianity first arrived in India. This is seen in Appendix Table 1 that reports estimates from the 2011 Census of India by state and by religion for sex ratios, and gender gaps in literacy and work rates. On average, Christians have lower sex ratios and lower gaps between genders in education and work status. Focusing on children, the comparatively better health status of Christian children is clearly evident in Figure 1 which depicts the association of a child's predicted probability of being stunted (height-for-age below two standard deviations of the mean of 0) and age in months for all children less than five years old. The figure is demarcated by gender and religious affiliation and includes 95 percent confidence intervals.[1] These plots include vertical lines distinguishing ages 6-23 months – the critical window of time when stunting is most likely to manifest itself (Heady *et al*. 2018). The patterns in Figure 1 highlight the advantage of Christian children in comparison to Hindu and Muslim children ("Non-Christian" in Figure 1). This advantage becomes evident as early as in the first six months of life, remains evident through infancy, through the first three years of life (the first thousand days), and for

[1] We checked for accuracy in measurement of age in months of the child and there is little evidence of "heaping".

many months thereafter. These trends remain the same when the sample is restricted to just girls (Panel A) or just boys (Panel B), with some indication that the relative stunting probabilities decline substantially for Christian girls and boys through infancy (when they are rising for Hindus and Muslims), and for girls in particular, the gap does not close even as of age five. Figure 1 thus underlines three things: (1) in relation to Hindus and Muslims, Christian children have reduced stunting probabilities particularly in the important junctures of early life, and these trends remain distinct. (2) in so far as infancy is a critical time of child development and the age-window that is most reflective of things that occurred *in utero* and of mother's health (possibly reinforcing and/or remedial actions of parents and the child's environment are likely to come into play only beyond this age), these patterns suggest that historical and other factors related to the health, education and welfare of Christian women are likely to be important explanations of their children's health advantage, and (3), even within the subset of Christian children, girls compare favorably to boys, perhaps echoing the intergenerational advantage of Christian women in relation to other groups, and the relative health benefits they bequeath to daughters. This paper analyzes these patterns in early childhood health and argues that Christian authority in colonial India is a pivotal explanatory factor. It thus highlights one channel by which Christian missionaries have contributed to improving human capital that facilitates development, although as noted in Smith (2017), the historical relationship between missionaries and those who benefitted from their presence has often been contentious.

We focus on children from birth to five years of age as evidence demonstrates that negative health shocks in this period can have large, long-lasting effects (Currie and Vogl 2013). Within this short span, infancy to about two years of age is the window of time when growth is fastest in terms of physical and mental development, and health in early childhood is considered to be one of the best predictors of adult earnings, well-being and skill formation (Cunha and Heckman 2007, Behrman 2009). Given the demands on data, a large part of this evidence has previously focused on children in the developed world. However, children in developing countries may be even more vulnerable because of the widespread prevalence of nutritional and environmental insults, and the frequency with which these occur. Negative health shocks to children in poor countries have only recently begun to receive attention in the economics literature (Almond and Mazumder 2011, Brainerd and Menon 2014). That religion might mediate some of these health impacts is also gaining widespread acceptance (Brainerd and Menon 2015, Blunch and Gupta 2020).

The data set that we use is the Demographic and Health Surveys (DHS) for India from 1992, 1998, and 2015, as these rounds have publicly available district level identifiers (unlike the 2005 round). The DHS surveys provide detailed data on child, mother, and father characteristics including detailed fertility histories of women aged 15 to 49. The year of birth of children ages 0-59 months in these rounds is 1988–2015. These data are supplemented with historical sources including a record of all Protestant and Catholic missions operating in India from the mid-1400s, numbers on mortality from cholera and fever from 1868 onwards, population affected in historical famines, and information on civil and international wars fought by countries establishing missions during the years they were active in pre-independent India. In particular, variation in the timing of establishment of missions of specific denominations within the same district is used for identification. To be clear, identification arises from differences in timing of location of missions, not from the presence of missions in of themselves, as we explain below. Focusing on stunting constructed from height-for-age (HFA), an indicator of child health that is considered to be a long-run measure of development (and more stable in the short-run that weight-for-age or weight-for-height), our results indicate that when Christian identity today is instrumented with historical factors, Christian girls score significantly better than Hindu or Muslim girls of comparable ages. More specifically, Christian girls aged 0-59 months are 30.0 percentage points less likely to be stunted as compared to similarly aged non-Christian girls. This is a sizeable effect but in keeping with other studies such as Hoddinott *et al*. (2011). This result is impervious to a variety of controls such as mother's education, mother's height, age at marriage and age at birth of child, access to sanitary facilities and household assets, child's birth order, nursing history, prenatal care, as well as a slew of robustness checks. The coefficient for Christian boys is measured imprecisely for reasons discussed below.

These patterns on the health of Christian infants' girls is, to the best of our knowledge, newly documented. As we discuss below, the health advantage for Christian girls is especially surprising in India where Christians are a minority group, and where son-preference among Hindus in particular results in the preferential treatment of boys that begins *in utero* and extends after-birth (Jayachandran and Kuziemko 2011, Bharadwaj and Lakdawala 2012, Barcellos et *al*. 2014). This study contributes to the discussions on child health in India by demonstrating that in addition to factors today, antecedents that changed practices and behavior historically also deserve consideration.

II. Related literature

Religion plays an important role in India. The main religious communities are Hindus and Muslims with Christians forming the second largest minority group. The proportion of Hindus (both upper and lower-caste) is about 80 percent in our sample, Muslims are 13 percent and Christians are seven percent (there are other groups such as Jains who form a tiny proportion of the population and are excluded for purposes of this study). Religious practices differ in a number of ways between Hindus, Muslims and Christians: upper-caste Hindus strictly adhere to a vegetarian diet and Muslims do not consume pork and fast during daylight hours in the holy month of Ramadan (including pregnant Muslim women). Christians also fast during certain religious times but in general, have few dietary restrictions. It is widely acknowledged that there are significant differences among the three groups in women's education and health status, personal health and hygiene, and access to medical care. In particular, while Muslim and Christian women tend to be taller than Hindu women, Muslim women are comparatively less literate, marry at a younger age, and are less likely to work. Christian women have the highest rates of literacy in our sample, marry at older ages, and work at rates higher than those of upper-caste Hindu and Muslim women.

A few papers demonstrate that religious practices affect the health outcomes of infants and young children. Almond and Mazumder (2011) shows that fasting during Ramadan by pregnant Muslim women is linked with lower birth weights and lower proportion of male births for individuals who were *in utero* during Ramadan. Further, Bhalotra *et al*. 2010 shows that within India, Muslim children have a significantly higher probability of survival in infancy than do Hindu children despite their lower socioeconomic status. Brainerd and Menon (2015) demonstrate that this advantage does not persist beyond infancy however, and Geruso and Spears (2018) document that sanitation externalities within neighborhoods may be an associated explanatory factor. Karlsson (2019) studies differences in child health between Muslims and Christians in countries of Sub-Saharan Africa to find that health outcomes among the former are worse than among the latter.

Calvi and Mantovanelli (2018) studies the effect of proximity to a Protestant medical mission in British India and health outcomes for adults today, and is the closest in spirit to this paper. Using geocoding techniques to measure distance between the location of individuals today and the location of Protestant health facilities in the nineteenth century, the study finds that proximity to historical medical missions beneficially affects adult health as measured by body mass index. This study differs from Calvi and Mantovanelli (2018) in three important ways. First, their main analysis is restricted to data on adults aged 20-60 years from seven out of twenty-nine states in India at one point in time.[2] We use a repeated cross-sectional sample that is representative of all states and union territories in India from 1992-2015, allowing richer controls for regional and time variation (over and above the contemporaneous and historical controls described below) in a period when India has been changing rapidly. Second, instead of adults, we focus on very young children below the age of five years. The advantage of focusing on this age group is that what we measure is likely to be less contaminated by remedial, compensatory or reinforcing actions taken by various agents, especially parents. There is evidence going back to Cunha and Heckman (2007) of dynamic complementarities in behavior and compensatory actions in child health investments that makes focusing on a sample of adults less desirable. Third, Calvi and Mantovanelli (2018) relies on an instrument that conditions on behavior of mission societies in countries outside of India. However, the study does not control for characteristics from these many external regions. We

[2] The cross sectional data from the 2003 India World Health Survey is supplemented with 2001 Census data and the 2007-2008 District Level Household and Facility Survey for robustness checks.

condition on variations in treatment arising from differences in timing of establishment of missions *within the same area*.

Our paper contributes to the literature in several ways. First, using geo-referencing and other techniques, we compile a historical data set at the district level on the location of Protestant missions, Catholic missions, occurrence of health shocks associated with epidemic diseases and large natural disasters, and wars that countries locating missions in India were engaged in, from approximately 1450 to 1910. These data allow us to measure Christianity's influence on child stunting today based on history. Second, these data allow us to show that in a country with strong son-preference and in which Christians are a minority group, very young Christian children, especially girls, do particularly well as compared to Hindus and Muslim children of comparable age groups. This is new and important to the discussion on causes and consequences of child malnutrition in India, as previous research has documented the strong link between health measures at birth and long-term health and labor market outcomes (detailed below). Third, compared to Islam, Christianity came relatively late to India, and importantly, it was mostly lower-caste Hindu groups that converted to Christianity in the years we consider. Hence rather than arising from a separate heterogeneous population, today's Christians in India originated from a similar genetic make-up to Hindus in the region, indicating that differences in child health outcomes among these groups today are most probably due to differences in behavior and practices and not due to genetic dissimilarities. The results of this study augment the literature that underlines the importance of behavior in choice, the critical role played by historical institutions in shaping development today (Nunn 2009; Alesina *et al.* 2013), and the role of religion in molding socio-economic consequences (Barro and McCleary 2003).[3]

III. Christian influence in India

It is important to understand the mechanism underlying the better health status of Christian

[3] Barro and McCleary (2003) highlights the importance of belief versus belonging in shaping economic outcomes. Where belonging is associated with social networks that operate on religious lines, a method we use to differentiate the two is to restrict part of the analysis to those states in India where Christian presence is relatively high (the Southern and Northeastern states). The main results become even stronger.

children in India and the role that missionary work played. Earliest accounts make clear that it was mostly lower-caste groups that were open to conversion for a variety of reasons including better economic conditions (improvement in education and employment) and increase in status (particularly of women) and self-respect (Pickett 1933). For these disadvantaged groups, conversion meant escape from an oppressive social hierarchical order that dictated every way of life, and that now allowed greater freedom and movement into more diversified occupations. For example, "…In the Nagercoil area the Nadars, who when the Christian movement began were confined almost entirely to drawing the juice of the toddy palm … are now entering every kind of work …" (Pickett 1933). These new occupations included tailoring, carpentry, masonry and pottery. In addition to reduction in social oppression and poverty, improved opportunities for education that came with conversion also served as protection against widespread fraud that had been perpetuated against these communities for generations. Further, after conversion, lower-caste groups obtained access to infrastructure such as public roads that had been previously denied to them (Kent 2004).

Although there were many demand side factors that increased the attractiveness of conversion for these communities, there were several supply side factors as well. Lower-caste conversions, particularly in rural areas, often happened in mass during or immediately after periods of economic hardship brought on by the occurrences of famines, natural disasters (cyclones and earthquakes) and epidemics (cholera, fever). The motivation in these circumstances was the material support provided by the missions (Kent 2004). Conversion to Christianity was not absent among the upper-caste groups. However, such conversions occurred in much smaller numbers, often individually, and were driven by ideological motives rather than economic concerns.

What are the mechanisms that may underlie the better health status today of children of converts from over a century ago? In addition to evangelism and teaching of vocational occupations for fostering cottage-industries such as embroidery, lace-work and spinning, lady missionaries and the wives of missionaries taught formerly lower-caste women concepts of germ theory (importance of cleanliness, hygiene and sanitation, how to administer medicine, and origins of worms and rashes), the advantages of growing and consuming vegetables in small plots next to their homes and the importance of a diversified diet, and emphasized child development and parenting (Kent 2004). The coming of Christianity also led to the prevention and cure of illnesses in many areas. As noted in Picket (1933) "The school-teacher…in a village in the Vidyanagar area, in which malaria is endemic, estimated that in one year the loss of two hundred and twenty-one days of work had been prevented by the distribution of quinine by the teacher among the twenty-nine Christian families." Access to medicine meant that death rates for children were lowest in Christian families. There is also evidence that consumption of alcohol and drugs, as well as "social evils" such as gambling and child marriage decreased in areas where Christianity spread its influence, and that literacy rates among children were higher in families who had converted to Christianity (Pickett 1933). Hence, in addition to subverting caste rules and laws and increasing education, income, and awareness, particularly among mothers, there were several related aspects of Christianity that had the potential to importantly influence child health in the long run.

IV. Mechanisms

The paragraphs above clarify that Christianity had strong influences on fostering an environment that would have been beneficial for improving children's long-term health and development. We use this information, supplemented with data on other factors, to study Christian identity today.[4] Since one is born into one's religion and marriage is restricted to one's caste and faith for the majority of the population, that religious identity is not a choice is less controversial in India. However, as discussed above, there was active conversion to Christianity in colonial times with people exercising this choice in response to a variety of economic and environmental factors. Even though rates of conversion are considerably lower today, these trends in the past are likely to have impacts today especially in the Christian community. There may also be other reasons for why religious identity is not randomly assigned. For example, omitted variables that are correlated to both religious affiliation and child health status, or measurement error in variables that we use as controls, may render the indicator variable for

[4] We focus on Christian identity alone using historical data since relatively very few Muslims were converted in colonial times and they were only faintly influenced by missions.

Christian identity today endogenous. For these reasons, we present and discuss reduced form Ordinary Least Squares (OLS) and instrumental variables results.

Location of Protestant and Catholic missions

We use the *Statistical Atlas of Christian Missions* published in 1910 to gather information on the location of all Protestant missions in India as of that year. This source was compiled for the World Missionary Conference in 1910 in Edinburgh, Scotland, and is a directory of missionary societies, maps of mission fields and an index of mission stations throughout the world. Using this Atlas, we geo-referenced the India maps and then superimposed them onto a map of India with 2001 district boundaries to gather data on the location of missions at the district level (India in 2001 had 593 districts). We have complete information for 1004 Protestant missions throughout India. This information is then supplemented with data from the *Encyclopedia of Missions* from 1904 to find the year in which the mission was established, the district of location as of 1910, and the country that was responsible for its establishment. Further, we use the *Centennial Survey of Foreign Missions* from 1902 and the *World Atlas of Christian Missions* from 1911 to gather data on the number of girls and boys and all children in elementary schools under Protestant tutelage, and the number of hospitals, pharmacies and print shops affiliated with Protestant missions. These variables are used in the robustness checks of our estimates, and as shown below, are influential in explaining some of the patterns we document.

Location of Catholic missions is obtained from the *Atlas Heirarchichus*, compiled by the Vatican, to provide data on the universe of Catholic missions throughout the world as of 1911. The India related maps from this source were geo-coded to gather data at the district level on the location of Catholic missions in the country. In addition to the location, this source also provides information for most of the missions on the year of founding, and the mission society and country that was responsible for its establishment. Using the *Encyclopedia of Missions*, we supplemented data on year of origin and country of establishment for the remaining missions in this list. The Catholic missions also have additional information on numbers of priests, the number of theological schools and seminaries, numbers of elementary schools and schools of higher degrees, number of hospitals, pharmacies and print shops. We have complete information for 290 Catholic missions in India as of 1910.

Mission locations may be endogenous. Missionaries may have chosen to work in areas that were easily accessible, more amenable climate-wise, or where the local population was systematically different and so more open to conversion (poor areas with high density of people) (Nunn 2010, Cage and Rueda 2013). We control for the possible endogeneity of mission location by using, amongst others, variables from three geo-referenced maps from *Constable's Hand Atlas of India* 1893. These include the number of cities at or above 1500 feet, number of cities on railway lines, and the number of cities on navigable canals. These variables help to explain why missions are situated in the locations that they are in. The creation of these variables is similar to the creation of the variables measuring location of Protestant and Catholic missions, and is accomplished at the district level.

Over and above these controls for possible non-random placement of missions, given the evidence that missions may exert direct effects (Caicedo 2019, Jedwab *et al*. 2019, Castello-Climent *et al*. 2017), we use variation in the year of establishment *within* districts of the same mission type for identification. In order to explain the strategy, consider Protestant missions. In a specific district, we calculate the median year of opening of all Protestant missions that we have data on. We then demarcate these missions as "older" if they were established in years earlier than the median value and "newer if they were established in the median year or later.[5] The idea here is that the efficacy and strength of influence of older missions should differ from those that are more recent as older missions have been around longer to "treat" or influence individuals in that district. Newer missions will also have some influence but this should be of lower intensity as they are established more recently, and because we use 1910 as the exogenous cut-off (the *Statistical Atlas of Christian Missions* was compiled in 1910, the *Atlas Heirarchichus* in 1911). To be clear, mission presence in of itself is not the instrument, differences in the timing of establishment of missions of the *same type* in the *same area,* are. That is, we compare the

[5] We considered alternate benchmarks such as missions established in the pre-modern era versus those established in the modern era. However, there are too few Catholic missions established before 1500, the start of the pre-modern era, and no protestant mission established before this year in our data.

influence exerted by missions of a certain denomination that were established earlier with the influence exerted by missions of the same denomination established later in the same geographical area. This strategy is similar to Caicedo (2019) which uses differences between functioning and abandoned Jesuit missions in a comparable geographic context to identify effects. Lacking information on which Protestant missions were established and then stopped functioning, we use differences in years of presence within a district to identify effects on the health of young children who today reside in that same district. Catholic missions are also differentiated on the basis of their vintage in the district, and identification of their impacts on child health today is accomplished by evaluating differences between older and newer Catholic missions located in the same district.

As we demonstrate below, it is the older missions, both Protestant and Catholic, which have measurable effects on child stunting. That we should expect these differences on the basis of age of the missions is evident in Figures 2 and 3. Panels A and B of Figure 2 show that the number of Protestant and Catholic missions in a district have statistically significant effects on predicted Christian prevalence among children 0-59 months of age. Catholic missions in particular have a strong effect as noted by the steep slope of the line in Panel B. However, Figure 2 does not differentiate between older and newer missions within each category. That differentiation is reported in Figure 3 where each mission type is split by years of operation in the district. In the case of both Protestant (Panel A) and Catholic (Panel B) missions, the impact of older missions is stronger. Appendix Figure 1 shows patterns where vintage of Protestant and Catholic missions is normalized by the number of missions of each type and category. It is clear that newer Protestant and Catholic missions both have impacts that are close to zero. Older Protestant and Catholic missions however have power in predicting Christian prevalence today. We use these variations for identification. Finally, Appendix Figure 2 depicts graphs that show the relationship between Christian prevalence and complete years of existence of Protestant or Catholic missions in the district using the finer variation in the length of presence data. The expected positive relationship between years of mission presence and predicted prevalence of Christians in the district today is evident.

Wars

The final source of exogenous variation that we use is an indicator for all the years in which countries that established Protestant or Catholic missions in India were engaged in wars (including civil wars). Over and above Great Britain (1642-1910), other countries active in mission work in India over this time period include Australia (1853-1910), Belgium (1830-1910), Canada (1874-1910), Denmark (1700-1910), France (1674-1910), Germany (1781-1910), Italy (1604-1910), Portugal (1498-1910), Sweden (1885-1910), Syria (Ottoman empire 1449-1910), and USA (1831-1910). *British Parliamentary Papers* and the *Centennial Survey of Foreign Missions* reveal that British Government financing was crucial to many operations of the church in India (Episcopal, Presbyterian and Roman Catholic) including resources to be used for salaries of bishops, archdeacons, chaplains, house rent, travel expenses, and even allowances for furniture and building repair.[6] Expenditure on clergy was also part of the military department for ecclesiastical purposes. Information on wars that countries fought in specific years proxies for disturbances in support for the church in India in those years. It is likely that during times of war, all available resources would be mobilized for the war effort. These are thus political factors that lead to exogenous declines in support for church operations, indirectly affecting the efficacy of missions in India. Using various historical sources including the *Encyclopedia of Wars* for each country, we find that Britain, France, US and Portugal were engaged in the most wars at 56, 54, 46, and 27, respectively. The more peaceful countries were Sweden, Belgium and Canada at zero, six and seven, respectively.

Information on wars by country and year is then merged with data on the location of missions by country (of establishment) and year (the mission location data also has current district information). As we note below, historical information was collected on famines, natural disasters, and mortality from diseases in order to conduct robustness checks of the main results. These data were merged with the missions and wars information on the basis of provinces (district and location of mission is used to trace its province) and year (in the mission data, this is year of establishment of the mission). We also use information from the 1901 census of India to conduct robustness checks. These variables are merged with

[6] For example, between 1830 and 1836, the British government spent Rupees 3,296,916, an appreciable amount then, on support of the Episcopalian church in just three Provinces – Bengal, Madras and Bombay.

the data on missions, wars, famines, natural disasters, and diseases on the basis of provinces in colonial India (as the 1901 census does not report statistics for these variables at the district level).

V. Methodology

In keeping with Heady *et al*. (2018), we use linear probability models to investigate the impact of Christian identity on whether a child is stunted. The empirical specification takes the following form:

$$S_{ijt} = \beta_0 + \beta_1 Christian_{ijt} + \beta_2 X^{c}_{ijt} + \beta_3 X^{w}_{ijt} + \beta_4 X^{h}_{ijt} + \beta_5 X^{HH}_{ijt} + \beta_6 X_{jt} + \beta_7 M + \beta_8 T^{c} + \beta_9 T + \beta_{10} S_j + \beta_{11}(T\,x\,S_j) + \varepsilon_{ijt} \quad (1)$$

where S_{ijt} is a dummy variable for whether child *i* in state/district *j* in year *t* is stunted (HFA less than two standard deviations of the mean of 0), $Christian_{ijt}$ is a dummy variable for Christian affiliation (reference group is non-Christian that includes Hindus and Muslims), X^{c}_{ijt} are child-specific indicators (order of birth, gender, age in months, whether child was nursed, whether child had diarrhea, fever or cough in the previous two weeks), X^{w}_{ijt} are woman (mother)-specific indicators (measures of maternal health such education and work characteristics, prenatal or antenatal check-ups with a doctor, and mother's demographic characteristics including age at first birth, age at first marriage, and height, which measures child's genetic endowment, controlled for directly in the years in which it is available and proxied for by size of the child at birth in 1992, the year in which it is not measured), X^{h}_{ijt} are husband (father)-specific indicators (age, education, and work characteristics), X^{HH}_{ijt} are household-specific indicators (rural/urban indicator, age and gender of household head, indicators for access to electricity and ownership of assets such as refrigerators, motorcycles, and cars, as well as information on sources of drinking water, toilet facilities and years lived in place of residence), and X_{jt} is a state-specific indicator (per capita net state domestic product, area under rice and wheat, rainfall, and other variables that are used in the robustness checks including per capita calories, infant mortality rate, Gini coefficient of distribution of consumption, public subsidies and average air temperature). In order to control for time trends, equation (1) includes month of conception dummies (M), year of conception dummies (T^{c}), a time indicator for the second (1998) and fourth (2015) rounds of the DHS data (T), state dummies (S_j), and interactions of the time dummy T and region dummies S_j . ε_{ijt} is the standard idiosyncratic error term. All models report robust standard errors clustered at the state level. The coefficients of interest is β_1: the impact of Christian identity on child stunting probabilities relative to Hindu and Muslim children of the same age and gender. The reduced form OLS results from this model are presented in Table 2.

Then, using the rich historical data described above, we instrument for Christian identity today in a standard two stage least squares (TSLS) framework in which the first stage is:

$$Christian_{ijt} = \gamma_0 + \gamma_1 Z_{ijt} + \vartheta_{ijt} \qquad (2)$$

Where subscripts are as described before and Z_{ijt} are the identifying variables described in detail in Section IV.[7] The results of the TSLS models (including robustness checks) are reported in Tables 3-4.

VI. Data and summary statistics

We use three rounds of the Demographic and Health Surveys for India from 1992-93, 1998-99, and 2015-2016, referred to as 1992, 1998, and 2015 from now on, since these have district identifiers publicly available, and study all children aged five years and below since anthropometrics are reported consistently for this age-group.[8] These data include maternal education, work and demographic characteristics that are asked of all women between the ages of 15-49, detailed reproductive histories on children born, gender of the child, and information on child HFA. These data are then merged with the dataset for historical instruments described above at the state and district level to obtain the full sample for analysis (at the year-state-district level). This sample includes information on 38,960, 24,468, and 207,859 children aged 0 – 59 months in 1992, 1998, and 2015, respectively.[9] Table 1 presents selected

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[7] As is usually the case in standard two stage least squares models, Z_{ijt} includes both included and excluded instruments in the estimation.

[8] The 1998 DHS only includes anthropometric data for children aged three and younger.

[9] Actual numbers in the estimation sample are lower because of the merge with historical data that have missing values. The number of sample observations are noted in each table of results.

summary statistics of child-specific, woman-specific, household-specific, and state-specific characteristics in our sample, separated by Christian and non-Christian.[10]

The summary statistics for stunting are shown in the top line of Table 1. The HFA z-score, which is the basis of the stunting measure, is considered an indicator of long-term health status that fluctuates little in response to short-term changes in diet or illness.[11] The estimates in Table 1 indicate that across both groups, children in India are malnourished: up to 42 percent of non-Christian children are stunted whereas 35 percent of Christian are also stunted. Hence, while Christian children have an average stunting score that is relatively better than children in the non-Christian group, the proportion is still substantially high. Other measures summarized in Table 1 indicate differences across the two samples by religious affiliation. Nursing rates are high, and non-Christian children are more likely to have been ill in the last two weeks as compared to Christian children.

In terms of woman-specific characteristics, non-Christian women are less likely to seek prenatal care and have earlier first births as compared to Christian women. Average age at first marriage is young (about 18 years) among non-Christian women. Alternatively, average age at first marriage is close to 21 years for Christian women. Literacy rates are lowest among non-Christian women and highest among Christian women. Christian women are also more likely to report having children who were large at birth. Relatively more Christian women are likely to report they are working, and women's average age ranges from 27 to 29 years while the average husband's age ranges from 32 to 33 years.

Summary statistics for other variables indicate that close to 90 percent of households are male-headed. In terms of the religion variable, among Hindus, 28 percent are lower-caste Hindus and 52 percent are upper-caste Hindus. Reflecting their minority status, about 13 percent of the population is Muslim and about seven percent is Christian (these statistics are not reported in Table 1). Other indicators of ownership of consumer durables (refrigerator or car) indicate that on average, the status of Christian households is relatively better than that of non-Christian households. This is underscored when

[10] Table 1 shows all child, woman, household and mission-specific variables. The full set of summary statistics is reported in Appendix Table 2.

[11] For all rounds of the DHS data, we use the z-scores based on the revised (2006) WHO growth charts.

access to electricity, access to piped water for drinking (a relatively clean source) and access to better sanitation through flush toilets is taken into account. In these data, non-Christian households are likely to report relatively fewer years lived in place of current residence, which is still quite high at 10-19 years.

Table 1 also reports summary statistics for state-specific characteristics, variables used to control for the endogeneity of the location of missions (number of elevated cities, number of cities on railway lines, and number of cities on navigable canals in districts as of 1893), and for mission-specific variables.[12] Information on per capita GDP (Base: 1980-81) for India is collected from the Economic Organization and Public Policy Program (EOPP) database at the London School of Economics. Rice and wheat cropped area were obtained from the *Statistical Abstract of India* and *Area and Production of Principal Crops in India*, various years. Information on malaria and TB deaths are collected from different editions of India's *Statistical Yearbooks*, *Agricultural Statistics*, and *Vital Statistics of India*. Data on rainfall and air temperature is collected from the Indian Meteorological Department, and the time-varying consumer price index (CPI) for India is for agricultural laborers (base: 1986-87=100) and is obtained from the *Statistical Yearbook of India 2013, 2015*, and the *Statistical Pocketbook of India 2002*. Data on per capita calories, per capita proteins and per capita fat per day is from Reserve Bank of India publications, various years. Infant mortality rate data was obtained from the *Sample Registration System Bulletin*, various years, and measures of inequality and national central assistance (public subsidies) are from *Niti Aayog* of India.

Statistics on Protestant and Catholic missions by vintage indicate that on average, there is one older Protestant missions in a district and about two newer Protestant missions. Catholic missions are fewer and on average, there is one per district in the Christian sample. Length of operation (which is a

[12] Appendix Table 2 reports summary statistics for the full set of variables including those used in the robustness checks such as nutrition measures and prices, variables from the 1901 Census, measures of education and health for both Protestant and Catholic missions (including number of hospitals, pharmacies, and print shops, and teachers by denomination and gender, and elementary and higher degree schools demarcated by religious affiliation and gender of students), historical disease measures and measures on historical shocks such as famines. In particular, the ratio of deaths per 1000 people from fever is relatively high in the non-Christian sample.

measure of “activity”) of older Protestant missions varies between 12 to 14 years, and between nine to 11 years for newer missions. In the Catholic sample, the comparable estimates range from five to 11 years.

VII. Results

A. OLS results

Table 2 presents the OLS results from the estimation of equation (1) where Christian religious identity is treated exogenously. Results in Table 2 are presented for young girls and boys, disaggregated by age in months. In general, we consider infants between zero to 11 months of age as this is an important period of time that is considered reflective of mother’s health, and the possible consequences of shocks that may have occurred *in utero*. We also focus on children between 0 – 36 months in light of the importance of the first thousand days of life, and all children (0-59 months) for whom anthropometric data are collected in the DHS surveys given the standards in the health economics literature. The first column for girls and boys focuses on the 6-23 months window because of the dramatic increase in the predicted prevalence of stunting seen in Figure 1 in this age-group, and because this is the time period in which stunting is most evident (Heady *et al*. 2018). The table reports coefficients on the Christian dummy where the excluded category is non-Christian children. Panel A corresponds to models that do not include maternal height and thus allow the use of the full data set that includes DHS rounds from 1992, 1998 and 2015. Panel B includes maternal height and uses data from rounds 1998 and 2015 since height of mothers was not collected in 1992.

The only result that is measured with precision in Table 2 corresponds to girls who are 6-23 months of age conditional on maternal height. Here, Christian girls are 15.6 percentage point less likely to be stunted as compared to non-Christian girls in this age group, holding constant all characteristics of the child, mother, father, household, and state. Since the average rate of stunting in this sample and age group is 37 percent, a 15.6 percentage point decline translates into a 42.2 percent relative decrease in the rate of stunting for Christian girls aged 6-23 months. Few other coefficients are measured with significance in the girls’ samples although all have the expected sign. It would seem that the level of noise in the OLS model is substantial. This holds true when we consider the boys’ results as well.

B. Two stage least squares models

Relevance and strength

As noted above, Figures 2 and 3 and Appendix Figure 1 provide graphical depictions of our first stage results. Following from that discussion, it is older missions – both Protestant and Catholic – that are the most relevant to Christian identity today. Further, the difference in impacts between older and newer missions within the same district indicates that the influence of older missions on child health today is the result of treatment of Christian identity alone, and not that of omitted variables which should similarly influence the effects exerted by newer missions in the same location (as seen in the graphs, newer missions have weaker or zero effects). That is, older missions and their related variables satisfy the exclusion restriction in that they influence Christian identity today, but conditional on this variable, have no direct impacts on the child health outcome we consider. To further ensure that this is the case, we control for a wide range of factors in our models (see Appendix Table 2 for a full list of all controls).

Supporting empirical evidence is presented in Appendix Table 3. In this table, the dependent variable is the dummy indicating Christian affiliation today with results presented for various age groups. The first column reports results for the 6-23 months age group for all the mission variables and the variable that measures total number of wars that mission establishing countries were engaged in. The bottom of Appendix Table 3 reports F-statistics and associated *p*-values for various sub-sets of the mission variables. Focusing on the first column, it is clear that the F-statistics for all variables and for various sub-sets are comfortably above the benchmark measure of 10.0. This is the case across most F-statistics values reported in columns of Appendix Table 3. In the case of children ages 0-59 months, the F-statistics are relatively smaller in magnitude than in the other columns; however, the *p*-values in this column indicate that the instruments have sufficient strength. We report tests of instrument validity in all the second stage results below.

Considering the values of the variables in Appendix Table 3, it is years of older Catholic and years of newer Catholic missions that are estimated significantly and that have the expected positive sign. This is generally true regardless of the sample considered. Catholicism came earlier than Protestantism to

India, especially in the South. Even though Protestant missions proliferated in India under British rule, their relatively late arrival may have somewhat diminished their years of impact and influence.[13] Finally, the variable measuring wars and civil conflicts during this time-frame has the expected negative sign across most columns, consistent with the intuition that during these times, fewer resources were available to support mission work. However, it is not precisely estimated.

Missionary accounts discussed above make the case that much of the conversion to Christianity occurred during times of significant hardships – during times of famines for example, when natural disasters such as cyclones and earthquakes struck, or when there were epidemics related to cholera or fever. However, we do not use these variables as instruments as they are likely to break the exclusion restriction by having direct impacts on child health today. Instead, we use the famine and disease variables in the robustness checks of the main results.

Results

Table 3 reports the results for girls and boys of different age groups in three panels.[14] For purposes of clarity, only the Christian identity dummy is reported along with tests of instrument strength and validity, but the regressions include the full set of child, mother, father and household characteristics, historical literacy rates for men and women, controls for endogeneity of mission locations, and month and year of conception dummies and time and state dummies (as well as their interactions).[15]

The coefficients in Table 3 for boys indicate no significant effects across Panels A, B and C. The case is very different when the mirror results for girls in Table 3 are considered. Looking at Panel A first, here the coefficient on the Christian dummy in the first column that focuses on the 6-23 month group indicates that in comparison to non-Christian 6-23 month old girls, Christian girls are 51.9 percentage

[13] This is in contrast to other studies where Protestant missions have the measurable impacts (Becker and Woessmann 2008, McCleary and Barro 2018).

[14] We do not report results for newer missions with maternal height as these are qualitatively the same as those in Panel C.

[15] There is some difference in fertility rates by religion. T-tests for differences indicate that Christian families have fewer children aged five or less in the household and also fewer total children ever born to a woman, as compared to the non-Christian sample. The number of children less than 5 years is included in all models. When we condition on the total number of children born to women as well, the estimates in Table 3 change only marginally.

points less likely to be stunted. Similarly, among all infant girls, Christians are 29.5 percentage points less likely to be stunted as compared to their non-Christian counterparts. Given the mean values of the stunting rates in these age groups in the sample, these magnitudes essentially imply that Christian girls in these age thresholds are almost completely unlikely to be stunted in relation to non-Christian girls in the same age benchmarks.[16] The subsequent columns in Panel A show that as these girls age, Christians still maintain a relative advantage. In particular, the coefficient for 0-59 month olds indicates that Christian girls are 30.0 percentage points less likely to be stunted as compared to similarly aged non-Christian girls. Given the mean value of stunting in this age group, this translates to a 72.1 percent reduction in stunting for Christian children that is still substantial, but not as large as in the younger age groups.[17] The Kleibergen-Paap Wald statistics in all the girls' results in Panel A are above the standard required benchmark value for instrument strength, and the *p*-value associated with Hansen's *J*-statistic gives us confidence that the instruments are valid and satisfy the exclusion restriction.[18]

As noted in Dyson and Moore (1983), southern regions of India are systematically different from the rest of the country when it comes to advantageous outcomes for women and girls arising from weaker son preference and different demographic behavior. We re-estimated the models in Table 3 for girls in the southern states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu to find that the stunting advantage for Christian girls is relatively even more pronounced. For example, Christian infant girls are 43.1 percentage points less likely to be stunted as compared to non-Christian girls in this age group. This is a larger coefficient than the corresponding values in Table 3. For non-Southern states, Christian infant

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[16] An aspect of linear probability models like those we estimate here is that probabilities need not remain in the zero-one bound. This statement follows from assigning a lower bound of zero to negative probabilities.

[17] We unpack the control group of Hindu and Muslim girls to understand against which specific group the Christian advantage in stunting is most evident. These results are presented in Appendix Table 4 and show that as expected, the reduced probabilities of stunting for Christian girls is primarily noticeable against Hindu girls of similar ages. However, there is some evidence that the Christian advantage in stunting is also evident when compared to Muslim girls in the 6-23 month age group and, to a lower extent, in the 0-59 age group (*t*-statistic= -1.62). Hence, although patriarchy and son preference may confer strong disadvantages on Hindu girls, the advantage that Christianity confers on its adherents is evident even against Muslim populations where these cultural factors are less of an issue.

[18] The list of controls include a rural/urban residence indicator. We also report estimates in Appendix Table 5 that disaggregates the main results in Panel A of Table 3 for girls by location of residence (over 75 percent of the sample is rural). These results indicate that most of these effects are evident in rural areas although there is some indication of Christian advantage in urban areas as well.

girls still exhibit an advantage but this is measured with more noise. The northeastern regions of India also have a sizable Christian population. Conditioning on both the south and the northeast, Christian infant girls are 35.9 percentage points less likely to be stunted as compared to non-Christian infants, again larger than the corresponding estimate in Table 3. Hence, the Christian advantage resonates in regions of the country where Christianity is practiced more widely, and where its historical presence had beneficial implications for the relative position of women that is still evident and widely noted in the health and gender inequities literature specific to India.[19]

In order to anchor the magnitude of the estimates in Panel A of Table 3 for girls, we focus on the 0-59 age group and re-estimate the model restricting the sample to below the median value, below the 75th percentile value, and below the 95th percentile value for HFA. We should expect variation even within age groups in terms of which girls benefitted. If weaker girls experience the largest impacts, then the coefficient on the Christian dummy should be largest in the 0-59 sample for those below the median value. If stronger girls benefitted more, then the Christian coefficient in this age group should be the largest for the sample that is below the 95th percentile value. We find the latter to be the case – that is, most of the average value reported for 0-59 month old girls in Panel A of Table 3 stems from those below the 95th percentile value. Hence, Christian identity has a reinforcing effect on those who already have low height disadvantages (lower probabilities of being stunted).[20]

Considering the results in Panel B of Table 3 next, it is clear that controlling for mother's height results in estimates that are on average larger than those reported for girls and boys in Panel A. Although the boys' results again remain measured with error, the coefficients on Christian identity in Panel B for girls confirm a significant health advantage for them in comparison to non-Christian girls in the same age brackets. For example, in the oldest 0-59 month sample, Christian girls are almost completely less likely to be stunted as compared to similarly aged Hindu or Muslim girls. Panel C presents results where the newer missions and their related variables are used as instruments along with the wars variable. In

[19] These results are available on request.
[20] These results are available on request.

keeping with intuition and the discussion above, there are no significant results for girls or boys.

In comparison to the OLS reduced form results in Table 2, the results in Panels A and B of Table 3 are larger in magnitude, indicating a negative bias in the OLS estimates. This reflects negative selection from the fact that current day Christians predominantly originated from lower-caste Hindu groups in the past.[21] Further, OLS is also possibly contaminated with attenuation bias resulting from measurement error from sources discussed above. As noted before, all regressions include variables that control for the endogeneity of mission locations including those that relate to the number of cities in the district that were at or about 1500 feet (the lowest threshold of elevation from *Constable's Hand Atlas of India* from which the map is geocoded), and the number of cities in the district on railway lines, and on navigable canals.[22] The full set of results for all variables in Panels A and B for children aged 0-59 months is reported in Appendix Table 7.

C. Robustness checks

Nutrient intake, prices and the disease environment

Table 4 reports results from various robustness checks of the estimates in Panel A of Table 3 for girls of different age groups. The estimates in the table correspond to the coefficient on the Christian dummy where, in each case, in addition to the full set of covariates and controls for endogeneity of mission locations, variables for specification tests are added sequentially in the second stage regression. The second, third and fourth rows add controls for per capita calories, per capita protein, per capita fat intake, prices (consumer price index for agricultural laborers), and the incidence of malaria and tuberculosis (TB). Examining the impact of food prices on child health is important as previous research has shown that nutrient availability can decline in times of relative prosperity due to increased food prices (Meng *et al*. 2009). Controlling for calorie, fat and protein intake as well as prices and the incidence of diseases such as Malaria and TB does not change the relative size of the Christian dummy for girls of

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[21] This is clear from Appendix Table 6 that presents OLS and instrumental variables results for Hindu girls by caste status. As evident, most significant results are for lower-caste Hindu groups.

[22] F-tests that these variables are jointly zero indicate that the null is rejected in most models of Panel A in Table 3 for girls.

different ages in Table 4. Focusing on 6-23 month olds in the first column, the coefficient varies from a 51.5 percentage point decline to a 54.4 percentage point decline, which is close to the baseline value reported in the first row. This comparability in estimate sizes upon including the additional variables is also true for the other age groups reported in Table 4.

Infant mortality rate, Gini, temperature and public subsidies

Table 4 next reports results for girls when controls are added in the second stage for the infant mortality rate, the Gini, air temperature and public subsidies (measured by national central assistance). With these controls, the results for Christian girls in Table 4 are all significant with coefficients that are in the same ballpark in terms of magnitude as the comparable runs in the baseline models reported in the first row. The only exception is in the case of 0-59 month olds where inclusion of air temperature results in the coefficient not being statistically different from zero. However, the size of the coefficient remains comparable to that in the baseline.

Colonial diseases, famine controls, 1901 census controls

As noted in Pickett (1933) and Kent (2004), times of economic hardship that coincided with the incidence of epidemic diseases were major drivers of mass conversions of lower-caste groups to Christianity. The Government of India published the *Annual Report of the Sanitary Commissioner with the Government of India* from 1864 to 1919 (we only have access from 1868 onwards, are missing a couple of years in between, and stop as of 1910 to be consistent with the mission location data) that compiles information at the British province level on deaths due to diseases such as cholera, smallpox, fever, dysentery and diarrhea. The British provinces for which data is available include the Bengal Presidency, Assam, North Western Provinces, Punjab, Oudh, Central Provinces, Berar, Rajputana, Central India, the Madras Presidency, the Bombay Presidency and Hyderabad. The largest causes of mortality in British India were fever, dysentery and cholera.

In addition to the occurrence of epidemics, other times of economic hardship that served as catalysts for large-scale conversion are famines and natural disasters including cyclones and earthquakes (Pickett 1933, Kooiman 1988, Kent 2004). Information on the occurrence of famines (and their intensity) in the provinces of British India from 1770 to 1910 was collected from several sources including *British Parliamentary Papers*, various years, *Report of the Indian Famine Commission*, various years, *Imperial Gazetteer of India*, various years, and McAlpin 1983. Data on the occurrence of cyclones and earthquakes in the provinces of British India from 1584 to 1910 were collected from sources including the *Bengal District Gazetteers*, *Imperial Gazetteer of India*, Davis 2008, Eliot 1900, *Transactions of the Bombay Geographical Society*, and the *Administration Report of the Indian Telegraph Department for 1885-86.*

As noted above, diseases and natural shocks in colonial times may independently affect health capital leading to effects on child HFA and stunting today, hence violating the exclusion restriction. Similarly, although the incidence of famine may be exogenously timed, there may be long-lasting consequences on health if the proportion of people affected is large and famines occur frequently. Moreover, independent impacts on health of children today may also result from differences in region and population characteristics (migration for example) prevalent in colonial India. For these reasons, we include the ratio of deaths from cholera and fever per 1000 people, a measure for the average number of people affected in famines, and controls from the 1901 census of India on the average population per square mile, average population per square mile in cities, proportion supported by industry, number of women with afflictions (blindness), and a control for migration – number per 10,000 of population who were immigrants in the district when enumerated, in the second stage. Results of these models are also reported in Table 4. As evident, coefficients on the Christian dummy are mostly indistinguishable as compared to the baseline estimates.

Number of schoolchildren, male and female teachers, elementary and higher degree schools and enrollment by gender

Next we consider numbers of school children, teachers, elementary schools, number of schools of higher degrees and enrollment in these schools by gender of children, and by Catholic and non-Catholic denominations. Whereas controlling for numbers of schoolchildren (girls, boys, total) and teachers do not change trends too much, there is some evidence that elementary schools and schools of higher learning have dampening effects, especially for girls in older age groups. This indicates that these controls may be explanatory factors for why Christian girls have lower stunting probabilities compared to their non-Christian counterparts, highlighting the human capital advantages that Christianity historically bequeathed to adherents.

Number of hospitals, pharmacies, print shops

Finally, Table 4 reports results for girls with controls in the second stage for factors that may independently affect child health today by improving health infrastructure in the past, or through better communication of information. These factors include numbers of hospitals, pharmacies and print shops in the district, and there is evidence in Table 4 that these matter importantly. The last row of Table 4 shows that these controls absorb all of the significance of the Christian coefficients across many of the age-groups studied, underlining the importance of their role in explaining Christian advantage today.

D. Why Christian girls and less so Christian boys?

Table 3 makes clear that while impacts for girls are measured with significance, those for boys mostly have unexpected signs and are measured with error.[23] There is now a substantial literature in economics that notes differences in the effects of interventions by gender where health investments are found to primarily increase the schooling of women but the returns to productivity for men, and schooling interventions are found to mainly increase the labor market returns of women (Maluccio *et al*. 2009, Field *et al*. 2009, Maitra *et al*. 2019), with much of the differences attributable to the brawn versus skill-based nature of the economy (Pitt *et al.* 2012). Becker and Woessmann (2008) notes how religious identity may influence female education with implications for the gender gap in literacy over time. More recently, historical work has found very few consequences of wealth shocks on son's schooling or occupational rank (Bleakley and Ferrie, 2016), and the negative consequences, both socioeconomic and health-wise, of war wounds suffered by Union army veterans in the US Civil War fell only on their daughters as the economy at that time was primarily a manual labor one (as is the case in the developing world today), and due to unobserved characteristics in the important early childhood years (Costa *et al.*, 2019).

[23] We note that we do not use mother fixed-effects in these models to identify impacts from within-family variation as some of the variables of interest, such as maternal education and height, are time invariant.

In the context of this study, the coming of Christianity was a natural experiment that was both a health and schooling investment in lower-caste Hindus primarily, which increased the health potential of girls. Since height is correlated with cognitive ability (Case and Paxson 2008) and given the brawn-based nature of the colonial Indian economy, it is possible that over time, women and girls would have had relatively higher growth rates of cognitive skills with respect to the previous generation of women and girls, but also in relation to the cognitive growth rates of men and boys in the same generation. We see evidence for this from the 1891 and 1901 censuses since Christian men and women had literacy rates that far exceeded those of the Hindu and Muslim populations (Appendix Figure 3), and growth rates in female literacy that exceeded growth rates in male literacy in the total population and when the population is restricted to those who are 15 years or older (Appendix Figure 4).[24] Could mothers with higher cognitive ability (compared to previous generations) bequeath this advantage (with less noise) relatively more to their daughters than to their sons? There is evidence that this might be the case. If you consider determinants of height, Silventoinen *et al*. (2003) and Case and Paxson (2008) argue that about eighty percent is genetic (heritability) whereas about twenty percent is the environment (uterine environment, nutritional status and the disease environment). Genetics change slowly but the environment is shaped more rapidly, and Silventoinen *et al*. (2003) indicates that the latter is more important for determining height in female populations. In colonial India, the "signal" would have been the strongest in terms of changing and reinforcing the environment for Christian women; this may lead to the reduced "noise" that we document in the child stunting measures for Christian girls today.

Another reason for why we do not document significant impacts for boys may be son preference. It is well known that son preference results in the advantageous treatment of boys in the allocation of resources and health inputs from very early ages, especially among Hindus in India, and especially for the elder born (Jayachandran and Pande 2017). This is true despite the fact that there is little evidence that mothers in particular derive any non-monetary advantages from having a boy (Zimmermann 2018), and

[24] The numbers in these figures are sorted from largest to smallest by the female estimates.

that patriarchal expectations have changed as fertility has declined in India (Allendorf 2020). Son preference implies that the gap in stunting between Christian and non-Christian boys is likely to be less pronounced as compared to the gap in stunting between Christian and non-Christian girls, especially for children of lower parity. We find evidence for this as the Christian advantage in stunting for girls across age-groups mostly disappears when we compare Christian girls to Muslim girls alone, where Muslims in general have lower son preference as compared to Hindus, and Muslim women are taller on average than Hindu women (that is, Muslim girls are treated relatively well and have relatively strong genetic endowments). These results were noted above in Appendix Table 4.

Further, considering lower parity sons alone, we find that rates of stunting are *higher* among Christian boys as compared to non-Christian boys, especially in infancy and in the 0-36 month age window. That is, non-Christian boys who are elder born are relatively *less* likely to be stunted. To elaborate further, in keeping with Jayachandran and Pande (2017), there is evidence that birth order matters as the main effects are mostly evident for children with parity of one or two. These results are in Appendix Table 8 that reports estimates separately by parity of the child and controls for the sex composition of previous children (an indicator for whether the child born immediately before was a girl). As is clear, the results in Panel A of Table 3 for girls are mostly comparable to those in Panel A of Appendix Table 8 for lower parity girls, the sample of births that may be considered random. Once we consider higher order parities for girls in Panel B of Appendix Table 8, the size of the Christian advantage increases in keeping with the intuition that sex selection among Hindus in particular is likely to be an issue. For boys of parity one or two, Christian boys are more stunted than their non-Christian counterparts in two of the four age-groups consistent with the fact that elder born boys among Hindus in particular are especially valued.

VIII. Conclusion

In a country marked by relatively high rates of child malnutrition and cultural aspects such as son preference, very young Christian children of ages 0-59 months do relatively well. In particular, Christian girls have substantially lower stunting probabilities across most age groups as compared to non-Christian girls, net of a comprehensive set of controls for child, mother, father, household and state characteristics. More specifically, Christian girls aged 0-59 months are 30 percentage points less likely to be stunted than non-Christian girls in this age group, which includes both Hindu and Muslim children. This is a relatively large effect, but the magnitude is in keeping with other studies that also find stronger impacts for women as compared to men (Hoddinott *et al.* 2011, Galasso and Wagstaff, 2017).[25] To the best of our knowledge, this is the first study to show that Christian girls fare relatively better at these critical stages of child development. That children of this denomination do so well is particularly surprising in a country where Christians are a minority at seven percent of the population.

Using historical records from British India and earlier, we demonstrate that these patterns are plausibly tied to the legacy of the advent and spread of Christianity, where Christian teachings that emphasized egalitarian principles and that stressed the importance of basic hygiene and sanitation are found to have long-term implications on child health today. More specifically, we demonstrate that factors that incremented the human capital of Christian mothers including elementary and higher degree schooling and access to public health infrastructure such as hospitals and pharmacies, play a pivotal role in explaining why Christian girls today exhibit superiority in height in comparison to their non-Christian similarly aged counterparts. Our results are robust to a wide series of specification checks and we offer explanations for why Christian girls in particular benefitted. Among these, patriarchy and the system of son preference among Hindus are found to be important. However, the relatively reduced stunting likelihood among Christian girls is also evident in comparison to Muslim children (in some age groups), a religious group where son preference is less relevant. Analysis by birth order reveals that in children of lower order parities (where selection along gender lines is less likely to be a factor), Christian dominance in child height remains evident. Our models control for a wide range of factors that are child, parent, household and region specific. We also control for differences in fertility rates by religion, caste-status within Hinduism, urban/rural location of the household, the gender composition of previous births, and

[25] Hoddinott *et al.* (2011) notes that whereas the impact of stunting as of age 3 reduces log per capita household consumption by nine percent under OLS methods, the estimate becomes substantially larger at 66 percent in IV models. The study also finds larger impacts for women as compared to men across many of the outcomes analyzed.

household size and structure. Variations in the geographic distribution of results are taken into account where Southern India is especially renowned for its favorable outcomes for women and girls; we find that our main results are even more pronounced in the Southern states (and in the Northeastern states where Christianity is also widely practiced).

In other robustness checks we confirm that we are not just measuring differential effects of shocks such as historical famines for example on Christian versus Hindu and Muslim populations where Christians, because of access to improved resources, were insulated, but Hindus and Muslims experienced declines in height (with little catch-up). This is because *both* Christian and Muslim women are on average taller in India today compared to Hindu women, and because controlling for such large-scale shocks in our estimations does not drive the impact of the Christian indicator to zero. We find little evidence that Christian missions benefit young Hindu children, thus ruling out spillovers that might weaken the size of the Christian advantage we document. In sum, our analysis underscores the importance of health and schooling investments in women as the returns to building and reinforcing their human capital clearly accrues over generations.

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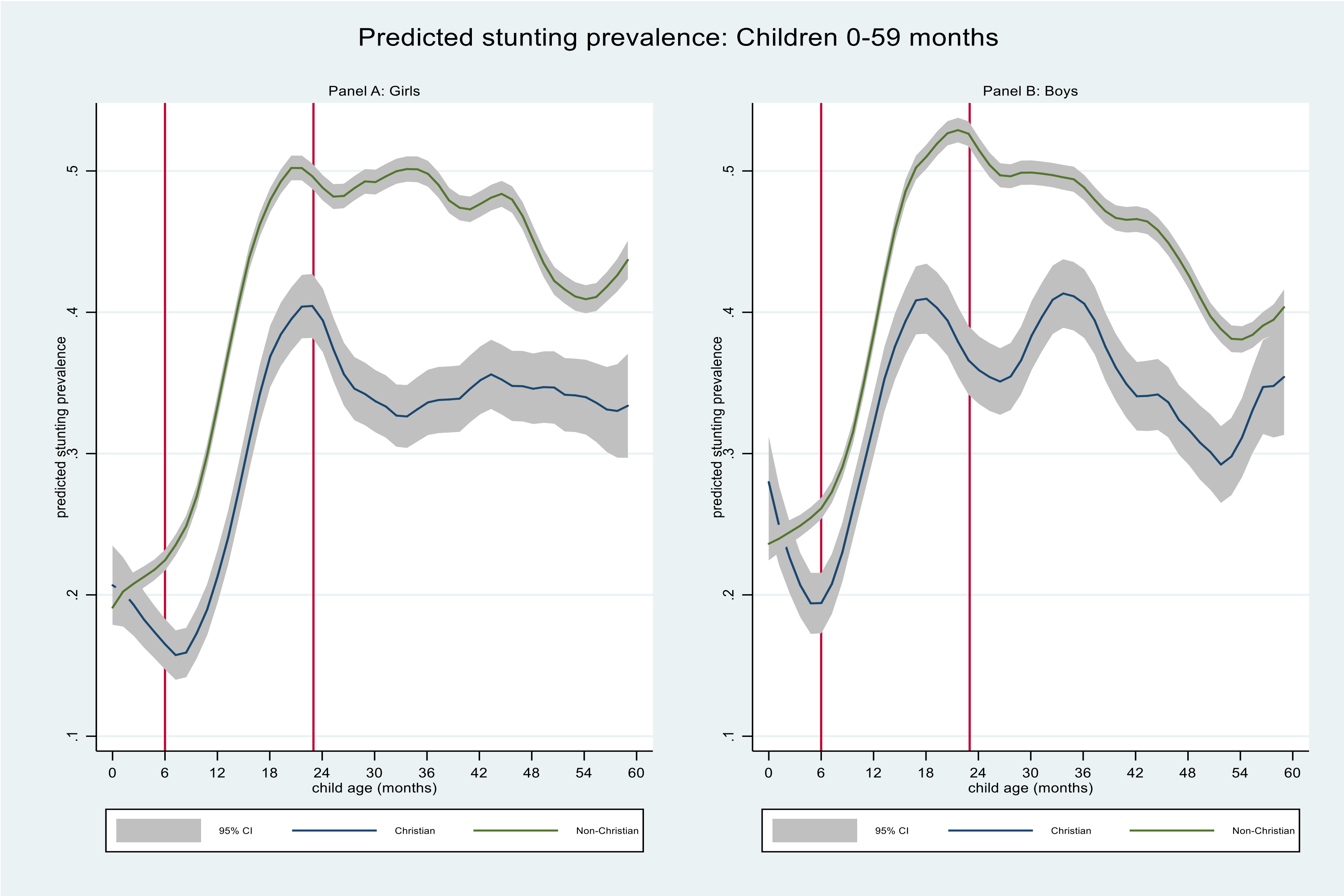
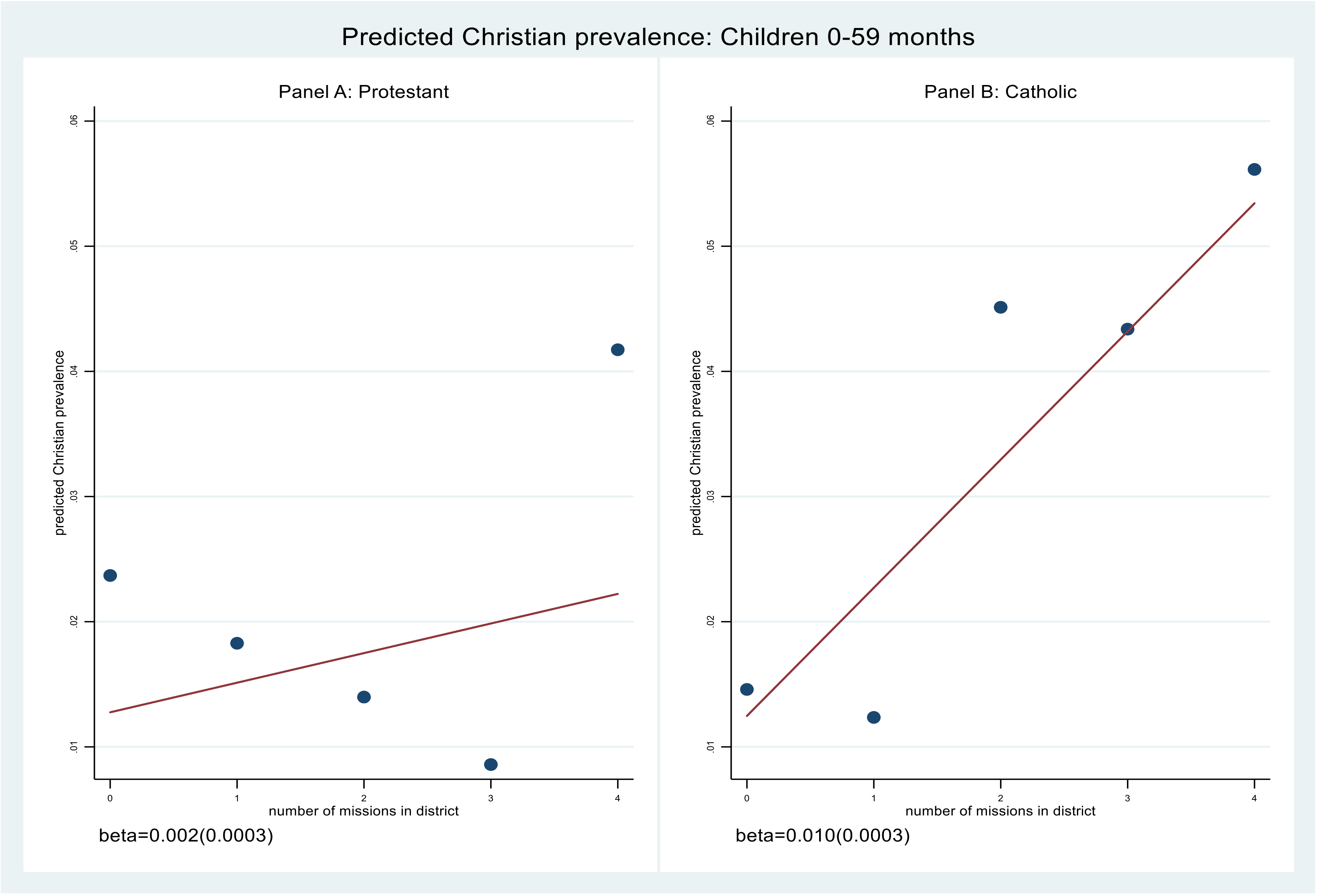
Figure 1: Predicted stunting prevalence by child's age, gender, and religious affiliation



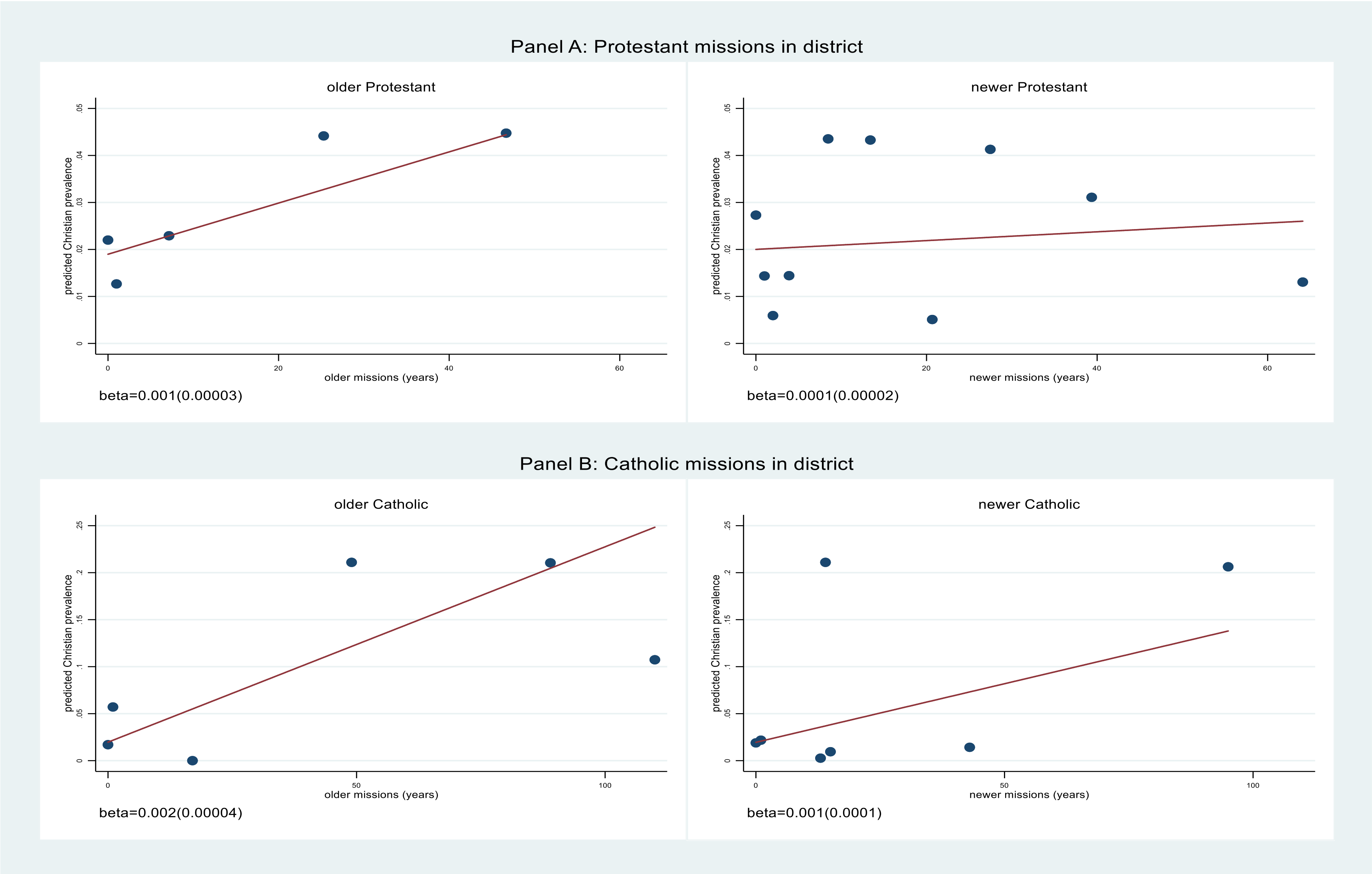
Notes: Author's calculations using weighted Lpoly plots and DHS data. "Non-Christian" represents Hindu and Muslim children.

Figure 2: Predicted Christian prevalence by number of Protestant and Catholic missions in district



Note: Weighted Binscatter plots using DHS and historical data. Standard errors in parentheses.

Figure 3: Variation by "older" versus "newer" Protestant and Catholic missions in district



Note: Weighted Binscatter plots using DHS and historical data. Older and newer Protestant missions demarcated on the basis of the median year of opening of Protestant missions in a district. Similarly older and newer Catholic mission categorized on the basis of the median year of opening of Catholic missions in a district. Standard errors in parentheses.

Table 1: Selected summary statistics

	Non-Christian		Christian		Difference
Child-specific	mean	std. dev	Mean	std. dev	
Height-for-age is below 2 std. dev of mean (stunted)	0.424	0.001	0.346	0.003	0.078***
Dummy for male child	0.521	0.001	0.506	0.003	0.015***
Order of birth	2.442	0.003	2.710	0.012	-0.267***
Dummy for child had diarrhea in last two weeks	0.107	0.001	0.082	0.002	0.024***
Dummy for child had a cough in the last two weeks	0.236	0.001	0.272	0.004	-0.036***
Dummy for child had a fever in the last two weeks	0.162	0.001	0.154	0.003	0.008***
Age of child (months)	27.866	0.033	27.760	0.113	0.106
Dummy for child was nursed	0.946	0.000	0.941	0.002	0.005***
Dummy for child was exposed to Ramadan *in utero*	0.024	0.000	0.000	0.000	0.024***
Woman-specific					
Dummy for had prenatal doctor check-ups	0.512	0.001	0.577	0.004	-0.065***
Dummy for had antenatal doctor check-up	0.450	0.001	0.326	0.003	0.124***
Age of the woman (years)	26.788	0.010	28.936	0.041	-2.148***
Dummy for woman is literate	0.552	0.001	0.780	0.003	-0.229***
Dummy for woman has no education	0.393	0.001	0.176	0.003	0.216***
Dummy for woman has some or all primary school	0.144	0.001	0.210	0.003	-0.066***
Dummy for woman has some secondary school	0.312	0.001	0.458	0.003	-0.146***
Dummy for woman has completed sec. school or higher	0.151	0.001	0.156	0.002	-0.005*
Dummy for child was large size at birth	0.165	0.001	0.173	0.003	-0.008***
Dummy for child was average size at birth	0.688	0.001	0.716	0.003	-0.028***
Dummy for child was small size at birth	0.147	0.001	0.111	0.002	0.036***
Mother's height (centimeters)	151.611	0.013	151.326	0.041	0.285***
Age at first birth (years)	20.539	0.007	21.818	0.030	-1.279***
Age at first marriage (years)	18.311	0.007	20.556	0.031	-2.245***
Dummy for woman is currently working	0.245	0.001	0.344	0.006	-0.099***
Number of children five years old and under	1.911	0.002	1.824	0.005	0.087***
Woman goes to the cinema at least once a month	0.063	0.000	0.027	0.001	0.036***
Woman listens to radio every week	0.281	0.001	0.333	0.005	-0.053***
Husband's age (years)	31.754	0.023	33.454	0.091	-1.700***
Dummy for husband has no education	0.269	0.001	0.159	0.004	0.111****
Dummy for husband has some or all primary school	0.194	0.001	0.228	0.005	-0.034***
Dummy for husband has some secondary school	0.329	0.002	0.399	0.006	-0.071***
Dummy for husband has completed. sec. school or higher	0.207	0.001	0.211	0.005	-0.004
Dummy for husband works outside the home	0.969	0.001	0.961	0.002	0.008***
Household-specific					
Dummy for household has a male head	0.895	0.001	0.874	0.002	0.022***
Age of household head (years)	43.971	0.030	42.476	0.100	1.496***
Rural household	0.752	0.001	0.751	0.003	0.001
Dummy for household owns a car or a refrigerator	0.032	0.000	0.056	0.002	-0.024***
Dummy for household owns a bicycle	0.502	0.001	0.175	0.003	0.327***

Dummy for household owns a motorcycle	0.306	0.001	0.185	0.003	0.121***
Dummy for household has electricity	0.774	0.001	0.855	0.002	-0.081***
Source of drinking water: piped water	0.359	0.001	0.511	0.003	-0.152***
Source of drinking water: ground water	0.457	0.001	0.090	0.002	0.367***
Source of drinking water: well water	0.132	0.001	0.155	0.002	-0.023***
Source of drinking water: surface water	0.034	0.000	0.209	0.003	-0.175***
Source of drinking water: rainwater, tanker truck, other	0.018	0.000	0.035	0.001	-0.017***
Toilet facility is: flush toilet	0.364	0.001	0.541	0.003	-0.177***
Toilet facility is: pit toilet/latrine	0.081	0.001	0.298	0.003	-0.217***
Toilet facility is: no facility/bush/field	0.547	0.001	0.145	0.002	0.402***
Toilet facility is: other	0.008	0.000	0.016	0.001	-0.008***
Years lived in place of residence	10.016	0.022	18.823	0.135	-8.807***
State-specific					
Per capita GDP	9503.008	8.959	9983.916	20.598	-480.908***
State produces greater than mean level of wheat or rice	0.787	0.002	0.270	0.007	0.516***
Rainfall (in millimeters $x10^{-2}$)	0.223	0.002	0.382	0.008	-0.148***
Number of lit. females per 1000 of population (1901)	5.930	0.008	5.137	0.023	0.793***
Number of literate males per 1000 of population (1901)	93.534	0.061	75.958	0.159	17.576***
Number of cities at or above 1500 ft in dist. as of 1893	4.569	0.016	0.960	0.019	3.609***
Number of cities on railway lines in district as of 1893	2.732	0.012	0.234	0.007	2.499***
Number of cities on navigable canals in dist. as of 1893	1.238	0.006	0.300	0.009	0.937***
Mission-specific					
No. of Protestant missions established before med. year of open.	0.816	0.003	0.589	0.009	0.227***
Diff b/w latest and earliest years of opening of older Prot. missions	7.852	0.066	4.683	0.186	3.169***
No. of Protestant missions established after median year of opening	1.825	0.003	1.660	0.008	0.165***
Diff b/w latest and earliest years of opening of newer Prot. missions	6.962	0.029	3.400	0.063	3.562***
No. of Catholic missions established before median year of opening	0.065	0.001	0.153	0.003	-0.088***
Diff b/w latest and earliest years of opening of older Cath missions	0.307	0.009	0.640	0.048	-0.333***
No. of Catholic missions established after median year of opening	0.521	0.002	0.379	0.006	0.142***
Diff b/w latest and earliest years of opening of newer Cath. missions	0.903	0.022	1.984	0.162	-1.081***
Total no. of wars miss. establishing countries engaged in as of 1910	3.946	0.009	4.372	0.027	-0.426***

Notes: Sample includes DHS children ages 0 – 59 months in 1992, 1998, and 2015. Statistics are weighted to national levels using weights provided by the DHS. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.

Table 2: OLS regression results. Dependent variable - stunted

	Girls				Boys			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon	6-23 mon	0-11 mon	0-36 mon	0-59 mon
	Panel A: No control for maternal height							
Christian	-0.071	-0.010	-0.038	-0.027	0.101	-0.097	-0.021	-0.036
	(0.052)	(0.045)	(0.050)	(0.045)	(0.049)	(0.080)	(0.042)	(0.036)
N	5537	3508	10789	12521	5569	3562	11042	12928
Mean dependent variable	0.386	0.228	0.398	0.416	0.423	0.269	0.425	0.426
	Panel B: Controls for maternal height							
Christian	-0.156**	-0.026	-0.075	-0.075	0.139	-0.091	0.032	0.032
	(0.078)	(0.077)	(0.078)	(0.078)	(0.084)	(0.134)	(0.078)	(0.078)
N	2485	1610	4895	4895	2484	1697	5046	5046
Mean dependent variable	0.370	0.218	0.382	0.400	0.408	0.256	0.408	0.408

Notes: DHS children in 1992, 1998, and 2015 in Panel A, children in 1998 and 2015 in Panel B. Regressions include child, woman, household, state controls, month and year of conception dummies, survey year dummies, state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.

Table 3: Instrumental variables regression results. Dependent variable - stunted

	Girls				Boys			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon	6-23 mon	0-11 mon	0-36 mon	0-59 mon
	Panel A: Older Missions, war variable, no control for maternal height							
Christian	-0.519***	-0.295**	-0.323**	-0.300**	0.391	0.036	2.580	1.711
	(0.124)	(0.134)	(0.135)	(0.167)	(0.998)	(0.317)	(2.389)	(1.841)
N	5537	3508	10789	12521	5569	3562	11042	12928
Mean dependent variable	0.386	0.228	0.398	0.416	0.423	0.269	0.425	0.426
Kleibergen-Paap rk Wald	129.898	244.543	65.411	51.501	131.110	6.679	27.347	54.330
Hansen's *J*-statistic	1.624	4.473	2.847	4.690	5.455	2.383	2.023	4.309
	[0.805]	[0.346]	[0.584]	[0.321]	[0.244]	[0.666]	[0.732]	[0.366]
	Panel B: Older Missions, war variable, includes maternal height							
Christian	-0.605***	-0.284	-0.471**	-0.471**	0.425	0.125	2.257	2.257
	(0.179)	(0.199)	(0.200)	(0.200)	(1.507)	(0.456)	(2.128)	(2.128)
N	2485	1610	4895	4895	2484	1697	5046	5046
Mean dependent variable	0.370	0.218	0.382	0.400	0.408	0.256	0.408	0.408
Kleibergen-Paap rk Wald	232.464	4582.734	355.591	355.591	374.466	25.545	115.292	115.292
Hansen's *J*-statistic	1.356	2.153	2.334	2.334	6.160	3.077	1.139	1.139
	[0.852]	[0.708]	[0.675]	[0.675]	[0.188]	[0.545]	[0.888]	[0.888]
	Panel C: Newer Missions, war variable, no control for maternal height							
Christian	-0.208	-0.503	0.064	-0.024	0.396	-1.131	0.160	-0.826
	(1.340)	(0.678)	(0.913)	(0.584)	(1.133)	(1.137)	(1.074)	(1.002)
N	5537	3508	10789	12521	5569	3562	11042	12928
Mean dependent variable	0.386	0.228	0.398	0.416	0.423	0.269	0.425	0.426
Kleibergen-Paap rk Wald	4.360	49.988	2.123	8.802	14.154	2.042	4.864	1.781
Hansen's *J*-statistic	4.348	4.545	0.843	3.018	4.723	3.552	5.796	3.414
	[0.361]	[0.337]	[0.933]	[0.555]	[0.317]	[0.470]	[0.215]	[0.491]

Notes: DHS children in 1992, 1998, and 2015 in Panels A and C; in 1998 and 2015 in Panel B. Regressions include child, woman, household, state controls, controls for endogenous mission placement, month and year of conception dummies, survey year and state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. *p*-values in square brackets.

Table 4: Robustness of Instrumental variables regression results. Dependent variable - stunted

	Girls			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon
Baseline	-0.519***	-0.295**	-0.323**	-0.300**
	(0.124)	(0.134)	(0.135)	(0.167)
Per capita calories, proteins and fat	-0.544***	-0.329**	-0.352***	-0.330**
	(0.109)	(0.138)	(0.128)	(0.150)
Consumer price index - AL	-0.519***	-0.295**	-0.323**	-0.300*
	(0.124)	(0.134)	(0.135)	(0.167)
Malaria/Tuberculosis	-0.515***	-0.311**	-0.348***	-0.358***
	(0.128)	(0.134)	(0.132)	(0.132)
Infant mortality rate	-0.521***	-0.287**	-0.319**	-0.297*
	(0.124)	(0.136)	(0.134)	(0.165)
Gini coefficient of distribution of consumption	-0.519***	-0.284**	-0.322**	-0.298*
	(0.124)	(0.132)	(0.136)	(0.168)
Air temperature	-0.525***	-0.288**	-0.300**	-0.275
	(0.120)	(0.137)	(0.134)	(0.169)
Public subsidies (approved normal central assistance)	-0.517***	-0.294**	-0.324**	-0.292*
	(0.124)	(0.133)	(0.140)	(0.174)

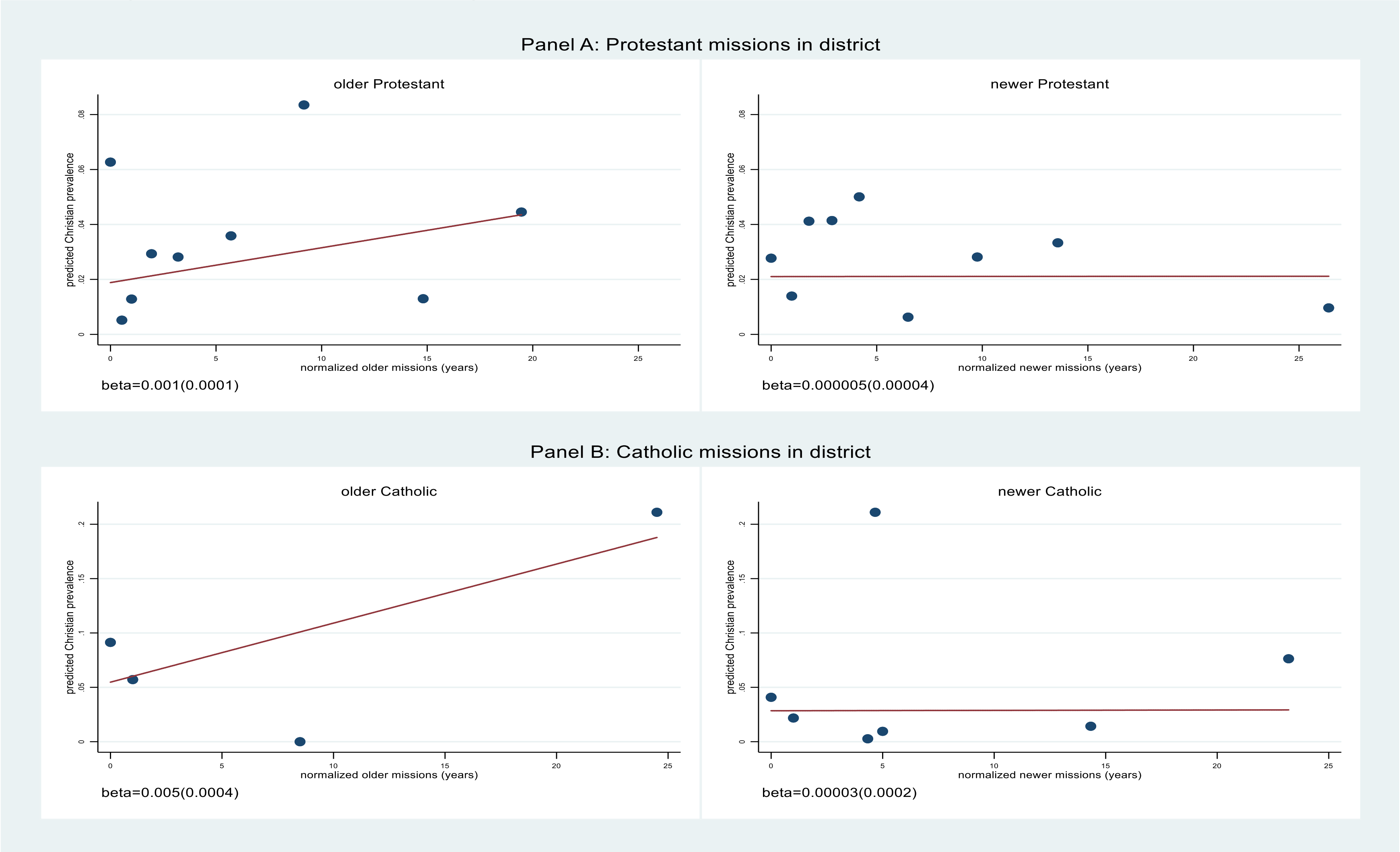
Notes: Table reports coefficients on the Christian dummy where the instruments are older mission variables and variables for robustness checks are added to the baseline model sequentially. DHS children in 1992, 1998, and 2015 (maternal height is not controlled for). Regressions include child, woman, household, state controls, controls for endogenous mission placement, month and year of conception dummies, survey year and state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is $p<0.01$, ** is $p<0.05$, * is $p<0.10$.

Table 4 continued: Robustness of Instrumental variables regression results. Dependent variable - stunted

	Girls			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon
Historical rates of diseases (cholera and fever)	-0.564***	-0.329***	-0.472***	-0.399**
	(0.179)	(0.106)	(0.181)	(0.200)
Famine related variable (population affected)	-0.501***	-0.314**	-0.296**	-0.274
	(0.139)	(0.138)	(0.148)	(0.177)
1901 Census variables (pop square mile, pop urban,	-0.433**	-0.295**	-0.279*	-0.276
prop industry, female blind, number of immigrants)	(0.187)	(0.128)	(0.154	(0.177)
Number of school children (boys, girls and total)	-0.506***	-0.349*	-0.495***	-0.326*
	(0.172)	(0.207)	(0.148)	(0.194)
Number of male/female missionaries and male/female	-0.650***	-0.562***	-0.676***	-0.572***
teachers (Catholic missions only)	(0.158)	(0.195)	(0.154)	(0.182)
Number of elementary schools (Catholic missions	-0.470***	-0.353	-0.459**	-0.376
only)	(0.126)	(0.235)	(0.192)	(0.232)
Number of schools of higher degree (Catholic only)	-0.370*	-0.306	-0.329	-0.211
and number of Catholic/non-Catholic children by gender	(0.211)	(0.277)	(0.297)	(0.355)
Historical number of hospitals, pharmacies and print	-0.425	-0.332	-0.468**	-0.393
shops	(0.270)	(0.240)	(0.202)	(0.240)

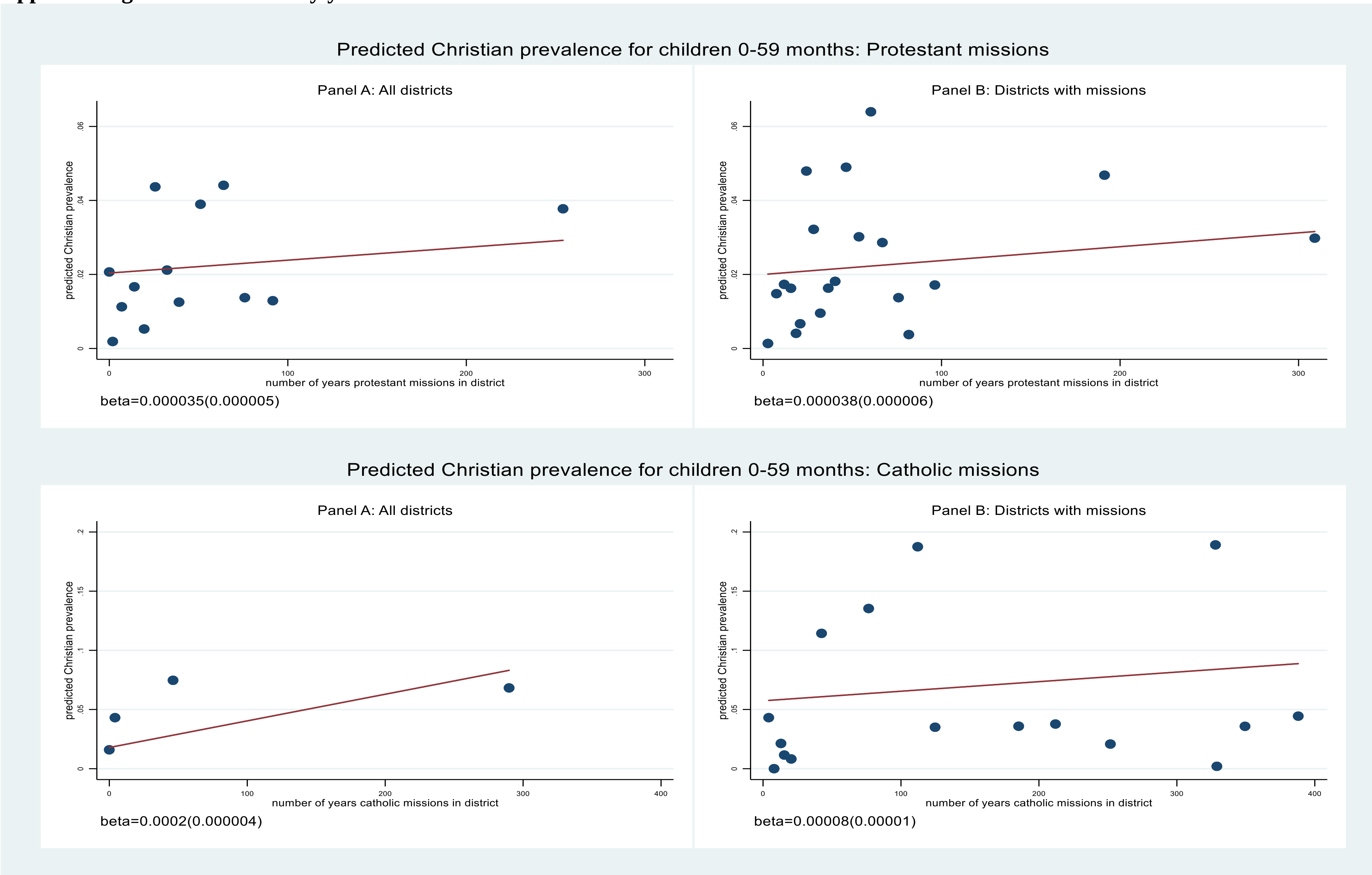
Notes: Table reports coefficients on the Christian dummy where the instruments are older mission variables and variables for robustness checks are added to the baseline model sequentially. DHS children in 1992, 1998, and 2015 (maternal height is not controlled for). Regressions include child, woman, household, state controls, controls for endogenous mission placement, month and year of conception dummies, survey year and state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.

Appendix Figure 1: Variation by normalized age in years of Protestant and Catholic missions in district



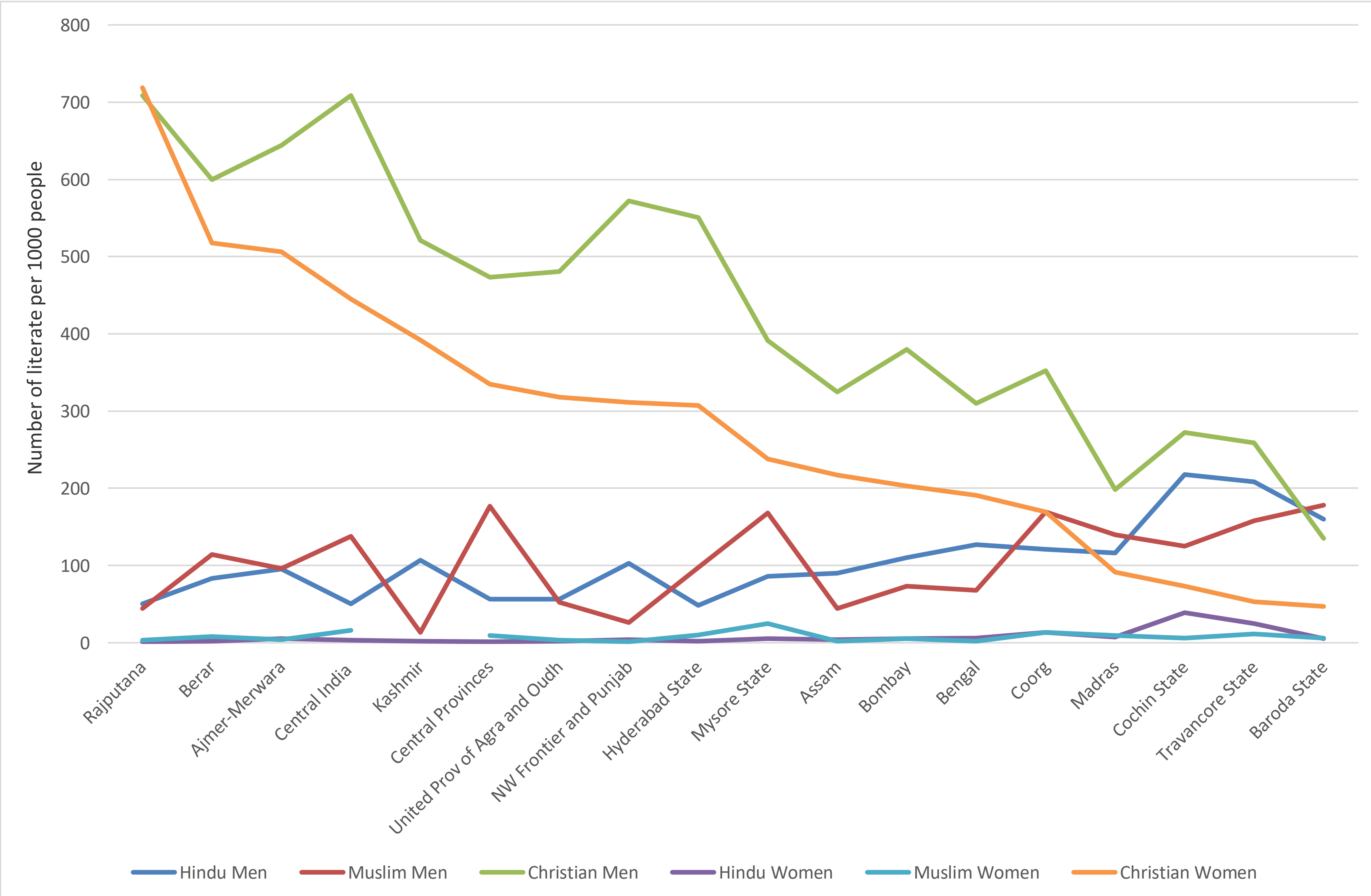
Note: Weighted Binscatter plots using DHS and historical data. Older and newer Protestant missions demarcated on the basis of the median year of opening of Protestant missions in a district. Similarly older and newer Catholic mission categorized on the basis of the median year of opening of Catholic missions in a district. Plots depict age (in year) values normalized by number of Protestant and Catholic missions of each vintage type, respectively. Standard errors in parentheses.

Appendix Figure 2: Variation by years of Protestant and Catholic missions in district



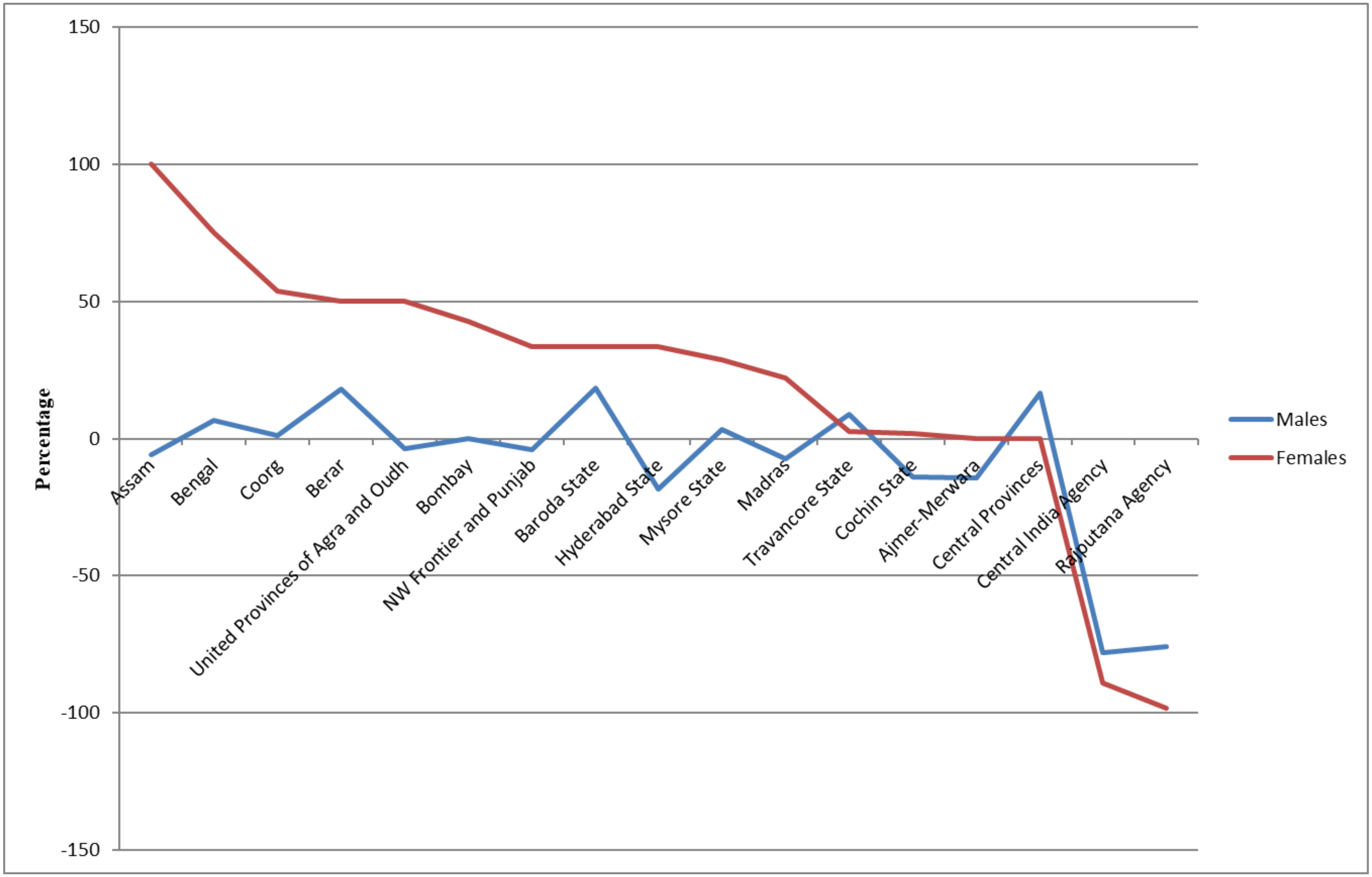
Note: Weighted Binscatter plots using DHS and historical data. Plots depict years of presence of Protestant and Catholic missions in the district. Standard errors in parentheses.

Appendix Figure 3: Number of literate males and females per 1000 by religious affiliation: 1901 Census



Note: Authors' calculations using data from the 1901 Census of India.

Appendix Figure 4: Comparison of growth rates in literacy for those over 15 years by gender: 1891-1901



Note: Authors' calculations using data from the 1981 and 1901 Censuses of India.

Appendix Table 1: Comparison of sex ratios and gender gaps in literacy and work rates by religion: Census 2011

State Name	Religion	Sex Ratio	Gender Gap in Literacy Rates	Gender Gap in Work Rates
Southern States				
Andhra Pradesh	Christian	0.944	0.025	0.227
Andhra Pradesh	Hindu	1.007	0.122	0.209
Andhra Pradesh	Muslim	1.022	0.096	0.446
Andhra Pradesh	Total	1.007	0.118	0.227
Goa	Christian	0.886	-0.032	0.319
Goa	Hindu	1.076	0.087	0.476
Goa	Muslim	1.105	0.089	0.627
Goa	Total	1.027	0.057	0.454
Karnataka	Christian	0.953	-0.004	0.316
Karnataka	Hindu	1.028	0.116	0.288
Karnataka	Muslim	1.032	0.074	0.483
Karnataka	Total	1.028	0.108	0.311
Kerala	Christian	0.951	-0.021	0.422
Kerala	Hindu	0.929	-0.018	0.388
Kerala	Muslim	0.889	-0.046	0.708
Kerala	Total	0.922	-0.026	0.455
Tamil Nadu	Christian	0.966	0.012	0.342
Tamil Nadu	Hindu	1.008	0.091	0.286
Tamil Nadu	Muslim	0.985	0.039	0.624
Tamil Nadu	Total	1.004	0.082	0.304
Northern States				
Bihar	Christian	1.047	0.123	0.296
Bihar	Hindu	1.095	0.210	0.443
Bihar	Muslim	1.062	0.170	0.513
Bihar	Total	1.089	0.204	0.453
Delhi	Christian	0.957	-0.007	0.213
Delhi	Hindu	1.156	0.133	0.697
Delhi	Muslim	1.170	0.156	0.827

Delhi	Total	1.152	0.130	0.705
Haryana	Christian	1.082	0.083	0.421
Haryana	Hindu	1.142	0.177	0.518
Haryana	Muslim	1.117	0.339	0.562
Haryana	Total	1.138	0.180	0.527
Himachal Pradesh	Christian	1.180	0.137	0.347
Himachal Pradesh	Hindu	1.025	0.090	0.142
Himachal Pradesh	Muslim	1.168	0.213	0.316
Himachal Pradesh	Total	1.029	0.092	0.148
Jammu and Kashmir	Christian	1.526	0.342	0.648
Jammu and Kashmir	Hindu	1.258	0.232	0.581
Jammu and Kashmir	Muslim	1.070	0.194	0.424
Jammu and Kashmir	Total	1.125	0.207	0.478
Punjab	Christian	1.095	0.132	0.568
Punjab	Hindu	1.138	0.124	0.649
Punjab	Muslim	1.160	0.176	0.671
Punjab	Total	1.117	0.116	0.632
Uttar Pradesh	Christian	1.053	0.104	0.404
Uttar Pradesh	Hindu	1.103	0.199	0.500
Uttar Pradesh	Muslim	1.067	0.167	0.584
Uttar Pradesh	Total	1.096	0.193	0.515
Uttarakhand	Christian	1.060	0.062	0.352
Uttarakhand	Hindu	1.024	0.116	0.257
Uttarakhand	Muslim	1.110	0.176	0.752
Uttarakhand	Total	1.038	0.123	0.318
Eastern States				
Chhattisgarh	Christian	0.972	0.053	0.109
Chhattisgarh	Hindu	1.010	0.150	0.168
Chhattisgarh	Muslim	1.050	0.095	0.533
Chhattisgarh	Total	1.009	0.145	0.171
Jharkhand	Christian	0.974	0.069	0.082

Jharkhand	Hindu	1.070	0.196	0.326
Jharkhand	Muslim	1.060	0.175	0.378
Jharkhand	Total	1.054	0.188	0.286
Orissa	Christian	0.967	0.111	0.126
Orissa	Hindu	1.023	0.129	0.363
Orissa	Muslim	1.046	0.092	0.714
Orissa	Total	1.022	0.129	0.357
West Bengal	Christian	0.980	0.063	0.271
West Bengal	Hindu	1.054	0.104	0.526
West Bengal	Muslim	1.052	0.083	0.605
West Bengal	Total	1.053	0.099	0.537
Western States				
Gujarat	Christian	1.021	0.058	0.243
Gujarat	Hindu	1.092	0.149	0.432
Gujarat	Muslim	1.059	0.108	0.688
Gujarat	Total	1.088	0.143	0.454
Madhya Pradesh	Christian	0.975	0.032	0.163
Madhya Pradesh	Hindu	1.077	0.182	0.263
Madhya Pradesh	Muslim	1.058	0.122	0.503
Madhya Pradesh	Total	1.074	0.175	0.276
Maharashtra	Christian	0.970	0.002	0.286
Maharashtra	Hindu	1.078	0.116	0.289
Maharashtra	Muslim	1.098	0.100	0.599
Maharashtra	Total	1.076	0.110	0.320
Rajasthan	Christian	1.028	0.084	0.182
Rajasthan	Hindu	1.079	0.243	0.207
Rajasthan	Muslim	1.057	0.232	0.369
Rajasthan	Total	1.077	0.238	0.224

Summary

Region	**Religion**	**Sex Ratio**	**Gender Gap in Literacy Rates**	**Gender Gap in Work Rates**
East	Christian	0.973	0.066	0.117
East	Hindu	1.039	0.139	0.344
East	Muslim	1.051	0.094	0.569
North	Christian	1.071	0.113	0.378
North	Hindu	1.121	0.155	0.509
North	Muslim	1.114	0.176	0.573
South	Christian	0.951	-0.004	0.319
South	Hindu	1.008	0.091	0.288
South	Muslim	1.022	0.074	0.624
West	Christian	0.998	0.045	0.212
West	Hindu	1.079	0.165	0.276
West	Muslim	1.059	0.115	0.551

Notes: Authors' calculations using data from the 2011 Census of India. The gender gap measures differences between male and female rates.

Appendix Table 2: Summary statistics

	Non-Christian		Christian		Difference
Child-specific	mean	std. dev	Mean	std. dev	
Height-for-age is below 2 std. dev of mean (stunted)	0.424	0.001	0.346	0.003	0.078***
Dummy for male child	0.521	0.001	0.506	0.003	0.015***
Order of birth	2.442	0.003	2.710	0.012	-0.267***
Dummy for child had diarrhea in last two weeks	0.107	0.001	0.082	0.002	0.024***
Dummy for child had a cough in the last two weeks	0.236	0.001	0.272	0.004	-0.036***
Dummy for child had a fever in the last two weeks	0.162	0.001	0.154	0.003	0.008***
Age of child (months)	27.866	0.033	27.760	0.113	0.106
Dummy for child was nursed	0.946	0.000	0.941	0.002	0.005***
Dummy for child was exposed to Ramadan *in utero*	0.024	0.000	0.000	0.000	0.024***
Woman-specific					
Dummy for had prenatal doctor check-ups	0.512	0.001	0.577	0.004	-0.065***
Dummy for had antenatal doctor check-up	0.450	0.001	0.326	0.003	0.124***
Age of the woman (years)	26.788	0.010	28.936	0.041	-2.148***
Dummy for woman is literate	0.552	0.001	0.780	0.003	-0.229***
Dummy for woman has no education	0.393	0.001	0.176	0.003	0.216***
Dummy for woman has some or all primary school	0.144	0.001	0.210	0.003	-0.066***
Dummy for woman has some secondary school	0.312	0.001	0.458	0.003	-0.146***
Dummy for woman has completed sec. school or higher	0.151	0.001	0.156	0.002	-0.005*
Dummy for child was large size at birth	0.165	0.001	0.173	0.003	-0.008***
Dummy for child was average size at birth	0.688	0.001	0.716	0.003	-0.028***
Dummy for child was small size at birth	0.147	0.001	0.111	0.002	0.036***
Mother's height (centimeters)	151.611	0.013	151.326	0.041	0.285***
Age at first birth (years)	20.539	0.007	21.818	0.030	-1.279***
Age at first marriage (years)	18.311	0.007	20.556	0.031	-2.245***
Dummy for woman is currently working	0.245	0.001	0.344	0.006	-0.099***
Number of children five years old and under	1.911	0.002	1.824	0.005	0.087***
Woman goes to the cinema at least once a month	0.063	0.000	0.027	0.001	0.036***
Woman listens to radio every week	0.281	0.001	0.333	0.005	-0.053***
Husband's age (years)	31.754	0.023	33.454	0.091	-1.700***
Dummy for husband has no education	0.269	0.001	0.159	0.004	0.111****
Dummy for husband has some or all primary school	0.194	0.001	0.228	0.005	-0.034***
Dummy for husband has some secondary school	0.329	0.002	0.399	0.006	-0.071***
Dummy for husband has completed. sec. school or higher	0.207	0.001	0.211	0.005	-0.004
Dummy for husband works outside the home	0.969	0.001	0.961	0.002	0.008***
Household-specific					
Dummy for household has a male head	0.895	0.001	0.874	0.002	0.022***
Age of household head (years)	43.971	0.030	42.476	0.100	1.496***
Rural household	0.752	0.001	0.751	0.003	0.001
Dummy for household owns a car or a refrigerator	0.032	0.000	0.056	0.002	-0.024***
Dummy for household owns a bicycle	0.502	0.001	0.175	0.003	0.327***

Dummy for household owns a motorcycle	0.306	0.001	0.185	0.003	0.121***
Dummy for household has electricity	0.774	0.001	0.855	0.002	-0.081***
Source of drinking water: piped water	0.359	0.001	0.511	0.003	-0.152***
Source of drinking water: ground water	0.457	0.001	0.090	0.002	0.367***
Source of drinking water: well water	0.132	0.001	0.155	0.002	-0.023***
Source of drinking water: surface water	0.034	0.000	0.209	0.003	-0.175***
Source of drinking water: rainwater, tanker truck, other	0.018	0.000	0.035	0.001	-0.017***
Toilet facility is: flush toilet	0.364	0.001	0.541	0.003	-0.177***
Toilet facility is: pit toilet/latrine	0.081	0.001	0.298	0.003	-0.217***
Toilet facility is: no facility/bush/field	0.547	0.001	0.145	0.002	0.402***
Toilet facility is: other	0.008	0.000	0.016	0.001	-0.008***
Years lived in place of residence	10.016	0.022	18.823	0.135	-8.807***
State-specific					
Per capita GDP	9503.008	8.959	9983.916	20.598	-480.908***
State produces greater than mean level of wheat or rice	0.787	0.002	0.270	0.007	0.516***
Rainfall (in millimeters $x10^{-2}$)	0.223	0.002	0.382	0.008	-0.148***
Number of lit. females per 1000 of population (1901)	5.930	0.008	5.137	0.023	0.793***
Number of literate males per 1000 of population (1901)	93.534	0.061	75.958	0.159	17.576***
Number of cities at or above 1500 ft in dist. as of 1893	4.569	0.016	0.960	0.019	3.609***
Number of cities on railway lines in district as of 1893	2.732	0.012	0.234	0.007	2.499***
Number of cities on navigable canals in dist. as of 1893	1.238	0.006	0.300	0.009	0.937***
Mission-specific					
No. of Protestant missions established before med. year of open.	0.816	0.003	0.589	0.009	0.227***
Diff b/w latest and earliest years of opening of older Prot. missions	7.852	0.066	4.683	0.186	3.169***
No. of Protestant missions established after median year of opening	1.825	0.003	1.660	0.008	0.165***
Diff b/w latest and earliest years of opening of newer Prot. missions	6.962	0.029	3.400	0.063	3.562***
No. of Catholic missions established before median year of opening	0.065	0.001	0.153	0.003	-0.088***
Diff b/w latest and earliest years of opening of older Cath missions	0.307	0.009	0.640	0.048	-0.333***
No. of Catholic missions established after median year of opening	0.521	0.002	0.379	0.006	0.142***
Diff b/w latest and earliest years of opening of newer Cath. missions	0.903	0.022	1.984	0.162	-1.081***
Total no. of wars miss. establishing countries engaged in as of 1910	3.946	0.009	4.372	0.027	-0.426***
Variables used in robustness checks					
Per capita calories (in kilo calories per day)	2215.154	0.248	2082.241	0.542	132.912***
Per capita protein intake (in grams per day)	61.829	0.013	53.638	0.023	8.191***
Per capita fat intake (in grams per day)	45.889	0.026	30.756	0.057	15.132***
CPI for agricultural laborers (base: 1986-1987=100)	596.924	0.537	584.218	2.068	12.706***
Number of malaria/TB deaths normalized by state pop.	0.002	0.000	0.001	0.000	0.000***
Infant mortality rate (per 1000 live births)	76.531	0.092	61.074	0.366	15.456***
Gini coefficient of distribution of consumption	0.306	0.000	0.239	0.000	0.066***

Average air temperature (in degrees Celsius)	24.275	0.006	19.973	0.030	4.302***
Public subsidies (approved normal central assistance)	2247.576	6.799	635.308	16.642	1612.268***
Ratio of deaths from cholera per 1000 people	1.769	0.004	2.666	0.011	-0.898***
Ratio of deaths from fever per 1000 people	20.693	0.013	14.545	0.040	6.148***
Average number of people affected in famines	8985960	38885.39	1.28e+07	255375.6	-3851135***
Average population per square mile (1901 census)	245.537	0.235	132.321	0.503	113.216***
Average pop. per square mile in cities (1901 census)	118.338	0.159	40.573	0.218	77.765***
Prop. supported by industry per 1000 of pop. (1901)	149.805	0.064	88.492	0.181	61.313***
No. of fem. afflicted by blind. per 1000 of pop. (1901)	139.034	0.171	91.342	0.181	47.691***
No. per 10000 of pop. immigrants where enumerated (1901)	1351.456	1.403	2045.665	1.351	-694.209***
Number of hospitals in district	3.367	0.025	2.704	0.088	0.663***
Number of pharmacies in district	5.347	0.031	4.217	0.111	1.130***
Number of print shops in district	0.776	0.006	0.777	0.022	-0.001
Number of native/indigenous Laien brothers	11.392	0.109	10.440	0.391	0.952**
Number of native/indigenous Schwestern sisters	83.062	0.776	74.553	2.774	8.510***
Number of male katechisten	113.339	0.978	105.707	3.516	7.633**
Number of female katechisten	4.271	0.039	3.764	0.139	0.507***
Indigenous male teachers who are not catechists	175.253	1.582	168.032	5.672	7.222***
Indigenous female teachers who are not catechists	99.042	0.912	89.252	3.269	9.790***
Number of boys in elementary schools (Protestant & Catholic)	3416.142	30.105	3229.021	108.882	187.121*
Number of girls in elementary schools (Protestant & Catholic)	1666.857	14.622	1551.994	53.068	114.863**
Number of all children in elem. schools (Protestant & Catholic)	9577.352	84.165	8941.163	304.181	636.189**
Number of elementary schools	125.066	1.086	124.534	3.929	0.532
Number of schools of higher degrees	19.509	0.174	17.319	0.623	2.190***
Number of Catholic boys in schools of higher degrees	1019.421	8.833	884.832	31.569	134.589***
Number of non-Cath boys in schools of higher degrees	631.028	5.531	554.071	19.823	76.957***
Number of Catholic girls in schools of higher degrees	433.231	3.566	365.426	12.603	67.804***
Number of non-Cath girls in schools of higher degrees	131.544	1.062	114.860	3.775	16.684***

Notes: Sample includes DHS children ages 0 – 59 months in 1992, 1998, and 2015. Statistics are weighted to national levels using weights provided by the DHS. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.

Appendix Table 3: Strength and validity of instruments. Dependent variable – Christian affiliation

	6-23 months	0-11 months	0-36 months	0-59 months
Number of older Protestant missions/1000	-0.997	-1.623	-1.145	-0.278
	(2.834)	(2.559)	(2.630)	(2.342)
Years older Protestant missions/1000	-0.035	-0.030	-0.031	-0.020
	(0.023)	(0.033)	(0.026)	(0.018)
Number of newer Protestant missions/1000	5.105	6.202*	5.351	4.756
	(3.737)	(3.407)	(3.419)	(3.036)
Years newer Protestant missions/1000	-0.075	-0.043	-0.111	-0.131
	(0.181)	(0.155)	(0.155)	(0.145)
Number of older Catholic missions/1000	10.918	1.736	10.905	10.765
	(8.177)	(6.919)	(7.996)	(7.533)
Years older Catholic missions/1000	1.818***	1.777***	1.533***	1.377**
	(0.437)	(0.434)	(0.433)	(0.484)
Number of newer Catholic missions/1000	-0.266	-4.354	-1.744	-1.733
	(3.695)	(4.317)	(3.811)	(3.530)
Years newer Catholic missions/1000	0.522***	0.518***	0.478***	0.486***
	(0.086)	(0.121)	(0.092)	(0.092)
Total number of wars mission establishing	-0.498	0.088	-0.409	-0.450
countries were engaged in as of 1910/1000	(0.643)	(0.641)	(0.505)	(0.486)
F-statistic: All variables	1110.280	2354.910	284.890	150.800
	[0.000]	[0.000]	[0.000]	[0.000]
F-statistic: Older missions variables and	19.710	10.920	8.750	6.790
total number of wars	[0.000]	[0.000]	[0.000]	[0.001]
F-statistics: Newer missions variables and	52.910	92.200	32.770	26.170
total number of wars	[0.000]	[0.000]	[0.000]	[0.000]
Includes geographic, rail-line, navigable canal, and historic literacy controls	YES	YES	YES	YES
N	64942	41104	129656	194907
Mean dependent variable	0.022	0.022	0.022	0.022

Notes: Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. *p*-values in square brackets. Statistics are weighted to national levels using weights provided by the DHS.

Appendix Table 4: Comparison with Hindu and Muslim children. Dependent variable - stunted

	Hindu girls				Muslim girls			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon	6-23 mon	0-11 mon	0-36 mon	0-59 mon
	Panel A: Instrumental variables regression results							
Christian	-0.473***	-0.374**	-0.348***	-0.316**	-1.458***	0.091	-0.162	-0.278
	(0.147)	(0.149)	(0.105)	(0.139)	(0.560)	(0.367)	(0.178)	(0.172)
N	4719	2980	9164	10626	1155	723	2274	2631
Kleibergen-Paap rk Wald	208.835	337.815	86.413	68.730	9.502	49.642	22.393	16.221
Hansen's *J*-statistic	3.588	3.960	1.639	4.460	5.660	3.969	5.541	4.353
	[0.465]	[0.411]	[0.802]	[0.347]	[0.226]	[0.410]	[0.236]	[0.360]

Notes: DHS children in 1992, 1998, and 2015 in Panel A; no controls for maternal height in order to maintain sample sizes. Regressions include child, woman, household, state controls, month and year of conception dummies, survey year dummies, state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.

Appendix Table 5: Comparison of rural and urban children. Dependent variable - stunted

	Rural girls				Urban girls			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon	6-23 mon	0-11 mon	0-36 mon	0-59 mon
	Panel A: Instrumental variables regression results							
Christian	-0.466**	-0.160	-0.481***	-0.511***	3.162	0.973	-2.156*	-1.479
	(0.184)	(0.121)	(0.131)	(0.152)	(5.145)	(1.949)	(1.130)	(1.007)
N	4098	2627	8015	9247	1439	881	2774	3274
Kleibergen-Paap rk Wald	129.919	339.692	127.523	124.866	0.596	2.545	5.990	6.690
Hansen's *J*-statistic	1.275	5.368	3.478	4.079	3.461	3.993	1.353	1.756
	[0.866]	[0.252]	[0.482]	[0.395]	[0.484]	[0.407]	[0.852]	[0.781]

Notes: DHS children in 1992, 1998, and 2015 in Panel A; sample includes Hindu, Muslim and Christian children; no controls for maternal height in order to maintain sample sizes. Regressions include child, woman, household, state controls, month and year of conception dummies, survey year dummies, state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.

Appendix Table 6: Comparison with Hindu children by caste. Dependent variable - stunted

	Lower-caste Hindu girls				Upper-caste Hindu girls			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon	6-23 mon	0-11 mon	0-36 mon	0-59 mon
	Panel A: OLS regression results							
Christian	-0.111	-0.066	-0.124*	-0.114*	-0.050	0.020	-0.020	-0.014
	(0.091)	(0.066)	(0.067)	(0.061)	(0.050)	(0.051)	(0.054)	(0.046)
N	1715	1068	3320	3744	3341	2107	6493	7618
	Panel B: Instrumental variables regression results							
Christian	-0.529**	-0.538***	-0.358***	-0.334***	-0.503***	-0.165	-0.247*	-0.200
	(0.236)	(0.156)	(0.099)	(0.107)	(0.112)	(0.120)	(0.134)	(0.174)
N	1715	1068	3320	3744	3341	2107	6493	7618
Kleibergen-Paap rk Wald	77.483	196.742	338.542	317.614	207.088	281.572	116.665	78.690
Hansen's *J*-statistic	0.479	9.743	2.716	1.565	2.313	2.811	0.786	3.106
	[0.976]	[0.045]	[0.606]	[0.815]	[0.678]	[0.590]	[0.940]	[0.540]

Notes: DHS children in 1992, 1998, and 2015 in Panels A & B; no controls for maternal height in order to maintain sample sizes. Regressions include child, woman, household, state controls, month and year of conception dummies, survey year dummies, state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is $p<0.01$, ** is $p<0.05$, * is $p<0.10$.

Appendix Table 7: Instrumental variables regression results. Dependent variable - stunted

	No control for mother's height				Control for mother's height			
	Girls		Boys		Girls		Boys	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Dummy for Christian	-0.300*	0.172	1.711	1.896	-0.471**	0.207	2.257	2.201
Order of birth	0.011	0.008	0.014**	0.006	0.010	0.009	0.007	0.007
Dummy for child had diarrhea in last two weeks	0.013	0.018	0.019*	0.011	0.031	0.018	0.024	0.016
Dummy for child had a cough in the last two weeks	0.019*	0.011	-0.022*	0.011	0.020	0.012	-0.038**	0.015
Dummy for child had a fever in the last two weeks	0.005	0.010	0.015	0.010	0.009	0.015	0.002	0.015
Age of child (months)	0.006	0.005	0.015	0.010	0.011	0.010	0.000	0.012
Dummy for child was nursed	0.001	0.032	-0.039	0.028	0.003	0.029	-0.047*	0.025
Dummy for child was exposed to Ramadan *in utero*	0.034	0.026	0.062	0.058	0.008	0.049	0.087**	0.044
Dummy for had prenatal doctor check-ups	-0.031**	0.013	-0.021**	0.009	-0.029*	0.015	-0.027	0.017
Dummy for had antenatal doctor check-up	-0.005	0.014	0.021	0.017	0.010	0.013	0.004	0.025
Age of the woman (years)	-0.004	0.002	-0.008**	0.003	-0.003	0.003	-0.007**	0.003
Mother's height (centimeters)					-0.010***	0.002	-0.008***	0.002
Dummy for woman is literate	-0.064**	0.025	-0.063**	0.029	-0.095	0.023	-0.065	0.039
Dummy for woman has some or all primary school	0.009	0.014	0.016	0.027	0.005	0.015	0.016	0.033
Dummy for woman has some secondary school	-0.012	0.020	-0.031	0.033				
Dummy for woman has completed sec. school or higher	-0.080*	0.041	-0.140**	0.055				
Dummy for child was large size at birth	-0.105***	0.012	-0.127***	0.021	-0.069***	0.019	-0.101**	0.036
Dummy for child was average size at birth	-0.052***	0.007	-0.070***	0.013	-0.043**	0.019	-0.062**	0.023
Age at first birth (years)	-0.003	0.005	0.003	0.003	-0.002	0.007	0.008**	0.003
Age at first marriage (years)	-0.002	0.003	-0.007	0.006	-0.004	0.005	-0.004	0.006
Dummy for woman is currently working	0.011	0.012	0.002	0.021	-0.006	0.012	0.000	0.015
Number of children five years old and under	-0.001	0.005	0.005	0.007	0.002	0.005	-0.003	0.009
Dummy for household has a male head	0.010	0.025	-0.005	0.037	0.029	0.035	-0.003	0.047
Age of household head (years)	0.000	0.000	0.000	0.001	0.001**	0.001	-0.001	0.001
Woman goes to the cinema at least once a month	-0.034*	0.018	-0.043	0.033	-0.011	0.017	-0.115***	0.037
Woman listens to radio every week	-0.001	0.014	0.005	0.012	0.033	0.021	-0.015	0.014
Husband's age (years)	-0.002	0.001	0.000	0.001	-0.003***	0.001	0.001	0.001

Dummy for husband has some or all primary school	-0.003	0.012	-0.023	0.015	-0.022**	0.009	-0.042**	0.019
Dummy for husband has some secondary school	-0.011	0.017	-0.051***	0.017	-0.012	0.012	-0.074**	0.033
Dummy for husband has completed sec. school or higher	-0.018	0.019	-0.067***	0.014	-0.042*	0.022	-0.059**	0.030
Dummy for husband works outside the home	0.027	0.036	0.011	0.038	0.031	0.051	-0.011	0.067
Rural household	0.011	0.016	0.022	0.025	0.011	0.021	0.032	0.037
Dummy for household owns a car or a refrigerator	0.040	0.052	0.098	0.103	0.045	0.119	0.016	0.058
Dummy for household owns a bicycle	-0.016	0.011	-0.006	0.010	-0.031*	0.017	0.005	0.014
Dummy for household owns a motorcycle	-0.044**	0.017	-0.083	0.052	0.020	0.026	-0.084***	0.027
Dummy for household has electricity	-0.007	0.013	-0.010	0.018	-0.007	0.023	-0.010	0.023
Source of drinking water: ground water	-0.001	0.015	0.005	0.028	0.001	0.022	0.017	0.035
Source of drinking water: well water	-0.025*	0.013	-0.018	0.021	-0.026	0.028	-0.043	0.028
Source of drinking water: surface water	0.003	0.032	-0.015	0.035	-0.003	0.046	-0.028	0.061
Source of drinking water: rainwater, tanker truck, other	-0.033	0.041	0.043	0.046	0.026	0.156	0.098	0.103
Toilet facility is: flush toilet	0.018	0.055	-0.057	0.091	0.043	0.078	-0.126	0.263
Toilet facility is: pit toilet/latrine	0.068	0.058	-0.010	0.098	0.133	0.080	-0.065	0.251
Toilet facility is: no facility/bush/field	0.076	0.060	-0.016	0.094	0.145*	0.081	-0.009	0.247
Years lived in place of residence	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
Per capita GDP	0.000***	0.000	0.000	0.000	0.000***	0.000	0.000	0.000
State produces greater than mean level of wheat or rice	0.116***	0.028	0.178***	0.024	0.545***	0.074	1.626	1.734
Rainfall (in millimeters x10^{-2})	-0.006	0.009	-0.018***	0.005	-0.007	0.018	-0.003	0.006
Number of literate females per 1000 of population (1901)	-0.002	0.007	-0.014	0.014	0.010**	0.005	-0.006	0.018
Number of literate males per 1000 of population (1901)	0.002	0.001	0.002	0.002	-0.001	0.001	0.000	0.003
Number of cities at or above 1500 ft in district as of 1893	0.001	0.002	-0.001	0.002	0.000	0.002	-0.001	0.002
Number of cities on railway lines in district as of 1893	-0.004***	0.001	-0.003***	0.000	-0.003**	0.001	-0.002	0.001
Number of cities on navigable canals in district as of 1893	0.002**	0.001	-0.003	0.003	0.006	0.004	0.000	0.004
N	12521		12928		4895		5046	
Kleibergen-Paap rk Wald	51.501		54.330		355.591		115.292	
Hansen's *J*-statistic	4.690 [0.321]		4.309 [0.366]		2.334 [0.675]		1.139 [0.888]	

Notes: DHS children in 1992, 1998, and 2015 in first four cols; in 1998 and 2015 in last four cols. Results correspond to those in Panels A and B of Table 3 for children 0-59 mon. Regressions include child, woman, household, state controls, controls for endogenous mission placement, month and year of conception dummies, survey year and state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10. *p*-values in square brackets.

Appendix Table 8: Comparison by birth order. Dependent variable - stunted

	Girls				Boys			
	6-23 mon	0-11 mon	0-36 mon	0-59 mon	6-23 mon	0-11 mon	0-36 mon	0-59 mon
	Panel A: First or second birth order							
Christian	-0.308	-0.365	-0.488**	-0.423*	1.079	0.556*	1.799**	1.083
	(0.296)	(0.241)	(0.227)	(0.227)	(1.258)	(0.298)	(0.819)	(0.816)
	Panel B: Third or higher birth order							
Christian	-0.908***	-1.532	-0.920**	-0.920**	0.960	-0.451	0.363	0.363
	(0.252)	(1.758)	(0.375)	(0.375)	(1.085)	(0.442)	(0.957)	(0.957)

Notes: DHS children in 1992, 1998, and 2015; no controls for maternal height in order to maintain sample sizes. Regressions include child, woman, household, state controls, month and year of conception dummies, survey year dummies, state dummies, and their interactions. Standard errors in parentheses are robust and clustered at the state level. The notation *** is p<0.01, ** is p<0.05, * is p<0.10.